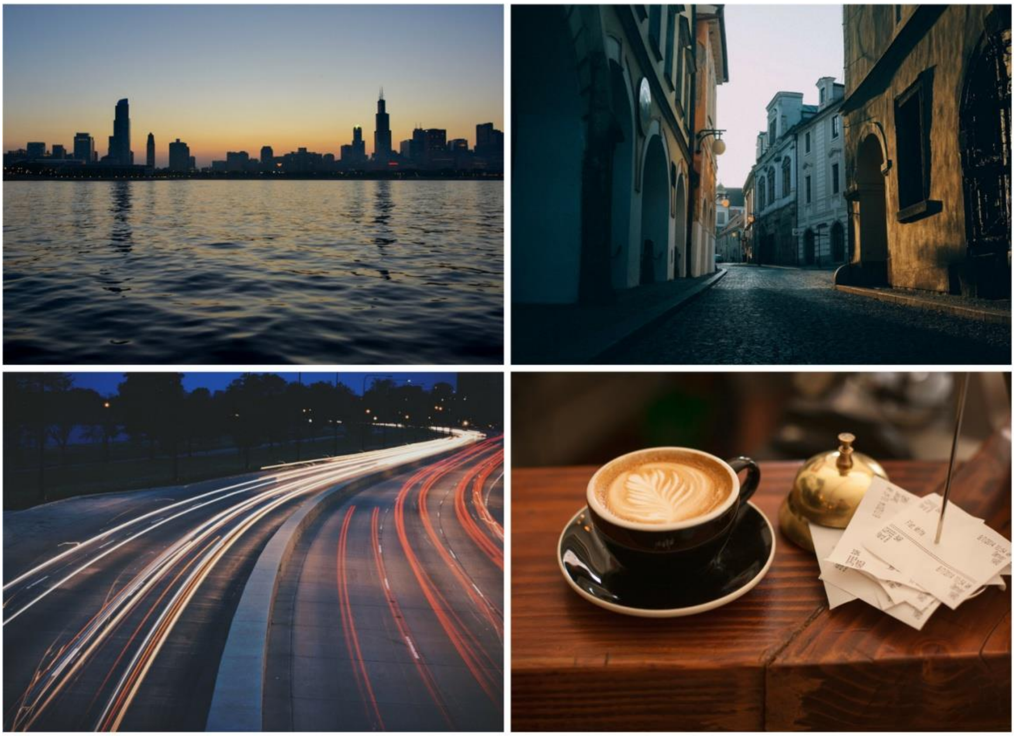
Social Disruption

ANA PAULA MARTINS



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Preface

This book inspects the interdependencies among social disruption signals and their relationship to economic conditions as emerging from available Portuguese time series. Comparisons with international cross-section evidence are provided.

Three types of innovations are presented: firstly, it searches for interactions – and common causes - between indicators of general aggressiveness or pro-activity that include accident, suicide, divorce rates and armed forces along with criminality records.

Secondly, it illustrates theoretical applications of principal components: in time series filtering; in cross-correlation and corresponding significance-level probabilities analysis; in the treatment of missing cases.

Finally, estimators based on observational replicability of second moments are proposed.

Contents

Introduction

Crime and violence has notably increased over the last decade. The fact is particularly disquieting in two directions: on the one hand, they have been increasing in most developed societies - specially in the first half of the nineties [1]; even in the US, where, according to some indicators, crime was stabilized, that seems to have been achieved at the cost of a rising average stock of prison inmates [2]. On the other, that rise seems to accompany development horizontally as well: for a cross-section of 66 countries [3], registered crimes per inhabitant exhibit positive and significant correlation with measures of per capita income.

One can argue that wealthier countries provide higher potential loots – they would be the ones that would get more "mugged" or, at least, suffer more attempts, and would be expected to spend more, proportionately more, in surveillance and security. They probably have a more sophisticated legal system [4]: what Western societies consider crime may be more stringent than what less

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[1] See Entorf & Spengler (2002), for example.

[2] See Freeman (1999).

[3] Based on the UN's Human Development Reports - see Table A.1, Appendix A.

[4] Without presuming too much, we note, for example, that if we look at the period 1981-1996, total labor accidents seem to exhibit on average a decreasing trend in Portugal, while trialed incidents (leaded one period) appear to be rising – see Fig. I.10 and I.12 in section I below. One could argue that appeal to courts would have implied higher safety-keeping at workplaces; yet the former movement still had to be explained.

advanced economies do. Also, enforcement may be less effective in the latter – unlawful behavior is, thus, not always reported there. Finally, criminal records may just be less comprehensive in poorer countries for purely statistical reasons. Nevertheless, - apparently - we are still left with the empirical regularity that we develop along with crime.

Social and economic research has simultaneously observed and studied the subject, in the aim to distinguish its causes and prevent, dissuade or remedy its disruptive consequences. This research subscribes such line of work, but searching for common factors in different indicators of social unrest.

The empirical literature on crime is vast. One can distinguish studies that inspect criminality among various subgroups; and studies that compare or inspect different types of infractions. As explanatory candidates one finds economic variables, demographic characteristics, law enforcement and crime prevention, and psychological factors and even tastes. Some studies use time series (more or less) aggregate data, others cross-section microeconomic information; others compare country differences, or urban and regional incidence.

Shaping empirical research, theoretical hypothesis were advanced. Hence, crime has been modelled within economic science; most economic literature focuses on individual (rational) optimisation: opportunities, incentives, and (implicit) restrictions imposed by law enforcement deterrent-schemes, with individual preferences towards risk in the background [5]. Crime arises in the presence of high loots, poor penalty systems, and, possibly, low legal income opportunities. This line of reasoning can be said to apply more closely to property crimes. Criminal behavior has also been explained on sociological grounds: strain theory and social disorganization theory [6] are two pertinent branches of study. The former highlights the role of frustration (for example, by failure to climb in the social ladder) and alienation from society as factors affecting the decision to commit a crime – it would more appropriately address violent crime. The latter studies how informal social arrangements can be more or less dissuasive/deterrent of deviant behavior; community and family stability are important, gang formation/affiliation, for example,

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[5] See Polinsky & Shavell (2000) and Garoupa (1997) for recent surveys. More distantly, Cameron (1988) and Heineke (1978).

[6] See Kelly (2000) for a brief overview.

arising as a substitute [7]. Finally, we can add (other) demographic – for successful crimes, physical strength is needed and this would explain male and young adults' higher incidence, and elderly and women as best targets - and cultural [8] and institutional factors – including religious affiliation, some partly explaining crime persistence.

As crime, other events involve losses, human losses or suffering, some (also) resulting in tragic endings. Our purpose was to follow a transversal path in which we compare and confront the behaviour of crime with other indicators of general aggressiveness and grief. Because if crime is just one signal similar to many others of social discomfort or discontent, then the methods used to heal other sores could also be successfully applicable. As such, we devoted some attention to road, labor and other accidents, suicides and divorces – the latter is sometimes used as explanatory variable in crime regressions -, strike activity; events that share similar consequences – in general, social and economic losses in which the human element or evaluation is primordial – with criminal activity, and thus, eventually, may entail similar causes. We also added the importance of military forces to the analysis, even if their contribution can have a deterrent effect – as it showed in some of the results.

This first line of inquiry led us, of course, to methods of composite treatment of a large set of variables – to principal components and factor analysis. We tried to infer a few common factors to which each of the variables would be more related to, and to give some interpretation to those factors. Additionally, we went further on the exploration of the pattern of the cross-correlations between the variables, applying principal components to a set of variables constructed to express the correlation pattern with the rest of the variables in the sample. Theoretical considerations on the inference based on those methods, and others with similar philosophy defined over the cross-product of observations (and not only of moments) of the different variables were advanced.

We relied on two different data sets. One comprises a cross-section of countries for which we could collect a consistent data set of the required variables. Unfortunately, we ended up with very

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[7] Social interaction is the main subject of the research of Glaeser, Sacerdote & Scheinkman (1996), for example. They conclude, after an appropriate index, it to be important and "highest in petty crimes, moderate in more serious crimes, and almost negligible in murder and rape."

[8] Even if these can subscribe to social disorganization theories.

few. The other comprises Portuguese evidence – long-run time series, collected in different sources of official publications. Not all series are very long and we could not always obtain the usually recommended 30 observations. Yet this research can be seen as tentative, and relies on a large horizontal spectrum of variables, even if not vertical. Some attempts were, nevertheless, pursued in order to deal with missing observations.

The time series treatment was more refined. On the one hand, we inspected unit roots in our data. We smoothed the data using the first principal component of leads and lags of each series – which if components are lagged (i.e., we extract pc from the series and its two first lags) can be seen as a univariate application of Stock & Watson (1998) proposed estimation strategy for multivariate dynamic factor models[9] – and confronted results in original with the smoothed (we could say "filtered") series. The properties of principal component decomposition in the treatment of time series data have been noticed before – see reference in Dhrymes (1974) to Stone (1947) study; in particular, it decomposed in some cases to vectors that are in line to specific variables, namely trend. We decomposed both the original and smoothed series and obtained vectors that when plotted against time exhibited the first one a pure trend, the others, a definite cyclical design.

The second broad range of questions is what determines the variables themselves on the one hand, and the "main" principal components previously extracted. Multicolinearity in the right hand-side is sometimes dealt with by principal components applied to the set of explanatory variables. We looked for the most prominently significant variables on the right hand-side that determine the derived composite left hand-sides and completed the analysis with the regressions on the principal components of the independent variable set.

The right hand-side comprises a broad range of indicators that subscribe to one of the following themes: demographic characteristics; employment and work-hours; labor earnings; wage inequality; income or product and national expenditure; prices and inflation; sector importance; public sector; capital markets; housing; international relations. The choice of explanatory variables was suggested by previous empirical research – and

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[9] Stock & Watson (1998), p. 8, suggesting that both the current as lagged values of the variables being used to extract components. See also Forni *et. al.,* (2000). Yet, we do not require stationarity of the series, in particular, a limiting finite mean or variance.

excellent surveys can be found in Entorf & Spengler (2002), Fajnzylber, Lederman & Loayza (2002), Freeman (1999) and Cameron (1988) – and restricted by availability. Because our hypothesis is one of composite formation of violent or aggressive behavior, we also relied on literature on health economics, and population and family formation and dissolution – Sickles & Taubman (1997) and Weiss (1997).

In Becker's (1968) tradition, which has the main merit of methodologically separating the motivations of criminals from those of law enforcers, observed crime is the result of an equilibrium between supply and (public) demand of offences. Translating into crime regressions, this view implies that these regressions – that in the literature we can say that are usually interpreted as "supply" equations – are in fact reduced forms. Simultaneity – endogeneity - issues arise [10] and were to some extent dealt with in a third step of the research, where simultaneous determination of some of the variables – some more related to criminal attitude, others to law enforcement endeavours - was considered.

Time series techniques allows us to study this last aspect in a special context – causality within VAR structures. The use of VAR to explore causal relations in crime time series is not new: an early reference is Corman, Joyce & Lovitch (1987) who find, using New York city data, that arrests deter crime and age composition of the population affects criminal behavior. Completing, therefore, our last results, we inspected briefly on two-by-two simple structures the robustness of some of the conclusions.

Firstly, we offer a brief description of some available disruption indicators: for some world economies, and the time series sample collected for the Portuguese economy in section I. In section II, we provide the results of principal component decomposition. Results of linear regressions on economic variables are presented and briefly discussed in section III; similar methodology is applied to the previously deducted principal components - section IV. Section V inspects the possible effects of counteractive measures. The exposition ends with a brief summary in section VI.

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[10] An estimation problem in criminometrics stressed by Fisher & Nagin (1978). Ehrlich (1973), for example, uses 2SLS to correct for it. See a discussion of the subject - and pertinent references and of the existence of measurement error bias - within the interpretation of the relation between crimes and sanctions in Freeman (1999), p. 3548 and ss.

1. The Data: Available Social Distress Indicators

A Cross-Section Sample of International Indicators

1. The variables used to capture social unrest in the cross-section data set are listed below:

MFERAR – Injured and Deaths in Road Accidents (per 100000 inhabitants), 1997, PNUD
DELDRO – Registered drug offenses (per 100000 people), 1994, PNUD
VIOLA – Registered rapes (per 100000 women, 15 year old or more), 1994, PNUD
HOMIC – Registered Homicides (per 100000 people), 1994, PNUD
SUICIH – Suicides, male (per 100000 people), 1993-1998, PNUD
SUICM – Suicides, female (per 100000 people), 1993-1998, PNUD
DIVOR – Divorces (as % of marriages), 1996, PNUD
DESASP – People killed in accidents/disasters, (per one million inhabitants), 1980-99, PNUD [11]
DESAIP – People killed in serious individual accidents/disaster (per one million inhabitants), 1980-99, PNUD [12]

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[11] PNUD's figures on total deaths were divided by total population in millions.
[12] PNUD's figures on total deaths were divided by total population in millions.

PRISION – Prisoners or Prison Inmates (per 100000 inhabitants) 1994, PNUD
PPRESAS – People Imprisoned (per 100000 inhabitants) 1994, PNUD [13]
CRIMREG – Total registered crimes (per 100000 people) 1994, PNUD
GREVET – Total Number of Strikes and Lockouts, (divided by) per a thousand employed, Yearbook of Labor Statistics, ILO, 1997
TRAGRET – Number of Workers Involved in Strikes and Lockouts, (divided by) per a thousand employed, Yearbook of Labor Statistics, ILO, 1997
DIAGRET – Number of Workdays Lost due to Strikes and Lockouts, (divided by) per a thousand employed, Yearbook of Labor Statistics, ILO, 1997
TXDIGRE – Number of Workdays Lost due to Strikes and Lockouts per Employment, Yearbook of Labor Statistics, ILO, 1997
DPMIPNB – Military Public Expenditures (as % of GNP) 1998, PNUD
FA98P – Total Armed Forces (per one thousand inhabitants) 1998, PNUD

The main source is, thus, the United Nations collection of indicators published in the Human Development Report [14].

We can distinguish five types of phenomena:

* Criminal Activities: registered crimes, drug offenses, rapes, homicides

* Psychologically Strained Occurrences, including suicides and divorces

* Violent Accidents (mainly mortal): people killed and injured in road accidents; people killed in accidents

* Strike Activity: incidence and duration of work-losses

* Armed Forces: individuals and expenditures involved

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[13] It is unclear, given Portuguese language construction, in our statistical source whether this variable refers to the stock of prisoners or to the flow of individuals sentenced to prison within the year. We take in the text the second view, once figures differ from the series PRISION, and the latter must indeed refer to the stock.

[14] Entorf & Spengler (2002), p. 123, compare different international crime data sets. They do not suggest that the UN is the most consistent, yet, they do cite Bennet & Lynch (1990): for aggregate purposes, within a specific collection of "respectable" data sets in which the UN one is included, it does not make a difference which one to use.

Prisoners and people made prisoners can be indicators of law-enforcement[15]. Yet, these variables share aspects with pure criminality: to be made prisoner, an individual must have committed a crime before-hand.

The use of strike activity indicators would leave us with only 13 (non-missing) observations for the full set of variables. Hence, we considered only the remaining variables, which allowed us to use data for 19 countries: Canada, Sweden, Belgium, Finland, Denmark, Austria, Italy, Israel, Greece, Slovenia, Hungary, Croatia, Estonia, Lithuania, Belarus, Russian Federation, Georgia, Kyrgyz Republic and Moldova. Discarding DELDRO (drug offences) allows 21 cases – United States and Bulgaria were added to the sample.

Whenever possible, we used all existing observations – out of an original data set of 174 observations, most of the times, we could retain more than 20, but not more than 50. We report in Appendix A some descriptive statistics – including the cross-correlations with and elasticities relative to per capita GDP and per capita GNP in US dollars - on the variables listed above. For example, all the 14 variables exhibit a lower elasticity than 1 with respect to per capita GDP and GNP (in US dollars) – if GDP per capita is 1% higher, the variable is less than 1% higher -, with negative values for homicides (HOMIC), fatal accidents (DESASP and DESAIP), people made prisoners (PPRESAS) and some strike intensity indicators (DIAGRET, TXDIGRE).

Given that most of the indicators are defined in a *per capita* basis and we are dealing with a cross-section sample of countries of different sizes, weighting procedures – for instance, in OLS regressions - by the total population variable could be advisable[16]. However, heteroeskedasticity tests carried out below usually do not point to its convenience.

Time Series Behavior: Portugal

1. We tried to collect time series information for Portugal that could capture the five aspects cited above. We ended up with the following variable series:

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[15] Fajnzylber, Lederman & Loayza. (2002) constructed the number of police personnel per 100000 inhabitants from the UN World Crime Survey – as an average for a specific time interval. We could not construct it in time and, from the description of those authors data set, we suspect we could not reach an adequate coverage of our working sample.

[16] If one had in mind a behavioural structure defined in terms of individuals. See a discussion of the subject in Greene & Martins (2002) for example.

CONDHAB – Number of Individuals Convicted in Criminal Cases (at trial stage) per a thousand inhabitants, 1967-1999

ARGHAB – Number of Defendants in Criminal Cases (at trial stage) per a thousand inhabitants, 1967-1999

RECHAB – Prison Inmates per a thousand inhabitants, 1970-1999

RECCHAB – Common Prison Inmates per a thousand inhabitants, 1970-1999

(We considered the first and second leads of the previous variables, once criminal cases take on average around one and a half years to close.)

CRPOLHA - Crimes Reported to the Police Departments per a thousand inhabitants, 1984-1998

ACRMORH – Number of Deaths in Road Accidents per one hundred thousand inhabitants, 1960-1999

ACRFERH – Injured in Road Accidents per a thousand inhabitants, 1960-1999

ACRTOTH - Road Accidents per a thousand inhabitants, 1960-1997

SUICHAB – Number of Suicides per one hundred thousand inhabitants, 1960,1961,1965,1969-1999

ACTJTOH - Labour Accidents, Completed Cases in Courts per one hundred thousand inhabitants, 1972-1999, Barreto

ACTJMOH – Fatal Labour Accidents, Completed Cases in Courts per one hundred thousand inhabitants, 1972-1997, Barreto

(We considered also the first leads of ACTJTOH and ACTJMOH, once labor cases take on average around 10 months to close.)

ACTTOH - Labour Accidents per a thousand inhabitants, 1980-1997, Barreto

ACTMOH – Fatal Labour Accidents per a thousand inhabitants, 1980-1997, Barreto

HOMLEGH - Deaths by Homicide (involving legal intervention [17]) per one hundred thousand inhabitants, 1969-1999

HOMIOUH - Deaths by Possible Homicide [18] per one hundred thousand inhabitants, 1969-1999

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[17] The statistical definition changed in the period. This was the reported definition in the beginning of our series, and the numbers would indicate an approximation to the current reported "deaths by homicide and intentional injuries".

[18] The numbers include the current item on "death by injuries when it is undetermined if due to accident or intention". Numbers pointed consistency with the statistical definition of "non-specified accidents" - to which we added war fatalities (the latter in very few number in the covered period) - in the early part of our sample.

HOMIH - Deaths by Homicide or Possible Homicide per one hundred thousand inhabitants, 1969-1999

MOCEXTH – Deaths Due to External Causes (injury and poisoning: accidents, homicides, suicides) per one hundred thousand inhabitants, 1969-1999

TXDIV - Divorce Rate, per one thousand inhabitants, 1960-1999, Barreto

TGRPT – Workers Involved in Strikes per a thousand Employed, 1987-1999, MT

HGRPT – Work Days Lost Due to Strikes per a thousand Employed, 1987-1999, MT

MILCAR – Permanent Armed Forces per a thousand inhabitants, 1974-1999, INE

SMO – Individuals complying with Mandatory Military Service per a thousand inhabitants, 1974-1999, INE

FA – Total Armed Forces per a thousand inhabitants, 1974-1999, INE

The coincidence is however not complete:

* we now include information on labor accidents as well

* some variables have a dubious classification – as is the case of HOMIOUH, deaths by external causes that may or may not be due to homicidal intentions;

* defendants and convicted in courts could now be included but have similar problems of classification as prisoners' data before.

Strike activity indicators, TGRPT and HGRPT, and reported crimes, CRPOLHA, were very short series. We discarded them in some of the empirical work below.

We included in Appendix A the descriptive statistics – and cross-correlations with a time trend and with real per capita GDP, annual (instantaneous) growth rates and elasticities relative to real per capita GDP - on the variables as we had performed for the cross-section sample. Suicides (SUICHAB), some labor accidents indicators (ACTTOH and ACTMOH), deaths due to external cause (MOCEXTH), strike indicators (TGRPT and HGRPT), and mandatory military servants (the bulk of total armed forces during most of the sample period – till 1993) and total armed forces (SMO and FA) decreased on average over the sample period; defendants (ARGHAB), prison inmates (RECHAB and RECCHAB), some road accident indicators (ACRTOTH), presumed homicides (HOMIOUH and HOMIH), divorces (TXDIV), and permanent armed forces (MILCAR) grew on average faster than per capita GDP.

We are now in the presence of time series data and we can inspect their statistical properties into more depth. On the one hand, those properties are important by themselves; on the other, the inspection of unit roots (non-stationarity) is a pre-requisite of VAR analysis, undertaken in a later chapter.

2. Stationarity of data is a much debated issue in time series analysis. One of the methods proposed to inspect stationarity is to look for unit roots in the data. If there is one in a particular series, then the variable is non-stationary. That has implications for its adequacy either in co-integrated relations one proposes to explore – long-run linear relationships between two or more variables; as for its correct use in VAR systems.

Unit roots are very simple to suggest in reference to an alternative first-order auto-regressive process. Consider a variable X_t to be AR(1); then, we can write:

$$X_t = \rho X_{t-1} + \varepsilon_t \qquad t = 1,2,...$$

where we admit ε_t to have mean zero, constant finite variance and to be uncorrelated in time. If $-1 < \rho < 1$, X_t has constant finite variance and auto-covariance only dependent on its order. If $\rho = 1$, we conclude two things: X_t is non-stationary; the first difference $\Delta X_t = X_t - X_{t-1}$, however, is stationary (in fact, X_t is I(1), an integrated process of the first order). Dickey-Fuller tests, are thus tests that use the t-ratio of the coefficient of X_{t-1} in a regression of the type:

$$\Delta X_t = (\rho - 1) X_{t-1} + \varepsilon_t \qquad t = 1,2,...$$

with which the hypothesis H_0: $\rho - 1 = 0$ is confronted with the alternative H_1: $\rho - 1 < 0$. The correct statistical distribution is not the standard t-student and we must use other critical values [19].

The relationship above may include a constant or not and can be enlarged to express more complex lagged structures under the null

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[19] The reader can find the pertinent information in standard textbooks like Greene (2003), Marques (1998), and other references also in Hall & Cummins' TSP manuals.

– autoregressive processes in first differences[20]. This was considered in the analysis below.

A time trend can also be added to the right hand-side. When this is the case, an F-test can be preformed – and again, under the null special critical values should be used.

In the following table, we summarize the information on unit root tests on the first three columns. In the last two columns we repeat the first two tests for data in first differences – that is, we inspect for an eventual second unit root.

Table 1.1. *Unit Roots Tests*

					First DIF	First DIF
	CONST Tau test (p-value) [nlags; nobs]	C, TREND Tau test (p-value) [nlags; nobs]	D on C, TREND and lag F	C, T; T2 Tau test [nlags; nobs] D-F (p-value) [nlags; nobs]	CONST Tau test (p-value) [nlags; nobs]	C, TREND Tau test (p-value) [nlags; nobs]
CONDHAB	-0.061851 (0.98717) [2; 30]	-0.54230 (0.99310) [2; 30]	5.11151 (0.013) [32]	-3.21460 [3; 29] -1.70026 (0.90797) [7; 25]	-2.75772 (0.023782) [2; 29]	-4.36795 (0.0015543) [2; 29]
ARGHAB	0.34932 (0.99621) [2; 30]	-0.48998 (0.99409) [2; 30]	3.72340 (0.036) [32]	-4.62908 [2; 30] -1.83651 (0.87222) [10; 22]	-2.96452 (0.012960) [2; 29]	-3.48191 (0.021522) [6; 25]
RECHAB	-1.12865 (0.76030) [3; 26]	-0.20483 (0.99747) [8; 21]	7.14986 (0.003) [29]	-1.58237 [4; 25] -2.77546 (0.41184) [10; 19]	-2.12879 (0.13765) [3; 25]	-2.82823 (0.13433) [3; 25]
RECCHAB	-0.77227 (0.90199) [9; 20]	-0.28749 (0.99677) [8; 21]	7.46401 (0.003) [29]	-1.3958 [4; 25] -4.25025 (0.014841) [10; 19]	-2.43051 (0.060839) [3; 25]	-2.89103 (0.11397) [3; 25]
CRPOLHA	-1.23499 (0.69772) [3; 11]	-1.03734 (0.97039) [3; 11]	0.502377 (0.618) [14]	-1.06023 [3; 11] -4.08497 (0.024604) [4; 10]	-1.7686 (0.31899) [2; 11]	-1.77016 (0.78571) [2; 11]
ACRMORH	-0.75133 (0.90738) [2; 37]	-1.11891 (0.96252) [2; 37]	2.49319 (0.097) [39]	-2.74992 [2; 37] -2.57201 (0.52793) [2; 37]	-3.22882 (0.0059240) [2; 36]	-3.90520 (0.0061687) [2; 36]
ACRFERH	-0.16991 (0.98236) [2; 37]	-2.62201 (0.22326) [2; 37]	2.80611 (0.074) [39]	-2.60191 [2; 37] -2.28356 (0.68819) [2; 37]	-3.63894 (0.0017462) [2; 36]	-3.68190 (0.011954) [2; 36]
ACRTOTH	0.82119 (0.99907) [3; 34]	-0.030995 (0.99849) [3; 34]	8.30188 (0.001) [37]	-1.63920 [2; 35] -1.67718 (0.91315) [3; 34]	-2.00958 (0.18563) [2; 34]	-3.32651 (0.033815) [2; 34]
SUICHAB	-2.00570 (0.18739) [2; 28]	-2.69938 (0.18572) [2; 28]	3.58240 (0.042) [30]	-3.92565 [2; 28] -1.12349	-4.54000 (0.00011835) [2; 27]	-4.87438 (0.00034253) [2; 27]

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[20] In all cases, the test statistics are the same whether we consider the procedures applied to the original series or to its symmetric. That is, it inspects over variables that may grow or decrease over time.

				(0.98133) [6; 24]		
ACTJTOH	-1.62357 (0.41948) [2; 25]	-3.10840 (0.062941) [2; 25]	2.42401 (0.110) [27]	-2.37116 [4; 23] -1.73816 (0.89824) [10; 17]	-3.51103 (0.0025572) [2; 24]	-3.53888 (0.018214) [2; 24]
ACTJMOH	-2.63066 (0.034390) [2; 23]	-3.28854 (0.037726) [2; 23]	5.57055 (0.011) [25]	-3.79258 [2; 23] -1.20604 (0.97622) [9; 16]	-3.44061 (0.0031544) [2; 22]	-3.54217 (0.018039) [2; 22]
ACTTOH	-1.48728 (0.52059) [5; 12]	-0.84476 (0.98313) [5; 12]	1.16793 (0.340) [17]	-1.12480 [3; 14] -3.51234 (0.10983) [5; 12]	-1.73194 (0.34326) [4; 12]	-2.38327 (0.36976) [4; 12]
ACTMOH	-1.54391 (0.47831) [2; 15]	-1.88288 (0.72359) [3; 14]	3.19941 (0.072) [17]	-2.13831 [3; 14] -1.47136 (0.94952) [3; 14]	-2.87146 (0.017045) [2; 14]	-2.93293 (0.10192) [2; 14]
HOMLEGH	-2.31660 (0.083456) [2; 28]	-2.58424 (0.24344) [2; 28]	3.66833 (0.039) [30]	-3.27157 [2; 28] -2.98506 (0.30235) [3; 27]	-4.18550 (0.00034138) [2; 27]	-4.55724 (0.00088331) [2; 27]
HOMIOUH	-0.16196 (0.98277) [2; 28]	-2.12815 (0.55707) [2; 28]	3.71154 (0.038) [30]	-2.19308 [2; 28] -3.16386 (0.22328) [10; 20]	-2.44308 (0.058727) [3; 26]	-2.52472 (0.27768) [3; 26]
HOMIH	-0.16902 (0.98241) [2; 28]	-2.24215 (0.47217) [2; 28]	3.88447 (0.033) [30]	-2.24790 [2; 28] -2.77781 (0.41053) [10; 20]	-2.47911 (0.053049) [3; 26]	-2.52709 (0.27626) [3; 26]
MOCEXTH	-0.89618 (0.86403) [2; 28]	-1.03748 (0.97038) [2; 28]	5.31591 (0.011) [30]	-4.59556 [2; 28] -2.53354 (0.55011) [4; 26]	-4.39620 (0.00018189) [2; 27]	-2.98500 (0.088530) [5; 24]
TXDIV	0.35974 (0.99633) [2; 37]	-2.09283 (0.58293) [2; 37]	3.87517 (0.030) [39]	-3.28144 [2; 37] -2.22558 (0.71749) [4; 35]	-4.38975 (0.00018543) [2; 36]	-4.91352 (0.00030472) [2; 36]
TGRPT	-0.58239 (0.94197) [2; 10]	-2.10290 (0.57560) [3; 9]	9.08902 (0.007) [12]	-1.82888 [3; 9] -6.53637 (9.0329D-7) [3; 9]	-1.31452 (0.64538) [3; 8]	-1.00115 (0.97334) [3; 8]
HGRPT	-0.47927 (0.95670) [2; 10]	-1.68550 (0.82524) [3; 9]	6.77124 (0.016) [12]	-1.86323 [3; 9] -1.36277 (0.96269) [3; 9]	-1.18424 (0.72873) [3; 8]	-0.91786 (0.97910) [3; 8]
MILCAR	-0.96043 (0.83985) [2; 23]	-2.16275 (0.53143) [2; 23]	1.80657 (0.188) [25]	-2.39282 [2; 23] -4.18642 (0.018108) [9; 16]	-2.75547 (0.023939) [2; 22]	-2.76264 (0.15881) [2; 22]
SMO	0.29031 (0.99548) [3; 22]	-1.80737 (0.76639) [7; 18]	105.489 (0.000) [25]	-1.71238 [3; 22] -3.36226 (0.15187) [9; 16]	-1.13540 (0.75660) [3; 21]	-1.72710 (0.80658) [3; 21]
FA	-0.024203 (0.98852) [3; 22]	-1.57367 (0.86836) [3; 22]	99.5883 (0.000) [25]	-2.04490 [3; 22] -2.85951 (0.36615) [2; 23]	-0.89007 (0.86616) [2; 22]	-1.72775 (0.80628) [3; 21]

ACTTOH, CRPOLHA, TGRPT and HGRPT have very few observations, and usually yield high p-values for the tau test-statistic, being inference with respect to unit roots blurred.

ACTJMOH would be stationary at 5%; at 10% - even if reported p-values are good only for 5% tests -, (if we include a trend) ACTJTOH and HOMLEGH would also.

All other variables have at least one unit root; RECHAB and RECCHAB, may have two roots at 5% – which is somehow consistent with the fact that they represent stocks, unlike other variables which represent flows and showed to have one root -, as well as (marginally) HOMIOUH and HOMIH; at 14%, all these variables would have only one unit root. SMO, FA (and possibly MILCAR) show (at least) two unit roots.

The second methodological step would be to inspect two-by-two co-integration tests as a previous validation of a long-run relationship between the isolated variables; the failure of such tests [21]- performed with and without a trend - suggested more complex relationships among them. RECHAB and RECCHAB were also first differenced in accordance – as well as the corresponding leads (we did not differenced the armed forces) – for that inspection.

We did not experiment with data transformations, namely logs – nor inverses. We rely on the representation of the behavior of the sample series focused on levels of, mostly, per capita variables, as was done for the cross-section exercises. Yet, other formulations may be useful in practice.

3. Given that we are in the presence of a time series sample and long-run patterns are sought, the use of lag indicators is traditionally justified. Instead – and specially because we rely on such a small sample – we completed the analysis by, in a first step, extracting the first component of the set formed by each indicator and its first two lags (we would rather use more lags, but that would leave us with very less observations and we don't have many). Those first components would hopefully capture the long-run or fundamental trend of the series, appropriately smoothed out of cyclical [22] or residual components.

Indeed, the first eigenvalue is, usually, the only one larger than 1. The two-lead series on justice indicators were lagged 4 times – that is, we extracted the first principal component from the first and second lead series, the current values and the two first lags of the series.

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[21] Estimates available upon request.

[22] The use of more leads and lags would purge the cycle as well. As we only use one lead and one lag, we expect only to extract the residual. As we will see later, we will capture trend and (apparently) cycles in other ways – by increasing the number of leads and lags to univariate series; by using multivariate decomposition through principal components of a subset of the variables below.

In terms of timing, the smoothed series, for other series rather than justice indicators - lags the original one by one period – that is, the smoothed series should come from the first principal component on the series, its first lag and its first lead; we plotted the various pairs graphically below, with the original series (also) standardized [23] – that is, each series is (firstly) centered - subtracted by the mean - and then divided by the standard deviation [24].

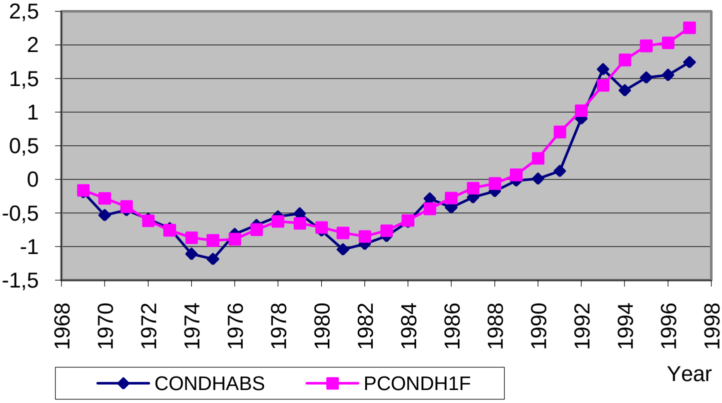

Figure 1.1. *CONDHAB – Number of Individuals Convicted in Criminal Cases*

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[23] One could argue that we should have plotted instead along with the standardized series the predictions of an OLS regression of the current standardized value of each series on the derived first component - of the series values, first lead and first lag. That is, smoothing would "discard variability, noise" in that proportion. We will follow this procedure below. Yet, if one aims at representing variability of the original series, then standardizing also – which, after all, results in the depicted cases - the predictions of such regressions may seem reasonable.

[24] We use TSP prin routine, which standardizes the original series and also standardizes the output principal components.

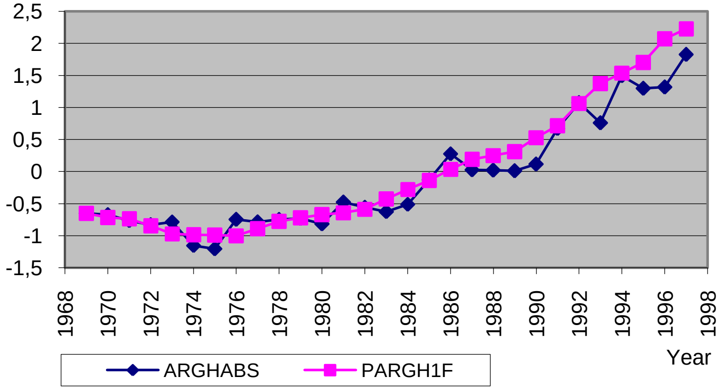

Figure 1.2. *ARGHAB – Number of Defendants in Criminal Cases*

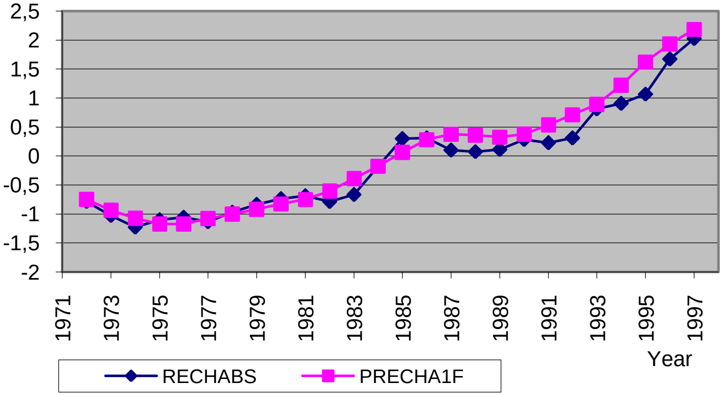

Figure 1.3. *RECHAB – Prison Inmates*

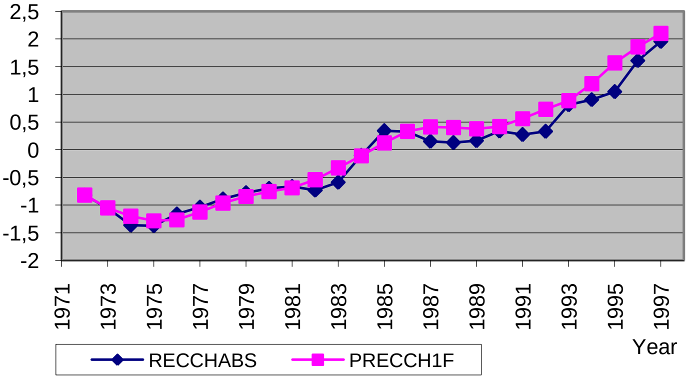

Figure 1.4. *RECCHAB – Common Prison Inmates*

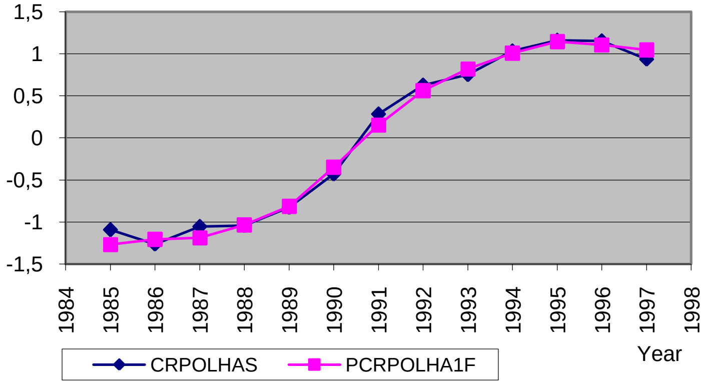

Figure 1.5. *CRPOLHA - Crimes Reported to the Police*

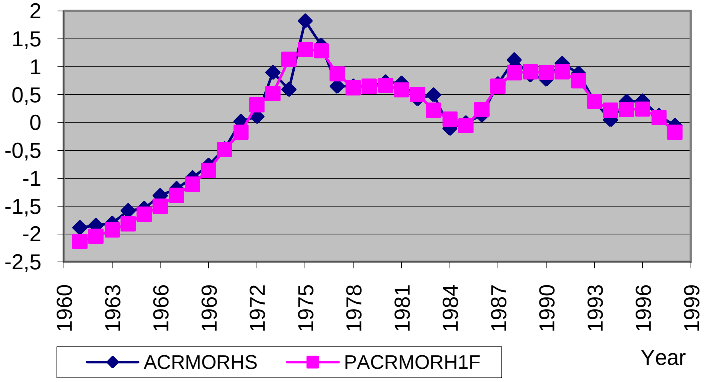

Figure 1.6. *ACRMORH – Deaths in Road Accidents*

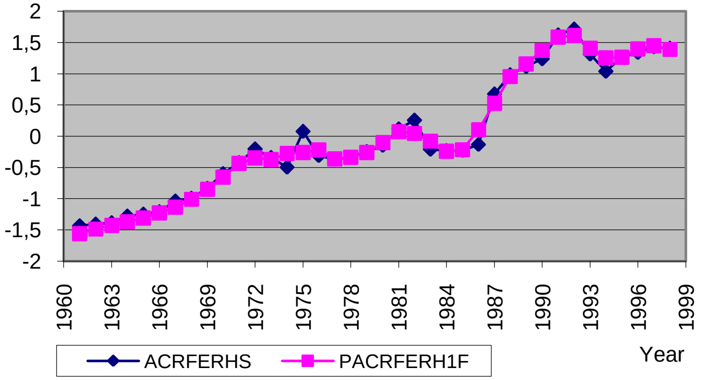

Figure 1.7. *ACRFERH – Injured in Road Accidents*

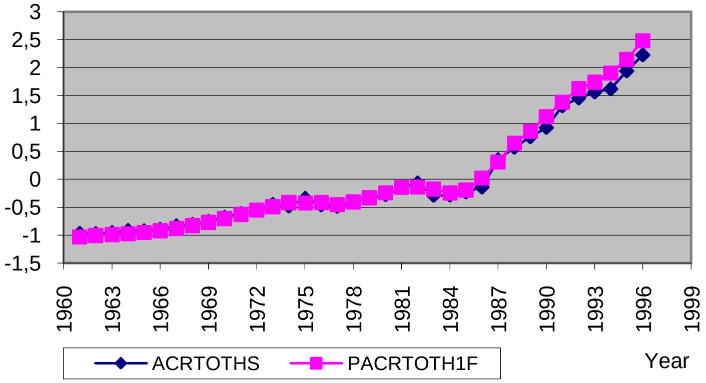

Figure 1.8. *ACRTOTH - Road Accidents*

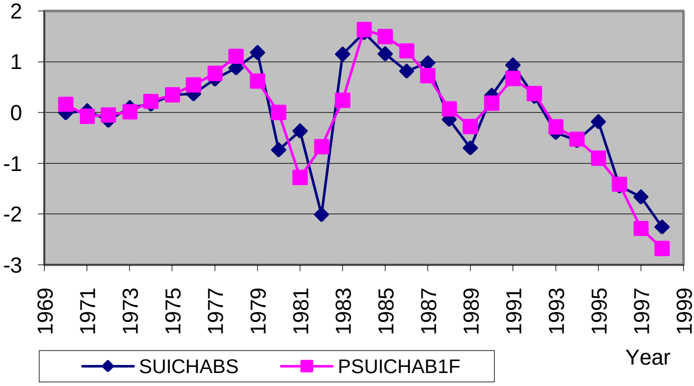

Figure 1.9. *SUICHAB – Suicides*

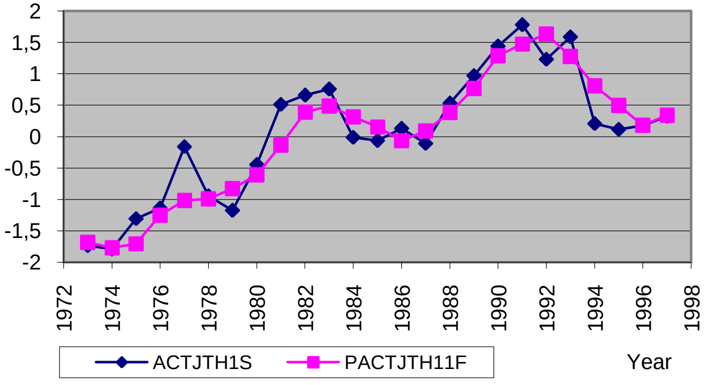

Figure 1.10. *ACTJTOH - Labour Accidents, Completed Cases in Courts*

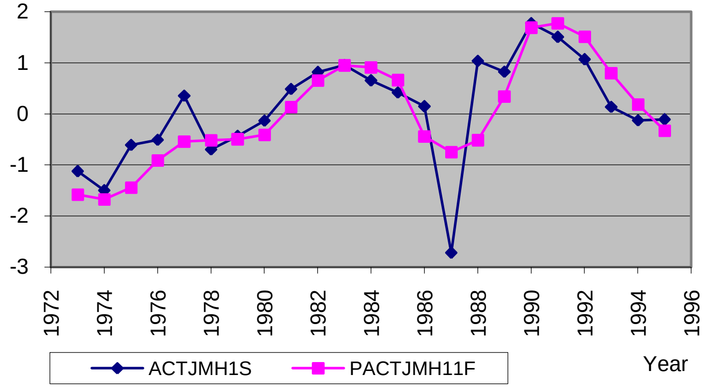

Figure 1.11. *ACTJMOH – Fatal Labour Accidents, Completed Cases in Courts*

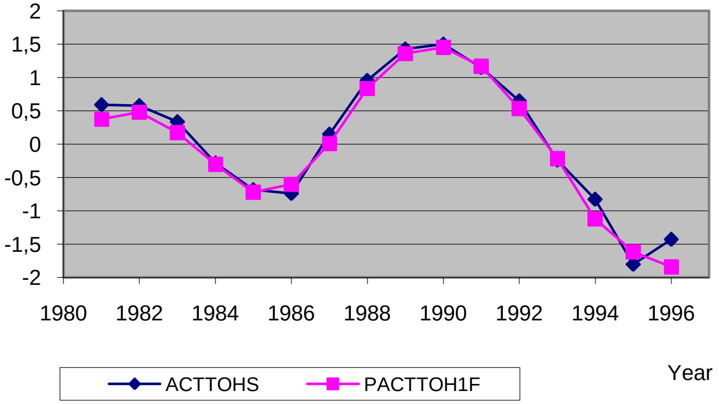

Figure 1.12. *ACTTOH - Labour Accidents*

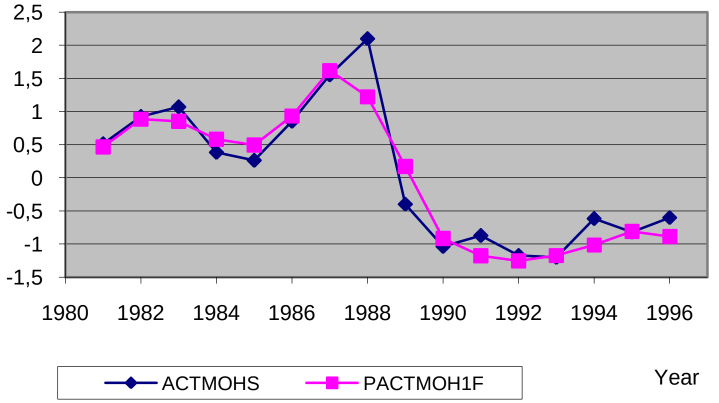

Figure 1.13. *ACTMOH – Fatal Labour Accidents*

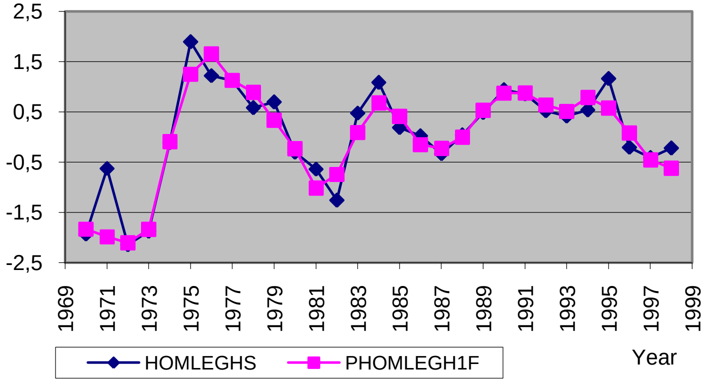

Figure 1.14. *HOMLEGH – Homicides*

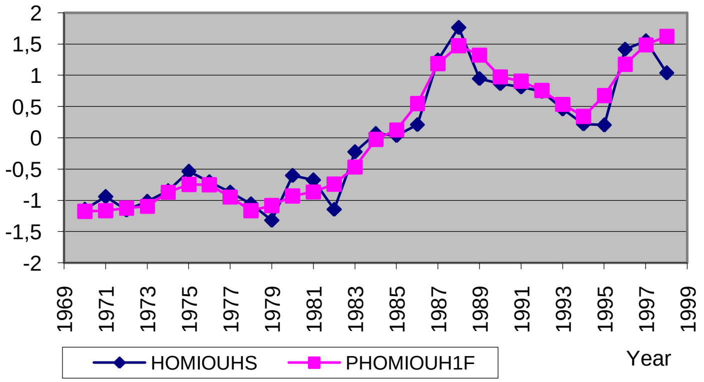

Figure 1.15. *HOMIOUH - Deaths by Possible Homicide*

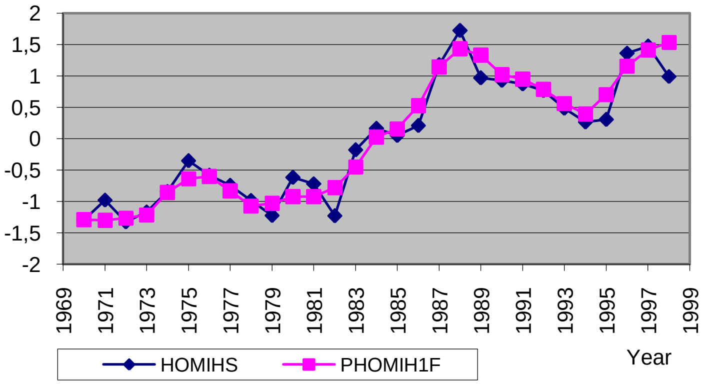

Figure 1.16. *HOMIH – Homicides and Deaths by Possible Homicide*

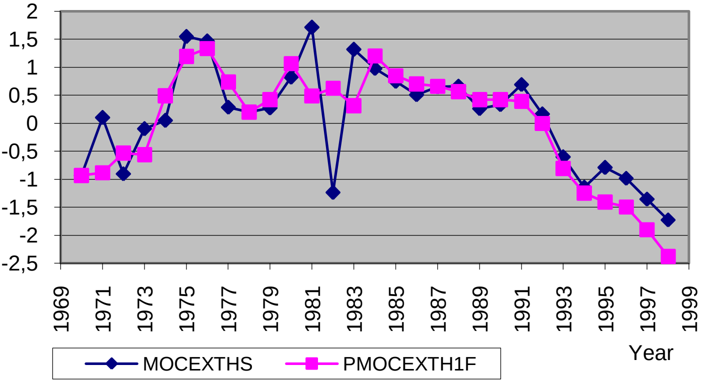

Figure 1.17. *MOCEXTH – Deaths Due to External Causes*

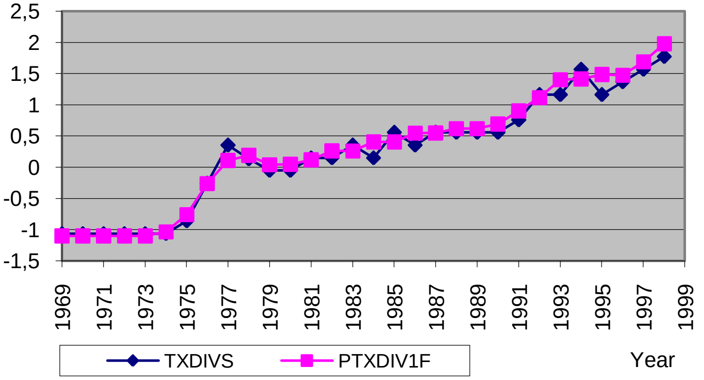

Figure 1.18. *TXDIV – Divorce Rate*

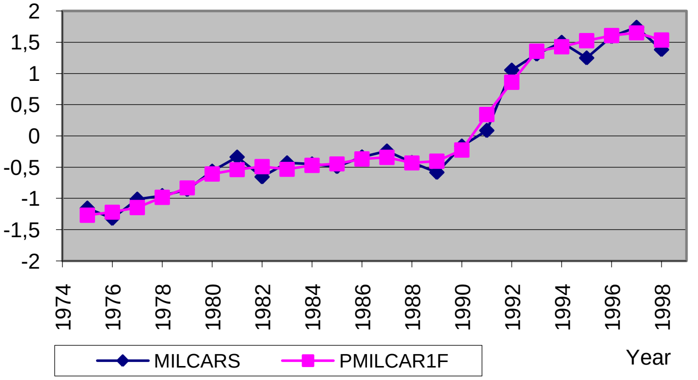

Figure 1.19. *MILCAR – Permanent Armed Forces*

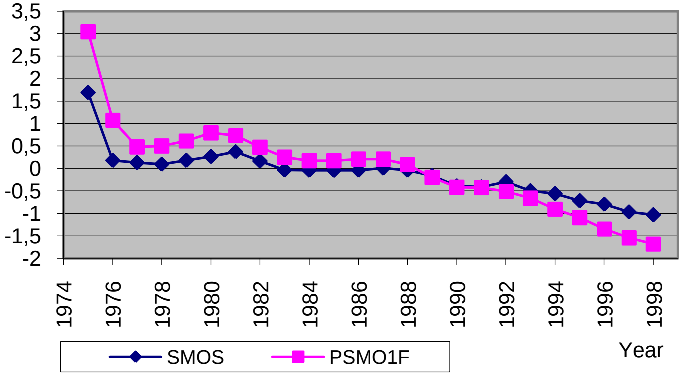

Figure 1.20. *SMO – Individuals Complying with Mandatory Military Service*

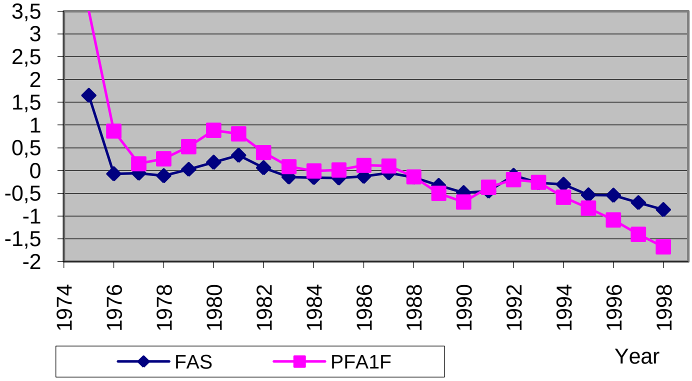

Figure 1.21. *FA – Total Armed Forces*

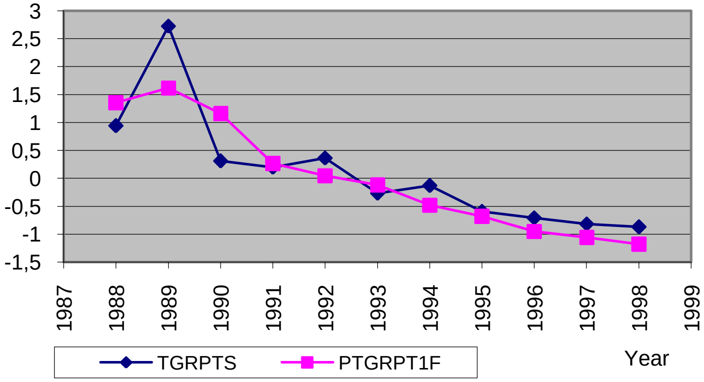

Figure 1.22. *TGRPT – Workers Involved in Strikes*

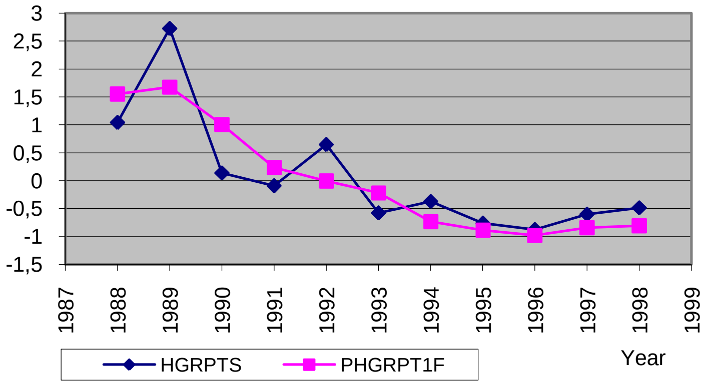

Figure 1.23. *HGRPT – Work Days Lost Due to Strikes*

4. For each of the longer series – CONDHAB, ARGHAB, HOMLEGH, HOMIOUH, HOMIH; ACRMORH, ACRFERH, ACRTOTH, MOCETXH, TXDIV -, we applied principal components to the current values of the series, its first four lags and its first four leads. From the resulting 9 components, only for representation of HOMLEGH (3 eigenvalues larger than 1), HOMIOUH (2 eigenvalues larger than 1), HOMIH (2 eigenvalues larger than 1), ACRMORH (2 eigenvalues larger than 1), MOCEXTH (3 eigenvalues larger than 1) were required more than the first pc to account for input data variability.

We represent in the graphs below the standardized series and first four principal components (of course, not all relevant, as noted) for the ten series of the sample to which the procedure was applied [25]:

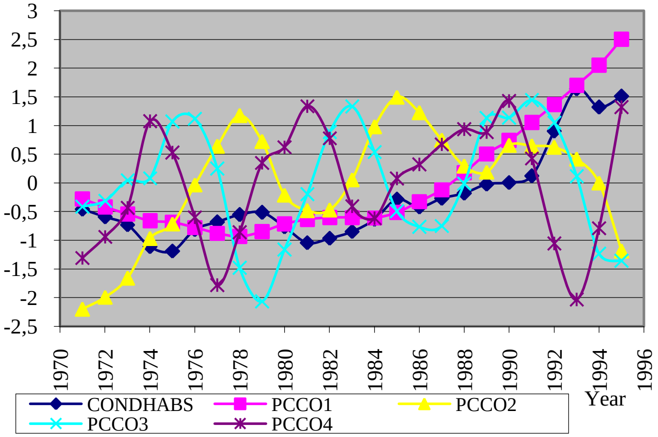

Figure 1.24. *CONDHAB – Number of Individuals Convicted in Criminal Cases*

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[25] We essayed including the yearly trend in each of the set as well. Graphical display of the main components did not change significantly.

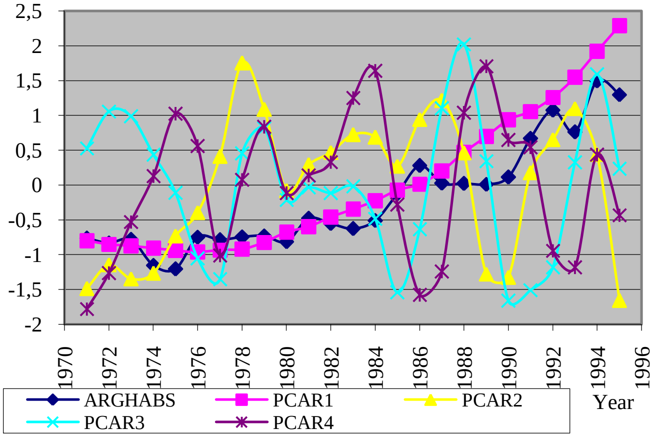

Figure 1.25. *ARGHAB – Number of Defendants in Criminal Cases*

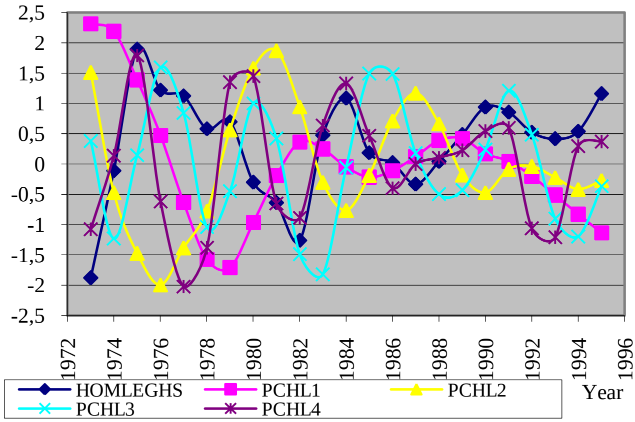

Figure 1.26. *HOMLEGH – Homicides*

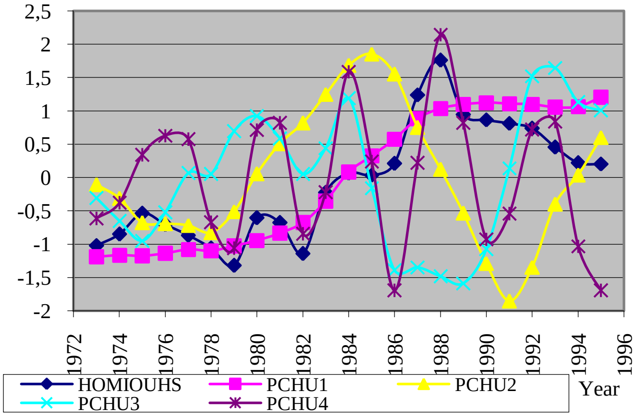

Figure 1.27. *HOMIOUH - Deaths by Possible Homicide*

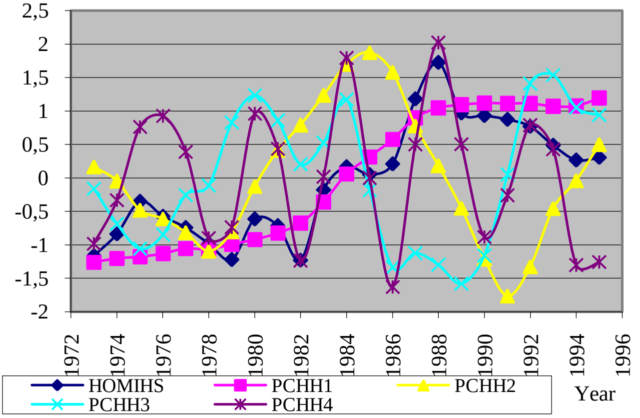

Figure 1.28. *HOMIH – Homicides and Deaths by Possible Homicide*

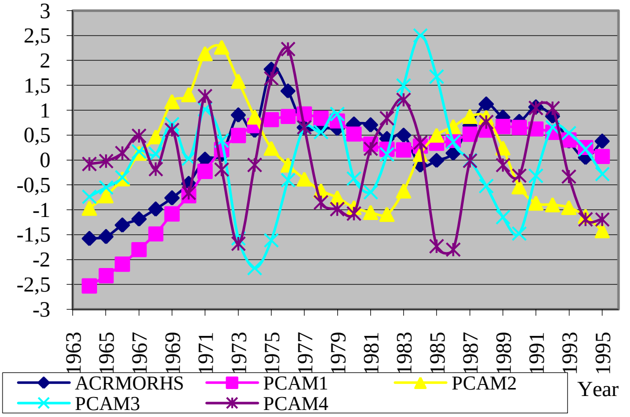

Figure 1.29. *ACRMORH – Deaths in Road Accidents*

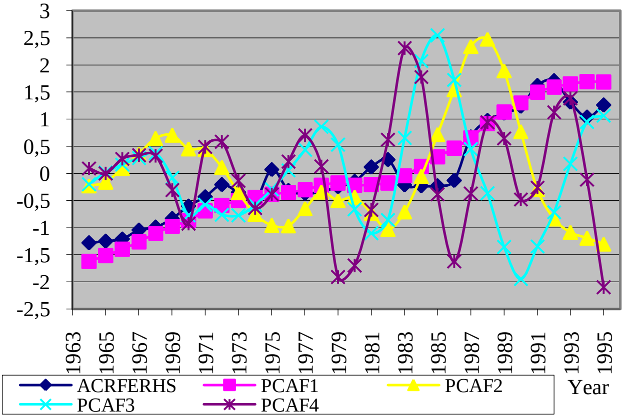

Figure 1.30. *ACRFERH – Injured in Road Accidents*

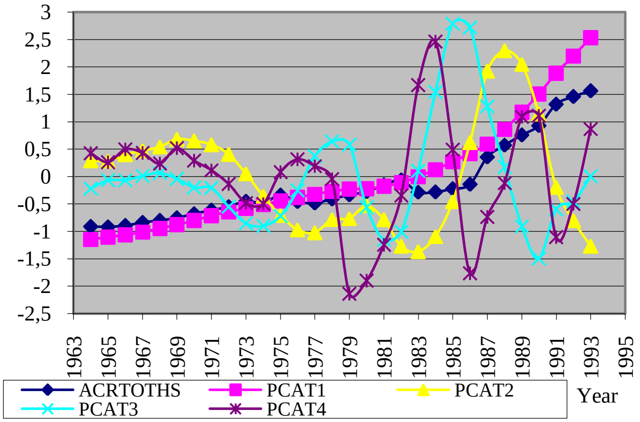

Figure 1.31. *ACRTOTH - Road Accidents*

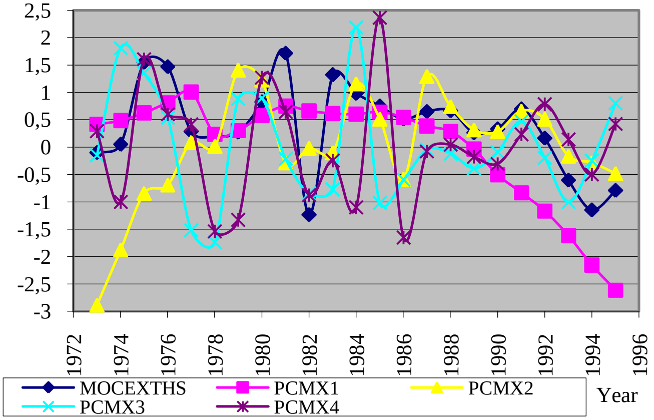

Figure 1.32. *MOCEXTH – Deaths Due to External Causes*

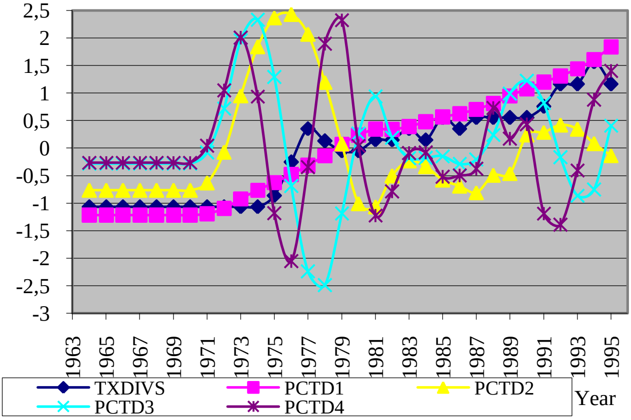

Figure 1.33. *TXDIV – Divorce Rate*

The procedure has an immediately resemblance to Wold's decomposition theorem. Yet, the theorem applies to stationary stochastic processes – being susceptible of representation by a linear combination of uncorrelated random variables – and that was not the case here. It is possible, that we separate the non-stationary part as well.

Moreover, in the previous graphs, the first component clearly shows the trend in the data. The others – resembling some sort of "biorhythms" of the original data series -, specially the second and third, exhibit a cyclical, oscillatory pattern with – if any – decreasing periodicity; the fourth component may be erratic.

Again, Fourier analysis comes to mind; but pertaining theorems – applications in factor analysis of economic time series can be found, for example, in Geweke & Singleton (1981), Forni & Reichlin (1996 and 1998) and Forni *et al.,* (2000), and authors in the field suggest or proceed to previous detrending or differencing of the series - apply, once again, to the stationary domain.

Finally, applying principal components or factor analysis to the leads, current values and lags of a series, and constructing the estimated residuals from the regression of the current values of the series on the (current values of the) main principal components seems an intuitively appealing strategy to de-trend and/or de-cycle the data, leaving a stationary residual. Apparently, the use of the leads would render the procedure, *per se*, useless for forecasting purposes – which, in any case, was not the objective of our research - for which, transposed strategies, considering the current variables as being decomposed into current and lagged factors or components, have been advanced in the literature; yet, the time series analysis and forecast by other techniques of each of the extracted components, and subsequent aggregation according to the obtained loadings (say, for the equation corresponding to the most recent lead; or even loadings from an hypothetical regression of the variable on the leads current values and lags of extracted components…) can provide an alternative to conventional forecasting strategies.

The graphs below illustrate the results of such procedure (with no forecast of the components involved, though) applied to the previous 10 series – we represent the original standardized series, the deducted components (those with eigenvalues larger than 1) multiplied by the corresponding coefficient estimate from the OLS implicit regression (with no constant term) having the current value of each series in the left hand-side [26], and the residual from the regression on all of the represented components; the Durbin-Watson on these residuals is also reported. Whenever more than one component were found important, a second graph illustrates the original series, the predictions with the OLS regression estimates with the first component, the two first components and, when a third one is included, with the first three ones; the residual was also (again) displayed.

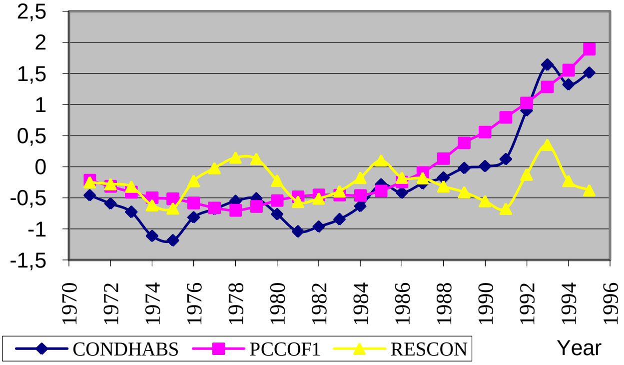

Figure 1.34. *CONDHAB – Number of Individuals Convicted in Criminal Cases, Predicted; Durbin-Watson = .521282 [.000,.000], n=25*

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[26] For some variables we also examined the regressions of the fourth lead and of the fourth lag of the variable on the current values of the components; the “middle”, current values equation exhibited the best fit.

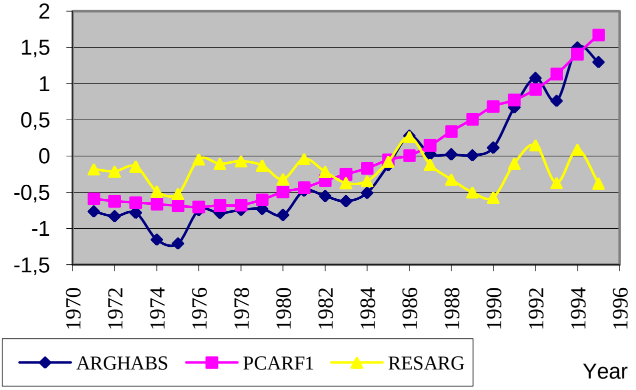

Figure 1.35. *ARGHAB – Number of Defendants in Criminal Cases, Predicted; Durbin-Watson = .905591 [.001,.001], n=25*

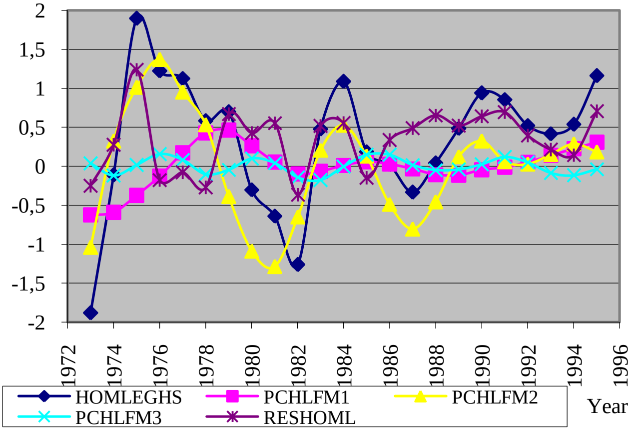

Figure 1.36. *HOMLEGH – Homicides, Predicted; Durbin-Watson = 1.16464 [.004,.049], n=23*

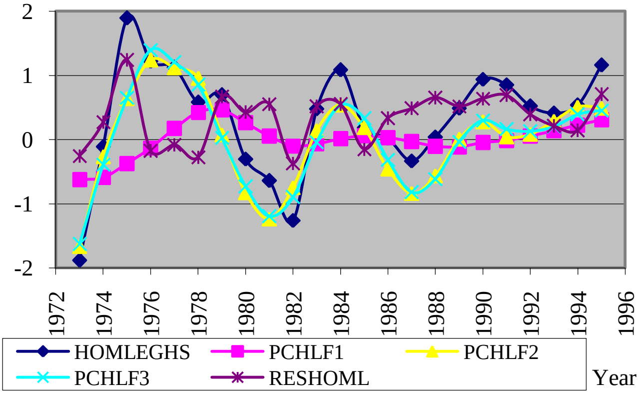

Figure 1.37. *HOMLEGH – Homicides, Accumulated Predictions*

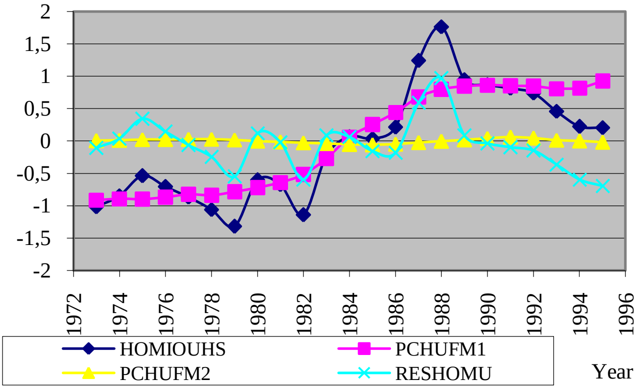

Figure 1.38. *HOMIOUH - Deaths by Possible Homicide, Predicted; Durbin-Watson = 1.01023 [.002,.009], n=23*

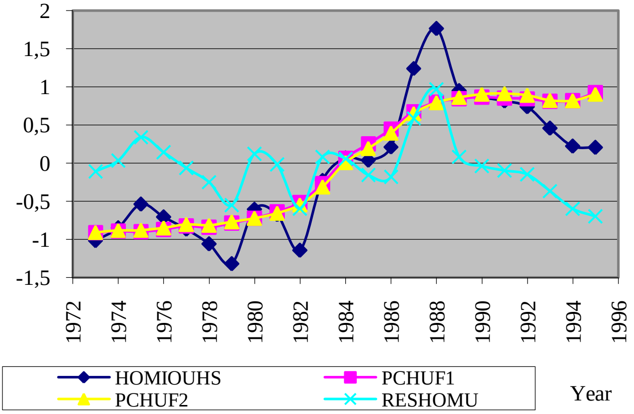

Figure 1.39. *HOMIOUH - Deaths by Possible Homicide, Accumulated Predictions*

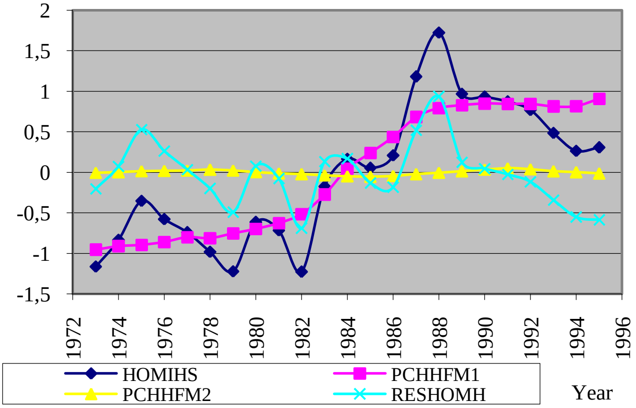

Figure 1.40. *HOMIH – Homicides and Deaths by Possible Homicide, Predicted; Durbin-Watson = 1.08711 [.004,.017], n=23*

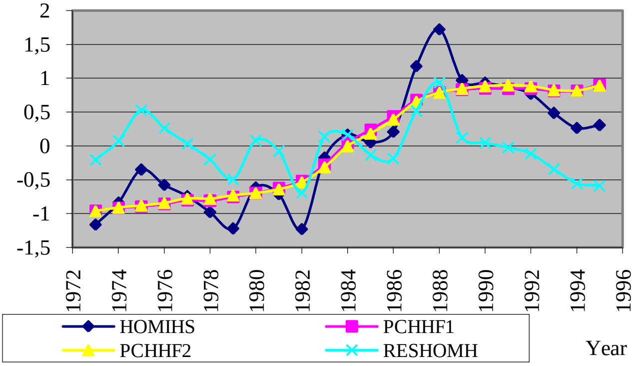

Figure 1.41. *HOMIH – Homicides and Deaths by Possible Homicide, Accumulated Predictions*

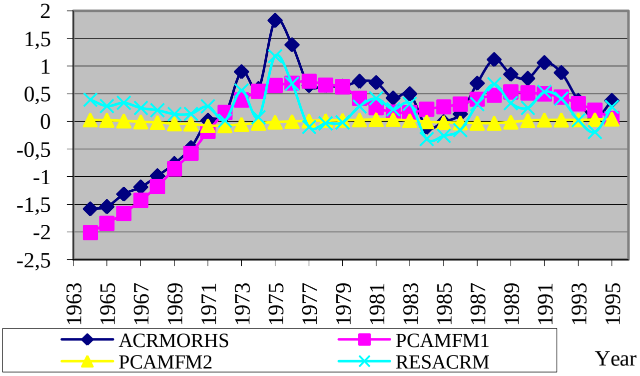

Figure 1.42. *ACRMORH – Deaths in Road Accidents, Predicted; Durbin-Watson = .926041 [.000,.001], n=32*

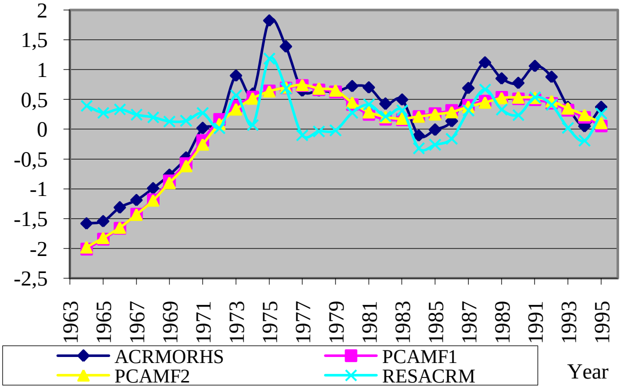

Figure 1.43. *ACRMORH – Deaths in Road Accidents, Accumulated Predictions*

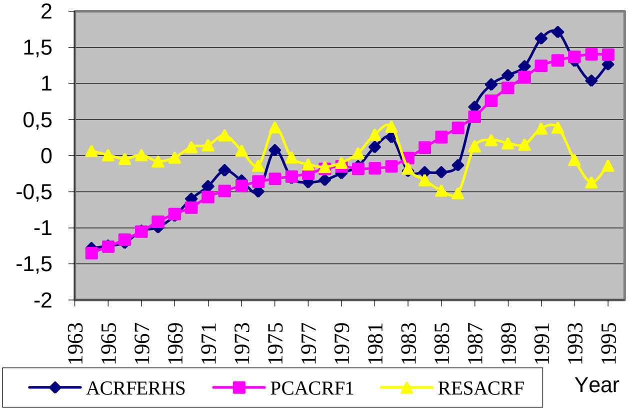

Figure 1.44. *ACRFERH – Injured in Road Accidents; Durbin-Watson = 1.06025 [.002,.002], n=32*

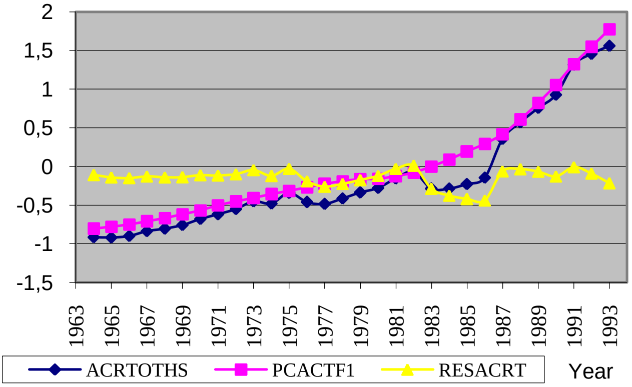

Figure 1.45. ACRTOTH - Road Accidents; Durbin-Watson = .338252 [.000,.000], n=30

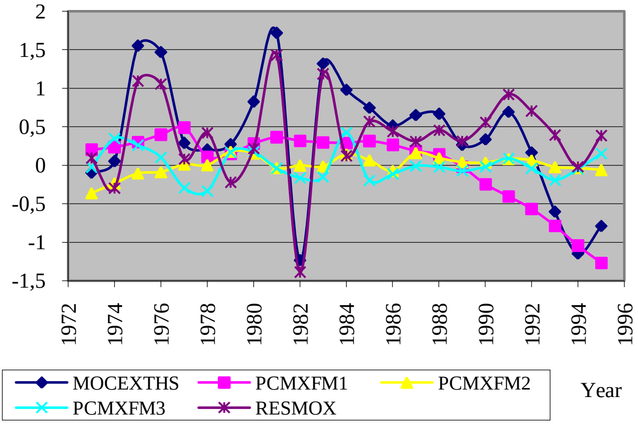

Figure 1.46. *MOCEXTH – Deaths Due to External Causes; Durbin-Watson = 1.99520 [.306,.685], n=23*

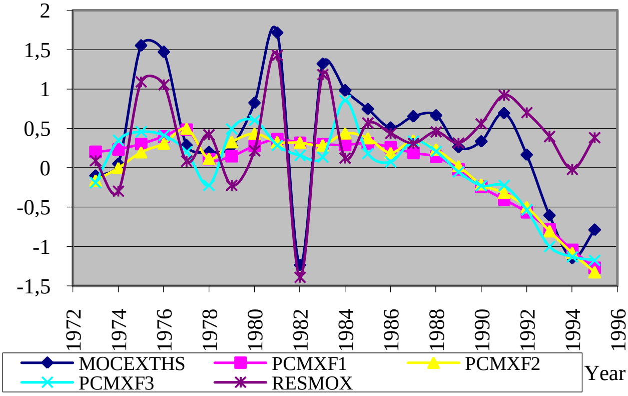

Figure 1.47. *MOCEXTH – Deaths Due to External Causes (Predicted)*

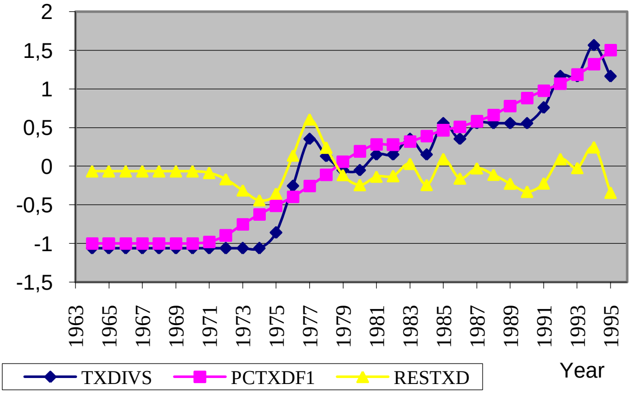

Figure 1.48. *TXDIV – Divorce Rate; Durbin-Watson = 1.08756 [.003,.003], n=32*

For all series, the graphically displayed residuals exhibit a stationary-like profile – the D-W points to positive autocorrelation, but it is usually larger than the R-square of the corresponding regression -, in some instances approximating the original series (specially for MOCEXTH, and HOMLEGH, the series with larger number of eigenvalues).

5. The following step was to inspect the long-run properties of the smoothed series and perform identical tests on unit roots. Results are summarized below; additionally, we present the simple correlations between the original series and the lead of the smoothed series in the first column of data, where the eigenvalue and proportion of the variance explained by the first principal component is recorded.

Unit roots conclusions do not differ that much – smoothing preserved the pattern and (as graphical inspection lead us to conclude) may have just discarded the erratic component in the series.

Table 1.2. *Unit Roots Tests – Smoothed Series*

						First DIF	First DIF
	Eigenvalue Exp. Vari [Corr, n]	CONST Tau test (p-value) [nlags; nobs]	C, TREND Tau test (p-value) [nlags; nobs]	D on C, TREND and lag F	C, T; T2 Tau test [nlags; nobs] D-F (p-value) [nlags; nobs]	CONST Tau test (p-value) [nlags; nobs]	C, TREND Tau test (p-value) [nlags; nobs]
CONDHAB	4.6149073 (0.92298146) [0.98069, 29]	-0.73029 (0.91253) [8; 20]	2.19058 (1.0000) [10; 18]	26.1174 (0.000) [28]	-0.70154 [8; 20] -2.94541 (0.32184) [10; 18]	-1.00993 (0.81894) [2; 25]	-2.20136 (0.50261) [7; 20]
ARGHAB	4.7514245 (0.95028490) [0.97800, 29]	-0.58170 (0.94208) [5; 23]	0.47830 (0.99967) [3; 25]	30.7764 (0.000) [28]	-2.47952 [2; 26] -1.93485 (0.84054) [10; 18]	0.68939 (0.99863) [10; 17]	-2.9919 (0.086879) [7; 20]
RECHAB	4.7293963 (0.94587925) [0.98645, 26]	-0.95086 (0.84366) [9; 16]	0.28646 (0.99942) [10; 15]	16.1683 (0.000) [25]	0.55160 [8; 17] -2.08655 (0.78166) [9; 16]	0.045666 (0.99066) [8; 16]	-1.15554 (0.95836) [8; 16]
RECCHAB	4.7183812 (0.94367624) [0.98774, 26]	-0.56594 (0.94460) [10; 15]	0.31967 (0.99947) [10; 15]	14.2754 (0.000) [25]	0.012779 [9; 16] -3.56514 (0.097324) [9; 16]	-0.35385 (0.96982) [9; 15]	-0.54534 (0.99304) [9; 15]
CRPOLHA	2.8980243 (0.96600811) [0.99629, 13]	-0.90261 (0.86175) [3; 9]	0.58973 (0.99976) [3; 9]	0.354416 (0.711) [12]	0.53141 [3; 9] -3.62093 (0.085329) [3; 9]	-1.63707 (0.40968) [3; 8]	-1.83673 (0.75031) [3; 8]
ACRMORH	2.8079885 (0.93599649) [0.98272, 38]	-0.62762 (0.93412) [3; 34]	-0.71951 (0.98834) [3; 34]	5.16708 (0.011) [37]	-0.60118 [10; 27] -2.51765 (0.55924) [10; 27]	-2.86386 (0.017430) [2; 34]	-2.15387 (0.53803) [10; 26]
ACRFERH	2.9156855	-0.48600	-0.92000	1.13270	-0.90561	-2.56375	-2.59544

	(0.97189516) [0.99385, 38]	(0.95586) [4; 33]	(0.97896) [8; 29]	(0.334) [37]	[8; 29] -4.16648 (0.019251) [10; 27]	(0.041687) [3; 33]	(0.23733) [3; 33]
ACRTOTH	2.9799066 (0.99330218) [0.99863, 36]	0.47939 (0.99743) [6; 29]	1.26013 (0.99997) [5; 30]	16.2710 (0.000) [35]	0.30580 [5; 30] -3.05539 (0.26947) [10; 25]	-0.89121 (0.86576) [5; 29]	-2.09073 (0.58446) [5; 29]
SUICHAB	1.9739497 (0.65798324) [0.88611, 29]	-0.57136 (0.94375) [3; 25]	-1.24555 (0.94620) [3; 25]	1.54822 (0.232) [28]	-2.10679 [3; 25] -2.12959 (0.76278) [10; 18]	-2.94134 (0.013877) [4; 23]	-3.69844 (0.011384) [4; 23]
ACTJTOH	3.2345651 (0.80864129) [0.94328, 25]	-0.60927 (0.93742) [10; 14]	-1.28182 (0.94041) [3; 21]	1.62347 (0.221) [24]	-0.77917 [8; 16] -1.84716 (0.86903) [9; 15]	-3.72217 (0.0013621) [3; 20]	-1.12102 (0.96229) [9; 14]
ACTJMOH	1.8682766 (0.46706914) [0.78131, 23]	-0.89199 (0.86549) [3; 19]	-1.82384 (0.75746) [3; 19]	1.55295 (0.237) [22]	-1.96945 [3; 19] -2.65311 (0.48114) [5; 17]	-2.26169 (0.096898) [4; 17]	-2.10941 (0.57084) [4; 17]
ACTTOH	2.4548955 (0.81829849) [0.98873, 16]	-1.54609 (0.47668) [4; 11]	-1.09890 (0.96462) [4; 11]	0.98023 (0.403) [15]	-0.043488 [4; 11] -3.77016 (0.058878) [4; 11]	-1.14225 (0.75282) [3; 11]	-1.81221 (0.76379) [3; 11]
ACTMOH	2.2286497 (0.74288323) [0.95132, 16]	-1.57360 (0.45622) [4; 11]	-1.20297 (0.95233) [3; 12]	1.54818 (0.252) [15]	-1.37023 [3; 12] -1.06437 (0.98431) [3; 12]	-1.36796 (0.60804) [3; 11]	-1.50097 (0.89127) [3; 11]
HOMLEGH	1.9836828 (0.66122761) [0.92730, 29]	-1.69330 (0.36974) [7; 21]	-1.55465 (0.87472) [7; 21]	2.43999 (0.108) [28]	-1.42413 [7; 21] 0.041437 (0.99902) [7; 21]	-1.43388 (0.56022) [6; 21]	-1.87220 (0.72993) [6; 21]
HOMIOUH	2.7002921 (0.90009736) [0.97213, 29]	-0.55691 (0.94600) [4; 24]	-2.33231 (0.40590) [3; 25]	1.26544 (0.300) [28]	-2.36542 [3; 25] -1.18113 (0.97789) [10; 18]	-2.38981 (0.068172) [3; 24]	-2.41559 (0.34754) [3; 24]
HOMIH	2.7013166 (0.90043885) [0.97234, 29]	-0.54981 (0.94707) [4; 24]	-2.33584 (0.40336) [3; 25]	1.14331 (0.335) [28]	-2.31229 [3; 25] -1.27596 (0.97088) [10,18]	-1.89314 (0.24405) [6; 21]	-1.97771 (0.66350) [6; 21]
MOCEXTH	1.9666083 (0.65553611) [0.82501, 29]	-0.66069 (0.92777) [2; 26]	-0.85428 (0.98265) [2; 26]	4.48313 (0.022) [28]	-3.55590 [2; 26] -2.54586 (0.54301) [4; 24]	-3.14646 (0.0075651) [2; 25]	-2.65069 (0.20874) [4; 23]
TXDIV	3.2345651 (0.80864129) [0.99396, 38]	0.12413 (0.99260) [9; 28]	0.20583 (0.99926) [10; 27]	4.01480 (0.027) [37]	-0.61408 [10; 27] -4.43748 (0.00806) [10; 27]	-0.95215 (0.84315) [9; 27]	-1.77186 (0.78486) [9; 27]
TGRPT	1.8829971 (0.62766571) [0.88254, 11]	-0.57254 (0.94356) [3; 7]	-1.70107 (0.81843) [2; 8]	1.55504 (0.276) [10]	-3.46096 [2; 8] -3.15024 (0.22876) [2; 8]	-1.23962 (0.69480) [2; 7]	-1.49560 (0.89282) [2; 7]
HGRPT	1.7287826 (0.57626088) [0.85890, 11]	-1.20084 (0.71881) [3; 7]	-0.95525 (0.97668) [2; 8]	1.08375 (0.389) [10]	-2.80103 [2; 8] -1.22323 (0.97500) [2; 8]	-1.00495 (0.82113) [2; 7]	-1.71876 (0.81044) [2; 7]

MILCAR	2.8796189 (0.95987296) [0.99155, 24]	-0.47960 (0.95666) [3; 20]	0.29231 (0.99943) [8; 15]	0.951463 (0.403) [23]	-0.38373 [8; 15] -2.22953 (0.71554) [8; 15]	-1.83433 (0.27791) [7; 15]	-2.07953 (0.59257) [7; 15]
SMO	2.5289257 (0.84297522) [0.98906, 24]	1.00927 (0.99947) [4; 19]	-1.21730 (0.95034) [4; 19]	29.6395 (0.000) [23]	-1.21674 [4; 19] -3.57704 (0.094664) [8; 15]	-1.41801 (0.57186) [3; 19]	-1.73316 (0.80374) [3; 19]
FA	2.2283027 (0.74276756) [0.97479, 24]	1.20963 (0.99971) [4; 19]	-1.39899 (0.91748) [4; 19]	32.6697 (0.000) [23]	-1.62519 [4; 19] -2.67275 (0.46987) [3; 20]	-1.39431 (0.58911) [3; 19]	-1.88002 (0.72530) [3; 19]

It is arguable that OLS residuals of the regressions of the current series in the “smoothed” values should also be inspected and used in the multivariate analysis. However, on the one hand, when a stationary input set is sought – see for example, Forni & Reichlin (1996) -, differencing is usually used in the literature. Secondly, principal components may deal with non-stationary series: it might separate, in a multivariate environment, for example, a trend from other aspects in data. Thirdly, fundamental patterns – as captured with smoothed series - may be of special relevance; after all, they represent the bulk of data variability. In accordance, we exhibit results for the current and the smoothed series in most of the analysis, and present in some sections results of multivariate treatment of differenced series.

2. Social Disruption Indicators: Common Factor and Trend Analysis

Principal Components – a Brief Overview and Some Extensions

1. Principal components and factor analysis are multivariate tools widely used to deal with sets of continuous variables measured in ratio scales[27], originally proposed by Pearson (1901) and developed by Hotelling (1933), with the birth of factor analysis having been attributed to Spearman (1904)[28]. Presently, they are having an increasing number of applications in finance and time series analysis – recent quotations can be found in Bai (2003). Assume we have a set of p variables, observed for t=1,2,...n sample elements, and let X_{jt} denote the value taken by the j-th variable for t-th element (observation) – j =1,2,...,p; t =1,2,...,n. Principal components transforms the original data set in another of the same length (that is, with the same number of observations) such that each of the new variables - the components -, a linear combination of the original ones, i.e.,

$$
\begin{aligned}
Y_{1t} &= a_{11} X_{1t} + a_{21} X_{2t} + \dots + a_{p1} X_{pt} \\
Y_{2t} &= a_{12} X_{1t} + a_{22} X_{2t} + \dots + a_{p2} X_{pt}
\end{aligned}
$$

---

[27] The reader can find the information here summarized in standard textbooks like Johnson & Wichern (2002), Reis (1997).

[28] See Harman (1976).

…

$$Y_{pt} = a_{1p} X_{1t} + a_{2p} X_{2t} + \dots + a_{pp} X_{pt}$$

$$t = 1,2,\dots,n$$

captures a decreasing amount of variability of the whole set, being totally uncorrelated with each other.

Let Y be the (nxp) matrix of principal components of the n observations of p generic variables, contained in a (nxp) matrix X, with the (pxp) covariance matrix S, i.e., $S = (\frac{X'X}{n} - X' \frac{LL'}{n^2} X)$ where L denotes a column vector of n 1's. If A_X is the matrix of (column) eigenvectors of S, and Λ_X the diagonal matrix of corresponding eigenvalues, in descending order of magnitude:

$$A_X' S A_X = \Lambda_X \quad ; \quad S = A_X \Lambda_X A_X'$$

A_X is (chosen) orthogonal and thus: $A_X' = A_X^{-1}$, implying $A_X' A_X = A_X A_X' = I_p$, where I_p denotes the (pxp) identity matrix. Denoting by A_{Xj} the j-th column of A_X (the j-th eigenvector) and by Λ_j the corresponding eigenvalue, the spectral decomposition of S is, thus, given by $S = \sum_{j=1}^{p} \Lambda_j A_{Xj} A_{Xj}'$[29]. We can write the matrix of pc's, Y, as[30]:

$$Y = X A_X \tag{1}$$

The variance of each Y_j will equal the corresponding eigenvalue in Λ_X and these sum to the total variability of the X's. Principal components have several interesting properties. If we pre-multiply both sides of (1) by A_X', we derive that:

$$X = Y A_X' \tag{2}$$

That is, we can write in an exact form:

---

[29] See Chamberlain & Rothschild (1983), for example.

[30] See Hall & Cummins (1998), to interpret notation.

$$
\begin{aligned}
X_{1t} &= a_{11} Y_{1t} + a_{12} Y_{2t} + \dots + a_{1p} Y_{pt} \\
X_{2t} &= a_{21} Y_{1t} + a_{22} Y_{2t} + \dots + a_{2p} Y_{pt} \\
&\dots \\
X_{pt} &= a_{p1} Y_{1t} + a_{p2} Y_{2t} + \dots + a_{pp} Y_{pt} \\
&\qquad\qquad\qquad\qquad t = 1,2,\dots,n
\end{aligned}
$$

Factor analysis is based in a similar format as this transposed system, being a linear combination of uncorrelated unobserved factors underneath the observed set of X variables [31]; less factors than variables would be of interest and an error term is added to each equation [32].

The computation results that were of use in this research and presented in the text or tables below are:

1) the proportion of total variance explained by each component. If, say, 90% of the variance is explained by only a small (relative to p) number of components, then we may just retain these to interpret or represent the data – somehow "reduced" by principal components.

2) factor loadings, the simple correlations between each original variable and each component. The variables that rate high in each component may form a pattern that allows us to interpret that component itself.

Technically, the variables were previously standardized (that is, the X's have mean zero and unit variance) [33]. Eigenvectors (j) associated to the eigenvalues of the variance-covariance matrix of X determine the a_{ij}'s of principal components (j), being the

---

[31] See Dhrymes (1974), p. 81 and 82, for example, for a similar derivation. Also, Chamberlain & Rothschild (1983) prove asymptotical equivalence in large factor models when factors are derived with, say, maximum likelihood techniques – see Bai (2003).

[32] Factor analysis – even principal component factor analysis - computes factor scores that differ from the principal components – the latter, much easier to deal with in programming. The applicability of the two methods are usually considered interchangeable in the literature (even if different procedures may offer different estimates). The conclusions one could draw from that approach would be, for our purposes, the same. However, extensions we advance in the text were linked to and proven for principal components only.

[33] TSP prin routine - which standardizes the derived principal components as well, which, for our purposes is of no consequence - was used for the computations in standardized variables. Occasionally, matrix programming of the same package was performed.

eigenvalue representative of the explained variance by the component [34].

The literature suggests several methods to determine what is the sufficient number of components; in accordance, and because data was previously standardized, we chose to consider components associated to eigenvalues larger than 1 (together, they usually accounted for more than 90% of the variance in the sample) [35]. For some cases, we performed tests of significance of the coefficients of more than the first k components (CHI1) in a system of p equations in which the X variables are explained by the first p-1 components [36] – yet, these pointed to a very few number of components being necessary [37]; additionally, and in the spirit of the previous "backward" test, we compute a "forward" one(s) and tested, in the systems of the p variables in the first k components (for k = 1,2,…), the joint significance of the coefficients associated to the k-th component in the p equations (CHI2). Also, for some cases, we computed information criteria as proposed by Stock & Watson (1998), Bai & Ng (2002) [38]:

$$\text{SIG} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{(np-k)}$$

$$\text{BIC3} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\ [1+\text{k}\ \frac{\ln(pn)}{pn}\ ]$$

---

[34] Being the variables standardized, their variance-covariance matrix is indeed the correlation matrix of the original variables; also, the proportion of the total variance explained by each component is equal to the associated eigenvalue divided by the total number of variables, p.

[35] Dhrymes (1974) presents tests for the validation of the number of components. We performed them for some cases, namely Lawley's (1956) test - estimates available upon request; however, the test statistics usually pointed to a much larger number of components than the ones with eigenvalues larger than 1. This, as other similar tests, usually rely on asymptotic assumptions – see Wichern & Johnson (2002); unfortunately, we seldom reach 30 observations.

[36] An example of the use of the procedure in factor analysis can be found in Albuquerque, Bauer & Schneider (2002). The last component (presumably, the least important) is not included in our regressions because it originates a perfect fit to the system, rendering the full model undefeated in any test.

[37] Again, the few number of observations available render the reliance on these tests problematic. Moreover, we do not require – even if some pertaining tests were performed - normality of the data; that could enlarge the tests that might be used, but it is not a necessary assumption for our study.

[38] Even if they are derived for large sample contexts.

$$\text{PC} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\ [1 + \text{i}\ \frac{p+n}{pn}\ \ln\left(\frac{pn}{p+n}\right)]$$

$$\text{IC} = \ln\left(\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\right) + \text{i}\ \frac{p+n}{pn}\ \ln\left(\frac{pn}{p+n}\right)$$

e_{jt}, t =1,2,…,n denote the estimated error terms from the OLS regressions of (standardized) variable j on the first i principal components. i is the number of components in the system, and k the number of parameters required for model estimation. For instance, for a system with i components, k = i (p + n – i). k' = i [2 * p – i] was also essayed (we consider here that the components are intermediate estimates, being loadings the relevant number of parameters): measures SIG' and BIC3' respectively.

We tried to validate the inclusion of the variables in the sets by studying the properties of systems of p, and (p-1) equations in which the variables are explained by components extracted with either p and p-1 variables, relying on applications of traditional linear restrictions testing; and information criteria. We estimated the following criteria, adjustments of those proposed in Bai & Ng (2002) made to generate statistics to be used in the comparison of models with the same number of components, i:

$$\text{SIG} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{(np-k)}$$

$$\text{BIC3} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\ [1 + \text{k}\ \frac{\ln(pn)}{pn}]$$

$$\text{ICZ} = \ln\left(\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\right) + \text{k}\ \frac{\ln(pn)}{pn}$$

$$\text{PC'} = \sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\ [1 + \text{k}\ \frac{p+n}{p\,n}\ \ln\frac{p\,n}{p+n}]$$

$$\text{ICZ'} = \ln\left(\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{jt}^{2}}{np}\right) + \text{k}\ \frac{p+n}{p\,n}\ \ln\frac{p\,n}{p+n}$$

e_{jt}, t =1,2,…,n denotes, as before, the estimated error terms from the OLS regressions of (standardized) variable j on the first i principal components. i is the number of components in the system, and k the number of parameters required for model estimation. For instance, for a system with i components, if the number of extracted components, p, is equal to number of equations, k = i [2 * p – i], where i refers the relevant components, included in the p-equation system; otherwise k = i* (p’ + p) where p’ refers the number of variables used to extract the components (with p’ ≥ i) and p the equations in the factor system. However, these statistics revealed inconsistency, always pointing to the components derived for the system in presence and we do not report them. (F tests on the parameters of the equations with 2 i components always originated rejection of the null in either direction.)

Some correlation must exist among the original variables for the method to be worthwhile – some tests are sometimes proposed. We performed Bartlett sphericity test [39] for cross-section data (time series already embodies a lot of cross-correlation).

Principal components may provide several functions, some with graphical counterparts with similar functions of other multivariate tools:

- firstly, it provides a grouping or “clustering” of the variables themselves according to the weight of factor loadings
- secondly, it may provide the clustering of the observations according to the values of the components; for example, the plot in a two-axis graph of the first against the second main components of the observations provides the same sort of reading as multi-dimensional scaling, eventually exhibiting clouds of clusters according to pc magnitudes. (And, of course, switching observations and variables – transposing the original data matrix –, performing pc on the transposed data matrix provides a direct clustering of the observations, the variables so created.)

We also relied on these properties of principal components to make inference.

We completed the inspection by analyzing the simple correlations of each extracted component with some common macroeconomic reference indicators: population, GDP per capita, GDP per capita growth rate, unemployment rate, and inflation rate; in time series evidence, also with the time trend and the price level index number itself.

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[39] Lawley’s (1963) test, cited in Johnson & Wichern, is sometimes proposed to test for equal correlation between all possible pairs of variables; by inspection of our sample correlation matrices, that is not usually the case.

2. We explored as well the structure of the cross-correlation matrix of the variables themselves: we constructed for each variable, the simple correlations with all other variables [40]. That is, the t-th observation of the (new) X^{new}_j variable is:

$$X^{new}_{j,t} = \mathrm{Corr}(X_j, X_t),\ t = 1,2,\ldots p$$

p is the total number of variables in the data set being considered. The second step of the approach was to inspect the principal components of the "new" set of variables which would capture the pattern of the correlations of each "original" variable with all others in the set. That is, the underlying principal components model in fact decomposes:

$$Y_{1t} = a_{11}\,\mathrm{Corr}(X_1,X_t) + a_{21}\,\mathrm{Corr}(X_2,X_t) + \ldots + a_{p1}\,\mathrm{Corr}(X_p,X_t)$$
$$Y_{2t} = a_{12}\,\mathrm{Corr}(X_1,X_t) + a_{22}\,\mathrm{Corr}(X_2,X_t) + \ldots + a_{p2}\,\mathrm{Corr}(X_p,X_t)$$
$$\ldots$$
$$Y_{pt} = a_{1p}\,\mathrm{Corr}(X_1,X_t) + a_{2p}\,\mathrm{Corr}(X_2,X_t) + \ldots + a_{pp}\,\mathrm{Corr}(X_p,X_t)$$

The components and factor loadings of the model capture similarities in the degree of (linear) association of each variable with all the others.

This cross-correlation matrix decomposition resembles an application of the Method of Moments, relying on the second moments, to the estimation of the loadings of a set of standardized variables in principal components. Yet, it cannot be mathematically justified on such grounds:

Let us depart from equation (1). Then:

$$Y'Y = A_X'\,X'X\,A_X$$

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[40] Needless to say, the method could be applied to the covariance structure of a given set of variables. That would probably be appropriate for some financial inquiries, for example. In our case, given the different units in which the variables are measured, the correlation structure is preferred.

If data (X) is centered, so that each column was extracted of its mean, then, also the Y’s will be centered (i.e., have mean zero) and, being n the number of observations:

$$Y'Y = n\Lambda_X = A_X' X'X A_X$$
$$n A_X \Lambda_X = X'X A_X$$

implying:

$$A_X \Lambda_X = \frac{X'X}{n} A_X \quad (3)$$

Being $Y = X A_X$, $\frac{X'X}{n} A_X = \frac{X'Y}{n}$: $A_X \Lambda_X$ contains the covariances between each original variable (line) and each component (column)[41] and equals $\frac{X'X}{n} A_X$.

If the input variables X were not only centered but standardized, $\frac{X'X}{n}$ is, as is well-known, the correlation matrix of the X’s[42]. In the own cross-correlations decomposition model we postulate:

$$Z = \frac{X'X}{n} A_{XX} \quad (4)$$

Apparently, Z, the principal components of the “new” model, would capture $A_X \Lambda_X$ – the co-variances between Y’s and X’s - of form (3) when the latter referred to standardized variables X. We could expect that the proposed method estimates loadings A_{XX} that would imply the maximization of the variance of the covariances between the (standardized, if we refer to the

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[41] This is also true if the X’s are not centered – see Johnson & Wichern (2002), for example. But previous algebra would become heavier.

[42] Then factor loadings, the correlations between the X’s and the Y’s, are obtained multiplying that matrix of (3) by the inverse of the square root of the matrix of eigenvalues.

correlation matrix by $\frac{X'X}{n}$) X's and the first principal component obtained from $Y^* = X\,A_{XX}$ – that is, this first principal component would discriminate the most the relationships between the X's and the component itself -, then the variance of the co-variance between the X's and the second principal component, being uncorrelated, and so on - capturing in the estimated Z's such covariances.

Yet, the new model in (4) does not entail standardization, not even centering of the new input data set. In general, $A_{XX} \neq A_X$ and the advanced interpretation of Z does not follow completely:

Let L be a (px1) vector of 1's. Only if the eigenvectors of

$$\frac{1}{p}\left(\frac{X'X}{n}\,\frac{X'X}{n} - \frac{X'X}{n}\,\frac{L\,L'}{p}\,\frac{X'X}{n}\right)$$

are the same as those of $\frac{X'X}{n}$, does $A_{XX} = A_X$.

Well, A_X are indeed the eigenvectors of $\left(\frac{X'X}{n}\,\frac{X'X}{n}\right)$ - with $(\Lambda_X\,\Lambda_X)$ the diagonal matrix of corresponding eigenvalues[43]; but the eigenvalues of $\left(\frac{X'X}{n}\,\frac{L\,L'}{p}\,\frac{X'X}{n}\right)$[44] are not the same as those of $\left(\frac{X'X}{n}\,\frac{X'X}{n}\right)$, hence, they will differ from those of $\left(\frac{X'X}{n}\,\frac{X'X}{n} - \frac{X'X}{n}\,\frac{L\,L'}{p}\,\frac{X'X}{n}\right)$. We conclude therefore, that the method of extracting the pc's of a covariance (correlation) matrix is not fully correspondent to obtaining the pc's of original (standardized) variables.

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[43] If a is an eigenvector and λ the associated eigenvalue of a square matrix B, B a = λ a and then (B B) a = B (B a) = B (λ a) = λ (B a) = λ^2 a: the matrix (B B) has the same eigenvectors as B, the corresponding eigenvalues being the square of those of B.

[44] Of these, in number of p, only one is expected to differ from zero.

Additionally, the matrix of eigenvalues of $\frac{1}{p}\,\frac{\mathrm{X'X}}{\mathrm{n}}\,\frac{\mathrm{X'X}}{\mathrm{n}}$, is $\Lambda_{\mathrm{XX}} = \frac{1}{p}\,\Lambda_{\mathrm{X}}\,\Lambda_{\mathrm{X}}$: the order of magnitude of the new eigenvalues would approach the square of the former divided by the number of variables. (In any case, as referred before in the text, we always correct obtained eigenvalues for purposes of determining the number of relevant components.)

3. From the above discussion, we infer that the application of "uncentered" principal components to the correlation (covariance) matrix would capture the same eigenvectors $\mathrm{A_X}$ as those to the original standardized (original centered or not) values.

3.1. By "uncentered" principal components we refer to a method that would create, from a matrix of original p variables with observations contained in an (nxp) matrix X, a new set Y (nxp) of p variables, linear combinations of the former, not necessarily uncorrelated, but orthogonal to each other - that is, such that Y'Y is a diagonal matrix – such that the first "uncentered" principal component (in the first column of Y) would have maximal uncentered second moment, the second component would capture the maximum second (uncentered) moment being the component orthogonal to the first, and so on, being in a relation to the second moments of the original variables as "centered" principal components are to their variances. Obviously, these "uncentered" principal components Y's would obey

$$\mathrm{Y = X\,B_X}$$

where $\mathrm{B_X}$ would have in its columns the eigenvectors corresponding to the p eigenvalues – by descending order – of the matrix $\mathrm{S_B} = \frac{\mathrm{X'X}}{\mathrm{n}}$, this being a matrix of uncentered cross moments, that is, of typical element in line j, column k $\frac{\sum_{i=1}^{n} X_{ji}X_{ki}}{n}$. Let such eigenvalues be contained in the diagonal of the diagonal matrix Λ_{Bx}. Then, $\mathrm{B_X}\,\Lambda_{\mathrm{Bx}} = \frac{\mathrm{X'Y}}{\mathrm{n}}$ captures the uncentered cross moments between the variables X (line) and the created components Y (column) [45].

The “factor loadings” can be obtained from:

$$SD^{-1/2} B_X \Lambda_{Bx}^{1/2}$$

where SD is a diagonal matrix containing the elements of the diagonal of $\frac{X'X}{n}$. Such factor loadings are “uncentered” correlation coefficients, $\frac{\sum_{i=1}^{n} X_{j,i} Y_{k,i}}{\sqrt{\sum_{i=1}^{n} X_{j,i}^2 \sum_{i=1}^{n} Y_{k,i}^2}}$, measuring the degree of proportionality between two variables, X_j and (the component) Y_k - and not only of general linear association between them, as conventional correlation coefficients represent.

If the variables in X are divided by the square root of the uncentered second moment, an “uncentered correlation” matrix format for the matrix originating eigenvalues and vectors would apply. Then, such “uncentered” factor loadings are obtained from simply $B_X \Lambda_{Bx}^{1/2}$ [46].

3.2. Let the original data X to which conventional (“centered”) principal components yield loadings (i.e., elements of the matrix of eigenvectors) A_X, generating $Y = X A_X$. If data X is (not) standardized, applying uncentered principal components to the standard correlation (covariance) matrix, generating the components in Z (pxp):

$$Z = \frac{X'X}{n} B_{XX} \qquad (5)$$

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[45] In some literature, it is unclear whether “principal components” would refer this concept, applicable to centered or standardized matrices X – see Theil (1979), for example. However – as is known -, if applied to an uncentered X matrix, it yields completely different results than what is in other literature associated to “principal components”.

[46] Of course, matrices are not the same as those obtained from “uncentered unstandardized formats”.

recovers in the transformation matrix $B_{XX} = A_X$, the same eigenvectors as those of the original format. B_{XX} contains the eigenvectors of the matrix $\frac{1}{p}\frac{X'X}{n}\frac{X'X}{n}$; with eigenvalue-diagonal matrix $\Lambda_{XX} = \frac{1}{p}\Lambda_X \Lambda_X$. One can infer original "factor loadings" – correlations between the X's and the Y's – from $p^{1/4} B_{XX} \Lambda_{XX}^{1/4} = p^{-1/4} Z \Lambda_{XX}^{-1/4}$ if we decompose the correlation matrix; from $p^{1/4} SD^{-1/2} B_{XX} \Lambda_{XX}^{1/4} = p^{-1/4} SD^{-1/2} Z \Lambda_{XX}^{-1/4}$ if decomposing the covariance matrix. (In reported results of correlation matrix decomposition by conventional pc, we will consider as important components with direct - "adjusted" - eigenvalues larger than 1; when relying on uncentered procedures, we will report components with the reverted – for original variables coordinates - eigenvalues larger than 1.)

Z contains the covariances between the (standardized, if we have a correlation matrix) X's and the Y's.

One also infers that conventional principal components Y imply the maximization of the second (uncentered) moment of the covariances between the (p) X's and the first principal component Y_1, then of the second moment of the covariances between the X's and the second principal component Y_2, being uncorrelated with Y_1, and so on.

4. Hence the proposed model (4) may have a value of its own. Applying "uncentered" principal components to (4) does not seem to lead to too much gain; but conventional pc may offer different insights. We therefore considered in the estimation of the system in 2. in the unstandardized (but centered) format and also standardizing the newly created "variables".

For "unstandardized centered" formats – as suggested by the similar status of A_X and A_{XX} in (3) and (4) previously interpreted -, we completed the analysis confronting the "conventional" (standardized) principal component analysis with another in which we derive the pc's with the "second-order" loadings, i.e., we confront $Y = X A_X$ with $Y^* = X A_{XX}$ (the X's being always standardized).

5. Taking a complementary approach to the previous one, and because we will be looking at potential causes of the previous set of variables, we considered the decomposition of the cross-correlations of the p variables not with themselves but with a pre-specified set of other, say, m potentially explanatory variables. That is, the t-th observation of the (new) X^{new}_j variable is:

$$X^{new}_{j,t} = \text{Corr}(X_j, Z_t),\ t = 1,2,...m$$

Each observation, t, refers now to a particular variable of another data set. The system decomposition would be written as:

$$Y_{1t} = a_{11}\,\text{Corr}(X_1,Z_t) + a_{21}\,\text{Corr}(X_2,Z_t) + ... + a_{p1}\,\text{Corr}(X_p,Z_t)$$
$$Y_{2t} = a_{12}\,\text{Corr}(X_1,Z_t) + a_{22}\,\text{Corr}(X_2,Z_t) + ... + a_{p2}\,\text{Corr}(X_p,Z_t)$$
...
$$Y_{pt} = a_{1p}\,\text{Corr}(X_1,Z_t) + a_{2p}\,\text{Corr}(X_2,Z_t) + ... + a_{pp}\,\text{Corr}(X_p,Z_t)$$

If the previous analysis would capture links among the variables in the dependent sample, now the eventual grouping of the variables of the dependent set is determined by their relations to another pre-defined exogenous set of variables. That is, if "internal" structure of the previous composite is determinant of the "own" cross-correlation analysis, we now capture "external" relations towards another set – common links to outside environment. Each component would exhibit high factor loadings for variables in Z that cause the dependent set X in the same way[47].

6. Given that the size and significance of the cross-correlations is very sensitive to the number of observations used, the previous correlation matrix decomposition models should be preformed for correlations computed from simultaneously non-missing observations for the whole set of involved variables – to "balanced samples", with no missing observations.

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[47] One could hypothesize an encompassing model including the X's and Z's. As will become apparent in subsequent econometric exploration, we will consider the X's as being caused by the Z's, hence, representing X and Z different phenomena.

The new equation formats in correlations suggest natural methods for using the full information available for each pair of variables, that is, to treat "unbalanced" samples. Moreover, in these cases, the theoretical exposition offered a self-contained interpretation for the models in cross-moment form without the need for the actual derivation of the components for the original variables – which is very convenient, once they cannot be computed for more observations than those of the "balanced sample".

Then, for a model in correlations [48], we can multiply each of them by the square root of the number of observations used for its computation – eventually divided by the mean - and apply [49] principal components – preferably, "uncentered" principal components, once these generate the levels' eigenvectors when applied to correlation decomposition - to the so weighted correlation matrix [50].

An alternative method considers extracting principal components of the matrix of the significance levels obtained from the low tail (the one-tail allows to discriminate high and negative, low, and high and positive correlations) probability (we used the t-student distribution, but the normal approximation could have been used as well), implied for the test H_0: $\rho = 0$ against H_1: $\rho > 0$ (the matrix contains, therefore, 1 minus the p-value of such test) by the estimated cross-correlations [51]. The correlation matrix can be viewed as containing some measure(s) of "distance" between the variables, and we justified its direct decomposition by principal components; using significance levels of the correlations would capture distances between variables but in another metric. (A more

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[48] We always compute the simple correlation coefficients using the same observations to obtain the numerator – the covariance between the two variables – and the denominator – the standard errors of each of the variables.

[49] From the previous theoretical discussion, one could argue that "uncentered" principal components should be applied to the weighted correlation matrix.

[50] The loadings (eigenvectors) obtained can be applied to the original values, the X's – then we may want to divide the weights of the "weighted" correlation matrix by their mean, and insure the diagonal elements of the derived matrix are 1. We would never recover more observations for the pc's themselves than before, though, once we need simultaneously all the X's being available per observation.

[51] Of course, the procedure could as well be applied to "balanced samples". Loadings obtained from the spectral decomposition of the significance probability matrix can be used to create "components" as linear combinations of the standardized variables. However, these "components", will not be uncorrelated and will have a non-linear relation to the interpretation of conventional ones.

refine treatment when the t-student distribution is used would convert that p-value into, say, the implied theoretical t-statistic, t, for a distribution with fixed degrees of freedom v - for example, mean sample size available minus 2 - and infer the "corrected" correlation, denote it by r, from $t^2 = v\, r^2 /(1 - r^2)$, with the sign of r being the same as that of t. If the sample size is always large and the standard normal is used to compute p-values, the corrected r will relate to ro, computed for n-2 observations, obeying $v\, r^2 /(1 - r^2) = (n-2)\, ro^2 /(1 - ro^2)$ – i.e., as the square root of $r^2 = (n – 2)\, ro^2 /[(n – 2)\, ro^2 + v\, (1 - ro^2)]$ and with the sign of ro. This would be, of course, an alternative and comparable procedure to that advanced in the previous paragraph.)

In fact, the use of the square root of the number of observations times the cross-correlations as described before is motivated by the relation of such product in large samples to the significance level of a test under the same common distribution, the standard normal.

Of course, it is not consistency that is the issue here, but correlation significance: covariances could be consistent estimators of a second moment matrix, provided this matrix had an asymptotic finite positive-definite one. In this case, principal components should be extracted using the direct covariance matrix of unbalanced samples if one is treating unstandardized variables.

7. Moreover, the new format of the input to principal component estimation – the correlation decomposition - provides additional graphical potential: we can now plot the first against the second component and (eventually) visualize in the points formed the clusters of the variables themselves – the disruption indicators when we considered the own correlations, the external variables when we consider correlations with the outside set.

The plot of either "loadings" (the elements of the eigenvectors) or "factor loadings" (the correlations between the variables and the components) of the variables from the first two principal components obtained from conventional ´pc´ could provide the same type of information, though [52]. Let us distinguish the two types of variable "scores":

The proportion of the variance of a (univariate) variable Y explained by another variable X_j in a linear regression of Y on k independent variables, being the X's totally uncorrelated, is given by the square of the coefficient of (standardized) X_j in the

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[52] There is no such correspondence with decomposition of cross-correlations with external sets.

regression of standardized Y on the k standardized X's, i.e., by the square of the estimate of the standardized coefficient of variable j. The explained variance (and not the proportion) can be inferred from the product of that squared coefficient by the variance of Y; or from the square of the coefficient of X_j in the regression of original Y in a constant term and the standardized X's. Analogously, in principal components, being the variables standardized, we can visualize the square root of that last effect if, for each component, we plot the loading (the elements of the eigenvector associated to the generation of the component) of the variable on the component – if we divide each loading by the standard deviation of the variance of the component, and represent (because the variables are standardized) factor loadings, we approximate the square root of the proportion of the variance of the component explained by the variable and retain the sign effect. Of course, if variables were not previously standardized, then "factor loadings" (the correlations between the variables and the component) measure the last concept and would be the relevant statistics to plot; if variance of each component is to be represented, the factor loadings times the square root of that component's eigenvalue should be used.

The X's are however correlated. Hence let us recall that in OLS regression of Y on k independent variables (and a constant term) the variance of Y attributed to variable X_j can be inferred from the product of the coefficient estimate of the variable by the covariance between Y and X_j – the proportion of variance of Y being recovered by the product of the same concepts for standardized variables and standardized coefficient estimate. In pc, being the variables unstandardized, the square of the element corresponding to variable j in the eigenvector of a component times the eigenvalue (obtained on unstandardized format, i.e., from the covariance, not the correlation, matrix of the X's) itself originates the same statistic: the square of the loading (not the "factor loading") of a variable in a component times the eigenvalue of the component should be plotted – or, better, (keeping, then, also the sign effect) the loading itself times the square root of the eigenvalue. If variables are standardized, we would plot the element of the eigenvector times the cross-product of each Y to the standardized variable X_j, which requires that we multiply the square of derived "factor loading" by the variance of X_j to obtain a comparable statistic to those of unstandardized formats – or the factor loading multiplied by the standard deviation of each variable j if we are to retain the sign effect.

In sum, if we rely on the first interpretation, "factor loadings" are to be represented. If we take the posture of the last paragraph, "loadings" of pc applied to original variables (times the square root of the eigenvalue of the component) – "factor loadings" times the standard deviation of each variable X_j – should be plotted.

Let us distinguish the matter from another angle, taking the "transposed view" of the problem, of Factor Analysis (if we ignore the error terms in this formulation), of equation (2). Equation (2) describes how the p variables the observations of which are contained in X are decomposed in linear combinations of the p uncorrelated components or factors; as the "right hand-side" is composed of uncorrelated variables - in which case it is indifferent in linear regression which view we take to measure how the variance of the left hand-side is explained by the right hand-side and we may as well look at standardized coefficients. Then, if the X's are standardized, the proportion of the variance of each X_j captured by the i-th component is the square of the element in line j, column i, of A_X' (line i, column j of A_X) multiplied by the eigenvalue of the component - that is, the square of the "factor loading". However, to infer the total variance of X_j explained by Y_i, we should multiply the previous quantity by the variance of X_j – in fact recovering a concept analogous to the square of "loadings" if obtained from unstandardized pc times the eigenvalue of the component derived in this format.

One can invoke now the interpretation of Z in (4) or (5) to interpret the plots of the first two principal components of a model decomposing a correlation matrix: the plots of the factor loadings represent correlation coefficients between the variables, X's, and the components Y's; the new plots (Z's) reflect covariances between the (standardized if we are decomposing the correlation matrix of the) X's and the Y's [53]. We thus recover the dispersion of "factor loadings" of a model in original variables. With reference to (2), we represent graphically a concept (proportional to that) of "proportion of the variance of (original) variable X_j accounted by the factor Y_i" – adjusted by the fact that we use different number

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[53] Notice, however, that we still plot - presumably - covariances of "standardized" X variables with the Y's, the later in levels. The difference is, thus, only in the scaling of each principal component. There would not be such correspondence if we were decomposing a covariance matrix.

of observations. If we were decomposing a covariance matrix, we would capture the “loadings” of an original model in unstandardized X variables.

As it will become visible in graphical exploration, specially in our time series sample, the plots of the two main pc’s from correlation decomposition offer a clearer clustering of the variables than numerical inspection of factor loadings of the pc’s on the variables themselves. Looking at the two main pc’s we look at the main features of the reduced set; inspecting in which component a variable has a higher loading does not necessarily offer the same view.

8. Experimenting with cross formats, we also constructed the cross-products of the standardized variables in such a way that we could reproduced the above systems in a per observation format. That is, we can recognize in 3.2. above an application of the principle of the Method of Moments Estimation to the system of principal components Y [54]. Let us – instead - look at the system in 2. in a per-observation format, and admit n (the number of observations available) replicas - or “clones” - of each implied equation so that the estimated principal component model can be written as:

$$\mathrm{Y}_{1t,i} = \mathrm{a}_{11} \frac{(X_{1i}-\overline{X}_1)(X_{ti}-\overline{X}_t)}{S_{X_1}S_{X_t}} + \mathrm{a}_{21} \frac{(X_{2i}-\overline{X}_2)(X_{ti}-\overline{X}_t)}{S_{X_2}S_{X_t}}$$

$$+\ldots+ \mathrm{a}_{p1} \frac{(X_{pi}-\overline{X}_p)(X_{ti}-\overline{X}_t)}{S_{X_p}S_{X_t}}$$

$$\mathrm{Y}_{2t,i} = \mathrm{a}_{12} \frac{(X_{1i}-\overline{X}_1)(X_{ti}-\overline{X}_t)}{S_{X_1}S_{X_t}} + \mathrm{a}_{22} \frac{(X_{2i}-\overline{X}_2)(X_{ti}-\overline{X}_t)}{S_{X_2}S_{X_t}}$$

$$+\ldots+ \mathrm{a}_{p2} \frac{(X_{pi}-\overline{X}_p)(X_{ti}-\overline{X}_t)}{S_{X_p}S_{X_t}}$$

…

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[54] One derives the same estimator of loadings (elements of the eigenvectors) A as with conventional PC - as estimates for the linear regression model parameters generated by the Method of Moments are the same as the OLS ones.

$$Y_{pt,i} = a_{1p}\frac{(X_{1i}-\overline{X}_1)(X_{ti}-\overline{X}_t)}{S_{X_1}S_{X_t}} + a_{2p}\frac{(X_{2i}-\overline{X}_2)(X_{ti}-\overline{X}_t)}{S_{X_2}S_{X_t}}$$

$$+\ldots+ a_{pp}\frac{(X_{pi}-\overline{X}_p)(X_{ti}-\overline{X}_t)}{S_{X_p}S_{X_t}}$$

$t = 1,2,\ldots,p;\ \ i=1,2,\ldots,n;$

In the p variables constructed to apply principal components to such model, each variable j, j=1,2,…p exhibits pxn observations, the first n observations being the product of the standardized observations of the (original) variable X_j with those of X_1; the following n observations, of those of variable X_j with X_2, and so on [55].

An analogous system can be forwarded for the correlations with external variables.

The application of "uncentered" principal components to these variables approximates a moment estimation of second-order - relying on 4-th moments of original (standardized) variables to obtain eigenvalues - to the loadings (contained in A, (pxp) matrix of eigenvectors) of the original standardized variables X.

Of course this procedure would not solve the missing observation problem – unless we proceed further to the weighting of implicit second moment matrix of the transformed data, a matrix of 4-th moments of the original variables.

The adequacy of the new format would eventually depend on statistical properties of a 4-th moment matrix [56] – as opposed to those of the covariance or correlation matrices, the basis of conventional PC -, the study of which is beyond the scope of this research. Moreover, conventional PC has also value in econometric theory independently of statistical considerations.

9. A generalization of the cross-product decomposition procedure would combine p models (m, if one is only interested in correlation with external variables), each of which would entail the cross-products of one of the (external) variables with all the others (all the internal ones); from each of the p (m) sets, p components would be extracted.

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[55] Needless to say, if the system in 2. was applied to covariances instead of correlations, the denominators of the variables of the current system of equations would disappear.

[56] Use of 4-th moment matrices is known in conventional method of moments estimation – see an example in Altonji, Martins & Siow (2002).

Stability of the full cross-sample estimation advanced in 8. would eventually require equality of the estimated loadings across the p sub-sets, testable within linear systems of pxp (mxp) equations of the variables in the p minus the last components – or in the relevant components -, when these were extracted independently for the p (m) sub-sets.

Comparison with the previous cross-product model overall performance originates different statistics and can also be performed using modifications of the information criteria. We computed:

$$\text{SIG} = \sum_{l=1}^{r}\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{ljt}^{2}}{(npr-k)}$$

$$\text{SIG1} = \sum_{l=1}^{r}\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{ljt}^{2}}{(npr-k')}$$

$$\text{BIC3} = \sum_{i=1}^{r}\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{ljt}^{2}}{npr}\ \left[1 + k'\,\frac{\ln(npr)}{npr}\right]$$

$$\text{ICZ} = \ln\left(\sum_{i=1}^{r}\sum_{j=1}^{p}\sum_{t=1}^{n}\frac{e_{ljt}^{2}}{npr}\right) + k'\,\frac{\ln(npr)}{npr}$$

e_{ljt}, t =1,2,…,n denotes the estimated error terms from the OLS regressions of (standardized) variable j of the l-th system on the first i principal components – either obtained from unrestricted logic, i.e., p separate components/loadings for each l systems; or from the restricted p component system on the np observations.

k refers to the number of parameters in the linear system and r to the number of sub-blocks – p when using the own cross-products; m (and npr is replaced by the number of expanded observations) for models in cross-products with external variables; k' refers the implied number of parameters required for the estimation – i.e. the number of all the loadings needed to perform the estimation. For instance, for a system with i relevant components per sub-block, k' = i [2 * p – i] * r for unrestricted components in unrestricted systems, where i refers the relevant components, included in the equations; k' = i* (p * r + p) in restricted systems. For restrictedly obtained components: k' = i [2 * p – i] for restricted systems; k' = i* (p + p *r) for unrestricted.

Chi-square tests confronting a system of r unrestricted p-equation sub-systems with one system – in separately components obtained; and in commonly derived – where also computed.

Cross Section Analysis – International Sample

1. We performed principal components on the set of disruption indicators previously listed, with (Set 1) and without (Set 2) DELDRO, drug offenses [57]. The latter turned out to provide a much clearer pattern of common factors - results obtained using each set are depicted in the table below.

Five components would seem to be important and enough to represent data variability orthogonally if we rely on eigenvalues larger than 1. The Chi-square test results [58] from the joint significance of the excluded components – line CHI1 of the table;– at 5% only indicate the first component as being necessary to explain the variables; if one argues that a 95% test should be performed instead, then three components with Set 2 and two with Set 1 are required. Yet, the test of significance of the last component in the system of equations – CHI2 - justifies the first 4 components at the 5% level for both sets, and even 5 at 10% for Set 2 (p-values of the test rise for systems including more than 5 components relative to the reported values).

With the smaller set (Set 2) of variables:

A first component would represent violence rate, negatively related to it.

The second component is related to accidents or hazardousness – rapes exhibit a high correlation with this component, imprisonment also rating high and opposite.

The third component is mainly related to law enforcement – people made prisoners and armed forces are positive and highly related to it; the crime rate also high and (consistently – presence of high enforcement would coexist with less crime) negatively.

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[57] The 14 series were inspected for univariate normality. Using all available observations, the null is rejected for almost all cases at the 1% level - both by Bera-Jarque as by Shapiro-Wilks statistics; DIVOR would be normal by both tests; SUICM would be barely normal according to Bera-Jarque statistic. With the 19 observations balanced sample, only for VIOLA, DESASP, DESAIP, PRISION, FA98P and DPMIPNB do we reject normality at 1% with both statistics. As noted in the literature, normality is not a requirement for principal components - it is for applicability of some tests.

[58] ANALYZ with SUR routine (TSP) was used, but, as the number of observations is small, the weighting matrix was fixed to be the identity matrix.

The fourth component is mainly representative of road accidents (the crime rate also has a high loading in this component, suggesting similar economic environments for its occurrence)

Finally, the fifth component is mainly related to female suicides. Male suicides may be violent-driven – we found them in the first component; women's despair may, thus, be of different nature.

In Set 1, the second principal component congregates drug offences and general crime, representing general crime; the fourth, is mainly linked to prisoners; the others keep the interpretation.

Table 2.1. *Principal Components – International Evidence*

			Set 1					Set 2		
	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
Eigenv.	50.433.848	25.499.255	22.000.240	16.420.937	10.896.724	47.018.140	22.005.678	20.583.886	14.131.908	10.319.002
Chi1	24.500.749	16.159.032	12.121.997	81.637.872	52.080.186	25.995.614	16.591.986	12.190.850	80.740.733	52.476.918
(df, p-v)	(182, 0.00127)	(168, 0.62465)	(154, 0.97620)	(140, 0.99998)	(126, 1.00000)	(156, 0.00000)	(143, 0.09211)	(130, 0.68119)	(117, 0.99569)	(104, 0.99999)
Chi2(df=14;13)	90.780.927	45.898.658	39.600.433	29.557.686	19.614.102	94.036.280	44.011.355	41.167.772	28.263.815	20.638.005
(p-v)	(0.00000)	(0.00003)	(0.00029)	(0.00878)	(0.14278)	(0.00000)	(0.00003)	(0.00009)	(0.00831)	(0.08040)
% Cum. Exp Var.	0.36024177	0.54237931	0.69952388	0.81681629	0.89465003	0.36167800	0.53095245	0.68929003	0.79799701	0.87737395
Factor Loadings:										
MFERAR	0.54796	0.29707	0.13773	0.39287	0.43806	0.36922	0.24434	0.057486	0.77649	0.039828
DELDRO	0.36132	0.61556	-0.25690	0.52210	-0.30247					
VIOLA	-0.59789	0.57231	0.37074	0.060237	0.045446	-0.66434	0.60354	-0.016954	0.24744	-0.050779
HOMIC	-0.83228	-0.21154	0.22284	0.12408	-0.27896	-0.78718	-0.087592	0.42661	-0.17038	-0.15562
SUICIH	-0.79788	-0.23720	-0.28569	0.17264	0.40473	-0.77165	-0.46408	0.027074	-0.020801	0.35278
SUICM	-0.59688	0.019181	-0.42407	0.16591	0.59640	-0.60100	-0.37645	-0.24286	-0.043475	0.62151
DIVOR	-0.81096	0.28604	-0.11143	0.26520	0.052388	-0.84712	0.022405	-0.079879	0.29865	0.10478
DESASP	-0.62691	0.46000	0.58084	-0.14202	-0.038411	-0.67606	0.68742	0.11083	-0.14032	-0.021391
DESAIP	-0.67992	0.44330	0.54552	-0.14216	0.027354	-0.72657	0.64288	0.095388	-0.16551	0.033574
PRISION	-0.45987	-0.32502	-0.17758	0.62581	-0.26631	-0.44930	-0.47248	0.34148	0.37475	-0.070313
PPRESAS	-0.63961	-0.55419	-0.031919	0.29854	-0.26404	-0.46389	-0.39838	0.47644	0.38198	-0.40530
CRIMREG	0.20110	0.78104	-0.40992	0.33328	-0.14753	0.067734	0.23012	-0.61195	0.52290	0.18605
FA98P	0.46700	-0.27069	0.64385	0.44259	0.097248	0.48297	0.21093	0.71538	-0.028102	0.36342
DPMIPNB	0.42127	-0.26047	0.63560	0.49027	0.17343	0.43634	0.21474	0.74531	0.14434	0.37990
Correlation with										
POPUL	-0.25438	-0.37720	-0.15341	0.53314 *	-0.24821	-0.063705	-0.18701	0.27546	0.67696 *	-0.33367
PIBpc98	0.43577 **	0.68045 *	-0.18345	0.36933	0.13652	0.27986	0.31023	-0.34849	0.72399 *	0.15980
PNBpc98	0.44570 **	0.67389 *	-0.21951	0.33366	0.0032287	0.29825	0.29442	-0.39029 **	0.61972 *	0.15271
PNBPCGR	0.36770	0.57248 *	0.0019733	0.27127	0.45502 **	0.27289	0.39094 **	-0.28234	0.47378 *	0.49009 *
TAXDES	0.19094	-0.11268	0.080959	0.30952	0.45896 *	0.18267	-0.088946	0.18878	-0.067152	0.61484 *
TXINF98	-0.26052	-0.41130 **	-0.062331	-0.063661	0.0026190	-0.17327	-0.32750	0.18311	-0.21010	-0.062151
TXINFAV	-0.19397	-0.50799 *	0.046885	-0.30770	-0.43137 **	-0.10630	-0.28418	0.24693	-0.43617 *	-0.49230 *

1. Bartletts' sphericity st.= 267.5465202 (df= 91; p-value= 0.000) 2. Bartletts' sphericity st.= 240.0405586 (df= 78; p-value= 0.000)

* Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556; for 21 observations 0.43285.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881; for 21 observations 0.36871.)

We then tried to inspect the covariability of the extracted components among observations (countries) of the working sample.

We present in the last two lines of the previous table the simple correlations between each component and population, measures of per capita GDP and GNP (in US dollars), its growth rate, unemployment and two measures of the inflation rate.

For each Set, one component is significant and positively related to GDP per capita, but it is never the first – presumably the most important. We conclude that other than pure affluence is the main explanation of the variability of the sample.

In both sets, the first principal component is negatively related to general violence; even if not significant at 5%, the correlations of that first component with per capita Product are always positive.

Also in both sets, (even if not significant at 5%) we register negative correlations with GDP per capita of the component most positively associated to armed forces.

In both sets, the high positive correlation with per capita GDP is found for a component directly related to general crime. In Set 1, also drug incidence is important for that component, in Set 2, road accidents. Apparently, affluence would promote crime in general or in the aggregate, presumably those economically driven, due to the higher available loots.

Also in both sets, unemployment follows directly and significantly the fifth component, the one most influenced by suicides.

Properties of the system of equations in which each variable is explained by the components was also inspected. Namely, independence of the error terms across equations – Breuch-Pagan test based on number of observations times the sum of squared correlations between the error term of an equation with the p-1 others – was always rejected, either in the p-1 component system as in the 5 component systems[59], with the sole exception for equation on DPMIPNB in the 5 component system of Set 2. The suggested information criteria originated an ever decreasing value with the number of extracted components; we present below the results for Set 1 – we also included the results for the standard formula's of Akaike (AIC) and Schwarz (SBIC).

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[59] This may occur, once they are (different) linear combinations of the same (the non-included) components. As the same components are included in all the equations, OLS is, in any case, justified; however independence is sometimes assumed in factor analysis inference. Residuals of each regression were in general found to be homoeskedastic and corresponding univariate normality was not rejected (at 10% significance level).

Set 1										
Inf. Criteria	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCIT6	PCIT7	PCIT8	PCIT9	PCIT10
AIC	2.44241	2.21262	1.89721	1.50760	1.05966	.586878	.085009	-.260187	-.761485	-1.23179
SBIC	-.206864	-.248045	-.374850	-.575860	-.835193	-1.11937	-1.43263	-1.58922	-1.90192	-2.18362
SIG	0.68897	0.56530	0.43023	0.30775	0.21070	0.14321	0.096614	0.078369	0.056402	0.044055
SIG’	0.67456	0.53888	0.39644	0.27154	0.17582	0.11114	0.068198	0.048796	0.029685	0.018442
BIC3	1.01319	0.99775	0.82243	0.59610	0.39310	0.24638	0.14707	0.10108	0.058670	0.034747
BIC3’	0.94958	0.90674	0.73280	0.52325	0.34073	0.21113	0.12465	0.084751	0.048656	0.028490
PC	0.76301	0.65803	0.50577	0.35327	0.22901	0.14297	0.085805	0.059721	0.035306	0.021399
IC	-0.24182	-0.31796	-0.47972	-0.71568	-1.00997	-1.32911	-1.67733	-1.86887	-2.21652	-2.53318

2. We present in Fig. II.1, for the balanced Set 1, the plot of the first component, PCIT1, against the second, PCIT2[60]. Similarly, for Set 2, the plot of the first component PCINT1 against the second, PCINT2 is forwarded in Fig. 2.2.

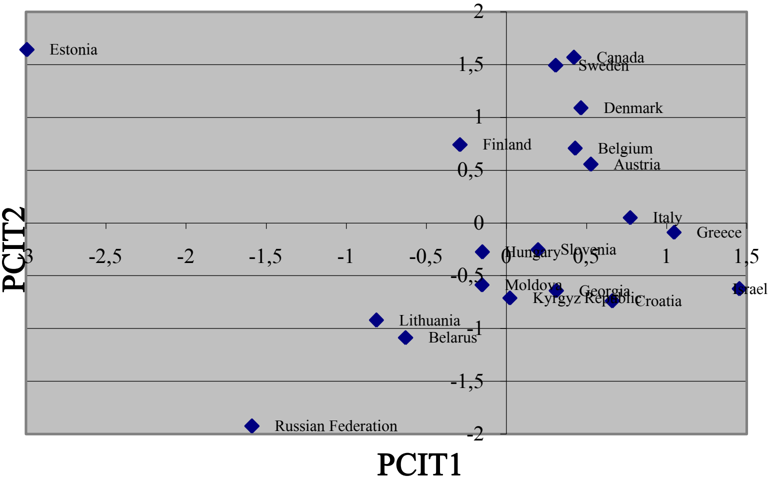

Figure 2.1. *First Two Principal Components, Set 1*

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[60] In our graphical display, size adjustment is done manually (in EXCEL). As the reader can deduct, the size was chosen to fit paper size, giving a reasonable discrimination of geography, and with no other special intention. In the following pictures, Estonia’s position brings such discrimination less clear. Yet, one could argue that scale size should be the same for both axis (or they should be preserved but extracted components should not be standardized – recall previous discussion on the subject); that is, roughly preserved in most displays.

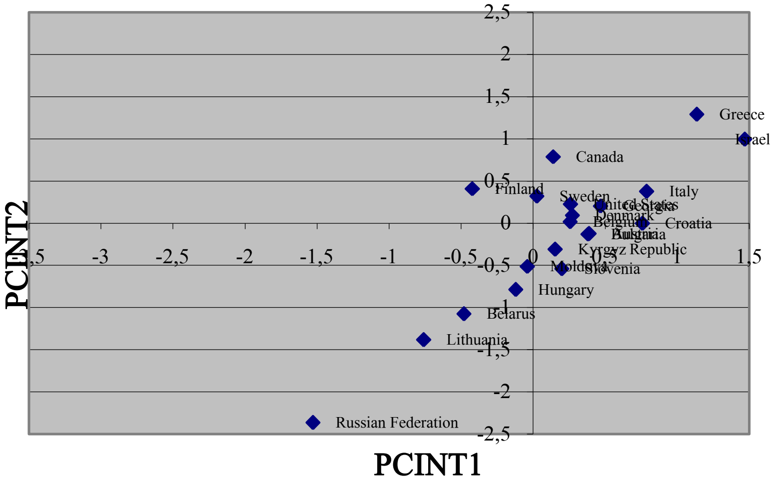

Figure 2.2. *First Two Principal Components, Set 2*

In both figures – recall the interpretation of the components -, general violence decreases as we move from left to right; in Fig. II.1, criminality increases, in Fig. 2.2, hazardousness (imprisonment decreases) increases as we move up.

Specially from the first, Fig. II.1, a possible clustering of the countries congregates: Highly developed ones - Canada, Sweden, Denmark, Belgium, Austria and Finland; Mediterranean countries of Medium-High development – Italy, Greece, Israel; an East European and West-Central Asian cluster – Hungary, Slovenia, Moldova, Kyrgyz Republic, Georgia and Croatia; and a final block in East Europe – Lithuania, Belarus and the Russian Federation. Estonia is a potential outlier (it registers a much higher incidence of rapes – VIOLA -, and deaths in accidents/disasters – DESAIP and DESASP - than the other 21 countries in the Set) [61].

In Fig. 2.2, for Set 2 – without DELDRO -, the United Sates locates close to Sweden and Denmark; Bulgaria close to Austria. However, the separation of observations is not as clear as in Fig. II.1.

3. We present in the left block of the table below principal components obtained when using the weighted correlation matrix (multiplying each element by the square root of the number of

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[61] Estonia will remain very far from the other observations of these sets; yet, this may not be the case (or it could cluster with other points) if we could widen the sample, reason why we did not discarded it from the estimation. On the contrary, we will be more interested in recovering every information possible on correlations with other countries not in these sub-samples.

observations used – the maximum possible pairwise; of the available observations for each diagonal cell) to obtain eigenvectors, then applied to the standardized (with means and standard errors calculated from the reduced set) variables to obtain the principal components.

In the right block of the table, we depict the results obtained when we divide all the weighted elements of the correlation matrix by the mean of the (nxn) roots of number of observations of all possible pairs - and adjust the diagonal terms to 1 [62]. The first and second components switch and the aggregation is different in the two methods and from the balanced results; overall, the right block may account for a better view aggregation of the variables. Looking at the effectively explained variance, it is the second component the one with most explanatory power.

Some of previous conclusions are preserved, but not all - it is possible that a different picture emerge in wider data sets. Namely, the aggregation of variables is different, even if the sign and strength of loadings of variables in common components – even if not by the same order – is, in general, preserved relative to equivalent statistics for the balanced Set 1. We explore the issue further in the paragraphs below, relying on the properties of cross-correlation decomposition previously inferred.

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[62] We also essayed with the mean of the off-diagonal number of observations, in number of $\frac{p(p-1)}{2}$.

Table 2.2. *Principal Components, Weighted, – International Evidence*

	Set 1 (19 obs.)					Set 1 (Mean square root of n = 7.59910)					
	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCIT6
Eigenv.	3.03225	2.71155	1.91691	1.58055	1.22862	3.21441	2.97817	2.11556	1.64985	1.42960	1.01750
% Cum. Exp Var.	0.21659	0.19368	0.54719	0.66009	0.747849	0.22960	0.44233	0.59344	0.71129	0.8134	0.886078
Eigenv.[1]	1.91301	4.03188	1.85026	1.70518	1.76407	2.37366	3.73767	1.90496	1.78071	1.47957	0.72060
% Cum. Exp Var.[1]	0.13664	0.42463	0.55679	0.67859	0.80459	0.16955	0.43653	0.5726	0.69979	0.80547	0.856942
Factor Loadings:											
MFERAR	0.24352	0.40561	-0.20409	0.43746	-0.67738	-0.23436	0.420947	-0.41261	-0.32802	0.752966	-0.13221
DELDRO	0.15206	0.10419	-0.61706	0.65305	-0.54469	-0.02325	0.143481	-0.86377	-0.25933	0.520901	-0.15728
VIOLA	-0.72114	-0.54624	0.072452	0.44547	0.13997	0.137354	-0.78666	-0.08954	-0.35068	-0.05389	0.208518
HOMIC	-0.40440	-0.62377	0.56073	0.12099	0.81348	0.417707	-0.67485	0.503203	-0.30883	-0.78828	0.212272
SUICIH	0.045135	-0.81855	0.55748	-0.15461	0.34949	0.855961	-0.53858	0.540172	0.027929	-0.32283	0.352837
SUICM	0.096654	-0.73066	0.30421	-0.10927	-0.055333	0.782359	-0.44152	0.263565	0.135522	0.06295	0.508758
DIVOR	-0.33149	-0.86239	0.24314	0.28077	0.26511	0.679607	-0.79405	0.099057	-0.21304	-0.22213	0.293376
DESASP	-0.94663	-0.43507	0.23892	0.31991	0.26623	-0.09627	-0.83325	0.133521	-0.33443	-0.19266	0.389685
DESAIP	-0.92733	-0.49538	0.27136	0.29408	0.27450	-0.0252	-0.86398	0.168778	-0.3126	-0.20286	0.457389
PRISION	0.22664	-0.47317	0.42754	0.25509	0.49103	0.641204	-0.2138	0.281131	-0.38723	-0.43645	-0.4312
PPRESAS	0.10664	-0.52082	0.62797	-0.031358	0.80936	0.619557	-0.31742	0.606377	-0.24652	-0.77099	-0.25031
CRIMREG	0.021795	-0.11717	-0.70415	0.49444	-0.64358	0.09528	-0.07147	-0.88323	-0.02776	0.616183	-0.0644
FA98P	0.16764	0.65940	0.42293	0.46571	-0.083592	-0.46603	0.530964	0.181675	-0.69456	0.137371	0.128949
DPMIPNB	0.17523	0.60731	0.44759	0.50566	-0.083435	-0.40873	0.499906	0.184717	-0.72585	0.141845	0.195621
Correlation with											
POPUL	0.28665	-0.26221	0.35870	0.16471	0.39647 **	0.46067 *	-0.029045	0.25819	-0.31385	-0.34472	-0.52675 *
PIBpc98	0.081050	0.16209	-0.55702 *	0.50572 *	-0.82878 *	-0.12313	0.16317	-0.76573 *	-0.15350	0.85201 *	-0.10952
PNBpc98	0.066709	0.18010	-0.60790 *	0.48463 *	-0.78702 *	-0.15537	0.16532	-0.79763 *	-0.11305	0.78568 *	-0.081871
PNBPCGR	0.021795	0.17876	-0.28840	0.44573 **	-0.83268 *	-0.15339	0.14165	-0.48889 *	-0.19013	0.87602 *	0.20968
TAXDES	0.23135	0.19746	0.23345	0.15842	-0.27296	-0.0065397	0.27667	0.10508	-0.27058	0.30320	0.23501
TXINF98	0.15204	-0.19063	0.37406	-0.27391	0.36695	0.29445	-0.052461	0.45619 *	0.077073	-0.37036	-0.014460
TXINFAV	-0.0063893	-0.012846	0.20671	-0.40163 **	0.66871 *	-0.0010429	-0.019656	0.40568 **	0.18928	-0.71255 *	-0.21811

* Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881.)

[1] Calculated from the created "principal components". Eigenvalues are scaled relative to the proportion of variance explained by each component.

4. Using the cross-correlations of the variables themselves, we found a much simpler structure, as depicted in the following tables – only non-missing observations for all variables in the set (19 for Set 1) were included to compute the Balanced cross-correlation "variables". We only present results including DELDRO – even if statistics without it were also obtained. Standardization of the "transformed" variables did not alter much the grouping of the variables for balanced samples, but it did somehow for unbalanced results.

For the first (left) block of the table, the correlation data was previously standardized; in the second one, there was no such previous treatment of the direct input series to principal components, the correlations between the variables[63] and the whole data was used The two approaches turned out to yield the same conclusions entirely.

Three factors are enough to represent the correlation matrix of the whole set of variables. With unstandardized data and the unbalanced sample, we now distinguish:

- a first principal component, congregating imprisonment and, negatively, catastrophes. Suicides, even if more rated in another component, are also important, following imprisonment.

- the second principal component that relates directly to rapes, suicides and divorces – to suffering -, negatively to law enforcement.

- the third principal component, reproducing mainly registered crimes, drug offenses, road accidents – and the aggregation of these three variables were often encountered in other estimation versions – and homicides.

The balanced sample exhibits a very different aggregation, not discriminating the groups of variables as well. Nor in the same direction: for instance, catastrophes/disasters rate similarly to imprisonment in the balanced sample; they show opposite signs in the same component where they rate higher for the unbalanced sample.

One concludes, again, that the balanced data set conclusions may apply to the smaller set of countries, but a different picture emerges when wider samples are studied. Or indeed, micronumerosity is blurring the restricted sample results, "biasing" inference.

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[63] That implies, among other peculiarities, that in the first case, the correlations of the correlation matrix were used to obtain eigenvalues, whereas in the second, the covariance of the correlation matrix was.

Table 2.3. *Principal Components, Cross-Correlations – International Evidence*

	Set 1 (Balanced)[1]				Set 1 (Unstandardized, Weighted)[2]			
	Mean (s.d)	PC1	PC2	PC3	Mean (s.d)	PC1	PC2	PC3
Eigenv.		8.3498860	2.7243354	2.0147928		5.58979	3.89484	2.10037
% Cum. Exp Var.		0.59642043	0.79101582	0.93492959		0.39927	0.67747	0.8275
Factor Loadings:								
MFERAR	0.0037127 (0.42836)	0.91730	0.15348	0.0027989	0.10531 (0.34110	0.290453	-0.31479	0.41421
DELDRO	0.066364 (0.41868)	0.71206	0.49195	-0.40385	0.14442 (0.35119	0.146098	0.003145	0.880677
VIOLA	0.28962 (0.37724)	-0.66376	0.60516	0.37656	0.17839 (0.32005)	0.01403	0.521787	0.502811
HOMIC	0.26310 (0.47168)	-0.93700	-0.20604	0.17444	0.12148 (0.35953)	-0.16779	0.165864	0.419319
SUICIH	0.23510 (0.47979)	-0.91524	-0.20130	-0.24993	0.20135 (0.44539)	0.53455	0.64814	-0.49206
SUICM	0.19981 (0.40242)	-0.78182	0.030752	-0.44026	0.18056 (0.43313)	0.572863	0.579385	-0.3831
DIVOR	0.32508 (0.41601)	-0.93503	0.26124	-0.15656	0.32080 (0.39523)	0.115966	0.932769	-0.0605
DESASP	0.25681 (0.42824)	-0.67296	0.45449	0.57548	0.20865 (0.50936)	-0.98116	0.098979	-0.15025
DESAIP	0.26940 (0.43951)	-0.72621	0.43154	0.53149	0.22769 (0.49784)	-0.97315	0.118958	-0.17662
PRISION	0.22475 (0.33966)	-0.60855	-0.55865	-0.39688	0.20234 (0.33604)	0.413444	0.358187	-0.37482
PPRESAS	0.18285 (0.45177)	-0.79258	-0.55640	-0.078708	0.19668 (0.36764)	0.531634	0.366877	-0.47609
CRIMREG	0.071829 (0.41897)	0.45074	0.72469	-0.49060	0.16498 (0.35293)	0.199488	0.282514	0.796721
FA98P	0.020623 (0.44402)	0.77296	-0.43895	0.43789	0.095948 (0.43644)	0.2901	-0.86382	-0.31117
DPMIPNB	0.048266 (0.42821)	0.76176	-0.45613	0.43460	0.15821 (0.39550)	0.090177	-0.90617	-0.19401
Correlation with “Correlations with”								
POPUL	0.13806 (0.29636)	-0.37234	-0.69490 *	-0.39452	0.011123 (0.15099)	0.23191	0.32739	-0.17896
PIBpc98	0.035839 (0.43505)	0.76887 *	0.55895 *	-0.28425	0.075649 (0.25343)	0.61496 *	-0.17642	0.55258 *
PNBpc98	0.016508 (0.43624)	0.75810 *	0.56375 *	-0.30769	0.079810 (0.24460)	0.55988 *	-0.11880	0.56641 *
PNBPCGR	0.044460 (0.38141)	0.77804 *	0.53981 *	-0.10028	-0.026033 (0.17330)	-0.28803	-0.077851	0.57649 *
TAXDES	0.066115 (0.29027)	0.65628 *	-0.42526	0.084335	-0.0019608 (0.20127)	0.28837	-0.65636 *	-0.46102 **
TXINF98	0.0065662 (0.27079)	-0.68778 *	-0.58088 *	-0.037343	-0.023737 (0.13780)	-0.47829 **	0.018943	-0.63559 *
TXINFAV	-0.093359 (0.29146)	-0.66771 *	-0.60152 *	0.20257	-0.024399 (0.17165)	0.098042	-0.10808	-0.62762 *

[1] Bartletts’ sphericity st.= 377.6618422 (df= 78; p-value= 0.000)

[2] Elements of correlation matrices were multiplied by the square root of the number of observations used in the calculations. Reported means and standard deviations are weighted by the number of observations.

* Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744.)

The plot of the two principal components of the weighted correlation matrix decomposition is depicted in Fig. II.3 below. Deaths by accidents/disasters form an isolated block; armed forces and military expenditures form another cluster; suicides are also in an extreme location; divorces may be considered isolated or joining the final sub-set of all other variables - crime related indicators and road accidents.

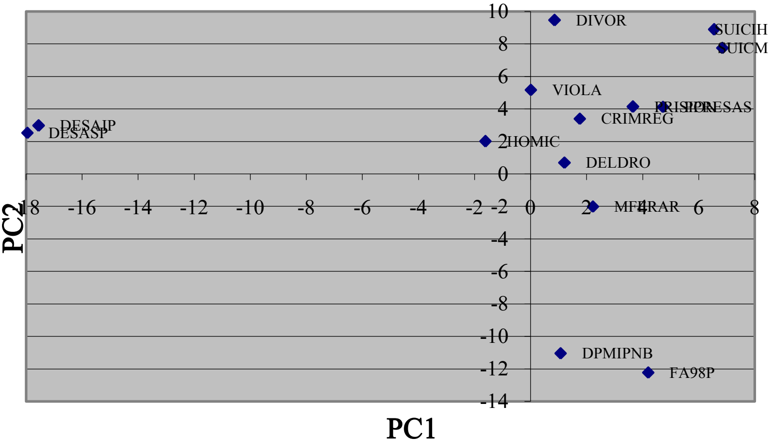

Figure 2.3. *First Two Principal Components, Own Cross-Correlation Decomposition, Unbalanced Sample*

Theory suggested that "uncentered" principal components could be used in the computations that use cross-correlations as inputs. As theoretically derived, it would be irrelevant for "balanced results" if one was using them to derive original variables loadings, but for "unbalanced", as having no direct relation to the observations of components in original variables that one could extract, that is not the case. Hence, we report below the results for unbalanced samples considering, on the left block, for the weighted (by square root of number of observations) correlation matrix, on the right, the results when we divide the weighted matrix elements by the mean of the square root of the observations and adjust to 1 the diagonal.

Table 2.4. *"Uncentered" Principal Components, Weighted Cross-Correlations – International Evidence*

		Set 1					Set 1 (Mean square root of n = 7.59910)				
	Mean (s.d) [1]	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Eigenv.		4.85218	3.88011	1.93914	1.31832	0.79660	4.59285	3.94255	1.98943	1.20995	0.90846
% Cum. Exp Var.		0.34658	0.62373	0.76224	0.856406	0.913306	0.32806	0.60967	0.75177	0.838195	0.903085
Factor Loadings:											
MFERAR	0.10531 (0.34110	0.27220	-0.13581	0.16212	-0.50562	0.50205	0.10257	-0.29402	0.39995	-0.40100	0.55569
DELDRO	0.14442 (0.35119	0.11105	0.12909	0.58891	-0.64964	0.26080	0.15440	0.028312	0.85184	-0.27176	0.18746
VIOLA	0.17839 (0.32005)	-0.051021	0.60348	0.31009	-0.45086	-0.21205	0.42027	0.49490	0.47543	-0.21197	-0.19891
HOMIC	0.12148 (0.35953)	-0.19081	0.24640	0.26805	-0.43452	-0.71595	0.052422	0.39016	0.36861	-0.29510	-0.73403
SUICIH	0.20135 (0.44539)	0.41771	0.77732	-0.40548	0.10720	0.13060	0.89831	0.18375	-0.33709	0.059150	0.13285
SUICM	0.18056 (0.43313)	0.46696	0.71058	-0.32174	0.083268	0.32665	0.88080	0.097175	-0.23575	0.095624	0.29215
DIVOR	0.32080 (0.39523)	-0.0066043	0.93336	-0.11104	-0.25229	-0.10137	0.71492	0.64188	0.030882	-0.17378	-0.065260
DESASP	0.20865 (0.50936)	-0.97214	0.12526	-0.17582	-0.054217	0.067386	-0.51606	0.78303	-0.17244	-0.12114	0.12552
DESAIP	0.22769 (0.49784)	-0.95824	0.16254	-0.20787	-0.069813	0.081687	-0.47561	0.79974	-0.18859	-0.13634	0.13765
PRISION	0.20234 (0.33604)	0.28943	0.56510	-0.42347	-0.21966	-0.21717	0.69734	0.16259	-0.28064	-0.35294	-0.11740
PPRESAS	0.19668 (0.36764)	0.40229	0.57495	-0.48911	-0.13117	-0.28956	0.75682	0.080283	-0.37281	-0.31418	-0.19115
CRIMREG	0.16498 (0.35293)	0.13515	0.39279	0.53791	-0.57281	0.33845	0.37454	0.17930	0.78523	-0.18963	0.28981
FA98P	0.095948 (0.43644)	0.32250	-0.66321	-0.54568	-0.28108	0.054542	-0.21915	-0.73318	-0.34924	-0.49830	0.059183
DPMIPNB	0.15821 (0.39550)	0.10919	-0.61891	-0.50852	-0.50378	-0.021604	-0.33105	-0.51578	-0.25315	-0.70559	0.022281
Correlation with "Correlations with"											
POPUL	0.011123 (0.15099)	0.21298	0.35216	-0.072465	0.37573	0.15331	0.39864	0.0034496	-0.15467	0.22886	0.23743
PIBpc98	0.075649 (0.25343)	0.62860 *	-0.15822	0.47295 **	-0.47192 **	0.46380 **	0.31287	-0.60471 *	0.60746 *	-0.060791	0.38899
PNBpc98	0.079810 (0.24460)	0.57059 *	-0.10807	0.50524 **	-0.43157	0.55425 *	0.30260	-0.53358 *	0.62932 *	0.032820	0.46120 **
PNBPCGR	-0.026033 (0.17330	-0.27787	-0.15325	0.55141 *	-0.34449	0.56027 *	-0.34221	0.11490	0.57887 *	0.027376	0.56107 *
TAXDES	0.0019608 (0.20127	0.32191	-0.59933 *	-0.61389 *	0.018759	0.31412	-0.13892	-0.66929 *	-0.46144 **	-0.31637	0.29255
TXINF98	-0.023737 (0.13780)	-0.48311 **	0.013908	-0.58741 *	0.48732 **	-0.46878 **	-0.29849	0.40371	-0.68552 *	0.024804	-0.43248
TXINFAV	-0.024399 (0.17165)	0.097405	-0.040691	-0.65620 *	0.24030	-0.56352 *	0.092414	-0.095284	-0.66194 *	-0.24859	-0.52793 *

[1] Reported means and standard deviations are weighted by the number of observations.

* Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.532446.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.457442.)

It is now possible to derive the implicit "factor loadings" with respect to the model in original variables - comparable with those of Table II.2 -, results being depicted in the Table below. As noted, the following table "factor loadings" are estimates of cross-correlations between the variables and hypothetical components that would be derived with more than the available observations (it is unclear what significance level for a correlation should we use, but the scaling would suggest the mean of the number of observations, or the square of mean square root of such number – the latter, reported).

Table 2.5. *"Uncentered" Principal Components, Weighted Cross-Correlations, Original Variables– International Evidence*

	Set 1					Set 1 (Mean square root of n = 7.59910)				
	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Eigenv.	3.02246	2.70280	1.91072	1.57545	1.22466	2.88290	2.67102	1.89738	1.47969	1.28216
% Cum. Exp Var.	0.21589	0.40895	0.54543	0.65796	0.745435	0.20592	0.39671	0.53224	0.63793	0.729513
Factor Loadings:										
MFERAR	0.13881	-0.073233	0.10398	-0.35712	0.40219	0.062826	-0.18710	0.30197	-0.34284	0.51039
DELDRO	0.066081	0.081230	0.44074	-0.53543	0.24380	0.10250	0.019527	0.69706	-0.25182	0.18660
VIOLA	-0.030601	0.38275	0.23391	-0.37455	-0.19980	0.27356	0.33466	0.38145	-0.19258	-0.19414
HOMIC	-0.11403	0.15572	0.20148	-0.35969	-0.67219	0.034764	0.26880	0.30131	-0.27315	-0.72991
SUICIH	0.35219	0.69306	-0.42998	0.12519	0.17298	0.79324	0.16857	-0.36691	0.072907	0.17591
SUICM	0.37767	0.60774	-0.32728	0.093280	0.41504	0.74121	0.084956	-0.24455	0.11232	0.36865
DIVOR	-0.0047987	0.71716	-0.10148	-0.25391	-0.11571	0.60581	0.56508	0.032256	-0.20554	-0.082922
DESASP	-1.13119	0.15413	-0.25731	-0.087382	0.12318	-0.55725	0.87842	-0.22953	-0.18258	0.20323
DESAIP	-1.11016	0.19914	-0.30290	-0.11203	0.14868	-0.51029	0.89144	-0.24942	-0.20418	0.22145
PRISION	0.19100	0.39436	-0.35148	-0.20078	-0.22514	0.47362	0.11473	-0.23495	-0.33459	-0.11957
PPRESAS	0.25836	0.39047	-0.39507	-0.11668	-0.29214	0.54532	0.060097	-0.33112	-0.31598	-0.20652
CRIMREG	0.086521	0.26591	0.43310	-0.50791	0.34038	0.25873	0.12868	0.66864	-0.18285	0.30020
FA98P	0.29497	-0.64147	-0.62773	-0.35609	0.078372	-0.16840	-0.58531	-0.33080	-0.53446	0.068193
DPMIPNB	0.091755	-0.55000	-0.53746	-0.58637	-0.028521	-0.24261	-0.39270	-0.22868	-0.72177	0.024484

The previous table offers a wider set of confrontation than the following where:

We used the previous loadings (table before last) to extract components of the original variables; corresponding results are depicted in the following table. One does not gain much more insight than before from Table II.2 – in fact, one can check the equivalent shading of the cells in the two tables, and of derived (appropriately scaled) eigenvalues.

Table 2.6. *"Uncentered" Principal Components, Weighted Cross-Correlations Loadings – International Evidence*

	Set 1					Set 1 (Mean square root of n = 7.59910)				
	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Eigenv.	1.91301	4.03188	1.85026	1.70518	1.76407	2.37366	3.73767	1.90496	1.78071	1.47957
% Cum. Exp Var.	0.13664	0.42463	0.55679	0.67859	0.80459	0.16955	0.43653	0.5726	0.69979	0.80547
Factor Loadings:										
MFERAR	0.24352	-0.40561	0.20409	-0.43746	0.67738	-0.23436	-0.42095	0.41261	-0.32802	0.75297
DELDRO	0.15206	-0.10419	0.61706	-0.65305	0.54469	-0.023247	-0.14348	0.86377	-0.25933	0.52090
VIOLA	-0.72114	0.54624	-0.072452	-0.44547	-0.13997	0.13735	0.78666	0.089536	-0.35068	-0.053888
HOMIC	-0.40440	0.62377	-0.56073	-0.12099	-0.81348	0.41771	0.67485	-0.50320	-0.30883	-0.78828
SUICIH	0.045135	0.81855	-0.55748	0.15461	-0.34949	0.85596	0.53858	-0.54017	0.027929	-0.32283
SUICM	0.096654	0.73066	-0.30421	0.10927	0.055333	0.78236	0.44152	-0.26356	0.13552	0.062950
DIVOR	-0.33149	0.86239	-0.24314	-0.28077	-0.26511	0.67961	0.79405	-0.099057	-0.21304	-0.22213
DESASP	-0.94663	0.43507	-0.23892	-0.31991	-0.26623	-0.096266	0.83325	-0.13352	-0.33443	-0.19266
DESAIP	-0.92733	0.49538	-0.27136	-0.29408	-0.27450	-0.025200	0.86398	-0.16878	-0.31260	-0.20286
PRISION	0.22664	0.47317	-0.42754	-0.25509	-0.49103	0.64120	0.21380	-0.28113	-0.38723	-0.43645
PPRESAS	0.10664	0.52082	-0.62797	0.031358	-0.80936	0.61956	0.31742	-0.60638	-0.24652	-0.77099
CRIMREG	0.021795	0.11717	0.70415	-0.49444	0.64358	0.095280	0.071470	0.88323	-0.027757	0.61618
FA98P	0.16764	-0.65940	-0.42293	-0.46571	0.083592	-0.46603	-0.53096	-0.18167	-0.69456	0.13737
DPMIPNB	0.17523	-0.60731	-0.44759	-0.50566	0.083435	-0.40873	-0.49991	-0.18472	-0.72585	0.14184
Correlation with "Correlations with"										
POPUL	0.28665	0.26221	-0.35870	-0.16471	-0.39647	0.46067 *	0.029045	-0.25819	-0.31385	-0.34472
PIBpc98	0.081050	-0.16209	0.55702 *	-0.50572 *	0.82878 *	-0.12313	-0.16317	0.76573 *	-0.15350	0.85201 **
PNBpc98	0.066709	-0.18010	0.60790 *	-0.48463 *	0.78702 *	-0.15537	-0.16532	0.79763 *	-0.11305	0.78568 **
PNBPCGR	0.021795	-0.17876	0.28840	-0.44573 **	0.83268 *	-0.15339	-0.14165	0.48889 *	-0.19013	0.87602 **
TAXDES	0.23135	-0.19746	-0.23345	-0.15842	0.27296	-0.0065396	-0.27667	-0.10508	-0.27058	0.30320
TXINF98	0.15204	0.19063	-0.37406	0.27391	-0.36695	0.29445	0.052461	-0.45619 *	0.077073	-0.37036
TXINFAV	-0.0063893	0.012846	-0.20671	0.40163 **	-0.66871 *	-0.0010429	0.019656	-0.40568 **	0.18928	-0.71255 *

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881.)

5. As suggested, an alternative method that uses all available information considers the previous model not in the cross-correlations but in the corresponding significance level. We therefore, considered all observations allowable to calculate the cross-correlations and calculated the implicit low-tail t-student probability. Results are depicted below (for Set 1 - DELDRO is always included).

In general, we recovered the weighted unbalanced sample conclusions drawn for the correlation matrices (with the first and second component switching and also switching signs).

Table 2.7. *Principal Components, Cross-Correlations Significance Level – International Evidence*

	Set 1 (Standardized)					Set 1 (Unstandardized)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PC1	PC2	PC3	PC4
Eigenv.		5.0257539	4.1011882	2.3209303	1.0015607		5.08337	4.14742	2.23746	1.04945
% Cum. Exp Var.		0.35898242	0.65192443	0.81770517	0.88924523		0.36310	0.65934	0.81916	0.894121
Factor Loadings:										
MFERAR	0.56890 (0.35225)	0.060030	0.31130	0.78615	0.33451	0.56890 (0.35225)	0.016727	-0.34098	0.78041	-0.32119
DELDRO	0.57467 (0.33826)	-0.23675	-0.25932	0.87814	0.0062890	0.57467 (0.33826)	-0.19051	0.26094	0.88825	0.021398
VIOLA	0.71216 (0.30647)	-0.76631	-0.43761	0.24745	-0.13596	0.71216 (0.30647)	-0.69601	0.51307	0.26415	0.14120
HOMIC	0.58371 (0.37436)	-0.16044	-0.64282	0.14290	0.63140	0.58371 (0.37436)	-0.078349	0.66699	0.17988	-0.62819
SUICIH	0.52696 (0.41134)	-0.83884	0.41277	-0.26764	0.17905	0.52696 (0.41134)	-0.89076	-0.29743	-0.26923	-0.18166
SUICM	0.56274 (0.39302)	-0.81216	0.51254	0.027597	0.11387	0.56274 (0.39302)	-0.87382	-0.40996	0.025834	-0.11010
DIVOR	0.80365 (0.34714)	-0.82556	-0.37364	-0.15793	-0.27956	0.80365 (0.34714)	-0.77083	0.46806	-0.14354	0.27858
DESASP	0.40861 (0.35752)	0.057147	-0.89621	-0.27693	0.25024	0.40861 (0.35752)	0.15666	0.89267	-0.24712	-0.23565
DESAIP	0.43920 (0.35173)	0.0034212	-0.87358	-0.30697	0.28682	0.43920 (0.35173)	0.099362	0.87881	-0.27573	-0.26909
PRISION	0.68745 (0.27210)	-0.72241	0.50673	-0.28312	0.17788	0.68745 (0.27210)	-0.77250	-0.39477	-0.27921	-0.17359
PPRESAS	0.64335 (0.34885)	-0.53223	0.59157	-0.25488	0.27722	0.64335 (0.34885)	-0.60270	-0.51055	-0.27042	-0.28809
CRIMREG	0.62242 (0.35884)	-0.69059	-0.11957	0.64070	-0.10316	0.62242 (0.35884)	-0.66806	0.17872	0.64934	0.12790
FA98P	0.34701 (0.37049)	0.56218	0.72551	0.058725	0.29139	0.34701 (0.37049)	0.46724	-0.78772	0.032682	-0.31706
DPMIPNB	0.48497 (0.35033)	0.84081	0.21430	0.15094	0.019166	0.48497 (0.35033)	0.81690	-0.32149	0.12825	-0.045792
Correlation with “Correlations with”										
POPUL	0.50271 (0.32954)	-0.41416	0.24430	-0.10117	-0.044441	0.50271 (0.32954)	-0.44951	-0.20267	-0.11746	0.029392
PIBpc98	0.64969 (0.36436)	-0.26251	0.51083 **	0.65952 *	0.0097230	0.64969 (0.36436)	-0.31965	-0.49198 **	0.64954 *	0.020123
PNBpc98	0.62546 (0.37089)	-0.23858	0.53140 **	0.62577 *	-0.077977	0.62546 (0.37089)	-0.29882	-0.51586 **	0.61431 *	0.10836
PNBPCGR	0.45373 (0.34024)	0.034265	-0.38983	0.55381 *	-0.38013	0.45373 (0.34024)	0.078526	0.35261	0.56044 *	0.41109
TAXDES	0.44199 (0.32660)	0.44491	0.66033 *	-0.17575	-0.11989	0.44199 (0.32660)	0.35255	-0.70049 *	-0.20213	0.11995
TXINF98	0.42360 (0.32656)	0.32330	-0.27935	-0.80606 *	-0.087466	0.42360 (0.32656)	0.35734	0.26328	-0.80446 *	0.060809
TXINFAV	0.42068 (0.33678)	0.19179	0.36156	-0.59047 *	0.36401	0.42068 (0.33678)	0.14779	-0.35549	-0.59897 *	-0.40566

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744.)

6. In the sequence of the interpretation of the loadings obtained from cross-correlation matrix model decomposition, we present below the results for the transformation of the original data set with the second-order loadings [64].

Given the differences encountered in the cross-correlation analysis, we ended up by recovering different ordering of the variables, specially when weighting, relative to that in the first block of Table II.1. Not unexpectedly, the weighting statistics reproduce the loading aggregation of the weighted results in the left block of Table II.2, of cross-correlation decomposition.

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[64] We did not expect much gain from using correlation matrices to obtain the loadings to apply to original data, as discussed in the previous theoretical exposition: "balanced" approaches should reproduce results from Table II.1; "unbalanced", to one of the blocks of Table II.2.

Table 2.8. *Principal Components, Unstandardized Cross-Correlations Loadings, – International Evidence*

	Set 1 (Balanced)					Set 1 (Weighted)				
	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5
Eigenv.	8.59788	2.61065	1.94399	0.52361	0.18363	5.58979	3.89484	2.10037	0.92858	0.54785
% Cum. Exp Var.	0.61413	0.80060	0.93946	0.976861	0.989977	0.39927	0.67747	0.8275	0.893827	0.932959
Eigenv. 1	4.92570	2.51728	2.17218	1.13597	0.70565	1.79595	3.73170	1.93462	1.79369	0.73319
% Cum. Exp Var. 1	0.35184	0.53161	0.68677	0.767911	0.818314	0.12828	0.39483	0.53302	0.66114	0.713511
Factor Loadings:										
MFERAR	0.60897	-0.15661	0.040309	-0.29357	0.57622	0.21010	-0.46112	0.41000	-0.62693	0.25589
DELDRO	0.43343	-0.54519	-0.29236	0.44329	-0.033258	0.14921	-0.13490	0.81459	-0.47178	0.40078
VIOLA	-0.52636	-0.52486	0.47790	0.078106	0.45778	-0.66770	0.49319	0.011664	0.22135	-0.25464
HOMIC	-0.82162	0.19163	0.21358	0.35659	-0.064297	-0.33333	0.54727	-0.56204	0.85795	-0.26198
SUICIH	-0.80635	0.13413	-0.29870	-0.31003	0.055557	0.14686	0.75695	-0.67139	0.37034	-0.39712
SUICM	-0.59370	-0.12245	-0.40484	-0.50144	-0.077733	0.18736	0.69066	-0.40826	-0.033436	-0.48362
DIVOR	-0.76614	-0.33029	-0.063012	0.095947	0.12881	-0.23097	0.79074	-0.24071	0.33766	-0.27608
DESASP	-0.56998	-0.40614	0.71083	0.099310	0.061999	-0.91287	0.39243	-0.17289	0.33079	-0.41621
DESAIP	-0.62512	-0.40068	0.67748	0.037074	0.048589	-0.88600	0.45064	-0.21922	0.33844	-0.49132
PRISION	-0.43929	0.32437	-0.33428	0.44803	0.40003	0.29920	0.36342	-0.36202	0.54983	0.49497
PPRESAS	-0.65489	0.51395	-0.14127	0.35064	0.26754	0.17808	0.43691	-0.65768	0.83129	0.17087
CRIMREG	0.26418	-0.77311	-0.35597	0.24834	-0.045677	0.036687	0.12577	0.80579	-0.58562	0.26225
FA98P	0.51459	0.48829	0.42721	0.041899	-0.062693	0.11154	-0.79243	-0.11906	-0.026529	0.068204
DPMIPNB	0.47416	0.48019	0.41204	-0.011836	-0.026568	0.12661	-0.75094	-0.13390	-0.018057	-0.0023650
Correlation with										
POPUL	-0.24582	0.38434	-0.31307	0.38757	0.40203 **	0.33346	0.17546	-0.30244	0.43497 **	0.57807 *
PIBpc98	0.50610 *	-0.60468 *	-0.18596	-0.012118	0.18196	0.067764	-0.17697	0.71919 *	-0.77012 *	0.32497
PNBpc98	0.50981 *	-0.61035 *	-0.21223	0.097089	-0.0050010	0.049635	-0.18320	0.75883 *	-0.73457 *	0.31202
PNBPCGR	0.43292 **	-0.47761 *	0.00032629	-0.33458	0.062803	0.0068188	-0.21309	0.44677 **	-0.77590 *	-0.017835
TAXDES	0.21804	0.19001	-0.041497	-0.36183	-0.020550	0.22311	-0.29949	-0.11960	-0.24672	-0.11631
TXINF98	-0.29788	0.35500	-0.092295	-0.034475	-0.045953	0.17815	0.17671	-0.46414 *	0.34212	-0.077328
TXINFAV	-0.25741	0.43761 **	0.055178	0.29552	-0.13692	-0.011358	0.056368	-0.34370	0.60938 *	0.053206

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881.)

The weighted full sample results present an interesting disaggregation of the variables: the first component would be negatively related to fatal accidents; the second one, positively related to suicides and divorces - psychological strain - but oppositely to military involvement; the third one would capture criminality; the fourth, imprisonment, along with homicides – road accidents joining this component negatively.

Graphical display of the first two components calculated with the new loadings when using the full sample could display a different picture than before in Fig 2.2. We present below the corresponding plot:

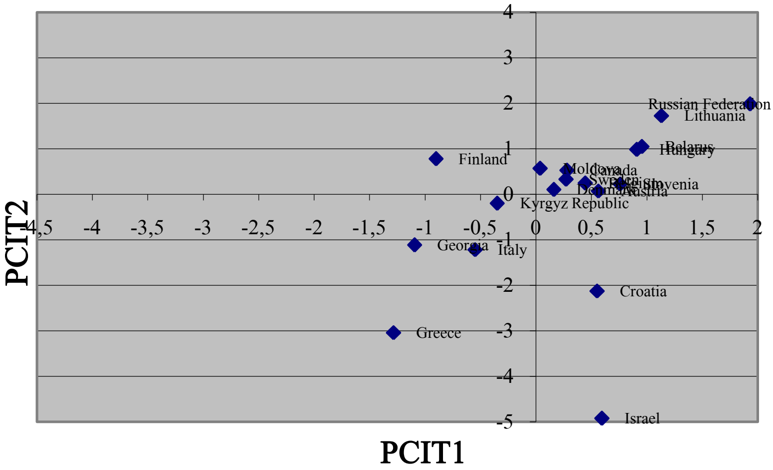

Figure 2.4. *First Two Principal Components, Loadings from Unstandardized Weighted Cross-Correlation Decomposition, Set 1*

Fatal hazardousness (and rapes – negatively associated to the first component) decreases as we move from left to right; psychological disruption (positively associated to the second component, to which military efforts contribute strongly and negatively) increases as we move up.

The Highly Developed block seems to merge with the previously identified East European and West-Central Asian cluster. Georgia and Croatia may now join the Medium-High Development group; Hungary, the set of East Europe's three countries. Estonia remains an outlier.[65]

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[65] This "geography" remained when we considered using as loadings A_{XX}, the eigenvectors of the correlation matrix of the original variables weighted by the square root of the number of observations, with elements divided by the column

However, using the whole data set correlation matrix to obtain components for the small set may only be of use if we believe there is no sub-sample specificity in the restricted sample.

7. Next we consider the cross correlations with the external variables. The set of such explanatory variables was chosen from chapter IV below, where it is studied in more depth. It includes all (24) variables listed in the first two tables there presented: DENSPO, ESPVN, COEDEP, TXALA98, IEDUC98, TXAMH98, TAXDES, PNBPC98, POB20, RIC20, POPURB, PAGR98, PIND98, CPPIB98, DPEDPNB, DPSAPNB, DEPR98, LENR98, APDP, PNBPCGR, INPIB98, DIR98, ICRGD98, DSDR98E.

Considering the whole set of these and the other variables left us with a very small number of simultaneously non-missing observations. Therefore, we use all possible observations allowable but restricted to existing observations for all the variables in the subset (Set 1, where correlations use between 13 and 19 observations) for reported balanced ("almost balanced") sample results.

Comparing Table II.9 (correlations with the external set) with II.3 (correlations among the social disruption variables), we recover similar signs of the loadings of the same variables in the same components. Yet, the separation of the variables by the component importance is now more disperse; we distinguish now an extra important component, and specially for the balanced sample, not so many variables are classified in the first component.

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mean of square roots of number of observations, and with the diagonal adjusted to 1.

Table 2.9. *Principal Components, Correlations with External Variables – International Evidence*

	Set 1 (Balanced Sample)					Set 1 (Unstandandized, Weighted) [1]				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PC1	PC2	PC3	PC4
Eigenv.		6.1241188	3.4415037	1.9213000	1.2515509		7.27881	2.07819	1.59151	1.37478
% Cum. Exp Var.		0.43743706	0.68325875	0.82049446	0.90989096		0.51992	0.66836	0.78204	0.880238
Factor Loadings:										
MFERAR	0.12962 (0.35728)	0.81856	0.22922	0.10217	0.44818	0.11745 (0.27436)	0.686015	-0.52227	0.185484	-0.33175
DELDRO	0.22015 (0.35224)	0.58261	0.65179	0.10951	-0.041882	0.13594 (0.22114)	0.753167	-0.27151	0.341346	-0.11613
VIOLA	0.023053 (0.16504)	-0.63002	0.52031	0.51240	0.18524	0.049084 (0.12717)	0.337362	0.488989	0.260982	-0.33867
HOMIC	-0.071673 (0.36748)	-0.84208	-0.42818	0.16290	-0.11769	0.010508 (0.20422)	-0.42244	0.510906	-0.19537	-0.61334
SUICIH	-0.016803 (0.35681)	-0.81911	0.082735	-0.36858	0.41339	0.056749 (0.26305)	0.813483	0.444818	-0.12909	0.322156
SUICM	0.052937 (0.34046)	-0.47332	0.47924	-0.51541	0.47436	0.052995 (0.25907)	0.858153	0.114099	-0.00565	0.46641
DIVOR	0.050528 (0.29461)	-0.74107	0.41995	-0.19398	0.30513	0.11674 (0.27459)	0.76947	0.516394	-0.03718	-0.13007
DESASP	-0.021442 (0.13604)	-0.52878	0.37378	0.72856	-0.082583	-0.094756 (0.16703)	-0.91064	-0.02615	0.106709	0.277951
DESAIP	-0.018651 (0.13613)	-0.65786	0.41781	0.59463	0.049849	-0.076241 (0.13978)	-0.89	-0.04476	0.09511	0.306077
PRISION	-0.0089473 (0.31893)	-0.71112	-0.39235	-0.012325	0.026359	0.031309 (0.15386)	-0.2709	0.428636	-0.23691	-0.65895
PPRESAS	-0.097467 (0.43980)	-0.79577	-0.52800	-0.050827	0.049393	0.027848 (0.20222)	0.037112	0.905215	-0.17751	-0.1352
CRIMREG	0.20287 (0.42181)	0.41273	0.85797	-0.085400	-0.013917	0.15004 (0.28196)	0.884514	-0.10379	0.355596	-0.0791
FA98P	0.026858 (0.31942)	0.55617	-0.54416	0.36186	0.47918	0.067405 (0.19538)	0.644993	-0.38935	-0.57378	-0.15062
DPMIPNB	0.042912 (0.33739)	0.48315	-0.56390	0.38117	0.51913	0.026285 (0.17450)	-0.07692	-0.22056	-0.77852	0.174065
Correlation with “Correlations with”										
POPUL	-0.027137 (0.29553)	-0.50751 *	-0.43955 *	-0.098792	0.10463	-0.010809 (0.084477)	-0.072255	-0.15728	0.23249	0.16153
PIBpc98	0.20900 (0.47343)	0.66509 *	0.68406 *	-0.063418	0.17742	0.21639 (0.43134)	0.91158 *	-0.23898	0.11546	-0.21285
PNBpc98	0.21453 (0.46097)	0.67371 *	0.69481 *	-0.045169	0.090582	0.19891 (0.40413)	0.88644 *	-0.25948	0.17551	-0.15904
PNBPCGR	0.19845 (0.48139)	0.62299 *	0.63548 *	-0.080313	0.38560 **	0.086026 (0.26890)	0.086305	-0.54145 *	0.21223	-0.17547
TAXDES	0.036896 (0.32697)	0.28965	0.12712	-0.18068	0.51641 *	0.0083395 (0.26320)	0.068008	-0.37354 **	-0.32864	0.34413 **
TXINF98	-0.096106 (0.40433)	-0.57779 *	-0.24263	-0.32668	0.25144	-0.11515 (0.24918)	-0.086341	0.46770 *	-0.11688	0.40136 **
TXINFAV	-0.20350 (0.37850)	-0.61361 *	-0.59605 *	-0.090668	-0.34865 **	-0.021549 (0.19523)	-0.17369	0.70087 *	-0.30225	0.13034

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 24 observations: 0.404407.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 24 observations: 0.343757.)

The plot of the first two (unstandardized) components of the weighted sample yielded the graph in Fig. II.5. The "observations" – the variables of the external set – are very disperse and a clear clustering – that would allow inference about which variables cause similarly the disruption variable set - does not seem to emerge.

ICRGD98, PNBPC98, POB20 and ESPVN seem to form a group. APDP, CPPIB98, POPURB and DPSAPNB another. DIR98, LENR98, DEPR98 and INPIB98 – capital market related variables - are close together; and close to TAXDES, DENSPO, PNBPCGR, that can join them or not. TXALA98, IEDUC98, DPEDPNB – education variables - are also closely located. Other variables are close to one of those clusters in a way that could (sometimes) be intuitively expected.

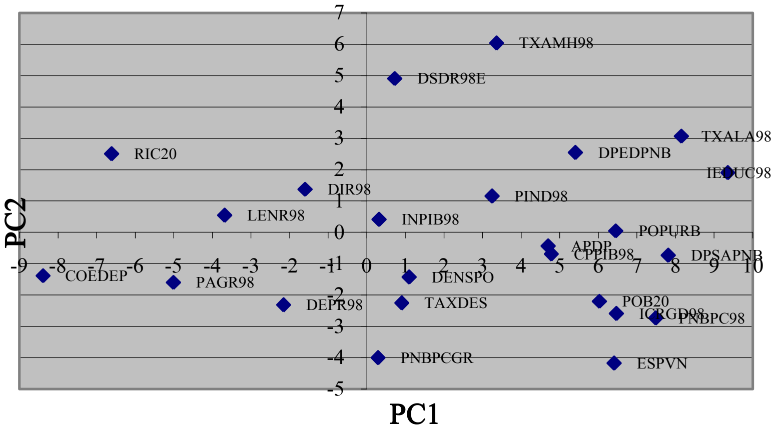

Figure 2.5. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Sample*

We reproduce below the results using "uncentered" principal components. Dividing the weighted elements of the input correlation matrix by the mean of the weights and adjusting the diagonal terms to 1, as the diagonal has no role in the current estimation, offers the same results as using the weighted matrix, of course.

Table 2.10. *Uncentered Principal Components, Weighted Correlations with External Variables – International Evidence*

		Set 1					Set 1 (Mean Square Root n = 8.71077)				
	Mean (s.d) [1]	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Eigenv.		7.87745	1.81581	1.43474	1.35116	0.70002	7.87745	1.81581	1.43474	1.35116	0.70002
% Cum. Exp Var.		0.56268	0.69238	0.79486	0.891371	0.941372	0.56268	0.69238	0.79486	0.891371	0.941372
Factor Loadings:											
MFERAR	.11745 (0.27436)	0.75001	-0.48694	-0.035419	0.31597	-0.015536	0.75001	-0.48694	-0.035419	0.31597	-0.015536
DELDRO	.13594 (0.22114)	0.81391	-0.23882	0.11205	0.30618	0.32415	0.81391	-0.23882	0.11205	0.30618	0.32415
VIOLA	.049084 (0.12717)	0.44706	0.44371	-0.090433	0.44736	0.32651	0.44706	0.44371	-0.090433	0.44736	0.32651
HOMIC	.010508 (0.20422)	-0.32832	0.47174	-0.63471	0.38744	0.21450	-0.32832	0.47174	-0.63471	0.38744	0.21450
SUICIH	.056749 (0.26305)	0.78923	0.45725	0.15642	-0.35181	0.0094683	0.78923	0.45725	0.15641	-0.35181	0.0094683
SUICM	.052995 (0.25907)	0.82067	0.14192	0.35749	-0.38822	-0.032218	0.82067	0.14192	0.35749	-0.38822	-0.032218
DIVOR	.11674 (0.27459)	0.81035	0.47458	-0.11207	0.071488	0.13791	0.81035	0.47458	-0.11207	0.071488	0.13791
DESASP	.094756 (0.16703)	-0.93644	-0.016495	0.20369	-0.099517	0.16563	-0.93644	-0.016495	0.20369	-0.099517	0.16563
DESAIP	.076241 (0.13978)	-0.92075	-0.032643	0.21086	-0.12292	0.18679	-0.92075	-0.032643	0.21086	-0.12292	0.18679
PRISION	.031309 (0.15386)	-0.12079	0.38007	-0.66286	0.36966	-0.23417	-0.12079	0.38007	-0.66286	0.36966	-0.23417
PPRESAS	.027848 (0.20222)	0.090010	0.88667	-0.27237	0.016399	-0.055487	0.090010	0.88667	-0.27237	0.016399	-0.055487
CRIMREG	.15004 (0.28196)	0.91027	-0.089572	0.18772	0.26813	0.19558	0.91027	-0.089572	0.18772	0.26813	0.19558
FA98P	.067405 (0.19538)	0.70175	-0.37277	-0.43971	-0.29494	-0.22364	0.70175	-0.37277	-0.43971	-0.29494	-0.22364
DPMIPNB	.026285 (0.17450)	0.015348	-0.23257	-0.54760	-0.56760	0.55341	0.015348	-0.23257	-0.54760	-0.56760	0.55341
Correlation with Correlations with”											
POPUL	.010809 (0.084477	0.099211	0.19906	0.13264	-0.057444	-0.097448	0.099211	0.19906	0.13264	-0.057444	-0.097448
PIBpc98	.21639 (0.43134)	-0.010344	-0.0081707	0.079721	0.11586	-0.023484	-0.010344	-0.0081707	0.079721	0.11586	-0.023484
PNBpc98	.19891 (0.40413)	-0.0068125	-0.032340	0.086213	0.14633	-0.017016	-0.0068125	-0.032340	0.086213	0.14633	-0.017016
PNBPCGR	.086026 (0.26890)	-0.15567	0.074794	0.21041	-0.21959	0.010561	-0.15567	0.074794	0.21041	-0.21959	0.010561
TAXDES	0083395 (0.26320	0.11074	0.13556	0.043230	-0.18875	0.089470	0.11074	0.13556	0.043230	-0.18875	0.089470
TXINF98	0.11515 (0.24918)	0.25949	-0.029802	0.092234	-0.014312	0.023973	0.25949	-0.029802	0.092234	-0.014313	0.023973
TXINFAV	.021549 (0.19523)	0.19595	0.022407	-0.20383	0.20630	0.20837	0.19595	0.022407	-0.20383	0.20630	0.20837

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 24 observations: 0.404407.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 24 observations: 0.343757.)

It is possible to recover estimates for the factor loadings with reference to original variables:

Table 2.11. *"Uncentered" Principal Components, Weighted Correlations with External Variables, Implicit Loadings with Original Variables– International Evidence*

	Set 1					Set 1 (Mean square root of n = 8.71077)				
	PC1	PC2	PC3	PC4	PC5	PC1	PC2	PC3	PC4	PC5
Eigenv.	4.02670	1.93327	1.71848	1.66767	1.20036	4.02670	1.93327	1.71848	1.66767	1.20036
% Cum. Exp Var.	0.28762	0.42571	0.54846	0.66758	0.75332	0.28762	0.42571	0.54846	0.66758	0.75332
Factor Loadings:										
MFERAR	0.54697	-0.51252	-0.039541	0.35807	-0.020753	0.54697	-0.51252	-0.039541	0.35807	-0.020753
DELDRO	0.56343	-0.23860	0.11873	0.32935	0.41099	0.56343	-0.23860	0.11873	0.32935	0.41099
VIOLA	0.16926	0.24244	-0.052409	0.26318	0.22641	0.16926	0.24244	-0.052409	0.26318	0.22641
HOMIC	-0.17919	0.37158	-0.53026	0.32858	0.21442	-0.17919	0.37158	-0.53026	0.32858	0.21442
SUICIH	0.66392	0.55514	0.20142	-0.45988	0.014588	0.66392	0.55514	0.20142	-0.45988	0.014588
SUICM	0.67833	0.16929	0.45231	-0.49862	-0.048773	0.67833	0.16929	0.45231	-0.49862	-0.048773
DIVOR	0.58362	0.49328	-0.12356	0.080004	0.18192	0.58362	0.49328	-0.12356	0.080004	0.18192
DESASP	-0.79628	-0.020243	0.26513	-0.13149	0.25796	-0.79628	-0.020243	0.26513	-0.13149	0.25796
DESAIP	-0.64895	-0.033204	0.22749	-0.13462	0.24112	-0.64895	-0.033204	0.22749	-0.13462	0.24112
PRISION	-0.057293	0.26018	-0.48129	0.27246	-0.20344	-0.057293	0.26018	-0.48129	0.27246	-0.20344
PPRESAS	0.048596	0.69087	-0.22509	0.013758	-0.054868	0.048596	0.69087	-0.22509	0.013758	-0.054868
CRIMREG	0.81778	-0.11614	0.25816	0.37431	0.32181	0.81778	-0.11614	0.25816	0.37431	0.32181
FA98P	0.61488	-0.47138	-0.58975	-0.40157	-0.35890	0.61488	-0.47138	-0.58975	-0.40157	-0.35890
DPMIPNB	0.010671	-0.23336	-0.58280	-0.61322	0.70473	0.010671	-0.23336	-0.58280	-0.61322	0.70473

As for the analysis of internal structure, the model was recalculated for the cross-correlation significance levels. We only report results with the whole 14 variables (i.e., including DELDRO).

As expected, we recover the same pattern as with the weighted correlation structure of Table II.9. Standardization did not affect the conclusions.

Table 2.12. *Principal Components, Cross-Correlations with External Variables Significance Level – International Evidence*

	Set 1 (Standardized)					Set 1 (Unstandardized)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PC1	PC2	PC3	PC4
Eigenv.		6.4769836	2.6860297	1.7240364	1.1047852		6.89513	2.41673	1.66258	1.14759
% Cum. Exp Var.		0.46264168	0.65450095	0.77764640	0.85655963		0.49251	0.66513	0.78389	0.865861
Factor Loadings:										
MFERAR	0.59142 (0.35371)	0.77909	0.23960	0.24896	0.40902	0.59142 (0.35371)	0.75931	-0.30739	0.26019	-0.38797
DELDRO	0.66616 (0.33546)	0.84066	0.079854	0.33227	0.20289	0.66616 (0.33546)	0.82572	-0.10578	0.37402	-0.21316
VIOLA	0.58476 (0.27614)	0.35951	-0.61242	0.50797	0.11304	0.58476 (0.27614)	0.33429	0.54052	0.51449	-0.16806
HOMIC	0.51764 (0.36691)	-0.34534	-0.76694	-0.058658	0.30490	0.51764 (0.36691)	-0.35720	0.75955	0.011918	-0.38767
SUICIH	0.58972 (0.40796)	0.80454	-0.25940	-0.27459	-0.39073	0.58972 (0.40796)	0.82594	0.32054	-0.25716	0.31257
SUICM	0.64224 (0.39519)	0.85387	0.0075390	-0.20202	-0.43590	0.64224 (0.39519)	0.87416	0.042131	-0.20113	0.40015
DIVOR	0.63509 (0.37896)	0.77860	-0.44522	-0.018568	-0.26639	0.63509 (0.37896)	0.78798	0.47402	0.029430	0.19664
DESASP	0.29276 (0.33853)	-0.92409	0.0042075	0.24544	-0.13981	0.29276 (0.33853)	-0.91881	-0.0084047	0.20206	0.17748
DESAIP	0.31508 (0.32598)	-0.92046	0.055705	0.21887	-0.15782	0.31508 (0.32598)	-0.91379	-0.054631	0.16982	0.19701
PRISION	0.55590 (0.31228)	-0.18267	-0.62143	-0.39536	0.43525	0.55590 (0.31228)	-0.18554	0.60118	-0.27558	-0.46089
PPRESAS	0.52933 (0.32728)	0.014403	-0.93459	-0.12465	-0.15011	0.52933 (0.32728)	0.018686	0.93547	-0.070225	0.051304
CRIMREG	0.63377 (0.41300)	0.87517	0.067885	0.37502	0.084673	0.63377 (0.41300)	0.86621	-0.093525	0.40719	-0.088734
FA98P	0.62052 (0.39059)	0.65280	0.25187	-0.44875	0.32142	0.62052 (0.39059)	0.65544	-0.26443	-0.45710	-0.36268
DPMIPNB	0.52352 (0.34977)	-0.073103	0.25028	-0.74271	0.10014	0.52352 (0.34977)	-0.062200	-0.18349	-0.77964	-0.15872
Correlation with “Correlations with”										
POPUL	0.45913 (0.27917)	-0.068792	0.28843	0.038934	-0.24090	0.45913 (0.27917)	-0.055845	-0.25934	0.061964	0.30650
PIBpc98	0.65449 (0.43860)	0.85605 *	0.19254	0.045612	0.26884	0.65449 (0.43860)	0.84544 *	-0.21570	0.088611	-0.27014
PNBpc98	0.60782 (0.44508)	0.87584 *	0.14476	0.11644	0.20093	0.60782 (0.44508)	0.86692 *	-0.16587	0.16012	-0.20736
PNBPCGR	0.60746 (0.38513)	0.32084	0.27002	-0.055007	0.46885 **	0.60746 (0.38513)	0.30530	-0.33213	-0.028756	-0.41301
TAXDES	0.44705 (0.31377)	0.099804	0.55327 *	-0.090632	0.14470	0.44705 (0.31377)	0.099987	-0.55546 *	-0.14949	-0.13188
TXINF98	0.26078 (0.35779)	-0.48086 **	-0.19945	0.0027850	-0.58267 *	0.26078 (0.35779)	-0.45126	0.25963	-0.034801	0.55326 *
TXINFAV	0.46294 (0.35168)	-0.32292	-0.57731 *	-0.089058	-0.30143	0.46294 (0.35168)	-0.30820	0.63715 *	-0.050920	0.22779

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744.)

8. We experimented with “uncentered” principal components that we applied to the (standardized) cross-products of the observations – the “replicated moments”; or, in this case, because data was standardized, “replicated correlations” - approach to principal components. We summarize in the left block of Table II.13 the results obtained for the own cross products and, in the right block, the ones obtained when considering the cross-products of the disruption indicators with the external set of 24 variables (we only report results including DELDRO)[66].

Reported factor loadings are the “uncentered” correlation coefficients – yet, conventional correlation coefficients are reported for the relation with the cross-products with the reference variables[67]. Factor loadings, as correlations, of Table II.13 are obtained from 266 and 436 (with correlations with the external variables cross-products losing some in a few cases) observations; the statistical properties of the loadings in presence were not studied fully: we signaled significance of correlations according to the degrees of freedom of analogous correlation decomposition – even if asymptotic standard normal critical values for correlations using 266 and 436 observations are also reported.

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[66] It is unclear what distribution properties should we expect for the cross-moments. Nevertheless, we performed normality tests as for the original variables. There are 14 input series to “uncentered” principal components for both blocks of the table; along the full sample (266 observations for the left block, 436 for the right one), normality is clearly rejected by both Bera-Jarque and Shapiro-Wilks tests at 5 and 1%. If one considers the (14 for the left block; 24 for the right block) sub-samples of cross-products for each of those 14 variables, normality is still rejected in most cases.

[67] The cross-products involved standardized variables; they usually have mean (that approach averages of conventional correlation coefficients) close to zero – in which case conventional correlation coefficients are close to the “uncentered” ones - and standard deviation close to 1.

Table 2.13. *Uncentered Principal Components, Standardized Cross-Products – International Evidence*

	Set 1 (Own Correlations; 266 obs.)						Set 1 (Cross Correlations with External Variables; 436 obs.)					
	Mean (s.d)	PCYY1	PCYY2	PCYY3	PCYY4	PCYY5	Mean (s.d)	PCXY1	PCXY2	PCXY3	PCXY4	PCXY5
Eigenv.		8.27122	2.39667	1.75215	0.76544	0.30732		5.09051	3.10408	2.19587	1.37408	0.96326
% Cum. Exp Var.		0.59080	0.76199	0.88714	0.941814	0.963766		0.36361	0.58533	0.74218	0.840328	0.909132
Factor Loadings:												
MFERAR	0.0035173 (1.02533)	0.55272	-0.37481	0.44229	-0.32974	0.37243	0.11988 (1.03570)	0.66737	-0.23142	0.51832	0.035729	-0.27489
DELDRO	0.062871 (0.95081)	0.51569	-0.17781	-0.049669	-0.78577	-0.15949	0.21338 (0.88844)	0.41514	0.17071	0.65966	-0.28656	0.46755
VIOLA	0.27437 (1.77154)	-0.91084	-0.32821	0.071424	-0.14663	0.037375	0.022018 (0.66223)	-0.18541	0.23794	0.38573	0.74988	0.092227
HOMIC	0.24925 (1.48011)	-0.89960	0.30896	0.18834	0.012379	-0.15163	-0.074915 (0.89486)	-0.74242	-0.34621	-0.079326	0.25627	0.40457
SUICIH	0.22272 (1.19359)	-0.78295	0.53578	-0.085399	0.022118	0.27652	-0.020724 (0.97546)	-0.85092	-0.096696	0.34536	-0.0030601	-0.34214
SUICM	0.18930 (1.03247)	-0.71936	0.39700	-0.27915	-0.065171	0.40786	0.046528 (0.95990)	-0.62083	0.18644	0.56847	-0.074440	-0.40964
DIVOR	0.30797 (1.37430)	-0.94303	0.075982	-0.026915	-0.21342	0.072252	0.050571 (0.90949)	-0.68216	0.074988	0.49780	0.14013	-0.15550
DESASP	0.24329 (1.88523)	-0.93140	-0.33059	0.10708	0.029174	-0.060654	-0.024417 (0.67888)	-0.13327	0.24519	0.15360	0.89314	0.22985
DESAIP	0.25522 (1.92054)	-0.93927	-0.31987	0.10012	0.030989	-0.027820	-0.019153 (0.66898)	-0.18892	0.25225	0.18858	0.90849	0.13285
PRISION	0.21292 (1.43852)	-0.26023	0.86581	0.22396	-0.25284	-0.10169	-0.013122 (1.21826)	-0.66910	-0.50702	0.27149	-0.20098	0.27629
PPRESAS	0.17323 (1.16527)	-0.51627	0.75825	0.29268	-0.0023394	-0.064351	-0.094649 (1.16081)	-0.74257	-0.54626	-0.14582	-0.097795	0.018788
CRIMREG	0.068049 (0.90528)	0.25037	-0.24179	-0.51106	-0.76092	-0.080026	0.19985 (0.92246)	0.18787	0.55645	0.70439	-0.22520	0.28257
FA98P	0.019537 (1.30080)	0.44068	-0.12654	0.87075	-0.014112	0.014723	0.020941 (1.18089)	0.56156	-0.76369	0.15787	0.12850	-0.043887
DPMIPNB	0.045726 (1.19726)	0.38071	-0.063188	0.89521	-0.065598	0.071873	0.029222 (1.12749)	0.53615	-0.76308	0.25404	0.13600	-0.010528
Correlation with "Cross-products with"												
POPUL	0.13079 (1.41835)	-0.041376	0.88525 *	0.18105	-0.18913	-0.12585	-0.032006 (1.19245)	-0.60827 *	-0.49539 *	0.25722	-0.23509	0.21681
PIBpc98	0.033953 (0.84365)	0.54525 *	-0.41704	-0.095796	-0.64170 *	0.14480	0.19793 (0.96639)	0.49055 *	0.24853	0.74524 *	-0.10475	-0.0085510
PNBpc98	0.015639 (0.86404)	0.58474 *	-0.38669	-0.16491	-0.60294 *	0.025448	0.20624 (0.94869)	0.49723 *	0.32143	0.68780 *	-0.16295	0.12304
PNBPCGR	0.041249 (0.92821)	0.28268	-0.66658 *	0.088384	-0.37496	0.38512	0.18866 (1.13161)	0.46218 *	0.15328	0.67626 *	0.026714	-0.38693 **
TAXDES	0.030316 (0.84660)	0.33185	0.44677	0.41009	-0.081390	0.27302	0.039503 (0.97075)	0.050489	-0.33130	0.49594 *	-0.013055	-0.15102
TXINF98	0.0062207 (0.77399)	-0.10144	0.28244	-0.030517	0.33885	0.092505	-0.093685 (1.36502)	-0.38390 **	-0.17297	-0.25196	-0.10059	-0.36372 **
TXINFAV	-0.088445 (0.82977)	-0.036394	0.44500	-0.088363	0.47174 **	-0.42647	-0.17742 (1.19590)	-0.32756	-0.13067	-0.66871 *	-0.039908	0.14238

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244; for 24 observations: 0.404407. Standard normal for 266 observations: 0.119761; for 436 observations: 0.0936694.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744; for 24 observations: 0.343757.) Standard normal for 266 observations: 0.100728; for 436 observations: 0.0787175.)

Stability across the 14 for the left block and 24 for the right one subsystems was also inspected: by an F test; and the information criteria for the full blocks and for the disaggregated estimation of the 14 and 24 factor systems was computed.

The comparison between contiguous restricted and unrestricted versions, except for the common 13-component case always rejects the restrictions. One could argue the correct comparison would involve the separate component unrestricted versions, and (with) the common component restricted versions for each i-component system (i being 13 or 5 in the context). Then, for the 13 component model, the restricted versions are usually preferred, with lower information criteria; for the 5 component models, only BIC3 and ICZ would lead to the choice of the restricted versions.

	Own Cross-Products					Cross Products with External Variables				
	SIG	SIG1	BIC3	ICZ	CH	SIG	SIG1	BIC3	ICZ	CH
13 Component Models:										
Separate Components										
Unrestricted System	0.000058245	0.000068909	0.00012926	-4.87572	0.5565909E+08	0.000080258	0.000097842	0.00017537	-4.00444	0.4859458E+08
Restricted System	0.91528	3.26149	6.11804	5.88918	(.00000)	0.65860	2.50980	4.79065	6.04963	(.00000)
Common Components										
Unrestricted System	0.000061605	0.000072885	0.00013672	-4.81964	1723.31906	0.000084091	0.000093940	0.00017931	-4.14343	3658.102
Restricted System	0.000050427	0.000050613	0.000068613	-9.51453	(1.00000)	0.000076595	0.000076764	0.000095005	-9.22878	(1.00000)
5 Component Models:										
Separate Components										
Unrestricted System	0.049081	0.063708	0.16473	0.23520	63628.01	0.056145	0.074277	0.20107	0.73964	65368.76
Restricted System	0.89152	1.21825	2.90279	2.18458	(.00000)	0.64940	0.89997	2.24623	2.05581	(.00000)
Common Components										
Unrestricted System	0.061155	0.062756	0.14953	-0.78134	1464.696	0.067392	0.068476	0.17091	-0.52007	3307.266
Restricted System	0.070438	0.071317	0.086664	-2.41808	(.00000)	0.086348	0.086997	0.099376	-2.29668	(.00000)

We considered the calibration used previously to infer about the “factor loadings” of original data – that is multiply the loadings matrix by the square root of implied eigenvalues. We obtained (occasionally the loadings so obtained are larger than 1 in absolute value. Being estimators of factor loadings, the formulas do not guarantee strict inclusion in the [–1,1] interval. Yet, relative magnitudes would approximate the correct relative position of variables with respect to principal components of variables in levels.):

Table 2.14. *Uncentered Principal Components, Standardized Cross-Products, "Original Factor Loadings" – International Evidence*

	Set 1 (Own Correlations; 266 obs.)					Set 1 (Cross Correlations with External Variables; 436 obs.)					
	PCYY1	PCYY2	PCYY3	PCYY4	PCYY5	PCXY1	PCXY2	PCXY3	PCXY4	PCXY5	PCXY6
Eigenv.	4.54327	2.44561	2.09107	1.38210	0.87575	3.04555	2.37822	2.00027	1.58230	1.32482	1.01426
% Cum. Exp Var.	0.32452	0.49921	0.64857	0.747291	0.809845	0.21754	0.38741	0.53029	0.64331	0.73794	0.810387
Factor Loadings:											
MFERAR	0.30352	-0.28053	0.35801	-0.32831	0.46583	0.55468	-0.21766	0.53157	0.041199	-0.34641	0.19426
DELDRO	0.26318	-0.12368	-0.037364	-0.72708	-0.18539	0.30239	0.14072	0.59291	-0.28958	0.51637	-0.25281
VIOLA	-0.87455	-0.42953	0.10108	-0.25526	0.081737	-0.097931	0.14222	0.25140	0.54951	0.073859	-0.025152
HOMIC	-0.72321	0.33854	0.22318	0.018043	-0.27765	-0.53146	-0.28046	-0.070069	0.25451	0.43910	0.10981
SUICIH	-0.50918	0.47491	-0.081863	0.026080	0.40961	-0.66182	-0.085108	0.33144	-0.0033020	-0.40347	0.083452
SUICM	-0.40444	0.30422	-0.23134	-0.066432	0.52229	-0.47561	0.16163	0.53738	-0.079118	-0.47581	0.20861
DIVOR	-0.71139	0.078124	-0.029928	-0.29190	0.12414	-0.49533	0.061619	0.44602	0.14117	-0.17120	-0.55976
DESASP	-0.94825	-0.45875	0.16069	0.053852	-0.14065	-0.072167	0.15025	0.10263	0.67100	0.18872	0.082843
DESAIP	-0.97465	-0.45241	0.15313	0.058302	-0.065753	-0.10079	0.15229	0.12414	0.67242	0.10746	0.033755
PRISION	-0.20268	0.91913	0.25712	-0.35704	-0.18040	-0.64983	-0.55723	0.32535	-0.27080	0.40684	0.47624
PPRESAS	-0.32576	0.65210	0.27221	-0.0026762	-0.092483	-0.68942	-0.57392	-0.16705	-0.12596	0.026448	-0.46972
CRIMREG	0.12173	-0.16024	-0.36628	-0.67079	-0.088626	0.14136	0.47382	0.65400	-0.23509	0.32237	-0.082960
FA98P	0.30705	-0.12017	0.89428	-0.017827	0.023365	0.52871	-0.81366	0.18341	0.16785	-0.062649	-0.25595
DPMIPNB	0.24430	-0.055266	0.84675	-0.076320	0.10505	0.48204	-0.77639	0.28183	0.16964	-0.014352	0.090967

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881.)

Finally, we used the “loadings” from the “own” cross-product analysis of the left block of the previous Table and used them to transform the set of standardized 14 variables. Results are depicted below, namely the conventional correlation coefficients of each component with the disruption variables – and the usual reference list.

It provides a reasonable clustering of the variables, recovering the pattern of Table II.1 (but with similarities to both sets of results of that table), but possibly offering with a more coherent aggregation. It isolates: imprisonment with male suicides; armed forces; general crime and drug offenses; road accidents and female suicides; all else (the first component) – rapes, homicides, divorces and fatal accidents.

Table 2.15. *Uncentered Principal Components, Standardized Cross-Products, Loadings – International Evidence*

	Set 1				
	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5
Eigenv.	4.66482	2.55750	2.10559	1.98766	1.11454
% Cum. Exp Var.	0.33320	0.51588	0.66628	0.80826	0.88787
Factor Loadings:					
MFERAR	0.44786	-0.44104	0.30650	-0.43228	0.46198
DELDRO	0.29974	-0.30180	-0.12476	-0.89509	-0.17452
VIOLA	-0.75321	-0.25109	0.017320	-0.28601	0.031257
HOMIC	-0.79683	0.50966	0.14972	0.15584	-0.26865
SUICIH	-0.67346	0.68691	-0.18639	0.079813	0.52061
SUICM	-0.50467	0.45807	-0.34859	-0.11437	0.69796
DIVOR	-0.80599	0.30162	-0.19874	-0.32799	0.18136
DESASP	-0.80093	-0.30413	0.11683	-0.0092993	-0.18147
DESAIP	-0.84299	-0.26068	0.088848	0.0045680	-0.10644
PRISION	-0.33453	0.75977	0.17205	-0.24903	-0.073676
PPRESAS	-0.49621	0.80707	0.19348	0.17852	-0.11216
CRIMREG	0.13517	-0.33414	-0.41761	-0.88934	-0.023315
FA98P	0.39470	-0.20880	0.89772	0.039478	-0.026391
DPMIPNB	0.34893	-0.17461	0.89974	0.0074648	0.050659
Correlation with					
POPUL	-0.13454	0.66316 *	0.20140	-0.15983	-0.091411
PIBpc98	0.33341	-0.48578 *	-0.13030	-0.77192 *	0.20041
PNBpc98	0.35303	-0.47257 *	-0.17725	-0.76438 *	0.059779
PNBPCGR	0.25159	-0.53282 *	0.0044304	-0.55188 *	0.44477 **
TAXDES	0.18567	0.028520	0.41563 **	-0.047430	0.40091 **
TXINF98	-0.16039	0.38456	0.029839	0.32547	0.064485
TXINFAV	-0.10208	0.35865	0.025074	0.52443 *	-0.44501 **

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 19 observations: 0.45556.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 19 observations: 0.38881.)

We finalize by presenting the plot of the two first derived components. Estonia and now the Russian Federation are outliers.

The relative position of the others is maintained; Finland may stand a little apart from the others.

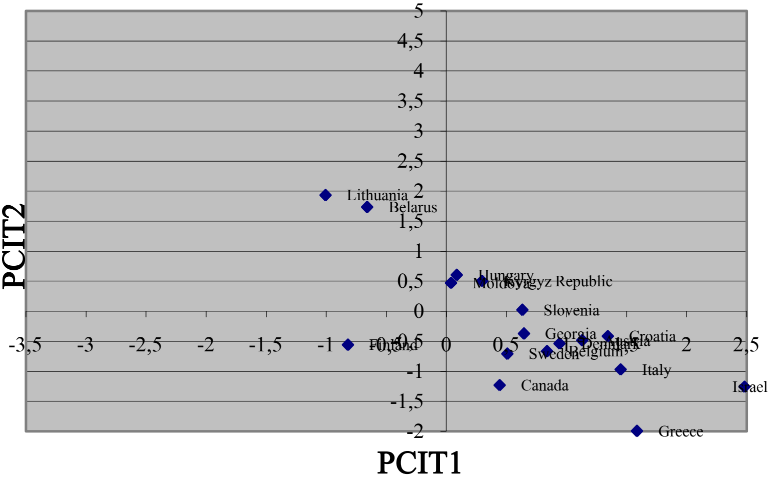

Figure 2.6. *First Two Principal Components, Set 1, Cross-Products Decomposition*

9. Overall, in the section we persistently encountered that

- general crime and drug offenses share relevancy and sign effect in the same component, usually not the main one, and the most correlated with per capita GDP. Homicides and rapes do not share the main importance in the same component as those other crimes.
- general crime has an opposite sign effect to armed forces, sharing main importance with the some of the latter variables in some instances.
- suicides and divorces share sign effect and main importance in the same component.
- suicides and imprisonment share sign effect and importance in the component, sometimes the same, where either one has higher factor loadings.

Time Series Analysis – the Portuguese Case

We proceeded to perform principal components on the Portuguese time series.

We essayed on several combinations; the first decision concerned the subset to use, once considering the whole sample would severely restrict the sample size, specially for "balanced" inference. After some trials with the whole set, we discarded the strike activity indicators TGRPT and HGRPT – which usually shared the component of law enforcement as the most important, but with factor loadings of symmetric sign to law enforcement variables. Also, reported crimes, CRPOLHA (that still left us only with 13 observations) were discarded, even if it consistently joined factor loading importance (and sign) with other law enforcement indicators.

In the remaining variables[68] – which allowed 17 observations covering the years 1980 to 1996 -, we considered several levels of component decomposition:

1) on the levels of the variables (we essayed also to include the yearly trend in the set)

2) on the cross-correlations of the variables (as performed for the cross-section sample)

3) on the first difference of the variables

Inquiries were performed for original data, and on the (same) previously smoothed series (in which case 2 extra observations were lost, leaving us with 15)[69].

Different data sets were also inspected. Using the contemporaneous values instead of the leads of the judicial outcome related variables did not change the grouping of the variables perceptibly. Yet, the use of the first difference of the two imprisonment and armed forces indicators – that unit roots inspection of section I suggested non-stationarity in levels and in first differences - instead of levels did, even if pattern changes were somehow consistent with expectations. We present in the end of the section a summary of some of the results but with the latter format and also considering all variables in first differences. Notice

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[68] Some of the series are linear combinations (sum of) of the others: FA = MILCAR + SMO; HOMIH = HOMLEGH + HOMIOUH. The literature advises not to use all the series in these cases; however, MILCAR and SMO represent different phenomena (they even exhibit an opposite trend pattern), and FA has a special significance of its own and correlations with other variables are also of interest in our study – reason why we kept the three series. The same comment is valid for HOMLEGH and HOMIOUH relative to HOMIH.

[69] The series were inspected for univariate normality. Contrary to what was recorded for the cross-section sample: For plain series, the null is not rejected in all cases but ACRTOTH at the 5% level by Bera-Jarque test; -yet Shapiro-Wilks statistics usually indicates rejection; with the 17 observations balanced sample, only for ACTJMOH do we reject normality at 5% by B-J; S-W rejects normality for more cases. For smoothed series, the null is not rejected in all cases but CONDHAB, ACRTOTH and FA at the 5% level by Bera-Jarque test; -Shapiro-Wilks statistics usually indicates rejection; with the 15 observations balanced sample, normality is never rejected at 5% by B-J; S-W does not reject normality at 5% but for ACRFERH, MOCEXTH and MILCAR.

that it is not clear that we should use stationary variables as inputs to pc; rather, we may think that the components would capture – and decompose - the several patterns contained in the set and we could want to consider the plain variables, the actually observed series.

Given that components in levels are to be used in further research in later chapters, we spent some effort on its validation. On the one hand, we inspected the time series patterns – unit roots - of the extracted components – using the same methodology of section I -, and the co-integration properties with respect to the variables that exhibit high loadings for each – if components were reasonably calibrated we should find co-integration. Additionally, we standardized the original variables, transposed the observation matrix, and preformed cluster analysis; we would expect to find the same grouping of the variables as principal components yielded; we roughly did, therefore, we do not report such results.

Principal Component in Levels

1. In levels, four components would be associated to eigenvalues of the component matrix larger than 1 – and an explanation of more than 90% of the total variance was achieved with those four components. Statistical results for the original and smoothed series are reported in the table below.

The Chi-square test results [70] from the joint significance of the excluded components – line Chi1 of the table;– at 5% indicate that no component is significant in either the "plain" (for which 17 – the number of observations, shorter than the number of variables – components were derived) nor the "smoothed" system (only 14 components were obtained for this case). If one argues that a 95% test should be performed instead, only the first component should be kept. Yet, the test of significance of the last component in the system of equations – CHI2 - justifies the first 3 components at the 5% level for plain data, 2 for smoothed data, and, at 10% the four components for plain data and three for smoothed (p-values of the test rise for systems including more than 5 components relative to the reported values).

Independence of the error terms across the equations of systems in which each variable is explained by the components – Breuch-Pagan test based on number of observations times the sum of squared correlations between the error term of an equation with the 19 others - – was always not rejected in the 16 data component

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[70] ANALYZ with SUR routine (TSP) was used, but, as the number of observations is small, the weighting matrix was fixed to be the identity matrix.

systems for plain data for CONDHA2, RECCHA2 and ACRMORH; and it was always rejected in the 13 for smoothed data; in the 4 component systems, it was not rejected for the equations explaining ARGHAB2, ACTJTH1, ACTTOH, HOMLEGH and TXDIV for plain data; ACTJMH1 and ACTMOH for smoothed data. Residuals from the regressions were in general found to be homoeskedastic and corresponding univariate normality was not rejected (at 10% significance level). Strong autocorrelation shows up in systems with the p-1 components, positive for plain data, negative for smoothed; yet, the Durbin-Watson suggested mild autocorrelation (at 5%) only for some equations in systems in the 4 main components.

Information criteria pointed to the inclusion of all components – we have a too small number of observations to fall within the criteria pre-requisites:

	Plain Data									
Inf. Criteria	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10
AIC	2.12294	1.78483	1.45441	.911637	.621933	.390433	.080571	-.270060	-.687270	-.965986
SBIC	-.489701	-.602584	-.707774	-1.02531	-1.08978	-1.09605	-1.18068	-1.30608	-1.49806	-1.55154
SIG	0.48643	0.34721	0.25164	0.14876	0.11438	0.094294	0.072845	0.054897	0.039464	0.033377
SIG’	0.49128	0.35510	0.26153	0.15787	0.12478	0.10677	0.086879	0.070582	0.056932	0.058410
BIC3	0.70335	0.60662	0.48418	0.29695	0.22666	0.17890	0.12813	0.086795	0.054343	0.038680
BIC3’	0.72572	0.63498	0.51136	0.31568	0.24224	0.19208	0.13816	0.093970	0.059071	0.042215
PC	0.53991	0.40883	0.30371	0.17887	0.13364	0.10456	0.074912	0.051110	0.032403	0.023458
IC	-0.59121	-0.80560	-1.01229	-1.43133	-1.59731	-1.70508	-1.89122	-2.11812	-2.41161	-2.56660

	Smoothed Data									
Inf. Criteria	PCS1	PCS2	PCS3	PCS4	PCS5	PCS6	PCS7	PCS8	PCS9	PCS10
AIC	1.97027	1.53728	1.02735	-.321524	-1.28211	-1.81657	-2.24968	-2.64290	-3.26852	-4.08086
SBIC	-.620690	-.806761	-1.06977	-2.17173	-2.88539	-3.17294	-3.35913	-3.50543	-3.88413	-4.44955
SIG	0.41451	0.26745	0.16124	0.042450	0.016681	0.010184	0.0070024	0.0051206	0.0030511	0.0015643
SIG’	0.42245	0.27939	0.17404	0.047892	0.020017	0.013366	0.010554	0.0097757	0.0095890	
BIC3	0.60512	0.47039	0.30976	0.083616	0.032126	0.018427	0.011474	0.0073219	0.0036575	0.0014999
BIC3’	0.64006	0.51005	0.34103	0.093086	0.036090	0.020867	0.013089	0.0084123	0.0042318	0.0017478
PC	0.45966	0.31319	0.19209	0.049872	0.018793	0.010710	0.0066867	0.0043088	0.0021854	0.00091421
IC	-0.75029	-1.06596	-1.45858	-2.69013	-3.53340	-3.95054	-4.26634	-4.54224	-5.05054	-5.74557

The interpretation of the components, as is known, is determined by the factor loadings. We have very few observations and the interpretations we provide are conditioned by the time series nature of the sample. Indeed, each component congregates a time series combination of variables, orthogonal to the other components – as a composite of “common trend” of the variables in the full sample.

The first (smoothed) component would possibly capture general aggressiveness. This interpretation would be consistent with road accidents caused by pro-activity rather than carelessness (ACRFERH and ACRTOTH have positive loadings). Labor accidents as well as death by external causes rate significantly and negatively in this component – being, thus associated to lethargy, the opposite to aggressiveness. Divorces join this component with positive loadings. Interestingly, mandatory military service is negative and highly correlated to this component – suggesting a possible substitution effect to aggressive and criminal activities. (Portugal decreased its military forces after 1974 due to the end of the war in the colonies; yet, the sub-sample we use starts only in 1980 – 1981 for smoothed data.)

The second component is related to accidentality or hazardousness. In general, labor accidents rate high and positive – whether legally judged or not – and mortal road accidents. HOMIOUH represents deaths by external causes not known to be accidents or not and (even if it shows more importantly on the first component) has positive loadings in this component.

The third component is mainly associated to the (reverse of) self-pain and mortal effects: suicides and also homicides – legally certified – rate high.

The fourth component would capture to some extent legal assistance in fatalities: fatal labor accidents in courts rate high and positive, as well as legally certified homicides; simply mortal labor accidents rate high and negative, as well as presumed homicides. Deaths on the roads also have high and negative loadings.

The use of smoothed series originated also four components and a similar aggregation of most of the variables. Apparently, the second component is symmetric to the one in the original series, the last two components switch, but most of the comments still apply.

The correlations with the trend and macroeconomic indicators suggest that, for both data sets, the first component captures a general increasing trend in the whole series.

The second component is related in opposite directions to the GDP per capita growth rate and to the unemployment rate. We can assume it would describe what is commonly associated to the business cycle.

The third component is mainly associated to the population level.

The fourth captures vaguely a residual effect from GDP per capita growth rate.

Even if the components do not share the same significance with those of the cross-section sample – as neither the set of contemplated variables coincide -, and if in the time series data the trend captures a large part of data variability, we recognize the distinction of some common features in the variables most correlated with the components: a population/human factor; an acceleration element (the relation to per capita GDP growth rate); and the level effect (of GDP per capita in the cross-section sample, here meshed with the linear trend effect).

Suicides (female in Set 2 of the cross-section sample, total in the time series case) sometimes stand aside the main components in relative importance. Road accidents join the first component in some cases, but with opposite sign relative to criminal indicators.

Table 2.16. *Principal Components – Portuguese Evidence*

	Original Variables				Smoothed Variables			
	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
Eigenv.	10.757832	3.3829595	2.1159910	1.8093369	12.124290	3.4053915	2.1208363	1.8158290
Chi1 (df, p-v)	320.00000 (320, 0.48949)	147.87468 (300, 1.00000)	93.747332 (280, 1.00000)	59.891476 (260, 1.00000)	273.04739 (260, 0.27693)	103.82519 (240, 1.00000)	68.266218 (220, 1.00000)	39.304409 (200, 1.00000)
Chi2 (df=20) (p-v)	172.12532 (0.00000)	54.127352 (0.00006)	33.855856 (0.02712)	28.949390 (0.08876)	169.74006 (0.00000)	47.675481 (0.00047)	29.691708 (0.07501)	25.421605 (0.18577)
% Cum. Exp Var.	0.53789161	0.70703958	0.81283914	0.90330598	0.60621451	0.77648408	0.88252589	0.97331734
Factor Loadings:								
CONDHA2	0.98070	0.066311	0.037441	0.050326	0.98938	0.10723	0.035047	0.024372
ARGHAB2	0.97727	-0.030923	-0.021501	0.039908	0.98903	0.11329	-0.032878	0.025165
RECHAB2	0.94850	-0.22818	-0.081175	0.021922	0.94793	0.25573	-0.18051	-0.031668
RECCHA2	0.94722	-0.22572	-0.082470	0.014264	0.94796	0.24662	-0.19153	-0.039651
ACRMORH	-0.0066885	0.79103	0.27703	-0.40149	0.15306	-0.82184	0.078882	0.52923
ACRFERH	0.82846	0.41905	0.24963	-0.18775	0.87825	-0.38293	0.097967	0.25234
ACRTOTH	0.96786	0.035788	0.17553	-0.11836	0.97875	-0.012090	0.092767	0.17469
SUICHAB	-0.16684	0.24661	-0.83996	0.30629	-0.21613	-0.21426	-0.49841	-0.76909
ACTJTH1	0.34529	0.72542	0.34147	0.28089	0.71506	-0.50487	0.39706	-0.18499
ACTJMH1	-0.030339	0.56993	0.25274	0.61692	0.18142	-0.48202	0.65205	-0.55175
ACTTOH	-0.35062	0.86288	0.25255	-0.035677	-0.19233	-0.93030	0.22833	0.18703
ACTMOH	-0.66967	-0.083816	-0.27745	-0.48521	-0.82775	0.085221	-0.47666	0.17988
HOMLEGH	0.52654	0.29290	-0.51655	0.52486	0.75010	-0.25253	-0.10906	-0.55591
HOMIOUH	0.56544	0.45111	-0.40498	-0.52104	0.54852	-0.51871	-0.63643	0.14120
HOMIH	0.58878	0.46015	-0.43221	-0.46645	0.57635	-0.51524	-0.62306	0.10090
MOCEXTH	-0.65224	0.42153	-0.45823	0.087849	-0.80428	-0.47133	-0.18596	-0.26015
TXDIV	0.93412	-0.13949	0.030775	-0.074180	0.96673	0.20160	-0.019027	0.038169
MILCAR	0.88287	-0.29511	0.12829	-0.0020188	0.89648	0.36477	0.16976	0.045657
SMO	-0.98081	0.060847	0.073529	-0.087166	-0.98674	-0.083199	0.0082120	0.076349
FA	-0.84767	-0.13982	0.23166	-0.13676	-0.86589	0.16030	0.21277	0.15513
Correlation with:								
ANO	0.98800 *	0.031595	-0.036076	-0.084207	0.99084 *	-0.016038	-0.11679	0.046325
POMINEN	0.56803 *	-0.31740	-0.48270 *	-0.10894	0.40372	0.42663	-0.67973 *	-0.36856
PIBppc *	0.97190 *	0.14017	0.14131	-0.038577	0.98184 *	-0.10954	0.090637	0.11249
TCPIBPPC	0.037244	0.50088 *	-0.062911	-0.55777 *	0.077077	-0.67974 *	-0.49535 **	0.43575
TXDESCE	-0.45778 **	-0.75376 *	-0.39704	0.081556	-0.61957 *	0.67887 *	-0.26039	-0.27813
IPPIB	-0.84768 *	0.015935	-0.17805	0.37818	-0.90679 *	0.011133	0.13715	-0.38107
ICPRIV	-0.81899 *	0.055107	-0.12303	0.39892	-0.87238 *	-0.0013157	0.27045	-0.33866
IIPPIB	0.98892 *	0.018047	-0.00046635	-0.061900	0.99357 *	0.0062502	-0.066410	0.054750
IICPRIV	0.98988 *	0.020959	-0.014586	-0.051437	0.99409 *	0.0032205	-0.072495	0.036644
Unit Roots	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
CONST Tau test (p-value) [nlags; nobs]	-0.72329 (0.91419) [6; 10]	-2.79613 (0.021258) [2; 14]	-1.64089 (0.40692) [2; 14]	-2.21007 (0.11127) [3; 13]	-0.031761 (0.98826) [3; 11]	-1.52380 (0.49332) [3; 11]	-2.62864 (0.034591) [3; 11]	-2.26891 (0.095027) [3; 11]
C, TREND Tau test (p-value) [nlags; nobs]	-0.79824 (0.98529) [2; 14]	-2.83021 (0.13365) [2; 14]	-1.63962 (0.84415) [2; 14]	-2.29455 (0.43338) [3; 13]	-0.62285 (0.99124) [4; 10]	-1.53841 (0.87995) [3; 11]	-2.80528 (0.14251) [3; 11]	-2.50877 (0.28734) [3; 11]
D on C, TREND and lag F (uncor. p-value) [nobs]	2.23100 (0.147) [16]	1.20127 (0.332) [16]	2.66527 (0.107) [16]	2.15468 (0.156) [16]	0.896350 (0.436) [14]	2.25161 (0.151) [14]	1.65627 (0.235) [14]	3.26152 (0.077) [14]
C, T; T2 Tau test [nlags; nobs] D-F (p-value) [nlags; nobs]	-1.74482 [4; 12] -4.45006 (0.0077250) [5; 11]	-2.64412 [2; 14] -35.57605 (0.0000) [5; 11]	-2.00178 [2; 14] -3.35336 (0.15468) [5; 11]	-2.33730 [3; 13] -2.58600 (0.51985) [2; 14]	-1.31393 [4; 10] -1.24089 (0.97369) [3; 11]	-1.10246 [3; 11] -3.02793 (0.28204) [4; 10]	-1.30672 [3; 11] -1.68652 (0.91109) [3; 11]	-1.92380 [3; 11] -2.56534 (0.53178) [4; 10]
Dif CONST Tau test (p-value) [nlags; nobs]	-1.61371 (0.42667) [3; 12]	-2.19973 (0.11436) [2; 13]	-1.67445 (0.38296) [2; 13]	-3.18992 (0.0066497) [2; 13]	-1.78407 (0.30904) [3; 10]	-1.83807 (0.27567) [3; 10]	-1.91153 (0.23405) [2; 11]	-2.20419 (0.11301) [3; 10]
Dif C, TREND Tau test (p-value) [nlags; nobs]	-2.88263 (0.11652) [3; 12]	-3.80716 (0.0082518) [5; 10]	-1.14248 (0.95989) [3; 12]	-3.18093 (0.051304) [2; 13]	-2.16786 (0.52762) [3; 10]	-2.60181 (0.23390) [3; 10]	-1.87851 (0.72620) [2; 11]	-1.78574 (0.77777) [3; 10]
Cointeg. Test	-2.25098 (.) [2; 14]	-4.13783 (0.14243) [2; 14]	-2.09446 (0.46555) [6; 10]	-2.43585 (0.34740) [2; 14]	-1.46150 (.) [5; 9]	-2.99615 (0.30529) [2; 12]	-1.34335 (0.83012) [3; 11]	-1.48067 (0.69441) [3; 11]
Cointeg. Test (>0.5)		-4.10718 (0.24050) [2; 14]	-2.30310 (0.50358) [6; 10]	-3.07833 (0.38674) [6; 10]		-1.44586 (0.87978) [4; 10]		0.11455 (0.94566) [5; 9]

The time series properties of the extracted components are vaguely captured – recall that we have 17 observations; tests suggest that:

- for the original variables, the first component would have (at least) one unit root (t-tests with p-values larger than 90%), but the 2-nd and the 4-th components (at 12%, in the first row of tau tests) could be stationary. The 3rd component is dubious (at 10%, it would be non-stationary, but, as is well known, the tests favor the null).

- for smoothed series the first two components would have (at least) one unit root; the last two would be stationary.

- co-integration of each component with the most representative variables is usually not accepted. But most p-values are smaller than 50% and rarely larger than 90%.

2. We plotted the several components against time (year) in Figs. II.7 and II.8. The first component turned out to be positive and strongly correlated with both time and per capita GDP – not unexpectedly, once a unit root was found for it, and always exhibits an increasing pattern for both original and smoothed samples.

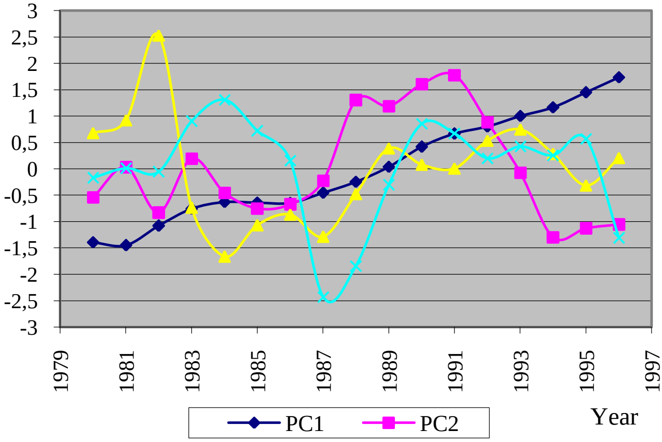

Figure 2.7. *First Four Principal Components, Portugal*

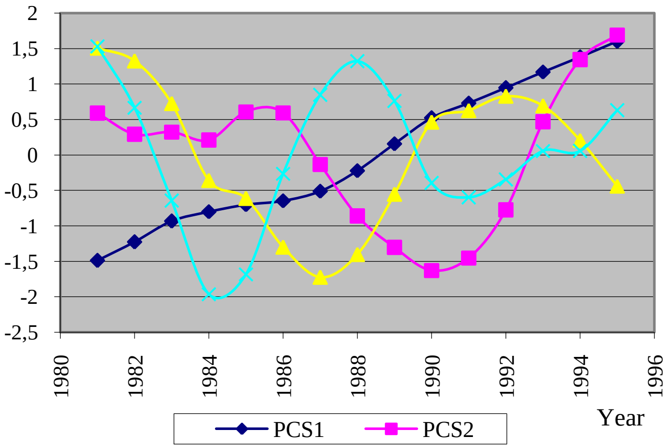

Figure 2.8. *First Four Principal Components, Smoothed Data, Portugal*

The main feature of data variability highlighted in the (a) first principal component appears to be, in our sample, its increasing time trend.

Second and interestingly, the other components seem to exhibit clear cyclical behavior, specially for the smoothed sample. Apparently, principal components mapped the set of original variables into a trend and several cyclical series.

3. We report below the principal component decomposition of the cross-correlation matrices corresponding to the two data sets used in levels to obtain the results in the last table. Interestingly – and unlike in the cross-section evidence -, the affiliation of the variables to each component was preserved relative to computations in the variables themselves.

Table 2.17. *Principal Components, Cross-Correlations – Portugal*

	Original Variables					Smoothed Variables				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		14.481368	2.8270944	1.4058720	1.1097289		15.198313	2.5071155	1.2185605	1.0619159
% Cum. Exp Var.		0.72406841	0.86542313	0.93571673	0.99120317		0.75991563	0.88527141	0.94619944	0.99929523
Factor Loadings:										
CONDHA2	0.29914 (0.67232)	0.99785	0.045464	0.0043340	0.029210	0.31099 (0.72471)	0.99649	0.076140	0.026214	0.016899
ARGHAB2	0.27387 (0.68012)	0.99926	-0.0071149	-0.012197	0.022878	0.31224 (0.72398)	0.99615	0.086232	-0.0023691	0.0084966
RECHAB2	0.23703 (0.67895)	0.99081	-0.12447	-0.0093122	0.033649	0.27719 (0.71272)	0.98270	0.17657	-0.049698	-0.025233
RECCHA2	0.23750 (0.67768)	0.99084	-0.12425	-0.0088640	0.030354	0.27945 (0.71161)	0.98282	0.17377	-0.053954	-0.030610
ACRMORH	0.17042 (0.32731)	-0.24926	0.83230	0.22433	-0.42212	0.18801 (0.35543)	0.14987	-0.90959	-0.18964	0.33697
ACRFERH	0.32590 (0.56481)	0.94556	0.28420	0.11819	-0.093116	0.35579 (0.62652)	0.96970	-0.22308	-0.013605	0.096693
ACRTOTH	0.28561 (0.67074)	0.99378	0.042422	0.095834	-0.021956	0.32005 (0.71231)	0.99681	-0.0013209	0.020542	0.076412
SUICHAB	0.054129 (0.33687)	-0.47545	-0.035341	-0.87250	0.0035505	0.026435 (0.35034)	-0.58450	-0.0032469	-0.22276	-0.77889
ACTJTH1	0.23618 (0.35451)	0.49664	0.83030	0.058955	0.19326	0.32337 (0.53211)	0.89987	-0.36051	0.23144	-0.076377
ACTJMH1	0.086017 (0.31541)	-0.20822	0.79883	-0.094689	0.52614	0.12804 (0.34922)	0.28917	-0.58595	0.67331	-0.34592
ACTTOH	0.065884 (0.45330)	-0.70135	0.70151	0.034973	-0.10026	0.086833 (0.42431)	-0.47780	-0.87524	0.013260	0.071700
ACTMOH	-0.17095 (0.51089)	-0.92220	-0.18517	-0.034386	-0.29288	-0.27078 (0.62452)	-0.96105	0.077709	-0.26272	0.023203
HOMLEGH	0.22519 (0.41939)	0.78954	0.16092	-0.54768	0.20544	0.30101 (0.55376)	0.93400	-0.099028	0.025492	-0.33920
HOMIOUH	0.28995 (0.41668)	0.80803	0.20074	-0.22681	-0.49758	0.30691 (0.43385)	0.78512	-0.30493	-0.52835	-0.10688
HOMIH	0.29854 (0.42704)	0.82409	0.20213	-0.25544	-0.45629	0.31503 (0.44655)	0.80867	-0.29211	-0.49450	-0.12717
MOCEXTH	-0.058630 (0.54511)	-0.93279	0.13851	-0.30739	-0.074671	-0.15950 (0.66057)	-0.95343	-0.23792	-0.080870	-0.16631
TXDIV	0.25953 (0.65480)	0.99405	-0.083739	0.051474	0.0035046	0.29242 (0.71703)	0.99060	0.13288	0.0087376	0.023293
MILCAR	0.20983 (0.64451)	0.97854	-0.14918	0.10427	0.063102	0.23299 (0.69534)	0.97163	0.20087	0.10197	0.065533
SMO	-0.26327 (0.68856)	-0.99800	0.019886	0.042216	-0.036126	-0.30689 (0.72402)	-0.99705	-0.065103	-0.016976	0.034100
FA	-0.25196 (0.59685)	-0.97686	-0.087629	0.17180	-0.0092351	-0.30430 (0.62906)	-0.98328	0.055036	0.092483	0.13074
Correlation with										
“Correlations with										
ANO	0.29740 (0.67871)	0.99932 *	0.0093835	-0.0039536	-0.033772	0.33828 (0.71262)	0.99830 *	0.028366	-0.050314	-0.0032987
POMINEN	0.13218 (0.46379)	0.88128 *	0.36468	0.22600	-0.090421	0.10278 (0.43627)	0.69071 *	0.54066 *	-0.33409	-0.34330
PIBppc *	0.30718 (0.66461	0.99318 *	0.096677	0.056422	-0.0034166	0.34075 (0.70516)	0.99752 *	-0.047701	0.022870	0.045032
TCPIBPPC	0.098416 (0.26434)	-0.045849	0.59188 *	-0.021349	-0.78973 *	0.15217 (0.32908)	0.0058146	-0.70051 *	-0.70001 *	0.12796
TXDESCE	-0.27868 (0.39673)	-0.63071 *	-0.74044 *	-0.18748	0.084945	-0.31543 (0.48778)	-0.82304 *	0.54672 *	-0.048115	-0.14389
IPPIB	-0.24229 (0.60236)	-0.97624 *	-0.00040356	-0.15728	0.14429	-0.30351 (0.66619)	-0.98330 *	-0.013867	0.11580	-0.13872
ICPRIV	-0.22258 (0.58795)	-0.97533 *	0.027517	-0.13788	0.16557	-0.30196 (0.63972)	-0.97707 *	-0.044327	0.17482	-0.10853
IIPPIB	0.29451 (0.68043)	0.99960 *	0.0080768	0.010260	-0.018352	0.33407 (0.71647)	0.99890 *	0.034703	-0.027854	0.0087355
IICPRIV	0.29556 (0.68068)	0.99971 *	0.0081520	0.0019962	-0.016079	0.33544 (0.71621)	0.99893 *	0.034831	-0.028020	0.00045910

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Weighting the correlation matrix with the full sample information and using the unstandardized decomposition, the number of relevant components is compressed. ACRMORH (fatal road accidents) and HOMLEGH (homicides) emerge in the second component.

Table 2.18. *Unstandardized Principal Components, Weighted Cross-Correlations (all available observations) – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		17.31105	1.05353		17.82835	1.01570
% Cum. Exp Var.		0.86555	0.918227		0.89142	0.942205
Factor Loadings:						
CONDHA2	0.42188 (0.58666)	0.99057	-0.013725	0.38642 (0.66359	0.99111	-0.037682
ARGHAB2	0.44596 (0.60212)	0.99178	0.025009	0.42840 (0.67496)	0.99340	-0.061213
RECHAB2	0.40642 (0.61842)	0.99054	-0.067021	0.38178 (0.70221)	0.99133	0.055602
RECCHA2	0.41536 (0.61831)	0.99099	-0.048117	0.38750 (0.70197)	0.99092	0.054674
ACRMORH	0.26591 (0.37126)	-0.28476	0.80220	0.23468 (0.46643	-0.46812	-0.81769
ACRFERH	0.47010 (0.56280)	0.94823	0.24468	0.47820 (0.62793)	0.94242	-0.29011
ACRTOTH	0.46211 (0.59663)	0.97419	0.11075	0.46913 (0.64537)	0.96524	-0.22886
SUICHAB	-0.067111 (0.44110)	-0.85468	0.11467	-0.031850 (0.47938)	-0.90311	-0.059427
ACTJTH1	0.36612 (0.49589)	0.88956	0.15469	0.36515 (0.59418)	0.94312	0.056596
ACTJMH1	0.25177 (0.33617)	0.61194	0.37111	0.30937 (0.47416)	0.86489	0.069171
ACTTOH	0.047153 (0.49964)	-0.72573	0.44417	0.056847 (0.49084)	-0.68148	-0.29486
ACTMOH	-0.16628 (0.52597)	-0.91737	-0.13124	-0.25685 (0.62937)	-0.92822	0.18355
HOMLEGH	0.28009 (0.27384)	0.12542	0.72279	0.29495 (0.28854)	0.084086	-0.75023
HOMIOUH	0.40849 (0.51626)	0.96820	0.020140	0.40133 (0.57291)	0.97081	-0.021054
HOMIH	0.42235 (0.50797)	0.96893	0.054417	0.41287 (0.56504)	0.97045	-0.047541
MOCEXTH	0.028649 (0.48644)	-0.87706	0.39286	-0.020213 (0.60742)	-0.95833	-0.18980
TXDIV	0.42955 (0.62543)	0.97686	0.15893	0.44786 (0.66882	0.96101	-0.22451
MILCAR	0.25534 (0.70085)	0.97167	-0.21166	0.24316 (0.77316)	0.98475	0.11496
SMO	-0.15380 (0.61326)	-0.96708	0.0066330	-0.21307 (0.76552)	-0.98777	-0.12162
FA	-0.12260 (0.54370)	-0.94001	-0.051115	-0.17878 (0.69080)	-0.97989	-0.13065
Correlation with "Correlations with"						
ANO	0.46536 (0.61671)	0.96598 *	0.18934	0.47853 (0.67067)	0.95388 *	-0.24656
POMINEN	0.39747 (0.54206)	0.92117 *	0.22547	0.41512 (0.54280)	0.89963 *	-0.20364
PIBppc *	0.45456 (0.62085)	0.96867 *	0.16092	0.46226 (0.68646)	0.95831 *	-0.24005
TCPIBPPC	-0.15176 (0.19201)	0.11058	-0.37677	-0.13527 (0.25416)	0.22686	0.66247 *
TXDESCE	0.24120 (0.31540)	0.52943 *	0.44569 *	0.27152 (0.27117)	0.23095	-0.52643 *
IPPIB	0.060040 (0.42834)	-0.77377 *	0.53301 *	0.041716 (0.54386)	-0.84548 *	-0.42202 **
ICPRIV	0.049191 (0.44046)	-0.79918 *	0.50717 *	0.018338 (0.55154)	-0.85104 *	-0.42595 **
IIPPIB	0.44231 (0.63814)	0.98955 *	0.067435	0.44464 (0.69048)	0.98234 *	-0.15814
IICPRIV	0.44631 (0.63665)	0.98968 *	0.073981	0.44890 (0.68898)	0.98206 *	-0.16117

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

As done for the cross-section sample, we plot the two components of the full sample results in Figs. II.9 and II.10 – for plain and smoothed data respectively.

The graphs suggest:

- a cluster formed by SMO, FA, ACTMOH, SUICHAB, MOCEXTH and ACTTOH
- a second intermediate group with ACRMORH, HOMLEGH
- MILCAR may stand alone or close to the last group of
- all other variables

It is interesting to notice that if road accidents, divorces and labor accidents in courts seem to join general law enforcement and crime related indicators, registered labor accidents are in the other extreme, with suicides, deaths by external causes and mandatory (temporary) military forces (the majority of total armed forces). Permanent armed forces, though, are somewhat closer to law enforcement points.

Comparing this geography with the one derived for cross-section sample, depicted in Fig. II.3 above, we conclude some general similarities:

- permanent armed forces (in time series sample) and military indicators in the cross-section case are in opposite locations with respect to at least one axis to suicides
- deaths due to external causes (in the time series sample) and the analogous variables in the cross-section one, deaths due to accident or disaster, stand quite far away from criminal and law-enforcing clusters
- divorces, even if on the same side to permanent armed forces in the first (the ‘x’ – first component) axis, are in the opposite position to the latter in the other axis (the ‘y’).

road injuries and road accidents (deaths and injured in the cross-section case) are in both Figures close to the criminal cluster, even if not exactly in the same “orbital” proximity of other variables.

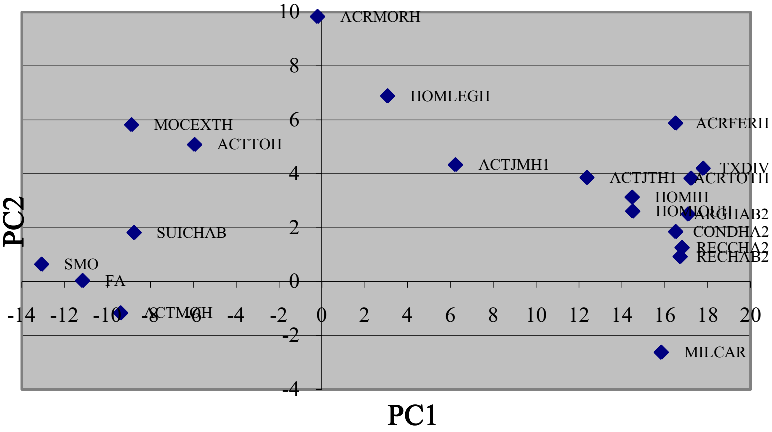

Figure 2.9. *First Two Principal Components, Own Cross-Correlation Decomposition, Unbalanced Sample, Portugal*

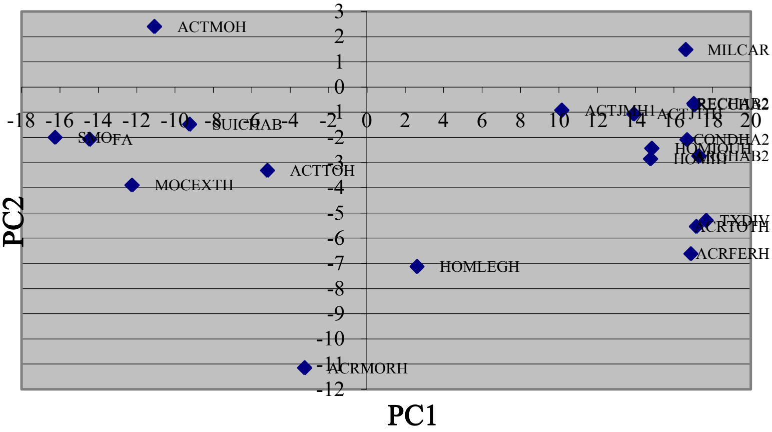

Figure 2.10. *First Two Principal Components, Own Cross-Correlation Decomposition, Unbalanced Smoothed Sample, Portugal*

With “uncentered” pc:

Table 2.19. *Uncentered Principal Components, Weighted Cross-Correlations (all available observations) – Portugal*

	Original Variables					Smoothed Variables				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		17.07429	1.58746	0.50895	0.36765		17.45253	1.52445	0.39148	0.26802
% Cum. Exp Var.		0.85371	0.933083	0.95853	0.976912		0.87263	0.948852	0.968426	0.981827
Factor Loadings:										
CONDHA2	0.42188 (0.58666)	0.99207	-0.013831	0.038854	-0.074114	0.38642 (0.66359)	0.99305	-0.022099	0.048459	-0.078760
ARGHAB2	0.44596 (0.60212)	0.99328	-0.043576	0.053213	-0.074561	0.42840 (0.67496)	0.99404	-0.064785	0.026523	-0.071617
RECHAB2	0.40642 (0.61842)	0.99147	0.041998	0.018945	-0.10192	0.38178 (0.70221)	0.99198	0.042479	-0.011813	-0.10256
RECCHA2	0.41536 (0.61831)	0.99213	0.024632	0.0049308	-0.10538	0.38750 (0.70197)	0.99178	0.035154	-0.026669	-0.10533
ACRMORH	0.26591 (0.37126)	0.10521	-0.89473	0.32084	0.12294	0.23468 (0.46643	-0.17489	-0.89862	0.26644	0.15198
ACRFERH	0.47010 (0.56280)	0.96355	-0.20844	0.085487	0.11397	0.47820 (0.62793)	0.95348	-0.25458	0.064266	0.11857
ACRTOTH	0.46211 (0.59663)	0.98204	-0.10374	0.14342	0.0052610	0.46913 (0.64537)	0.97209	-0.18928	0.11447	0.0074471
SUICHAB	-0.067111 (0.44110)	-0.79584	-0.32400	-0.25921	-0.40844	-0.031850 (0.47938)	-0.82682	-0.34885	-0.26537	-0.30840
ACTJTH1	0.36612 (0.49589)	0.92174	-0.15121	-0.30530	0.13771	0.36515 (0.59418)	0.95404	-0.049472	-0.27082	0.048686
ACTJMH1	0.25177 (0.33617)	0.73409	-0.34633	-0.52644	0.11892	0.30937 (0.47416)	0.89447	-0.095806	-0.39913	0.0044662
ACTTOH	0.047153 (0.49964)	-0.55735	-0.62675	-0.25527	0.42030	0.056847 (0.49084)	-0.54017	-0.55078	-0.40860	0.42436
ACTMOH	-0.16628 (0.52597)	-0.90922	-0.081070	0.060764	0.13796	-0.25685 (0.62937)	-0.94166	0.070782	-0.037977	0.096911
HOMLEGH	0.28009 (0.27384)	0.44803	-0.76247	-0.051579	-0.42045	0.29495 (0.28854)	0.37787	-0.81406	-0.0060669	-0.38768
HOMIOUH	0.40849 (0.51626)	0.97248	-0.093907	-0.020512	0.063403	0.40133 (0.57291)	0.97110	-0.10822	-0.089809	0.066883
HOMIH	0.42235 (0.50797)	0.97128	-0.12773	-0.027588	0.040760	0.41287 (0.56504)	0.96915	-0.13704	-0.090912	0.050561
MOCEXTH	0.028649 (0.48644)	-0.70245	-0.65704	-0.14606	-0.17386	-0.020213 (0.60742)	-0.85646	-0.46995	-0.17043	-0.078314
TXDIV	0.42955 (0.62543)	0.98620	-0.088223	0.040364	0.016720	0.44786 (0.66882	0.97154	-0.17545	0.066527	0.017393
MILCAR	0.25534 (0.70085)	0.95279	0.28191	0.051637	0.0074078	0.24316 (0.77316)	0.96985	0.21705	0.066341	0.0078212
SMO	-0.15380 (0.61326)	-0.92709	-0.24151	0.22379	0.0053503	-0.21307 (0.76552)	-0.96697	-0.23173	0.032203	-0.037018
FA	-0.12260 (0.54370)	-0.89871	-0.21388	0.30651	-0.0075108	-0.17878 (0.69080)	-0.95685	-0.24010	0.085075	-0.069558
Correlation with “Correlations with’										
ANO	0.46536 (0.61671)	0.97136 *	0.34157	0.060253	0.086293	0.47853 (0.67067)	0.95921 *	0.21186	0.22725	0.12942
POMINEN	0.39747 (0.54206)	0.92739 *	0.29355	-0.096262	-7.19230D-06	0.41512 (0.54280)	0.90477 *	0.20812	0.14584	0.033161
PIBppc *	0.45456 (0.62085)	0.97320 *	0.36647	0.10484	0.12478	0.46226 (0.68646)	0.96316 *	0.22685	0.25181	0.16207
TCPIBPPC	-0.15176 (0.19201)	0.096605	0.42332 **	-0.53820 *	0.40935 **	-0.13527 (0.25416)	0.21374	0.62342 *	-0.69838 *	0.33058
TXDESCE	0.24120 (0.31540)	0.54291 *	-0.10544	0.053756	-0.17696	0.27152 (0.27117)	0.24280	-0.34656	0.43136 **	-0.075996
IPPIB	0.060040 (0.42834)	-0.75739 *	-0.85064 *	0.050413	-0.036145	0.041716 (0.54386)	-0.83529 *	-0.74814 *	0.084978	0.011738
ICPRIV	0.049191 (0.44046)	-0.78353 *	-0.84314 *	0.083734	-0.024387	0.018338 (0.55154)	-0.84095 *	-0.74984 *	0.10020	0.027287
IIPPIB	0.44231 (0.63814)	0.99138 *	0.45373 *	0.087969	0.069200	0.44464 (0.69048)	0.98532 *	0.30843	0.23086	0.10292
IICPRIV	0.44631 (0.63665)	0.99169 *	0.44852 *	0.081963	0.067099	0.44890 (0.68898)	0.98517 *	0.30457	0.22657	0.10187

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Dividing:

Table 2.20. *Uncentered Principal Components, Weighted Cross-Correlations – Portugal*

	Original Variables (Mean square root n = 5.13676)					Smoothed Variables (Mean square root n = 4.88698)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		17.12668	1.53682	0.49781	0.35566		17.50863	1.44097	0.38733	0.25419
% Cum. Exp Var.		0.85633	0.933171	0.958062	0.975845		0.87543	0.947479	0.966845	0.979555
Factor Loadings:										
CONDHA2	0.42188 (0.58666)	0.99357	-0.017126	0.053349	-0.053144	0.38642 (0.66359)	0.99416	-0.024777	0.063047	-0.057376
ARGHAB2	0.44596 (0.60212)	0.99379	-0.044395	0.067704	-0.055001	0.42840 (0.67496)	0.99428	-0.066395	0.044414	-0.056232
RECHAB2	0.40642 (0.61842)	0.99226	0.038390	0.039894	-0.083462	0.38178 (0.70221)	0.99238	0.037471	0.013058	-0.096010
RECCHA2	0.41536 (0.61831)	0.99284	0.021143	0.027741	-0.090031	0.38750 (0.70197)	0.99216	0.029841	-0.000047912	-0.10214
ACRMORH	0.26591 (0.37126)	0.10260	-0.87621	0.30438	0.13285	0.23468 (0.46643	-0.18661	-0.87192	0.24149	0.19110
ACRFERH	0.47010 (0.56280)	0.96408	-0.20026	0.066938	0.10821	0.47820 (0.62793)	0.95354	-0.24298	0.043119	0.11660
ACRTOTH	0.46211 (0.59663)	0.98212	-0.097601	0.13435	0.024804	0.46913 (0.64537)	0.97240	-0.17990	0.10735	0.031333
SUICHAB	-0.067111 (0.44110)	-0.81484	-0.32142	-0.16786	-0.42267	-0.031850 (0.47938)	-0.83934	-0.35133	-0.17346	-0.34799
ACTJTH1	0.36612 (0.49589)	0.92307	-0.17162	-0.31012	0.093635	0.36515 (0.59418)	0.95489	-0.066316	-0.27147	-0.0074789
ACTJMH1	0.25177 (0.33617)	0.73301	-0.37270	-0.52617	0.024207	0.30937 (0.47416)	0.89329	-0.11736	-0.39453	-0.083737
ACTTOH	0.047153 (0.49964)	-0.54219	-0.64457	-0.31242	0.38588	0.056847 (0.49084)	-0.52223	-0.56467	-0.49316	0.34505
ACTMOH	-0.16628 (0.52597)	-0.88972	-0.080035	0.058052	0.18118	-0.25685 (0.62937)	-0.93033	0.076387	-0.052472	0.098949
HOMLEGH	0.28009 (0.27384)	0.45582	-0.76201	0.051238	-0.42725	0.29495 (0.28854)	0.38438	-0.82100	0.11244	-0.35779
HOMIOUH	0.40849 (0.51626)	0.97409	-0.10147	-0.012850	0.076552	0.40133 (0.57291)	0.97267	-0.11437	-0.084561	0.056118
HOMIH	0.42235 (0.50797)	0.97280	-0.13435	-0.015009	0.052464	0.41287 (0.56504)	0.97066	-0.14263	-0.081109	0.040744
MOCEXTH	0.028649 (0.48644)	-0.71205	-0.64952	-0.086202	-0.19848	-0.020213 (0.60742)	-0.86349	-0.46527	-0.12362	-0.10582
TXDIV	0.42955 (0.62543)	0.98630	-0.083188	0.037532	0.012103	0.44786 (0.66882	0.97149	-0.16518	0.063805	0.026519
MILCAR	0.25534 (0.70085)	0.95339	0.27774	0.043781	0.028026	0.24316 (0.77316)	0.97031	0.21455	0.055158	0.022589
SMO	-0.15380 (0.61326)	-0.92864	-0.23417	0.23064	0.054401	-0.21307 (0.76552)	-0.96779	-0.22639	0.047088	-0.026838
FA	-0.12260 (0.54370)	-0.90017	-0.20457	0.31497	0.059864	-0.17878 (0.69080)	-0.95777	-0.23313	0.10519	-0.047071
Correlation with										
“Correlations with”										
ANO	0.46536 (0.61671)	0.97094 *	0.35656	0.020933	0.048229	0.47853 (0.67067)	0.95894 *	0.22743	0.18464	0.15844
POMINEN	0.39747 (0.54206)	0.92719 *	0.30733	-0.11376	-0.066573	0.41512 (0.54280)	0.90442 *	0.22707	0.13484	0.040649
PIBppc *	0.45456 (0.62085)	0.97249 *	0.38042 **	0.056863	0.096976	0.46226 (0.68646)	0.96267 *	0.24174	0.19832	0.19788
TCPIBPPC	-0.15176 (0.19201)	0.098375	0.37985 **	-0.60631 *	0.37585	-0.13527 (0.25416)	0.21649	0.58951 *	-0.77019 *	0.18933
TXDESCE	0.24120 (0.31540)	0.54037 *	-0.072754	0.072882	-0.23698	0.27152 (0.27117)	0.23848	-0.30774	0.45749 *	-0.010454
IPPIB	0.060040 (0.42834)	-0.76001 *	-0.84049 *	0.070687	-0.071901	0.041716 (0.54386)	-0.83803 *	-0.74198 *	0.10219	0.019287
ICPRIV	0.049191 (0.44046)	-0.78617 *	-0.83322 *	0.10138	-0.051454	0.018338 (0.55154)	-0.84368 *	-0.74377 *	0.11221	0.038330
IIPPIB	0.44231 (0.63814)	0.99082 *	0.46549 *	0.050531	0.050029	0.44464 (0.69048)	0.98487 *	0.32189	0.18991	0.13870
IICPRIV	0.44631 (0.63665)	0.99117 *	0.46028 *	0.044991	0.046228	0.44890 (0.68898)	0.98474 *	0.31796	0.18622	0.13635

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Extracting the implicit estimated eigenvalues and “factor loadings” for original variables:

Table 2.21. *Uncentered Principal Components, Weighted Cross-Correlations (all available observations) Implicit Factor Loadings of Original Variables – Portugal*

	Original Variables					Smoothed Variables			
	PC1	PC2	PC3	PC4	PC5	PCS1	PCS2	PCS3	PCS4
Eigenv.	9.77075	2.97926	1.68691	1.43375	1.04869	10.34813	3.05836	1.54984	1.28237
% Cum. Exp Var.	0.48854	0.6375	0.721846	0.793534	0.845968	0.51741	0.67033	0.747822	0.811941
Factor Loadings:									
CONDHA2	0.88208	-0.022271	0.083141	-0.17203	0.086328	0.85775	-0.035112	0.10816	-0.19325
ARGHAB2	0.91608	-0.072781	0.11811	-0.17951	0.047851	0.89466	-0.10725	0.061681	-0.18310
RECHAB2	0.88658	0.068011	0.040770	-0.23792	0.13790	0.87077	0.068590	-0.026795	-0.25575
RECCHA2	0.89320	0.040160	0.010684	-0.24766	0.13042	0.87349	0.056951	-0.060692	-0.26352
ACRMORH	0.061425	-0.94599	0.45080	0.18737	-0.29003	-0.10763	-1.01723	0.42368	0.26569
ACRFERH	0.90501	-0.35454	0.19324	0.27944	-0.13240	0.89077	-0.43748	0.15514	0.31467
ACRTOTH	0.93031	-0.17797	0.32698	0.013010	-0.099934	0.89838	-0.32177	0.27336	0.019551
SUICHAB	-0.43826	-0.32311	-0.34354	-0.58716	0.094402	-0.44872	-0.34825	-0.37214	-0.47545
ACTJTH1	0.67346	-0.20007	-0.53685	0.26266	0.074181	0.72092	-0.068766	-0.52880	0.10451
ACTJMH1	0.35455	-0.30292	-0.61191	0.14993	-0.082443	0.53060	-0.10454	-0.61178	0.0075260
ACTTOH	-0.27198	-0.55388	-0.29980	0.53543	0.059604	-0.23689	-0.44430	-0.46302	0.52866
ACTMOH	-0.48874	-0.078918	0.078609	0.19359	0.51860	-0.57004	0.078818	-0.059405	0.16665
HOMLEGH	0.21613	-0.66609	-0.059880	-0.52946	-0.057703	0.17845	-0.70718	-0.0074035	-0.52010
HOMIOUH	0.78584	-0.13742	-0.039893	0.13375	0.45182	0.77386	-0.15863	-0.18493	0.15140
HOMIH	0.78809	-0.18768	-0.053874	0.086335	0.42921	0.77303	-0.20107	-0.18738	0.11456
MOCEXTH	-0.41601	-0.70467	-0.20817	-0.26879	0.082452	-0.58794	-0.59342	-0.30232	-0.15272
TXDIV	0.95616	-0.15490	0.094184	0.042319	-0.20912	0.92424	-0.30701	0.16354	0.047004
MILCAR	0.80966	0.43384	0.10560	0.016433	0.066371	0.83028	0.34180	0.14675	0.019020
SMO	-0.66676	-0.31454	0.38735	0.010045	0.26220	-0.81121	-0.35759	0.069808	-0.088219
FA	-0.56961	-0.24549	0.46754	-0.012427	0.28672	-0.72066	-0.33263	0.16557	-0.14882

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Dividing:

Table 2.22. *Uncentered Principal Components, Weighted Cross-Correlations, Implicit Factor Loadings of Original Variables – Portugal*

	Original Variables (Mean square root n = 5.13676)					Smoothed Variables (Mean square root n = 4.88698)			
	PC1	PC2	PC3	PC4	PC5	PCS1	PCS2	PCS3	PCS4
Eigenv.	9.69901	2.90537	1.65358	1.39768	1.03863	10.22863	2.93440	1.52135	1.23246
% Cum. Exp Var.	0.48495	0.63022	0.712899	0.782783	0.834715	0.51143	0.65815	0.734218	0.795841
Factor Loadings:									
CONDHA2	0.87735	-0.027631	0.11409	-0.12362	0.052179	0.85218	-0.039653	0.14013	-0.14169
ARGHAB2	0.91102	-0.074358	0.15031	-0.13282	0.030939	0.88870	-0.11080	0.10294	-0.14480
RECHAB2	0.88599	0.062630	0.086271	-0.19631	0.15174	0.86918	0.061274	0.029654	-0.24225
RECCHA2	0.89261	0.034730	0.060403	-0.21322	0.15333	0.87190	0.048960	-0.00010917	-0.25858
ACRMORH	0.056763	-0.88570	0.40783	0.19362	-0.28790	-0.10929	-0.95335	0.36670	0.32242
ACRFERH	0.89024	-0.33787	0.14970	0.26321	-0.15398	0.87309	-0.41537	0.10237	0.30756
ACRTOTH	0.91798	-0.16668	0.30412	0.061072	-0.11548	0.88314	-0.30505	0.25281	0.081980
SUICHAB	-0.43493	-0.31346	-0.21700	-0.59430	0.16821	-0.44572	-0.34833	-0.23885	-0.53237
ACTJTH1	0.67486	-0.22925	-0.54912	0.18033	0.058195	0.72071	-0.093449	-0.53127	-0.016262
ACTJMH1	0.35656	-0.33124	-0.61986	0.031019	-0.064147	0.53234	-0.13058	-0.60964	-0.14376
ACTTOH	-0.27854	-0.60502	-0.38871	0.52222	-0.044546	-0.24123	-0.48698	-0.59068	0.45917
ACTMOH	-0.49953	-0.082102	0.078936	0.26796	0.62606	-0.57949	0.088834	-0.084748	0.17756
HOMLEGH	0.21479	-0.65607	0.058475	-0.53036	-0.035486	0.17628	-0.70295	0.13371	-0.47270
HOMIOUH	0.78319	-0.14906	-0.025023	0.16214	0.41876	0.76799	-0.16860	-0.17312	0.12765
HOMIH	0.78542	-0.19819	-0.029348	0.11158	0.40264	0.76714	-0.21046	-0.16622	0.092767
MOCEXTH	-0.41595	-0.69323	-0.12195	-0.30542	0.13783	-0.58514	-0.58865	-0.21722	-0.20657
TXDIV	0.94142	-0.14508	0.086761	0.030433	-0.13991	0.90651	-0.28776	0.15438	0.071286
MILCAR	0.81470	0.43365	0.090607	0.063088	0.046133	0.83162	0.34332	0.12258	0.055774
SMO	-0.67180	-0.30953	0.40410	0.10367	0.16659	-0.81282	-0.35500	0.10255	-0.064936
FA	-0.57407	-0.23837	0.48647	0.10057	0.17762	-0.72214	-0.32818	0.20566	-0.10224

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Using the loadings of the previous decomposition to extract the components:

Table 2.23. *Uncentered Principal Components, Weighted Cross-Correlations (all available observations) Loadings – Portugal*

	Original Variables					Smoothed Variables				
	PC1	PC2	PC3	PC4	PC5	PCS1	PCS2	PCS3	PCS4	PCS5
Eigenv.	10.02995	2.36005	1.33594	2.03793	1.00353	11.27369	1.81814	1.56712	1.70231	1.75511
% Cum. Exp Var.	0.50150	0.6195	0.686297	0.788197	0.838373	0.56368	0.654587	0.732943	0.818059	0.905814
Factor Loadings:										
CONDHA2	0.98020	0.10771	0.026629	-0.33245	-0.42659	0.98896	-0.094193	0.33915	-0.33161	0.28053
ARGHAB2	0.96885	0.19764	0.071482	-0.40216	-0.38661	0.98877	-0.090973	0.34570	-0.35027	0.21630
RECHAB2	0.92542	0.36724	0.15517	-0.50559	-0.31201	0.94461	0.051177	0.40350	-0.49483	0.082624
RECCHA2	0.92479	0.36609	0.15449	-0.50012	-0.30269	0.94458	0.042046	0.39200	-0.49737	0.073788
ACRMORH	0.072085	-0.77192	-0.025642	0.65666	0.053317	0.17197	-0.83434	-0.18845	0.82681	-0.0096658
ACRFERH	0.86921	-0.23783	0.058084	0.11645	-0.34561	0.88742	-0.54614	0.11496	0.16609	0.25631
ACRTOTH	0.97563	0.14134	0.21951	-0.18565	-0.42839	0.98207	-0.20090	0.35028	-0.13589	0.29856
SUICHAB	-0.19226	-0.40370	-0.56007	-0.55021	0.43673	-0.22687	-0.22465	-0.68838	-0.48962	-0.36031
ACTJTH1	0.40693	-0.55055	-0.55738	0.33788	-0.36731	0.71788	-0.60136	-0.32594	0.061534	0.57998
ACTJMH1	0.015106	-0.48815	-0.76647	0.23348	-0.36308	0.17490	-0.44848	-0.68408	0.0074444	0.77398
ACTTOH	-0.27464	-0.83242	-0.46521	0.72336	0.089534	-0.17970	-0.84061	-0.59273	0.80291	0.11396
ACTMOH	-0.66120	-0.055954	0.15756	0.25575	0.81271	-0.82386	0.22042	-0.024061	0.21352	-0.70725
HOMLEGH	0.50390	-0.29213	-0.56476	-0.63999	-0.19703	0.73869	-0.37919	-0.34821	-0.47566	0.21110
HOMIOUH	0.60003	-0.36360	-0.018072	-0.040785	0.41859	0.55766	-0.65793	-0.11235	0.090233	-0.49645
HOMIH	0.62067	-0.37511	-0.060103	-0.087829	0.39166	0.58445	-0.65778	-0.12976	0.055661	-0.46769
MOCEXTH	-0.63658	-0.63956	-0.39373	0.017650	0.48252	-0.80369	-0.32977	-0.68874	0.27327	-0.32559
TXDIV	0.92654	0.28436	0.22500	-0.35276	-0.31348	0.96642	-0.0047114	0.40659	-0.38348	0.21787
MILCAR	0.86458	0.41561	0.34314	-0.40119	-0.43008	0.89472	0.17399	0.50462	-0.41351	0.37665
SMO	-0.96501	-0.23659	-0.0046060	0.45475	0.38543	-0.98317	0.097187	-0.25252	0.38311	-0.26265
FA	-0.83722	-0.037076	0.26360	0.40968	0.25601	-0.86112	0.29205	-0.0024957	0.28867	-0.059582
Correlation with										
ANO	0.98753 *	0.14209	0.10082	-0.32762	-0.29122	0.99205 *	-0.21963	0.27147	-0.27723	0.13232
POMINEN	0.53572 *	0.38997	0.038437	-0.57004 *	0.26691	0.39437	0.29805	0.16576	-0.78465 *	-0.46214 **
PIBppc *	0.98321 *	0.042816	0.090493	-0.19090	-0.44439 **	0.98496 *	-0.29658	0.24184	-0.12392	0.31062
TCPIBPPC	0.077226	-0.45991 **	0.072746	0.40852	0.26782	0.091645	-0.70255 *	-0.14488	0.56610 *	-0.53360 *
TXDESCE	-0.52676 *	0.60297 *	0.18911	-0.45730 **	0.33682	-0.63214 *	0.77158 *	0.14719	-0.47490 **	-0.33436
IPPIB	-0.85929 *	-0.18570	-0.39831	0.042744	0.23042	-0.91486 *	0.20504	-0.47654 **	0.028113	-0.020469
ICPRIV	-0.82539 *	-0.22108	-0.40822	0.073278	0.19668	-0.88028 *	0.20546	-0.45707 **	0.096161	0.10202
IIPPIB	0.98766 *	0.15123	0.12227	-0.32821	-0.33879	0.99482 *	-0.19862	0.29280	-0.27560	0.17883
IICPRIV	0.98813 *	0.14898	0.10555	-0.33897	-0.33259	0.99502 *	-0.20170	0.27891	-0.28795	0.17711

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Table 2.24. *Uncentered Principal Components, Weighted Cross-Correlations Loadings – Portugal*

	Original Variables (Mean square root n = 5.13676)					Smoothed Variables (Mean square root n = 4.88698)				
	PC1	PC2	PC3	PC4	PC5	PCS1	PCS2	PCS3	PCS4	PCS5
Eigenv.	10.03981	2.44746	1.22621	2.01807	1.17200	11.27708	1.90767	1.50326	1.67087	1.64418
% Cum. Exp Var.	0.50199	0.62436	0.68567	0.78657	0.84517	0.56385	0.659233	0.734396	0.81794	0.900149
Factor Loadings:										
CONDHA2	0.98033	0.10673	0.077983	-0.33441	-0.34019	0.98906	-0.091728	0.40376	-0.23976	0.29319
ARGHAB2	0.96918	0.19642	0.13643	-0.39441	-0.29505	0.98884	-0.087907	0.41779	-0.25438	0.22812
RECHAB2	0.92586	0.36686	0.23974	-0.47628	-0.18297	0.94479	0.054122	0.50855	-0.38101	0.089420
RECCHA2	0.92522	0.36562	0.23836	-0.47043	-0.17397	0.94476	0.044870	0.49866	-0.38553	0.080085
ACRMORH	0.070288	-0.76526	-0.12841	0.62944	-0.072884	0.17057	-0.82374	-0.33776	0.78560	0.026643
ACRFERH	0.86833	-0.23747	0.032611	0.10797	-0.35654	0.88682	-0.54005	0.089138	0.20465	0.28350
ACRTOTH	0.97542	0.14282	0.24144	-0.16536	-0.37360	0.98192	-0.19582	0.37330	-0.044347	0.32081
SUICHAB	-0.19177	-0.40213	-0.40950	-0.59401	0.51799	-0.22646	-0.23704	-0.53691	-0.62178	-0.41176
ACTJTH1	0.40646	-0.56246	-0.63392	0.23345	-0.41547	0.71793	-0.60814	-0.33754	-0.010374	0.57933
ACTJMH1	0.015405	-0.50362	-0.83101	0.094351	-0.37925	0.17570	-0.46605	-0.69731	-0.16377	0.75153
ACTTOH	-0.27593	-0.83920	-0.59090	0.63788	-0.059279	-0.18062	-0.84066	-0.73903	0.66238	0.12960
ACTMOH	-0.66199	-0.051608	0.14609	0.31485	0.77294	-0.82443	0.22618	-0.048559	0.21195	-0.71489
HOMLEGH	0.50470	-0.29530	-0.43038	-0.71478	-0.073871	0.73921	-0.39004	-0.22611	-0.52919	0.19256
HOMIOUH	0.59897	-0.36023	0.033599	-0.016606	0.42742	0.55656	-0.64978	-0.073466	0.10457	-0.48296
HOMIH	0.61971	-0.37208	0.00020026	-0.069984	0.40951	0.58342	-0.65058	-0.084162	0.066313	-0.45593
MOCEXTH	-0.63684	-0.63377	-0.35154	-0.025574	0.44136	-0.80393	-0.33526	-0.71225	0.11573	-0.34855
TXDIV	0.92655	0.28476	0.28302	-0.31656	-0.22863	0.96652	-0.0014480	0.48145	-0.27515	0.22853
MILCAR	0.86489	0.41834	0.40191	-0.35459	-0.34758	0.89508	0.17641	0.56844	-0.29373	0.38672
SMO	-0.96550	-0.23402	-0.077170	0.45425	0.26740	-0.98341	0.097278	-0.33061	0.30782	-0.27017
FA	-0.83772	-0.031155	0.19238	0.44482	0.13478	-0.86120	0.29393	-0.080658	0.26049	-0.063936
Correlation with										
ANO	0.98749 *	0.14163	0.15830	-0.31127	-0.20739	0.99192 *	-0.21586	0.33791	-0.19343	0.14608
POMINEN	0.53619 *	0.38715	0.16162	-0.52160 *	0.40271	0.39474	0.29619	0.35656	-0.71165 *	-0.49012 **
PIBppc *	0.98303 *	0.042502	0.11465	-0.18983	-0.39040	0.98480 *	-0.29298	0.26728	-0.055556	0.33020
TCPIBPPC	0.075840	-0.45427 **	0.020803	0.41638 **	0.18936	0.090185	-0.69016 *	-0.21282	0.55668 *	-0.50288 **
TXDESCE	-0.52553 *	0.60564 *	0.27838	-0.40012	0.42446 **	-0.63134 *	0.76722 *	0.23554	-0.44502 **	-0.36315
IPPIB	-0.85864 *	-0.18910	-0.40088	-0.011096	0.20950	-0.91426 *	0.19387	-0.48799 **	-0.098636	-0.052345
ICPRIV	-0.82481 *	-0.22545	-0.41774 **	0.016688	0.16540	-0.87964 *	0.19387	-0.49135 **	-0.030871	0.073606
IIPPIB	0.98765 *	0.15137	0.17768	-0.31182	-0.25757	0.99472 *	-0.19489	0.35526	-0.18935	0.19332
IICPRIV	0.98815 *	0.14878	0.16334	-0.32416	-0.24940	0.99495 *	-0.19834	0.34464	-0.20441	0.19056

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Considering the correlations significance levels we obtain the same pattern as with unstandardized weighted cross-correlation results.

Table 2.25. *Principal Components, Cross-Correlations Significance Levels – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		16.006341	1.6029611		16.080670	1.4842572
% Cum. Exp Var.		0.80031706	0.88046511		0.80403351	0.87824637
Factor Loadings:						
CONDHA2	0.68042 (0.45263)	0.98506	0.074289	0.66880 (0.46308)	0.98361	0.091495
ARGHAB2	0.69095 (0.45552)	0.97042	0.11625	0.67946 (0.45879)	0.97477	0.13153
RECHAB2	0.66273 (0.46232)	0.98502	0.014575	0.64922 (0.47957)	0.97878	0.020674
RECCHA2	0.66809 (0.46044)	0.98445	0.030349	0.65084 (0.47910)	0.97762	0.023923
ACRMORH	0.70895 (0.30775)	-0.39365	0.69523	0.61080 (0.41750)	-0.54376	0.65223
ACRFERH	0.72581 (0.43522)	0.94006	0.18326	0.72948 (0.43852)	0.91651	0.19571
ACRTOTH	0.69591 (0.45804)	0.95192	0.13794	0.70430 (0.46005)	0.92785	0.21281
SUICHAB	0.38639 (0.41998)	-0.91229	0.21278	0.42348 (0.44693)	-0.92500	0.15637
ACTJTH1	0.73017 (0.41342)	0.90686	0.082075	0.69900 (0.44168)	0.92419	-0.045732
ACTJMH1	0.75695 (0.33360)	0.80861	0.33037	0.73300 (0.40595)	0.88534	0.00084846
ACTTOH	0.52876 (0.42056)	-0.72130	0.31433	0.54149 (0.40722)	-0.66962	0.17697
ACTMOH	0.35075 (0.41716)	-0.96859	-0.044860	0.31584 (0.42595)	-0.96315	-0.14862
HOMLEGH	0.81082 (0.28483)	0.33598	0.76705	0.82448 (0.28380)	0.15556	0.86149
HOMIOUH	0.71520 (0.40099)	0.97985	0.024655	0.71031 (0.41916)	0.97247	0.014851
HOMIH	0.72631 (0.39759)	0.97632	0.078429	0.71683 (0.41629)	0.97024	0.054147
MOCEXTH	0.46763 (0.46133)	-0.88793	0.28681	0.42529 (0.48415)	-0.93999	0.14554
TXDIV	0.69956 (0.46493)	0.94830	0.14981	0.70186 (0.46600)	0.92321	0.21734
MILCAR	0.59069 (0.48777)	0.93886	-0.21240	0.60526 (0.49424)	0.95640	-0.12896
SMO	0.38060 (0.47842)	-0.95858	0.15141	0.39375 (0.49489)	-0.95340	0.13606
FA	0.36849 (0.45929)	-0.96376	0.13031	0.38809 (0.48815)	-0.95510	0.14058
Correlation with "sl of Correlations with"						
ANO	0.70091 (0.46250)	0.94932 *	0.15214	0.70381 (0.46172)	0.92658 *	0.21402
POMINEN	0.74543 (0.41182)	0.91291 *	0.13486	0.74774 (0.40705)	0.88602 *	0.16394
PIBppc *	0.69865 (0.45707)	0.95453 *	0.13873	0.70592 (0.45422)	0.93249 *	0.20187
TCPIBPPC	0.29789 (0.26654)	-0.021022	-0.50365 *	0.37091 (0.32196)	0.19954	-0.65891 *
TXDESCE	0.75703 (0.35558)	0.54264 *	0.28332	0.78320 (0.28488)	0.23396	0.39809 **
IPPIB	0.55283 (0.44593)	-0.76235 *	0.40505 **	0.51969 (0.46166)	-0.80268 *	0.33167
ICPRIV	0.54228 (0.44934)	-0.78600 *	0.39432 **	0.51092 (0.46158)	-0.81910 *	0.32227
IIPPIB	0.69232 (0.46087)	0.95565 *	0.12635	0.69902 (0.46061)	0.93258 *	0.19879
IICPRIV	0.69350 (0.46132)	0.95481 *	0.12995	0.69959 (0.46084)	0.93182 *	0.20069

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Unstandardized:

Table 2.26. *Unstandardized Principal Components, Cross-Correlations Significance Levels – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		16.93369	1.18570		16.79083	1.13978
% Cum. Exp Var.		0.84668	0.905965		0.83954	0.896529
Factor Loadings:						
CONDHA2	0.68042 (0.45263)	0.98537	-0.12290	0.66880 (0.46308)	0.98318	-0.12204
ARGHAB2	0.69095 (0.45552)	0.97058	-0.18071	0.67946 (0.45879)	0.97401	-0.17800
RECHAB2	0.66273 (0.46232)	0.98594	-0.039901	0.64922 (0.47957)	0.97938	-0.015822
RECCHA2	0.66809 (0.46044)	0.98514	-0.060836	0.65084 (0.47910)	0.97811	-0.019923
ACRMORH	0.70895 (0.30775)	-0.39485	-0.48132	0.61080 (0.41750)	-0.54787	-0.53857
ACRFERH	0.72581 (0.43522)	0.93628	-0.27062	0.72948 (0.43852)	0.91184	-0.31528
ACRTOTH	0.69591 (0.45804)	0.95210	-0.21248	0.70430 (0.46005)	0.92596	-0.30154
SUICHAB	0.38639 (0.41998)	-0.91777	-0.26123	0.42348 (0.44693)	-0.92856	-0.23763
ACTJTH1	0.73017 (0.41342)	0.89938	-0.096969	0.69900 (0.44168)	0.92074	0.031458
ACTJMH1	0.75695 (0.33360)	0.79486	-0.30347	0.73300 (0.40595)	0.88085	0.0088516
ACTTOH	0.52876 (0.42056)	-0.72546	-0.41639	0.54149 (0.40722)	-0.66804	-0.22167
ACTMOH	0.35075 (0.41716)	-0.96691	0.073598	0.31584 (0.42595)	-0.95985	0.23049
HOMLEGH	0.81082 (0.28483)	0.32658	-0.53161	0.82448 (0.28380)	0.15352	-0.55405
HOMIOUH	0.71520 (0.40099)	0.97801	-0.091486	0.71031 (0.41916)	0.96924	-0.098721
HOMIH	0.72631 (0.39759)	0.97359	-0.15174	0.71683 (0.41629)	0.96655	-0.14533
MOCEXTH	0.46763 (0.46133)	-0.89398	-0.39301	0.42529 (0.48415)	-0.94478	-0.24613
TXDIV	0.69956 (0.46493)	0.94836	-0.23070	0.70186 (0.46600)	0.92168	-0.30211
MILCAR	0.59069 (0.48777)	0.94339	0.27698	0.60526 (0.49424)	0.96108	0.21158
SMO	0.38060 (0.47842)	-0.96180	-0.18922	0.39375 (0.49489)	-0.95812	-0.22005
FA	0.36849 (0.45929)	-0.96597	-0.16535	0.38809 (0.48815)	-0.95939	-0.22061
Correlation with						
“sl of Correlations with”						
ANO	0.70091 (0.46250)	0.94920 *	-0.23288	0.70381 (0.46172)	0.92481 *	-0.30155
POMINEN	0.74543 (0.41182)	0.91238 *	-0.22067	0.74774 (0.40705)	0.88540 *	-0.25561
PIBppc *	0.69865 (0.45707)	0.95432 *	-0.21611	0.70592 (0.45422)	0.93041 *	-0.29189
TCPIBPPC	0.29789 (0.26654)	-0.028059	0.32100	0.37091 (0.32196)	0.19862	0.50166 *
TXDESCE	0.75703 (0.35558)	0.53838 *	-0.25751	0.78320 (0.28488)	0.23657	-0.31056
IPPIB	0.55283 (0.44593)	-0.76471 *	-0.40368 **	0.51969 (0.46166)	-0.80542 *	-0.35521
ICPRIV	0.54228 (0.44934)	-0.78846 *	-0.39386 **	0.51092 (0.46158)	-0.82203 *	-0.34820
IIPPIB	0.69232 (0.46087)	0.95603 *	-0.19929	0.69902 (0.46061)	0.93117 *	-0.27942
IICPRIV	0.69350 (0.46132)	0.95512 *	-0.20429	0.69959 (0.46084)	0.93036 *	-0.28228

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

4. Considering the cross-correlations with the external variables, results depicted in the table below, we recognize similarities with ordering of Table II.17.

Table 2.27. *Principal Components, Correlations with External Variables – Portugal*

	Original Variables				Smoothed Variables			
	Mean (s.d)	PC1	PC2	PC3	Mean (s.d)	PCS1	PCS2	PCS3
Eigenv.		16.052998	2.3945120	1.0157796		16.061401	2.1729059	1.2467006
% Cum. Exp Var.		0.80264992	0.92237552	0.97316450		0.80307004	0.91171534	0.97405037
Factor Loadings:								
CONDHA2	0.17158 (0.78795)	0.99892	0.028628	0.0077422	0.18287 (0.82812)	0.99790	0.053045	0.033711
ARGHAB2	0.16870 (0.78597)	0.99946	-0.014924	0.010628	0.17924 (0.83453)	0.99761	0.066857	0.012755
RECHAB2	0.15919 (0.75843)	0.99416	-0.092575	0.011821	0.15933 (0.81795)	0.98951	0.14402	-0.0074769
RECCHA2	0.15877 (0.75855)	0.99413	-0.093280	0.014607	0.15838 (0.81937)	0.98939	0.14442	-0.013044
ACRMORH	0.027301 (0.26049)	0.087892	0.95116	-0.071330	0.052649 (0.34063)	0.48046	-0.77869	-0.34995
ACRFERH	0.15844 (0.70704)	0.97934	0.19181	-0.017721	0.17585 (0.75558)	0.98697	-0.14597	-0.052971
ACRTOTH	0.17684 (0.78557)	0.99770	0.045761	-0.045716	0.19066 (0.81594)	0.99900	-0.013589	0.031790
SUICHAB	-0.072089 (0.22260)	-0.48606	-0.23487	0.83610	-0.090745 (0.29398)	-0.50971	0.40862	-0.61827
ACTJTH1	0.091270 (0.32150)	0.79302	0.56801	0.075373	0.15724 (0.56676)	0.96731	-0.23359	0.035201
ACTJMH1	0.017473 (0.17273)	-0.43148	0.77526	0.14709	0.065959 (0.20064)	0.23282	-0.73472	0.41809
ACTTOH	-0.037251 (0.36223)	-0.74812	0.63760	0.098526	-0.010764 (0.34040)	-0.47805	-0.82485	-0.29811
ACTMOH	-0.13701 (0.51458)	-0.96187	-0.13140	0.13288	-0.17636 (0.64376)	-0.98085	0.092563	-0.16226
HOMLEGH	0.065383 (0.44587)	0.95255	0.027447	0.26252	0.11474 (0.62610)	0.97817	0.061207	-0.11719
HOMIOUH	0.059410 (0.58181)	0.94085	0.089845	0.24731	0.059889 (0.62277)	0.90394	-0.033261	-0.42569
HOMIH	0.062542 (0.59701)	0.94447	0.086830	0.24870	0.064488 (0.63886)	0.91205	-0.027167	-0.40863
MOCEXTH	-0.12564 (0.52099)	-0.98165	0.080928	0.15435	-0.16470 (0.66423)	-0.97029	-0.11407	-0.20371
TXDIV	0.15863 (0.77492)	0.99809	-0.037986	-0.015723	0.17616 (0.81782)	0.99457	0.092858	0.042181
MILCAR	0.16325 (0.70476)	0.98645	-0.068299	-0.10873	0.17618 (0.74132)	0.98095	0.10879	0.15735
SMO	-0.16234 (0.78571)	-0.99820	0.030702	-0.038550	-0.17851 (0.81663)	-0.99718	-0.068550	-0.014540
FA	-0.12636 (0.69851)	-0.98351	0.0028493	-0.15717	-0.14081 (0.73950)	-0.98797	-0.045917	0.12343
Correlation with “Correlations with”								
ANO	0.16122 (0.82889)	0.99896 *	0.0036182	0.034203	0.17359 (0.85203)	0.99819 *	0.042031	-0.042170
POMINEN	0.057038 (0.56350)	0.90459 *	-0.31730 **	0.24368	0.019559 (0.49483)	0.78034 *	0.56663 *	-0.22309
PIBppc *	0.17630 (0.79297)	0.99693 *	0.073366	-0.018561	0.18933 (0.81939)	0.99926 *	-0.033328	0.0067947
TCPIBPPC	-0.000062657 (0.28012)	0.41408 *	0.53452 *	0.29810 **	-0.0059361 (0.34902)	0.46269 *	-0.39025 *	-0.77446 *
TXDESCE	-0.10858 (0.45463)	-0.84506 *	-0.52335 *	0.041535	-0.14109 (0.56361)	-0.91771 *	0.38306 *	0.086655
IPPIB	-0.14793 (0.73700)	-0.99412 *	-0.025936	0.036403	-0.16580 (0.80244)	-0.99610 *	-0.0011925	0.050885
ICPRIV	-0.13270 (0.73840)	-0.98974 *	-0.020963	0.0054541	-0.14775 (0.79977)	-0.99128 *	-0.033764	0.10232
IIPPIB	0.16426 (0.82420)	0.99956 *	0.0095189	0.015362	0.17765 (0.84792)	0.99896 *	0.037982	-0.021350
IICPRIV	0.16325 (0.82526)	0.99951 *	0.0064035	0.020900	0.17678 (0.84865)	0.99881 *	0.040683	-0.024151

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.33384.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.28259.)

Weighting the correlation matrix and using “unstandardized” principal components, we recover the loadings pattern of the own cross-correlation decomposition.

Table 2.28. *Unstandardized Principal Components, Weighted Correlations with External Variables (all available observations) – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		17.97272	1.19373		17.96121	1.24166
% Cum. Exp Var.		0.89864	0.95844		0.89806	0.960143
Factor Loadings:						
CONDHA2	0.42188 (0.58666)	0.98837	-0.10541	0.38642 (0.66359	0.98998	-0.099316
ARGHAB2	0.44596 (0.60212)	0.99696	-0.0043522	0.42840 (0.67496)	0.99808	-0.00045356
RECHAB2	0.40642 (0.61842)	0.99471	-0.048232	0.38178 (0.70221)	0.99508	-0.057296
RECCHA2	0.41536 (0.61831)	0.99516	-0.024109	0.38750 (0.70197)	0.99521	-0.034722
ACRMORH	0.26591 (0.37126)	0.17794	0.92064	0.23468 (0.46643	0.092506	0.91395
ACRFERH	0.47010 (0.56280)	0.96708	0.20929	0.47820 (0.62793)	0.95421	0.26024
ACRTOTH	0.46211 (0.59663)	0.98503	0.12438	0.46913 (0.64537)	0.97283	0.20043
SUICHAB	-0.067111 (0.44110)	-0.91920	0.18271	-0.031850 (0.47938)	-0.91923	0.23876
ACTJTH1	0.36612 (0.49589)	0.94542	0.069673	0.36515 (0.59418)	0.96294	0.017301
ACTJMH1	0.25177 (0.33617)	0.78417	0.32671	0.30937 (0.47416)	0.88557	0.17031
ACTTOH	0.047153 (0.49964)	-0.84461	0.12426	0.056847 (0.49084)	-0.78586	0.012688
ACTMOH	-0.16628 (0.52597)	-0.84325	0.29530	-0.25685 (0.62937)	-0.85396	0.28175
HOMLEGH	0.28009 (0.27384)	0.47246	0.75244	0.29495 (0.28854)	0.49167	0.72159
HOMIOUH	0.40849 (0.51626)	0.99307	-0.055774	0.40133 (0.57291)	0.99347	-0.028053
HOMIH	0.42235 (0.50797)	0.99464	-0.032637	0.41287 (0.56504)	0.99424	-0.0087870
MOCEXTH	0.028649 (0.48644)	-0.81918	0.51593	-0.020213 (0.60742)	-0.87560	0.42340
TXDIV	0.42955 (0.62543)	0.97050	0.21700	0.44786 (0.66882	0.94574	0.29856
MILCAR	0.25534 (0.70085)	0.96923	-0.21694	0.24316 (0.77316)	0.97517	-0.18874
SMO	-0.15380 (0.61326)	-0.97201	0.050321	-0.21307 (0.76552)	-0.98502	0.13189
FA	-0.12260 (0.54370)	-0.95261	0.0014705	-0.17878 (0.69080)	-0.98242	0.10568
Correlation with						
“Correlations with”						
ANO	0.46536 (0.61671)	0.93866 *	0.26778	0.47853 (0.67067)	0.91087 *	0.34451 *
POMINEN	0.39747 (0.54206)	0.91776 *	0.33043 **	0.41512 (0.54280)	0.87441 *	0.41412 *
PIBppc *	0.45456 (0.62085)	0.97462 *	0.18177	0.46226 (0.68646)	0.95790 *	0.25356
TCPIBPPC	-0.15176 (0.19201)	-0.14430	-0.85530 *	-0.13527 (0.25416)	-0.074011	-0.88318 *
TXDESCE	0.24120 (0.31540)	0.40220 *	0.81329 *	0.27152 (0.27117)	0.25620	0.84435 *
IPPIB	0.060040 (0.42834)	-0.43456 *	0.87599 *	0.041716 (0.54386)	-0.50785 *	0.81207 *
ICPRIV	0.049191 (0.44046)	-0.47403 *	0.85615 *	0.018338 (0.55154)	-0.54420 *	0.79295 *
IIPPIB	0.44231 (0.63814)	0.98991 *	0.090526	0.44464 (0.69048)	0.97968 *	0.16447
IICPRIV	0.44631 (0.63665)	0.98910 *	0.099394	0.44890 (0.68898)	0.97802 *	0.17327

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594)

Plotting the two components of unbalanced sample results in Figs II.11 and 11.12, we conclude that:

- IG, HORNOR, POPED1, PQESQ, TXNUP, EMSECU form a group; TXFEC may belong to it, or to a larger cluster that includes:
- TXNAT, IDEJOV, CFAPCE, SALRTCC, IPOMINE, closely located
- ICPRIV, INVPIB and SALPIB cluster together
- TXDESCE and ID1CASH are both singly isolated

The rest of the variables cluster together, with a separation of TXREURO, TXDBPR, WQSNQ, P65M, ESVIFN, POPED4, TXACTC, PTCO, FONOH of that rest possible

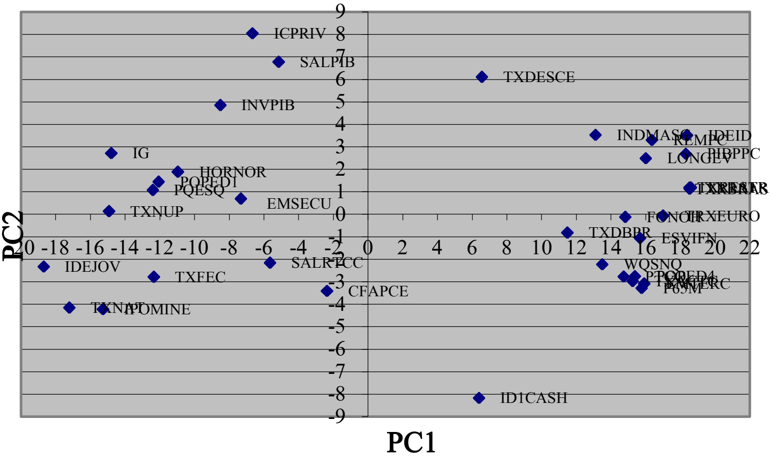

Figure 2.11. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Sample, Portugal*

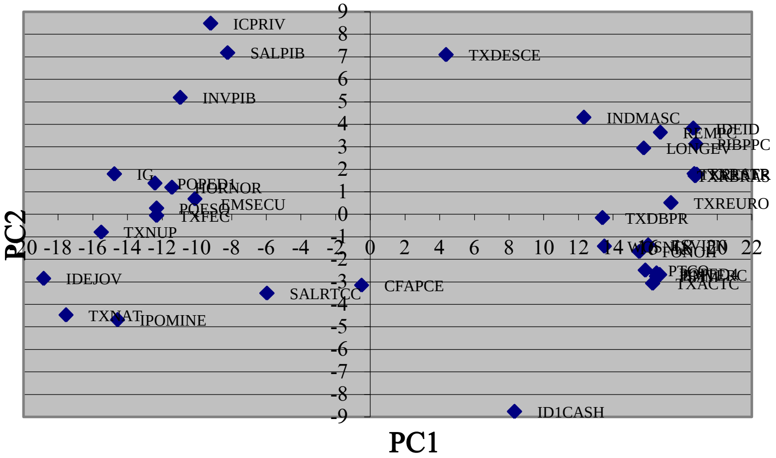

Figure 2.12. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Smoothed Sample, Portugal*

Applying "uncentered" principal components to the correlation matrix we obtain:

Table 2.29. *Uncentered Principal Components, Weighted Correlations with External Variables (all available observations) – Portugal*

	Original Variables					Smoothed Variables				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		18.06875	1.11026	0.35719	0.15925		18.05074	1.16793	0.35315	0.13445
% Cum. Exp Var.		0.90344	0.958953	0.976813	0.9847755		0.90254	0.960936	0.978594	0.9853164
Factor Loadings:										
CONDHA2	0.42188 (0.58666)	0.98917	-0.10218	0.056774	-0.056475	0.38642 (0.66359)	0.99052	-0.097296	0.051629	-0.054133
ARGHAB2	0.44596 (0.60212)	0.99719	-0.0049741	0.012747	-0.045425	0.42840 (0.67496)	0.99818	-0.0022864	-0.0070599	-0.042311
RECHAB2	0.40642 (0.61842)	0.99493	-0.048103	-0.027423	-0.057894	0.38178 (0.70221)	0.99487	-0.059388	-0.047143	-0.043813
RECCHA2	0.41536 (0.61831)	0.99533	-0.025053	-0.044476	-0.058749	0.38750 (0.70197)	0.99490	-0.037960	-0.068334	-0.043453
ACRMORH	0.26591 (0.37126)	0.20664	0.91659	0.29167	0.029793	0.23468 (0.46643	0.12365	0.91271	0.29557	0.066145
ACRFERH	0.47010 (0.56280)	0.96911	0.20015	0.065542	0.086817	0.47820 (0.62793)	0.95703	0.25054	0.070523	0.069731
ACRTOTH	0.46211 (0.59663)	0.98575	0.11958	0.084190	0.0059922	0.46913 (0.64537)	0.97422	0.19337	0.068773	0.0080296
SUICHAB	-0.067111 (0.44110)	-0.92306	0.16261	-0.23989	-0.16481	-0.031850 (0.47938)	-0.92398	0.21745	-0.24479	-0.075297
ACTJTH1	0.36612 (0.49589)	0.94955	0.066029	-0.22416	0.11787	0.36515 (0.59418)	0.96500	0.013411	-0.23240	0.072387
ACTJMH1	0.25177 (0.33617)	0.80239	0.31336	-0.35258	0.21227	0.30937 (0.47416)	0.89411	0.16439	-0.33786	0.087438
ACTTOH	0.047153 (0.49964)	-0.84209	0.12907	-0.074440	0.41565	0.056847 (0.49084)	-0.78354	0.022230	0.023435	0.52939
ACTMOH	-0.16628 (0.52597)	-0.85403	0.28383	-0.38949	0.010085	-0.25685 (0.62937)	-0.86371	0.26857	-0.36905	0.00081130
HOMLEGH	0.28009 (0.27384)	0.44911	0.74213	-0.039743	-0.43535	0.29495 (0.28854)	0.47265	0.70619	0.0018083	-0.40800
HOMIOUH	0.40849 (0.51626)	0.99270	-0.057007	-0.038301	0.022127	0.40133 (0.57291)	0.99256	-0.032915	-0.067516	0.025590
HOMIH	0.42235 (0.50797)	0.99406	-0.034798	-0.042988	0.0099750	0.41287 (0.56504)	0.99322	-0.014360	-0.068404	0.016553
MOCEXTH	0.028649 (0.48644)	-0.83232	0.49453	-0.21179	-0.071321	-0.020213 (0.60742)	-0.88325	0.40768	-0.21973	-0.0063361
TXDIV	0.42955 (0.62543)	0.97289	0.20731	-0.032746	0.028675	0.44786 (0.66882	0.95003	0.28660	-0.031269	-0.0078423
MILCAR	0.25534 (0.70085)	0.97132	-0.20958	0.065292	0.0078269	0.24316 (0.77316)	0.97664	-0.18268	0.071635	0.0094761
SMO	-0.15380 (0.61326)	-0.96922	0.055352	0.16923	0.011898	-0.21307 (0.76552)	-0.98498	0.13239	0.015480	-0.027617
FA	-0.12260 (0.54370)	-0.94750	0.0089999	0.23425	0.017867	-0.17878 (0.69080)	-0.98152	0.10911	0.055913	-0.037693
Correlation with “Correlations with’										
ANO	0.46536 (0.61671)	0.33528 *	0.021322	0.035433	-0.10129	0.47853 (0.67067)	0.33547 *	0.0073980	0.11053	-0.12532
POMINEN	0.39747 (0.54206)	0.35280 *	-0.021333	0.081756	-0.17868	0.41512 (0.54280)	0.36419 *	-0.019449	0.17499	-0.21431
PIBppc *	0.45456 (0.62085)	0.32260 **	0.023850	0.021384	-0.072150	0.46226 (0.68646)	0.31967 **	0.0045425	0.098394	-0.096871
TCPIBPPC	-0.15176 (0.19201)	-0.26524	0.22397	-0.14686	0.18220	-0.13527 (0.25416)	-0.33739 *	0.16461	-0.21607	0.13134
TXDESCE	0.24120 (0.31540)	0.35123 *	-0.11647	0.15131	-0.36426 *	0.27152 (0.27117)	0.38952 *	-0.10792	0.26059	-0.38739 *
IPPIB	0.060040 (0.42834)	0.089644	-0.18253	0.095220	-0.34718 *	0.041716 (0.54386)	0.11402	-0.080288	0.10722	-0.24149
ICPRIV	0.049191 (0.44046)	0.064286	-0.17526	0.079560	-0.32153 **	0.018338 (0.55154)	0.093685	-0.080297	0.099478	-0.21759
IIPPIB	0.44231 (0.63814)	0.30779 **	0.021143	0.017790	-0.031586	0.44464 (0.69048)	0.30128 **	0.0023323	0.089108	-0.065281
IICPRIV	0.44631 (0.63665)	0.31005 **	0.019943	0.018093	-0.035193	0.44890 (0.68898)	0.30411 **	0.0020522	0.089778	-0.068710

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594)

Adjusting:

Table 2.30. *Uncentered Principal Components, Weighted Correlations with External Variables – Portugal*

	Original Variables (Mean square root n = 5.19285)					Smoothed Variables (Mean square root n = 4.95055)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		18.06875	1.11026	0.35719	0.15925		18.05074	1.16793	0.35315	0.13445
% Cum. Exp Var.		0.90344	0.958953	0.976813	0.9847755		0.90254	0.960936	0.978594	0.9853164
Factor Loadings:										
CONDHA2	0.42188 (0.58666)	0.98917	-0.10218	0.056774	-0.056475	0.38642 (0.66359)	0.99052	-0.097296	0.051629	-0.054133
ARGHAB2	0.44596 (0.60212)	0.99719	-0.0049742	0.012747	-0.045425	0.42840 (0.67496)	0.99818	-0.0022864	-0.0070599	-0.042311
RECHAB2	0.40642 (0.61842)	0.99493	-0.048103	-0.027423	-0.057894	0.38178 (0.70221)	0.99487	-0.059388	-0.047143	-0.043813
RECCHA2	0.41536 (0.61831)	0.99533	-0.025053	-0.044476	-0.058749	0.38750 (0.70197)	0.99490	-0.037960	-0.068334	-0.043453
ACRMORH	0.26591 (0.37126)	0.20664	0.91659	0.29167	0.029793	0.23468 (0.46643	0.12365	0.91271	0.29557	0.066145
ACRFERH	0.47010 (0.56280)	0.96911	0.20015	0.065542	0.086817	0.47820 (0.62793)	0.95703	0.25054	0.070523	0.069731
ACRTOTH	0.46211 (0.59663)	0.98575	0.11958	0.084190	0.0059922	0.46913 (0.64537)	0.97422	0.19337	0.068773	0.0080296
SUICHAB	-0.067111 (0.44110)	-0.92306	0.16261	-0.23989	-0.16481	-0.031850 (0.47938)	-0.92398	0.21745	-0.24479	-0.075297
ACTJTH1	0.36612 (0.49589)	0.94955	0.066029	-0.22416	0.11787	0.36515 (0.59418)	0.96500	0.013411	-0.23240	0.072387
ACTJMH1	0.25177 (0.33617)	0.80239	0.31336	-0.35258	0.21227	0.30937 (0.47416)	0.89411	0.16439	-0.33786	0.087438
ACTTOH	0.047153 (0.49964)	-0.84209	0.12907	-0.074440	0.41565	0.056847 (0.49084)	-0.78354	0.022230	0.023435	0.52939
ACTMOH	-0.16628 (0.52597)	-0.85403	0.28383	-0.38949	0.010085	-0.25685 (0.62937)	-0.86371	0.26857	-0.36905	0.00081130
HOMLEGH	0.28009 (0.27384)	0.44911	0.74213	-0.039743	-0.43535	0.29495 (0.28854)	0.47265	0.70619	0.0018083	-0.40800
HOMIOUH	0.40849 (0.51626)	0.99270	-0.057007	-0.038301	0.022127	0.40133 (0.57291)	0.99256	-0.032915	-0.067516	0.025590
HOMIH	0.42235 (0.50797)	0.99406	-0.034798	-0.042988	0.0099750	0.41287 (0.56504)	0.99322	-0.014360	-0.068404	0.016553
MOCEXTH	0.028649 (0.48644)	-0.83232	0.49453	-0.21179	-0.071321	-0.020213 (0.60742)	-0.88325	0.40768	-0.21973	-0.0063362
TXDIV	0.42955 (0.62543)	0.97289	0.20731	-0.032746	0.028675	0.44786 (0.66882	0.95003	0.28660	-0.031269	-0.0078423
MILCAR	0.25534 (0.70085)	0.97132	-0.20958	0.065292	0.0078269	0.24316 (0.77316)	0.97664	-0.18268	0.071635	0.0094761
SMO	-0.15380 (0.61326)	-0.96922	0.055352	0.16923	0.011898	-0.21307 (0.76552)	-0.98498	0.13239	0.015480	-0.027617
FA	-0.12260 (0.54370)	-0.94750	0.0089999	0.23425	0.017867	-0.17878 (0.69080)	-0.98152	0.10911	0.055913	-0.037693
Correlation with “Correlations with’										
ANO	0.46536 (0.61671)	0.33528 *	0.021322	0.035433	-0.10129	0.47853 (0.67067)	0.33547 *	0.0073980	0.11053	-0.12532
POMINEN	0.39747 (0.54206)	0.35280 *	-0.021333	0.081756	-0.17868	0.41512 (0.54280)	0.36419 *	-0.019449	0.17499	-0.21431
PIBppc *	0.45456 (0.62085)	0.32260 **	0.023850	0.021384	-0.072150	0.46226 (0.68646)	0.31967 **	0.0045425	0.098394	-0.096871
TCPIBPPC	-0.15176 (0.19201)	-0.26524	0.22397	-0.14686	0.18220	-0.13527 (0.25416)	-0.33739 *	0.16461	-0.21607	0.13134
TXDESCE	0.24120 (0.31540)	0.35123 *	-0.11647	0.15131	-0.36426 *	0.27152 (0.27117)	0.38952 *	-0.10792	0.26059	-0.38739 *
IPPIB	0.060040 (0.42834)	0.089644	-0.18253	0.095220	-0.34718 *	0.041716 (0.54386)	0.11402	-0.080288	0.10722	-0.24149
ICPRIV	0.049191 (0.44046)	0.064286	-0.17526	0.079560	-0.32153 **	0.018338 (0.55154)	0.093685	-0.080297	0.099478	-0.21759
IIPPIB	0.44231 (0.63814)	0.30779 **	0.021143	0.017790	-0.031586	0.44464 (0.69048)	0.30128 **	0.0023323	0.089108	-0.065280
IICPRIV	0.44631 (0.63665)	0.31005 **	0.019943	0.018093	-0.035193	0.44890 (0.68898)	0.30411 **	0.0020522	0.089778	-0.068710

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594)

Deriving or estimating the “factor loadings” on original variable coordinates:

Table 2.31. *Uncentered Principal Components, Weighted Correlations with External Variables Implicit Factor Loadings of Original Variables – Portugal*

	Original Variables				Smoothed Variables			
	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
Eigenv.	10.90639	2.70351	1.53345	1.02390	10.93217	2.78078	1.52912	0.94349
% Cum. Exp Var.	0.54532	0.6805	0.757172	0.808367	0.54661	0.68565	0.762106	0.809281
Factor Loadings:								
CONDHA2	0.89099	-0.18487	0.13638	-0.16602	0.85159	-0.16586	0.11868	-0.15842
ARGHAB2	0.95411	-0.0095591	0.032527	-0.14185	0.90926	-0.0041294	-0.017195	-0.13119
RECHAB2	0.93061	-0.090369	-0.068405	-0.17673	0.89331	-0.10573	-0.11318	-0.13391
RECCHA2	0.93635	-0.047338	-0.11158	-0.18038	0.89886	-0.068001	-0.16507	-0.13363
ACRMORH	0.12525	1.11585	0.47146	0.058936	0.072928	1.06731	0.46611	0.13279
ACRFERH	0.94975	0.39398	0.17130	0.27769	0.90964	0.47215	0.17923	0.22561
ACRTOTH	0.96663	0.23553	0.22017	0.019178	0.90713	0.35699	0.17122	0.025450
SUICHAB	-0.47966	0.16972	-0.33244	-0.27952	-0.48701	0.22724	-0.34499	-0.13509
ACTJTH1	0.67161	0.093801	-0.42283	0.27209	0.72231	0.019903	-0.46511	0.18444
ACTJMH1	0.29554	0.23182	-0.34634	0.25517	0.49084	0.17893	-0.49592	0.16339
ACTTOH	-0.34423	0.10597	-0.081152	0.55454	-0.28992	0.016309	0.023186	0.66676
ACTMOH	-0.46170	0.30820	-0.56156	0.017794	-0.52364	0.32284	-0.59823	0.0016743
HOMLEGH	0.16415	0.54481	-0.038740	-0.51933	0.16903	0.50073	0.0017291	-0.49666
HOMIOUH	0.85784	-0.098944	-0.088268	0.062405	0.84970	-0.055870	-0.15454	0.074569
HOMIH	0.86043	-0.060497	-0.099233	0.028179	0.85103	-0.024396	-0.15672	0.048279
MOCEXTH	-0.49972	0.59636	-0.33912	-0.13976	-0.59779	0.54709	-0.39764	-0.014597
TXDIV	1.01246	0.43333	-0.090882	0.097394	0.95677	0.57230	-0.084201	-0.026884
MILCAR	0.87693	-0.38004	0.15721	0.023062	0.85122	-0.31570	0.16694	0.028114
SMO	-0.73953	0.084828	0.34436	0.029629	-0.84054	0.22401	0.035321	-0.080221
FA	-0.64288	0.012265	0.42387	0.039565	-0.76281	0.16813	0.11619	-0.099715

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Dividing:

Table 2.32. *Uncentered Principal Components, Weighted Correlations with External Variables, Implicit Factor Loadings of Original Variables – Portugal*

	Original Variables (Mean square root n = 5.13676)				Smoothed Variables (Mean square root n = 4.88698)			
	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
Eigenv.	10.90639	2.70351	1.53345	1.02390	10.93217	2.78078	1.52912	0.94349
% Cum. Exp Var.	0.54532	0.6805	0.757172	0.808367	0.54661	0.68565	0.762109	0.809284
Factor Loadings:								
CONDHA2	0.89099	-0.18487	0.13638	-0.16602	0.85159	-0.16586	0.11868	-0.15842
ARGHAB2	0.95411	-0.0095591	0.032527	-0.14185	0.90926	-0.0041294	-0.017195	-0.13119
RECHAB2	0.93061	-0.090369	-0.068405	-0.17673	0.89331	-0.10573	-0.11318	-0.13391
RECCHA2	0.93635	-0.047338	-0.11158	-0.18038	0.89886	-0.068001	-0.16507	-0.13363
ACRMORH	0.12525	1.11585	0.47146	0.058936	0.072928	1.06731	0.46611	0.13279
ACRFERH	0.94975	0.39398	0.17130	0.27769	0.90964	0.47215	0.17923	0.22561
ACRTOTH	0.96663	0.23553	0.22017	0.019178	0.90713	0.35699	0.17122	0.025450
SUICHAB	-0.47966	0.16972	-0.33244	-0.27952	-0.48701	0.22724	-0.34499	-0.13509
ACTJTH1	0.67161	0.093801	-0.42283	0.27209	0.72231	0.019903	-0.46511	0.18444
ACTJMH1	0.29554	0.23182	-0.34634	0.25517	0.49084	0.17893	-0.49592	0.16339
ACTTOH	-0.34423	0.10597	-0.081152	0.55454	-0.28992	0.016309	0.023186	0.66676
ACTMOH	-0.46170	0.30820	-0.56156	0.017794	-0.52364	0.32284	-0.59823	0.0016743
HOMLEGH	0.16415	0.54481	-0.038740	-0.51933	0.16903	0.50073	0.0017291	-0.49666
HOMIOUH	0.85784	-0.098944	-0.088268	0.062405	0.84970	-0.055870	-0.15454	0.074569
HOMIH	0.86043	-0.060497	-0.099233	0.028179	0.85103	-0.024396	-0.15672	0.048279
MOCEXTH	-0.49972	0.59636	-0.33912	-0.13976	-0.59779	0.54709	-0.39764	-0.014598
TXDIV	1.01246	0.43333	-0.090882	0.097394	0.95677	0.57230	-0.084201	-0.026884
MILCAR	0.87693	-0.38004	0.15721	0.023062	0.85122	-0.31570	0.16694	0.028114
SMO	-0.73953	0.084828	0.34436	0.029629	-0.84054	0.22401	0.035322	-0.080221
FA	-0.64288	0.012265	0.42387	0.039565	-0.76281	0.16813	0.11619	-0.099715

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Considering the cross-correlations significance levels we obtain:

Table 2.33. *Principal Components, Correlations with Ext. Var. Significance Levels – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		16.115617	2.0645229		16.282816	1.9394232
% Cum. Exp Var.		0.80578083	0.90900697		0.81414080	0.91111196
Factor Loadings:						
CONDHA2	0.58438 (0.48121)	0.99144	0.071145	0.58118 (0.48177)	0.99398	0.061985
ARGHAB2	0.58072 (0.48807)	0.99115	0.014193	0.57783 (0.49115)	0.98861	0.0038748
RECHAB2	0.57569 (0.49544)	0.98759	0.022784	0.57592 (0.49202)	0.98735	0.0097873
RECCHA2	0.57492 (0.49606)	0.98694	0.013486	0.57432 (0.49517)	0.98439	-0.0020654
ACRMORH	0.54018 (0.43873)	0.076923	-0.89062	0.53164 (0.42860)	0.028943	-0.88307
ACRFERH	0.63018 (0.45616)	0.89478	-0.25489	0.62443 (0.46032)	0.89106	-0.28676
ACRTOTH	0.60307 (0.46048)	0.97419	-0.12666	0.60118 (0.46278)	0.95406	-0.20242
SUICHAB	0.36756 (0.41439)	-0.91187	-0.20770	0.39876 (0.43153)	-0.94649	-0.20825
ACTJTH1	0.59794 (0.45430)	0.96249	-0.049684	0.58108 (0.47363)	0.98043	-0.0010324
ACTJMH1	0.63263 (0.36683)	0.74973	-0.35701	0.62377 (0.42200)	0.87490	-0.11981
ACTTOH	0.43109 (0.39877)	-0.90023	-0.087927	0.44148 (0.38239)	-0.83387	-0.00018516
ACTMOH	0.41631 (0.44786)	-0.81949	-0.33265	0.40942 (0.46045)	-0.83991	-0.29484
HOMLEGH	0.49717 (0.37820)	0.46800	-0.80109	0.49756 (0.39296)	0.49169	-0.79711
HOMIOUH	0.58450 (0.48101)	0.99185	0.076687	0.58461 (0.48377)	0.99276	0.042082
HOMIH	0.58266 (0.48339)	0.99242	0.058312	0.58276 (0.48580)	0.99212	0.029050
MOCEXTH	0.40257 (0.44474)	-0.87178	-0.37494	0.41418 (0.46306)	-0.90378	-0.31017
TXDIV	0.60874 (0.46467)	0.92163	-0.25741	0.60118 (0.47527)	0.88968	-0.31299
MILCAR	0.58480 (0.48295)	0.95812	0.18260	0.58566 (0.48680)	0.95495	0.18000
SMO	0.40976 (0.48151)	-0.98587	-0.039256	0.41628 (0.48776)	-0.97576	-0.11830
FA	0.41152 (0.47509)	-0.97791	-0.011840	0.41257 (0.48591)	-0.98040	-0.096097
Correlation with "Correlations with"						
ANO	0.63052 (0.47716)	0.83591 *	-0.33137 **	0.62811 (0.48142)	0.80944 *	-0.36817 *
POMINEN	0.62669 (0.46874)	0.85331 *	-0.32839 **	0.61836 (0.46804)	0.83929 *	-0.36273 *
PIBppc *	0.62205 (0.45606)	0.92134 *	-0.23320	0.61652 (0.46188)	0.90286 *	-0.28615 **
TCPIBPPC	0.45942 (0.36717)	-0.14094	0.87705 *	0.44461 (0.39443)	-0.050127	0.86642 *
TXDESCE	0.59726 (0.44123)	0.28151	-0.81635 *	0.60037 (0.47010)	0.041321	-0.79691 *
IPPIB	0.45654 (0.43426)	-0.41070 *	-0.76875 *	0.47069 (0.44757)	-0.44606 *	-0.72853 *
ICPRIV	0.45240 (0.43417)	-0.45899 *	-0.73831 *	0.46344 (0.44821)	-0.48922 *	-0.70100 *
IIPPIB	0.61185 (0.46157)	0.97857 *	-0.058313	0.60893 (0.46192)	0.97419 *	-0.11171
IICPRIV	0.61221 (0.46105)	0.97564 *	-0.074605	0.60927 (0.46119)	0.96983 *	-0.12739

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.33384.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.28259.)

Table 2.34. *Unstandardized Principal Components, Weighted Correlations with External Variables Significance Levels – Portugal*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PC1	PC2	Mean (s.d)	PCS1	PCS2
Eigenv.		16.64988	1.74979		16.75617	1.65386
% Cum. Exp Var.		0.83249	0.919979		0.83781	0.920503
Factor Loadings:						
CONDHA2	0.58438 (0.48121)	0.99333	-0.059160	0.58118 (0.48177)	0.99522	-0.052912
ARGHAB2	0.58072 (0.48807)	0.99268	-0.0012562	0.57783 (0.49115)	0.98920	0.0095002
RECHAB2	0.57569 (0.49544)	0.98937	-0.0099009	0.57592 (0.49202)	0.98796	0.0035518
RECCHA2	0.57492 (0.49606)	0.98862	-0.00052696	0.57432 (0.49517)	0.98485	0.016277
ACRMORH	0.54018 (0.43873)	0.064916	0.89256	0.53164 (0.42860)	0.021300	0.86366
ACRFERH	0.63018 (0.45616)	0.89113	0.27382	0.62443 (0.46032)	0.88913	0.30804
ACRTOTH	0.60307 (0.46048)	0.97303	0.14118	0.60118 (0.46278)	0.95252	0.22102
SUICHAB	0.36756 (0.41439)	-0.91230	0.19435	0.39876 (0.43153)	-0.94826	0.21004
ACTJTH1	0.59794 (0.45430)	0.96163	0.061507	0.58108 (0.47363)	0.98068	0.015124
ACTJMH1	0.63263 (0.36683)	0.74168	0.36359	0.62377 (0.42200)	0.87292	0.13989
ACTTOH	0.43109 (0.39877)	-0.89975	0.080147	0.44148 (0.38239)	-0.82780	-0.0037643
ACTMOH	0.41631 (0.44786)	-0.82005	0.32839	0.40942 (0.46045)	-0.83996	0.30550
HOMLEGH	0.49717 (0.37820)	0.45773	0.79462	0.49756 (0.39296)	0.48218	0.78473
HOMIOUH	0.58450 (0.48101)	0.99372	-0.064614	0.58461 (0.48377)	0.99386	-0.031534
HOMIH	0.58266 (0.48339)	0.99422	-0.045968	0.58276 (0.48580)	0.99305	-0.017529
MOCEXTH	0.40257 (0.44474)	-0.87433	0.36904	0.41418 (0.46306)	-0.90613	0.31526
TXDIV	0.60874 (0.46467)	0.91831	0.27414	0.60118 (0.47527)	0.88691	0.33692
MILCAR	0.58480 (0.48295)	0.96019	-0.17375	0.58566 (0.48680)	0.95751	-0.18050
SMO	0.40976 (0.48151)	-0.98726	0.025595	0.41628 (0.48776)	-0.97780	0.11451
FA	0.41152 (0.47509)	-0.97871	-0.0025496	0.41257 (0.48591)	-0.98226	0.090525
Correlation with						
“Correlations with”						
ANO	0.63052 (0.47716)	0.83131 *	0.35219 *	0.62811 (0.48142)	0.80682 *	0.39566 *
POMINEN	0.62669 (0.46874)	0.84793 *	0.34563 *	0.61836 (0.46804)	0.83620 *	0.38994 *
PIBppc *	0.62205 (0.45606)	0.91829 *	0.25147	0.61652 (0.46188)	0.90076 *	0.30814 **
TCPIBPPC	0.45942 (0.36717)	-0.12767	-0.86732 *	0.44461 (0.39443)	-0.038850	-0.85562 *
TXDESCE	0.59726 (0.44123)	0.26860	0.81590 *	0.60037 (0.47010)	0.031612	0.79023 *
IPPIB	0.45654 (0.43426)	-0.42093 *	0.76257 *	0.47069 (0.44757)	-0.45296 *	0.72347 *
ICPRIV	0.45240 (0.43417)	-0.46883 *	0.73206 *	0.46344 (0.44821)	-0.49594 *	0.69637 *
IIPPIB	0.61185 (0.46157)	0.97882 *	0.075998	0.60893 (0.46192)	0.97415 *	0.12946
IICPRIV	0.61221 (0.46105)	0.97564 *	0.092455	0.60927 (0.46119)	0.96964 *	0.14591

Notes. * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594)

5. Finally, we reproduce the Replicated Moments procedure taken for the cross-section sample [71]:

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[71] There are 20 input series to "uncentered" principal components for both blocks of the tables below; normality is almost always rejected by both Bera-Jarque and Shapiro-Wilks tests at 5%. However, if one considers the (20 for the left block; 35 for the right block) sub-samples of cross-products for each of those 20 variables – unlike the cross-section case -, normality is frequently accepted at 5 and even 10% level, specially by Bera-Jarque statistic. Plain and smoothed data showed, with respect to normality tests, the same regularities.

Table 2.35. *Uncentered Principal Components, Standardized "Own" Cross-Products – Portugal*

	Original Variables (340 obs.)					Smoothed Variables (300 obs)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		12.30059	2.89211	1.74579	1.46705		13.86741	3.12946	1.60904	1.03132
% Cum. Exp Var.		0.61503	0.75964	0.84693	0.920283		0.69337	0.84984	0.930292	0.981858
Factor Loadings:										
CONDHA2	0.28155 (1.02618)	0.97930	-0.093067	0.11890	-0.017432	0.29026 (1.06810)	0.99298	-0.040927	0.078437	-0.015979
ARGHAB2	0.25776 (1.10170)	0.98457	-0.00017480	0.0099437	-0.013593	0.29143 (1.10218)	0.99641	-0.041340	0.022763	0.019600
RECHAB2	0.22308 (1.13796)	0.97921	0.11779	-0.041185	-0.052354	0.25871 (1.17906)	0.98552	-0.10577	-0.12568	0.022559
RECCHA2	0.22353 (1.13998)	0.97835	0.11735	-0.040368	-0.044238	0.26082 (1.18038)	0.98564	-0.093409	-0.13448	0.022686
ACRMORH	0.16040 (0.83561)	-0.22245	-0.55255	0.33065	0.55599	0.17548 (0.82686)	-0.18603	0.59100	0.60582	0.48549
ACRFERH	0.30673 (0.84261)	0.83073	-0.27539	0.33149	0.25762	0.33207 (0.86061)	0.85448	0.30367	0.37431	0.17754
ACRTOTH	0.26881 (1.02095)	0.97208	0.035154	0.13431	0.11633	0.29872 (1.02254)	0.97493	-0.034815	0.20284	0.074125
SUICHAB	0.050945 (1.03595)	-0.13405	-0.73319	-0.47994	-0.38348	0.024673 (1.03805)	-0.13726	0.68066	-0.63635	-0.26882
ACTJTH1	0.22229 (0.87739)	0.11223	-0.57173	0.71477	-0.027958	0.30181 (0.86267)	0.58947	0.62246	0.38819	-0.27287
ACTJMH1	0.080957 (0.94681)	-0.20906	-0.39828	0.66925	-0.37794	0.11950 (0.85700)	-0.078364	0.64586	0.38914	-0.64497
ACTTOH	0.062009 (1.01314)	-0.63837	-0.55977	0.42253	0.21023	0.081044 (1.03537)	-0.55889	0.69309	0.42949	0.11713
ACTMOH	-0.16090 (0.89016)	-0.65274	0.041886	-0.35769	0.40906	-0.25273 (0.86659)	-0.82079	-0.072003	-0.41574	0.31077
HOMLEGH	0.21194 (1.06279)	0.50164	-0.57688	-0.17223	-0.56797	0.28094 (1.05309)	0.78160	0.47678	-0.24297	-0.26850
HOMIOUH	0.27289 (1.03281)	0.64398	-0.50681	-0.29091	0.46047	0.28645 (0.93258)	0.61038	0.61851	-0.25655	0.41700
HOMIH	0.28098 (1.03468)	0.66131	-0.53432	-0.29459	0.40229	0.29403 (0.94842)	0.63365	0.61920	-0.26200	0.37744
MOCEXTH	-0.055181 (1.08687)	-0.63879	-0.58114	-0.30005	-0.078394	-0.14887 (1.13885)	-0.85838	0.47145	-0.15796	-0.028623
TXDIV	0.24427 (1.04060)	0.95292	0.053491	0.0097075	0.031566	0.27292 (1.09738)	0.98738	-0.093785	0.022533	-0.0066396
MILCAR	0.19749 (1.03275)	0.92411	0.21929	0.018588	-0.023858	0.21745 (1.08009)	0.93679	-0.28274	0.12281	-0.084279
SMO	-0.24779 (1.11256)	-0.99148	0.0089818	-0.013290	0.067357	-0.28643 (1.13077)	-0.99483	-7.36569D-06	0.023241	0.043811
FA	-0.23714 (1.09012)	-0.90851	0.19061	0.0060256	0.092258	-0.28402 (1.13343)	-0.91363	-0.21832	0.18094	-0.015967
Correlation with "Cross-products with'	(Centered Correlation Coefficients:)									
ANO	0.27991 (1.05925)	0.99003 *	-0.020175	-0.021536	0.029496	0.31572 (1.07533)	0.99373 *	0.013509	-0.039200	0.051565
POMINEN	0.12441 (1.09002)	0.75902 *	0.046176	-0.33980	0.0022419	0.095924 (1.16000)	0.71538 *	-0.0033654	-0.69357 *	-0.032826
PIBppc *	0.28912 (0.98691)	0.97045 *	-0.021326	0.13515	0.038932	0.31803 (0.98971)	0.97241 *	0.012712	0.16985	0.029629
TCPIBPPC	0.092626 (0.83133)	0.0040240	-0.38536 **	-0.14897	0.61589 *	0.14202 (0.80319)	-0.074256	0.59139 *	-0.015354	0.72860 *
TXDESCE	-0.26229 (0.74850)	-0.19669	0.55400 *	-0.64122 *	-0.24967	-0.29440 (0.77064)	-0.37189	-0.56753 *	-0.64476 *	-0.16190
IPPIB	-0.22804 (0.98118)	-0.87939 *	-0.15961	-0.021577	-0.29321	-0.28328 (1.01004)	-0.93618 *	0.13556	-0.11126	-0.27716
ICPRIV	-0.20949 (0.97303)	-0.87609 *	-0.14153	0.019216	-0.28985	-0.28183 (1.00221)	-0.92441 *	0.087838	-0.011607	-0.30730
IIPPIB	0.27719 (1.04419)	0.98933 *	-0.0055299	-0.0027641	0.0059980	0.31180 (1.06278)	0.99460 *	-0.018305	0.0016083	0.035359
IICPRIV	0.27818 (1.04656)	0.98980 *	-0.015483	-0.0071072	-0.0013214	0.31308 (1.06547)	0.99490 *	-0.0061522	-0.010680	0.026776

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378. Standard normal for 340 observations: 0.1060092; for 300 observations: 0.1128149.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833. Standard normal for 340 observations: 0.08912017; for 300 observations: 0.09486256.)

Estimating the factor loadings for original variables:

Table 2.36. *Uncentered Principal Components, Standardized "Own" Cross-Products, implicit Factor Loadings for Original Variables" – Portugal*

	Original Variables (340 obs.)						Smoothed Variables (300 obs)				
	PC1	PC2	PC3	PC4	PC5	PC6	PC1	PC2	PC3	PC4	PC5
Eigenv.	6.25372	3.03237	2.35598	2.15973	1.33255	1.02487	8.17210	3.88214	2.78368	2.22860	1.03169
% Cum. Exp Var.	0.31269	0.46431	0.58211	0.6901	0.756728	0.807972	0.40861	0.60272	0.7419	0.85333	0.904915
Factor Loadings:											
CONDHA2	0.71112	-0.097050	0.14067	-0.021540	0.10719	-0.10422	0.79792	-0.047716	0.10799	-0.024587	0.15226
ARGHAB2	0.76017	-0.00019381	0.012508	-0.017858	0.063431	0.15696	0.82470	-0.049644	0.032281	0.031065	0.10543
RECHAB2	0.77483	0.13384	-0.053095	-0.070494	-0.12031	-0.026139	0.86364	-0.13448	-0.18871	0.037855	0.011701
RECCHA2	0.77554	0.13359	-0.052135	-0.059672	-0.13674	-0.034078	0.86499	-0.11894	-0.20221	0.038125	0.0071643
ACRMORH	-0.12915	-0.46071	0.31277	0.54931	0.33955	0.35785	-0.11415	0.52618	0.63696	0.57048	0.0026576
ACRFERH	0.50837	-0.24202	0.33050	0.26827	0.17464	-0.086069	0.57230	0.29509	0.42954	0.22770	0.12575
ACRTOTH	0.70032	0.036371	0.15765	0.14261	0.19894	0.059512	0.75401	-0.039066	0.26879	0.10978	0.041949
SUICHAB	-0.094871	-0.74516	-0.55339	-0.46182	0.025505	-0.38923	-0.10346	0.74437	-0.82182	-0.38801	0.41088
ACTJTH1	0.069318	-0.50711	0.71926	-0.029385	-0.061474	-0.49503	0.39115	0.59928	0.44135	-0.34672	0.17310
ACTJMH1	-0.13556	-0.37086	0.70700	-0.41700	-0.36955	0.31542	-0.049224	0.58861	0.41881	-0.77580	-0.098008
ACTTOH	-0.44213	-0.55676	0.47679	0.24777	-0.086873	-0.19225	-0.42134	0.75810	0.55478	0.16910	-0.12097
ACTMOH	-0.40291	0.037129	-0.35972	0.42966	-0.53269	-0.21361	-0.53791	-0.068463	-0.46683	0.39000	-0.065878
HOMLEGH	0.37096	-0.61263	-0.20750	-0.71471	0.019238	0.16713	0.61845	0.54736	-0.32941	-0.40684	-0.27592
HOMIOUH	0.46944	-0.53056	-0.34550	0.57118	-0.15833	0.061395	0.43233	0.63561	-0.31135	0.56559	0.094822
HOMIH	0.48384	-0.56140	-0.35116	0.50084	-0.15231	0.072216	0.45680	0.64764	-0.32361	0.52104	0.075338
MOCEXTH	-0.47434	-0.61971	-0.36300	-0.099056	0.47162	0.17040	-0.71568	0.57030	-0.22565	-0.045698	0.11236
TXDIV	0.69505	0.056029	0.011536	0.039178	0.14223	-0.35040	0.81059	-0.11171	0.031695	-0.010438	0.23990
MILCAR	0.66303	0.22594	0.021728	-0.029128	0.39283	-0.15108	0.74928	-0.32811	0.16831	-0.12908	0.30218
SMO	-0.77116	0.010032	-0.016841	0.089148	0.10997	-0.076903	-0.84247	-9.05004D-06	0.033723	0.071046	0.19284
FA	-0.69161	0.20838	0.0074734	0.11951	0.45661	-0.22895	-0.77502	-0.26870	0.26299	-0.025936	0.68029

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Considering the cross-products with external variables:

Table 2.37. *Uncentered Principal Components, Standardized Cross-Products with External Variables – Portugal*

	Original Variables (592 obs.)					Smoothed Variables (522 obs.)				
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		13.35232	2.50149	1.65094	0.90878		14.45309	2.92078	1.47608	0.80706
% Cum. Exp Var.		0.66762	0.79269	0.875237	0.920676		0.72265	0.86869	0.942494	0.982847
Factor Loadings:	(“Uncentered Loadings:)									
CONDHA2	0.16378 (1.08087)	0.98599	-0.049187	0.099330	-0.059075	0.17328 (1.12761)	0.99072	-0.081307	0.076748	-0.022909
ARGHAB2	0.16076 (1.13876)	0.98682	0.0040721	0.0031297	0.031831	0.17016 (1.16060)	0.99538	-0.067203	0.030321	0.016391
RECHAB2	0.15178 (1.18454)	0.97833	0.083656	-0.10183	-0.053692	0.15171 (1.23520)	0.98774	-0.091325	-0.11672	0.034923
RECCHA2	0.15144 (1.18938)	0.97753	0.081680	-0.097825	-0.051465	0.15092 (1.23910)	0.98817	-0.077465	-0.12302	0.035122
ACRMORH	0.026380 (0.80240)	-0.24820	-0.32508	0.69807	0.30759	0.050076 (0.78979)	-0.16928	0.41962	0.79495	0.38657
ACRFERH	0.15143 (0.93989)	0.85359	-0.13369	0.45972	0.010068	0.16655 (0.92740)	0.87908	0.16083	0.43102	0.10688
ACRTOTH	0.16845 (1.06965)	0.96635	0.099839	0.18299	0.035623	0.18030 (1.06940)	0.97105	-0.11338	0.20290	0.040030
SUICHAB	-0.068242 (1.01297)	-0.086753	-0.83161	-0.48781	-0.10614	-0.085705 (1.06480)	-0.0053662	0.82054	-0.51716	-0.15736
ACTJTH1	0.087057 (0.89361)	0.20653	-0.51118	0.64492	-0.38620	0.14872 (0.87402)	0.63994	0.49616	0.42901	-0.35047
ACTJMH1	0.016388 (0.70315)	-0.27530	-0.48153	0.33876	-0.59409	0.061657 (0.76021)	-0.11471	0.58908	0.35980	-0.70601
ACTTOH	-0.035180 (0.95575)	-0.62148	-0.48414	0.56217	-0.056658	-0.0098938 (0.96799)	-0.57578	0.59414	0.55036	0.035993
ACTMOH	-0.12983 (0.78048)	-0.68496	-0.014512	-0.17067	0.26050	-0.16596 (0.84566)	-0.84887	0.059740	-0.35618	0.27835
HOMLEGH	0.062220 (1.06258)	0.53939	-0.61118	-0.40225	-0.28640	0.11008 (1.15402)	0.81111	0.47346	-0.21837	-0.21027
HOMIOUH	0.058182 (1.02675)	0.74751	-0.43717	0.063178	0.46170	0.060671 (1.04528)	0.70879	0.59947	-0.053957	0.36211
HOMIH	0.061191 (1.03835)	0.75931	-0.46687	0.029645	0.42121	0.065340 (1.06827)	0.72539	0.59848	-0.067205	0.32836
MOCEXTH	-0.11903 (1.11030)	-0.69167	-0.54641	-0.16383	0.17242	-0.15494 (1.11643)	-0.83017	0.53073	-0.084326	0.017776
TXDIV	0.15170 (1.10667)	0.95637	0.044890	0.061155	-0.029372	0.16706 (1.15321)	0.98597	-0.11366	0.027578	-0.020798
MILCAR	0.15501 (1.03667)	0.91683	0.21807	0.033432	-0.024431	0.16602 (1.08813)	0.92983	-0.32066	0.081629	-0.097652
SMO	-0.15476 (1.16083)	-0.99188	0.0027224	0.057507	0.037927	-0.16964 (1.17920)	-0.99438	0.023217	0.033568	0.044097
FA	-0.12079 (1.16453)	-0.91410	0.17159	0.11939	0.036944	-0.13574 (1.19835)	-0.92636	-0.21084	0.15855	-0.021089
Correlation with “Cross-products with’										
ANO	0.15470 (1.14570)	0.99169 *	-0.051370	0.042141	0.021589	0.16564 (1.16202)	0.99615 *	0.047361	0.016350	0.064423
POMINEN	0.056423 (1.23281)	0.78864 *	-0.11981	-0.25651	-0.012487	0.019617 (1.21339)	0.76438 *	0.17594	-0.59808 *	0.010969
PIBppc *	0.16809 (1.04677)	0.97149 *	-0.017565	0.18126	0.0036448	0.17934 (1.05105)	0.97540 *	-0.00050239	0.19476	0.031916
TCPIBPPC	0.00040477 (0.75658)	0.082345	-0.24649	0.33017 **	0.59779 *	-0.0047784 (0.78479)	0.086449	0.57377 *	0.23301	0.73073 *
TXDESCE	-0.10334 (0.77791)	-0.32231 **	0.38921 *	-0.79750 *	0.079411	-0.13323 (0.77982)	-0.47600 *	-0.40730 *	-0.76020 *	-0.089465
IPPIB	-0.14186 (1.06519)	-0.88613 *	-0.15304	-0.24072	-0.12986	-0.15717 (1.07864)	-0.93990 *	0.12664	-0.17290	-0.24371
ICPRIV	-0.12704 (1.05930)	-0.88734 *	-0.15310	-0.19546	-0.16006	-0.14051 (1.09734)	-0.93350 *	0.054824	-0.10704	-0.28995 **
IIPPIB	0.15718 (1.12025)	0.98977 *	-0.030281	0.051166	0.010670	0.16903 (1.14389)	0.99519 *	0.011167	0.046275	0.050298
IICPRIV	0.15631 (1.12551)	0.99054 *	-0.042894	0.044174	0.0062945	0.16831 (1.14856)	0.99592 *	0.024981	0.035616	0.044083

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845. Standard normal for 592 observations: 0.08043050; for 522 observations: 0.08563594.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594). Standard normal for 592 observations: 0.0675688; for 522 observations: 0.07195105.)

Stability across the 20 for the first table and 35 for the second one, subsystems was inspected: by an F test; and the information criteria for the full blocks and for the disaggregated estimation of the 20 and 35 factor systems was computed.

The comparison between contiguous restricted and unrestricted versions, - and unlike in the cross-section case – sometimes point to restricted versions. Comparing the separate component unrestricted versions with the common component restricted versions for each i-component system (i being 16 or 14 and 4 in the context): for the almost-full (16 and 14) component models, the restricted versions are only preferred with ICZ; for the 4 component models, only SIG would lead to the choice of the unrestricted versions (and not even in all cases). Apparently, stability would more easily pass in our time series.

	Own Cross-Products									
	Plain Data					Smoothed Data				
	SIG	SIG1	BIC3	ICZ	CH	SIG	SIG1	BIC3	ICZ	CH
16 Component Models:										
Separate Components										
Unrestricted System	9.06408D-17	-4.12004D-17	5.84724D-17	-29.80615	2.96467D+19	1.60316D-16	-5.00988D-17	1.23501D-16	-28.52202	1.16813D+19
Restricted System	0.41469	33.59003	3.84146	7.79244	(.00000)	0.32740	15.60586	2.97308	7.36115	(.00000)
Common Components										
Unrestricted System	8.70631D-17	4.35316D-16	4.97840D-17	-31.09225	55497.33	9.68556D-17	3.22852D-16	6.15067D-17	-31.05584	50130.22
Restricted System	7.51018D-16	7.58509D-16	1.07232D-15	-34.37497	(0.00000)	8.55618D-16	8.68370D-16	1.24619D-15	-34.21473	(0.00000)
4 Component Models:										
Separate Components										
Unrestricted System	0.078584	0.10424	0.28469	0.92566	30452.71	0.020307	0.028639	0.077078	-0.031161	90660.80
Restricted System	0.41692	0.54721	1.31031	1.29353	(.00000)	0.32609	0.44686	1.10545	1.30185	(.00000)
Common Components										
Unrestricted System	0.083834	0.085144	0.20388	-0.56697	1840.733	0.020993	0.021382	0.052894	-1.73787	1378.273
Restricted System	0.087835	0.088680	0.10302	-2.25725	(.00000)	0.020490	0.020714	0.024438	-3.69244	(.99589)

	Cross Products with External Variables									
	Plain Data					Smoothed Data				
	SIG	SIG1	BIC3	ICZ	CH	SIG	SIG1	BIC3	ICZ	CH
14 Component Models:										
Separate Components										
Unrestricted System	7.50980D-17	-3.00392D-17	4.72781D-17	-29.39880	4.75589D+19	6.67373D-17	-1.85704D-17	5.02886D-17	-28.74572	0.3782036E+20
Restricted System	0.31003	11.16119	3.05447	7.92727	(.00000)	0.24843	7.01119	2.40177	7.51453	(.00000)
Common Components										
Unrestricted System	8.39794D-17	1.67959D-16	4.59651D-17	-30.80799	113934.0	7.42534D-17	1.32006D-16	4.52203D-17	-30.99666	128683.5
Restricted System	8.35230D-16	8.39896D-16	1.05986D-15	-34.44203	(0.00000)	9.45148D-16	9.53028D-16	1.21655D-15	-34.29975	(0.00000)
4 Component Models:										
Separate Components										
Unrestricted System	0.084408	0.11221	0.32175	1.25060	35668.91	0.020526	0.029041	0.082123	0.26886	120114.7
Restricted System	0.32090	0.42118	1.04590	1.13803	.00000	0.25312	0.34687	0.89236	1.17108	(.00000)
Common Components										
Unrestricted System	0.091358	0.092174	0.22889	-0.38135	2036.61147	0.021078	0.021301	0.054798	-1.61913	2094.070
Restricted System	0.086049	0.086520	0.095218	-2.34554	1.00000	0.019804	0.019927	0.022161	-3.80192	(1.00000)

Estimating the factor loadings for original variables:

Table 2.38. *Uncentered Principal Components, Standardized Cross-Products with External Variables, implicit Factor Loadings for Original Variables" – Portugal*

	Original Variables (592 obs.)						Smoothed Variables (522 obs)			
	PC1	PC2	PC3	PC4	PC5	PC6	PC1	PC2	PC3	PC4
Eigenv.	6.70239	2.90102	2.35677	1.74856	1.45591	1.08758	8.51519	3.82793	2.72125	2.01219
% Cum. Exp Var.	0.33512	0.48017	0.59801	0.685438	0.758234	0.812613	0.42576	0.61716	0.75322	0.85383
Factor Loadings:										
CONDHA2	0.73511	-0.055741	0.12489	-0.086230	0.086853	-0.066525	0.80966	-0.099105	0.11095	-0.038515
ARGHAB2	0.77399	0.0048546	0.0041395	0.048878	0.097727	0.054549	0.83640	-0.084222	0.045069	0.028332
RECHAB2	0.79679	0.10356	-0.13987	-0.085614	-0.099703	-0.10531	0.88054	-0.12143	-0.18406	0.064045
RECCHA2	0.79931	0.10152	-0.13489	-0.082390	-0.12060	-0.11656	0.88361	-0.10331	-0.19459	0.064606
ACRMORH	-0.13590	-0.27053	0.64454	0.32971	0.33640	0.33715	-0.095964	0.35479	0.79717	0.45081
ACRFERH	0.55420	-0.13194	0.50335	0.012798	0.13698	0.042718	0.59336	0.16191	0.51463	0.14841
ACRTOTH	0.71363	0.11207	0.22789	0.051505	0.20325	0.019310	0.75439	-0.13138	0.27884	0.063974
SUICHAB	-0.060067	-0.87520	-0.56958	-0.14388	0.034219	-0.26431	-0.0041064	0.93650	-0.70005	-0.24772
ACTJTH1	0.12646	-0.47576	0.66594	-0.46298	-0.20422	-0.39090	0.40643	0.46998	0.48198	-0.45789
ACTJMH1	-0.13205	-0.35107	0.27402	-0.55791	-0.19390	0.10675	-0.062672	0.48003	0.34774	-0.79350
ACTTOH	-0.40536	-0.47997	0.61834	-0.072351	-0.17821	0.011040	-0.39927	0.61448	0.67510	0.051344
ACTMOH	-0.36960	-0.011903	-0.15530	0.27520	-0.59978	-0.31642	-0.52405	0.055006	-0.38896	0.35349
HOMLEGH	0.39154	-0.67435	-0.49242	-0.40703	0.23839	0.35375	0.67357	0.58640	-0.32077	-0.35921
HOMIOUH	0.52426	-0.46604	0.074723	0.63396	-0.20294	-0.018329	0.53161	0.67060	-0.071587	0.55870
HOMIH	0.53862	-0.50339	0.035463	0.58499	-0.17912	0.0088546	0.55613	0.68435	-0.091143	0.51787
MOCEXTH	-0.52674	-0.63249	-0.21040	0.25708	0.52130	-0.23471	-0.67029	0.63912	-0.12044	0.029525
TXDIV	0.72855	0.051979	0.078565	-0.043807	0.10374	-0.39533	0.82301	-0.14150	0.040721	-0.035714
MILCAR	0.65541	0.23695	0.040304	-0.034193	0.40269	-0.32293	0.73317	-0.37711	0.11386	-0.15840
SMO	-0.79219	0.0033049	0.077455	0.059305	0.089426	-0.10651	-0.84861	0.029551	0.050676	0.077416
FA	-0.72986	0.20825	0.16075	0.057751	0.43169	-0.39088	-0.80030	-0.27167	0.24230	-0.037479

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

6. Using the loadings of the own cross-product pc decomposition and applying it to the standardized observations we derive:

Table 2.39. *Uncentered Principal Components, Standardized "Own" Cross-Products Loadings – Portugal*

	Original Variables				Smoothed Variables			
	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
Eigenv.	10.57666	3.11540	2.38832	1.88057	11.81146	3.27739	2.38066	1.96272
% Cum. Exp Var.	0.52883	0.6846	0.80402	0.898048	0.59057	0.75444	0.87347	0.971606
Factor Loadings:								
CONDHA2	0.97102	-0.16875	0.33383	-0.0056169	0.99156	0.099473	0.32690	-0.037213
ARGHAB2	0.97705	-0.095382	0.23529	-0.036853	0.99469	0.10306	0.27274	0.00093152
RECHAB2	0.96322	0.069858	0.094668	-0.093313	0.97235	-0.0044620	0.068761	0.0058601
RECCHA2	0.96203	0.068131	0.093264	-0.085246	0.97225	0.0075924	0.060352	0.0082109
ACRMORH	-0.059500	-0.59370	0.47056	0.66329	0.077473	0.65805	0.63601	0.57393
ACRFERH	0.79275	-0.37782	0.55990	0.36303	0.83667	0.46830	0.61427	0.22930
ACRTOTH	0.95751	-0.073491	0.37677	0.16946	0.96750	0.16210	0.47264	0.077890
SUICHAB	-0.15542	-0.55218	-0.52085	-0.40945	-0.20278	0.42180	-0.68422	-0.26244
ACTJTH1	0.28194	-0.60636	0.78791	0.053656	0.65679	0.61481	0.65184	-0.25262
ACTJMH1	-0.080454	-0.46268	0.64401	-0.32301	0.12112	0.53121	0.50651	-0.68354
ACTTOH	-0.41146	-0.65396	0.50544	0.35009	-0.27689	0.74813	0.53066	0.25154
ACTMOH	-0.64273	0.098376	-0.53975	0.35897	-0.79883	-0.23014	-0.59683	0.39754
HOMLEGH	0.51937	-0.56195	-0.0017763	-0.51844	0.73917	0.54447	0.023900	-0.31378
HOMIOUH	0.56127	-0.58448	-0.092792	0.53856	0.53071	0.65811	-0.051566	0.59908
HOMIH	0.58420	-0.60995	-0.090246	0.48395	0.55865	0.66859	-0.050446	0.55894
MOCEXTH	-0.66050	-0.49745	-0.33753	-0.075253	-0.82762	0.36260	-0.33837	0.028517
TXDIV	0.93838	0.029424	0.18694	0.044031	0.97845	0.012166	0.24975	-0.019951
MILCAR	0.89122	0.20460	0.18588	-0.052955	0.91298	-0.18347	0.31414	-0.16258
SMO	-0.98424	0.088144	-0.20266	0.098785	-0.99104	-0.14916	-0.25516	0.083699
FA	-0.84678	0.30878	-0.16056	0.11479	-0.86252	-0.39472	-0.10962	-0.036248
Correlation with "Cross-products with'								
ANO	0.98585 *	-0.15103	0.22858	0.092824	0.98974 *	0.23064	0.26536	0.097986
POMINEN	0.60733 *	0.060703	-0.38103	-0.081845	0.46937 **	-0.12141	-0.69511 *	-0.012392
PIBppc *	0.95515 *	-0.18919	0.42075 **	0.12004	0.96365 *	0.26964	0.48268 **	0.054980
TCPIBPPC	0.018801	-0.43483 **	0.041919	0.64966 *	0.039625	0.61098 *	0.078336	0.79638 *
TXDESCE	-0.39505	0.59714 *	-0.76037 *	-0.39393	-0.54833 *	-0.66020 *	-0.77273 *	-0.23336
IPPIB	-0.84393 *	-0.0083450	-0.25534	-0.39278	-0.90320 *	-0.12841	-0.35959	-0.37072
ICPRIV	-0.82033 *	-0.029838	-0.18245	-0.38805	-0.87571 *	-0.14056	-0.22701	-0.41062
IIPPIB	0.98549 *	-0.12911	0.25317	0.073964	0.99181 *	0.20147	0.30063	0.070016
IICPRIV	0.98668 *	-0.13779	0.24694	0.062524	0.99258 *	0.20976	0.28975	0.060100

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 17 observations: 0.48207; for 15 observations 0.513913.) ** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 17 observations: 0.41235; for 15 observations 0.440874.)

Plotting the newly derived four components, we get:

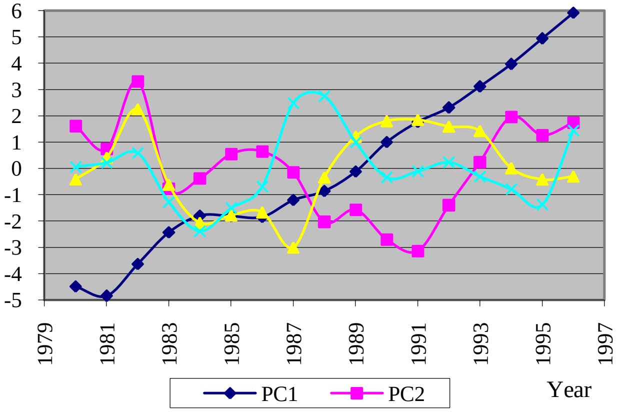

Figure 2.13. *First Four Principal Components, Cross-Product Decomposition, Portugal*

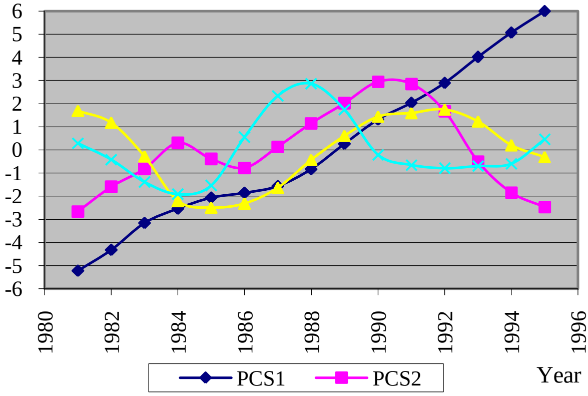

Figure 2.14. *First Four Principal Components, Smoothed Data, Cross-Product Decomposition, Portugal*

7. A final comment can be made with respect to the time series results: overall, the aggregation of the variables by the several pc applications for the time series sample is more consistent than for the international cross-section data set. This is not unexpected – the same structure (country, in our case) is behind the time series input; lengthier variables in time from the same source do not exhibit/imply so much variation as additional observations from different structures may and, in our cross-section case, do.

Principal Component Applied to Differenced Variables

1. We report below the principal component summary statistics obtained for the data set comprising differenced original variables. The conclusions differ from those obtained for levels or correlation matrices.

On the one hand, the use of differences spanned the components: we now distinguish seven eigenvalues larger than 1. We distinguish the following:

- the first component apparently would be negatively related to accidentality, with mandatory military service rating high and positive.
- the second component would capture violent death
- imprisonment and divorce are mainly associated with the 4-th component
- the fifth component congregates judicial intervention

Table 2.40. *Principal Components, First Differences – Portugal*

	PC1	PC2	PC3	PC4	PC5	PC6	PC7
Eigenv.	4.3868944	3.6808597	2.7120754	2.4540150	2.0097600	1.2433953	1.0892329
% Cum. Exp Var.	0.21934472	0.40338771	0.53899148	0.66169222	0.76218022	0.82434999	0.87881163
Factor Loadings:							
CONDHA2	0.22028	0.38857	0.42640	0.013239	0.48671	0.36850	0.15105
ARGHAB2	0.18559	-0.048708	-0.33299	0.48155	0.0071832	-0.60138	-0.40171
RECHAB2	0.40042	0.46753	0.17623	-0.62791	0.22721	-0.20962	-0.28681
RECCHA2	0.36818	0.45775	0.19525	-0.64876	0.22117	-0.21297	-0.27905
ACRMORH	-0.59469	0.47610	0.44612	0.16678	0.096598	0.15158	-0.13987
ACRFERH	-0.66767	-0.14197	0.52015	0.20881	0.30177	-0.014593	-0.26148
ACRTOTH	-0.54968	-0.14025	0.57806	0.093255	0.18915	0.079982	-0.41883
SUICHAB	0.24395	0.73567	-0.33654	0.25200	0.30653	0.25307	-0.023276
ACTJTOH	0.023488	-0.24221	-0.13626	-0.24098	0.77796	-0.35644	0.21439
ACTJMOH	0.36970	-0.38791	-0.039472	0.36558	0.58494	0.052616	-0.011997
ACTTOH	-0.55296	-0.022569	0.27357	0.26536	0.41308	-0.36181	0.39370
ACTMOH	-0.46753	0.45118	0.14398	-0.63987	-0.22892	-0.026308	0.10256
HOMLEGH	0.55175	0.54972	-0.16678	0.33581	0.097728	-0.023475	-0.15935
HOMIOUH	-0.56340	0.64600	-0.078208	0.16021	-0.16318	-0.30249	0.15745
HOMIH	-0.49359	0.70987	-0.098140	0.20033	-0.15052	-0.30393	0.13732
MOCEXTH	-0.11732	0.73975	-0.35136	0.36622	0.17651	0.26540	-0.017040
TXDIV	-0.35313	-0.031205	-0.45407	-0.46168	0.34306	0.088266	0.25003
MILCAR	-0.28616	0.026847	-0.71644	-0.18312	0.21703	0.072039	-0.21760
SMO	-0.76657	-0.24253	-0.35472	-0.078814	0.045570	0.13736	-0.18017
FA	-0.71547	-0.21749	-0.55245	-0.16134	0.12191	0.12202	-0.24030
Unit Roots							
CONST	-2.06911	-0.90734	-2.74195	-1.70711	-3.15818	-1.86298	-0.84822
Tau test	(0.16022)	(0.86006)	(0.024901)	(0.36017)	(0.0073064)	(0.26106)	(0.88001)
(p-value)	[3; 12]	[5; 10]	[2; 13]	[2; 13]	[5; 10]	[4; 11]	[2; 13]
[nlags; nobs]							
C, TREND	-2.07332	-0.94030	-2.73461	-1.72502	-2.33795	-1.90358	-2.24517
Tau test	(0.59704)	(0.97768)	(0.17032)	(0.80755)	(0.40184)	(0.71105)	(0.46991)
(p-value)	[3; 12]	[5; 10]	[2; 13]	[2; 13]	[2; 13]	[4; 11]	[3; 12]
[nlags; nobs]							
D on C, TREND and lag	3.89125	10.9361	8.59243	4.66302	4.29920	6.85716	13.1900
F (uncor. p-value) [nobs]	(0.050)	(0.002)	(0.005)	(0.032)	(0.039)	(0.010)	(0.001)
	[15]	[15]	[15]	[15]	[15]	[15]	[15]
C, T; T2	-2.15875	-1.38942	-2.78849	-2.28858	-2.43792	-1.79347	-2.27047
Tau test	[3; 12]	[4; 11]	[2; 13]	[4; 11]	[2; 13]	[4; 11]	[3; 12]
[nlags; nobs]	-1.24106	-0.17906	-2.25058	-3.55028	-2.73434	-1.26774	-1.20366
D-F (p-value)	(0.97367)	(0.99854)	(0.70503)	(0.10073)	(0.43484)	(0.97156)	(0.97639)
[nlags; nobs]	[3; 12]	[4; 11]	[2; 13]	[4; 11]	[2; 13]	[4; 11]	[3; 12]
Dif CONST	-3.65246	-0.12134	-2.65076	-2.16041	-2.31283	-1.61877	-2.26745
Tau test	(0.0016771)	(0.98471)	(0.032450)	(0.12681)	(0.084321)	(0.42297)	(0.095402)

(p-value)	[2; 12]	[5; 9]	[2; 12]	[3; 11]	[2; 12]	[4; 10]	[3; 11]
[nlags; nobs]							
Dif C, TREND	-3.17847	-0.30647	-2.56175	-2.24287	-2.26912	-1.74683	-1.94961
Tau test	(0.051663)	(0.99658)	(0.25603)	(0.47163)	(0.45213)	(0.79722)	(0.68198)
(p-value)	[2; 12]	[4; 10]	[2; 12]	[3; 11]	[2; 12]	[4; 10]	[3; 11]
[nlags; nobs]							
	-2.10981	-1.44322	-2.95738	-3.0030	-2.02481	-3.88407	
Cointeg. Test	(.)	(0.92445)	(0.31798)	(0.55815)	(0.73265)	(0.047477)	
	[2; 13]	[2; 13]	[2; 13]	[2; 13]	[2; 13]	[2; 13]	
	-2.35283		-3.76808				
Cointeg. Test (>0.5)	(.)		(0.33016)				
	[2; 13]		[3; 10]				

We inspect the graphical appearance of the components:

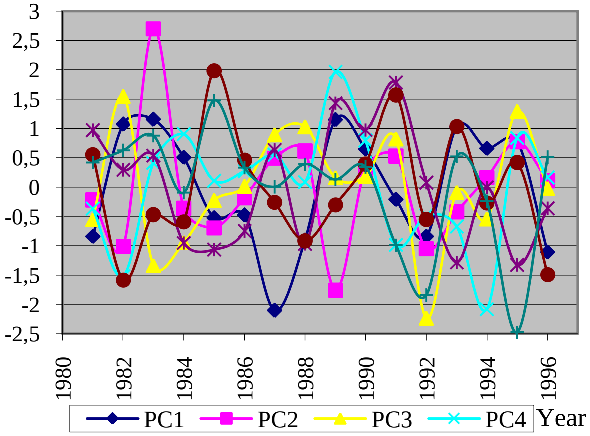

Figure 2.15. *First Four Principal Components, First Differences, Portugal*

2. Using difference of RECHAB2, MILCAR, SMO, FA, instead of levels for each particular data set, we reproduced the statistics of some of the tables of sub-section II.B. The exercise tries to reflect the use of input variables to principal components with the same number of unit roots (in the case, one [72]), a logic pre-requisite, as co-integration analysis could suggest.)

On the one hand, original and smoothed series result in different aggregation of variables than before. Original data now requires a six-component representation. Comparing with the previous factor loadings, it would seem that the first component of the previous set spanned into the first two components of the current one, with the second capturing the differenced variables impact; the previous 3rd component is symmetrically captured in the current 5th.

Secondly, smoothed variable statistics suggest common features with the previous decomposition. Prison (differenced) data now join accidents but that is the sole novelty (two components are switched with respect to the same representative variables).

Finally, the correlation grouping still reproduces the levels patterns (of the new sample).

We can therefore conclude that the conclusions and interpretation in levels are quite robust.

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[72] We ignore, however, that – as previous unit root inspection of chapter I suggested - some may be stationary in levels. Nevertheless, unit root tests are sometimes claimed to favour the null.

First differences yield a different pattern from all the others. It is derived from some doubled differenced series which may explain why it does not show any interpretation we could summarize.

Table 2.41. *Principal Components – Portugal*

	Original Variables						Smoothed Variables			
	PC1	PC2	PC3	PC4	PC5	PC6	PCS1	PCS2	PCS3	PCS4
Eigenv.	7.0870650	3.6088246	2.9924669	1.8806523	1.8246831	1.2367530	10.401735	4.2580382	2.6601206	2.0409248
% Cum. Exp Var.	0.35435325	0.53479448	0.6844178	0.77845044	0.86968459	0.93152225	0.52008676	0.73298866	0.86599469	0.96804093
Factor Loadings:										
CONDHA2	0.97578	0.021724	0.12702	0.027449	0.088973	0.079012	0.98403	0.069611	0.14151	0.0020881
ARGHAB2	0.93193	0.058632	0.27390	-0.044105	0.10118	-0.10824	0.98266	0.074444	0.13693	0.069887
DRECHA2	0.39292	-0.60346	-0.34375	0.19111	0.033464	0.56568	-0.33516	-0.79787	0.43410	0.034526
DRECCH2	0.37370	-0.61370	-0.33208	0.22526	0.0029500	0.56408	-0.27456	-0.80019	0.45612	0.0076344
ACRMORH	0.16242	0.42247	-0.63979	0.12557	-0.50664	0.052571	0.14658	-0.95217	0.10575	-0.15132
ACRFERH	0.91197	0.19774	-0.17967	0.091393	-0.23341	-0.024478	0.87506	-0.45319	0.11203	-0.10864
ACRTOTH	0.96841	-0.0010062	0.15886	0.085043	-0.11467	-0.015990	0.96958	-0.085871	0.21307	-0.071119
SUICHAB	-0.21782	0.49502	-0.0056979	-0.40817	0.55684	0.42145	-0.17368	0.073946	-0.78630	0.50200
ACTJTH1	0.52355	0.11533	-0.74313	0.082506	0.12565	-0.10196	0.74588	-0.34249	-0.33005	-0.41451
ACTJMH1	0.096077	-0.0093749	-0.73512	0.028113	0.41007	-0.23572	0.24021	-0.14062	-0.67314	-0.67501
ACTTOH	-0.14890	0.32705	-0.86347	0.025673	-0.19195	-0.10170	-0.17514	-0.87288	-0.26451	-0.31973
ACTMOH	-0.69017	-0.078898	-0.020370	-0.33204	-0.43446	0.38777	-0.85225	-0.018712	0.12607	0.45103
HOMLEGH	0.49998	0.25001	-0.063709	-0.40991	0.64149	0.091666	0.78272	0.032097	-0.57049	0.10366
HOMIOUH	0.55957	0.54606	0.041427	-0.46285	-0.37361	0.097994	0.53770	-0.57240	-0.090603	0.60051
HOMIH	0.58109	0.54914	0.035430	-0.48037	-0.31449	0.10207	0.56786	-0.54974	-0.12292	0.58824
MOCEXTH	-0.63199	0.57528	-0.28204	-0.11614	0.20706	0.20584	-0.77698	-0.32082	-0.49864	0.13636
TXDIV	0.89758	-0.031467	0.32079	0.072231	0.0034927	0.12700	0.95731	0.14641	0.19072	0.064003
DMILCAR	0.28883	0.59271	-0.022426	0.56200	0.24872	0.029345	0.82802	0.40118	0.37872	-0.0018018
DSMO	-0.36701	0.63528	0.33515	0.43651	-0.078801	0.23201	-0.97977	-0.11421	0.017586	-0.12206
DFA	-0.15259	0.72515	0.25503	0.57976	0.022595	0.17635	-0.87274	0.13153	0.33468	-0.23437
Correlation with:										
ANO	0.96098 *	0.048473	0.22369	-0.11046	-0.025353	0.017787	0.98297 *	-0.056070	0.099038	0.13955
POMINEN	0.43494 **	-0.085711	0.49481`**	-0.47363 **	0.063088	0.22298	0.39395	0.48091 **	-0.11995	0.72661 *
PIBppc *	0.98868 *	0.066448	0.076244	0.063540	-0.031289	-0.029188	0.97850 *	-0.14948	0.11714	-0.075183
TCPIBPPC	0.10374	0.41795	-0.19890	-0.24196	-0.55106 *	-0.12643	0.053122	-0.84919 *	0.083111	0.42568
TXDESCE	-0.63395 *	-0.31495	0.59458 *	-0.19819	0.21132	0.10047	-0.62696 *	0.71129 *	0.010637	0.30212
IPPIB	-0.84384 *	0.0039818	-0.23987	-0.010115	0.36842	0.029447	-0.87835 *	0.20694	-0.39741	-0.15320
ICPRIV	-0.79992 *	-0.027366	-0.30880	0.011104	0.36769	0.044264	-0.84380 *	0.20786	-0.37055	-0.29354
IIPPIB	0.96465 *	0.049442	0.22923	-0.048759	-0.0063755	0.013646	0.98650 *	-0.038857	0.11899	0.093081
IICPRIV	0.96409 *	0.053586	0.22951	-0.061396	0.0067745	0.013128	0.98799 *	-0.033930	0.10143	0.099120
Unit Roots	PC1	PC2	PC3	PC4	PC5	PC6	PCS1	PCS2	PCS3	PCS4
CONST	-0.43740	-2.22939	-1.05992	-2.41127	-2.94680	-2.34515	-1.10113	-2.09557	-1.84800	-2.73789
Tau test	(0.96159)	(0.10568)	(0.79572)	(0.064209)	(0.013655)	(0.077157)	(0.77497)	(0.14987)	(0.26979)	(0.025198)
(p-value)	[3; 13]	[2; 14]	[5; 11]	[2; 14]	[3; 13]	[3; 13]	[5; 9]	[3; 11]	[3; 11]	[3; 11]
[nlags; nobs]										
C, TREND	-1.46878	-2.26217	-2.81536	-2.38692	-2.98638	-2.32346	-0.73735	-2.10183	-1.98302	-2.82841
Tau test	(0.90025)	(0.45728)	(0.13887)	(0.36722)	(0.088197)	(0.41230)	(0.98771)	(0.57639)	(0.65994)	(0.13427)
(p-value)	[3; 13]	[2; 14]	[2; 14]	[2; 14]	[3; 13]	[3; 13]	[4; 10]	[3; 11]	[3; 11]	[3; 11]

[nlags; nobs]										
D on C, TREND and lag	1.10753	3.59289	1.94151	2.89764	2.34498	8.81072	0.973867	0.628332	3.66429	1.35769
F	(0.360)	(0.057)	(0.183)	(0.091)	(0.135)	(0.004)	(0.408)	(0.552)	(0.060)	(0.297)
	[16]	[16]	[16]	[16]	[16]	[16]	[14]	[14]	[14]	[14]
C, T; T2	-1.47850	-2.56432	-1.33537	-2.94481	-2.90855	-2.15629	-1.45083	-1.26681	-1.15861	-1.43635
Tau test	[3; 13]	[3; 13]	[5; 11]	[2; 14]	[3; 13]	[3; 13]	[4; 10]	[3; 11]	[3; 11]	[3; 11]
[nlags; nobs]	-4.87723	-3.65573	-2.47624	-2.56741	-3.44826	-1.89753	-4.14725	-0.52775	-3.21690	-1.59283
D-F (p-value)	(0.0016544)	(0.078453)	(0.58292)	(0.53059)	(0.12657)	(0.85316)	(0.020413)	(0.99663)	(0.20225)	(0.93009)
[nlags; nobs]	[5; 11]	[5; 11]	[5; 11]	[5; 11]	[2; 14]	[3; 13]	[4; 10]	[4; 10]	[4; 10]	[3; 11]
Dif CONST	-2.39431	-3.34646	-0.74554	-2.89660	-2.87052	-2.26398	-1.20694	-1.70565	-1.86886	-2.00754
Tau test	(0.067324)	(0.0041752)	(0.90883)	(0.015831)	(0.017092)	(0.096301)	(0.71511)	(0.36118)	(0.25768)	(0.18655)
(p-value)	[5; 10]	[2; 13]	[5; 10]	[2; 13]	[2; 13]	[4; 11]	[3; 10]	[3; 10]	[4; 9]	[2; 11]
[nlags; nobs]										
Dif C, TREND	-2.36442	-3.15691	-1.52159	-3.12273	-2.88546	-2.40197	-1.31315	-2.10883	-2.13958	-1.95712
Tau test	(0.38298)	(0.054913)	(0.88516)	(0.060461)	(0.11566)	(0.35683)	(0.93494)	(0.57127)	(0.54862)	(0.67710)
(p-value)	[5; 10]	[2; 13]	[5; 10]	[2; 13]	[2; 13]	[3; 12]	[3; 10]	[3; 10]	[3; 10]	[2; 11]
[nlags; nobs]										
	-0.47150	-1.70212	-2.73438	-1.68051	-1.82212	-1.32750	-0.49761	-2.47452	-1.95932	-2.47284
Cointeg. Test	(.)	(0.91105)	(0.64970)	(0.68546)	(0.70679)	(0.83141)	(.)	(0.68892)	(0.50497)	(0.52173)
	[6; 10]	[2; 14]	[2; 14]	[6; 10]	[3; 13]	[3; 13]	[5; 9]	[2; 12]	[5; 9]	[5; 9]
	-2.70406	-1.81052			-2.73903			-1.78518	-2.36873	-0.48395
Cointeg. Test (>0.5)	(.)	(.)			(0.51905)			(.)	(0.59840)	(0.90925)
	[2; 14]	[2; 14]			[3; 13]			[3; 11]	[3; 11]	[5; 9]

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 16 observations 0.497346; for 14 observations 0.532446)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 16 observations 0.425841; for 14 observations 0.457442)

Graphically:

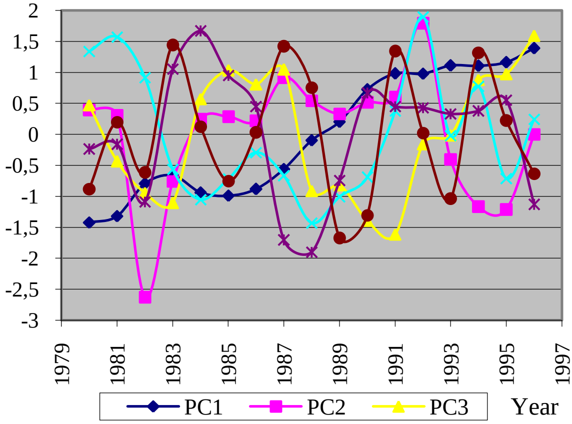

Figure 2.16. *First Four Principal Components, Some Differenced Series, Portugal*

Smoothed series do not show as smooth a path as it did when all the variables were in levels:

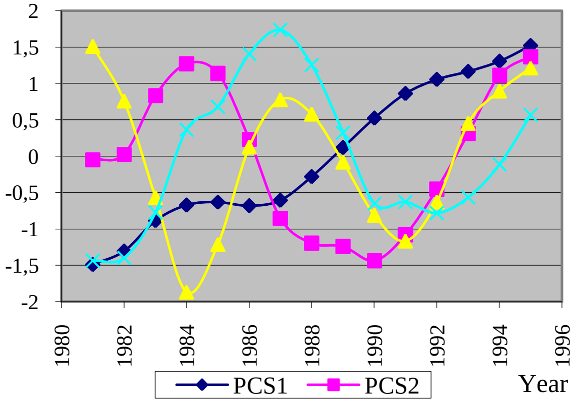

Figure 2.17. *First Four Principal Components, Some Differenced Series, Smoothed Data, Portugal*

Table 2.42. *Principal Components, Cross-Correlations – Portugal*

	Original Variables						Smoothed Variables				
	Mean (s.d)	PC1	PC2	PC3	PC4	PC5	Mean (s.d)	PCS1	PCS2	PCS3	PCS4
Eigenv.		10.005268	4.0253071	2.6447418	1.5184848	1.4682437		13.669627	3.3567546	1.7906140	1.1494704
% Cum. Exp Var.		0.5002634	0.70152878	0.83376587	0.90969011	0.98310229		0.68348135	0.85131908	0.94084978	0.99832330
Factor Loadings:											
CONDHA2	0.28839 (0.52113)	0.98166	0.17583	0.021608	0.0046419	0.060031	0.18529 (0.70566)	0.99424	0.015187	0.10356	0.0098168
ARGHAB2	0.24198 (0.52624)	0.95640	0.28222	0.024024	0.036151	0.040179	0.18371 (0.70537)	0.99412	0.010551	0.10430	-0.021646
DRECHA2	0.11237 (0.39581)	0.61499	-0.68743	0.29405	-0.11174	0.10309	0.12069 (0.46514)	-0.67139	0.70101	0.22386	-0.046046
DRECCH2	0.10341 (0.39437)	0.59632	-0.69236	0.30544	-0.14885	0.10752	0.13227 (0.44358)	-0.60745	0.74742	0.25241	-0.027523
ACRMORH	0.22318 (0.28958)	-0.089184	-0.20392	-0.83114	-0.41232	-0.25325	0.26394 (0.38213)	0.045039	0.99400	-0.057742	0.070347
ACRFERH	0.33157 (0.46211)	0.94595	0.11363	-0.25300	-0.15447	-0.037429	0.29267 (0.61491)	0.93905	0.33821	0.040640	0.045462
ACRTOTH	0.26523 (0.53102)	0.97685	0.18148	0.0029323	-0.10690	0.010108	0.21529 (0.68879)	0.98448	0.11545	0.12549	0.040760
SUICHAB	0.088517 (0.33846)	-0.63975	0.34671	-0.016765	0.64936	0.013438	-0.0089752 (0.36436)	-0.32955	-0.33422	-0.72731	-0.49493
ACTJTH1	0.26613 (0.34929)	0.61864	-0.43221	-0.61683	0.090729	0.15376	0.25378 (0.54508)	0.91061	0.23891	-0.25506	0.21885
ACTJMH1	0.11387 (0.31480)	0.039493	-0.66169	-0.54584	0.35327	0.30236	0.094235 (0.37312)	0.43329	0.070454	-0.72569	0.52879
ACTTOH	0.12243 (0.36778)	-0.48194	-0.43707	-0.74836	-0.044867	-0.083195	0.18685 (0.41488)	-0.48660	0.75900	-0.39075	0.17711
ACTMOH	-0.17315 (0.43269)	-0.86028	-0.17809	0.18450	-0.073991	-0.42018	-0.16255 (0.62806)	-0.96912	-0.039216	0.073674	-0.22839
HOMLEGH	0.22110 (0.33556)	0.64448	0.23302	-0.11067	0.69901	0.10142	0.17470 (0.59212)	0.94209	-0.067317	-0.31711	-0.078291
HOMIOUH	0.27988 (0.35614)	0.58501	0.55149	-0.29721	0.035011	-0.50962	0.27511 (0.43832)	0.73983	0.46289	-0.085631	-0.47968
HOMIH	0.28846 (0.35935)	0.60840	0.54719	-0.29384	0.082880	-0.48336	0.27633 (0.45097)	0.77138	0.42793	-0.10595	-0.45791
MOCEXTH	-0.0040822 (0.48311)	-0.94285	0.087109	-0.23707	0.19323	0.0068433	0.059509 (0.62191	-0.93185	0.085028	-0.33567	-0.10754
TXDIV	0.23767 (0.50942)	0.95392	0.24653	0.14597	-0.064964	0.044560	0.16317 (0.69585)	0.98930	-0.027981	0.14078	-0.013300
DMILCAR	0.22417 (0.29301)	0.14927	0.59315	-0.39540	-0.17142	0.63996	0.061953 (0.65384)	0.94974	-0.15336	0.27036	0.035571
DSMO	0.017839 (0.41130)	-0.72751	0.59532	0.0021048	-0.25482	0.18390	-0.17662 (0.70526)	-0.99764	0.028864	-0.029760	0.050605
DFA	0.10524 (0.37786)	-0.54038	0.68943	-0.12475	-0.28713	0.35699	-0.22379 (0.62462)	-0.97170	-0.070376	0.17347	0.14101
Correlation with											
“Correlations with											
ANO	0.26806 (0.52774)	0.96795 *	0.24440	0.031737	0.0060563	-0.043898	0.22030 (0.69431)	0.99231 *	0.073429	0.078480	-0.060571
POMINEN	0.075297 (0.36553)	0.71722 *	0.37154	0.43601 *	0.24722	-0.27367	0.011186 (0.44246	0.71571 *	-0.47974 *	0.042647	-0.50474 *
PIBppc *	0.29461 (0.52500)	0.97988 *	0.17821	-0.056491	-0.055976	0.034375	0.23651 (0.68763)	0.98704 *	0.13953	0.069566	0.036636
TCPIBPPC	0.11229 (0.26053)	-0.032412	0.29108	-0.66738 *	-0.24177	-0.62726 *	0.22166 (0.36408)	-0.10897	0.89006 *	-0.024396	-0.43842 **
TXDESCE	-0.31897 (0.35611)	-0.70271 *	0.13092	0.66419 *	0.19953	-0.034256	-0.30646 (0.48949)	-0.77510 *	-0.60297 *	0.093515	-0.16373
IPPIB	-0.20925 (0.49226)	-0.94012 *	-0.23251	-0.020926	0.20474	0.13056	-0.22634 (0.63456)	-0.94656 *	-0.20498	-0.23935	0.067611
ICPRIV	-0.19075 (0.47870)	-0.92013 *	-0.29654	-0.037649	0.20234	0.14372	-0.22366 (0.61283)	-0.93865 *	-0.19923	-0.23829	0.14560
IIPPIB	0.26874 (0.52929)	0.96809 *	0.24712	0.032586	-0.0099431	-0.0089759	0.21532 (0.69804)	0.99300 *	0.068065	0.087822	-0.037282
IICPRIV	0.26939 (0.52879)	0.96744 *	0.24985	0.032312	0.00092130	-0.0095209	0.21516 (0.69889)	0.99392 *	0.062932	0.079389	-0.040489

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Considering the correlations significance levels we obtain:

Table 2.43. *Principal Components, Cross-Correlations Significance Levels – Portugal*

	Original Variables					Smoothed Variables		
	Mean (s.d)	PC1	PC2	PC3	PC4	Mean (s.d)	PCS1	PCS2
Eigenv.		11.621092	3.4712922	1.3973433	1.1488765		15.910000	1.4593087
% Cum. Exp Var.		0.58105458	0.75461919	0.82448635	0.88193017		0.79549999	0.86846542
Factor Loadings:								
CONDHA2	0.75105 (0.38500)	0.95441	0.027037	0.083050	0.12603	0.56922 (0.48884)	0.98584	0.073068
ARGHAB2	0.76714 (0.38613)	0.94138	0.017041	0.10439	0.20233	0.57963 (0.48737)	0.97769	0.11201
DRECHA2	0.80019 (0.21014)	0.73733	0.51078	-0.25253	0.12120	0.42120 (0.47311)	-0.94997	-0.053940
DRECCH2	0.77964 (0.24323)	0.57250	0.72517	-0.25610	-0.040592	0.40389 (0.44809)	-0.92605	-0.083552
ACRMORH	0.71485 (0.32512)	-0.049333	0.82071	-0.093389	-0.39653	0.70638 (0.38083)	-0.52871	0.53514
ACRFERH	0.79636 (0.35420)	0.93845	0.13817	0.059010	0.22138	0.63607 (0.47095)	0.92242	0.18720
ACRTOTH	0.76841 (0.38844)	0.92813	0.097055	0.067418	0.22445	0.60514 (0.49302)	0.93462	0.18983
SUICHAB	0.41849 (0.37889)	-0.84990	0.11716	0.31451	0.20311	0.45977 (0.42788)	-0.82651	0.38760
ACTJTH1	0.82132 (0.33076)	0.85670	-0.14878	0.14275	0.017773	0.60110 (0.47262)	0.93251	-0.0055117
ACTJMH1	0.83756 (0.21829)	0.77803	0.15730	0.28251	-0.066798	0.63043 (0.44485)	0.89906	0.10066
ACTTOH	0.59917 (0.33790)	-0.59173	0.10800	0.18162	0.58436	0.63785 (0.38317)	-0.67845	0.089868
ACTMOH	0.36656 (0.36196)	-0.83586	-0.10262	-0.28276	0.23118	0.40811 (0.44820)	-0.96558	-0.14111
HOMLEGH	0.78169 (0.34736)	0.27780	0.76353	0.25863	-0.33503	0.73667 (0.37792)	0.36447	0.80832
HOMIOUH	0.75425 (0.31176)	0.97198	-0.066441	-0.097005	0.084188	0.61659 (0.44916)	0.97267	0.039778
HOMIH	0.76735 (0.30443)	0.97746	0.038142	-0.066587	0.10778	0.62114 (0.45056)	0.97060	0.082242
MOCEXTH	0.48001 (0.42673)	-0.79321	0.43034	0.16234	0.23787	0.50895 (0.47589)	-0.92688	0.25308
TXDIV	0.77599 (0.40375)	0.92124	0.074789	-0.013946	0.29955	0.60187 (0.49912)	0.93095	0.19282
DMILCAR	0.71835 (0.24893)	0.18557	-0.18368	0.87893	-0.15238	0.50153 (0.50018)	0.95777	-0.18129
DSMO	0.67872 (0.33091)	0.51131	-0.75716	-0.20396	-0.17819	0.49079 (0.50218)	-0.94983	0.20455
DFA	0.67572 (0.33566)	0.58868	-0.71552	-0.0010623	-0.21427	0.47514 (0.48806)	-0.94786	0.21916
Correlation with “Correlations with”								
ANO	0.77372 (0.40043)	0.92406 *	0.085507	-0.020101	0.29379	0.60389 (0.49543)	0.93365 *	0.19167
POMINEN	0.81809 (0.33524)	0.84597 *	0.11358	-0.13851	0.31482	0.64776 (0.45531)	0.89966 *	0.19208
PIBppc *	0.77308 (0.39107)	0.93608 *	0.066319	-0.0059499	0.27516	0.60669 (0.48803)	0.93814 *	0.18175
TCPIBPPC	0.37574 (0.33860)	-0.24425	-0.85182 *	0.098806	0.19932	0.41046 (0.36025)	-0.14017	-0.64891 *
TXDESCE	0.83791 (0.25657)	0.31422	0.17177	-0.39304 **	0.15378	0.72424 (0.36818)	0.26917	0.58313 *
IPPIB	0.58352 (0.39893)	-0.60570 *	0.55480 *	-0.045956	0.055475	0.57279 (0.42702	-0.70132 *	0.48816 *
ICPRIV	0.57002 (0.40901)	-0.61392 *	0.57889 *	-0.060687	0.053848	0.57222 (0.42786)	-0.74511 *	0.45488 *
IIPPIB	0.75935 (0.39515)	0.93687 *	0.069440	-0.019343	0.25744	0.59942 (0.49299)	0.93858 *	0.17372
IICPRIV	0.76197 (0.39559)	0.93573 *	0.069362	-0.014325	0.26241	0.59993 (0.49340)	0.93796 *	0.17598

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Considering the cross-correlations with the external variables, we obtain:

Table 2.44. *Principal Components, Correlations with External Variables – Portugal*

	Original Variables				Smoothed Variables			
	Mean (s.d.)	PC1	PC2	PC3	Mean (s.d.)	PCS1	PCS2	PCS3
Eigenv.		14.117944	2.7253645	1.3832710		14.599933	3.2790283	1.4278653
% Cum. Exp Var.		0.70589722	0.84216545	0.91132900		0.72999665	0.89394807	0.96534133
Factor Loadings:								
CONDHA2	0.17158 (0.78795)	0.99453	0.040081	0.026886	0.18287 (0.82812)	0.99912	0.0070172	0.0079926
ARGHAB2	0.16870 (0.78597)	0.99227	0.086671	0.025660	0.17924 (0.83453)	0.99879	0.013367	0.031892
DRECHA2	0.092067 (0.21259)	0.84698	-0.18089	-0.30430	-0.043435 (0.31237)	-0.60041	-0.75348	0.20189
DRECCH2	0.090467 (0.20263)	0.80993	-0.20342	-0.37089	-0.030599 (0.28955)	-0.47615	-0.83067	0.19132
ACRMORH	0.027301 (0.26049)	0.13585	-0.90042	0.23340	0.052649 (0.34063)	0.43416	-0.89642	0.075491
ACRFERH	0.15844 (0.70704)	0.98327	-0.11354	0.065517	0.17585 (0.75558)	0.97717	-0.21037	0.019452
ACRTOTH	0.17684 (0.78557)	0.99564	0.017785	-0.0084749	0.19066 (0.81594)	0.99706	-0.059112	-0.011483
SUICHAB	-0.072089 (0.22260)	-0.53103	0.31992	0.63166	-0.090745 (0.29398)	-0.49950	0.29191	0.63959
ACTJTH1	0.091270 (0.32150)	0.83423	-0.48142	0.20471	0.15724 (0.56676)	0.96045	-0.23358	-0.11347
ACTJMH1	0.017473 (0.17273)	-0.35692	-0.77712	0.22923	0.065959 (0.20064)	0.23123	-0.44355	-0.72419
ACTTOH	-0.037251 (0.36223)	-0.70682	-0.62455	0.27433	-0.010764 (0.34040)	-0.51797	-0.83381	-0.034409
ACTMOH	-0.13701 (0.51458)	-0.97380	0.11243	0.11946	-0.17636 (0.64376)	-0.98149	0.076262	0.16891
HOMLEGH	0.065383 (0.44587)	0.94393	0.081460	0.23767	0.11474 (0.62610)	0.98015	0.0045250	0.12160
HOMIOUH	0.059410 (0.58181)	0.91896	0.058457	0.33268	0.059889 (0.62277)	0.88816	-0.21837	0.39649
HOMIH	0.062542 (0.59701)	0.92323	0.059660	0.32822	0.064488 (0.63886)	0.89727	-0.20555	0.38175
MOCEXTH	-0.12564 (0.52099)	-0.97685	-0.13060	0.11630	-0.16470 (0.66423)	-0.97741	-0.10891	0.11791
TXDIV	0.15863 (0.77492)	0.98999	0.10043	-0.0088321	0.17616 (0.81782)	0.99748	0.046025	0.015081
DMILCAR	0.067709 (0.22987)	0.78927	-0.47486	-0.16956	0.16104 (0.71358)	0.98057	0.15427	-0.061624
DSMO	-0.071561 (0.22803)	-0.90643	-0.10897	-0.21944	-0.16910 (0.82528)	-0.99760	-0.029888	-0.059034
DFA	-0.025726 (0.14203)	-0.52381	-0.44646	-0.38016	-0.13305 (0.74920)	-0.98017	0.059581	-0.16721
Correlation with "Correlations with"								
ANO	0.16122 (0.82889)	0.98920 *	0.078327	0.063419	0.17359 (0.85203)	0.99673 *	-0.027725	0.073425
POMINEN	0.057038 (0.56350)	0.86654 *	0.43408 **	0.19299	0.019559 (0.49483)	0.79780 *	0.43785 **	0.40415 **
PIBppc *	0.17630 (0.79297)	0.99535 *	-0.0041146	0.022720	0.18933 (0.81939)	0.99617 *	-0.082836	0.0023465
TCPIBPPC	-0.000062657 (0.28012)	0.39470 **	-0.34354	0.60694 *	-0.0059361 (0.34902)	0.41947 **	-0.66941 *	0.60037 *
TXDESCE	-0.10858 (0.45463)	-0.87208 *	0.44718 *	-0.12454	-0.14109 (0.56361)	-0.89766 *	0.43849 **	0.035493
IPPIB	-0.14793 (0.73700)	-0.98576 *	-0.051152	-0.022576	-0.16580 (0.80244)	-0.99092 *	0.082552	-0.076909
ICPRIV	-0.13270 (0.73840)	-0.97542 *	-0.061909	-0.056204	-0.14775 (0.79977)	-0.98572 *	0.070260	-0.13654
IIPPIB	0.16426 (0.82420)	0.99120 *	0.066168	0.042662	0.17765 (0.84792)	0.99788 *	-0.025476	0.053430
IICPRIV	0.16325 (0.82526)	0.99081 *	0.070333	0.046959	0.17678 (0.84865)	0.99784 *	-0.023200	0.056477

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Considering the cross-correlations significance levels we obtain:

Table 2.45. *Principal Components, Correlations with Ext. Var. Significance Levels – Portugal*

	Original Variables				Smoothed Variables		
	Mean (s.d)	PC1	PC2	PC3	Mean (s.d)	PCS1	PCS2
Eigenv.		13.762914	2.7400361	1.2804751		15.898590	2.1145215
% Cum. Exp Var.		0.68814572	0.82514753	0.88917129		0.79492948	0.90065556
Factor Loadings:							
CONDHA2	0.58438 (0.48121)	0.96617	0.19782	0.041413	0.58118 (0.48177)	0.98983	0.080395
ARGHAB2	0.58072 (0.48807)	0.97210	0.13808	0.023696	0.57783 (0.49115)	0.98415	0.010852
DRECHA2	0.63565 (0.35622)	0.83188	-0.49284	-0.029455	0.38937 (0.43826)	-0.93865	0.18537
DRECCH2	0.62269 (0.34589)	0.75572	-0.60450	0.070933	0.38807 (0.41729)	-0.90418	0.29279
ACRMORH	0.54018 (0.43873)	0.16594	-0.84491	0.20946	0.53164 (0.42860)	0.038946	-0.82774
ACRFERH	0.63018 (0.45616)	0.91691	-0.12385	0.17661	0.62443 (0.46032)	0.89518	-0.26287
ACRTOTH	0.60307 (0.46048)	0.97459	0.0092866	0.13265	0.60118 (0.46278)	0.95660	-0.18756
SUICHAB	0.36756 (0.41439)	-0.88072	-0.30160	-0.015223	0.39876 (0.43153)	-0.94189	-0.25104
ACTJTH1	0.59794 (0.45430)	0.96583	0.029505	-0.12786	0.58108 (0.47363)	0.97852	0.0010716
ACTJMH1	0.63263 (0.36683)	0.82959	-0.33300	-0.32302	0.62377 (0.42200)	0.88343	-0.14313
ACTTOH	0.43109 (0.39877)	-0.87599	-0.19593	-0.10137	0.44148 (0.38239)	-0.83724	0.022110
ACTMOH	0.41631 (0.44786)	-0.77204	-0.45716	-0.28657	0.40942 (0.46045)	-0.83904	-0.34489
HOMLEGH	0.49717 (0.37820)	0.53049	-0.68666	0.39849	0.49756 (0.39296)	0.50989	-0.77800
HOMIOUH	0.58450 (0.48101)	0.96626	0.19803	0.017660	0.58461 (0.48377)	0.98798	0.057326
HOMIH	0.58266 (0.48339)	0.96877	0.17998	0.015783	0.58276 (0.48580)	0.98739	0.041611
MOCEXTH	0.40257 (0.44474)	-0.81842	-0.48936	-0.12628	0.41418 (0.46306)	-0.89924	-0.35481
TXDIV	0.60874 (0.46467)	0.94320	-0.13284	0.13041	0.60118 (0.47527)	0.89624	-0.30431
DMILCAR	0.51879 (0.15107)	0.36493	0.28021	0.26442	0.59221 (0.48786)	0.93378	0.25825
DSMO	0.63219 (0.39814)	0.75666	-0.092811	-0.61188	0.41356 (0.48732)	-0.94803	-0.23044
DFA	0.62771 (0.38980)	0.79017	-0.082192	-0.57419	0.41377 (0.48469)	-0.95396	-0.21653
Correlation with “Correlations with”							
ANO	0.63052 (0.47716)	0.87148 *	-0.21287	0.14554	0.62811 (0.48142)	0.81543 *	-0.35193 *
POMINEN	0.62669 (0.46874)	0.88881 *	-0.23278	0.077564	0.61836 (0.46804)	0.84669 *	-0.35354 *
PIBppc *	0.62205 (0.45606)	0.93959 *	-0.10326	0.14844	0.61652 (0.46188)	0.90727 *	-0.26756
TCPIBPPC	0.45942 (0.36717)	-0.23730	0.83537 *	-0.26138	0.44461 (0.39443)	-0.076402	0.87389 *
TXDESCE	0.59726 (0.44123)	0.40131 *	-0.81423 *	-0.10115	0.60037 (0.47010)	0.064108	-0.80189 *
IPPIB	0.45654 (0.43426)	-0.30743 **	-0.82811 *	-0.090966	0.47069 (0.44757)	-0.43091 *	-0.74590 *
ICPRIV	0.45240 (0.43417)	-0.35918 *	-0.80364 *	-0.093776	0.46344 (0.44821)	-0.47516 *	-0.72055 *
IIPPIB	0.61185 (0.46157)	0.97119 *	0.067986	0.048774	0.60893 (0.46192)	0.97128 *	-0.096143
IICPRIV	0.61221 (0.46105)	0.97065 *	0.051630	0.051769	0.60927 (0.46119)	0.96747 *	-0.11235

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 35 observations 0.333845)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 35 observations 0.282594)

3. Finally, we use the first differences of the variables of Table II.41 – to second differences of RECHAB2, RECCHA2, MILCAR, SMO and FA, first differences of all other variables. The application of PC to this format would reflect an application of PC to (differenced till) stationary series.

Table 2.46. *Principal Components, First Differences – Portugal*

	PC1	PC2	PC3	PC4	PC5	PC6
Eigenv.	4.5170188	4.0501441	2.8047053	2.4751346	2.0475691	1.2216639
% Cum. Exp Var.	0.22585094	0.42835815	0.56859341	0.69235014	0.79472859	0.85581179
Factor Loadings:						
CONDHA2	0.032021	0.34815	0.47098	0.24880	0.49735	0.13812
ARGHAB2	-0.35309	-0.64594	-0.30586	-0.0038663	0.19293	-0.32727
DRECHAB2	0.38849	0.68791	0.46799	0.32085	-0.040614	-0.052713
DRECCHA2	0.38827	0.71583	0.44249	0.30871	-0.050526	-0.015682
ACRMORH	-0.42221	0.67573	-0.075583	-0.21126	0.37889	0.089360
ACRFERH	-0.10908	0.56943	-0.56999	0.074497	0.46620	0.10941
ACRTOTH	-0.0063091	0.53634	-0.56809	-0.045196	0.42936	0.30842
SUICHAB	-0.55454	-0.15715	0.71669	0.10847	0.26407	0.096122
ACTJTH1	0.11783	0.091141	-0.010206	0.85498	-0.019141	-0.37199
ACTJMH1	0.16351	-0.44416	-0.11381	0.55929	0.46154	0.083656
ACTTOH	-0.20919	0.48995	-0.34633	0.28272	0.28542	-0.55587
ACTMOH	-0.12238	0.74563	0.20242	-0.25172	-0.47489	-0.054880
HOMLEGH	-0.22731	-0.37792	0.66196	-0.099294	0.38307	-0.11285
HOMIOUH	-0.78403	0.34548	-0.044114	-0.30628	-0.10155	-0.24714
HOMIH	-0.80801	0.29786	0.036664	-0.31693	-0.054443	-0.25971
MOCEXTH	-0.75201	-0.013188	0.48037	-0.031940	0.22429	0.10005
TXDIV	-0.23067	0.20098	-0.039671	0.53066	-0.55992	0.070038
DMILCAR	-0.71212	-0.18272	-0.080788	0.41855	-0.10514	-0.18735
DSMO	-0.67943	-0.0088511	-0.13809	0.33762	-0.20979	0.48345
DFA	-0.76541	-0.079473	-0.18480	0.43357	-0.21100	0.29286
Unit Roots	PC1	PC2	PC3	PC4	PC5	PC6
CONST	-3.54418	-1.72469	-2.51843	-1.77579	-3.07572	-2.93849
Tau test	(0.0023165)	(0.34815)	(0.047448)	(0.31435)	(0.0093296)	(0.013994)
(p-value)	[2; 13]	[5; 10]	[5; 10]	[2; 13]	[2; 13]	[2; 13]
[nlags; nobs]						
C, TREND	-3.29476	-1.98474	-2.26849	-1.92983	-3.06456	-2.95892
Tau test	(0.037056)	(0.65879)	(0.45260)	(0.69467)	(0.071126)	(0.095023)
(p-value)	[2; 13]	[5; 10]	[2; 13]	[2; 13]	[2; 13]	[4; 11]
[nlags; nobs]						
D on C, TREND and lag	9.26534	5.60527	8.24743	7.84490	5.36730	5.43471
F	(0.004)	(0.019)	(0.006)	(0.007)	(0.022)	(0.021)
	[15]	[15]	[15]	[15]	[15]	[15]
C, T; T2	-3.32979	-1.81925	-2.37626	-1.99012	-3.05002	-3.51953
Tau test	[2; 13]	[4; 11]	[2; 13]	[2; 13]	[4; 11]	[2; 13]

[nlags; nobs]	-3.83699	-1.10775	-0.76699	-1.82773	-3.63101	-6.51325
D-F (p-value)	(0.049419)	(0.98217)	(0.99344)	(0.87480)	(0.083291)	(1.0162D-6)
[nlags; nobs]	[4; 11]	[4; 11]	[3; 12]	[2; 13]	[4; 11]	[4; 11]
Dif CONST	-1.09889	-2.27285	-1.59806	-1.89690	-2.79878	-2.81695
Tau test	(0.77613)	(0.094019)	(0.43815)	(0.24198)	(0.021094)	(0.020001)
(p-value)	[4; 10]	[5; 9]	[5; 9]	[2; 12]	[2; 12]	[4; 10]
[nlags; nobs]						
Dif C, TREND	-3.87938	-1.61998	-1.91717	-1.83863	-2.85289	-3.96401
Tau test	(0.0066603)	(0.85172)	(0.70263)	(0.74925)	(0.12599)	(0.0051795)
(p-value)	[2; 12]	[4; 10]	[3; 11]	[2; 12]	[2; 12]	[2; 12]
[nlags; nobs]						
	-2.61685	-1.62072	-3.01673	-2.80302	-1.72013	-3.70297
Cointeg. Test	(.)	(0.90856)	(0.51258)	(0.36826)	(0.73642)	(0.062728)
	[3; 12]	[2; 13]	[5; 10]	[2; 13]	[2; 13]	[2; 13]
	-2.21422	-1.51524		-2.90386		
Cointeg. Test (>0.5)	(.)	(.)		(0.46535)		
	[3; 12]	[2; 13]		[2; 13]		

3. Stepwise (and Other) Regressions and the Explanation of Individual Series

Missing Observations and Replicated Moment Estimation

1. In the following sub-sections we present the results of regressions in each of the disruption indicators. We consider the explanatory variables categorized in Appendix B.

A previous "run" was preformed using stepwise regression of each dependent variable in several candidates; given that we would usually end up with a very small number of observations – smaller than we could use with the subset of variables chosen by the algorithm (SPSS) -, we proceeded by calibrating each of the resulting equations manually. In the tables, we present the coefficient estimates for the best regressions encountered, the corresponding standard deviations in brackets, the p-values of individual significance tests in square brackets and standardized coefficients in | |. For each equation, we also report in the final rows of the tables: the sum of square errors; the standard error of the regression; the adjusted R-square; an heteroeskedasticity test for cross-section data, the Durbin-Watson for time series estimation; the number of observations used.

For cross-section evidence, along with the regression coefficients, we add a column in which the linear correlation coefficients of the dependent variables with each of the presented regressands; we calculate the full available sample correlations –

implying that usually we cover a higher number of cases than included in the regressions.

Time series data has a much wider set of variables; along with the regressions with the variables in levels, we present the best regressions using previous filtered series (both the explanatory as explained variables were smoothed). The conclusions are not always so consistent as with cross-section data due to the existence multicolinearity.

2. The use of method of moment estimators or of moment inference applied to the estimation of formulas of b, the OLS estimator – to X'X and X'Y appropriately weighted by number of observations – in the spirit of the former interpretation of weighted cross-correlation estimators might provide more accurate results.

In multiple regression, being Y the (nx1) vector of the dependent variable observations, and X the matrix of corresponding (n) observations of the independent variables, the vector b of estimators of the regression parameters obeys:

$$X'Y = X'X\,b, \quad \text{or yet,} \quad \frac{X'Y}{n} = \frac{X'X}{n}\,b$$

Being the data centered (b does not contain the intercept term), $\frac{X'Y}{n}$ and $\frac{X'X}{n}$ are covariance matrices (the former, a vector). A first hypothesis is that if we take the sample covariance matrices using all pairwise available information, call it ZY and ZZ, then we can approximate $b = ZZ^{-1} \times ZY$; this will be a consistent estimator of b, with null asymptotic covariance matrix. Inference on the parameters could be accomplished using the approximation Cov(b) $= n^{-1}\,\hat{\sigma}^{2}\,ZZ^{-1}$, where n has for majorand the number of simultaneously non-missing observations (and, one can argue, could be approximated by the mean number of observations used for the computations) and $\hat{\sigma}^{2}$ the estimator of the error variances, obtained from the sum of squares of the estimated residuals - with b and the non-missing observations – divided by n minus the number of parameters (including the intercept) in the original form of the model.

The previous format can be seen to subscribe to previous treatment of missing observations – see Griliches (1986), p. 1493-1495 – and also to the minimum distance and the method of moments estimators – see Newey & McFadden (1994) and Hall

(2003) for recent overviews. Yet, the philosophy is different (and simpler): we look (instead) for consistent estimators of OLS partial formulas.

Now, suppose that the original data is also standardized – and $b^{\#}$ contains the standardized coefficients of the original model in unstandardized variables; then, the two matrices $\frac{X'Y}{n}$ and $\frac{X'X}{n}$ contain cross-correlations; we can write: $\sqrt{n}$

$$\frac{X'Y}{n} = \sqrt{n}\,\frac{X'X}{n}\,b^{\#}$$

If, in the sample correlation matrices that use the whole pairwise available information to compute each correlation (but, eventually, the same observations to compute each correlation), we multiply each correlation by the square root of the number of observations used in the computations of that element, we obtain the vector WY and the matrix WW with similar properties of the weighted matrices advanced in section II that may replace $\sqrt{n}\,\frac{X'Y}{n}$ and $\sqrt{n}\,\frac{X'X}{n}$ in the previous expression, and a natural estimator for $b^{\#}$ - the elements of which relates to the original parameters as $b_j^{\#} = b_j \frac{S_{X_j}}{S_Y}$ - that applies is, therefore, $b^{\#} = WW^{-1}$ x WY. Inference on the parameters could be accomplished using the approximation $Cov(b^{\#}) = \sqrt{n}^{\,-1}\,\hat{\sigma}^2\;WW^{-1}$, with n and $\hat{\sigma}^2$ defined as for the “covariance matrix procedure”.

The use of both methods rely on the assumption of stability of the underlying matrices and random absence of observations for the variables. At first sight, this may be more dubious for the covariance than for the correlation procedure.

3. A decomposition based on replication similar to the one proposed in section II can also be advanced for OLS. Again, it does not solve the missing observation status unless we rely on 4-th moment matrices approximations of the original variables in the spirit of the preceding discussion.

3.1. Consider variables are centered[73] and the system from where usual OLS estimators are derived in the "covariance" form:

$$\frac{X'Y}{n} = \frac{X'X}{n}\,b$$

If there are k independent variables, then the matrix operations above define k equations in k unknowns - the parameters b_j, j=1,2,…k, elements of (column) vector b:

$$\sum_{i=1}^{n}\frac{(X_{1i}-\overline{X}_1)(Y_i-\overline{Y})}{n}=\sum_{i=1}^{n}\frac{(X_{1i}-\overline{X}_1)^2}{n}b_1+$$

$$\sum_{i=1}^{n}\frac{(X_{1i}-\overline{X}_1)(X_{2i}-\overline{X}_2)}{n}b_2+\ldots+\sum_{i=1}^{n}\frac{(X_{1i}-\overline{X}_1)(X_{ki}-\overline{X}_k)}{n}b_k$$

$$\sum_{i=1}^{n}\frac{(X_{2i}-\overline{X}_2)(Y_i-\overline{Y})}{n}=\sum_{i=1}^{n}\frac{(X_{2i}-\overline{X}_2)(X_{1i}-\overline{X}_1)}{n}b_1+$$

$$\sum_{i=1}^{n}\frac{(X_{2i}-\overline{X}_2)^2}{n}b_2+\ldots+\sum_{i=1}^{n}\frac{(X_{2i}-\overline{X}_2)(X_{ki}-\overline{X}_k)}{n}b_k$$

$$\ldots$$

$$\sum_{i=1}^{n}\frac{(X_{ki}-\overline{X}_1)(Y_i-\overline{Y})}{n}=\sum_{i=1}^{n}\frac{(X_{ki}-\overline{X}_k)(X_{1i}-\overline{X}_1)}{n}b_1+$$

$$\sum_{i=1}^{n}\frac{(X_{ki}-\overline{X}_k)(X_{2i}-\overline{X}_2)}{n}b_2+\ldots+\sum_{i=1}^{n}\frac{(X_{ki}-\overline{X}_k)^2}{n}b_k$$

Admit we observe n replicas - one per each observation - of each of the k equations. Then, an approximation to b, the unknowns of the system, could be obtained by applying OLS to the model for which we construct:

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[73] Centering is not essential here. All depends on what is assumed stable, whether centered or uncentered fourth moments of original variables. Centering, of course, can only be adequate if the original model has an intercept.

$$\underset{(nk \times 1)}{Y^*} = \begin{bmatrix} (X_{11}-\overline{X}_1)(Y_1-\overline{Y}) \\ (X_{12}-\overline{X}_1)(Y_2-\overline{Y}) \\ \dots \\ (X_{1n}-\overline{X}_1)(Y_n-\overline{Y}) \\ \\ (X_{21}-\overline{X}_2)(Y_1-\overline{Y}) \\ (X_{22}-\overline{X}_2)(Y_2-\overline{Y}) \\ \dots \\ (X_{2n}-\overline{X}_2)(Y_n-\overline{Y}) \\ \\ \dots \\ \\ (X_{k1}-\overline{X}_k)(Y_1-\overline{Y}) \\ (X_{k2}-\overline{X}_k)(Y_2-\overline{Y}) \\ \dots \\ (X_{kn}-\overline{X}_k)(Y_n-\overline{Y}) \end{bmatrix}$$

and

$$\underset{(nk \times k)}{X^*} = \begin{bmatrix}
(X_{11}-\overline{X}_1)^2 & (X_{11}-\overline{X}_1)(X_{21}-\overline{X}_2) & \\
(X_{12}-\overline{X}_1)^2 & (X_{12}-\overline{X}_1)(X_{22}-\overline{X}_2) & \cdots \\
\cdots & \cdots & \\
(X_{1n}-\overline{X}_1)^2 & (X_{1n}-\overline{X}_1)(X_{2n}-\overline{X}_2) & \\
(X_{11}-\overline{X}_1)(X_{k1}-\overline{X}_k) & & \\
(X_{12}-\overline{X}_1)(X_{k2}-\overline{X}_k) & & \\
\cdots & & \\
(X_{1n}-\overline{X}_1)(X_{kn}-\overline{X}_k) & & \\
(X_{21}-\overline{X}_2)(X_{11}-\overline{X}_1) & (X_{21}-\overline{X}_2)^2 & \\
(X_{22}-\overline{X}_2)(X_{12}-\overline{X}_1) & (X_{22}-\overline{X}_2)^2 & \cdots. \\
\cdots & \cdots & \\
(X_{2n}-\overline{X}_2)(X_{1n}-\overline{X}_1) & (X_{2n}-\overline{X}_2)^2 & \\
(X_{21}-\overline{X}_2)(X_{k1}-\overline{X}_k) & & \\
(X_{22}-\overline{X}_2)(X_{k2}-\overline{X}_k) & & \\
\cdots & & \\
(X_{2n}-\overline{X}_2)(X_{kn}-\overline{X}_k) & & \\
\cdots & & \\
(X_{k1}-\overline{X}_k)(X_{11}-\overline{X}_1) & (X_{k1}-\overline{X}_k)(X_{21}-\overline{X}_2) & \\
(X_{k2}-\overline{X}_k)(X_{12}-\overline{X}_1) & (X_{k2}-\overline{X}_k)(X_{22}-\overline{X}_2) & \\
\cdots & \cdots & \\
(X_{kn}-\overline{X}_k)(X_{1n}-\overline{X}_1) & (X_{kn}-\overline{X}_k)(X_{1n}-\overline{X}_1) & \\
(X_{k1}-\overline{X}_k)^2 & & \\
(X_{k2}-\overline{X}_k)^2 & & \\
\cdots \quad \cdots & & \\
(X_{kn}-\overline{X}_k)^2 & &
\end{bmatrix}$$

obtaining b' = $(X^{*\prime}X^{*})^{-1} X^{*\prime}Y^{*}$.

Notice that what is at stake here is a solution to the OLS system above and not the application of the Method of Moments to the linear model in a cross-product format.

It is arguable that the mechanically obtained standard errors of the parameters from regressing Y* on X* should be scaled up, multiplied by $\sqrt{k}$[74] (for centered forms, $\sqrt{k+1}$ for uncentered): if we take the posture that we are just using replicated forms to infer cross-products used for OLS statistics, in (X'X), required for the estimation of the covariance matrix of the estimators, we should just sum n and not nxk – nx(k+1) in uncentered formats– elements. Distribution statistics would use n (not nk) for number of observations.

In another angle, we may say that by replicating the sample or model k times, exploiting cross-moment implied restrictions, we increase sample size at the cost of non-spherical disturbances.

3.2. A natural generalization of the estimation method above would rely on the application of restricted (across equations) SUR estimation to the system formed by the cross-product elements, either in centered form, with the k equations, one per each exogenous variable:

$$(X_{1i}-\overline{X}_1)(Y_i-\overline{Y})=(X_{1i}-\overline{X}_1)^2\beta_1+(X_{1i}-\overline{X}_1)(X_{2i}-\overline{X}_2)$$

$$\beta_2+\ldots+(X_{1i}-\overline{X}_1)(X_{ki}-\overline{X}_k)\beta_k+v_{1i}$$

$$(X_{2i}-\overline{X}_2)(Y_i-\overline{Y})=(X_{2i}-\overline{X}_2)(X_{1i}-\overline{X}_1)\beta_1+(X_{2i}-\overline{X}_2)^2$$

$$\beta_2+\ldots+(X_{2i}-\overline{X}_2)(X_{ki}-\overline{X}_k)\beta_k+v_{2i}$$

...

$$(X_{ki}-\overline{X}_1)(Y_i-\overline{Y})=(X_{ki}-\overline{X}_k)(X_{1i}-\overline{X}_1)\beta_1+$$

$$(X_{ki}-\overline{X}_k)(X_{2i}-\overline{X}_2)\beta_2+\ldots+(X_{ki}-\overline{X}_k)^2\beta_k+v_{ki}$$

Or to uncentered forms, with k+1 equations - one per each exogenous variable, and a first one (associated to the intercept, the

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[74] Eventually, $\sqrt{\dfrac{k(n-1)}{n-k-1}}$. That would be the case if we estimated the OLS b's replicating (without any cross-product operations) the n observations k times.

constant term) reproducing the original single-equation linear model:

$$Y_i = \beta_0 + X_{1i}\beta_1 + X_{2i}\beta_2 + \ldots + X_{ki}\beta_k + \beta_i$$

$$X_{1i}Y_i = X_{1i}\ \beta_0 + X_{1i}^{\ 2}\ \beta_1 + X_{1i}X_{2i}\beta_2 + \ldots + X_{1i}X_{ki}\beta_k + v_{1i}$$

$$X_{2i}Y_i = X_{2i}\ \beta_0 + X_{2i}X_{1i}\ \beta_1 + X_{2i}^{\ 2}\beta_2 + \ldots + X_{2i}X_{ki}\beta_k + v_{2i}$$

...

$$X_{ki}Y_i = X_{ki}\ \beta_0 + X_{ki}X_{1i}\ \beta_1 + X_{ki}X_{2i}\ \beta_2 + \ldots + X_{ki}^{\ 2}\ \beta_k + v_{ki}$$

$$i = 1,2,\ldots,n$$

Technically, the covariance structure of the error terms is left free in SUR to obtain, now, a vector b" of k (k+1 in the uncentered version) estimators of the β_j's.

3.3. If we assume, in the previous system, $v_{ji} = \varepsilon_i\ X_{ji}$, we have a linear system of nx(k+1) equations in k+1+n (k+1 b_j's and n ε_i's) unknowns. Then, we would expect it to be over identified – and we could recover multiple solutions for both the true parameters and error terms [75] ; yet, the equations are not "non-linearly" independent, and the implied cross-equation restrictions on the error structure will not allow for identification [76]. On the other

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[75] For instance, efficient frontier Y = F(X) + ⍰ parameter estimates could be obtained forcing error terms to be negative (positive if efficiency implies minimization – for example, of cost function) at this point – say, parametrizing them as minus its square in programming.

[76] For example, consider k = 2, and n = 5, and that variable Y observations are 6, 4, 7, 8 and 9, variable X_1 observations are 2, 3, 3, 1 and 2, variable X_2 observations are 4, 2, 4, 2 and 2. OLS estimators of the coefficients are b_1 = -1.4 and b_2 = 0.1, with residuals –1.2, -1.6, 1.2, -0.4, 2. OLS estimates of the cross-product centered system are b_1 = –1.24218 and b_2 = 0.309789 with residuals for the original linear equation -1.42018, -1.55843, 0.82199, -0.042779, 2.19940; GLS estimates are b_1 = -1.52632 and b_2 = .464912 with residuals for the linear equation -1.66316, -1.20702, 0.86316, -0.25965 and 2.26667. One can write the implied linear system in k + n = 2 + 5 parameters imposing the restrictions, then the OLS estimates are (with TSP) b_1 = 1 and b_2 = -3 and residuals 3, -6, 3, 0, 0 (in EXCEL regression: b_1 = –1.047528 and b_2 = 0.19486692 and, for residuals, -1.243346008, -1.80608365, 0.80418251, 0.098859316 and 2.146387833; estimates vary substantially if we use paste

hand, applying GLS to the system, under the traditional assumptions for the linear model – implying a division of each equation by the X_{ji} to solve for heteroeskedasticity – originates the conventional OLS estimators (even if replicating observations k times, hence, decreasing computed standard-errors); yet, error terms are indeed correlated across equations – hypothetic GLS corrections accounting for such fact are not viable once the implicit error-covariance matrix is singular; using pseudo-inverses, one arrives, again at the OLS estimators.

However, one can forward a GLS correction [77], under a stochastic regressor-type of context [78], considering for the (nxk) – nx(k+1) for uncentered cases - error vector ε of the systems above that $\text{Cov}(\varepsilon) = \sigma^2 \Omega$ such that it could be approximated by $\Omega = \text{Cov}(X) \otimes I_n$, where Cov(X) denotes the (kxk) covariance matrix of the k (original) variables estimated from the n observations [79].

In fact, we have n x (k+1) observations: the n observations of the dependent and of the k independent variables; we must infer about n error terms and k parameters; OLS is a procedure, justified under a series of hypothesis, one of which is linearity. Ultimately, we can think of the linear model as a device to estimate a set of k partial derivatives – a first order Taylor expansion of a function of some unknown form - and not necessarily a strict linear relation between the left and right hand-sides; the use of cross-moment forms may thus be acceptable.

In any case, if standard errors are to be computed for the parameters obtained by regressing Y* on X* - by OLS, GLS or SUR -, they should at least be corrected for heteroeskedasticity.

3.4. With the use of cross-product formats, the first n observations are expanded k times (k+1, if data is not centered). We do not solve missing information problems, but the significance of the estimates using cross-product estimates derived

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values) – and the model (in which "residuals" are parameters) exhibits (in all experimented software) a perfect fit.

[77] Specially if we look at the procedure as deriving solutions for the intermediate OLS estimators equation.

[78] Higher moment estimators for linear regression models have been proposed before in the literature – see Dagenais & Dagenais (1997) and Cragg (1997). Their argument relies on the presence of Errors-in Variables, which differs from the one advanced here, where independence between X and [illegible] is a maintained hypothesis.

[79] If data is "uncentered", we can use for Cov(X) the (k+1)x(k+1) matrix of mean uncentered cross-products of the explanatory variables, where the first variable is represented by a column of 1's.

from standard routines increases with the “replicated moment” forms.

The gains from applying these formats against the standard OLS formula relies on the statistical properties – namely, consistency - of the moment matrices and, of course, of the empirical structure of the error terms. If 4-th moment matrices of the variables are stable (consistent) and 2-nd moment ones are not, b’ or b” may improve upon b.

4. The inquiry in the huge amount of information used in this research by those methods would be too cumbersome and with uncertain benefits in terms of additional significance and we leave it to elsewhere. Nevertheless, we performed some estimates of the conventional OLS models encountered and presented below by both the “moment” and “weighted correlation matrix” procedures described in 2. above for the regression on divorces, DIVOR with the cross-section sample; the main benefit of such refinement is to justify signs and significance of the parameters found by OLS in balanced samples, which, as is well-known, may be multicolinearly infected in small and most time-series samples. If signs seem to be preserved, significances do not, suggesting that either multicolinearity was present, or OLS balanced sample results suffered from sub-sample specificity (i.e., they are valid for the observations used, but would not stand a structural confrontation with similar regressions using the wider samples if these were complete) –, and/or the stability concept of the second moment matrices is not observed in the sample.

For the same dependent variable, we advanced the - “balanced sample” but – replicated moment estimators proposed.

Divorces and Suicides

Economic literature - namely, health economics - is quite silent about suicides. The matter seems to have been ascribed to psychology and sociology, and we refer here the work of Durkheim (2001), who inspects regional and time series statistical patterns – forwarding sociological explanations – in late XIX century Europe. Suicides and divorces were rising at the time, both occurrences exhibiting higher incidence in the same regions. Suicides were more frequent for males, unmarried individuals, and incidence increased with age and education, being higher in urban areas, less for people occupied in agriculture relative to other sectors; geographically, they seemed to rise with temperature and, after some point, to decrease. Jews committed less suicides than Catholics and these less than Protestants – even if general madness could follow the opposite pattern; yet, of registered motives, mental disorders rated highest, followed by various sorrows.

Unlike suicides, marriage formation and dissolution has been the subject of intense research within family economics, specially after the work of Becker (1981). Theoretically – see a recent survey in Weiss (1997) and also Montgomery & Trussell (1986) -, marriage has been modeled as an association between two individuals providing a means to produce a special kind of collective good (or externalities) - including child-rearing - with a capital-like nature, hence, requiring a long-run commitment, and specialization in household production which usually goes along with those (therefore) non-marketable activities; to benefit from increasing returns in consumption of some goods; to proceed at risk pooling; to promote human capital investment under imperfect capital markets. Marriage would be a contractual arrangement that would save on "transaction costs" relative to other forms of partnership, insure household-specific investment, and state the splitting and pertaining bargaining as of little relevance within the association; it could also provide or rely on other forms of "monitoring" and enforcement that usual contracts cannot. Marriage stability would be promoted by adequate relative (to non-married status) gains, dependent on legal obstacles to divorce, on existence of welfare program support to single parenthood, and a good or bad "match" would be the result of the search – affecting, for example, age at first marriage of individuals – previously engaged on, constrained by demographic (educational, social) availability. Anticipation of divorce could also shape marriage and marital search decisions.

In the reviewed literature, marriages and divorces are "microeconomic" consequences of rational individuals; empirical studies use, in general, microeconomic data sets. Translating theories into our macroeconomic scenario, we could expect that economic affluence could increase divorce rates, by merely reducing the importance of increasing returns in household production/consumption and by making the threshold "costs of divorce" of some couples become affordable, specially if we consider that it does not enhance the collective good production as well. In fact, divorces seem to plague more affluent societies – the correlation of the divorce rate with per capita GDP (see Table A.1 in Appendix A) is positive (0.226 for 47 observations), even if weak; however, in empirical studies, the existence of property seems to decrease divorce hazards.

Also – by reducing "comparative advantage" in labor versus non-labor market activities - a decrease in the male-female wage differential – an increase in female labor market participation - is expected to rise family dismantlement; lately, this effect is especially encountered if unexpected increase in female, decrease in male earnings occur.

It is unclear, however, how general inequality would interact with marital dissolution. Couples with similar school attainment at time of marriage have been found less likely to dissolve; if inequality is based on school achievements and more inequality makes those type of marriages more frequent, then it decreases divorces. The same can be said for mere education – if there is, in general, less education, presumably marriage education types will be compressed around lower, hence, on average more similar education levels, and divorces are less likely to occur (yet at very high levels of education of the population – assuming there is an upper bound for education – the opposite effect could be observed).

The existence of children could be captured in the aggregate by demographic indicators such as fertility rates, birth rates or proportion of youths in total population, with theory – marital status is sometimes modeled in a joint fertility-decision framework - naturally suggesting a negative effect (specially, of the existence of small children) on divorces. Age at first marriage (marital search duration) could move in the opposite direction to the divorce rate (and this seems to be a stylized fact in empirical observation) – even if explained causality usually works on them in the opposite direction as the one seeked in our empirical work below -, but the reverse (through divorce anticipation) could also be found.

International Evidence

Suicides and divorces appear to share common influences of some of the variables, but react oppositely to some of the right-hand side ones.

Demographic variables and sector decomposition:

- life expectancy at birth (ESPVN) decreases suicides; weight of population aged 65 and older (POPM65) increases divorces

- education (TXALA98) as measured by the literacy rate seems to enhance both

- female participation rate (TXACM98) increases divorces – consistent with family economics well-known findings (suggesting endogeneity, of course). The influence does not show up in suicides equations

General Economic Conditions and Business Cycle:

Coefficients of variables representing affluence in general show opposite signs in suicides and divorce regressions:

- suicides seem to be more common in countries of higher per capita GNP (PNBPC98), yet, they increase with the country's unemployment rate (TAXDES).

- divorces react exactly in the opposite way with respect to the two variables. Acceleration in per capita GNP promotes divorces.

Inequality: A higher proportion of income in the richest 20% (RIC20) - more inequality - enhances divorces.

Urbanization and Sector Decomposition: urbanization (POPURB) increases divorces (it decreases male suicides but not significantly). Weight of tertiary sector (PSERV98) increases both divorces and male suicides, whereas weight of primary sector (PAGR98) decreases female. Overall, tertiarization would seem to have promoted both.

Capital Markets:

In general, capital market tightness (a low real lending rate, LENR98; high investment rate, INPIB98; a high ICRGD98, implying good evaluation of investment risk) enhances suicides and investment (INPIB98, the investment rate) promotes also divorces.

International Relations: Surplus in external trade balance enhances divorces

In general, divorces may be enhanced by economic affluence - even if per capita GDP, which has a very higher beta in absolute value, exhibits a negative impact. Suicides do not show such a consistent pattern.

Table 3.1. *Linear Regressions, Divorces and Suicides – International Evidence*

	Dependent Variables:								
	SUICH			SUICM			DIVOR		
Indep. Var.	(1)	(2)	Simp. Cor.	(1)	(2)	Simp. Cor.	(1)	(2)	Simp. Cor.
INTERC.	429.266 (71.6575) [.000]	357.571 (127.588) [.009]		17.7415 (38.4951) [.649]	112.361 (17.9804) [.000]		-456.994 (123.346) [.002]	-488.767 (119.870) [.001]	
DENSPO			-0.068036 (81) [0.546]	.608974E-02 (.45176E-02) [.189] |.170111|		0.056152 (81) [0.619]	-.097628 (.034845) [.013] |-.449358|	-.114520 (.030949) [.002] |-.527108|	-0.054795 (47) [0.715]
ESPVN	-6.47145 (1.00892) [.000] |-1.38638|	-7.64588 (1.31570) [.000] |-1.56850|	-0.031176 (80) [0.784]	-1.23130 (.276863) [.000] |-1.18271|	-1.83234 (.301157) [.000] |-1.70762|	0.045596 (80) [0.688]			-0.027327 (47) [0.855]
POPM65			0.47075 (80) [0.000]			0.43763 (80) [0.000]	4.26943 (1.32809) [.006] |.676703|	3.78866 (1.24922) [.008] |.600501|	0.41968 (47) [0.003]
TXALA98		1.11463 (.743524) [.145] |.177819|	0.38657 (82) [0.000]	.737668 (.284139) [.015] |.338892|		0.21233 (82) [0.055]	3.28346 (1.36453) [.029] |.484542|	3.91082 (1.22858) [.006] |.577123|	0.49331 (47) [0.000]
TXACM98			0.27739 (80) [0.013]			0.26166 (80) [0.019]	.478849 (.458599) [.313] |.175204|		0.28456 (47) [0.053]
TAXDES	1.92553 (.508913) [.001] |.443413|	2.31537 (.576743) [.000] |.545916|	0.11310 (47) [0.449]	.388698 (.126067) [.005] |.401331|	.607067 (.136584) [.000] |.650238|	0.16371 (47) [0.272]	-2.51679 (.735859) [.004] |-.546477|	-2.73091 (.708699) [.001] |-.592970|	-0.30553 (44) [0.044]
PNBPC98	.122863E-02 (.353064E-3) [.002] |.755216|	.113954E-02 (.426675E-3) [.012] |.673221|	0.065576 (81) [0.561]	.269892E-03 (.996881E-4) [.012] |.743825|	.371595E-03 (.101151E-3) [.001] |.997307|	0.22213 (81) [0.046]	-.164457E-02 (.47361E-03) [.003] |-.914820|	-17.74291 (.455562E-3) [.001] |-.992593|	0.19565 (47) [0.188]
PNBPCGR			-0.28792 (75) [0.012]			-0.032122 (75) [0.784]	2.64440 (1.48561) [.095] |.509004|	2.95536 (1.45955) [.060] |.568860|	-0.00059942 (41) [0.997]
RIC20			-0.39840 (63) [0.001]			-0.49483 (63) [0.000]	1.69903 (.642910) [.018] |.439252|	1.74291 (.643342) [.015] |.450596|	-0.078045 (41) [0.628]
POPURB			0.12337	-.060312		0.051517	.496463	.527676	0.48463

			(82)	(.044912)		(82)	(.246257)	(.245124)	(47)
			[0.269]	[.191]		[0.646]	[.062]	[.047]	[0.001]
				|-.196359|			|.309687|	|.329157|	
PAGR98			-0.21569		-.102301	-0.22972			-0.31474
			(72)		(.063603)	(72)			(41)
			[0.069]		[.119]	[0.052]			[0.045]
					|-.258034|				
PSERV98	.458027	.431134	0.12015	.107890		0.087627	.452839	.529787	0.31105
	(.186029)	(.200009)	(71)	(.045928)		(71)	(.259897)	(.249932)	(40)
	[.020]	[.040]	[0.318]	[.027]		[0.467]	[.102]	[.050]	[0.051]
	|.295249|	|.292142|		|.311825|			|.267078|	|.312461|	
INPIB98	.978769	.699924	-0.0076167		.225366	0.10545	.843927	.820542	0.10653
	(.465954)	(.453688)	(78)		(.109473)	(78)	(.477543)	(.478361)	(46)
	[.045]	[.134]	[0.947]		[.049]	[0.358]	[.098]	[.106]	[0.481]
	|.251150|	|.186604|			|.272954|		|.256312|	|.249210|	
LENR98	-.181129		-0.22961	-.089924		-0.33191			-0.23774
	(.167573)		(69)	(.036389)		(69)			(39)
	[.289]		[0.058]	[.020]		[0.005]			[0.145]
	|-.137391|			|-.305827|					
ICRGD98		.685061	0.049326		.221732	0.18255			0.094281
		(.373909)	(65)		(.094410)	(65)			(38)
		[.078]	[0.696]		[.026]	[0.146]			[0.573]
		|.380644|			|.559689|				
BGSIP98			0.082456			0.27317	.015880	.015309	0.11543
			(71)			(71)	(.551384E-2)	(.550207E-2)	(42)
			[0.494]			[0.021]	[.011]	[.013]	[0.467]
							|.482753|	|.465381|	
SSR	3541.80	3602.17		196.726	228.655		2087.78	2239.53	
SER	11.2469	11.3423		2.75070	2.80796		11.7977	11.8309	
RBAR2	.648253	.664676		.577025	.575869		.693592	.691863	
LM het	.546059	.883489		.149295	.541030		.132091	.196101	
	(.460)	(.347)		(.699)	(.462)		(.716)	(.658)	
NOBS	35	36		35	36		28	28	

2. We present in the tables below the regression results for divorces with missing observation techniques and replicated moment estimation.

Table 3.1.B. *Linear Regressions, Divorces – International Evidence*

Dependent Variable: DIVOR

Indep. Var.	(1)	Miss Cov *	SE with mean nob	Miss Corr *	SE with mean nob	Mom OLS (Centered)**	Mom OLS (Uncentered)**	Mom GLS (Centered) **	Mom GLS (Uncentered) **	Mom SUR (Centered)	Mom SUR (Centered) LM	Mom SUR (Uncentered)	Mom SUR (Uncentered) LM
INTERC.	-456.994						-226.149		-449.076			-273.376	2.22859
	(123.346)						(331.540)		(49.6446)			(143.616)	[.135]
	[.002]						[.496]		[0.000]			[.057]	
DENSPO	-.097628	-0.011707		-0.032196		-.077431	-.139574	-.096995	-.097457	-.087459	3.17109	-.133743	.321754
	(.034845)	(0.012299)	(0.0058696)	(0.027836)	(0.19555)	(.040736)	(.048349)	(0.011941)	(0.010117)	(.013242)	[.075]	(.015679)	[.571]
	[.013]	[0.34116]	[0.046095]	[0.24743]	[0.099683]	[.058]	[.004]	[0.000]	[0.000]	[.000]		[.000]	
POPM65	4.26943	4.39637		1.17560	(0.85110)	3.58984	-1.72684	4.56735	4.55225	3.79680	.914365	.157505	1.52791
	(1.32809)	(1.82509)	(0.87101)	(1.21152)	[0.16720]	(2.23168)	(3.05398)	(.466894)	(.409095)	(.679983)	[.339]	(1.23073)	[.216]
	[.006]	[0.016003]	[4.47808D-7]	[0.33187]		[.109]	[.572]	[0.000]	[0.000]	[.000]		[.898]	
TXALA98	3.28346	-0.55736		0.51731	(0.73717)	3.12080	3.71276	3.17568	3.23785	3.02346	.520916	3.17593	2.08059
	(1.36453)	(0.27910)	(0.13320)	(1.04934)	[0.48283]	(1.64609)	(3.41312)	(.608677)	(.543751)	(.747296)	[.470]	(1.43594)	[.149]
	[.029]	[0.045822]	[0.000028579]	[0.62202]		[.059]	[.277]	[0.000]	[0.000]	[.000]		[.027]	
TXACM98	.478849	0.53907		1.05691	(0.25372)	.267970	-.322987	.566493	.555526	.381489	12.4065	-.197990	2.69215
	(.458599)	(0.31986)	(0.15265)	(0.36117)	[0.000031052	(.507229)	(.429128)	(0.181047)	(0.170688)	(.259501)	[.000]	(.204718)	[.101]
	[.313]	[0.091928]	[0.00041345]	[0.0034294]		[.598]	[.452]	[0.002]	[0.001]	[.142]		[.333]	
TAXDES	-2.51679	-1.40365		-1.20851	(0.52267)	-2.51978	-3.86276	-2.42486	-2.44976	-2.23447	22.6285	-3.15658	4.11201
	(.735859)	(0.72736)	(0.34713)	(0.74401)	[0.020768]	(.824971)	(1.07274)	(0.262512)	(0.252752)	(.383104)	[.000]	(.362682)	[.043]
	[.004]	[0.053634]	[0.000052636]	[0.10431]		[.002]	[.000]	[0.000]	[0.000]	[.000]		[.000]	
PNBPC98	-.16446E-2	-0.0015129		-0.00073609	(0.00023857)	-.167932E-02	-.265382E-02	-.174079E-2	-.175335E-2	-.16053E-2	.249869	-.249163E-2	.020277
	(.47360E-3)	(0.0009503)	(0.00045352)	(0.0003396)	[0.0020332]	(.595915E-3)	(.958326E-3)	0.000220846)	(0.000219963)	(.35647E-3)	[.617]	(.327179E-3)	[.887]
	[.003]	[0.11138]	[0.00085034]	[0.030198]		[.005]	[.006]	[0.000]	[0.000]	[.000]		[.000]	
PNBPCGR	2.64440	1.11363		0.66608	(0.47661)	1.86200	3.97538	2.80302	2.81977	1.86156	2.72731	3.84111	7.15828
	(1.48561)	(1.38900)	(0.66289)	(0.67845)	[0.16226]	(2.09320)	(3.14378)	(.837633)	(.766372)	(1.21171)	[.099]	(.841565)	[.007]
	[.095]	[0.42269]	[0.092963]	[0.32621]		[.374]	[.207]	[0.001]	[0.000]	[.124]		[.000]	
RIC20	1.69903	0.84438		0.096555	(0.43811)	1.45030	-.247542	1.60168	1.59585	1.42611	.581673	.406076	2.09700
	(.642910)	(0.73573)	(0.35112)	(0.62364)	[0.82557]	(.679807)	(1.17256)	(0.268721)	(0.245168)	(.320668)	[.446]	(.352307)	[.148]
	[.018]	[0.25110]	[0.016181]	[0.87696]		[.034]	[.833]	[0.000]	[0.000]	[.000]		[.249]	
POPURB	.496463	0.58329		0.76807	(0.19053)	.258987	.768457	.495053	.500800	.318884	16.5231	.801848	.451796
	(.246257)	(0.27610)	(0.13177)	(0.27121)	[0.000055482]	(.426771)	(.416356)	(0.073661)	(0.066412)	(.097736)	[.000]	(.165284)	[.501]
	[.062]	[0.034631]	[9.56536D-6]	[0.0046260]		[.544]	[.066]	[0.000]	[0.000]	[.001]		[.000]	
PSERV98	.452839	0.34432		0.14605	(0.15740)	.913502	.271393	.420581	.429623	.784385	27.0284	.465203	1.29334
	(.259897)	(0.34274)	(0.16357)	(0.22405)	[0.35346]	(.361241)	(.392551)	(0.079404)	(0.069168)	(.189292)	[.000]	(.080918)	[.255]
	[.102]	[0.31509]	[0.035290	[0.51450]		[.012]	[.490]	[0.000]	[0.000]	[.000]		[.000]	
INPIB98	.843927	0.15252		0.090123	(0.28102)	.383872	-.967149	.670735	.659275	.539584	4.73246	-.219445	2.18063
	(.477543)	(0.48830)	(0.23304)	(0.40002)	[0.74844]	(.744708)	(1.32968)	(0.214270)	(0.210508)	(.401811)	[.030]	(.424787)	[.140]
	[.098]	[0.75477]	[0.51280]	[0.82175]		[.607]	[.467]	[0.002]	[0.002]	[.179]		[.605]	
BGSIP98	.015880	0.0087021		0.0077290	(0.0033902)	.014404	.013893	.015984	.015854	.016351	1.43251	.014685	.034277
	(.551384E-02)	(0.0060390)	(0.0028820)	(0.0048259)	[0.022621]	(.489299E-02)	(.477816E-2)	(0.00152417)	(0.00127076)	(.195970E-2)	[.231]	(.183429E-2)	[.853]

	[.011]	[0.14959]	[0.0025326]	[0.10925]	[.003]	[.004]	[0.000]	[0.000]	[.000]		[.000]	
SSR	2087.78	6264.66031		5161.27087	.233449E+12 (2797.55319 ***)	.149221E+12 (16314.62789***)	22103.8	24792.8	(2460.5787***		(8625.25 ***)	
SER	11.7977	20.43634		18.54952	26842.5 (13.65663***)	20618.7 (32.97942***)	8.25963	8.40445	(12.80775 ***)		(23.97951***)	
LM het	.132091 (.716)				45.6207 [.000]	9.32783 [.002]	7.94927 [.005]	54.5590 [.000]	CHISQ = (df, p-v)	1625.6830 (132, .00000)	CHISQ = (df, p-v)	0.28480569E+10 (156, .00000)
BP (df; p-value)					290.0279 (66, .00000)	1299.588 (78, .00000)	114.3163 (66, .00021)	138.6550 (78, .00003)	151.91712 (unrest) (66, .00000)		1168.29737 (unrest) (78, .00000)	
NOBS	28	122.93590 (iv)		114.96154 (iv)	336	364	336	364	28	28	28	28

Notes: * P-values computed for the standard normal.

** Standard errors corrected for heteroeskedasticity.

*** Computed for the n observations - comparable to the original equation in levels, even if, of course, they would never improve upon OLS.

(iv) Mean number of observations

GLS statistics obtained from transformed data - SER comparable levels equation.

Using the unbalanced methods (results in columns Miss Cov and Miss Corr, with standard errors computed with mean number of observations in third and fifth columns respectively), signs switched only for literacy rate, TXALA98, with Miss Cov. Significance at 10% (3rd in 5th columns) of estimates of

- INPIB98 (investment rate) disappears in Miss Cov
- POPM65, TXALA98, PNBPCGR, RIC20, PSERV98, INPIB98 disappear in Miss Corr:

The effects of population density (DENSPO, negative), female participation (TXACM98, positive), unemployment rate (TAXDES, negative) per capita GNP (PNBPC98, negative; yet its growth has a positive effect, not always significant), urbanization (POPURB, positive) and external commercial surplus (BGSIP98, positive) remain in all versions.

Replicated moment estimation seems to indicate that GLS methods reproduce in general the signs of OLS equation, yet with a much more precise estimation. "Uncentered moment-OLS" gives the worst results. Uncentered [80] SUR seems to give poorer standard errors than centered SUR; in SUR, cross-equation restrictions (CHISQ tests) were rejected – suggesting misspecification of the linear model - and some equations suffer from heteroeskedasticity.

Specifically, TXACM98 (female participation) and INPIB98 (investment rate) switch signs and lose significance in uncentered OLS and uncentered SUR.

Portugal

Demographic variables

- the influence of aging on the two variables is consistent with respect to the effect of the older cohorts: the weight of the population aged 65 and older (P65M or IDEID) increases both suicide as divorce rates. Yet, the weight of younger cohorts (IDEJOV) has different signs in the several regressions: it is more positive than negative on suicides; it is negative, as the effect of the weight of people aged 25 to 34 (P2534), on divorces – suggesting divorces occur more frequently on older cohorts (young cohorts are not even married, and its youth may force joint parenthood).
- marriage rates (TXNUP) promote both; age of male at first marriage (ID1CASH) decreases both
- education decreases both indicators: weight of population with low levels of education (POPED1) enhances divorces, weight of population with higher education (POPED4) decreases both. (This

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[80] Recall from previous discussion that uncentered methods may require instrumentation more intensely.

is somehow opposite to the findings in the cross-section sample – but in there the only information on education that enter the regressions is the literacy rate, which does not contain a complete grading of educational attainment of the population.)

Employment and hours:

- female participation (PPACTFE), as in the cross-section sample, increases divorces
- proportion of non-self-employment (PTCO) decreases suicides

General Economic Conditions and Business Cycle:

- unemployment (TXDESCE) decreases suicides almost always
- divorces seem to be higher when per capita GDP (PIBPPC) is lower

Inequality:

Unlike in cross-section sample, less inequality – here measure by wage divergence ratios: WQMSQ and WFEMAS - enhances divorces.

Sector Composition:

- weight of primary sector (EMPRIM) decreases suicides, as found before

Public Sector:

- per capita public sector expenditures (DESPURH) decreases divorces

Capital Markets:

As in the international sample, capital market tightness (a low interest rate, TXDBPR; or a low SPRE1, implying less investment risk) enhances suicides and now also divorces.

International Relations:

Surplus in external trade balance enhances suicides

Evidence on the influence of economic condition switch somewhat relative to effect found for the international the cross-section sample.

Table 3.2. *Linear Regressions, Divorces and Suicides – Portugal*

	Dependent Variables:							
	SUICHAB				TXDIV			
	PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	-22.3313 (4.43158) [.001]	176.041 (19.2627) [.000]	8.34519 (1.99569) [.006]	4.49877 (.457168) [.000]	15.4499 (1.99652) [.000]	22.4855 (2.70289) [.000]	-4.02325 (.453531) [.001]	-3.17467 (.082471) [.000]
IPOMINE					-237.009 (23.5345) [.000] |-.587942|	-208.516 (18.4449) [.000] |-.517260|		-3.19327 (.080910) [.000] |-.538201|
ESVIFN							2.60578 (.211465) [.000] |1.71862|	
P2534						-.086885 (.015431) [.000] |-.362383|		-.248244 (.026547) [.000] |-.315631|
P65M	.990901 (.141973) [.000] |.996085|	.698483 (.271977) [.019] |.899949|					.178011 (.039059) [.010] |.250236|	
IDEJOV	-.890258 (.082380) [.000] |-3.19779|	.659162 (.118456) [.000] |3.27499|	7.20610 (1.97853) [.011] |3.69478|	6.10707 (.646827) [.000] |4.68272|		-.061828 (.017342) [.005] |-1.08732|	-8.69197 (.861312) [.001] |-10.7126|	-.637226 (.089907) [.000] |-.722869|
IDEID					.283268 (.090800) [.010] |1.48800|	.137007 (.049814) [.020] |.719692|		2.74013 (.194932) [.000] |2.47957|
TXNUP	3.45917 (.406926) [.000] |.914727|		3.29175 (.682761) [.003] |.761576|		.189264 (.060235) [.009] |.235218|	.282983 (.059950) [.001] |.351692|		.770728 (.070452) [.000] |.394517|
ID1CASH		-3.22807 (.413954) [.000] |-1.50609|	-1.42221 (.635375) [.066] |-1.14569|	-1.65764 (.179770) [.000] |-1.40490|			-1.16150 (.151587) [.002] |-2.15655|	
POPED1							1.30067 (.098504) [.000] |1.22266|	

POPED4			-.471372 (.192303) [.050] |-.328670|	-.632832 (.263097) [.029] |-.574476|			-1.37755 (.111645) [.000] |-2.40571|	
PPACTFE					.101554 (.024872) [.002] |.497978|			.099561 (.041478) [.047] |.122990|
PTCO		-1.27489 (.172925) [.000] |-2.79189|	-3.46515 (.565903) [.001] |-1.84177|	-3.66939 (.417091) [.000] |-3.33102|				
HORNOR	.126128 (.064913) [.084] |.154590|		-.252562 (.134895) [.110] |-.209248|					
TXDESCE	.306006 (.079371) [.004] |.331954|	-.697382 (.095658) [.000] |-.884589|	-1.43691 (.377113) [.009] |-.739163|	-1.81416 (.135540) [.000] |-.979279|				
PIBPPC					-.794897E-03 (.629319E-03) [.233] |-.512368|		-3.35397 (.408671) [.001] |-4.19871|	-1.03355 (.146369) [.000] |-1.22829|
REMPC	-.063264 (.386467E-02) [.000] |-3.60417|							
SALPIB	.554972 (.041654) [.000] |1.26392|							
WQNSQ							-.775614 (.094328) [.001] |-1.51323|	
WQMSQ					-.783138 (.144487) [.000] |-.564722|	-.621120 (.114178) [.000] |-.447890|		-.351720 (.024998) [.000] |-.644713|
WFEMAS						-4.60219 (1.53742) [.013] |-.129837|		
EMPRIM		-.948012	-10.3513	-9.09324				

		(.134107) [.000] |-5.39883|	(1.19043) [.000] |-5.75060|	(.894612) [.000] |-8.25471|				
DESPURH					-.010700 (.399238E-02) [.021] |-.217948|	-.718233E-02 (.328599E-02) [.054] |-.146299|	.198907 (.064880) [.037] |.249019|	-.207428 (.036842) [.001] |-.251282|
TXDBPR							-1.15999 (.112693) [.001] |-.644129|	
SPRE1			-.562938 (.078457) [.000] |-.360602|					
FONOH	.427876 (.121076) [.006] |.441584|						-.539424 (.034730) [.000] |-1.16503|	
EXIMPIB		.177261 (.045579) [.001] |.467585|	1.74772 (.221340) [.000] |1.22700|	1.08932 (.072247) [.000] |.937570|				
SSR	.362050	3.94816	.028178	.586572	.014729	.862807E-02	.256258E-03	.402708E-03
SER	.200569	.468340	.068530	.191470	.036593	.029374	.800402E-02	.758483E-02
RBAR2	.980490	.888604	.996776	.969789	.984995	.990332	.999733	.999807
DW	2.90083 (.185,1.00)	2.40860 (.213,.999)	3.57249 (.582,1.00)	1.85757 (.005,.959)	2.55223 (.116,1.00)	2.68794 (.091,1.00)	3.30762 (.000,1.00)	2.58491 (.000,1.00)
NOBS	18	26	17	24	19	19	16	17

Accidents: Total, Fatal; Labor and Road

In theory, we would expect that general accidents, specially fatal - eventually, also suicides -, would move along with mortality rates, in opposite direction to general development. However, the special types of accidents considered below, could exhibit the opposite pattern – for example, road accidents occur if there are cars, and these are in larger number in developed societies; other things equal – safety rules, for instance – *per capita* labor accidents are likely to be more frequent if labor participation and employment is high. Some of these variables may even show business-cycle (medium-run) influences contrary to the long-run trend of increasing safety with per capita GDP in the economies. As such, if our methodological framework will depart from an interpretation of health signal formation, we also consider them (namely, life expectancy and mortality rates) as possible explanatory variables – as it turned out, they showed up directly in very few of the regressions.

Looking, thus, for potential explanatory candidates, being safety one of the vectors of higher survival rates, we turned to the (economic) literature on general mortality and morbidity - and also on general health. We summarize in the following lines some pertinent information.

Demographic regularities in vital statistics – see Sickles & Taubman (1997) – point to a positive and significant relationship of life expectancy and per capita gross national product [81] and employment indicators. Life expectancy (not only longevity) decreases with age – which reflects the increasing life expectancy of the overall population over time. Female life expectancy is longer than male – either a result of less exposure to occupational risks due to lower (and different) labor market participation, anatomical differences, lifestyle peculiarities (alcohol and smoking habits). Married individuals seem to have higher survival rates than unmarried even controlling for age cohort effects. Migrants, due to a self-selection process (people who migrate are eventually healthier than those who did not; also, they may be, on average, younger than the national population), may exhibit higher survival rates in the same age cohort.

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[81] In Appendix B, we report the strong positive correlation of life expectancy, ESPVN and ESPVN98, with per capita GDP in the international sample. For Portugal, the mortality rate is the variable TXMORT, with negative correlation with both the time trend and per capita GDP; ESVIFN, life expectancy, and LONGEV, longevity are strong and positively associated to the trend and per capita GDP – recorded Table B.2.

Historically, urbanization has been linked to the spread of some diseases; if violent accidents are of different nature than fatal epidemics, simple population "crowding" may create a more accident-prone environment – and this may be true for road as for labor accidents.

Labor market involvement is related to health indicators in some studies. Theoretically, after the work of Grossman (1972) and others, joint decision models of health level – the health good or asset -, labor supply and even wages have been proposed, and analogy (and complementarity: being education a non-transmissable asset, rewards from longer schooling suggest longer life-spans) between education and health recognized in life-cycle scenarios. However, in much of (empirical) labor economics research, health is usually viewed as exogenous – as noted in a recent survey by Currie & Madrian (1999); in recent investigation, the endogeneity hypothesis (important to justify our "left hand-side" treatment of safety indicators) has been tested: wages may affect health as vice-versa; endogeneity is also found in the (positive) association of education and hours of work to health status. Unemployment seems to co-exist with worse health status – even if causation may work in either direction; participation (for example female) in the labor market, specially in occupations requiring adequate physical activity, may enhance (even if self-selection may bias the findings again) individual health.

A clearer causal direction between safety and risks – namely labor risk – and wages has been devised in labor economics, relying on the theory of equalizing differences exposed for example in Rosen (1986). The causality, however, is one of risk exposure being rewarded in the market through higher wages; risk supply-demand considerations could justify the variables in either side of the relation that would be an hedonic price line.

Public expenditures on health (for instance in sanitary measures, vaccination, etc.) are recognized as public policy tools affecting population death rates; a rise in public health care is also expected to provide a more egalitarian access to health and increase average survival rates of the population. The literature – see Gerdtham & Jöhnsson (2000) – recognizes a relationship to total health expenditures, but these, in the spirit of the previously cited theoretical models, are dealt in health-oriented empirical work as an endogenous variable.

Overall, health, in the form of lower mortality or other, has generally been related to economic development but – again – the direction of causation is uncertain. Better nutrition may be behind lower death rates (subject studied for example by Fogel (1997) among others) and the former can have been accomplished by more productive societies; on the other hand, an increase in income can purchase all kinds of goods: it is possible that populations have used part of the economic achievements to purchase the “health(y)” commodity and, thus, extra living years.

International Evidence

Apart from GNP growth rate, that seems to promote both types of events, road accidents and other accidents or disasters show different explanatory variables; when common influence is found, it has opposite sign.

Road accients are influenced:

- negatively by both the share of income of the poorest 20th (POB20) as the wealthiest 20th (RIC20), even if the former has higher beta in absolute value – more inequality would seem to enhance road casualties
- positively by the share of the tertiary sector (PSERV98)
- positively by the public sector balance (SORPI98)
- positively by both credit abundance (CREPI98) and good ratings in the investment risk indicator (ICRGD98)

In general, road injuries and fatalities are related to economic welfare (the only indicator not consistent with that evidence is aid forwarded to other countries – APDP -, which has a negative effect). Probably, development would enhance private transport ownership, and/or, higher “speed” of things; consequently, more accidents would be bound to occur.

People killed in disasters or accidents are influenced:

- negatively by life expectancy at birth (ESPVN)
- negatively by literacy rate (TXALA98)
- negatively by female participation rate (TXACM98)
- negatively by the share of the secondary sector (PIND98)
- negatively by ratings of the investment risk indicator (ICRGD98)

Table 3.3. *Linear Regressions, Road and Fatal Accidents – International Evidence*

	Dependent Variables:						
	MFERAR			DESASP		DESAIP	
Indep. Var.	(1)	(2)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	1900.45	-439.480		2349.22		2239.09	
	(2157.70)	(460.175)		(516.752)		(658.773)	
	[.393]	[.350]		[.000]		[.001]	
ESPVN			0.62687		-0.29301	-19.0145	-0.24749
			(48)		(163)	(6.82658)	(163)
			[0.000]		[0.000]	[.006]	[0.001]
						| -.273649|	
TXALA98			0.12812	-11.5115	-0.34766		-0.29079
			(48)	(4.39724)	(170)		(170)
			[0.386]	[.010]	[0.000]		[0.000]
				| -.268837|			
TXACM98			-0.22125		0.080598	-6.60109	0.056714
			(48)		(160)	(5.37431)	(160)
			[0.131]		[0.311]	[.222]	[0.476]
						| -.122584|	
TAXDES			-0.026481		-0.082011		-0.071469
			(45)		(49)		(49)
			[0.863]		[0.575]		[0.626]
PNBPC98			0.54552		-0.17229		-0.14043
			(48)		(165)		(165)
			[0.000]		[0.027]		[0.072]
PNBPCGR		18.9071	0.45778		0.039462	26.7270	0.050492
		(15.4439)	(43)		(156)	(18.2640)	(156)
		[.234]	[0.002]		[0.625]	[.146]	[0.531]
		|.293326|				| .126403|	
POB20	-123.746	-43.7666	0.0039421		-0.13054		-0.083557
	(96.6173)	(26.3717)	(41)		(109)		(109)
	[.221]	[.111]	[0.980]		[0.176]		[0.388]
	|-.760346|	|-.295942|					
RIC20	-26.8855		-0.10688		0.16638		0.11559
	(32.4194)		(41)		(109)		(109)
	[.421]		[0.506]		[0.084]		[0.231]
	|-.487386|						
PIND98			-0.041881	-16.1962	-0.22726	-15.4306	-0.20599
			(37)	(8.47653)	(147)	(6.73617)	(147)
			[0.806]	[.059]	[0.006]	[.024]	[0.012]
				| -.176856|		| -.202461|	
PSERV98	5.22098	5.75823	0.42408		-0.10572		-0.084549
	(4.32516)	(4.49998)	(40)		(150)		(150)
	[.247]	[.214]	[0.006]		[0.198]		[0.304]
	|.208880|	|.241278|					
SORPI98	25.3824		0.26518		-0.012995		0.019891
	(16.2511)		(38)		(99)		(99)
	[.141]		[0.108]		[0.898]		[0.845]
	|.265224|						
CREPI98	399.798		0.56751		-0.16685		-0.13966
	(138.016)		(37)		(129)		(129)
	[.012]		[0.000]		[0.059]		[0.114]
	|.545180|						
LENR98			-0.25044		0.0066651		0.0030724
			(41)		(130)		(130)
			[0.114]		[0.940]		[0.972]
ICRGD98		10.8405	0.46415	-8.94665	-0.26774		-0.23704
		(6.56604)	(39)	(8.08681)	(123)		(123)
		[.113]	[0.003]	[.271]	[0.003]		[0.008]
		|.460917|		| -.111117|			
BGSIP98			-0.085424		-0.034360		-0.028826
			(44)		(129)		(129)
			[0.581]		[0.699]		[0.746]
APDP		-1.02115	0.083303		-0.10246		-0.083799
		(.562547)	(46)		(168)		(168)
		[.083]	[0.582]		[0.186]		[0.280]
		|-.359498|					
SSR	550448	.109419E+07		.779406E+08		.728810E+08	
SER	198.287	223.015		865.696		763.576	
RBAR2	.495548	.319959		.151838		.083154	
LM het	7.03855	12.2617		16.5278		28.3224	
	(.008)	(.000)		(.000)		(.000)	
NOBS	20	28		108		130	

Portugal

Accidentality had a wide range of indicators in the Portuguese sample. In a first table, we present results that can be related to the cross-section sample – regressions on the three road accident indicators and death by external causes. The last variable turned out not to be exhibit the same causes as general disasters before and to behave more in line with road accidents.

In a second table, we record the evidence for labor accidents, with no counterpart in the international data set.

1. Road accidents and deaths by external causes

. Demographic variables

- the weight of the population aged 65 and older (P65M or IDEID) increases the four indicators; life expectancy at birth (ESVIFN) also increases death by external causes – which, however seem to behave in line with the general mortality rate (TXMORT has a positive coefficient). The weight of younger cohorts (IDEJOV) has also a positive influence.
- age of male at first marriage (ID1CASH) decreases road accidents
- immigration indicators show up in some of the regressions; they indicate a positive influence in road injuries (either TXRESTR or TXRBRAS); mixed signs in death by external causes (Europeans, TXREURO, having a negative influence, Africans, TXRAFR, positive)

. Employment and hours:

- participation (TXACTC) decreases road accidentality but affects death by external causes positively (these deaths include labor accidents)
- female participation (PPACTFE) increases total road accidents
- proportion of non-self-employment (PTCO) – a measure of job security - consistently decreases all variables.
- proportion of employment of qualified and semi-qualified professionals (PQESQ), as firm size (DIMEMP), decreases road casualties.

. General Economic Conditions and Business Cycle:

- unemployment (TXDESCE) decreases most of the variables (consistently, hours of work, HORNOR; increases total road accidents).
- in some regressions, growth of per capita GDP shows up positively. Positive influence is also recorded for wage level or growth indicators: REMPC, SALRTCP, SALRTCC.

. Inequality:

In general, less inequality – lower WQSNQ and WQSSQ - enhances accidentality, even if a higher wage bill, SALPIB, seems to decrease it.

. Sector Composition:

- weight of primary sector (EMPRIM) decreases death by external causes and of tertiary (EMTERC) increases road accidents, as found before

. Public Sector:

- weight public sector expenditures (DESPUPI) seems to move in line with death by external causes

. Capital Markets:

- Investment (INVPIB) and low interest rates (TXDBPR) – capital market tightness - favor road injuries.

. Housing:

- Housing move in opposite direction to road casualties and injuries.

Table 3.4. *Linear Regressions, Road and Fatal Accidents – Portugal*

	Dependent Variables:															
	ACRFERH				ACRMORH				ACRTOTH				MOCEXTH			
	PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	71.7340 (18.4584) [.002]	-126.510 (8.07602) [.000]	-1.05671 (.189077) [.000]	.505421 (.117838) [.001]	550.284 (53.3539) [.000]	532.915 (94.2455) [.000]	-7.56286 (.848829) [.000]	-5.45181 (.780550) [.000]	-281.386 (15.5579) [.000]	-233.171 (15.0351) [.001]	-2.19127 (.18373) [.000]	-2.58248 (.081269) [.000]	-310.419 (77.6157) [.002]	398.409 (166.456) [.048]	-2.68782 (1.14747) [.044]	3.28352 (.386231) [.000]
POMINEN					-.037433 (.444444E-2) [.000] |-1.08786|				.017970 (.122577E-2) [.000] |.244434|	.014666 (.121838E-2) [.000] |.199495|	2.53256 (.182231) [.000] |.204109|	2.70287 (.074232) [.000] |.217835|				
IPOMINE	-143.687 (63.8740) [.042] |-.409507|		-.655097 (.175400) [.004] |-.394992|													
TXNAT																7.16519 (1.12098) [.000] |2.82070|
TXMORT													9.11689 (1.57007) [.000] |.477952|	10.3767 (.392861) [.000] |.543998|		
ESVIFN													3.93451 (.985928) [.002] |.428897|	4.12037 (.405043) [.000] |.449157|		
LONGEV						.759420 (.383408) [.083] |.413969|		.506181 (.114680) [.005] |.475930|								
P65M	.268614 (.126969) [.054] |.364065|	.249254 (.079037) [.006] |.337825|	.653291 (.151394) [.002] |.822610|	-.117621 (.060301) [.070] |-.148106|												4.54096 (.591851) [.000] |3.03472|
IDEJOV									.741237 (.105410) [.000] |.890661|	.530223 (.076549) [.000] |.637110|	1.35181 (.284573) [.005] |.837199|	1.03916 (.091346) [.000] |.643570|				
IDEID	.674641 (.167689) [.001]		.969059 (.252128) [.003]			8.45070 (2.27933) [.006]	8.95500 (1.07231) [.000]	5.13449 (.764449) [.001]	3.76312 (.301947) [.000]	3.35141 (.255835) [.000]	2.64381 (.326202) [.000]	2.77764 (.127433) [.000]			4.94211 (1.66378) [.016]	4.84738 (.986878) [.000]

	|.982894|		|.728923|			|5.52787|	|12.2102|	|7.00091|	|1.28731|	|1.14647|	|1.24954|	|1.31280|			|2.37002|	|1.37124|
TXNUP		.315228 (.056769) [.000] |.298386|														
ID1CASH	-1.38311 (.421442) [.006] |-.650897|		-1.10704 (.209513) [.000] |-1.24752|	-.315431 (.147529) [.049] |-.355460|		-20.7406 (3.36753) [.000] |-5.97532|	-3.84610 (.220478) [.000] |-10.3289|	-2.73317 (.281901) [.000] |-7.34006|								
INDMASC		1.65489 (.109350) [.000] |1.11383|												-8.43053 (1.76354) [.002] |-.062696|		-1.81147 .513978) [.003] |-.014772|
TXRESTR	1.29002 (.583121) [.045] |.467696|		.577178 (.119298) [.001] |.655379|													
TXREURO														-79.7615 (11.2941) [.000] |-1.12688|		-8.31058 1.18143) [.000] |-5.09486|
TXRAFR														28.8378 (3.85101) [.000] |.726686|		6.18670 1.08377) [.000] |2.53688|
TXRBRAS		27.7485 (3.18229) [.000] |1.30040|		1.02756 (.286649) [.003] |1.20709|												
TXACTC	-.331785 (.092893) [.003] |-.488580|	-.289733 (.056005) [.000] |-.426655|	-.610450 (.110722) [.000] |-.755838|						-.277642 (.047480) [.001] |-.083843|	-.272562 (.046310) [.001] |-.082309|	-.121654 (.039783) [.028] |-.064120|	-.132904 (.015172) [.000] |-.070050|	3.33442 (.405638) [.000] |.612046|	3.77186 (.124033) [.000] |.692340|		
PPACTFE									1.02310 (.130188) [.000] |.352806|	1.15787 (.115485) [.000] |.399278|	.587699 (.118104) [.004] |.400430|	.530196 (.046412) [.000] |.361251|				
PTCO	-.251883 (.062328) [.001] |-.592241|	-.143190 (.032113) [.000] |-.336675|	-.786689 (.120304) [.000] |-1.02636|	.226488 (.075606) [.009] |.295490|	-.260560 (.147937) [.106] |-.246600|	-.791456 (.201358) [.004] |-.695480|	-.407132 (.145198) [.026] |-.721405|	-.462763 (.043667) [.000] |-.819979|	-.464222 (.048242) [.000] |-.235636|	-.263965 (.035430) [.000] |-.133987|	-.289397 (.065770) [.007] |-.203621|	-.246790 (.020949) [.000] |-.173643|			-1.04360 (.246371) [.002] |-.691008|	-.831298 .160832) [.000] |-.455792|
DIMEMP						-.885060		-.573002						.543685		

						(.546680) [.144] |-1.27112|		(.180541) [.019] |-1.52149|						(.232535) [.052] |.231354|		
PQESQ					-2.19161 (.341982) [.000] |-1.29823|	-1.46527 (.569546) [.033] |-.821568|	-.396603 (.072003) [.001] |-1.09542|	-.301453 (.066773) [.004] |-.832613|								
HORNOR									.274151 (.038101) [.000] |.108888|	.263652 (.037162) [.000] |.104718|	.113998 (.028227) [.010] |.111292|	.084392 (.010075) [.000] |.082389|			-.470667 (.157869) [.015] |-.451391|	
TXDESCE	-.593878 (.063397) [.000] |-.813602|	-.667488 (.041072) [.000] |-.914447|	-1.02596 (.073854) [.000] |-.800376|	-.679548 (.109007) [.000] |-.530131|					-.803131 (.057055) [.000] |-.298889|	-.706446 (.047311) [.000] |-.262907|	-.466703 (.037475) [.000] |-.320267|	-.482604 (.014324) [.000] |-.331179|			-.618535 (.085548) [.000] |-.395451|	-.956769 (.180990) [.000] |-.351087|
TCPIBPPC				.228763 (.021273) [.000] |.259920|								-.073592 (.870039E-02) [.000] |-.064135|		.409543 (.041852) [.000] |.134875|		
REMPC	.450320E-2 (.208447E-2) [.050] |.263513|		.961007 (.212979) [.001] |.735078|				-.564769 (.271146) [.076] |-1.05925|									
SALRTCP													.283523 (.139833) [.068] |.084907|			
SALRTCC						.198819 (.074121) [.028] |.255161|		.135978 (.025650) [.002] |.228509|								.514413 (.080616) [.000] |.407111|
SALPIB			-.123082 (.047023) [.026] |-.157951|													
WQSNQ						-13.6819 (3.25742) [.003] |-2.33526|	-1.26594 (.266175) [.002] |-3.49651|	-.995229 (.152156) [.001] |-2.74881|								
WQMSQ					8.78357 (2.63304) [.007]											

					|.829117|											
WQSSQ													-64.8670 (4.14784) [.000] |-3.21579|	-52.6564 (1.87352) [.000] |-2.61045|		
ICPRIV							-.448668 (.114185) [.006] |-1.11427|								1.36046 (.254213) [.000] |1.21650|	
EMPRIM													-1.30315 (.168918) [.000] |-.880593|	-1.16855 (.075410) [.000] |-.789633|		
EMSECU										-.334518 (.067453) [.002] |-.128169|						
EMTERC	.060121 (.025233) [.033] |.400132|		.471807 (.127011) [.004] |.615764|			.447070 (.147459) [.016] |1.24391|	.554828 (.194207) [.024] |1.14200|	.782248 (.161069) [.003] |1.61009|	.196764 (.040780) [.002] |.326770|		.339968 (.134119) [.052] |.273347|					
DESPUPI													.433653 (.093140) [.001] |.317891|	.373433 (.025264) [.000] |.273747|		
INVPIB						.386081 (.114940) [.010] |.664044|		.346336 (.062459) [.001] |.660933|								
TXDBPR					-.296323 (.114579) [.025] |-.248423|		-.424464 (.136753) [.017] |-.352152|									
FONOH				-.209199 (.102389) [.059] |-.293637|	-1.91733 (.349746) [.000] |-1.28461|											
SHANOH	-.348868E-02 (.163683E-02) [.053] |-.361671|	-.551482E-02 (.108628E-02) [.000] |-.571722|	-.243982 (.117296) [.064] |-.332948|												-2.11870 (.499155) [.002] |-2.14649|	
SSR	.288867	.301217	.546731E-02	.054961	6.74127	3.35518	.012410	.206597E-02	.075449	.072313	.530506E-03	.791848E-04	17.8387	.641866	.204937	.277930

SER	.149065	.137208	.023382	.060531	.782843	.647609	.042105	.018556	.103820	.101639	.010301	.397957E-02	1.27346	.302812	.150900	.140898
RBAR2	.986690	.988723	.999067	.993751	.874734	.927124	.986476	.997373	.999386	.999411	.999881	.999982	.975262	.998601	.976354	.981934
DW	2.55947	2.38614	1.89264	2.56344	2.25949	2.75801	2.98558	2.98510	3.21402	2.95377	3.32998	3.50988	1.64019	2.37005	3.40240	3.02558
	(.015,1.00)	(.093,1.00)	(.000,1.00)	(.264,1.00)	(.051,.999)	(.005,1.00)	(.055,1.00)	(.002,1.00)	(.236,1.00)	(.042,1.00)	(.132,1.00)	(.398,1.00)	(.000,.960)	(.000,1.00)	(.901,1.00)	(.567,1.00)
NOBS	25	25	23	23	18	19	17	17	17	17	15	15	19	19	16	24

2. Labor accidents. These turned out to show conflicting patterns, also due to the small number of observations. Neither recorded accidents nor cases trialed were influenced in the same way by the same variables, nor fatal accidents in trial exhibited a similar pattern as total labor casualties (recall from section I, Figs. I.10-I.13, that if recorded cases seemed to decrease, trialed figures appeared to rise in the last fifteen years of the sample period).

. Demographic variables

- age and life expectancy indicators show up with conflicting signs in the regressions. Apparently, aged population would increase and weight of youth would decrease labor accidents.

- age of male at first marriage (ID1CASH; in some cases plain marriage rates, TXNUP) increases labor accidents

- proportion of higher educated population (POPED4) increases (POPED1, proportion of people with low schooling levels, decreases) labor accidents

- immigration indicators (TXRESTR, TXREURO) show up again in the regressions; now they usually point to a negative influence in labor injuries

. Employment and hours:

- participation (TXACTC) shows with mixed signs.

- proportion of non-self-employment (PTCO) decreases most variables.

- proportion of employment of qualified and semi-qualified professionals (PQESQ), as in some cases, firm size (DIMEMP) or plant size (DIMEST) decreases them.

. General Economic Conditions and Business Cycle:

unemployment (TXDESCE) decreases most of the variables and consistently, hours of work, HORNOR; increases them.

. Inequality:

- inequality – WQSNQ - enhances labor accidents.

. Inflation and the Price Level:

- inflation seems to increase total accidents; but it decreases fatal cases

. Sector Composition:

- in some regressions, weight of secondary sector (EMSECU) and tertiary (EMTERC) increases labor cases; tertiary (EMTERC) shows up negative in some total accident regressions

. Public Sector:

- balanced public accounts (CFAPCE) move in opposite direction to labor cases

. Capital Markets and Housing

- Housing (SHANOH) and low interest rates (TXDBPR) and low risk (SPRE1) increase labor judicial cases. Recorded labor accidents would respond in the opposite way to some of these variables

Table 3.5. *Linear Regressions, Labor Accidents – Portuguese Evidence*

	Dependent Variables:															
	ACTJMH1				ACTJTH1				ACTMOH				ACTTOH			
	PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	152.628 (25.1753) [.001]	164.537 (34.8425) [.002]	15.1608 (1.14376) [.001]	-13.6319 (2.09038) [.001]	-43.9106 (241.761) [.858]	-9046.4 (1106.82) [.000]	1.49537 (.152341) [.000]	.107594 (.110897) [.346]	174.015 (41.5874) [.002]	219.948 (19.9270) [.000]	-3.85190 (1.18119) [.014]	-6.72967 (1.04053) [.003]	-319.892 (27.8970) [.000]	-319.323 (95.3918) [.015]	1.91480 (.335489) [.001]	-.709070 (.324717) [.065]
IPOMINE									-1406.35 (379.802) [.005] |-.590513|	-2134.37 (232.564) [.000] |-.896206|	-7.00725 (1.18109) [.001] |-.458829|	-6.00066 (.544154) [.000] |-.392918|	2536.54 (264.938) [.001] |.454547|			-2.58806 (.373225) [.000] |-.218393|
TXNAT										-.413477 (.154721) [.032] |-.465556|						
TXMORT												-.594783 (.108246) [.005] |-.369572|				
ESVIFN							-2.23482 (.308724) [.000] |-1.37048|								1.08503 (.392034) [.033] |.325777|	
LONGEV						3.68515 (1.34770) [.026] |.377371|										
P65M	.754249 (.356912) [.079] |.535772|		-4.33815 (.154554) [.000] |-3.24473|												-.743556 (.276664) [.036] |-.472141|	
IDEJOV			21.2245 (1.37421) [.001] |14.4727|		-6.57598 (1.80996) [.002] |-1.95194|	4.27626 (1.85881) [.050] |1.36270|			-.186556 (.171761) [.306] |-.687076|		-1.49175 (.599247) [.042] |-.850020|					
IDEID						9.07831 (6.13851) [.177] |.802157|		1.15003 (.227267) [.000] |.742771|								
TXNUP										2.36403 (.455322) [.001] |.655828|		2.72957 (.336420) [.001] |.694373|				

ID1CASH			4.25670 (.450392) [.003] |4.04332|	5.67471 (.675712) [.000] |5.39026|									7.06479 (1.15432) [.004] |1.34247|	11.4027 (3.08051) [.010] |2.16678|		
INDMASC				24.8398 (2.34138) [.000] |1.14816|		78.4783 (11.5922) [.000] |.526484|						3.80145 (1.10634) [.026] |.136289|				
POPED1			-2.92666 (.127380) [.000] |-1.75240|													
POPED4	-.414092 (.174490) [.055] |-.398134|								1.46885 (.268989) [.000] |2.00604|	1.90803 (.178599) [.000] |2.60583|	2.73425 (.170719) [.000] |2.26842|	2.11357 (.105583) [.000] |1.75348|	1.10473 (.150761) [.002] |.643896|	1.94855 (.468232) [.006] |1.13573|		
TXRESTR					-118.806 (25.3904) [.000] |-2.42007|	-203.102 (29.8225) [.000] |-4.74888|	-.406549 (.128282) [.016] |-.539928|	-1.66751 (.149951) [.000] |-1.62579|	-9.60072 (2.25569) [.002] |-2.56019|	-8.34695 (.645824) [.000] |-2.22585|	-4.39728 (.463608) [.000] |-2.72096|	1.73945 (.881526) [.120] |1.07634|	-15.1279 (1.91228) [.001] |-1.72166|	-29.6974 (6.08488) [.003] |-3.37977|		
TXREURO				-7.30547 (.551171) [.000] |-6.87380|								-2.49303 (.638773) [.017] |-2.14140|				-1.07943 (.217888) [.002] |-.977837|
TXRBRAS						765.479 (223.912) [.009] |2.48821|										
TXACTC	-.760035 (.259976) [.027] |-.492922|		2.59850 (.139718) [.000] |1.51994|				-.352583 (.187567) [.102] |-.360922|	.979510 (.079241) [.000] |1.04136|					.780590 (.120650) [.003] |.308350|	.753555 (.247447) [.023] |.297670|	.294951 (.261695) [.303] |.142655|	
PPACTFE					10.4108 (4.61655) [.036] |.997918|	30.9277 (2.83699) [.000] |2.78161|							-1.18257 (.234486) [.007] |-.533435|			
PTCO	.793082 (.100471) [.000] |.914098|	1.23015 (.188170) [.000] |1.41785|					-.829345 (.240167) [.011] |-1.02244|	.692412 (.074813) [.000] |.775667|	-.761407 (.163174) [.001] |-1.18460|	-.874654 (.081539) [.000] |-1.36079|	-2.22573 (.154660) [.000] |-1.44086|	-1.24432 (.099321) [.000] |-.805526|		-.478153 (.266006) [.122] |-.317485|		
DIMEMP																-1.14434 (.245579) [.002] |-1.01942|
DIMEST		-.555013				12.3642										

		(.311592) [.118] |-.696839|				(2.47995) [.001] |1.88170|										
PQESQ	-2.71705 (.371566) [.000] |-1.74362|	-3.51959 (.550579) [.000] |-2.25863|	-1.85536 (.143934) [.001] |-2.08489|				-.71097 (.107232) [.000] |-1.29613|						-1.55025 (.159641) [.001] |-.598460|			
HORNOR									.889134 (.277164) [.011] |1.08242|	1.22226 (.168673) [.000] |1.48797|	1.43153 (.192597) [.000] |1.28584|	.467760 (.094121) [.008] |.420156|	.793680 (.148371) [.006] |.412358|	1.92668 (.442060) [.005] |1.00101|		
TXDESCE						-3.10007 (1.79089) [.122] |-.263372|		.153203 (.044363) [.003] |.102622|						-.942714 (.303312) [.021] |-.458926|	-1.68170 (.089317) [.000] |-1.05898|	-1.74315 (.029653) [.000] |-1.09823|
PIBPPC	-.020231 (.423453E-02) [.003] |-1.74489|	-.039878 (.789443E-02) [.001] |-3.43940|														
TCPIBPPC		.218010 (.079967) [.029] |.334855|														
ISARTCC															-1.66583 (.220584) [.000] |-.727583|	
WQSNQ	6.02916 (1.34434) [.004] |1.15671|	7.01691 (1.32663) [.001] |1.34622|	2.20089 (.201676) [.002] |2.33498|	4.72046 (.257489) [.000] |5.00807|									4.91085 (.507716) [.001] |.583926|	4.97272 (1.73412) [.029] |.591283|	.403041 (.257326) [.168] |.357988|	
IPPIB					1.83743 (.648072) [.011] |.538258|											
ICPRIV							.472516 (.115713) [.005] |.786674|		-.153160 (.040993) [.005] |-.789352|	-.138180 (.019692) [.000] |-.712152|	-1.24066 (.116434) [.000] |-1.02774|	-.523530 (.097779) [.006] |-.433680|	.089303 (.030943) [.045] |.196424|		.321915 (.106038) [.023] |.265960|	.790063 (.082529) [.000] |.676990|
EMSECU			1.41540 (.104390) [.001] |1.58580|				.824123 (.121792) [.000] |1.60389|									.516979 (.107366) [.002] |.576377|
EMTERC			11.2078				3.17014						-.244568	-.254834		

			(.543070) [.000] |9.99850|				(.449323) [.000] |4.55849|						(.023138) [.000] |-.531295|	(.141008) [.121] |-.553597|		
CFAPCE	-1.13460 (.112107) [.000] |-1.66926|	-1.51407 (.202478) [.000] |-2.22755|	-1.62524 (.108494) [.001] |-1.30113|	-2.90538 (.167006) [.000] |-2.32597|												
INVPIB				-1.59477 (.170087) [.000] |-1.38607|												.379371 (.094198) [.005] |.321638|
TXDBPR	-1.48476 (.102204) [.000] |-1.44866|	-1.49889 (.122641) [.000] |-1.46244|														
SPRE1				-1.57461 (.167335) [.000] |-1.60521|						.128769 (.037710) [.011] |.330223|						
FONOH													-.701772 (.161033) [.012] |-.276869|			
SHANOH					.109257 (.051861) [.049] |.636390|	.218193 (.022245) [.000] |1.64296|									-.352523 (.236319) [.186] |-.303949|	
EXIMPIB				-1.47140 (.152865) [.000] |-1.46840|		1.81815 (.473647) [.005] |.418130|		-.085641 (.035177) [.027] |-.091512|						.264914 (.088202) [.024] |.349616|		.467668 (.041299) [.000] |.477594|
SSR	.833228	1.09573	.196434E-02	.022416	2103.17	31.6600	.013239	.157904	1.80597	.331072	.029204	.251363E-02	.071900	1.24054	.014493	.799937E-2
SER	.372654	.395642	.025589	.066957	10.5211	1.98935	.043490	.099343	.447955	.217476	.064591	.025068	.134071	.454705	.049147	.033805
RBAR2	.961272	.956347	.999038	.993410	.790692	.987466	.993191	.987590	.892568	.974678	.996045	.999404	.998247	.979838	.997722	.998857
DW	2.25801 (.000,1.00)	2.64170 (.006,1.00)	3.03679 (.000,1.00)	3.55429 (.593,1.00)	1.31927 (.000,.297)	2.78224 (.001,1.00)	3.13981 (.253,1.00)	2.66169 (.503,1.00)	2.49295 (.038,1.00)	3.53665 (.732,1.00)	2.74239 (.055,1.00)	3.05811 (.000,1.00)	2.21709 (.000,1.00)	2.77367 (.000,1.00)	2.70609 [.001,1.00]	3.44787 (.684,1.00)
NOBS	16	16	14	14	25	20	16	23	17	17	15	15	17	17	15	16

Homicides (Corporal Offences)

International Evidence

. Demographic variables

- life expectancy (ESPVN) affects homicides positively.

- education enhances violent crimes: TXALA98, IEDUC98 and DPEDPNB show with a positive sign in either of the regressions [82].

. General Economic Conditions and Business Cycle:

- general economic conditions do not seem to affect homicides. If we look at the relative size of the (square of) standardized coefficients, good economic conditions have a more negative than positive effect on rapes; if the effect of ICRGD98 is also taken into consideration, though, the reverse is true (in fact, only per capita GDP level shows a counteractive impact).

. Inequality:

- inequality increases violent crimes: proportion of income in poorest 20-th (POB20) decreases homicides, in the richest 20th (RIC20) increases both [83].

. Public Sector:

- voting habits or propensity (AFLVO) seem to counteract homicides

- public expenditures (GASPI98) move in the same direction to homicides, even if public health expenditures (DPSAPNB) counteract somewhat the effect

. Capital Markets

- a good investment risk evaluation (ICRGD98) decreases homicides; as noted, it increases rapes.

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[82] The literature is controversial on the impact of aggregate level education on criminal activities – see Fajnzylber, Lederman & Loayza (2002) and citations therein.

[83] This is consistent with Fajnzylber, Lederman & Loayza (2002) findings; these authors, however, find a positive impact of economic growth on violent crimes that we did not.

Table 3.6. *Linear Regressions, Corporal Offences – International Evidence*

	Dependent Variables:				
	HOMIC			VIOLA	
Indep. Var.	(1)	(2)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	-11.6316 (22.3889) [.607]	-40.6941 (19.2513) [.042]		-811.951 (345.425) [.029]	
ESPVN	.418781 (.368045) [.263] |.217376|		-0.064846 (59) [0.626]		0.018693 (64) [0.883]
TXALA98	.267244 (.152826) [.089] |.279488|		0.050928 (60) [0.699]		0.13551 (64) [0.286]
IEDUC98		39.1017 (17.2438) [.030] |.354744|	0.0088891 (60) [0.946]		0.19753 (64) [0.118]
TAXDES			-0.18849 (31) [0.310]	-7.63548 (3.97099) [.068] |-.33373|	-0.13142 (34) [0.459]
PNBPC98			-0.10134 (60) [0.441]	-.612775E-02 (.229443E-02) [.014] |-.754644|	0.041879 (64) [0.742]
PNBPCGR			-0.16425 (55) [0.231]	12.2807 (5.90502) [.050] |.471963|	-0.013168 (59) [0.921]
POB20	-1.93432 (.831554) [.026] |-.367919|		-0.46799 (46) [0.001]		-0.15919 (51) [0.265]
RIC20		.719905 (.198029) [.001] |.492132|	0.48581 (46) [0.001]	12.3940 (4.28206) [.009] |.597541|	0.10844 (51) [0.449]
AFLVO		-.284599 (.122670) [.026] |-.291977|	-0.20396 (53) [0.143]		-0.083643 (57) [0.536]
GASPI98	1.08757 (.395984) [.010] |.446852|	1.05421 (.374797) [.008] |.405436|	0.31683 (51) [0.023]		0.14811 (55) [0.281]
DPEDPNB			0.10626 (57) [0.431]	29.9563 (11.2093) [.014] |.494415|	0.30408 (62) [0.016]
DPSAPNB	-3.80954 (1.39335) [.010] |-.586518|	-2.92560 (1.20365) [.021] |-.440803|	-0.21980 (56) [0.104]		0.11438 (60) [0.384]
LENR98			0.23303 (50) [0.103]		0.0084594 (54) [0.952]
ICRGD98	-.281777 (.244006) [.256] |-.230616|		-0.27320 (49) [0.058]	5.11300 (3.26458) [.132] |.529152|	0.073856 (54) [0.596]
SSR	3680.87	3250.24		135721	
SER	10.4048	9.77729		80.3922	
RBAR2	.366824	.440762		.362982	
LM het	25.8057 (.000)	26.7153 (.000)		24.3284 (.000)	
NOBS	41	40		28	

Portugal

We report regressions in plain legally registered homicides, HOMLEGH, but also presumed homicides HOMIOUH. The latter can include violent deaths caused by accident (even if they were known to come from pure accident would be captured in MOCEXT but not in HOMIOUH; MOCEXT in any case, includes all these cases, as well as homicides).

. Demographic variables

- population (POMINEN) shows negatively or its inverse (IPOMINE) positively (negatively only in confirmed homicides) in some of the regressions – population density would detract murders

- the weight of the population aged 65 and older (P65M), life expectancy at birth (ESVIFN), longevity (LONGEV) seem to point to the fact that increasing life-span contributes more positively than negatively for violent crimes. Only IDEID shows with a minus sign in regressions on violent deaths due to unknown causes.

- age of male at first marriage (ID1CASH) decreases homicides (this goes in the opposite direction of other evidence and only shows in plain data)

- weight of people with low levels of education decrease both HOMLEGH and HOMIOUH; proportion of higher schooling increases HOMIOUH even if it shows up negatively in some of confirmed homicide regressions. That is, education may have an overall positive impact on extreme crimes, as we had found in the cross-section sample

- immigration indicators show up in some of the regressions; they indicate a positive influence of total aliens (TXRESTR) in homicides, Europeans, (TXREURO) and Africans (TXRAFR) having an additional negative influence in a limited number of the regressions

. Employment and hours:

- proportion of employment of qualified and semi-qualified professionals (PQESQ), as firm size (DIMEMP) have a positive effect.

- standard hours (HORNOR) shows negatively in some cases. Hours in commerce (HORTOCO), however, appear with a positive influence in HOMIOUH and HOMIH

. General Economic Conditions and Business Cycle:

- in HOMLEGH regressions either unemployment (TXDESCE) shows as positive or, if negative, the real wage level (ISARTCC) also appears negatively.

- in the other regressions, somewhat the opposite is found. GDP per capita (PIBPPC) shows positively; in some cases unemployment also shows up positively.

. Inequality:

- in general, less inequality – lower WQSNQ and WQSPA - enhances extreme crimes. This is in opposition to findings for the cross-section data set; yet, it does not show up in confirmed homicides.

. Prices:

- inflation rate (IPPIBCE or ICPRIV) has a negative impact on some of the regressions.

. Sector Composition:

- weight of secondary sector (EMSECU) or of tertiary (EMTERC) decreases HOMIOUH and HOMIH. A positive influence of tertiary on HOMLEGH was found, however.

. Public Sector and Capital Markets

- either both public administration surplus (CFAPCE) and the real discount rate (TXDBPR) show simultaneously with a positive influence on the regressions, or the real commercial banks lending rate appeared isolated with a negative sign.

Good economic conditions may refrain homicides, but they more likely enhance HOMIOUH and, hence, total HOMIH.

Table 3.7. *Linear Regressions, Corporal Offences – Portugal*

	Dependent Variables:											
	HOMLEGH				HOMIOUH				HOMIH			
	PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	95.2658	80.1046	10.0654	4.12157	-51.2841	-46.9226	-1.28730	1.52673	-50.0494	-47.7308	.599089	4.21239
	(19.3416)	(13.4292)	(1.08504)	(1.43237)	(11.4893)	(10.5046)	(.138534)	(.216359)	(9.97686)	(9.01912)	(.605907)	(.172375)
	[.001]	[.000]	[.000]	[.021]	[.001]	[.001]	[.000]	[.000]	[.000]	[.000]	[.361]	[.000]
POMINEN	-.505753E-02	-.639666E-02										
	(.970620E-03)	(.785579E-03)										
	[.000]	[.000]										
	|-1.88630|	|-2.38576|										
IPOMINE			-2.76315								2.47174	4.58454
			(.869626)								(.331870)	(.216637)
			[.025]								[.000]	[.000]
			|-.483084|								|.340741|	|.632000|
TXMORT										.652800		
										(.271343)		
										[.037]		
										|.104910|		
ESVIFN		.324820	-6.35603	-3.31049								
		(.071923)	(.963548)	(.810822)								
		[.001]	[.001]	[.004]								
		|1.44211|	|-4.08989|	|-2.13019|								
LONGEV					2.13026	1.96360			2.18285	2.00920		
					(.132266)	(.144691)			(.114855)	(.116950)		
					[.000]	[.000]			[.000]	[.000]		
					|1.05971|	|.976806|			|1.0807|	|.994773|		
P65M	.200260			1.44577			.141669				1.15258	1.73194
	(.083312)			(.157965)			(.066891)				(.181128)	(.043822)
	[.037]			[.000]			[.079]				[.001]	[.000]
	|1.49703|			|1.98196|			|.148900|				|1.24586|	|1.87212|
IDEID							-6.07214	-8.84112				
							(.770909)	(.519483)				
							[.000]	[.000]				
							|-4.36992|	|-6.36267|				
ID1CASH	-1.73289	-1.53805										
	(.400263)	(.316091)										
	[.001]	[.001]										
	|-6.02450|	|-5.34714|										
POPED1	-.923964E-02						-1.13255	-1.91217				
	(.628508E-02)						(.060278)	(.060934)				
	[.172]						[.000]	[.000]				
	|-.340449|						|-.738511|	|-1.24689|				

POPED4	-.106988 (.038002) [.018] |-.955699|	-.093262 (.028564) [.010] |-.833090|					1.02305 (.109081) [.000] |1.25516|	.371742 (.030739) [.000] |.456081|				
TXRESTR	2.56766 (.739877) [.006] |5.31847|	9.91550 (.915095) [.000] |20.5383|	5.53606 (.467273) [.000] |7.91748|	6.89267 (1.34250) [.001] |9.85764|								
TXREURO				-5.06754 (.621422) [.000] |-10.4058|						-5.58467 (2.20136) [.030] |-.241870|		
TXRAFR		-11.2743 (1.19957) [.000] |-11.5709|										
TXACTC								-.702262 (.059798) [.000] |-.624714|				
PPACTFE			5.34708 (1.17781) [.006] |6.85179|									
PTCO	.039238 (.029210) [.209] |.416080|										-.995879 (.103138) [.000] |-.957877|	-1.20553 (.044833) [.000] |-1.15952|
DIMEST		.287858 (.087880) [.010] |3.95982|		-3.08085 (.879949) [.008] |-5.61741|		.266442 (.133196) [.071] |.277179|						
PQESQ			1.89552 (.239311) [.001] |3.60419|	1.14192 (.203185) [.000] |2.17127|							.592479 (.153545) [.008] |.888290|	.444382 (.043090) [.000] |.666250|
HORNOR	-.141052 (.052437) [.023] |-1.32788|	-.200846 (.032115) [.000] |-1.89078|									-.368018 (.085193) [.005] |-.551760|	-.103235 (.018660) [.001] |-.154777|
HORTOCO					.594172 (.173560) [.005] |.260352|	.480231 (.165350) [.014] |.210426|		.120054 (.029544) [.007] |.102480|	.581548 (.150713) [.002] |.253618|	.456560 (.134043) [.007] |.199109|		
TXDESCE		.053421	-4.43075	-2.50717			.814895	.875007				

	(.020713) [.030] |.428700|	(.376075) [.000] |-5.23086|	(.234871) [.000] |-2.95991|			(.060598) [.000] |.737591|	(.046566) [.000] |.792002|				
PIBPPC						7.21498 (.677460) [.000] |6.81916|	7.73955 (.390072) [.000] |7.31496|			2.15328 (.511742) [.006] |2.09306|	.806908 (.079856) [.000] |.784341|
TCPIBPPC											-.381298 (.029903) [.000] |-.441640|
SALRTCC											.102646 (.011888) [.000] |.093635|
ISARTCC		-16.7614 (1.76879) [.000] |-15.5946|	-4.85952 (.590747) [.000] |-4.52124|								
WQSNQ						-1.20291 (.096074) [.000] |-1.75360|				-1.11053 (.144603) [.000] |-1.66499|	-.930367 (.051648) [.000] |-1.39488|
WQSPA				-4.52752 (.926883) [.000] |-.276603|	-2.81524 (1.19161) [.038] |-.171994|		-.171989 (.035118) [.003] |-.250724|	-4.59265 (.804872) [.000] |-.279258|	-2.94323 (.935510) [.010] |-.178964|		
IPPIBCE				-.181607 (.020955) [.000] |-.516172|	-.252173 (.039946) [.000] |-.716736|		-.659757 (.077698) [.000] |-.903022|	-.164986 (.018197) [.000] |-.466716|	-.199520 (.024281) [.000] |-.564408|		
ICPRIV		-1.84015 (.351410) [.003] |-3.14609|								.694086 (.194940) [.012] |.935700|	
EMSECU				-.591387 (.083448) [.000] |-.359473|	-.659940 (.082126) [.000] |-.401142|			-.634314 (.072463) [.000] |-.383745|	-.661412 (.063411) [.000] |-.400139|		
EMTERC		1.26244 (.176332) [.001] |1.78885|				-1.51409 (.188228) [.000] |-1.64488|					
CFAPCE		.420798 (.158407)				.653086 (.053670)				1.60344 (.152410)	1.74576 (.055872)

			[.045]				[.000]				[.000]	[.000]
			|.541614|				|.644472|				|1.62732|	|1.77175|
TXDBPR			.586947				.214516				.604911	
			(.244056)				(.085724)				(.198017)	
			[.061]				[.046]				[.022]	
			|.335232|				|.093934|				|.272421|	
TXACM1R					-.484529	-.498616		-1.08018	-.460436	-.486974		
					(.044018)	(.039993)		(.033387)	(.038223)	(.033975)		
					[.000]	[.000]		[.000]	[.000]	[.000]		
					|-.609633|	|-.627356|		|-.786042|	|-.576584|	|-.609816|		
SSR	.082153	.038668	.828793E-02	.037496	1.58347	1.16110	.144470E-2	.115727E-2	1.19403	.670390	.435505E-02	.570056E-3
SER	.090638	.065547	.040713	.068462	.363258	.324891	.015517	.013888	.315440	.258919	.026941	.974727E-2
RBAR2	.792125	.891286	.994007	.983055	.980904	.984725	.999488	.999590	.985737	.990390	.998368	.999786
DW	2.86713	2.69049	3.33211	3.47335	2.67475	3.05146	3.23061	3.47939	3.18577	3.04520	2.92967	3.09349
	(.218,1.00)	(.024,1.00)	(.026,1.00)	(.805,1.00)	(.347,1.00)	(.603,1.00)	(.077,1.00)	(.398,1.00)	(.861,1.00)	(.416,1.00)	(.000,1.00)	(.018,1.00)
NOBS	19	19	17	17	19	19	17	17	19	19	17	17

Criminal Activities

International Evidence

General crime incidence and drug offenses do not show the same causes, according to the regressions obtained. In common:

- education decreases both: TXALA98 and IEDUC98 show with a negative sign in either of the regressions. However, public expenditures in education (DPEDPNB) has a significant positive impact on both as well – in DELDRO, with larger betas in absolute value than other education coefficients

- economic affluence favors both indicators: (PNBPC98, PNBPCGR have positive coefficients; TAXDES negative)

Other indicators are not coincidental:

. In CRIMREG regressions

- life expectancy (ESPVN) has a positive influence; the dependency coefficient (youngsters and old ones) has a negative one.

- female participation (TXAMH98) increases crime.

- urbanization (POPURB) increases crime and involvement in other than primary sector (PAGR98 has a negative sign)

- public surpluses decrease crime; voting habits or propensity (AFLVO) seem to enhance crimes

- inequality increases crimes: proportion of income in the richest 20th (RIC20) has a positive influence.

. In DELDRO regressions

- high interest rates promote drug offenses

- international relations variables appear on drug offense regressions. Current Account surplus discourages drug offenses whereas a home currency devaluation increases it. Yet, countries that concede aid are more prone to suffer drug offenses than others (which may just be related to country's economic abundance).

Table 3.8. *Linear Regressions, Criminal Activities – International Evidence*

<table>
<tr><th></th><th colspan="6">Dependent Variables:</th></tr>
<tr><th></th><th colspan="3">CRIMREG</th><th colspan="3">DELDRO</th></tr>
<tr><th>Indep. Var.</th><th>(1)</th><th>(2)</th><th>Simp. Cor.</th><th>(1)</th><th>(2)</th><th>Simp. Cor.</th></tr>
<tr><td>INTERC.</td><td>-8003.02
(2667.59)
[.005]</td><td>-46733.6
(4626.67)
[.000]</td><td></td><td>28.3176
(65.5000)
[.669]</td><td>24.8292
(69.2507)
[.723]</td><td></td></tr>
<tr><td>ESPVN</td><td></td><td>652.183
(60.2800)
[.000]
|.948445|</td><td>0.32076
(64)
[0.010]</td><td></td><td></td><td>0.34044
(59)
[0.008]</td></tr>
<tr><td>COEDEP</td><td></td><td>-157.837
(44.4782)
[.005]
|-.217873|</td><td>-0.26653
(64)
[0.033]</td><td></td><td></td><td>-0.10864
(59)
[0.413]</td></tr>
<tr><td>TXALA98</td><td></td><td></td><td>0.33091
(66)
[0.007]</td><td>-1.01507
(.705455)
[.161]
|-.180840|</td><td>-.939735
(.731547)
[.210]
|-.166706|</td><td>0.14173
(59)
[0.284]</td></tr>
<tr><td>IEDUC98</td><td></td><td>-16024.6
(4930.41)
[.008]
|-.295174|</td><td>0.43332
(66)
[0.000]</td><td></td><td></td><td>0.22767
(59)
[0.083]</td></tr>
<tr><td>TXAMH98</td><td>79.0255
(24.9595)
[.004]
|.389146|</td><td>279.550
(23.4648)
[.000]
|1.08198|</td><td>0.31858
(63)
[0.011]</td><td></td><td></td><td>0.12492
(58)
[0.350]</td></tr>
<tr><td>TAXDES</td><td></td><td>-244.004
(39.0065)
[.000]
|-.369334|</td><td>-0.081227
(34)
[0.648]</td><td></td><td></td><td>-0.16880
(30)
[0.373]</td></tr>
<tr><td>PNBPC98</td><td>.134362
(.031312)
[.000]
|.566385|</td><td></td><td>0.56297
(66)
[0.000]</td><td></td><td></td><td>0.60390
(59)
[0.000]</td></tr>
<tr><td>PNBPCGR</td><td>227.887
(90.5908)
[.017]
|.320166|</td><td></td><td>0.20995
(61)
[0.104]</td><td>6.46988
(2.35197)
[.010]
|.360082|</td><td>5.85930
(2.64181)
[.036]
|.289184|</td><td>0.11185
(54)
[0.421]</td></tr>
<tr><td>RIC20</td><td>60.7791
(36.5961)
[.107]
|.196971|</td><td></td><td>-0.28622
(51)
[0.042]</td><td></td><td></td><td>-0.23788
(46)
[0.111]</td></tr>
<tr><td>POPURB</td><td></td><td>48.1693
(16.9836)
[.016]
|.190676|</td><td>0.32127
(66)
[0.009]</td><td></td><td></td><td>0.20218
(59)
[0.125]</td></tr>
<tr><td>PAGR98</td><td>-38.7941
(16.3541)
[.024]
|-.239412|</td><td>-214.439
(31.0923)
[.000]
|-.578812|</td><td>-0.32588
(57)
[0.013]</td><td>1.17646
(.603958)
[.061]
|.279412|</td><td>1.20337
(.621647)
[.064]
|.290032|</td><td>-0.037397
(50)
[0.797]</td></tr>
<tr><td>AFLVO</td><td></td><td>55.6809
(11.7541)
[.001]
|.280473|</td><td>0.10579
(58)
[0.429]</td><td></td><td></td><td>-0.065422
(52)
[0.645]</td></tr>
<tr><td>SORPI98</td><td>-136.891
(107.323)
[.212]
|-.130166|</td><td>-389.320
(69.3452)
[.000]
|-.400909|</td><td>-0.011161
(49)
[0.939]</td><td></td><td></td><td>0.10332
(43)
[0.510]</td></tr>
<tr><td>DPEDPNB</td><td>370.072
(164.960)
[.032]
|.228914|</td><td></td><td>0.38358
(62)
[0.002]</td><td>19.3164
(5.54771)
[.002]
|.438835|</td><td>21.8037
(6.24185)
[.002]
|.474990|</td><td>0.37191
(57)
[0.004]</td></tr>
<tr><td>DEPR98</td><td></td><td></td><td>0.034102
(55)
[0.805]</td><td>2.50901
(1.17677)
[.041]
|.316846|</td><td>1.36234
(.987054)
[.179]
|.168155|</td><td>0.073532
(48)
[0.619]</td></tr>
<tr><td>LENR98</td><td></td><td></td><td>-0.14646
(56)
[0.281]</td><td></td><td></td><td>-0.062880
(49)
[0.668]</td></tr>
<tr><td>BGSPI98</td><td></td><td></td><td>0.10514
(53)
[0.454]</td><td></td><td>-.014647
(.800176E-02)
[.079]
|-.223354|</td><td>-0.082812
(48)
[0.576]</td></tr>
<tr><td>DSDR98E</td><td></td><td></td><td>-0.13219
(65)
[0.294]</td><td>10.9937
(10.0161)
[.281]</td><td></td><td>-0.13400
(58)
[0.316]</td></tr>
</table>

				|.169720|		
APDP			0.48522	.570596	.562534	0.48030
			(65)	(.142098)	(.146968)	(58)
			[0.000]	[.000]	[.001]	[0.000]
				|.577738|	|.580032|	
SSR	.766987E+08	.357104E+07		75187.6	68544.3	
SER	1598.94	569.772		50.0625	51.3451	
RBAR2	.654762	.956569		.525617	.533066	
LM het	.011000	.869110		.534741	.034624	
	(.916)	(.351)		(.982)	(.852)	
NOBS	38	21		38	34	

Portugal

Reported crimes seem to have common factors with convictions; defendants show in some cases opposite influence of the variables. Of common factors:

. Demographic variables

- weight of people with low levels of education (POPED1) increase crime and people with higher schooling levels (POPED4) decrease convictions. They usually don't show up in defendants regressions.

- immigration indicators show up in some of the convictions and defendants regressions; they indicate a positive influence in most cases (when not, they coexist with positive coefficients of indicators of the same category).

. General Economic Conditions and Business Cycle:

- unemployment (TXDESCE) shows a negative sign in the regressions. In some others per capita GDP (PIBPPC) shows up positively. Other indicators have mixed influences.

. Sector Composition:

- weight of tertiary (EMTERC) promotes defendants and convictions.

- public surpluses have a negative impact in some regressions.

. Capital Markets

- investment (INVPIB) dissuades crimes, consistently, the real discount rate (TXDBPR) shows a positive influence on the regressions, in others the spread (SPRE1). Tight capital markets dissuade crime.

On the other hand:

. Demographic variables

- youth (IDEJOV) – contrary to common wisdom - has a negative effect on crimes, and weight of oldsters (IDEID) a positive one in convictions. Defendants show mixed effects: both tales would enhance them.

- age of male at first marriage (ID1CASH) decreases crime and convictions, but has a positive effect on defendants

. Employment and hours:

- proportion of non-self-employment (PTCO) and firm size (DIMEMP) have a negative effect on crime. The former has a positive influence on defendants.
- proportion of employment of qualified and semi-qualified professionals (PQESQ) have a positive effect in one of crime regressions, a negative one in some others.
- standard hours (HORNOR) shows positively for defendants, negatively in convictions.

Table 3.9. *Linear Regressions, Criminal Activities – Portugal*

Dependent Variables:												
	CRPOLHA				ARGHAB2				CONDHA2			
	PLAIN		SMOOTH		PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	-6.82919 (51.3396) [.897]	19.2813 (4.69273) [.003]	-3.97369 (.420410) [.000]	-2.07758 (.114004) [.000]	-68.1293 (15.6047) [.012]	-53.8259 (23.7029) [.064]	2.75294 (.330104) [.000]	-.455602 (.176723) [.042]	12.3662 (11.0294) [.305]	7.16993 (5.66464) [.253]	-1.41506 (.330970) [.004]	1.14865 (.200160) [.000]
POMINEN									.324565E-02 (.681971E-03) [.003] |.183407|		2.77959 (.361444) [.000] |.201646|	1.37233 (.352936) [.004] |.163720|
ESVIFN					-1.42289 (.227685) [.003] |-.441633|	-.777516 (.182784) [.005] |-.241323|	-1.96998 (.288851) [.000] |-.704353|		-.461632 (.052300) [.000] |-.371564|	-.311982 (.041563) [.000] |-.251111|		
LONGEV										.267373 (.026557) [.000] |.349130|		
P65M					.896352 (.104107) [.001] |.478437|	.832034 (.153209) [.002] |.444107|		-.531289 (.198059) [.036] |-.401734|				
IDEJOV	-1.70655 (.260405) [.000] |-1.43994|		-1.86983 (.787059) [.064] |-.905161|		.881780 (.107083) [.001] |1.69731|	.693470 (.123763) [.001] |1.33484|						
IDEID									.589877 (.164847) [.012] |.838282|	.798612 (.114136) [.000] |1.13492|		
TXFEC										1.82961 (.239345) [.000] |.427717|		
ID1CASH	2.57526 (1.63352) [.154] |.290302|		-1.13183 (.299985) [.013] |-.857124|	-1.28373 (.172154) [.000] |-.972158|	5.99259 (.791834) [.002] |1.39453|	4.33660 (.774233) [.001] |1.00916|	2.02095 (.268490) [.000] |1.97911|		-1.17901 (.303819) [.008] |-.711503|	-1.22793 (.213722) [.001] |-.741023|	.573344 (.118341) [.002] |.462510|	
INDMASC												-1.13584 (.443928) [.031] |-.056709|

POPED1	.125061 (.037654) [.011] |.104808|		.685496 (.176265) [.012] |.189388|									
POPED4							.587786 (.098004) [.001] |.579162|		-.233824 (.037385) [.001] |-.432816|	-.208170 (.023544) [.000] |-.385331|		
TXRESTR					10.3654 (1.09655) [.001] |1.44465|	9.40479 (1.35208) [.000] |1.31076|		-6.02732 (1.58881) [.009] |-4.42954|	1.54893 (.480801) [.018] |.559826|		-.918335 (.111808) [.000] |-.555938|	-3.31912 (.438932) [.000] |-2.08041|
TXREURO												2.95220 (.348409) [.000] |2.50140|
TXRAFR								7.30604 (1.62296) [.004] |4.77392|		1.45386 (.239817) [.001] |.257384|		
TXACTC								.575479 (.138345) [.006] |.331448|				
PPACTFE					-1.22961 (.175833) [.002] |-.679249|	-1.65610 (.196898) [.000] |-.914843|		-.724708 (.403936) [.123] |-.539573|	.389670 (.071313) [.002] |.558221|	.628811 (.075614) [.000] |.900802|		
PTCO			-.420945 (.156564) [.043] |-.260918|		.354222 (.060370) [.004] |.288029|	.267814 (.080509) [.016] |.217768|		1.00189 (.255289) [.008] |.770309|				
DIMEMP		-1.73089 (.054515) [.000] |-1.02506|		-1.11035 (.168653) [.000] |-.879546|								
DIMEST												-.347586 (.137569) [.032] |-.285277|
IG											-.452415 (.126663) [.009] |-.354548|	
PQESQ			.390094				-.151911	-.369646				

			(.073392) [.003] |.280434|				(.075240) [.090] |-.162843|	(.052923) [.000] |-.396248|				
HORNOR					.305984 (.050816) [.004] |.194685|	.259995 (.074243) [.013] |.165424|	.355752 (.092741) [.009] |.379518|		-.156434 (.031996) [.003] |-.258114|	-.118468 (.018465) [.001] |-.195471|		
TXDESCE		-.359021 (.157740) [.049] |-.117233|			-.876796 (.132937) [.003] |-.522717|	-.597092 (.092699) [.001] |-.355967|			-.140598 (.031469) [.004] |-.217367|			
PIBPPC			2.30313 (.435161) [.003] |1.23783|	1.63797 (.104502) [.000] |.880333|	-.792178E-02 (.441250E-02) [.147] |-.520969|							
TCPIBPPC												-.165538 (.018134) [.000] |-.117577|
REMPC	-.041993 (.012899) [.012] |-.708698|						-.601576 (.152581) [.008] |-.429039|				.725474 (.079905) [.000] |.426204|	
SALRTCC				.071346 (.041065) [.126] |.029836|								
SALPIB	.501338 (.120997) [.003] |.235974|	.548437 (.061520) [.000] |.258143|			-.111865 (.035836) [.035] |-.137689|							
WQSNQ											.411022 (.083197) [.002] |.358115|	
EMTERC					.241080 (.039903) [.004] |.641362|	.198783 (.053898) [.010] |.528836|			.015525 (.750954E-02) [.084] |.107110|			
CFAPCE	-.272454 (.076060) [.007] |-.129142|	-.304765 (.091992) [.009] |-.144457|									-.283270 (.032330) [.000] |-.175127|	
INVPIB				-.628580 (.030236)				-.529372 (.081536)		-.029502 (.549928E-02)		

				[.000]				[.001]		[.002]		
				|-.330627|				|-.443236|		|-.127694|		
TXDBPR			.445328				.220915					
			(.098600)				(.094051)					
			[.006]				[.057]					
			|.121185|				|.070965|					
SPRE1												.232351
												(.025461)
												[.000]
												|.203311|
SHANOH							-.341965					
							(.174426)					
							[.098]					
							|-.351111|					
EXIMPIB		.152169										
		(.079632)										
		[.088]										
		|.073328|										
SSR	1.26213	1.40723	.424570E-02	.921520E-02	.044731	.175137	.795740E-02	.684514E-02	.015219	.606280E-02	.516772E-02	.986860E-02
SER	.397198	.395423	.029140	.036283	.105748	.170849	.036417	.033777	.050364	.031788	.027171	.033114
RBAR2	.993787	.993842	.999151	.998684	.998365	.995731	.998227	.998474	.997505	.999006	.999330	.999081
DW	2.93511	1.96995	3.03173	3.24809	2.36372	2.63442	2.94839	2.79903	2.89910	2.62616	2.80716	3.19611
	(.358,1.00)	(.010,.984)	(.071,1.00)	(.730,1.00)	(.000,1.00)	(.000,1.00)	(.039,1.00)	(.008,1.00)	(.000,1.00)	(.000,1.00)	(.083,1.00)	(.632,1.00)
NOBS	15	15	13	13	17	17	15	15	17	17	15	17

. Demographic variables

- life expectancy (ESPVN) decreases imprisonment.

- literacy, TXALA98, show with a positive sign in all of the regressions.

. Employment:

- female participation, TXAMH98, show with a positive sign in the flow regressions.

. Inequality:

- inequality increases imprisonment: proportion of income in poorest 20-th (POB20) decreases the flow, in the richest 20th (RIC20) increases the stock. (Yet proportion of income in poorest 20-th also increases the stock).

. Sector Composition:

- importance of the primary sector (PAGR98) counteracts the total inmates

. Public Sector:

- public sector surplus (SORPI98) move in the opposite direction to the flow

Opposite influence in stocks and flows was found for:

. General Economic Conditions and Business Cycle:

- general economic conditions (PNBPC98) enhance imprisonment; yet, the stock of prisoners increases with unemployment (TAXDES).

. Capital Markets

- investment (INVPIB98) enhances the flow which may just compound the economic conditions effects; consistently to what was found for inmates, a good investment risk evaluation (ICRGD98) decreases the stock.

. International Relations

- aid forwarded (APDP) moves oppositely to prison sentences; in the same direction as the number of inmates.

The fact that economic indicators move oppositely for stocks and flows suggest the following comment. Usually, more crimes are done and sentenced in good times, yet, good economic conditions and tight labor markets would propel the release of prisoners – prison penances are sentenced in good times, yet, completed during bad times.

Table 3.10. *Linear Regressions, Prisoners – International Evidence*

<table>
<tr><th></th><th colspan="5">Dependent Variables:</th></tr>
<tr><th></th><th colspan="3">PPRESAS</th><th colspan="2">PRISION</th></tr>
<tr><th>Indep. Var.</th><th>(1)</th><th>(2)</th><th>Simp. Cor.</th><th>(1)</th><th>Simp. Cor.</th></tr>
<tr><td>INTERC.</td><td>420.020
(300.725)
[.174]</td><td>-363.575
(174.454)
[.044]</td><td></td><td>-2531.50
(1818.25)
[.178]</td><td></td></tr>
<tr><td>ESPVN</td><td>-24.0889
(5.29496)
[.000]
|-.892924|</td><td>-6.70498
(2.71180)
[.018]
|-.458744|</td><td>-0.13564
(57)
[0.314]</td><td>-39.4056
(13.8026)
[.009]
|-.554099|</td><td>-0.074015
(75)
[0.528]</td></tr>
<tr><td>TXALA98</td><td>12.8413
(2.43725)
[.000]
|.830470|</td><td>8.59658
(2.14190)
[.000]
|.669289|</td><td>0.22626
(58)
[0.088]</td><td>33.5008
(9.52487)
[.002]
|.361560|</td><td>0.11025
(76)
[0.343]</td></tr>
<tr><td>TXAMH98</td><td>5.20074
(1.33133)
[.001]
|.535988|</td><td>5.02950
(1.29503)
[.000]
|.555124|</td><td>0.35196
(56)
[0.008]</td><td></td><td>-0.11811
(73)
[0.320]</td></tr>
<tr><td>TAXDES</td><td></td><td></td><td>-0.19338
(32)
[0.289]</td><td>10.0948
(6.81066)
[.153]
|.159409|</td><td>-0.0028963
(39)
[0.986]</td></tr>
<tr><td>PNBPC98</td><td>.011356
(.249487E-02)
[.000]
|1.05571|</td><td>.550755E-02
(.209154E-02)
[.012]
|.529468|</td><td>-0.059803
(58)
[0.656]</td><td></td><td>-0.010914
(76)
[0.925]</td></tr>
<tr><td>POB20</td><td>-45.8039
(7.84242)
[.000]
|-.865569|</td><td>-40.2019
(7.57586)
[.000]
|-.823615|</td><td>-0.27115
(46)
[0.068]</td><td>98.5727
(43.4360)
[.034]
|.659114|</td><td>-0.35129
(60)
[0.006]</td></tr>
<tr><td>RIC20</td><td></td><td></td><td>0.21074
(46)
[0.160]</td><td>63.5465
(16.7521)
[.001]
|1.19764|</td><td>0.38725
(60)
[0.002]</td></tr>
<tr><td>PAGR98</td><td></td><td></td><td>-0.014747
(53)
[0.917]</td><td>-30.7164
(4.96494)
[.000]
|-.866937|</td><td>-0.11155
(68)
[0.365]</td></tr>
<tr><td>SORPI98</td><td>-5.81209
(5.76180)
[.322]
|-.106692|</td><td></td><td>0.22770
(42)
[0.147]</td><td></td><td>0.10947
(52)
[0.440]</td></tr>
<tr><td>INPIB98</td><td>5.08742
(2.44622)
[.047]
|.236278|</td><td>2.91523
(2.28962)
[.211]
|.153388|</td><td>0.028838
(55)
[0.834]</td><td></td><td>-0.068356
(70)
[0.574]</td></tr>
<tr><td>LENR98</td><td></td><td></td><td>0.058948
(53)
[0.675]</td><td></td><td>0.12533
(67)
[0.312]</td></tr>
<tr><td>ICRGD98</td><td></td><td></td><td>-0.11874
(46)
[0.432]</td><td>-11.4666
(5.49112)
[.049]
|-.455238|</td><td>-0.076789
(59)
[0.563]</td></tr>
<tr><td>APDP</td><td>-.789138
(.223241)
[.001]
|-.597948|</td><td>-.558855
(.231076)
[.021]
|-.417122|</td><td>-0.12728
(57)
[0.345]</td><td>1.40625
(.390560)
[.002]
|.461094|</td><td>0.026118
(75)
[0.824]</td></tr>
<tr><td>SSR</td><td>152219</td><td>265729</td><td></td><td>425674</td><td></td></tr>
<tr><td>SER</td><td>75.0850</td><td>84.7458</td><td></td><td>142.374</td><td></td></tr>
<tr><td>RBAR2</td><td>.646557</td><td>.506126</td><td></td><td>.745459</td><td></td></tr>
<tr><td>LM het</td><td>11.8332
(.001)</td><td>16.2405
(.000)</td><td></td><td>2.60256
(.107)</td><td></td></tr>
<tr><td>NOBS</td><td>36</td><td>45</td><td></td><td>30</td><td></td></tr>
</table>

Portugal

. Demographic variables

- the weight of youngsters (IDEJOV) – and birth rates, TXNAT - contributes negatively to imprisonment. Proportion of older population (IDEID) has a positive influence.

- age of male at first marriage (ID1CASH) decreases imprisonment according to some regressions

- weight of people with low levels of education affect positively the stock of prisoners.

- immigration indicators indicate a positive influence in some of both regressions

. Employment and hours:

- standard hours (HORNOR) shows up positively

. General Economic Conditions and Business Cycle:

- unemployment (TXDESCE) increases imprisonment, the real wage level (REMPC) appears negatively. This is the effect found for the stock regressions in the cross-section data set.

. Sector Composition:

- weight of tertiary sector (EMTERC) decreases imprisonment, but it only shows in one regression.

. Public Sector

- either both public administration surplus (CFAPCE) has a negative coefficient and public expenditures positive in some of the regressions.

Table 3.11. *Linear Regressions, Prisoners – Portugal*

	Dependent Variables:							
	RECHAB2				RECCHA2			
	PLAIN		SMOOTH		PLAIN		SMOOTH	
Indep. Var.	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
INTERC.	-6.45434 (3.88559) [.125]	.928361 (.080829) [.000]	-2.01088 (.120022) [.000]	-2.34294 (.442631) [.000]	14.4027 (2.34455) [.000]	14.2509 (2.34563) [.000]	-1.60956 (.040370) [.000]	-.128174 (0.57994) [.042]
TXNAT				-.608151 (.083192) [.000] |-.259369|		-.099598 (.037811) [.023] |-.622254|		
TXMORT								-.085261 (.059096) [.168] |-.062352|
ESVIFN					-.053040 (.019353) [.016] |-.187718|			
P65M							-.442600 (.021540) [.000] |-.412315|	
IDEJOV	-.044883 (.014327) [.010] |-.853808|		-4.80631 (.429915) [.000] |-3.74367|				-3.53878 (.103904) [.000] |-2.95048|	
IDEID				2.26834 (.628309) [.004] |1.26238|				
TXFEC						.539628 (.219894) [.032] |.513474|		
ID1CASH					-.326811 (.052085) [.000] |-.702425|	-.520185 (.075926) [.000] |-1.15391|		
POPED1			.851004 (.098298) [.000] |.539339|				.596999 (.023359) [.000] |.405002|	
TXRESTR					.849007 (.094968) [.000] |1.16502|	.897550 (.093209) [.000] |1.22603|		
TXRAFR								.828971 (.087275) [.000] |.680374|
TXRBRAS		7.32356 (.372032) [.000] |1.36823|		.284161 (.150212) [.085] |.268223|				
TXACTC						.015076 (.809715E-02) [.090] |.073603|		.099668 (.038455) [.020] |.095176|
PPACTFE	.169255 (.091683) [.092] |.924030|		-.568756 (.109677) [.004] |-.487384|					
DIMEMP				.532372 (.187391) [.016] |.574336|				
DIMEST						-.076812 (.024512) [.010] |-.712621|		
IG					-3.82493 (.883748) [.001] |-.674640|			
HORNOR	.048920 (.022286)		.042874 (.015156)				.296941 (.011422)	

	[.051] |.307610|		[.037] |.052642|				[.000] |.390270|	
TXDESCE	.047432 (.018066) [.024] |.279464|		.471216 (.022465) [.000] |.406690|	.571815 (.083355) [.000] |.420966|				
REMPC	-.166777E-02 .145121E-02) [.275] |-.492254|	-.169572E-02 (.260902E-03) [.000] |-.451746|	-1.45228 (.239144) [.002] |-1.19210|				-1.37760 (.090755) [.000] |-1.21043|	.246854 (.111828) [.042] |.141888|
SALPIB			.408805 (.063382) [.001] |.221240|				-.348487 (.026955) [.000] |-.201877|	
EMTERC			-.962616 (.096610) [.000] |-.973424|					
DESPURH			.379094 (.025976) [.000] |.276799|				.912858 (.012358) [.000] |.713471|	
CFAPCE							-.340299 (.886550E-02) [.000] |-.314654|	
FONOH							-.442099 (.016934) [.000] |-.615755|	
EXIMPIB								.204811 (.028783) [.000] |.200090|
SSR	.037819	.079568	.202857E-03	.014406	.014544	.748622E-02	.801575E-04	.059553
SER	.058635	.054286	.636956E-02	.036188	.032232	.026088	.400393E-02	.061009
RBAR2	.950891	.971391	.999928	.998129	.987217	.991055	.999967	.995945
DW	2.30532 (.127,.997)	1.03028 (.000,.007)	3.14655 (.022,1.00)	1.81412 (.008,.925)	2.41067 (.389,..990)	3.03407 (.680,1.00)	3.25428 (.072,1.00)	1.36117 (.000,424)
NOBS	17	30	15	17	19	18	15	22

Armed Forces

International Evidence

People in Armed Forces and Public Military Expenditures turned out to include different set of explanatory variables, and when the same variables are included in both regressions, symmetric signs for the coefficients were found.

. Armed Contingents seem to be larger when

- both ends of age cohorts (COEDEP) are lighter

- female participation, TXAMH98, is higher (suggesting female solicitation from civil labor market due to male involvement in the military sector).

- general economic conditions (PNBPC98) are worse - unemployment (TAXDES) is higher

- secondary sector (PIND98) is more important

- public sector expenditures (GASPI98) are lower

- aid forwarded (APDP) is more important

. Public Military spending reacts

- negatively to education (IEDUC98)

- negatively to female participation (TXAMH98)
- positively to urbanization (POPURB)
- negatively to voting incidence (AFLVO)
- positively to public sector expenditures (GASPI98) but negatively to voting incidence (AFLVO)
- positively to the real deposit rate (DEPR98) (the only influence that, if linked to economic conditions, may appear similar in both types of regressions)

Table 3.12. *Linear Regressions, Military Sector – International Evidence*

	Dependent Variables:				
	FA98P			DPMIPNB	
Indep. Var.	(1)	(2)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	-1.89873	10.1325		3.56836	
	(5.31869)	(5.72069)		(1.23788)	
	[.724]	[.085]		[.005]	
COEDEP		-.149889	-0.27141		0.20084
		(.084059)	(154)		(130)
		[.083]	[0.001]		[0.022]
		|-.242783|			
IEDUC98			0.19095	-2.34041	-0.18646
			(154)	(1.35342)	(131)
			[0.018]	[.088]	[0.033]
				|-.272020|	
TXAMH98	.099929	.110849	-0.27010	-.014031	-0.16579
	(.065099)	(.049157)	(153)	(.011453)	(129)
	[.137]	[.030]	[0.001]	[.224]	[0.060]
	|.277364|	|.362258|		|-.136103|	
TAXDES	.206680	.163125	0.40209		0.26013
	(.078398)	(.070229)	(49)		(49)
	[.014]	[.026]	[0.004]		[0.071]
	|.417979|	|.325937|			
PNBPC98	-.952599E-04	-.135641E-03	0.18893		-0.0055874
	(.805170E-04)	(.659598E-04)	(149)		(129)
	[.247]	[.047]	[0.021]		[0.950]
	|-.326519|	|-.535081|			
POPURB			0.38990	.014505	0.079373
			(154)	(.010912)	(131)
			[0.000]	[.188]	[0.367]
				|.200414|	
PIND98	.149280		0.14855		0.27484
	(.100012)		(133)		(116)
	[.148]		[0.088]		[0.003]
	|.236541|				
AFLVO			0.038228	-.015018	0.037118
			(127)	(.011772)	(113)
			[0.670]	[.206]	[0.696]
				|-.140952|	
GASPI98	-.297316	-.302537	0.23956	.091178	0.38064
	(.134024)	(.115158)	(114)	(.037174)	(104)
	[.035]	[.013]	[0.010]	[.017]	[0.000]
	|-.399376|	|-.413938|		|.295295|	
DEPR98			-0.011540	.053417	0.084552
			(125)	(.028560)	(110)
			[0.898]	[.065]	[0.380]
				|.203983|	
LENR98			-0.076644		-0.078306
			(115)		(103)
			[0.416]		[0.432]
APDP	.014792	.017013	-0.093209		-0.091551
	(.010529)	(.888389E-02)	(153)		(130)
	[.172]	[.064]	[0.252]		[0.300]
	|.387511|	|.486575|			
SSR	232.044	254.273		176.128	
SER	2.98743	2.69535		1.54276	
RBAR2	.257968	.316078		.127108	
LM het	4.04319	5.53744		16.0884	
	(.044)	(.011)		(.000)	
NOBS	33	42		81	

Portugal

. Demographic variables

- the weight of youngsters (IDEJOV) – and birth rates, TXNAT - contributes negatively to permanent forces; proportion of older population (IDEID) has a positive influence. Consistently, life expectancy (ESVIFN) has a positive influence on mandatory effectives.

- weight of people with low levels of education affect positively some of the regressands. Yet, proportion of people with higher schooling levels is consistent with higher mandatory service

- immigration indicators indicate a negative influence in some of several regressions

. Employment and hours:

- proportion of non-self-employment (PTCO) shows up negatively

- standard hours (HORNOR) shows up negatively

. General Economic Conditions and Business Cycle show an inconsistent impact.

. Inequality:

- wage inequality decreases the regressands (WQSNQ, WQMSQ); yet the wage bill share (SALPIB) increases mandatory service.

. Prices:

- a high inflation rate has a negative coefficient occasionally (IPPIB, ICPRIV).

. Sector Composition

- weight of tertiary activities (EMTERC) has a positive coefficient in some of the regressions.

. Capital Market and Housing

- investment (INVPIB) or housing (SHANOH) have negative coefficients and the real interest rate positive (capital market tightness decreases contingents).

Table 3.13. *Linear Regressions, Military Sector – Portugal*

<table>
<tr><th></th><th colspan="11">Dependent Variables:</th></tr>
<tr><th></th><th colspan="4">MILCAR</th><th colspan="4">SMO</th><th colspan="3">FA</th></tr>
<tr><th></th><th colspan="2">PLAIN</th><th colspan="2">SMOOTH</th><th colspan="2">PLAIN</th><th colspan="2">SMOOTH</th><th>PLAIN</th><th colspan="2">SMOOTH</th></tr>
<tr><th>Indep. Var.</th><th>(1)</th><th>(2)</th><th>(1)</th><th>(2)</th><th>(1)</th><th>(2)</th><th>(1)</th><th>(2)</th><th>(1)</th><th>(1)</th><th>(2)</th></tr>
<tr><td>INTERC.</td><td>14.0301
(1.78051)
[.000]</td><td>20.0629
(1.72832)
[.000]</td><td>.441093
(.183816)
[.053]</td><td>-.405320
(.091221)
[.002]</td><td>63.6805
(6.80472)
[.000]</td><td>42.5606
(9.30544)
[.003]</td><td>.217952
(.060959)
[.009]</td><td>.964559
(.312341)
[.018]</td><td>35.4006
(1.79856)
[.000]</td><td>-1.53965
(.214153)
[.000]</td><td>-5.74720
(.531077)
[.000]</td></tr>
<tr><td>POMINEN</td><td></td><td></td><td></td><td></td><td>-.632512E-02
(.447913E-03)
[.000]
|-.240401|</td><td>-.489590E-02
(.648014E-03)
[.000]
|-.201200|</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TXNAT</td><td></td><td>.305156
(.089735)
[.006]
|.588711|</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-6.21717
(.693646)
[.000]
|-3.01952|</td></tr>
<tr><td>ESVIFN</td><td></td><td></td><td>-1.04697
(.130059)
[.000]
|-.372994|</td><td></td><td>.614193
(.076290)
[.000]
|.307888|</td><td>.672012
(.085988)
[.000]
|.328742|</td><td>.994124
(.119614)
[.000]
|.491599|</td><td>.918639
(.113410)
[.000]
|.454271|</td><td></td><td></td><td></td></tr>
<tr><td>LONGEV</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>.628628
(.219865)
[.021]
|.372765|</td></tr>
<tr><td>P65M</td><td></td><td></td><td>.676085
(.077548)
[.000]
|.513366|</td><td>.150471
(.083576)
[.109]
|.114256|</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>IDEJOV</td><td>-.290874
(.026298)
[.000]
| -1.96806|</td><td>-.620639
(.063794)
[.000]
|-4.19926|</td><td>-2.21913
(.294013)
[.000]
|-1.47736|</td><td>-1.65159
(.146708)
[.000]
|-1.09952|</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>IDEID</td><td></td><td></td><td></td><td></td><td>-1.08842
(.126658)
[.000]
|-.967605|</td><td>-1.46264
(.141008)
[.000]
|-1.27214|</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TXFEC</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1.14875
(.161498)
[.000]
|1.72326|</td></tr>
<tr><td>INDMASC</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-1.01735
(.352860)
[.024]
|-.053981|</td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>POPED1</td><td>.040906
(.340655E-02)
[.000]
|.385897|</td><td>.053384
(.539679E-02)
[.000]
|.503621|</td><td>1.28386
(.061374)
[.000]
|.651898|</td><td>1.17509
(.037262)
[.000]
|.596668|</td><td></td><td></td><td></td><td></td><td>.100315
(.579042E-02)
[.024]
|.693267|</td><td>-.189012
(.071242)
[.024]
|-.178297|</td><td>.881309
(.161134)
[.001]
|.686685|</td></tr>
<tr><td>POPED4</td><td></td><td></td><td></td><td></td><td>.190585
(.048151)
[.005]
|.204810|</td><td>.107205
(.045088)
[.049]
|.105518|</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>TXRESTR</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-.993372
(.070258)
[.000]
|-1.09180|</td><td></td><td>-.978273
(.337765)
[.027]
|-.348549|</td><td></td><td></td></tr>
<tr><td>TXREURO</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-.804244
(.037971)
[.000]
|-1.51292|</td></tr>
<tr><td>TXRBRAS</td><td></td><td>-24.5320
(3.79038)
[.000]
|-1.79865|</td><td></td><td></td><td></td><td></td><td></td><td>-1.00381
(.054399)
[.000]
|-1.23609|</td><td></td><td></td><td></td></tr>
<tr><td>TXACTC</td><td></td><td></td><td></td><td></td><td>.127407
(.039378)
[.014]
|.102758|</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>PPACTFE</td><td></td><td></td><td></td><td></td><td>-.690581
(.142143)
[.002]
|-.592396|</td><td>-.262073
(.172152)
[.172]
|-.212779|</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>PTCO</td><td></td><td></td><td>-.256091
(.055667)
[.004]
|-.183415|</td><td></td><td></td><td></td><td>-.512834
(.053608)
[.000]
|-.480751|</td><td>-.441343
(.047232)
[000]
|-.413733|</td><td>-.196287
(.026427)
[.000]
|-.377002|</td><td>.265391
(.070486)
[.004]
|.353119|</td><td></td></tr>
<tr><td>DIMEMP</td><td></td><td></td><td></td><td>.239864
(.088201)
[.026]
|.243670|</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>PQESQ</td><td></td><td></td><td></td><td></td><td></td><td></td><td>.169212
(.042431)
[.005]
|.247259|</td><td>.134860
(.037071)
[.008]
|.197064|</td><td></td><td></td><td></td></tr>
<tr><td>HORNOR</td><td></td><td></td><td>-.134905
(.040717)
[.016]
|-.139945|</td><td>-.179487
(.029931)
[.000]
|-.186193|</td><td>-.128180
(.027744)
[.002]
|-.133389|</td><td>-.157381
(.033285)
[.002]
|-.163250|</td><td>-.070948
(.013050)
[.001]
|-.103672|</td><td></td><td>-.239221
(.016140)
[.000]
|-.386292|</td><td></td><td></td></tr>
<tr><td>TXDESCE</td><td>.142736</td><td>.329727</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-.283100</td><td></td><td></td></tr>
</table>

	(.019181) [.000] |.293270|	(.035081) [.000] |.677469|						(.021160) [.000] |-.404608|		
TCPIBPPC					.080111 (.019194) [.004] |.118397|					
ISARTCC			-.852886 (.246571) [.013] |-.441447|						1.62166 (.199090) [.000] |1.55935|	
SALPIB				.144479 (.016232) [.000] |.279371|	.129180 (.017381) [.000] |.233160|	.520195 (.048275) [.000] |.315547|	.438168 (.047699) [.000] |.265790|	-.060788 (.010240) [.001] |-.182394|		
WQSNQ	-.924475 (.334584) [.016] |-.487515|	-.767790 (.258856) [.013] |-.404888|						-.709593 (.240227) [.025] |-.258214|	-.760913 (.179133) [.002] |-1.48975|	-.413733 (.051362) [.000] |-.720686|
WQMSQ	-1.09193 (.326057) [.005] |-.302937|									
IPPIB				-.100831 (.012286) [.000] |-.407569|	-.058260 (.922499E-02) [.000] |-.224380|					
ICPRIV			-.338815 (.071753) [.003] |-.327701|							
EMSECU										-.101495 (.024689) [.003] |-.175989|
EMTERC						.383180 (.034571) [.000] |.417262|	.498615 (.033928) [.000] |.542965|	.100842 (.011265) [.000] |.628146|		
DESPURH						-.246154 (.082636) [.021] |-.237714|	-.212642 (.072725) [.022] |-.205351|	-.027995 (.791465E-02) [.012] |-.157088|		
CFAPCE						.230803 (.039706)	.193969 (.037415)			

							[.001]	[.001]			
							|.228297|	|.191863|			
INVPIB						-.075672					
						(.023129)					
						[.014]					
						|-.173056|					
TXDBPR									.112267		
									(.842893E-02)		
									[.000]		
									|.191007|		
SPRE1		-.021115									-.149283
		(.891762E-02)									(.049784)
		[.037]									[.017]
		|-.091004|									|-.201054|
SHANOH			-.335108	-.170733	-.198991E-02				-.699597E-02	-.644772	
			(.054739)	(.037306)	(.579618E-03)				(.567416E-03)	(.115267)	
			[.001]	[.002]	[.011]				[.000]	[.002]	
			|-.367229|	|-.187098|	|-.155299|				|-.847224|	|-1.31266|	
EXIMPIB				.234547		-.070813					
				(.025889)		(.023853)					
				[.000]		[.021]					
				|.223753|		|-.158163|					
SSR	.122758	.047431	.166398E-2	.430644E-2	.031703	.039188	.154651E-2	.124608E-2	.015717	.014510	.471392E-2
SER	.097175	.065665	.016653	.023201	.067298	.074822	.014864	.013342	.051181	.038092	.024274
RBAR2	.984337	.992848	.999663	.999346	.998417	.998280	.999528	.999620	.997795	.993915	.998212
DW	1.91788	2.74206	3.17944	2.95612	3.51947	2.70358	3.02767	2.68943	2.52803	2.72925	3.09141
	(.028,.932)	(.256,1.00)	(.104,1.00)	(.262,1.00)	(.618,1.00)	(.000,1.00)	(.076,1.00)	(.001,1.00)	(.000,1.00)	(.412,1.00)	(.297,1.00)
NOBS	19	19	16	16	18	19	17	17	18	16	17

. Demographic variables

- education, TXALA98, promotes lost days due to strikes. Consistently, public expenditures in education have a positive impact on strike occurrence

. General Economic Conditions, and Business Cycle:

- unemployment (TAXDES) increases strike incidence and duration. Consistently, growth of per capita GNP exhibits a positive sign in strike duration equations – durations are counter-cyclical. Incidence, however, shows a positive coefficient for level of per capita GNP.

. Inequality:

- inequality (or poverty) increases all indicators: POB10, show a negative sign in all the regressions.

. Sector Composition:

- importance of the secondary sector (PIND98) – surprisingly - counteracts strike time losses

. Public Sector and Prices

- voting habits (AFLVO) enhance strike incidence
- Strike occurrence is higher in countries with worse public sector surplus (SORPI98) and higher inflation (TXINFAV)

. Capital Markets

- investment risk increases strike occurrence (ICRGD98 has a negative coefficient).

. International Relations

- aid forwarded (APDP) moves in the same direction as strike occurrence.

Table 3.14. *Linear Regressions, Strike Activity – International Evidence*

	Dependent Variables:					
	GREVET		TRAGRET		DIAGRET	
Indep. Var.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	.103341 (.085784) [.235]		-15.3282 (11.4621) [.193]		-57.5050 (142.658) [.692]	
TXALA98		0.097354 (82) [0.384]		0.10663 (76) [0.359]	1.61871 (1.51237) [.299] |.202096|	-0.046934 (74) [0.691]
TAXDES		0.11930 (33) [0.508]	1.63256 (.526891) [.005] |.494247|	0.17952 (34) [0.310]	2.36936 (1.48621) [.129] |.279383|	0.18563 (34) [0.293]
PNBPC98		-0.053520 (81) [0.635]	.249819E-03 (.170060E-03) [.154] |.229315|	0.11405 (75) [0.330]		-0.13813 (73) [0.244]
PNBPCGR		0.16017 (80) [0.156]		0.019494 (73) [0.870]	-3.50220 (1.69212) [.054] |-.381406|	0.041773 (71) [0.729]
POB10	-.022711 (.010531) [.037] |-.307364|	-0.13354 (66) [0.285]	-4.46600 (2.23368) [.056] |-.315239|	-0.15414 (62) [0.232]	-12.0935 (5.80263) [.053] |-.405218|	-0.047042 (60) [0.721]
TXINFAV	.461713E-03 (.295297E-03) [.125] |.227952|	-0.015030 (82) [0.893]		0.045569 (76) [0.696]		0.043539 (74) [0.713]
PIND98		0.019144 (71) [0.874]		-0.089443 (65) [0.479]	-1.56522 (.969139) [.125] |-.306919|	-0.11006 (62) [0.394]
AFLVO		0.34755 (72) [0.003]	.298700 (.149558) [.056] |.317448|	0.31842 (67) [0.009]		0.038994 (67) [0.754]
SORPI98	-.644605E-02 (.415951E-02) [.129] |-.215198|	-0.081616 (62) [0.528]		-0.11651 (60) [0.375]		-0.23446 (57) [0.079]
DPEDPNB	.019920 (.659219E-02) [.004] |.453020|	0.14122 (79) [0.214]		0.23876 (74) [0.040]		-0.043491 (73) [0.715]
LENR98		0.10847 (76) [0.351]		0.27647 (71) [0.020]		0.018095 (68) [0.884]
ICRGD98	-.180250E-02 (.124411E-02) [.155] |-.283896|	0.043106 (67) [0.729]		0.064700 (65) [0.609]		-0.062259 (63) [0.628]
APDP	.360861E-03 (.139526E-03) [.013] |.416111|	-0.071022 (80) [0.531]		-0.10420 (74) [0.377]		-0.26368 (72) [0.025]
SSR	.166365		2913.25		9410.61	
SER	.062937		10.5853		23.5280	
RBAR2	.300253		.322128		.380455	
LM het	22.5363 (.000)		20.9010 (.000)		.811051 (.368)	
NOBS	49		31		23	

4. The Four Knights of the Apocalypse: Determinants of Each Principal Component

System-Wide Principal Components: A Theoretical Note

1. Having explored the individual dependent variables, we now turn to the components previously extracted in section II.

The unavoidable conclusion of section III is that the scarcity of observations only provides a blurred picture. A reasonable way around was to rely on a first few principal components of the explanatory candidates, find an interpretation for what they may stand for, and re-run the regressions on the new reduced set of independent factors – multicolinearity/micronumerosity would be dimmed.

We therefore proceeded by, firstly, identifying the more important variables explaining the left hand-side composites. From that “right hand-side” set, the main pc’s are extracted. These provided alternative explanatory aggregates for the dependent components, but also for the dependent variables individually.

As (Whenever) the explanatory components are (were [84]) standardized, the relative magnitude of their coefficients in each regression are in line with the relative importance of the components in the explanation of the variance of the left hand-side (dependent) variable.

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[84] When the TSP prin routine output series was used.

2. In a following step, we propose a joint model for the full set of dependent variables – in fact a system of equations (even if not simultaneous). As we are explaining a set of variables and have a system of equations – one for each component of the dependent variable set – SUR (seemingly unrelated regressions) estimation can be applied.

As is well-known, if we include the same right hand side variable set in all the equations, SUR (seemingly unrelated regressions) and OLS give the same results. But if we restrict the right hand side variables in each equation, SUR can improve upon the estimates. Also, if residuals of the different equations are independent, OLS can be applied individually.

A simple test was proposed to infer about the independence of the errors of each equation from the errors of all others – in the spirit of the Breusch-Pagan (BP on SUR tables) statistic [85]. These tests (BP1 on SUR tables) turned out to be useful to discard equations from the system, specially because we have very few observations (SUR estimations requires additional parameter estimates, which increase with the number of equations).

Tests on the restrictions implied by the exclusion of variables from the system (CH reported in SUR tables) were also performed, and SUR estimation of restricted forms always carried out.

An additional technical remarks can be made: regressing principal components of a set on the principal components of another as done below resembles canonical correlation. Yet, the causal structure is, in here, theoretically different: we forward and want to measure the determinants of each component of the left hand-side separately. It, thus, follows more closely the purposes of structural equation models like LISREL - being in our case, only involved in the system of equations, the main pc's of dependent and independent samples – and other latent variable estimation procedures – see Wansbeek and Meijer (2003) for a recent survey.

3. Finally, cross-correlation decomposition methods were pursued. On the one hand, the decomposition of the cross-correlation matrix between a set of dependent variables, Y – in our case the disruption signal variables -, on a set of the explanatory or "external" variables, X, gives the complementary view of the analysis of its transpose, pursued in section II. What was found

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[85] The number of observations times the sum of the squares of the simple correlations between the estimated residuals (we used OLS residuals) of an equation with those of the other k-1 equations in the system should, in case of independence of the former from all others, follow a chi-square distribution with k-1 degrees of freedom.

there for the variables (affiliation of variables according to factor loadings) is expected to be reproduced now for observations (their location in plots of the two first principal components) and vice-versa.

Secondly, the comparison of results with the "own correlation" decomposition of the Y's with the correlations with external variables in the format below suggests further comments:

In the general linear regression model, being Y a (nxp) matrix of p dependent variables, with n observations per each, and X a matrix of (n) observations of m independent variables that enter in all regressions, the (pxm) matrix b of estimators of the parameters obeys:

$$Y'Y = Y'X\,b + Y'\,e \quad \text{or yet,} \quad \frac{Y'Y}{n} = \frac{Y'X}{n}\,b + \frac{Y'e}{n} \qquad (6)$$

Assume the data is centered – $\frac{Y'Y}{n}$ and $\frac{Y'X}{n}$ are covariance matrices; if standardized, they are correlation matrices. If the explanatory power of the model is high (e.g., the model has an overall good performance - or m is close to n), $\frac{Y'e}{n} = \frac{e'e}{n}$ will be small relative to $\frac{Y'Y}{n}$ (and to $\frac{Y'X}{n}$ b). Then, and a regression of the principal components of $\frac{Y'Y}{n}$ on those of $\frac{Y'X}{n}$ might capture the same phenomenon as the regression of the principal components of Y on those of X – that is, a "reduced" b.

(The same will be the case if $\frac{e'e}{n}$ has the same elements in each column and we add a constant to the regressions - but that is hardly the expected, once it represents estimators of covariances of the errors of the p equations.)

Again, the new format allows us to use observations with pairwise simultaneity, which may, of course, provide greater accuracy of the inference.

A final remark can be added with respect to the cross-correlation decomposition advanced. We could relied on the fact that the least squares estimates obey

$$X'Y = X'X\,b, \quad \text{or yet,} \quad \frac{X'Y}{n} = \frac{X'X}{n}\,b \qquad (7)$$

and proceed to the principal component decomposition of $\frac{X'Y}{n}$ and $\frac{X'X}{n}$ and regress the components of the new format instead.

If the design of a pc-reduced model based on (7) is inspired in the properties of least squares estimator, a system-pc approach to (6) (ignoring the error moment matrix), implying an explanation of $\frac{Y'Y}{n}$ by $\frac{Y'X}{n}$, has a more appealing (and different) interpretation: it explores how the links between the dependent variables (the Y's) are explained by the bivariate relationships between those dependent variables and an exogenous set of causes (the X's).

At this stage, we therefore chose to concentrate on (6) and leave (7) – and the confrontation of both formats – to further inquiry.

4. Some final technical details apply to some of the results of this section:

When data is previously standardized, the principal components also have mean zero; hence, no constant term is used in the regressions that only use principal components from standardized sets. Results from correlation matrix decomposition used, in some instances, TSP prin routine output – that standardizes the principal components, which, thus, exhibit unitary variance; this is irrelevant to interpret signs and significance levels of the regression coefficients below.

Of course, ("centered" or conventional) principal components always have zero cross-correlations: when they are discarded from a regression, the estimates of coefficients of the remainder do not change – and their significance only suffers minor adjustments. Also, the special structure of our principal component vectors (standardized as well) is such that when included in the right hand-side, the standard deviation of the coefficients of the components is always the same.

Estimation: the Explanatory Set, Impact on the Dependent Set and Correlation Analysis

International Evidence

Level Effects: Regressions on The Components

We must here recall the interpretation of the five components proposed in section II.

1. Including the all set of variables, Set 1, we can identify:

The first component is negatively related to general violence. It is almost completely explained by demographic variables, with a posive effect of per capita GDP. If plain literacy (TXALA98) as a benefic influence, the education level index (IEDUC98) has a negative impact (positive on violence) and a much stronger effect (larger standardized coefficient in absolute value).

The second component is related to general criminality. Income distribution indicators and capital (physical and human) appear on the right hand-side of the explanatory regression.

The third component is mainly related to military services (fatal disasters also have high loadings). On the right hand-side we find state or public development indicators: from urbanization to public aid disbursed and public accounts indicators.

The fourth component is mainly representative of prison inmates (the drug offences also have a high loading in this component). Labor market and economic indicators show on the right-hand side.

Finally, the fifth component was related to suicides (road accidents also rating high).

Table 4.1. *Linear Regressions, Principal Components – International Evidence, Set 1*

	Dependent Variables:									
	PCIT1		PCIT2		PCIT3		PCIT4		PCIT5	
Indep. Var.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	-28.4253 (20.8992) [.197]		-16.8665 (9.09730) [.101]		-1.90456 (.864387) [.046]		16.5654 (7.20159) [.050]		-2.83052 (1.27635) [.047]	
DENSPO		0.49184 (19) [0.032]		-0.028538 (19) [0.908]		0.20040 (19) [0.411]		0.079131 (19) [0.747]	.332864E-2 (.14761E-2) [.044] |.285722|	0.31479 (19) [0.189]
ESPVN	.234204 (.053739) [.001] |1.03790|	0.68110 (19) [0.001]		0.58713 (19) [0.008]		0.072733 (19) [0.767]	-.268228 (.080014) [.010] |-1.23492|	0.18705 (19) [0.443]		0.088131 (19) [0.720]
COEDEP	.050868 (.024550) [.059] |.333161|	0.20427 (19) [0.402]		-0.12903 (19) [0.599]		0.21488 (19) [0.377]		-0.012372 (19) [0.960]		-0.51418 (19) [0.024]
TXALA98	.343511 (.206956) [.121] |.357509|	-0.51367 (19) [0.024]		0.12835 (19) [0.601]		-0.70000 (19) [0.001]		-0.10239 (19) [0.677]		0.14444 (19) [0.555]
IEDUC98	-27.5774 (6.17750) [.001] |-1.03680|	-0.057598 (19) [0.815]		0.77068 (19) [0.000]		-0.32324 (19) [0.177]		0.33689 (19) [0.158]		0.00006636 (19) [1.00]
TXAMH98		-0.50763 (19) [0.027]		0.11864 (19) [0.629]		-0.34596 (19) [0.147]	-.030000 (.018295) [.140] |-.322454|	0.066436 (19) [0.787]		-0.31714 (19) [0.186]
TAXDES		0.19094 (18) [0.448]		-0.11268 (18) [0.656]		0.080959 (18) [0.749]	.083709 (.033963) [.039] |.439689|	0.30952 (18) [0.211]		0.45896 (18) [0.055]
PNBPC98	.39718E-4 (.23248E-4 [.111] |.436339|	0.44570 (19) [0.056]		0.67389 (19) [0.002]		-0.21951 (19) [0.367]	.102093E-3 (.23799E-4) [.003] |1.28361|	0.33366 (19) [0.163]	-.82371E-4 (.1621E-4) [.000] |-.883479|	0.0032287 (19) [0.990]
POB20		0.32603 (18) [0.187]	1.11018 (.485959) [.052] |2.21506|	0.53954 (18) [0.021]		-0.34999 (18) [0.155]		-0.086478 (18) [0.733]	.362199 (.113767) [.008] |.612953|	0.48242 (18) [0.043]
RIC20		-0.47144 (18) [0.048]	.253763 (.143219) [.114] |1.69434|	-0.56581 (18) [0.014]		0.31921 (18) [0.197]	.085823 (.035049) [.040] |.568766|	0.11891 (18) [0.638]		-0.41359 (18) [0.088]
POPURB		0.0056773 (19) [0.982]		0.33337 (19) [0.163]	.017815 (.012303) [.171] |.271965|	-0.021606 (19) [0.930]		0.67981 (19) [0.001]		0.071706 (19) [0.771]
PAGR98		0.32825 (17) [0.198]		-0.30536 (17) [0.233]		0.53505 (17) [0.027]	-.028531 (.015561) [.104] |-.398517|	0.27955 (17) [0.277]		-0.22566 (17) [0.384]
PIND98		-0.25120 (16) [0.348]	-.115691 (.036492) [.013] |-.810353|	-0.27079 (16) [0.310]		-0.50353 (16) [0.047]		0.35482 (16) [0.177]		0.45713 (16) [0.075]
CPPIB98		0.076482 (19) [0.756]		0.26492 (19) [0.273]	.133000 (.04483) [.011] |.783568|	0.20102 (19) [0.409]		0.42190 (19) [0.072]		0.21364 (19) [0.380]
DPEDPNB		-0.055368 (19) [0.822]	.226457 (.087635) [.032] |.497674|	0.33811 (19) [0.157]		-0.0029495 (19) [0.990]		0.00095604 (19) [0.997]		-0.21151 (19) [0.385]
DPSAPNB		0.20733 (19) [0.394]		0.30493 (19) [0.204]	-.342916 (.150787) [.041] |-.649230|	-0.080272 (19) [0.744]		0.46660 (19) [0.044]	.185039 (.110722) [.121] |.324413|	0.56185 (19) [0.012]
DEPR98		0.18907 (18) [0.452]	-.055467 (.032731) [.129] |-.419615|	0.051216 (18) [0.840]		0.10082 (18) [0.691]		-0.13894 (18) [0.582]		-0.30593 (18) [0.217]

LENR98		0.032264 (19) [0.896]		-0.24357 (19) [0.315]		0.13261 (19) [0.588]		-0.19132 (19) [0.433]	-.028107 (.016101) [.106] |-.392772|	-0.50476 (19) [0.028]
APDP		0.15943 (18) [0.527]		0.53198 (18) [0.023]	-.5360E-2 (.15917E-2) [.005] |-.591056|	-0.60146 (18) [0.008]		0.081416 (18) [0.748]		-0.25570 (18) [0.306]
SSR	2.78052		2.87491		5.42302		1.57070		3.12097	
SER	.462479		.599470		.645875		.443100		.509981	
RBAR2	.786113		.570656		.542356		.760952		.753671	
LM het	9.11255 (.003)		1.06802 (.301)		.276636 (.599)		.048863 (.825)		1.72409 (.189)	
NOBS	19		14		18		15		18	

Without DELDRO, Set 2

The first component was negatively related to general violence. It is almost completely explained by demographic variables and international relations; public consumption also influences it negatively, even if health expenditures have a positive coefficient.

The second component is related to accidents – imprisonment rating high and opposite. Life expectancy (positively) and the real discount rate (negatively) appear on the right hand-side.

The third component is mainly related to law enforcement. On the right hand-side we find income distribution, growth and investment risk measures, and public account indicators.

The fourth component is mainly representative of road accidents (the crime rate also has a high loading in this component). The right hand-side as similar variables to the second component: income level and distribution, and the real lending rate.

Finally, the fifth component was related to female suicides. Life expectancy, unemployment rate, income distribution, urbanization, and the investment rate show on the right-hand side.

Table 4.2. *Linear Regressions, Principal Components – International Evidence, Set 2*

	Dependent Variables:									
	PCINT1		PCINT2		PCINT3		PCINT4		PCINT5	
Indep. Var.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.	(1)	Simp. Cor.
INTERC.	4.35491 (3.30493) [.212]		-14.8950 (1.97093) [.000]		9.18473 (1.53342) [.000]		2.61710 (.917742) [.012]		-2.61074 (1.94846) [.203]	
DENSPO		0.45384 (21) [0.039]		0.12703 (21) [0.583]		0.10118 (21) [0.663]		-0.025898 (21) [0.911]		0.25769 (21) [0.259]
ESPVN	.292823 (.035146) [.000] |1.26501|	0.56262 (21) [0.008]	.197667 (.026237) [.000] |.886203|	0.48328 (21) [0.026]		-0.27411 (21) [0.229]		0.41871 (21) [0.059]	-.050002 (.028253) [.100] |-.208438|	0.19694 (21) [0.392]
COEDEP	.040339 (.016880) [.034] |.260349|	0.21939 (21) [0.339]		0.090159 (21) [0.698]		0.25527 (21) [0.264]		-0.048213 (21) [0.836]		-0.42918 (21) [0.052]
IEDUC98	-30.0204 (4.06761) [.000] |-1.14872|	-0.17973 (21) [0.436]		0.25924 (21) [0.256]		-0.50770 (21) [0.019]		0.63381 (21) [0.002]		0.13549 (21) [0.558]
TAXDES		0.18267 (20) [0.441]		-0.088946 (20) [0.709]		0.18878 (20) [0.425]		-0.067152 (20) [0.778]	.120187 (.022457) [.000] |.521444|	0.61484 (20) [0.004]
PNBPC98		0.29825 (21) [0.189]		0.29442 (21) [0.195]		-0.39029 (21) [0.080]	.666287E-4 (.140884E-4) [.000] |.740747|	0.61972 (21) [0.003]		0.15271 (21) [0.509]
PNBPCGR		0.27289 (19) [0.258]		0.39094 (19) [0.098]	.230392 (.065736) [.007] |.540063|	-0.28234 (19) [0.242]		0.47378 (19) [0.040]		0.49009 (19) [0.033]
POB20		0.22153 (20) [0.348]		0.11281 (20) [0.636]	-.313994 (.092003) [.008] |-.499529|	-0.60236 (20) [0.005]	-.395252 (.101597) [.001] |-.705949|	-0.18830 (20) [0.427]	.263447 (.063359) [.001] |.484696|	0.61021 (20) [0.004]
POPURB		-0.068058 (21) [0.769]		0.11289 (21) [0.626]		0.060314 (21) [0.795]		0.58548 (21) [0.005]	.024491 (.00745792) [.006] |.325465|	0.33088 (21) [0.143]
CPPIB98	-.065210 (.028668) [.042] |-.361357|	-0.0072968 (21) [0.975]		0.24227 (21) [0.290]	.182283 (.050254) [.006] |.899770|	0.11062 (21) [0.633]		0.13755 (21) [0.552]		0.51289 (21) [0.017]
DPEDPNB		-0.12331 (21) [0.594]		0.22404 (21) [0.329]	-.358588 (.122172) [.017] |-.576784|	-0.18310 (21) [0.427]		0.051076 (21) [0.826]		-0.042728 (21) [0.854]
DPSAPNB	.180493 (.100061) [.096] |.328830|	0.10685 (21) [0.645]		0.096134 (21) [0.678]	-.385447 (.144877) [.026] |-.442688|	-0.099761 (21) [0.667]		0.48860 (21) [0.025]		0.62323 (21) [0.003]
INPIB98		-0.33548 (21) [0.137]		0.0077491 (21) [0.973]		-0.10936 (21) [0.637]		-0.023666 (21) [0.919]	.071174 (.018278) [.002] |.396938|	0.39382 (21) [0.077]
LENR98		0.047149 (21) [0.839]		-0.039287 (21) [0.866]		0.17643 (21) [0.444]	-.026514 (.013172) [.061] |-.371790|	-0.18763 (21) [0.415]		-0.51132 (21) [0.018]
DIR98		-0.33193 (14) [0.246]	-.011729 (.656156E-2 [.101] |-.210261|	-0.25453 (14) [0.380]		0.32951 (14) [0.250]		0.29558 (14) [0.305]		0.048804 (14) [0.868]
ICRGD98		0.28274 (19) [0.241]		0.45681 (19) [0.049]	-.074994 (.024329) [.013] |-.638657|	-0.65304 (19) [0.002]		0.14248 (19) [0.561]		0.11616 (19) [0.636]
DSDR98E	.201895 (.073427) [.018]	-0.21570 (21) [0.348]		-0.45727 (21) [0.037]		0.24744 (21) [0.280]		0.0007464 (21) [0.997]		-0.21397 (21) [0.352]

	|.308435|									
APDP	.320463E-2	0.066629		-0.013157		-0.66510		0.23742		0.052716
	(.119818E-2	(20)		(20)		(20)		(20)		(20)
	[.020]	[0.780]		[0.956]		[0.001]		[0.313]		[0.825]
	|.324301|									
SSR	1.98941		1.56083		1.66026		6.24304		2.00513	
SER	.407166		.376688		.429504		.624652		.392735	
RBAR2	.831061		.820579		.856069		.628669		.849405	
LM het	8.16798		.523403		.314571		.317495		1.05274	
	(.004)		(.469)		(.575)		(.573)		(.305)	
NOBS	20		14		16		20		19	

Reducing the Explanatory Set

1. The results of principal component decomposition in the explanatory set are depicted below.

We present three sets of results. Firstly, we had to choose the independent set. We focused on the explanatory candidates reported in the regressions on the principal components of the dependent set; we discarded four of them because it restricted the sample too much further – which left us with 20 variables.

Our main purpose is the relation with the disruption indicators; hence we would like to include observations that exists also for such indicators; accordingly, Set 1 and Set 2 were restricted to observations available for the included disruption variables (DELDRO excluded in Set 2 as before). Unfortunately, the use of the 20 explanatory candidates left us with only 16 observations with simultaneous information for the all dependent indicators when DELDRO is excluded, 14 when it is included – we lose from both the 21 and 19 countries sets Canada, Sweden, Israel, Greece and Belarus.

A final set of results is obtained for all observations of the 20 exogenous variables, independently of the existence in the dependent sets. That allowed us to keep 30 observations.

Five to six components seem to represent well the explanatory sample variability. Loadings suggest similar aggregation of the variables, specially Sets 1 and 2. We will focus on Set 1, where:

The first principal component is positively related to general well-being and development.

The second principal component is negatively related to industry and investment – possibly, to capital intensity, once indicators as population density and dependency have positive loadings.

The third principal component is negatively related to public expenditures. Unemployment rate has a positive loading as well.

The fourth component captures population and labor force characteristics, negatively related to literacy and weight of female labor market participation, education and external aid also rating high and negative.

The fifth component may capture an association with variables sensitive to the business-cycle: the unemployment rate (negative) and also the investment rate (positive).

Apparently, including the observations missing for DELDRO (but not for the other dependent variables) spans the fourth component into a new fourth component, associated to education, and a sixth one, with female participation. All other components maintain roughly the sign and magnitude of factor loadings.

Table 4.3. *Principal Components, Independent Variables – International Evidence*

	Set 1 (14 obs.)					Set 2 (16 obs.)					
	PCIX1	PCIX2	PCIX3	PCIX4	PCIX5	PCINX1	PCINX2	PCINX3	PCINX4	PCINX5	PCINX6
Eigenv.	8.0528321	3.2046319	2.4385901	2.0068356	1.2669917	7.3234969	3.0188550	2.3040954	2.2319557	1.1928858	1.0917999
% Cum. Exp Var.	0.40264160	0.56287320	0.68480270	0.78514448	0.84849407	0.36617484	0.51711759	0.63232236	0.74392015	0.80356444	0.85815443
Factor Loadings:											
DENSPO	0.51482	0.49086	0.18705	0.15571	0.19068	0.48983	0.42243	0.24610	0.15482	0.37018	0.36167
ESPVN	0.79564	0.47499	-0.010609	0.13372	-0.15899	0.77198	0.47845	0.0058629	0.069628	-0.15207	0.034454
COEDEP	-0.67899	0.48411	-0.33257	0.10015	-0.15183	-0.67294	0.46777	-0.29582	0.20636	-0.078264	0.20155
TXALA98	0.43602	-0.37155	0.38215	-0.47982	0.37876	0.45365	-0.32558	0.064392	-0.60984	0.30557	-0.27315
IEDUC98	0.72564	0.20972	-0.019474	-0.49646	-0.0051517	0.70764	0.25800	-0.29266	-0.43684	-0.030171	-0.068105
TXAMH98	-0.44532	-0.39124	-0.44230	-0.53015	-0.11614	-0.42667	-0.29947	-0.49309	-0.18679	-0.33414	-0.47380
TAXDES	0.37378	-0.39964	0.43716	0.32781	-0.56723	0.33164	-0.40246	0.58935	0.12334	-0.55105	0.10167
PNBPC98	0.79254	0.41546	-0.17265	-0.23211	-0.20456	0.74181	0.42345	-0.32614	-0.18880	-0.13358	0.16201
POB20	0.84525	0.16689	-0.22337	0.29212	0.055032	0.70307	0.094054	0.12160	0.53157	-0.052297	-0.26750
RIC20	-0.84202	-0.28382	0.19907	-0.29524	-0.11303	-0.76711	-0.22112	-0.090420	-0.50137	-0.041008	0.20183
POPURB	0.59207	0.14507	0.31486	-0.55230	0.10128	0.59632	0.21738	0.030190	-0.58613	0.077158	-0.030085
PAGR98	-0.89517	0.22494	-0.30530	0.12700	-0.027176	-0.88998	0.17682	-0.14434	0.32254	-0.012350	0.019515
PIND98	0.41576	-0.73878	0.13773	0.13981	-0.13440	0.40871	-0.75118	0.12995	0.0028701	-0.020733	0.25081
CPPIB98	0.38314	-0.46659	-0.60052	-0.023836	-0.35111	0.38011	-0.48043	-0.53215	0.27296	-0.30091	0.16226
DPEDPNB	-0.090535	-0.22343	-0.78533	-0.26603	0.15796	-0.059032	-0.23675	-0.81866	0.12158	0.20676	0.034977
DPSAPNB	0.73373	-0.43277	-0.16895	0.11118	-0.27151	0.72141	-0.39933	-0.20782	0.037938	-0.12779	0.39017
LENR98	-0.90417	0.33924	0.026872	-0.039742	-0.16417	-0.83068	0.26778	-0.089043	-0.072988	-0.0041076	0.28636
APDP	0.56977	0.34192	-0.30386	-0.46975	-0.27331	0.57442	0.35013	-0.46706	-0.16717	-0.20515	0.15418
INPIB98	0.26161	-0.60557	-0.31762	0.26409	0.48469	0.26291	-0.62570	-0.22404	0.28483	0.53623	0.084885
DSDR98E	-0.59899	-0.23837	0.47879	-0.38299	-0.24155	-0.57525	-0.23771	0.18687	-0.57045	-0.094581	0.33109
Correlations with											
POPUL	-0.16790	-0.19734	0.70916 *	-0.30781	-0.33196	-0.030081	0.044050	0.040476	-0.63419 *	-0.16332	0.17102
PIBPC98	0.86710 *	0.34013	-0.033318	-0.14273	-0.13540	0.77207 *	0.35343	-0.20063	-0.22997	-0.080250	0.13660
PNBPC98	0.79254 *	0.41546	-0.17265	-0.23211	-0.20456	0.74181 *	0.42345	-0.32614	-0.18880	-0.13358	0.16201
PNBPCGR	0.88560 *	-0.015876	-0.30287	0.075240	0.041609	0.86024 *	0.0092304	-0.26292	0.13931	0.074596	0.11949
TXINF98	-0.57254 *	-0.54596 *	0.16119	0.25760	0.15658	-0.45546 **	-0.37853	0.38531	0.23507	-0.063152	-0.33995
TXINFAV	-0.66210 *	0.24693	0.25709	-0.14534	0.059556	-0.65608 *	0.22418	0.19811	-0.16679	0.0053362	-0.21172
TAXDES	0.37378	-0.39964	0.43716	0.32781	-0.56723 *	0.33164	-0.40246	0.58935 *	0.12334	-0.55105 *	0.10167

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations 0.532446; for 16 observations 0.497346)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations 0.457442; for 16 observations 0.425841)

Table 4.4. *Principal Components, Independent Variables – International Evidence*

	Full Sample (30 obs.)					
	PCX1	PCX2	PCX3	PCX4	PCX5	PCX6
Eigenv.	6.2263924	3.1843102	2.4585214	1.7750374	1.3466421	1.1616083
% Cum. Exp Var.	0.31131962	0.47053513	0.59346120	0.68221307	0.74954517	0.80762559
Factor Loadings:						
DENSPO	0.40788	0.35749	0.47864	0.21160	0.20063	0.41449
ESPVN	0.77620	0.43162	-0.017018	-0.14242	0.15146	-0.21436
COEDEP	-0.56582	0.39660	-0.40708	-0.29404	0.17739	-0.18845
TXALA98	0.32563	-0.32631	-0.37097	0.68751	0.13647	0.12258
IEDUC98	0.73951	0.28580	-0.36172	0.27563	-0.061442	0.092079
TXAMH98	-0.15161	-0.56591	-0.51562	0.33992	0.14447	0.094857
TAXDES	0.16744	-0.50516	0.25188	0.35236	-0.14866	-0.60603
PNBPC98	0.77588	0.45179	-0.29762	-0.079549	0.025042	-0.021314
POB20	0.62273	-0.49265	0.10019	-0.050268	0.49749	-0.0053684
RIC20	-0.73552	0.38823	0.0066848	-0.033090	-0.48540	0.0084724
POPURB	0.49484	0.45968	-0.021002	0.44775	-0.24694	0.13229
PAGR98	-0.81048	-0.042035	-0.18398	0.11515	0.41546	0.087855
PIND98	0.30680	-0.42329	0.47562	0.011468	-0.26020	0.42457
CPPIB98	0.25211	-0.62982	-0.49704	-0.16965	-0.21350	-0.073372
DPEDPNB	0.041665	-0.25094	-0.66675	-0.43859	-0.13725	0.31878
DPSAPNB	0.71295	-0.22889	-0.23923	-0.10619	-0.31586	-0.16068
LENR98	-0.76799	0.086026	-0.23857	0.17914	0.21661	0.17892
APDP	0.61023	0.39831	-0.44545	-0.11137	0.023405	0.13687
INPIB98	0.22483	-0.52912	0.27167	-0.46703	-0.034922	0.30219
DSDR98E	-0.56610	-0.038497	-0.16883	0.34106	-0.43441	0.16630
Correlations with						
POPUL	-0.0021188	0.37693 *	0.064467	0.12919	-0.42719 *	-0.025780
PIBPC98	0.81408 *	0.41194 *	-0.18056	-0.088381	-0.048629	-0.067447
PNBPC98	0.77588 *	0.45179 *	-0.29762	-0.079549	0.025042	-0.021314
PNBPCGR	0.73973 *	0.26126	0.14681	-0.37420 *	-0.12027	0.017056
TAXDES	0.16744	-0.50516 *	0.25188	0.35236 **	-0.14866	-0.60603 *
TXINF98	-0.60478 *	-0.36317 *	0.30637 **	0.073994	-0.021040	-0.037718
TXINFAV	-0.65170 *	-0.011202	-0.14333	0.35889 **	0.21402	0.047670

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 30 observations 0.360945)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 30 observations 0.306035)

When the 30 observations are used – Table IV.4 -, a somewhat different arrangement is found for the variables.

We present in the following figure the country scores in the two first components:

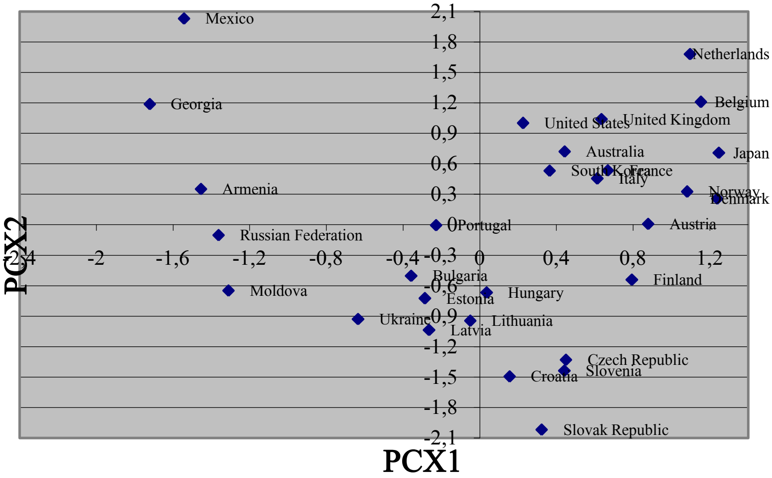

Figure 4.1. *Principal Components, Independent Variables, International Evidence*

Weighting the correlation matrix that uses all pairwise available information by the square root of the number of observations to obtain eigenvectors, these applied to the standardized variables of the 30 observation set, for Table IV.5; also dividing the off-diagonal elements of the correlation matrix by the mean of the square roots of n and adjusting the diagonal to 1, for Table IV.6; we obtain similar aggregation as with the balanced set of 30 observations – there maybe stability of the 30 observation moment matrix relative to the total 174 countries, even if the 16 and 14 observation sub-samples seem to give a slightly different representation of the variables:

The main principal component still exhibits a high correlation with general development.

The second component aggregates now income distribution, directly related to inequality.

The third component is connected to public expenditures.

The fourth captures acceleration in the economy: investment rate has high positive loadings, currency devaluation rate, negative. It is positively related to per capita GDP growth rate.

Industrialization comes somewhat isolated in the fifth component.

The sixth component relates to literacy and (yet negatively) aid to development.

The last presented represents unemployment rate, female participation (inversely) and the lending interest rate (also inversely)

Table 4.5. *Principal Components, External Variables, Weighted – International Evidence*

	Full Sample (30 obs.)						
	PCX1	PCX2	PCX3	PCX4	PCX5	PCX6	PCX7
Eigenv.	6.43708	2.24083	1.78814	1.53216	1.22658	1.14271	0.97142
% Cum. Exp Var.	0.32185	0.43389	0.523297	0.599905	0.661234	0.718369	0.767261
Eigenv. [1]	5.01980	1.14050	2.53594	2.02229	0.85992	0.95340	1.15167
% Cum. Exp Var. [1]	0.25099	0.308015	0.434815	0.535925	0.578921	0.626591	0.684174
Factor Loadings:							
DENSPO	0.36232	-0.12266	-0.57039	0.51460	-0.27544	0.012190	0.11008
ESPVN	0.71760	-0.45808	-0.44646	0.24123	0.33373	-0.33828	0.34998
COEDEP	-0.56820	0.25144	-0.066310	-0.50227	0.45794	-0.33174	-0.34911
TXALA98	0.47860	-0.34732	0.19205	-0.14111	-0.075086	0.48801	-0.29023
IEDUC98	0.81542	-0.37245	-0.24620	-0.10378	0.12500	-0.15370	0.00045983
TXAMH98	-0.041502	-0.30101	0.57132	-0.33786	-0.071519	0.40244	-0.60842
TAXDES	0.14063	-0.20157	0.25012	0.26298	-0.055396	0.49023	0.49525
PNBPC98	0.78355	-0.45058	-0.36031	-0.0062313	0.25537	-0.51695	0.16417
POB20	0.55575	-0.80241	0.27146	0.63572	-0.043175	0.10937	0.11441
RIC20	-0.69565	0.83170	-0.19001	-0.55348	-0.082256	-0.12244	-0.11555
POPURB	0.55368	-0.00087710	-0.50368	-0.045684	-0.046830	-0.14869	0.18730
PAGR98	-0.77361	0.17608	0.10489	-0.36685	0.068765	0.29987	-0.65512
PIND98	0.29122	0.040265	0.21832	0.55828	-0.69282	-0.012884	0.18319
CPPIB98	0.30724	-0.29147	0.80632	-0.051805	0.24535	-0.094909	0.036126
DPEDPNB	0.12640	-0.11019	0.58714	-0.34873	0.24367	-0.36180	-0.30479
DPSAPNB	0.72975	-0.36390	0.30415	0.14151	0.17151	-0.21193	0.40025
LENR98	-0.66545	0.42099	0.033265	-0.44664	-0.038886	0.13187	-0.67806
APDP	0.63826	-0.47674	-0.24434	-0.14384	0.18040	-0.66877	-0.026769
INPIB98	0.16068	-0.029541	0.47318	0.60344	-0.26498	-0.062620	0.062434
DSDR98E	-0.42048	0.52217	0.12760	-0.56987	-0.52083	0.073928	-0.22678
Correlations with							
POPUL	0.041901	0.38202 *	-0.33071 **	-0.23686	-0.17253	-0.16336	0.17302
PIBPC98	0.80596 *	-0.39194 *	-0.35800 **	0.082543	0.21749	-0.44453 *	0.27049
PNBPC98	0.78355 *	-0.45058 *	-0.36031 **	-0.0062313	0.25537	-0.51695 *	0.16417
PNBPCGR	0.63169 *	-0.29972	-0.25114	0.39631 *	0.084321	-0.46847 *	0.44863 *
TAXDES	0.14063	-0.20157	0.25012	0.26298	-0.055396	0.49023 *	0.49525 *
TXINF98	-0.64554 *	0.25098	0.24899	0.032913	-0.29746	0.33371 **	-0.016242
TXINFAV	-0.55715 *	0.24840	-0.0070365	-0.41868 *	-0.0066834	0.37867 *	-0.47611 *

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 30 observations: 0.360945.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 30 observations: 0.306035.)

Table 4.6. *Principal Components, Independent Variables, Weighted – International Evidence*

	Full Sample (30 obs.) (Mean square root of n = 11.49270)						
	PCX1	PCX2	PCX3	PCX4	PCX5	PCX6	PCX7
Eigenv.	6.74064	2.36608	1.81456	1.56913	1.25522	1.14888	1.01981
% Cum. Exp Var.	0.33703	0.45533	0.546058	0.624515	0.687276	0.74472	0.795711
Eigenv.[1]	5.04191	1.19810	2.50964	2.01457	0.80455	1.20405	1.05998
% Cum. Exp Var.[1]	0.25210	0.312005	0.437485	0.538215	0.578442	0.638644	0.691643
Factor Loadings:							
DENSPO	0.361456	-0.10729	-0.54131	0.525423	-0.35445	0.032002	-0.038219
ESPVN	0.71681	-0.41675	-0.45067	0.2454	0.125539	-0.313604	0.361181
COEDEP	-0.56964	0.286366	-0.09797	-0.50681	0.207639	-0.552032	-0.193664
TXALA98	0.478408	-0.34405	0.171941	-0.14144	0.15674	0.312512	-0.393462
IEDUC98	0.813155	-0.31849	-0.27669	-0.11866	0.017376	-0.18112	0.037772
TXAMH98	-0.04035	-0.30532	0.537118	-0.38005	0.093818	0.193362	-0.54572
TAXDES	0.142656	-0.25411	0.287704	0.341834	0.483333	0.702147	0.395659
PNBPC98	0.781877	-0.38933	-0.38816	-0.02908	-0.03124	-0.453319	0.303606
POB20	0.560447	-0.84585	0.293759	0.586189	-0.08039	0.08697	0.043309
RIC20	-0.6995	0.859862	-0.20431	-0.507	-0.03246	-0.029588	-0.010312
POPURB	0.550224	0.043774	-0.51373	-0.01477	-0.07891	-0.045792	0.170598
PAGR98	-0.77348	0.180649	0.088294	-0.36057	0.117287	-0.03521	-0.658321
PIND98	0.293033	-0.00886	0.259706	0.53222	-0.60912	0.363369	0.245763
CPPIB98	0.309524	-0.32192	0.793802	-0.13821	0.201443	-0.119947	0.107317
DPEDPNB	0.127147	-0.09939	0.547319	-0.46599	-0.06277	-0.495741	-0.15153
DPSAPNB	0.730133	-0.36558	0.298443	0.097283	0.134069	-0.058889	0.436861
LENR98	-0.66653	0.431161	0.018584	-0.42354	0.002071	-0.083566	-0.566841
APDP	0.636907	-0.40914	-0.28258	-0.18825	-0.15689	-0.571642	0.245615
INPIB98	0.163867	-0.09543	0.509616	0.524635	-0.41181	0.033106	0.04939
DSDR98E	-0.42231	0.527559	0.108631	-0.52828	-0.2332	0.331126	-0.060498
Correlations with							
POPUL	0.038715	0.41358 *	-0.34037 **	-0.19217	-0.12200	0.059262	0.24146
PIBPC98	0.80438 *	-0.34125 **	-0.37660 *	0.068080	-0.020270	-0.34818 **	0.36262 *
PNBPC98	0.78188 *	-0.38933 *	-0.38816 *	-0.029078	-0.031237	-0.45332 *	0.30361
PNBPCGR	0.63158 *	-0.28199	-0.24158	0.36934 *	-0.17677	-0.28128	0.50549 *
TAXDES	0.14266	-0.25411	0.28770	0.34183 **	0.48333 *	0.70215 *	0.39566 *
TXINF98	-0.64372 *	0.20129	0.26980	0.053680	-0.065831	0.39684 *	-0.094556
TXINFAV	-0.55777 *	0.25506	-0.021694	-0.37765 *	0.17818	0.14234	-0.51660 *

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 30 observations 0.360945)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 30 observations 0.306035)

2. Unfortunately, as noted, the use of the 20 explanatory candidates left us with only 16 observations when DELDRO is excluded, 14 when it is included. We essayed regressing the original – from Table II.1 – components on the right hand-side ones obtained from the 30 observations above. Of course, we are still left with only 16 and 14 valid cases.

The first striking features of the results – see Table IV.7 and IV.8 - is the poor explanatory power of any of the independent components in the explanation of the first dependent component – PCIT1 and PCINT1 -, specially when DELDRO is included. The significant regressors – and corresponding signs - are the same for the same components of both sets for except for the second.

To interpret results we must rely on the interpretation given for the extracted components of the left and right hand-side variables – of Table II.1 and IV.4. respectively.

Table 4.7. *Unbalanced Linear Regressions, Principal Components – International Evidence, OLS*

	Dependent Variables:									
	Set 1 (14 obs.)					Set 2 (16 obs.)				
Indep. Var.	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
PCX1	.175395	.538989	-.374827	.168946	.503647	.076709	.122154	-.570440	.208128	.688592
	(.270016)	(.196154)	(.246832)	(.178841)	(.135524)	(.267944)	(.274398)	(.096949)	(.175223)	(.130406)
	[.534]	[.025]	[.167]	[.372]	[.006]	[.781]	[.666]	[.000]	[.262]	[.000]
PCX2	.310144	.221416	.417222	.402851	-.966041	.351959	.274916	.231403	.807296	-.901467
	(.473893)	(.344262)	(.433203)	(.313876)	(.237853)	(.362096)	(.370817)	(.131015)	(.236794)	(.176228)
	[.531]	[.538]	[.364]	[.235]	[.004]	[.354]	[.476]	[.108]	[.007]	[.000]
PCX3	.155378	-.251111	.016039	-.067216	.521256	.200911	-.116731	.097274	.025705	.132709
	(.333780)	(.242476)	(.305121)	(.221075)	(.167528)	(.324368)	(.332180)	(.117364)	(.212122)	(.157866)
	[.654]	[.331]	[.959]	[.769]	[.014]	[.550]	[.733]	[.427]	[.906]	[.420]
PCX4	-.281569	-.283168	-.709560	.132405	.287107	-.336314	-.608552	-.143964	-.292980	.461163
	(.526562)	(.382523)	(.481350)	(.348761)	(.264288)	(.428829)	(.439158)	(.155161)	(.280435)	(.208707)
	[.607]	[.480]	[.179]	[.714]	[.309]	[.451]	[.196]	[.375]	[.321]	[.052]
PCX5	.258790	.089583	-.413323	-.637244	.317829	.230459	.032232	-.538643	-.638850	.136462
	(.373387)	(.271249)	(.341327)	(.247308)	(.187407)	(.276402)	(.283059)	(.100009)	(.180754)	(.134522)
	[.508]	[.750]	[.260]	[.033]	[.128]	[.424]	[.912]	[.000]	[.005]	[.334]
PCX6	-.268168	.100960	-.473126	-.057875	.165008	-.312368	-.228877	-.391997	-.113753	.144370
	(.352926)	(.256385)	(.322623)	(.233756)	(.177138)	(.316825)	(.324456)	(.114635)	(.207189)	(.154196)
	[.469]	[.704]	[.181]	[.811]	[.379]	[.347]	[.497]	[.007]	[.595]	[.371]
SSR	7.64195	4.03293	6.38596	3.35244	1.92513	9.72394	10.1980	1.27303	4.15851	2.30328
SER	.977365	.710011	.893446	.647344	.490552	.986100	1.00985	.356796	.644865	.479925
RBAR2	.096808	.436691	-.143693	.549568	.810928	.093707	-.155021E-02	.863089	.583673	.819466
LM het	.295810E-02	.529984	1.52217	.211515E-02	1.74987	.172158E-02	.139962	2.12837	4.21532	.981891E-03
	[.957]	[.467]	[.217]	[.963]	[.186]	[.967]	[.708]	[.145]	[.040]	[.975]

Table 4.8. *Unbalanced Linear Regressions, Principal Components – International Evidence, SUR*

	Dependent Variables:									
	Set 1 (14 obs.)					Set 2 (16 obs.)				
Indep. Var.	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
PCX1		.586955	-.281774	.150446	.444052			-.548087	.311018	.698117
		(.145025)	(.137300)	(.117294)	(.094478)			(.064564)	(.121623)	(.096823)
		[.000]	[.040]	[.200]	[.000]			[.000]	[.011]	[.000]
PCX2			.318236	.490437	-.773990			.112548	.733293	-.899243
			(.166128)	(.171158)	(.137167)			(.084217)	(.161572)	(.132851)
			[.055]	[.004]	[.000]			[.181]	[.000]	[.000]
PCX3		-.357433			.525463					
		(.127854)			(.122719)					
		[.005]			[.000]					
PCX4			-.538163				-.637787			.490069
			(.173461)				(.220702)			(.132039)
			[.002]				[.004]			[.000]
PCX5			-.369923	-.650522	.175652			-.500522	-.516102	.133960
			(.129851)	(.120914)	(.097653)			(.061685)	(.114828)	(.096850)
			[.004]	[.000]	[.072]			[.000]	[.000]	[.167]
PCX6	-.290623		-.518155			-.445450		-.364519		
	(.255225)		(.138756)			(.217176)		(.066618)		
	[.255]		[.000]			[.040]		[.000]		
SSR	12.5379	5.70497	6.73293	3.54589	2.28417	14.4986	12.4443	1.46741	4.66559	2.67792
SER	.946343	.638356	.693487	.503267	.403925	.951925	.881911	.302841	.539999	.409108
R2	.137196	.517799	.267323	.694553	.868990	.153747	.190967	.921141	.684472	.873162
LM het	.356892	.632084	1.20230	.219127	2.54816	.173339	.051498	.309226E-02	2.33314	.997133E-02
	[.550]	[.427]	[.273]	[.640]	[.110]	[.677]	[.820]	[.956]	[.127]	[.920]
BP1 (pv)	7.155836	10.47710	15.64048	3.179807	1.109825	7.628715	9.463963	8.460239	1.617271	1.240530
Df = 4	(.12788)	(.03311)	(.00354)	(.52820)	(.89271)	(.10617)	(.05049)	(.07610)	(.80568)	(.87138)
	BP (df, pv) =	18.78152	CH (df,pv) =	94.586231		BP (df, pv) =	14.20536	CH (df,pv) =	39.764519	
		(10, .04313)		(15, 0.00000)			(10, .16383)		(17, .00140)	

3. One could argue that the procedure above, using different number of observations to obtain left and right hand-sides, would capture some piece of missing information; however, it could burden the explanatory capacity of the system, that after all, does not obtain extra degrees of freedom, and blur the effectively existing relations between the variables with false representativeness. Hence, we proceeded to balanced methods.

Firstly, we re-estimated the principal components for the left hand-side - aggregation of the dependent variables changed relative to the one of Table II.1, justifying the inspection of the new set of components.

Excluding DELDRO, the relative magnitude of the factor loadings is preserved for the first four components, with those of the fourth switching signs.

The first component represents negatively aggressiveness or violence.

The second, negatively, law enforcement, with general crime rating positively.

The third, female suicides, and also general crime with Set 2.

The fourth is related to authority– imprisonment and military variables rating high and with opposite signs. Military aggregates influence the component positively in Set 1, negatively in Set 2.

The fifth, that captures DELDRO (negatively) in Set 1, isolates road fatalities in Set 2.

Unemployment rate marks negatively the first component in Set 1, but not in Set 2. Development follows the third component in both sets, and also the second one in Set 1, and the last presented in Set 2.

Table 4.9. *Principal Components – International Evidence*

	Set 1 (14 obs.)					Set 2 (16 obs.)				
	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
Eigenv.	5.3114135	2.6776804	2.1379408	1.6062744	1.3054254	4.8897547	2.2960390	1.6051878	1.5504274	1.4323590
% Cum. Exp Var.	0.37938668	0.57064957	0.72335962	0.83809351	0.93133818	0.37613497	0.55275336	0.67622934	0.79549299	0.90567445
Factor Loadings:										
MFERAR	0.47797	0.27286	0.45331	0.10277	0.34350	0.26290	0.10963	0.26350	0.41272	0.74201
DELDRO	0.41000	0.44941	0.44698	-0.29743	-0.55265					
VIOLA	-0.81400	0.43918	-0.016145	0.31429	-0.020096	-0.84903	0.32882	-0.072012	-0.17542	0.30089
HOMIC	-0.89455	-0.28259	-0.14265	0.056119	-0.25610	-0.82457	-0.34076	-0.39291	-0.096315	-0.020686
SUICIH	-0.70611	-0.25553	0.47184	-0.16776	0.36827	-0.69411	-0.41981	0.43654	0.036644	-0.28203
SUICM	-0.41719	-0.010235	0.74635	-0.031199	0.46085	-0.45343	-0.24399	0.76648	-0.19319	-0.24952
DIVOR	-0.84076	0.27716	0.28425	-0.20601	0.090936	-0.88095	0.071518	0.27532	0.22375	0.065689
DESASP	-0.76062	0.49989	-0.059706	0.34577	-0.20152	-0.82492	0.41409	-0.11335	-0.27143	0.20028
DESAIP	-0.77773	0.49018	-0.044470	0.35996	-0.12994	-0.83880	0.40270	-0.078813	-0.29980	0.16030
PRISION	-0.45319	-0.54720	0.33483	-0.39421	-0.37484	-0.42593	-0.68585	0.016139	0.33669	-0.017304
PPRESAS	-0.69212	-0.53951	-0.062043	-0.37229	-0.19522	-0.46784	-0.49604	-0.29918	0.55096	0.32978
CRIMREG	0.30992	0.60489	0.57856	-0.22793	-0.33373	0.16057	0.38572	0.63205	0.17514	0.28790
FA98P	0.30912	-0.46560	0.46550	0.57749	-0.30528	0.33913	-0.49647	0.093064	-0.66604	0.27806
DPMIPNB	0.11461	-0.56829	0.42266	0.63654	-0.13803	0.17676	-0.61118	0.073218	-0.44335	0.55645
Correlation with										
POPUL	-0.23818	-0.60410 *	0.28198	-0.27221	-0.33265	-0.040316	-0.37705	-0.096149	0.51894 *	0.69745 *
PIBpc98	0.43008	0.58645 *	0.56612 *	-0.12430	-0.13497	0.24358	0.35269	0.52331 *	0.34572	0.55988 *
PNBpc98	0.47302 **	0.59681 *	0.51055 **	-0.15018	-0.28779	0.28866	0.39539	0.49317 **	0.30801	0.49652 **
PNBPCGR	0.27773	0.60212 *	0.62686 *	0.023613	0.16577	0.15891	0.40343	0.73256 *	0.060694	0.41896
TAXDES	-0.46614 **	-0.52497 **	-0.12514	0.051479	0.30080	-0.16822	-0.41740	-0.14778	-0.39612	-0.30093
TXINF98	-0.070271	-0.42031	-0.58720 *	0.11043	-0.29156	0.018413	-0.21079	-0.70895 *	-0.14177	-0.25053
TXINFAV	0.15842	-0.42531	0.54432 *	0.49118 **	0.13739	0.17214	-0.50299 *	0.35155	-0.55333 *	0.10348

Notes. * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations 0.532446; for 16 observations 0.497346.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations 0.457442; for 16 observations 0.425841.)

We then run these components on the five and six explanatory principal components for the right hand-side set for the same observations – that is, of those corresponding to Table IV.3. We present below the corresponding regressions.

For both cases considered, the Breusch-Pagan statistic did not reject the null correlations among the residuals of the restricted OLS equations neither at 5 nor at the 10% level – and again, independent OLS becomes reliable. Moreover, sign and significance of the parameters was not altered as reported below. Hence SUR does not show much improvement on the understanding of the phenomenon in these cases.

Aggressiveness and violence (negatively represented by PCT1 – "short" for PCIT1 and PCINT1) appears as negatively related to general development (PX1) only in Set 1, positively to capital intensity (negatively represented by PX2), and education and female labor market involvement (negatively represented by PX4).

(Strict or need for) Law enforcement (negatively represented by PCT2) appears as negatively related to general development (PX1), positively to capital intensity (negatively represented by PX2), negatively to public expenditures (negatively represented by PX3), and appears as counter-cyclical (PX5). In Set 2, we capture a more complex explanation.

Female suicides (PCT3) is positively associated to development (PX1) and capital intensity (PX2).

Authority (discipline, PCT4, negatively represented in Set 2) is negatively associated to literacy and female labor market involvement (negatively represented by PX4). In Set 2, also they show counter-cyclicity (PX5).

(Mainly) Drug offenses (symmetricly represented in PCIT5 in Set 1) seem higher for coutries with lower capital intensity (negatively represented by PX2), higher education and female labor market involvement (negatively represented by PX4), for less tight labor markets (higher unemployment rates negatively related to PX5); Road Fatalities in Set 2 (PCT5) appear negatively, but not significantly, associated to labor market tightness.

Table 4.10. *Linear Regressions, Principal Components – International Evidence, OLS*

	Dependent Variables:									
	Set 1 (14 obs.)					Set 2 (16 obs.)				
Indep. Var.	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
PCI(N)X1	.327503	.491027	.700819	.094799	.186513	.173617	.287185	.819379	-.073572	.258912
	(.212173)	(.147342)	(.153361)	(.272623)	(.166197)	(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
	[.157]	[.009]	[.001]	[.736]	[.291]	[.449]	[.058]	[.000]	[.721]	[.357]
PCI(N)X2	.511011	.359100	-.355820	-.114291	-.403014	.444461	.441912	-.322149	.196224	.205915
	(.212173)	(.147342)	(.153361)	(.272623)	(.166197)	(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
	[.039]	[.038]	[.045]	[.685]	[.038]	[.071]	[.008]	[.055]	[.351]	[.460]
PCI(N)X3	-.075524	-.508858	.212718	-.065604	.095911	.195928	-.451492	-.00817892	-.214958	-.065823
	(.212173)	(.147342)	(.153361)	(.272623)	(.166197)	(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
	[.730]	[.007]	[.199]	[.815]	[.578]	[.395]	[.007]	[.957]	[.309]	[.811]
PCI(N)X4	.385065	-.141785	-.216666	.508026	.533144	.401660	.361104	-.057051	-.513999	-.230793
	(.212173)	(.147342)	(.153361)	(.272623)	(.166197)	(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
	[.103]	[.361]	[.191]	[.095]	[.011]	[.098]	[.022]	[.709]	[.028]	[.410]
PCI(N)X5	-.269210	.394352	-.279956	-.215984	.510646	-.220172	.403261	.022453	.371780	-.303322
	(.212173)	(.147342)	(.153361)	(.272623)	(.166197)	(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
	[.236]	[.025]	[.101]	[.449]	[.013]	[.341]	[.013]	[.883]	[.093]	[.284]
PCINX6						.196912	-.214767	-.021523	.325391	.148799
						(.220305)	(.133885)	(.148509)	(.200395)	(.268108)
						[.392]	[.140]	[.888]	[.135]	[.591]
SSR	5.26704	2.54003	2.75179	8.69580	3.23170	7.28014	2.68878	3.30823	6.02372	10.7823
SER	.765001	.531249	.552951	.982955	.599231	.853238	.518535	.575172	.776127	1.03838
RBAR2	.414774	.717775	.694245	.03380	.640922	.271986	.731122	.669177	.397628	-.078230
LM het	.860534	.591656	.051830	2.48174	1.72229	2.65643	.697322	.178561	.187655	.135295
	[.354]	[.442]	[.820]	[.115]	[.189]	[.103]	[.404]	[.673]	[.665]	[.713]

Table 4.11. *Linear Regressions, Principal Components – International Evidence, SUR*

						Dependent Variables:				
			Set 1 (14 obs.)					Set 2 (16 obs.)		
Indep. Var.	PCIT1	PCIT2	PCIT3	PCIT4	PCIT5	PCINT1	PCINT2	PCINT3	PCINT4	PCINT5
PCI(N)X1	.321667	.467654	.7550018				.321931	.872270		
	(.177542)	(.118403)	(.119298)				(.090737)	(.108625)		
	[.070]	[.000]	[.000]				[.000]	[.000]		
PCI(N)X2	.485090	.377326	-.362528		-.434844	.402516	.455542	-.326710		
	(.178320)	(.118509)	(.122218)		(.129569)	(.193668)	(.103432)	(.108666)		
	[.007]	[.001]	[.003]		[.001]	[.038]	[.000]	[.003]		
PCI(N)X3		-.546059	.218580				-.399074			
		(.088208)	(.118793)				(.079461)			
		[.000]	[.066]				[.000]			
PCI(N)X4	.239005		-.235366	.585872	.517459	.391246	.334156		-.489437	
	(.134869)		(.121869)	(.219894)	(.143910)	(.199288)	(.094620)		(.168331)	
	[.076]		[.053]	[.008]	[.000]	[.050]	[.000]		[.004]	
PCI(N)X5		.289306	-.316534		.472064		.355672		.406832	-.307168
		(.089071)	(.121482)		(.129004)		(.079930)		(.163564)	(.226110)
		[.001]	[.009]		[.000]		[.000]		[.013]	[.174]
PCINX6							-.167959		.292157	
							(.079610)		(.163562)	
							[.035]		[.074]	
SSR	6.56987	2.97423	2.80623	9.72361	3.83924	9.64487	2.82862	3.41484	7.41962	13.6202
SER	.685037	.460917	.447711	.833393	.523671	.776405	.420463	.461982	.680975	0.922637
R2	.500780	.771482	.787705	.258090	.704903	.358402	.813315	.774958	.505472	.092004
LM het	.108941E-02	.413368	.568733E-07	.590681	.298296	.016301	.152367	.032911	.021839	1.03921
	[.974]	[.520]	[1.00]	[.442]	[.585]	[.898]	[.696]	[.856]	[.883]	[.308]
BP1 (pv)	8.392783	8.223772	.7865678	5.253705	3.760842	5.242408	8.072999	6.020166	2.896845	1.916074
Df = 4	(0.07820)	(0.08372)	(0.94024)	(0.26224)	(0.43934)	(0.26332)	(0.08894)	(0.19765)	(0.57523)	(0.75119)
	BP (df, pv) =	13.20884	CH (df,pv) =	12.674717		BP (df, pv) =	12.07425	CH (df,pv) =	18.581902	
		(10, 0.21223)		(9, 0.17789)			(10, 0.28012)		(16, 0.29094)	

One can compare the estimate of the standard error of the regressions (SER in the tables) of the formulations with those of Tables IV.1 and IV.2: the number of observations in the two sets differ, as well as the number of parameters, yet the two magnitudes are comparable – on grounds of the model of smaller number of observations being equivalent to another with the larger number, the included variables and an additional set of observation dummies for the extra observations. We see that the unrestricted right hand-side component regressions performs better for the 2nd and 3rd components – in Table IV.10 – and reasonably well for the 5-th; the restricted versions, relying on a more parsimonious criteria - the p-values -, not completely, but they usually do not worsen the estimator of the standard error very much.

4. We complete the presentation regressing each of the left hand-side variables on those same "right hand-side" components. We use the full sample principal components depicted in Table IV.4 – that allows for 30 observations and a larger sample for the individually considered variables.

Table 4.12. *Linear Regressions, Principal Components – International Evidence*

	Dependent Variable: (Full Sample)													
	MFERAR	DELDRO	VIOLA	HOMIC	SUICIH	SUICM	DIVOR	DESASP	DESAIP	PRISION	PPRESAS	CRIMREG	FA98P	DPMIPNB
Indep. Var.	352.495	59.1193	60.0102	9.17489	29.6814	8.33888	41.8121	68.4717	45.2018	232.334	177.441	3317.93	5.89569	2.04000
	(48.2397)	(12.3367)	(26.2557)	(1.17234)	(2.48013)	(.601421)	(3.47627)	(24.4753)	(24.6911)	(41.9613)	(22.0582)	(387.832)	(.595223)	(.211026)
	[.000]	[.000]	[.036]	[.000]	[.000]	[.000]	[.000]	[.010]	[.081]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	61.9077	47.2713	-10.3767	-3.31004	.257806	1.46201	4.09795	-6.87536	-7.22253	-64.5287	-64.2609	2160.88	-.187450	.037650
	(49.5548)	(11.5503)	(27.6420)	(1.20868)	(2.47527)	(.600242)	(3.57104)	(24.4836)	(24.6995)	(44.6565)	(22.4857)	(394.603)	(.605399)	(.214633)
	[.227]	[.001]	[.712]	[.015]	[.918]	[.023]	[.265]	[.781]	[.773]	[.163]	[.010]	[.000]	[.760]	[.862]
PCX2	116.187	22.3023	19.3305	-.809769	-12.6473	-2.67857	-5.27906	4.20630	-10.7240	-9.59709	-10.2609	474.411	-.694387	-.199030
	(53.1871)	(15.0684)	(30.2755)	(1.33735)	(2.68531)	(.651177)	(3.83280)	(24.9426)	(25.1626)	(48.5861)	(21.2926)	(445.016)	(.605399)	(.214633)
	[.042]	[.163]	[.532]	[.554]	[.000]	[.000]	[.184]	[.868]	[.674]	[.845]	[.622]	[.303]	[.263]	[.363]
PCX3	60.9565	-54.7208	-.098211	-.788610	-2.03236	.101921	-4.88045	-15.9318	-15.5392	-40.8124	-33.0478	-1504.09	1.06546	.095460
	(58.3418)	(12.2772)	(29.4194)	(1.28898)	(2.49340)	(.604639)	(4.20425)	(24.4914)	(24.7073)	(44.1580)	(22.8851)	(420.185)	(.605399)	(.214633)
	[.309]	[.001]	[.997]	[.550]	[.424]	[.868]	[.260]	[.522]	[.536]	[.366]	[.166]	[.003]	[.092]	[.661]
PCX4	-133.569	18.2972	-41.6719	1.90594	4.40509	1.01886	5.74823	-21.2559	-14.6482	111.212	47.6408	473.565	1.45930	.362795
	(57.0162)	(20.6961)	(44.1271)	(1.92223)	(2.47337)	(.599781)	(4.10873)	(24.4603)	(24.6760)	(52.3285)	(21.2926)	(631.619)	(.605399)	(.214633)
	[.030]	[.393]	[.359]	[.337]	[.089]	[.103]	[.178]	[.394]	[.559]	[.046]	[.040]	[.465]	[.024]	[.104]
PCX5	-94.9448	6.35698	-36.3403	-2.10614	-7.79333	-.644178	-6.95402	-17.0972	-16.2453	-166.280	-62.6946	181.587	.545508	-.256166
	(48.7321)	(13.2092)	(26.3366)	(1.15391)	(2.52242)	(.611676)	(3.51175)	(24.5624)	(24.7790)	(44.5000)	(20.7025)	(383.219)	(.605399)	(.214633)
	[.066]	[.638]	[.187]	[.088]	[.005]	[.304]	[.062]	[.494]	[.519]	[.001]	[.007]	[.642]	[.377]	[.245]
PCX6	-88.4409	2.33712	-.962927	-.148273E-2	.755161	.025722	9.19042	8.82524	5.94435	10.5088	16.1633	-42.6528	-.487851	-.288327
	(53.2139)	(9.94448)	(22.4508)	(1.01012)	(2.47625)	(.600480)	(3.83473)	(24.4782)	(24.6941)	(40.8850)	(22.3592)	(324.069)	(.605399)	(.214633)
	[.113]	[.818]	[.966]	[.999]	[.763]	[.966]	[.027]	[.722]	[.812]	[.800]	[.479]	[.897]	[.429]	[.192]
SSR	.101159E+7	26608.4	188767	334.916	3890.85	228.799	5253.20	381443	388200	968774	213534	.360241E+8	244.461	30.7270
SER	230.742	45.2416	108.618	4.72523	13.2988	3.22490	16.6278	131.675	132.836	214.784	108.917	1549.71	3.26017	1.15584
RBAR2	.313188	.631991	-.182515	.435795	.539522	.434747	.349303	-.171239	-.192129	.454375	.459363	.655416	.166200	.038927
LM het	2.32836	7.82461	3.01760	.134747	2.01605	.077555	.797904	1.07558	2.89198	14.9393	.030815	.112500E-02	3.78520	2.94387
	[.127]	[.005]	[.082]	[.714]	[.156]	[.781]	[.372]	[.300]	[.089]	[.000]	[.861]	[.973]	[.052]	[.086]
NOBS	26	20	23	22	29	29	26	29	29	28	25	22	30	30

The application of SUR required that the same number of observations be used for estimation. We used the components derived for Set 1 (for 16 observations) – which are, therefore, not the same variables as those of the previous table - and obtained the set of results of Table IV.13.

General development (PX1) affects:

- positively: road accidents (MFERAR), drug offences (DELDRO), female suicides (SUICM), general crime (CRIMREG);
- negatively: homicides (HOMIC), drug offences (DELDRO), imprisonment (PRISION, PPRESAS).

Capital intensity (industrialization, negatively represented by PX2) affects:

- positively: homicides (HOMIC), suicides (SUICIH and SUICM), divorces (DIVOR), imprisonment (PRISION, PPRESAS), military expenditures (DPMIPNB);
- negatively: drug offences (DELDRO), general crime (CRIMREG).

Public Expenditures and importance (negatively represented by PX3) affects:

- positively: drug offences (DELDRO), general crime (CRIMREG);
- negatively: road accidents (MFERAR), suicides (SUICIH and SUICM), imprisonment (PRISION, PPRESAS).

Literacy and female labor market involvement (negatively represented by PX4) affects:

- positively: drug offences (DELDRO), homicides (HOMIC), male suicides (SUICIH), divorces (DIVOR), imprisonment (PRISION, PPRESAS), general crime (CRIMREG);
- negatively: road accidents (MFERAR), military expenditures (DPMIPNB).

The business cycle (PX5) is associated:

- positively to: rapes (VIOLA), female suicides (SUICM), divorces (DIVOR);
- negatively to: drug offences (DELDRO), imprisonment (PRISION, PPRESAS), armed forces (FA98P and DPMIPNB).

Comparing the estimated standard error with that obtained in section III for the regression on the same left hand-side variable, only for VIOLA, DIVOR and PRISION (and for one equation of CRIMREG) is it now higher - and the explanatory variables yielding the components are not even the same (the best found, presumably) that were used in those former estimates.

Table 4.13. *Linear Regressions, Principal Components – International Evidence, SUR*

	Dependent Variable: (Set 1)													
	MFERAR	DELDRO	VIOLA	HOMIC	SUICIH	SUICM	DIVOR	DESASP	DESAIP	PRISION	PPRESAS	CRIMREG	FA98P	DPMIPNB
Indep. Var.	287.000	69.1500	48.1500	10.4500	37.7571	9.98571	42.5000	88.5486	74.2507	280.307	172.764	3517.43	5.31378	1.79286
	(34.1021)	(8.08716)	(28.9878)	(1.10475)	(2.49852)	(.567270)	(4.11179)	(43.3619)	(44.1624)	(39.4533)	(17.4685)	(303.696)	(.533202)	(.261525)
	[.000]	[.000]	[.097]	[.000]	[.000]	[.000]	[.000]	[.041]	[.093]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	149.928	43.3702		-4.23708		1.71220				-99.4484	-92.2730	2179.84		
	(35.3895)	(6.70147)		(.621510)		(.405225)				(34.9234)	(10.5537)	(288.721)		
	[.002]	[.000]		[.000]		[.000]				[.004]	[.000]	[.000]		
PCX2		36.0494		-2.33722	-16.7522	-2.86676	-6.13316			-118.494	-50.6920	722.430		-.449361
		(7.00355)		(.749764)	(2.29615)	(.561895)	(3.05777)			(38.2307)	(14.9869)	(300.703)		(.271398)
		[.000]		[.002]	[.000]	[.000]	[.045]			[.002]	[.001]	[.016]		[.129]
PCX3	53.0969	-20.6134			3.88185	.917645				217.767	48.3396	-771.434		
	(35.3895)	(5.85044)			(1.82961)	(.491597)				(34.6548)	(11.7133)	(262.639)		
	[.164]	[.000]			[.034]	[.062]				[.000]	[.000]	[.003]		
PCX4	80.7534	-38.0629		-2.16819	-3.63814		-10.4248			-179.367	-49.8293	-1059.57		.462054
	(35.3895)	(6.45600)		(.749441)	(1.66734)		(2.77372)			(37.5792)	(14.8293)	(273.835)		(.271398)
	[.046]	[.000]		[.004]	[.029]		[.000]			[.000]	[.001]	[.000]		[.119]
PCX5		-20.4257	23.7727			.327270	7.07171			-63.0135			-1.15457	-.911189
		(4.95938)	(9.51008)			(.325530)	(2.33800)			(14.4190)			(.408403)	(.271398)
		[.000]	[.012]			[.315]	[.002]			[.000]			[.005]	[.007]
SSR	162814	13455.3	168646	251.014	1284.32	66.5580	3682.98	368530	382262	326665	61130.5	.184604E+8	58.2855	9.57538
SER	127.599	31.0015	109.755	4.23434	9.57794	2.18040	16.2194	162.245	165.240	152.752	66.0792	1148.30	2.04040	.978539
R2	.717562	.857553	.118151	.615808	.789669	.733787	.572165	.159803	.028540	.816737	.790536	.843292	.373478	.628419
LM het	3.27544	4.79080	2.20470	1.72412	.618104	.700696	2.23389	-.149917E-03	-.247798E-03	.743347	1.47337	.049705	3.98462	11.3076
	[.070]	[.029]	[.138]	[.189]	[.432]	[.403]	[.135]	[1.00]	[1.00]	[.389]	[.225]	[.824]	[.046]	[.001]
BP1 (pv)	8.229007	26.99716	40.80714	35.81432	24.27516	15.90541	36.18154	42.79721	43.25674	27.74993	29.83599	16.59842	16.29096	11.28932
Df = 13	(0.82837)	(0.01245)	(0.00010)	(0.00063)	(0.02869)	(0.25428)	(0.00056)	(0.00005)	(0.00004)	(0.00980)	(0.00497)	(0.21832)	(0.23377)	(0.58659)
	OLS			BP (df, pv) =	169.26202	(66, 0.0000			CH (df,pv) =	89.300511	(21, 0.0000)			OLS
	estimates													estimates

5. Finally, we summarize the pattern of aggregate correlation between the right hand-side components and the left hand-side components and variables in the following tables:

Determinants of Social Disruption Composites, International Evidence

	Agressiveness (- PCT1)	Degree of Law Enforcement / Abidance (- PCT2)	Female Suicides (PCT3)	Authority (discipline, PCT4, - in Set 2)	Drug Offenses (- PCIT5) Road Fatalities (PCINT5)
General Development (PX1)	-	-	+		
Capital Intensity (- PX2)	+	+	+		-
Public Expenditures (- PX3)		-	- (?)		
Education and Female Involvement (- PX4)	+		+ (?)	-	+
Business Cycle, Labor Market Tightness (PX5)		-	+ (?)	-	-

Determinants of Social Disruption Variables, International Evidence

	General Development (PX1)	Capital Intensity (- PX2)	Public Expenditures (- PX3)	Education and Female Involvement (- PX4)	Business Cycle, Labor Market Tightness (PX5)
MFERAR	+ (*)		-	-	
DELDRO	+	-	+	+	-
VIOLA					+
HOMIC	- (*)	+		+	
SUICIH		+ (*)	-	+	
SUICM	+	+	-		+
DIVOR		+		+	+
DESASP					
DESAIP					
PRISION	-	+	- (*)	+	-
PPRESAS	- (*)	+	-	+	
CRIMREG	+ (*)	-	+	+	
FA98P					-
DPMIPNB		+		-	- (*)

Notes: (*) Much larger impact than the others in the regression.

Cross-Correlation Decomposition

An alternative approach relies on the correlation matrix decomposition of both sets in line with the approach taken in section II. We therefore:

1. Present the decomposition of the cross-correlation matrix of the X – the explanatory set of 24 variables – by the Y variables.

Table 4.14. *Principal Components, Correlations with External Variables – International Evidence*

	Set 1 (Balanced Sample)						Set 1 (Unstandardized, Weighted)					
	Mean (s.d)	PCYX1	PCYX2	PCYX3	PCYX4	PCYX5	Mean (s.d)	PCYX1	PCYX2	PCYX3	PCYX4	PCYX5
Eigenv.		11.316881	6.1208854	3.0962027	1.5730553	1.1730166		13.04102	3.39710	2.66515	2.60534	1.06741
% Cum. Exp Var.		0.47153670	0.72657359	0.85558203	0.92112600	0.97000170		0.54338	0.68493	0.79598	0.90454	0.949016
Factor Loadings:												
DENSPO	-0.093071 (0.32350)	0.713213	0.544369	0.396142	0.008177	0.077699	0.018605 (0.10972	0.295585	-0.45876	0.175214	0.56322	0.432301
ESPVN	-0.068817 (0.49952)	0.973756	0.187474	-0.05097	-0.06951	-0.00629	0.0065651 (0.25213)	0.815897	-0.4556	0.268105	-0.10213	0.121237
COEDEP	-0.072849 (0.22014)	0.141659	0.775016	-0.40563	0.275687	0.353309	-0.053678 (0.26148)	-0.89058	-0.24017	0.093973	-0.1321	-0.32938
TXALA98	0.070684 (0.43199)	-0.44243	-0.86998	-0.06744	-0.18347	0.030539	0.032775 (0.26747	0.872744	0.371567	0.275768	0.090641	0.102714
IEDUC98	0.16000 (0.35102	0.619542	-0.66854	-0.36871	-0.08357	0.025363	0.042614 (0.29559	0.915476	0.226017	0.288457	-0.07052	0.114809
TXAMH98	0.13199 (0.34678	-0.56472	-0.67721	-0.39729	0.033669	0.136064	0.054618 (0.23778	0.260075	0.840654	-0.24858	-0.30224	-0.21206
TAXDES	0.066115 (0.29027)	0.377829	0.495873	0.622602	-0.36328	-0.05943	-0.0019608 (0.20127)	0.225177	-0.49215	-0.27036	0.688805	0.169999
PNBPC98	0.016508 (0.43624)	0.953555	-0.12495	-0.16853	-0.15807	0.118872	0.079810 (0.24460	0.864393	-0.32617	0.052109	-0.33427	-0.05439
POB20	-0.070727 (0.38332)	0.867194	-0.44108	0.152044	-0.07811	-0.07655	0.043944 (0.27544	0.700601	-0.15527	-0.62612	0.276945	-0.06955
RIC20	0.11977 (0.42371	-0.94053	0.295298	-0.11187	0.064699	0.045592	-0.045913 (0.28178)	-0.76075	0.187751	0.565788	-0.23278	0.063035
POPURB	0.21331 (0.18454	0.807569	-0.14758	-0.09032	-0.13383	0.490846	0.10287 (0.21747)	0.779638	-0.14503	0.508515	0.220213	0.063614
PAGR98	-0.016504 (0.35851)	0.201504	0.923571	0.09316	0.2088	0.211273	-0.016630 (0.17725)	-0.86518	-0.32539	-0.17749	-0.0373	0.124396
PIND98	0.086623 (0.30663)	-0.45192	-0.56613	0.52406	-0.20082	0.379404	0.034029 (0.18975	0.501178	0.070787	0.305815	0.686386	-0.23219
CPPIB98	0.15293 (0.18736	0.83933	0.185785	0.143303	0.295618	0.076798	0.15692 (0.22192)	0.437726	-0.36621	0.231358	0.5527	-0.53755
DPEDPNB	0.047449 (0.18170)	0.375928	-0.43198	-0.61842	0.487133	0.020382	0.067920 (0.20107	0.735964	0.38633	0.165556	-0.22936	-0.45403
DPSAPNB	0.11150 (0.28236	0.860432	-0.12754	0.426833	-0.13491	0.132289	0.078114 (0.22976	0.9426	-0.03464	-0.22006	-0.13213	0.027513
DEPR98	-0.091042 (0.16507)	0.41768	0.574979	-0.56223	-0.29941	-0.27366	-0.044531 (0.13647)	-0.30505	-0.61957	0.584796	-0.19473	-0.28299
LENR98	-0.095480 (0.19822)	-0.49444	0.654738	-0.52417	-0.19784	-0.07498	-0.060051 (0.14123)	-0.6796	0.057152	0.644974	-0.0919	-0.02665
APDP	-0.029171 (0.36585)	0.608265	-0.58055	-0.39359	-0.25736	0.212263	0.017673 (0.19349	0.704148	0.057975	-0.18581	-0.50466	-0.21357
PNBPCGR	0.044460 (0.38141)	0.978214	-0.08797	0.133024	0.028706	-0.02655	-0.026033 (0.17330)	0.150897	-0.58317	-0.07497	-0.70009	0.154009
INPIB98	0.087381 (0.27777)	-0.42604	-0.55618	0.537615	0.278344	-0.34605	-0.017626 (0.075411)	0.18482	0.256043	-0.28732	0.405151	0.076922
DIR98	0.17513 (0.19853	-0.54638	0.226602	-0.20125	-0.75021	-0.00831	0.018948 (0.13566	-0.47557	0.144121	0.760476	0.078282	-0.04836

ICRGD98	-0.098684						0.014411 (0.24850					
	(0.42078)	0.89781	-0.29147	-0.20391	-0.00669	-0.2441		0.903386	-0.25353	0.026765	-0.2907	-0.08301
DSDR98E	0.033524						0.051431 (0.16992					
	(0.30584)	-0.85892	-0.02679	0.10451	0.047198	0.487258		-0.05667	0.762584	0.048011	0.510187	0.129712
Correlations with "Correlations with"												
POPUL	0.13806 (0.29636	-0.69390 *	0.12161	-0.030537	-0.56214 *	0.40676	0.011123 (0.15099	0.11453	0.24543	-0.036254	-0.13566	0.31513
PIBPC98	0.035839	0.96065 *	-0.11828	-0.094665	-0.16787		0.075649 (0.25343	0.87263 *	-0.34621	0.18585	-0.27480	
	(0.43505)					0.072542						-0.0088838
PNBPC98	0.016508	0.95356 *	-0.12495	-0.16853	-0.15807		0.079810 (0.24460	0.86439 *	-0.32617	0.052109	-0.33427	
	(0.43624)					0.11887						-0.054387
PNBPCGR	0.044460	0.97821 *	-0.087970	0.13302	0.028706		-0.026033	0.15090	-0.58317 *	-0.074965	-0.70009 *	
	(0.38141)					-0.026545	(0.17330)					0.15401
TAXDES	0.066115	0.37783	0.49587 **	0.62260 *	-0.36328		-0.0019608	0.22518	-0.49215 **	-0.27036	0.68880 *	
	(0.29027)					-0.059434	(0.20127)					0.17000
TXINF98	0.0065662	-0.86556 *	-0.098994	0.26436	0.26129		-0.023737	-0.70313 *	0.30887	-0.19316	0.48452 **	
	(0.27079)					0.30642	(0.13780)					0.091500
TXINFAV	-0.093359	-0.93489 *	0.23050	-0.14475	0.12981		-0.024399	-0.36378	0.39619	0.072662	0.74025 *	
	(0.29146)					0.12935	(0.17165)					-0.17853

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244; for 13 observations 0.55295.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744; for 13 observations 0.47618.)

The cross correlation presents the possibility of plotting the dependent variables, the observations, according to the relationships towards the dependent set. We can compare the graph with the one of section II, designed for the own cross-correlations.

For the weighted unstandardized results we have:

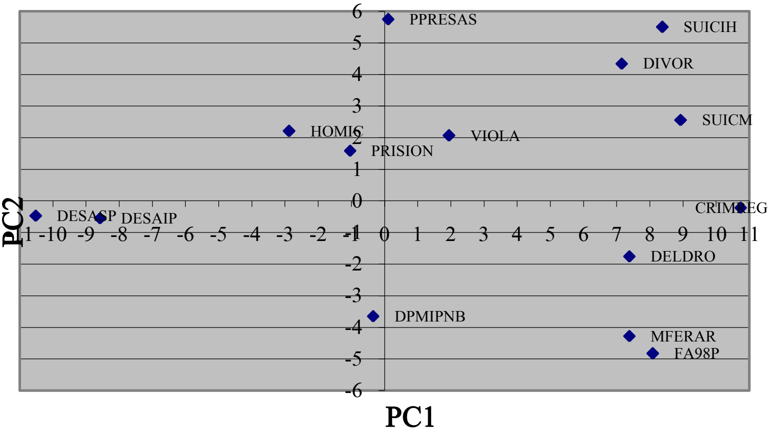

Figure 4.2. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Sample*

The observations arise in a more disperse form, but still DESAIP and DESASP show isolated. Divorces, DIVOR, now join suicides, SUICH and SUICM. Homicides (HOMIC), rapes (VIOLA) and imprisonment (PPRESAS and PRISION) cluster together. General crime, CRIMREG, is close to suicides and divorces and also to a final cluster including drug offenses (DELDRO), road accidents (MFERAR) and armed forces (FA98P) - with military expenses (DPMIPNB) may be included in this final block.

2. Consistently, we decompose the probability matrix of the full sample:

Table 4.15. *Principal Components, Correlations with Ext. Var. Significance Levels – International Evidence*

	Set 1 (Standardized)						Set 1 (Unstandardized)					
	Mean (s.d)	PCYX1	PCYX2	PCYX3	PCYX4	PCYX5	Mean (s.d)	PCYX1	PCYX2	PCYX3	PCYX4	PCYX5
Eigenv.		11.211171	3.5910293	3.1005407	2.7268868	1.2560501		12.41110	3.54891	2.92894	2.11798	1.25603
% Cum. Exp Var.		0.46713212	0.61675834	0.74594753	0.85956782	0.91190324		0.51713	.66500	.78704	.875289	0.927624
Factor Loadings:												
DENSPO	0.49806 (0.26493)	0.28703	0.084870	0.67210	0.37408	0.47331	0.49806 (0.26493)	0.27531	-0.22736	0.61522	-0.34686	0.46244
ESPVN	0.50383 (0.37058)	0.81651	-0.40193	-0.089472	0.35067	0.089155	0.50383 (0.37058)	0.82596	-0.32394	-0.21579	-0.36559	0.025097
COEDEP	0.36906 (0.40859)	-0.89972	-0.12194	0.10945	0.080311	-0.36996	0.36906 (0.40859)	-0.90144	-0.19365	0.059063	-0.011904	-0.36557
TXALA98	0.71079 (0.39154)	0.80040	0.36559	-0.28986	0.070448	0.31658	0.71079 (0.39154)	0.80316	0.48147	-0.080134	-0.15530	0.25938
IEDUC98	0.72100 (0.40756)	0.84217	0.23582	-0.30355	0.066856	0.33477	0.72100 (0.40756)	0.84514	0.37380	-0.15905	-0.16682	0.27990
TXAMH98	0.63108 (0.41561)	0.25114	0.35261	-0.64305	-0.48563	-0.23673	0.63108 (0.41561)	0.26024	0.63840	-0.42115	0.45624	-0.26621
TAXDES	0.44199 (0.32660)	0.27647	-0.077945	0.87969	0.031808	-0.059080	0.44199 (0.32660)	0.26045	-0.46769	0.73628	0.092016	0.088767
PNBPC98	0.62546 (0.37089)	0.96922	-0.16445	0.0064226	0.10757	0.084314	0.62546 (0.37089)	0.97132	-0.15080	-0.048379	-0.11319	0.066388
POB20	0.53462 (0.434599	0.76736	-0.24924	0.40114	-0.12687	-0.31014	0.53462 (0.434599	0.76843	-0.41840	0.27312	0.26786	-0.22212
RIC20	0.44623 (0.44097)	-0.82766	0.28950	-0.35262	0.066392	0.27525	0.44623 (0.44097)	-0.82779	0.43048	-0.21289	-0.18273	0.20102
POPURB	0.77119 (0.33548)	0.75593	0.34117	-0.11075	0.51480	-0.062147	0.77119 (0.33548)	0.75320	0.30798	0.15248	-0.51777	-0.15476
PAGR98	0.36289 (0.32199)	-0.84310	-0.37891	0.14580	-0.044112	0.015805	0.36289 (0.32199)	-0.83763	-0.39712	-0.082264	0.044535	0.041141
PIND98	0.62935 (0.37091)	0.44252	0.66127	0.44450	0.26206	-0.096050	0.62935 (0.37091)	0.42973	0.34709	0.76316	-0.16125	-0.089170
CPPIB98	0.76584 (0.31892)	0.76842	0.19074	-0.020132	0.41611	-0.37234	0.76584 (0.31892)	0.76549	0.11796	0.17962	-0.36622	-0.41561
DPEDPNB	0.68880 (0.36387)	0.68871	0.35714	-0.41898	0.0016344	-0.37470	0.68880 (0.36387)	0.68693	0.48768	-0.15139	0.0035318	-0.44261
DPSAPNB	0.64058 (0.40959)	0.96523	-0.13744	-0.014202	-0.11953	-0.012260	0.64058 (0.40959)	0.96487	-0.10448	-0.078081	0.10454	0.016874
DEPR98	0.42877 (0.28492)	-0.22511	-0.25618	-0.061563	0.88450	-0.22670	0.42877 (0.28492)	-0.21642	-0.27843	-0.049403	-0.82031	-0.38401
LENR98	0.36301 (0.31078)	-0.73276	0.36033	-0.29990	0.41495	0.15738	0.36301 (0.31078)	-0.72609	0.44142	-0.068563	-0.46082	0.023207
APDP	0.50527 (0.38045)	0.76835	-0.084094	-0.28332	-0.18333	0.011429	0.50527 (0.38045)	0.77778	0.067599	-0.27736	0.20287	-0.019587
PNBPCGR	0.45373 (0.34024)	0.11805	-0.83616	-0.39371	-0.0080817	0.23143	0.45373 (0.34024)	0.13542	-0.54605	-0.75677	-0.069877	0.16876
INPIB98	0.44852 (0.23752)	0.27603	0.30358	0.31916	-0.50709	0.042356	0.44852 (0.23752)	0.24674	0.15313	0.31063	0.43423	0.16780
DIR98	0.52095 (0.25770)	-0.56741	0.49436	-0.19008	0.54010	-0.0063020	0.52095 (0.25770)	-0.56341	0.46262	0.13374	-0.53812	-0.13808
ICRGD98	0.55632 (0.39231)	0.93860	-0.30019	-0.040195	0.051276	0.064628	0.55632 (0.39231)	0.94205	-0.24173	-0.16552	-0.067833	0.052448
DSDR98E	0.57909 (0.33784)	-0.066106	0.84043	0.32272	-0.34120	0.089034	0.57909 (0.33784)	-0.082732	0.61474	0.63223	0.37724	0.17168
Correlations with “Correlations with”												
POPUL	0.50271 (0.32954)	0.089102	0.32206	-0.056099	-0.35248	0.42161	0.50271 (0.32954)	0.067382	0.36514	0.0015225	0.21665	0.43305
PIBPC98	0.64969 (0.36436)	0.95553 *	-0.10632	-0.037493	0.19380	0.063780	0.64969 (0.36436)	0.95701 *	-0.088923	-0.050140	-0.20798	0.029258
PNBPC98	0.62546 (0.37089)	0.96922 *	-0.16445	0.0064226	0.10757	0.084314	0.62546 (0.37089)	0.97132 *	-0.15080	-0.048379	-0.11319	0.066388
PNBPCGR	0.45373 (0.34024)	0.11805	-0.83616 *	-0.39371	-0.0080817	0.23143	0.45373 (0.34024)	0.13542	-0.54605 *	-0.75677 *	-0.069877	0.16876
TAXDES	0.44199 (0.32660)	0.27647	-0.077945	0.87969 *	0.031808	-0.059080	0.44199 (0.32660)	0.26045	-0.46769 **	0.73628 *	0.092016	0.088767
TXINF98	0.42360 (0.32656)	-0.73159 *	0.22014	0.23156	-0.29652	-0.15423	0.42360 (0.32656)	-0.73520 *	0.10583	0.28313	0.33513	-0.041350
TXINFAV	0.42068 (0.33678)	-0.32868	0.66815 *	0.49434 **	0.066469	-0.18512	0.42068 (0.33678)	-0.34565	0.35130	0.76499 *	0.028019	-0.12501

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 14 observations: 0.53244.)

** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 14 observations: 0.45744.)

We completed the analysis using the loadings of cross-correlation decomposition to transform the original variables, even if their treatment was not the main focus of our study [86]. In general, the correlations had poor significance – possibly suggesting a better performance of “uncentered” pc if applied in correlation matrix decomposition for purposes referring to transformation of the original variables of the set.

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[86] We had to decompose the own cross-correlation matrix of the external variables set. Corresponding estimates were not reported.

Table 4.16. *Principal Components, External Variables, Unstandardized Cross-Correlation Loadings – International Evidence*

	Full Sample (30 obs.)						
	PCX1	PCX2	PCX3	PCX4	PCX5	PCX6	PCX7
Eigenv.	12.28954	3.40272	1.71312	1.01703	0.61033	0.42223	0.16517
% Cum. Exp Var.	0.61448	0.78462	0.870276	0.921127	0.951643	0.972754	0.9810123
Eigenv.	0.74864	1.91435	0.23221	0.84558	0.81776	1.09631	0.52793
% Cum. Exp Var.	0.037432	0.13315	0.144761	0.18704	0.227928	0.282744	0.30914
Factor Loadings:							
DENSPO	-0.091706	0.084999	0.079384	0.097457	-0.25380	0.12720	-0.14140
ESPVN	-0.014953	0.24390	0.15657	0.091645	-0.10637	0.13777	-0.41206
COEDEP	-0.044236	0.14893	0.10204	-0.12000	-0.066787	-0.14534	-0.083327
TXALA98	0.46180	-0.25739	-0.27308	-0.16451	0.56668	-0.014530	0.31537
IEDUC98	0.22330	0.14066	-0.039646	-0.083319	0.25146	0.027171	-0.22289
TXAMH98	0.30286	0.023682	0.046676	-0.16765	0.62171	-0.20791	0.14972
TAXDES	0.11858	-0.23622	0.051252	0.082417	0.14920	0.050561	0.24653
PNBPC98	0.13412	0.13808	0.0025392	-0.055583	0.016464	0.070553	-0.23533
POB20	0.10308	-0.14570	0.089227	0.082373	0.18754	0.069813	0.18725
RIC20	-0.18186	0.17851	0.015340	-0.068218	-0.26234	-0.094871	-0.17222
POPURB	-0.025423	0.044623	-0.12632	0.11756	-0.095882	0.12252	-0.15056
PAGR98	0.19009	-0.022389	-0.10400	-0.18964	0.21761	-0.054935	0.077492
PIND98	-0.047278	0.072746	0.022901	0.11130	-0.056089	0.10084	-0.089956
CPPIB98	0.15300	-0.041628	0.048318	-0.16016	0.44231	-0.31687	0.28561
DPEDPNB	0.13863	-0.058117	-0.057537	-0.17490	0.19755	-0.15166	0.15254
DPSAPNB	0.18523	0.069406	0.10709	-0.17491	0.17375	-0.090657	-0.049017
LENR98	0.20593	-0.016800	-0.073947	-0.080582	0.22194	0.050669	0.020836
APDP	0.10825	0.30181	0.14029	-0.12255	0.12475	-0.080567	-0.29376
INPIB98	-0.35635	0.000084479	0.30053	0.46674	-0.16123	0.16681	-0.051485
DSDR98E	0.14470	-0.13477	-0.15290	-0.12095	0.10776	0.023092	0.13499
Correlations with							
POPUL	0.035876	-0.12797	-0.14201	0.027160	-0.24091	0.18521	0.018501
PIBPC98	0.037763	0.13268	0.039034	0.021696	-0.053901	0.10323	-0.26588
PNBPC98	0.13412	0.13808	0.0025392	-0.055583	0.016464	0.070553	-0.23533
PNBPCGR	-0.22615	0.13032	0.15816	0.23378	-0.35749 **	0.20746	-0.32979 **
TAXDES	0.11858	-0.23622	0.051252	0.082417	0.14920	0.050561	0.24653
TXINF98	-0.10981	-0.086623	-0.056607	-0.070430	-0.048009	-0.14476	0.22328
TXINFAV	0.27638	-0.038611	-0.16447	-0.21902	0.32082 **	-0.067540	0.11932

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 30 observations: 0.360945.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 30 observations: 0.306035.)

Using the “unbalanced” weighted matrix:

Table 4.17. *Principal Components, External Variables, Weighted Unstandardized Cross-Correlation Loadings – International Evidence*

	Full Sample (30 obs.)						
	PCX1	PCX2	PCX3	PCX4	PCX5	PCX6	PCX7
Eigenv.	13.42062	2.01368	1.17624	0.94060	0.59362	0.52204	0.35971
% Cum. Exp Var.	0.67103	0.77171	0.830522	0.907233	0.933335	0.95132	0.967294
Eigenv.	0.85828	1.68786	0.18472	0.45945	0.44123	0.64019	0.50054
% Cum. Exp Var.	0.042914	0.127307	0.1365431	0.1595151	0.1815761	0.2135861	0.2386131
Factor Loadings:							
DENSPO	-0.046656	0.14370	-0.080473	0.16983	-0.15548	0.16534	0.082547
ESPVN	-0.024884	-0.023988	-0.22281	0.041148	-0.045920	0.0039070	-0.047767
COEDEP	-0.020990	-0.038306	-0.071483	0.058832	0.11758	-0.16094	-0.17466
TXALA98	0.35503	-0.26318	0.16557	-0.42151	0.023248	-0.069740	0.11397
IEDUC98	0.16993	-0.19437	-0.16980	-0.16943	0.069482	-0.15139	-0.11617
TXAMH98	0.13517	-0.48384	-0.058975	-0.57653	0.28608	-0.20177	-0.097721
TAXDES	0.041724	-0.077412	0.24740	-0.24388	-0.067769	0.12719	0.26000
PNBPC98	0.14157	-0.039048	-0.12127	0.0068232	-0.026145	-0.069852	-0.057670
POB20	-0.0099135	-0.16381	0.12411	-0.32037	-0.054898	0.18156	0.24781
RIC20	-0.076903	0.15411	-0.12703	0.31462	0.063008	-0.13518	-0.22863
POPURB	0.017869	0.15343	-0.15172	0.19848	-0.14414	0.077734	-0.013559
PAGR98	0.15066	-0.16364	0.028061	-0.16992	0.074965	-0.11062	-0.045999
PIND98	-0.058288	0.028101	-0.14845	0.025990	-0.10150	0.16040	0.057724
CPPIB98	0.061324	-0.31210	0.042634	-0.37469	0.29988	-0.22655	-0.13457
DPEDPNB	0.12496	-0.11985	0.097243	-0.13230	0.14029	-0.17710	-0.082092
DPSAPNB	0.14204	-0.20943	0.041015	-0.21383	0.14373	-0.19082	-0.068439
LENR98	0.12678	-0.17806	-0.028716	-0.21542	-0.028732	0.014727	0.051827
APDP	0.075593	-0.20872	-0.26504	-0.12000	0.15146	-0.18839	-0.21427
INPIB98	-0.44910	0.035030	-0.087816	-0.067926	-0.12155	0.39092	0.24431
DSDR98E	0.12737	-0.044331	0.13864	-0.075004	-0.029906	-0.023954	0.057495
Correlations with							
POPUL	0.11298	0.24394	0.13036	0.23758	-0.26182	0.15635	0.17400
PIBPC98	0.045202	0.00049845	-0.11510	0.045569	-0.037937	-0.028854	-0.037041
PNBPC98	0.14157	-0.039048	-0.12127	0.0068232	-0.026145	-0.069852	-0.057670
PNBPCGR	-0.18631	0.18734	-0.10746	0.23657	-0.15645	0.16088	0.068643
TAXDES	0.041724	-0.077412	0.24740	-0.24388	-0.067769	0.12719	0.26000
TXINF98	-0.069996	0.065899	0.099010	0.081869	0.074059	-0.037447	-0.053559
TXINFAV	0.22125	-0.20656	0.0049963	-0.22570	0.070562	-0.12040	-0.049665

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 30 observations: 0.360945.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 30 observations: 0.306035.)

3. Finally, we explain the Y principal components on the correlations with the X ones of each type.

That is, we explain similarities in the one-by-one relations between the Y's by similarities in the one-by-one relations between the Y's and the X's.

Table 4.18. *Linear Regressions, Principal Components, Cross-Correlations – International Evidence*

Dependent Variables: (Set 1 – 14 obs.)						
	Balanced Sample			(Unstandardized, Weighted)		
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY1	PCYY2	PCYY3
Intercept				-3.82432	1.75523	-1.54810
				(1.12364)	(.678413)	(.500639)
				[.009]	[.032]	[.015]
PCYX1	.829571	.528081	-.087946	.931777	.039763	.168746
	(.041987)	(.048268)	(.061435)	(.141239)	(.085275)	(.062929)
	[.000]	[.000]	[.186]	[.000]	[.653]	[.028]
PCYX2	.472120	-.563116	.583656	.461095	1.57686	-.355592
	(.041987)	(.048268)	(.061435)	(.276731)	(.167080)	(.123298)
	[.000]	[.000]	[.000]	[.134]	[.000]	[.020]
PCYX3	.134409	-.422675	-.033686	.738180	-.387585	.536981
	(.041987)	(.048268)	(.061435)	(.312429)	(.188633)	(.139203)
	[.011]	[.000]	[.597]	[.046]	[.074]	[.005]
PCYX4	-.112986	.223198	.522135	.820444	-.954995	-1.14857
	(.041987)	(.048268)	(.061435)	(.315995)	(.190786)	(.140792)
	[.025]	[.001]	[.000]	[.032]	[.001]	[.000]
PCYX5	.205465	-.393182	-.586415	-.034495	.264528	-1.01208
	(.041987)	(.048268)	(.061435)	(.493680)	(.298066)	(.219960)
	[.001]	[.000]	[.000]	[.946]	[.401]	[.002]
SSR	.206262	.272589	.441593	94.4721	34.4380	18.7542
SER	.151387	.174034	.221508	3.43642	2.07479	1.53110
RBAR2	.977082	.969712	.950934	.804884	.897922	.896917

Table 4.19. *Linear Regressions, Principal Components, Cross-Correlations – International Evidence, SUR*

	Dependent Variables (Set 1, 14 obs.)					
	Balanced Sample			(Unstandardized, Weighted)		
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY1	PCYY2	PCYY3
Intercept				-3.81096 (.777190) [.000]	1.61724 (.464677) [.001]	-1.51492 (.371574) [.000]
PCYX1	.829571 (.033665) [.000]	.528081 (.038701) [.000]	-.087946 (.050074) [.079]	.938728 (.106128) [.000]		.178058 (.044793) [.000]
PCYX2	.472120 (.033665) [.000]	-.563116 (.038701) [.000]	.583656 (.050074) [.000]	.461095 (.209253) [.028]	1.57686 (.134000) [.000]	-.355592 (.093204) [.000]
PCYX3	.116571 (.020741) [.000]	-.409468 (.033352) [.000]		.738180 (.236246) [.002]	-.387585 (.151286) [.010]	.536981 (.105228) [.000]
PCYX4	-.112986 (.033665) [.001]	.223198 (.038701) [.000]	.522135 (.050074) [.000]	.820444 (.238943) [.001]	-.954995 (.153012) [.000]	-1.14857 (.106429) [.000]
PCYX5	.205465 (.033665) [.000]	-.393182 (.38701) [.000]	-.586415 (.050074) [.000]			-.949176 (.153640) [.000]
SSR	.210399	.274856	.456345	94.5583	38.7645	18.9972
SER	.122591	.140116	.180544	2.59888	1.66400	1.16488
R2	.983820	.978887	.964897	.879846	.929291	.935787
BP1 (pv) Df = 2	12.41005 (.00202)	7.326819 (.02564)	12.28822 (.00215)	0.4593448 (.79479)	1.762337 (.41430)	1.870759 (.39244)
	BP (df, pv) = 16.01255 (3, .00113)		CH (df,pv) = 0.46768815 (1, .49405)	BP (df, pv) = 2.04622 (3, .56287)		CH (df,pv) = 1.7602999 (3, .62361)

Table 4.20. *Linear Regressions, Principal Components, Cross-Correlations Significance Levels – International Evidence, Set 2*

				Dependent Variables: (14 obs)				
	Standardized				Unstandardized			
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY4	PCYY1	PCYY2	PCYY3	PCYY4
Interc.					-.711554	.768452	-.034268	-.652978
					(.251706)	(.274389)	(.145575)	(.265142)
					[.022]	[.023]	[.820]	[.039]
PCYX1	-.358539	.597661	.519747	-.075173	-.268221	-.312428	.217054	.032137
	(.116512)	(.128747)	(.123651)	(.275155)	(.078593)	(.085675)	(.045455)	(.082788)
	[.013]	[.001]	[.002]	[.791]	[.009]	[.007]	[.001]	[.708]
PCYX2	-.472042	.297310	-.427933	.435198	-.851226	.066088	-.192919	-.148341
	(.116512)	(.128747)	(.123651)	(.275155)	(.146975)	(.160219)	(.085003)	(.154820)
	[.003]	[.046]	[.007]	[.148]	[.000]	[.691]	[.053]	[.366]
PCYX3	.607999	.542729	-.364666	.132119	.358463	-.717718	-.393673	-.214395
	(.116512)	(.128747)	(.123651)	(.275155)	(.161783)	(.176362)	(.093568)	(.170419)
	[.001]	[.002]	[.016]	[.643]	[.058]	[.004]	[.003]	[.244]
PCYX4	.375910	.114603	.494471	.244585	-.444275	.200504	-.510545	.151297
	(.116512)	(.128747)	(.123651)	(.275155)	(.190252)	(.207396)	(.110033)	(.200407)
	[.010]	[.397]	[.003]	[.397]	[.048]	[.362]	[.002]	[.472]
PCYX5	-.124415	.312309	-.177899	-.215127	-.265888	-.629545	-.451118	.235438
	(.116512)	(.128747)	(.123651)	(.275155)	(.247052)	(.269315)	(.142884)	(.260240)
	[.313]	[.038]	[.184]	[.454]	[.313]	[.048]	[.013]	[.392]
SSR	1.58829	1.93938	1.78888	8.85813	1.02284	1.21548	.342131	1.13495
SER	.420091	.464205	.445830	.992087	.357568	.389789	.206800	.376654
RBAR2	.823524	.784513	.801236	.015763	.799107	.707395	.847332	-.079749

Table 4.21. Linear Regressions, Principal Components, Cross-Correlations Significance Levels – International Evidence, Set 2, SUR

	Dependent Variables: (14 obs)							
	Standardized				Unstandardized			
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY4	PCYY1	PCYY2	PCYY3	PCYY4
Interc.					-.613815 (.191812) [.001]	.663650 (.152282) [.000]	.013300 (.103663) [.898]	-.953899 (.093352) [.000]
PCYX1	-.357963 (.099142) [.000]	.589409 (.104386) [.000]	.530345 (.093157) [.000]		-.269047 (.063536) [.000]	-.308038 (.068291) [.000]	.221395 (.032758) [.000]	
PCYX2	-.472042 (.099159) [.000]	.297310 (.107676) [.006]	-.427933 (.099141) [.000]	.435198 (.240625) [.071]	-.841485 (.117662) [.000]		-.207332 (.059220) [.000]	
PCYX3	.606987 (.099142) [.000]	.557231 (.104386) [.000]	-.383291 (.093157) [.000]		.363972 (.130788) [.005]	-.747006 (.140577) [.000]	-.422632 (.067433) [.000]	
PCYX4	.354466 (.098084) [.000]		.435932 (.091450) [.000]		-.419549 (.152308) [.006]		-.462961 (.076658) [.000]	
PCYX5		.307524 (.103272) [.003]	-.150089 (.093135) [.107]			-.638027 (.212584) [.003]	-.448170 (.100769) [.000]	
SSR	1.79551	2.11404	1.84945	10.5378	1.17381	1.38808	.355864	1.70807
SER	.358121	.388591	.363461	.867584	.289558	.314879	.159433	.349292
R2	.861968	.837385	.858082	.189397	.858212	.794584	.902303	.00539980
BP1 (pv)	0.2690045	1.216388	1.754412	2.486297	.8871868	1.139357	2.400373	1.611303
Df = 3	(.96575)	(.74908)	(.62491)	(.47777)	(.82852)	(.76758)	(.49357)	(.65683)
	BP (df, pv) = 2.863050 (6, .82583)		CH (df,pv) = 7.2880812 (6, .29503)		BP (df, pv) = 3.019110 (6, .80644)		CH (df,pv) = 10.899574 (8, .20745)	

Portugal

Level Effects: Regressions on The Components

We consider the four principal components extracted for the data set of variables in levels – plain and serially smoothed – were also regressed in the explanatory candidates. We could not find a pattern as clear as was found for the cross-section data sample.

The first component would capture general aggressiveness. It is related to demographic characteristics and labor market earnings and opportunities. With a similar significance of what was found for the cross-section sample, proportion of individuals with low level of education decreases aggressiveness.

The second component is related to accidentality or hazardousness. It is related to age, education, immigration, and employment – in levels, it is negatively associated to the unemployment rate; in levels, its symmetric is affected consistently, being high when labor market participation is low and self-employment is high.

The third component is mainly associated to the (reverse of) self-pain and mortal effects: suicides and also homicides – legally certified – rate high. It is a male determined factor, more frequent when labor earnings are high and the labor market participation is low.

The fourth component would capture to some extent legal assistance in fatalities. It is high when activity rate is high and self-employment is low, when industry concentration is higher and either housing is high (original) or wages accelerate (smooth).

The use of smoothed series originated a second component symmetric to the one in the original series, the last two components switch.

Table 4.22. *Linear Regressions, Principal Components, Levels – Portuguese Evidence*

	Dependent Variables:							
	PLAIN				SMOOTH			
Indep. Var.	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
INTERC.	21.2084	-92.6647	-355.316	-141.995	6.74638	-3.87726	-15.2837	-11.5139
	(2.39059)	(23.5657)	(90.2391)	(28.5612)	(.164022)	(.312953)	(2.62445)	(3.79269)
	[.000]	[.004]	[.003]	[.001]	[.000]	[.000]	[.001]	[.023]
IPOMINE					7.06023			
					(.169631)			
					[.000]			
					|.446646|			
TXNAT		1.15652				5.94227		
		(.188372)				(.379870)		
		[.000]				[.000]		
		|2.00660|				|1.90220|		
ESVIFN	-.282150						3.09812	
	(.030542)						(.661519)	
	[.000]						[.002]	
	|-.242407|						|.964288|	
LONGEV					.423075			
					(.016022)			
					[.000]			
					|.164227|			
P65M			-.798975					6.42156
			(.099722)					(.771702)
			[.000]					[.000]
			|-1.16812|					|4.64420|
IDEJOV		.827031				-8.45228		
		(.267485)				(.633998)		
		[.015]				[.000]		
		|4.19573|				|-5.00713|		
IDEID		1.94451						
		(.635026)						
		[.016]						
		|2.68012|						
TXFEC	-1.29565							
	(.187068)							
	[.000]							
	|-.342771|							
TXNUP	-.261963	1.03671	-1.85213					
	(.036577)	(.347321)	(.260823)					
	[.000]	[.017]	[.000]					
	|-.096304|	|.381119|	|-.680885|					
ID1CASH								-3.17218
								(.692622)
								[.004]
								|-2.52332|
INDMASC			3.61921		-1.57283		16.8237	8.55729
			(.966717)		(.179809)		(2.72990)	(4.01702)
			[.004]		[.003]		[.000]	[.077]
			|.212759|		|-.063388|		|.639474|	|.325264|
POPED1	-.011370	-.200823						
	.298549E-2)	(.024796)						
	[.007]	[.000]						
	|-.104446|	|-1.84481|						
POPED4		.241572				-.414580		
		(.070486)				(.032667)		
		[.009]				[.000]		
		|.449292|				|-.346862|		
TXRESTR							-28.3633	
							(2.20579)	
							[.000]	
							|-16.3716|	
TXREURO						-4.01781		
						(.636218)		
						[.003]		
						|-3.21668|		
TXRAFR	2.50341					3.85800		
	(.130692)					(.632521)		
	[.000]					[.004]		
	|.410887|					|1.87905|		
TXRBRAS							29.1235	
							(2.33048)	
							[.000]	
							|20.1406|	
TXACTC				.627245		-.867663		-4.96326
				(.21522)		(.035349)		(.410648)

				[.015] |.746582|		[.000] |-.506624|		[.000] |-2.89802|
PTCO			.157600 (.050121) [.010] |.359364|	.373576 (.144664) [.027] |.790223|		.532993 (.075832) [.002] |.368205|		-3.10158 (.594566) [.002] |-2.14265|
IG				23.6866 (9.87512) [.037] |1.01527|			4.99590 (.522357) [.000] |4.07912|	
PQESQ				1.10658 (.289537) [.003] |1.30326|	-1.13878 (.023260) [.000] |-1.11574|			
HORNOR					-.177780 (.88421E-2) [.000] |-.173912|			
TXDESCE		-.473485 (.070016) [.000] |-.744095|			1.91366 (.034721) [.000] |1.35781|	2.17534 (.077944) [.000] |1.41569|		
REMPC	.665690E-2 (.250912E-3) [.000] |.492448|		.019004 (.15790E-2) [.000] |1.40585|					6.65559 (1.06483) [.001] |3.86074|
SALRTCC	-.014653 (.277643E-2) [.001] |-.047917|				-.054680 (.585830E-2) [.003] |-.038944|		.386092 (.046942) [.000] |.250837|	
SALPIB					.872835 (.014311) [.000] |.376956|			
WQSNQ					.978948 (.743491E-02) [.000] |.905555|			
ICPRIV	.015878 (.271119E-2) [.001] |.109746|							
EMSECU			.658954 (.103100) [.000] |1.00856|			.344863 (.064328) [.006] |.348901|		
EMTERC		.275515 (.065610) [.003] |1.99486|						
CFAPCE	.034454 (.36139E-2) [.000] |.094725|							.876872 (.262045) [.015] |.624442|
INVPIB								1.64793 (.267443) [.001] |1.38649|
TXDBPR					-.336572 (.013559) [.000] |-.101530|			
FONOH				.802178 (.320314) [.031] |.937017|		-.208694 (.068333) [.038] |-.194784|	-.363811 (.120257) [.019] |-.339563|	
SSR	.329564E-02	.221778	.305674	4.33553	.212376E-04	.528065E-03	.027690	.061046
SER	.021698	.166500	.174835	.658448	.266068E-02	.011490	.062895	.100868
RBAR2	.999529	.972278	.969433	.592764	.999992	.999868	.996044	.989826
DW	2.70319	2.36638	2.23135	1.74020	2.94916	3.10784	2.87656	3.30658
	(.002,1.00)	(.001,1.00)	(.030,1.00)	(.003,.917)	(.000,1.00)	(.000,1.00)	(.122,1.00)	(.343,1.00)

NOBS	17	17	17	16	14	15	15	15

Reducing the Explanatory Set

1. If for cross-section data a larger number of simultaneously non-missing observations was obtained for the explanatory set than for the dependent one, we lose one (1980, for plain data) in the time series sample. Therefore, we are left with 16 observations (1981-1996) for plain data, 14 for smoothed variables.

Factor loadings of principal components performed on external variables are depicted in Table IV.23. The main feature of the results is the strong emphasis of the trend, captured (inversely) in the first principal component; the second component – and we recall Stone's (1947) study, cited in Dhrymes (1974), which extract a second component of aggregate data related to the change of GDP, after a first one marked by a strong trend correlation – is related to GDP per capita growth rate. Our third component captures population and labor market developments – the most significant factor loadings are found for population level and the unemployment rate.

For plain series (not smoothed), a fourth component is significant, being related to the real (discount) rate, and even if less strongly, with the inflation rate.

From the inspection of factor loadings, most variables rate more highly in the first component. Proportion of males (INDMASC), weight of lowly educated population (POPED1), share of the wage bill in total GDP (SALPIB) and real wage growth rate (SALRTCC) show more importantly in the second one.

Table 4.23. *Principal Components, External Variables: – Portuguese Evidence*

	Original Variables				Smoothed Variables		
	PCX1	PCX2	PCX3	PCX4	PCSX1	PCSX2	PCSX3
Eigenv.	23.664576	3.7736444	3.1703533	1.3557646	25.151523	4.5692048	3.6069727
% Cum. Exp Var.	0.67613074	0.78394915	0.87453067	0.91326680	0.71861494	0.84916365	0.95222001
Factor Loadings:							
IPOMINE	0.51420	0.26784	0.76100	0.0031831	0.26627	0.27387	0.91613
TXNAT	0.96585	0.21290	-0.033495	0.078035	0.96820	-0.22012	0.10784
ESVIFN	-0.92650	-0.020762	0.028744	-0.18821	-0.95999	0.10448	-0.064631
LONGEV	-0.61842	-0.74507	0.14243	0.042695	-0.53677	0.80192	-0.21474
P65M	-0.95308	-0.045266	-0.15412	0.16546	-0.97680	-0.070902	-0.12232
IDEJOV	0.99275	-0.064152	-0.077303	-0.021834	0.99535	0.0065285	-0.092244
IDEID	-0.97597	0.14773	0.11981	-0.018142	-0.98607	-0.036643	0.15143
TXFEC	0.93596	0.30567	-0.031656	0.059171	0.93324	-0.31829	0.15019
TXNUP	0.74256	0.060362	0.61664	0.040544	0.68953	0.32757	0.63212
ID1CASH	-0.97889	0.11484	0.024341	-0.070449	-0.99483	-0.035046	0.049968
INDMASC	0.34344	-0.77627	-0.11718	0.17369	0.68592	0.58899	-0.35535
POPED1	0.50787	0.80667	-0.077647	-0.10061	0.40864	-0.83192	0.30221
POPED4	-0.91940	0.16470	-0.029726	-0.010650	-0.97136	-0.14462	0.0064731
TXRESTR	-0.94813	0.18986	-0.18363	0.045985	-0.95599	-0.25405	-0.047384
TXREURO	-0.96088	0.20267	-0.095783	0.045514	-0.97042	-0.20911	0.033930
TXRAFR	-0.91715	0.21231	-0.22294	0.0054201	-0.93364	-0.28591	-0.084173
TXRBRAS	-0.94677	0.25047	-0.13612	0.061748	-0.95042	-0.28844	0.024372
TXACTC	-0.72924	0.0089176	0.054962	0.60710	-0.84530	-0.096393	0.26994
PTCO	-0.80645	0.32486	0.22542	-0.053105	-0.90286	-0.22288	0.30253
IG	0.98348	-0.10550	0.040885	-0.048608	0.98867	0.13267	-0.017742
PQESQ	0.88242	0.12181	-0.36781	0.0067372	0.89654	-0.33970	-0.26304
HORNOR	0.82898	0.32828	-0.012824	0.18253	0.88414	-0.33473	0.26540
TXDESCE	0.46353	-0.048138	-0.85652	-0.021497	0.62487	-0.40889	-0.65312
PIBPPC	-0.95689	0.18164	0.20233	0.037479	-0.96788	-0.033490	0.24581
REMPC	-0.84009	0.46920	0.23085	0.0046179	-0.88709	-0.26437	0.37268
SALRTCC	-0.30626	-0.43689	0.43310	-0.43556	-0.45407	0.72264	0.020167
SALPIB	0.54792	0.71034	0.12708	0.028284	0.40347	-0.68352	0.47761
WQSNQ	-0.97155	0.014799	0.11335	0.056316	-0.98726	0.027099	0.13323
ICPRIV	0.87523	0.070604	-0.067192	0.43781	0.93475	-0.17380	0.11254
EMSECU	0.88770	-0.022237	0.35095	-0.13940	0.90803	0.23677	0.29051
EMTERC	-0.96764	0.17543	-0.044958	0.056684	-0.97554	-0.19398	0.045162
CFAPCE	-0.66697	-0.40376	0.39693	0.031732	-0.71158	0.61960	0.17218
INVPIB	0.77713	0.15533	0.46658	-0.14225	0.76490	0.22066	0.48498
TXDBPR	-0.37607	0.20994	-0.44331	-0.60139	-0.59699	-0.39178	-0.56955
FONOH	-0.86224	0.19861	0.27286	0.16055	-0.90577	-0.0069310	0.37574

Correlation with							
ANO	-0.99723 *	0.051087	0.0042975	0.013618	-0.99875 *	-0.028431	0.029860
POMINEN	-0.51416 *	-0.26596	-0.76264 *	-0.0048040	-0.26604	-0.27469	-0.91613 *
PIBPPC	-0.95689 *	0.18164	0.20233	0.037479	-0.96788 *	-0.033490	0.24581
tcPIBppc *	-0.17837	-0.63251 *	0.50698 *	-0.27180	-0.15558	0.94331 *	0.052773
TXDESCE	0.46353 **	-0.048138	-0.85652 *	-0.021497	0.62487 *	-0.40889	-0.65312 *
IPPIB	0.86547 *	-0.11835	-0.11507	0.38393	0.95067 *	-0.093458	-0.034120
ICPRIV	0.87523 *	0.070604	-0.067192	0.43781 **	0.93475 *	-0.17380	0.11254
IIPPIB	-0.99333 *	0.097399	0.015588	0.0030278	-0.99623 *	-0.066258	0.049212
IICPRIV	-0.99382 *	0.090706	0.0069595	0.013890	-0.99632 *	-0.066534	0.044163

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 16 observations 0.497346; for 14 observations 0.532446)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 16 observations 0.425841; for 14 observations 0.457442)

We present below the evolution of the four first components along the sample period:

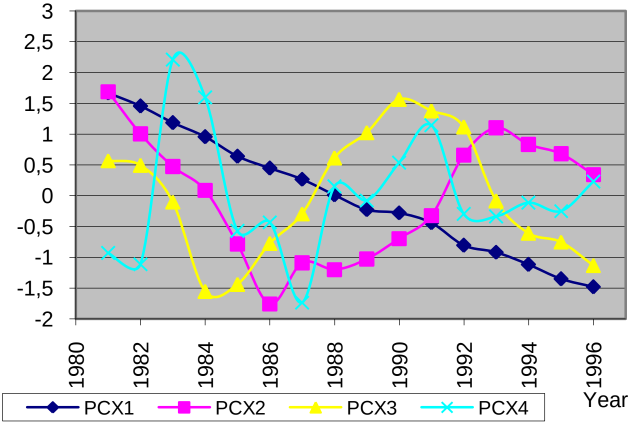

Figure 4.3. *Principal Components, Independent Variables, Portugal, Plain Data*

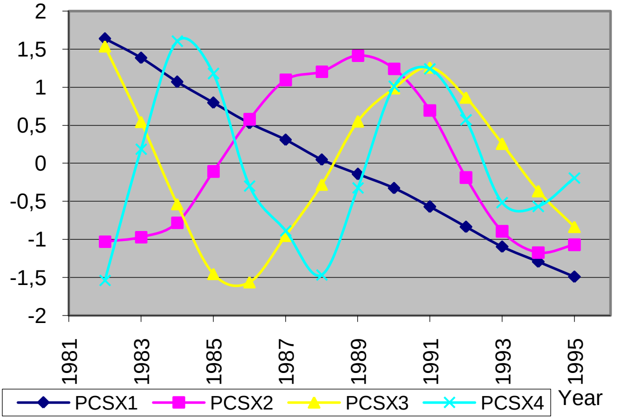

Figure 4.4. *Principal Components, Independent Variables, Portugal, Smoothed Data*

As was found for the Disruption variables set, the first component exhibits a clear, almost perfect straight trend. Universal (physical) expansion may be behind this feature of a lot of economic and social series, some following it positively, others negatively; breaches, may arise as matter "stretches" [87] – social

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[87] Even if we did not search for scientific support for this conclusion.

disruption may be one of the vectors through which they occur. The other components show in smoothed data a wave-like pattern with apparent decreasing periodicity.

2. Regressing the components, for plain data:

General violence (PC1) has an increasing trend (PX1, negatively related to time) but it decelerates with real per capita GDP growth rate (PX2, negatively associated to growth of per capita GDP). Inflation (low interest rates, PX4) promotes it.

Hazardousness (PC2) is positively associated to acceleration of per capita GDP (PX2, negatively associated to growth of per capita GDP) and inflation (PX4), negatively to population and unemployment (PX3, negatively associated to population and the unemployment rate). Self pain and homicides (negatively related to PC3) are positively associated to the same three effects.

Legal assistance (PC4) would follow the inflation rate (PX4, oppositely, the real interest rate).

Comparing the estimated standard error of the regressions with those of table IV.22, we obtain, in general higher values.

Table 4.24. *Linear Regressions, Principal Components – Portugal*

	Original Variables (16 obs.)				Smoothed Variables (14 obs.)			
Indep. Var.	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
PC(S)X1	-.976006	-.058520	.090246	.091857	-.979596	.036441	.162547	-.072486
	(.032283)	(.095013)	(.167386)	(.221802)	(.026728)	(.078996)	(.192372)	(.236094)
	[.000]	[.549]	[.600]	[.686]	[.000]	[.654]	[.416]	[.765]
PC(S)X2	.157593	-.289778	.629404	.203776	-.133432	-.781175	-.516881	.206660
	(.032283)	(.095013)	(.167386)	(.221802)	(.026728)	(.078996)	(.192372)	(.236094)
	[.000]	[.010]	[.003]	[.376]	[.000]	[.000]	[.021]	[.400]
PC(S)X3	-.028905	.850808	.433400	-.101033	.121361	-.565503	.547117	-.582144
	(.032283)	(.095013)	(.167386)	(.221802)	(.026728)	(.078996)	(.192372)	(.236094)
	[.388]	[.000]	[.024]	[.657]	[.001]	[.000]	[.016]	[.031]
PCX4	.096104	.283548	-.267685	.591167				
	(.032283)	(.095013)	(.167386)	(.221802)				
	[.012]	[.011]	[.136]	[.021]				
SSR	.187592	1.62495	5.04324	8.85528	.102158	.892370	5.29199	7.97090
SER	.125031	.367985	.648282	.859034	.096370	.284824	.693607	.851250
RBAR2	.984367	.864587	.579730	.262060	.990713	.918875	.518910	.275373
DW	1.84061	2.18677	2.60744	1.46261	1.38024	1.31028	.951831	1.03126
	(.083,.752)	(.268,.926)	(.623,.993)	(.011,.438)	(.021,.289)	(.014,.241)	(.001,.063)	(.002,.091)

Table 4.25. *Linear Regressions, Principal Components – Portugal, SUR*

	Original Variables (16 obs)				Smoothed Variables (14 obs)			
Indep. Var.	PC1	PC2	PC3	PC4	PCS1	PCS2	PCS3	PCS4
PC(S)X1	-.984635 (.025957) [.000]				-.985002 (.018698) [.000]			
PC(S)X2	.157366 (.028876) [.000]	-.282694 (.083280) [.001]	.606293 (.144912) [.000]		-.141940 (.021938) [.000]	-.728732 (.044238) [.000]	-.649834 (.106862) [.000]	
PC(S)X3		.816906 (.077503) [.000]	.503262 (.132547) [.000]		.121361 (.023692) [.000]	-.565503 (.070696) [.000]	.547117 (.175966) [.002]	-.582144 (.217306) [.007]
PCX4	.096104 (.028876) [.001]	.283548 (.083574) [.001]	-.267685 (.146706) [.068]	.591167 (.201637) [.003]				
SSR	.201242	1.69431	5.24663	9.75783	.103479	.945386	5.86527	8.59441
SER	.112150	.325415	.572638	.780938	.085973	.259861	.647262	.783509
R2	.986655	.888111	.650871	.349478	.992083	.928995	.559170	.338892
DW	1.71987	2.03022	2.46348	1.34820	1.38060	1.20368	.863368	.951566
BP1 (pv)	4.702188	7.319883	8.026665	0.5022957	4.336954	12.62949	15.28841	19.35131
Df = 3	(.19495)	(.06237)	(.04546)	(.91839)	(.22730)	(.00551)	(.00159)	(.00023)
	BP (df, pv) = 10.27552 (6, .11352)		CH (df,pv) = 3.2401238 (6, .77816)		BP (df, pv) = 25.80309 (6, .00024)		CH (df,pv) = 8.1516281 (4, .08618)	

3. Regressing each dependent variable on the explanatory components:

The rising trend (PX1, negatively related to time) affects

- positively: convicted (CONDHA2) and defendants (ARGHAB2), prisoners (RECHAB2 and RECCHA2), road injuries (ACRFERH) and road accidents (ACRTOTH), labour accidents on trial (ACTJTH1), homicides (HOMLEGH, HOMIOUH, HOMIH), divorces (TXDIV), permanent armed forces (MILCAR);

- negatively: labor accidents (ACTTOH and ACTMOH), deaths by external causes (MOCEXTH), mandatory military services (SMO) and total armed forces (FA).

Economic acceleration (PX2, negatively associated to growth of per capita GDP) affects

- positively: suicides (SUICHAB), labor accidents (ACTTOH and ACTMOH), presumed homicides (HOMIOUH, HOMIH), and – barely - mandatory military services (SMO);

- negatively: convicted (CONDHA2) and defendants (ARGHAB2), prisoners (RECHAB2 and RECCHA2), road injuries (ACRFERH) and road accidents (ACRTOTH), divorces (TXDIV), permanent and total armed forces (MILCAR, FA).

Human factors, the rise of population and unemployment rate (PX3, negatively associated to population and the unemployment rate) affects

- positively: prisoners (RECHAB2 and RECCHA2), permanent armed forces (MILCAR);

- negatively: road accidents in general (ACRMORH, ACRFERH, ACRTOTH), labor accidents (ACTJTH1, ACTJMH1, ACTTOH), mandatory military services (SMO).

The inflation rate (PX4, low interest rates) affect:

- positively: convicted (CONDHA2) and defendants (ARGHAB2), prisoners (RECHAB2 and RECCHA2), suicides (SUICHAB), labor accidents (ACTJTH1, ACTJMH1, ACTTOH), homicides (HOMLEGH), deaths per external causes (MOCEXTH);
- negatively: road injuries (ACRFERH), mandatory military services (SMO) and total armed forces (FA).

Standard error of the regressions, as compared with those of section III, are now higher: in general, the time series performance of the components model with only four independent variables does not improve upon the models in the variables; however, multicolinearity is much stronger in the time series which may be behind the better fit of the regressions of the previous section.

Table 4.26. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, OLS: (Original Variables, 16 obs.)									
Indep. Var.	CONDHA2	ARGHAB2	RECHAB2	RECCHA2	ACRMORH	ACRFERH	ACRTOTH	SUICHAB	ACTJTH1	ACTJMH1
Intercept	2.68872	7.12420	.994608	.970803	21.9573	5.56906	9.72289	8.49822	137.134	7.52343
	(.063803)	(.174562)	(.015962)	(.016180)	(.301957)	(.070387)	(.173828)	(.274732)	(2.12391)	(.353422)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	-.890265	-2.32106	-.226042	-.221426	-.204873	-.969067	-3.63585	.287919	-3.00360	.270993
	(.065895)	(.180287)	(.016486)	(.016710)	(.311860)	(.072696	(.179529)	(.283742)	(2.19357)	(.365012)
	[.000]	[.000]	[.000]	[.000]	[.525]	[.000]	[.000]	[.332]	[.198]	[.473]
PCX2	.174702	.392456	.059064	.056493	-.313362	.119691	.914972	-.524592	2.47373	.146384
	(.065895)	(.180287)	(.016486)	(.016710)	(.311860)	(.072696)	(.179529)	(.283742)	(2.19357)	(.365012)
	[.023]	[.052]	[.004]	[.006]	[.337]	[.128]	[.000]	[.092]	[.283]	[.696]
PCX3	.072495	-.163733	-.069116	-.067998	1.84571	.604604	.466107	-.234345	12.2759	.973989
	(.065895)	(.180287)	(.016486)	(.016710)	(.311860)	(.072696)	(.179529)	(.283742)	(2.19357)	(.365012)
	[.295]	[.383]	[.002]	[.002]	[.000]	[.000]	[.025]	[.426]	[.000]	[.022]
PCX4	.111614	.325360	.041946	.040598	-.044963	-.080400	-.116082	.498218	4.11676	1.03765
	(.065895)	(.180287)	(.016486)	(.016710)	(.311860)	(.072696)	(.179529)	(.283742)	(2.19357)	(.365012)
	[.118]	[.099]	[.027]	[.033]	[.888]	[.292]	[.531]	[.107]	[.087]	[.016]
SSR	.716464	5.36306	.044843	.046075	16.0473	.871971	5.31806	13.2841	793.938	21.9836
SER	.255212	.698248	.063849	.064719	1.20783	.281549	.695313	1.09893	8.49566	1.41369
RBAR2	.926699	.919166	.936411	.931964	.684140	.942706	.966981	.219282	.693798	.442663
DW	1.76874	2.10946	1.68029	1.66829	1.87416	2.44822	1.39806	1.80108	2.12839	2.47605
	[.020,.829]	[.109,.960]	[.011,.772]	[.010,.764]	[.037,.884]	[.326,.996]	[.001,.537]	[.024,.847]	[.117,.964]	[.350,.997]

Table 4.27. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, OLS: (Original Variables, 16 obs.)									
Indep. Var.	ACTTOH	ACTMOH	HOMLEGH	HOMIOUH	HOMIH	MOCEXTH	TXDIV	MILCAR	SMO	FA
Intercept	26.4673	3.50390	1.46334	10.1237	11.5871	67.1156	.968750	2.53627	4.79681	7.33963
	(.278492)	(.248298)	(.035438)	(.389668)	(.380447)	(1.30342)	(.018059)	(.044943)	(.092131)	(.106452)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	1.07124	.913260	-.094709	-1.51489	-1.60960	4.03758	-.206642	-.603903	1.29908	.705337
	(.287625)	(.256441)	(.036600)	(.402448)	(.392924)	(1.34617)	(.018651)	(.046417)	(.095152)	(.109944)
	[.003]	[.004]	[.025]	[.003]	[.002]	[.012]	[.000]	[.000]	[.000]	[.000]
PCX2	-.599836	-.489857	-.027373	-1.36420	-1.39157	-1.82862	.055047	.326956	-.137210	.196757
	(.287625)	(.256441)	(.036600)	(.402448)	(.392924)	(1.34617)	(.018651)	(.046417)	(.095152)	(.109944)
	[.061]	[.083]	[.470	[.006]	[.005]	[.202]	[.013]	[.000]	[.177]	[.101]
PCX3	2.63958	-.258588	-.327708E-02	.391627	.388350	.902977	-.023298	-.131382	.160982	.033033
	(.287625)	(.256441)	(.036600)	(.402448)	(.392924)	(1.34617)	(.018651)	(.046417)	(.095152)	(.109944)
	[.000]	[.335]	[.930]	[.351]	[.344]	[.516]	[.238]	[.016]	[.119]	[.769]
PCX4	.375313	-.181444	.121494	.150449	.271943	1.85947	-.013842	-.038544	-.284260	-.330562
	(.287625)	(.256441)	(.036600)	(.402448)	(.392924)	(1.34617)	(.018651)	(.046417)	(.095152)	(.109944)
	[.219]	[.494]	[.007]	[.716]	[.503]	[.195]	[.474]	[.424]	[.012]	[.012]
SSR	13.6501	10.8507	.221025	26.7241	25.4743	299.007	.057396	.355503	1.49390	1.99445
SER	1.11397	.993191	.141750	1.55867	1.52179	5.21368	.072234	.179773	.368523	.425809
RBAR2	.869728	.480054	.487753	.602610	.640974	.380142	.896250	.937129	.928998	.767409
DW	2.30166	1.56939	2.07003	1.99094	2.03672	2.53853	3.08276	2.35223	1.98738	2.13187
	[.215,.987]	[.005,.688]	[.093,.951]	[.065,.929]	[.080,.943]	[.405,.998]	[.867,1.00]	[.251,.991]	[.064,.928]	[.119,.965]

Table 4.28. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, SUR: (Original Variables, 16 obs.)									
Indep. Var.	CONDHA2	ARGHAB2	RECHAB2	RECCHA2	ACRMORH	ACRFERH	ACRTOTH	SUICHAB	ACTJTH1	ACTJMH1
Intercept	2.68872	7.12420	.994608	.970803	21.9573	5.56906	9.72289	8.49822	137.134	7.52343
	(.064360)	(.173283)	(.013235)	(.013416)	(.266489)	(.058362)	(.146844)	(.244880)	(2.14783)	(.335457)
	[.000]	[.000]	[.000	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	-.890265	-2.32106	-.218261	-.213015		-.949392	-3.51349		-3.00360	
	(.066470)	(.178966)	(.012361)	(.012341)		(.049777)	(.118256)		(2.21827)	
	[.000]	[.000]	[.000]	[.000]		[.000]	[.000]		[.201]	
PCX2	.174702	.392456	.053113	.050377		.150274	.903182	-.311842		
	(.066470)	(.178966)	(.997127E-2)	(.980482E-2)		(.048265)	(.109864)	(.175417)		
	[.022]	[.049]	[.000]	[.000]		[.002]	[.000]	[.075]		
PCX3			-.053415	-.052477	1.81553	.582833	.454651		12.2759	.973989
			(.855335E-2)	(.851448E-2)	(.112856)	(.043058)	(.079530)		(2.21827)	(.346459)
			[.000]	[.000]	[.000]	[.000]	[.000]		[.000]	[.015]
PCX4	.111614	.325360	.049530	.049184		-.105285		.219263	4.11676	1.03765
	(.066470)	(.178966)	(.821116E-2)	(.839815E-2)		(.041398)		(.212642)	(2.21827)	(.346459)
	[.119]	[.094]	[.000]	[.000]		[.011]		[.302]	[.088]	[.010]
SSR	.795296	5.76518	.050844	.052416	18.1938	.908206	5.74882	17.1975	885.728	23.4066
SER	.257439	.693132	.056371	.057236	1.06636	.238250	.599417	1.03675	8.59131	1.34183
R2	.940331	.936277	.948845	.945140	.737583	.956569	.974840	.331139	.749491	.564831
DW	1.64039	1.97076	1.38633	1.38097	1.58598	2.23065	1.29875	1.48432	1.93622	2.27894
	[.032,.595]	[.137,.833]							[.121,.813]	[.481,.892]
BP1 (pv)	19.33766	8.901128	50.89548	51.07139	44.64086	28.85556	41.15233	25.10032	19.36034	20.42896
Df = 19	(.43538)	(.97509)	(.00010)	(.00009)	(.00077)	(.06829)	(.00230)	(.15727)	(.43395)	(.36919)
	OLS	OLS		BP (df, pv) =	245.8810		CH (df,pv) =	18.655804	OLS	OLS
	estimates	estimates			(91, 0.0000)			(13, 0.13417)	estimates	estimates

Table 4.29. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, SUR: (Original Variables, 16 obs.)									
Indep. Var.	ACTTOH	ACTMOH	HOMLEGH	HOMIOUH	HOMIH	MOCEXTH	TXDIV	MILCAR	SMO	FA
Intercept	26.4673	3.50390	1.46334	10.1237	11.5871	67.1156	.968750	2.53627	4.79681	7.33963
	(.230913)	(.219619)	(.030132)	(.338680)	(.335677)	(1.18815	(.018136)	(.044358)	(.076391)	(.088627)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX1	1.06373	1.05118	-.121825	-1.33847	-1.46253	3.69828	-.206642	-.603903	1.29698	.695944
	(.238417)	(.177878)	(.023032)	(.257749)	(.261956)	(.808146)	(.018730)	(.045813)	(.071077)	(.084321)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX2	-.587079	-.446517		-1.10804	-1.11414		.055047	.326956	-.078246	.245691
	(.237817)	(.148176)		(.229334)	(.238791)		(.018730)	(.045813)	(.069037)	(.077404)
	[.014]	[.003]		[.000]	[.000]		[.012]	[.000]	[.257]	[.002]
PCX3	2.36869							-.131382	.124770	
	(.152921)							(.045813)	(.025157)	
	[.000]							[.014]	[.000]	
PCX4	.309024		.074727			.996859			-.298678	-.314919
	(.174176)		(.019419)			(.708222)			(.047352)	(.057242)
	[.076]		[.000]			[.159]			[.000]	[.000]
SSR	14.8201	12.6611	.276262	30.8154	30.3248	374.283	.068411	.377787	1.56890	2.05173
SER	.962421	.889560	.131402	1.38779	1.37670	4.83660	.072543	.177432	.313149	.358096
R2	.902991	.561468	.530520	.678615	.699184	.437950	.895362	.951005	.945334	.824535
DW	1.90733	1.17882	1.65619	1.68025	1.72166	2.09297	2.55241	2.02119	1.87314	2.01605
							[.707,.968]	[.163,.859]		
BP1 (pv)	27.16386	36.38435	30.06742	52.49012	51.50433	35.81481	14.99257	17.20760	48.87499	45.20783
Df = 19	(.10089)	(.00946)	(.05095)	(.00006)	(.00008)	(.01112)	(.72307)	(.57581)	(.00019)	(.00064)
							OLS estimates	OLS estimates		

With smoothed variables, cross-equation tests pointed to the simultaneous estimation of all but one equation. Nevertheless, the short number of observations for joint estimation led us to restrict its number.

In general there is a correspondence with plain data interpretation (the second component of external data switches signs when data is smoothed; consistently, the signs of PX2 in the regressions below are symmetric to those found for plain data). One less component is relevant in the right hand-side, but the general importance of the remainder reproduces the previous conclusions.

Table 4.30. *Linear Regressions, Principal Components – Portugal*

					Dependent Variable, OLS: (Smoothed Variables, 14 obs.)					
Indep. Var.	CONDHA2	ARGHAB2	RECHAB2	RECCHA2	ACRMORH	ACRFERH	ACRTOTH	SUICHAB	ACTJTH1	ACTJMH1
Intercept	.501156	.639428	.580119	.602247	.487958	.766927	.788586	.282949	.678075	.531205
	(.018369)	(.021304)	(.024227)	(.022355)	(.027432)	(.018735)	(.022079)	(.177513)	(.067225)	(.179411)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.142]	[.000]	[.014]
PCX1	-.957425	-.773471	-.612491	-.573028	-.084225	-.623840	-.843056	.357218	-.319379	-.915288E-02
	(.019063)	(.022108)	(.025141)	(.023199)	(.028467)	(.019442)	(.022912)	(.184214)	(.069763)	(.186183)
	[.000]	[.000]	[.000]	[.000]	[.014]	[.000]	[.000]	[.081]	[.001]	[.962]
PCX2	-.203693	-.146653	-.157102	-.141573	.245186	.160473	-.088432	.204786	.012658	-.086563
	(.019063)	(.022108)	(.025141)	(.023199)	(.028467)	(.019442)	(.022912)	(.184214)	(.069763)	(.186183)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.003]	[.292]	[.860]	[.652]
PCX3	.058927	.011016	-.128577	-.122815	.207524	.289628	.174792	-.347552	.380720	.571058
	(.019063)	(.022108)	(.025141)	(.023199)	(.028467)	(.019442)	(.022912)	(.184214)	(.069763)	(.186183)
	[.011]	[.629]	[.000]	[.000]	[.000]	[.000]	[.000]	[.089]	[.000]	[.012]
SSR	.047241	.063540	.082171	.069962	.105351	.049141	.068244	4.41150	.632687	4.50634
SER	.068732	.079712	.090648	.083643	.102641	.070101	.082610	.664191	.251533	.671293
RBAR2	.995106	.989830	.980560	.981033	.911006	.990222	.990953	.299406	.786095	.337620
DW	1.56391	1.88953	1.28494	1.27758	1.43287	1.68003	1.13984	.929808	.930715	.939904
	[.016,.593]	[.081,.822]	[.002,.356]	[.002,.350]	[.007,.482]	[.031,.685]	[.000,.242]	[.000,.113]	[.000,.114]	[.000,.118]

Table 4.31. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, OLS: (Smoothed Variables, 14 obs.)									
Indep. Var.	ACTTOH	ACTMOH	HOMLEGH	HOMIOUH	HOMIH	MOCEXTH	TXDIV	MILCAR	SMO	FA
Intercept	.104385	.030064	.346582	.544443	.558455	.194514	.763488	.128051	-.190520	-.202791
	(.051990)	(.137737)	(.111532)	(.048201)	(.045539)	(.087582)	(.013526)	(.031231)	(.030621)	(.058840)
	[.072]	[.832]	[.011]	[.000]	[.000]	[.051]	[.000]	[.002]	[.000]	[.006]
PCX1	.167390	.807993	-.309625	-.366098	-.380531	.631620	-.409525	-.699921	.460069	.293610
	(.053952)	(.142937)	(.115743)	(.050020)	(.047258)	(.090888)	(.014037)	(.032410)	(.031777)	(.061062)
	[.011]	[.000]	[.023]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.001]
PCX2	.616597	.243456	.681094E-02	.505987	.493451	.378076	-.121372	-.381690	.107398	-.035272
	(.053952)	(.142937)	(.115743)	(.050020)	(.047258)	(.090888)	(.014037)	(.032410)	(.031777)	(.061062)
	[.000]	[.119]	[.954]	[.000]	[.000]	[.002]	[.000]	[.000]	[.007]	[.576]
PCX3	.658218	-.399016	.044363	-.079804	-.075703	-.486201E-02	-.767996E-02	.011953	-.034350	-.027079
	(.053952)	(.142937)	(.115743)	(.050020)	(.047258)	(.090888)	(.014037)	(.032410)	(.031777)	(.061062)
	[.000]	[.019]	[.710]	[.142]	[.140]	[.958]	[.596]	[.720]	[.305]	[.667]
SSR	.378411	2.65602	1.74152	.325265	.290335	1.07388	.025615	.136555	.131273	.484706
SER	.194528	.515366	.417316	.180351	.170392	.327701	.050611	.116857	.114574	.220160
RBAR2	.956533	.753077	.248842	.922821	.930269	.828046	.986114	.978869	.944014	.613685
DW	1.50745	1.01399	1.14053	1.75771	1.83131	1.58053	1.98500	1.43867	1.25039	1.15656
	[.011,.546]	[.000,.159]	[.000,.243]	[.045,.741]	[.063,.789]	[.018,.607]	[.116,.870]	[.007,.487]	[.001,.328]	[.001,.254]

Table 4.32. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, SUR: (Smoothed Variables, 14 obs.)									
Indep. Var.	CONDHA2	ARGHAB2	RECHAB2	RECCHA2	ACRMORH	ACRFERH	ACRTOTH	SUICHAB	ACTJTH1	ACTJMH1
Intercept	.501156 (.018369) [.000]	.639428 (.020563) [.000]	.580119 (.020475) [.000]	.602247 (.018893) [.000]	.487958 (.023184) [.000]	.766927 (.018735) [.000]	.788586 (.018660) [.000]	.282949 (.159026) [.075]	.678075 (.056909) [.000]	.531205 (.153278) [.001]
PCX1	-.957425 (.019063) [.000]	-.773471 (.021339) [.000]	-.612729 (.020839) [.000]	-.573206 (.019363) [.000]	-.085317 (.014785) [.000]	-.623840 (.019442) [.000]	-.843851 (.013556) [.000]	.364388 (.108212) [.001]	-.316428 (.029306) [.000]	
PCX2	-.203693 (.019063) [.000]	-.146653 (.021339) [.000]	-.158551 (.701279E-02) [.000]	-.143216 (.652620E-02) [.000]	.234469 (.012088) [.000]	.160473 (.019442) [.000]	-.094557 (.811069E-2) [.000]			
PCX3	.058927 (.019063) [.011]		-.149472 (.011636) [.000]	-.142121 (.010825) [.000]	.225610 (.015100) [.000]	.289628 (.019442) [.000]	.170268 (.796303E-2) [.000]	-.349917 (.087311) [.000]	.371383 (.027173) [.000]	.458211 (.063896) [.000]
SSR	.047241	.065117	.087874	.074843	.111113	.049141	.069007	4.95743	.636017	4.77039
SER	.068732	.076940	.079226	.073116	.089088	.070101	.070207	.595065	.213143	.583731
R2	.996235	.991983	.984076	.984462	.928005	.992479	.992964	.394464	.834867	.479339
DW	1.56391 [.016,.593]	1.85698 [.159,.663]	1.25150	1.24302	1.33986	1.68003 [.031,.685]	1.15521	.814246	.910562	.876537
BP1 (pv) Df = 19	47.15989 (.00034)	25.05097 (.15887)	63.08681 (.00000)	62.16058 (.00000)	79.07555 (.00000)	56.00654 (.00002)	72.74714 (.00000)	60.76580 (.00000)	74.33490 (.00000)	82.62740 (.00000)
	OLS estimates	OLS estimates		BP (df, pv) =	296.8636 (66, 0.0000)	OLS estimates	CH (df,pv) =	14.762674 (6, 0.02219)		

Table 4.33. *Linear Regressions, Principal Components – Portugal*

	Dependent Variable, SUR: (Smoothed Variables, 14 obs.)									
Indep. Var.	ACTTOH	ACTMOH	HOMLEGH	HOMIOUH	HOMIH	MOCEXTH	TXDIV	MILCAR	SMO	FA
Intercept	.104385	.030064	.346582	.544443	.558455	.194514	.763488	.128051	-.190520	-.202791
	(.043939)	(.116409)	(.094968)	(.048201)	(.045539)	(.083518)	(.013089)	(.029980)	(.027350)	(.051031)
	[.018]	[.796]	[.000]	[.000]	[.000]	[.040]	[.000]	[.001]	[.000]	[.000]
PCX1	.168489	.801538	-.304983	-.366098	-.380531	.631620	-.409525	-.699921	.459516	.293005
	(.041403)	(.044819)	(.056621)	(.050020)	(.047258)	(.086671)	(.013583)	(.031111)	(.026710)	(.051902)
	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]	[.000]
PCX2	.617220	.221037		.505987	.493451	.378076	-.121372	-.381690	.111487	
	(.019973)	(.034992)		(.050020)	(.047258)	(.086671)	(.013583)	(.031111)	(.833516E-02)	
	[.000]	[.000]		[.000]	[.000]	[.001]	[.000]	[.000]	[.000]	
PCX3	.696943	-.306153		-.079804	-.075703					
	(.027133)	(.072183)		(.050020)	(.047258)					
	[.000]	[.000]		[.142]	[.140]					
SSR	.397927	2.77520	1.76799	.325265	.290335	1.07419	.026382	.138412	.146833	.510416
SER	.168592	.445229	.355366	.180351	.170392	.312496	.048973	.112174	.102411	.190941
R2	.965814	.803297	.413498	.940631	.946360	.867690	.988999	.983524	.951830	.687075
DW	1.49233	.950126	1.10912	1.75771	1.83131	1.58087	1.91400	1.44468	1.13273	1.11711
				[.045,.741]	[.063,.789]	[.057,.445]	[.188,.704]	[.030,.338]		
BP1	58.87844	83.70832	80.74607	56.15431	47.85415	50.56936	50.57772	45.16727	64.31966	58.52567
(pv)	(.00001)	(.00000)	(.00000)	(.00002)	(.00027)	(.00011)	(.00011)	(.00065)	(.00000)	(.00001)
Df = 19										
					OLS estimates	OLS estimates	OLS estimates	OLS estimates		

4. Finally, we summarize the pattern of aggregate correlation between the right hand-side components and the left hand-side components and variables in the following tables:

Determinants of Social Disruption Composites, Portugal

	Violence (PC1)	Hazardousness (PC2)	Suicides, Homicides (- PC3)	Legal Assistance (PC4)
Trend (- PX1)	+			
Economic Acceleration (- PX2)	-	+	+	
Population, Unempl. Rate (- PX3)		-	+	
Inflation, Low Interest Rates (PX4)	+	+	+	+

Determinants of Social Disruption Variables, Portugal

	Trend (- PX1)	Economic Acceleration (- PX2)	Population, Unemp. Rate (- PX3)	Inflation, Low Interest Rates, (PX4)
CONDHA2	+ (*)	-		+
ARGHAB2	+ (*)	-		+
RECHAB2	+ (*)	-	+	+
RECCHA2	+ (*)	-	+	+
ACRMORH			-	
ACRFERH	+	-	-	-
ACRTOTH	+ (*)	-	-	
SUICHAB		+		+
ACTJTH1	+		- (*)	+
ACTJMH1			-	+
ACTTOH	-	+	- (*)	+
ACTMOH	- (*)	+		
HOMLEGH	+			+
HOMIOUH	+	+		
HOMIH	+	+		
MOCEXTH	- (*)			+
TXDIV	+ (*)	-		
MILCAR	+	-	+	
SMO	- (*)	+	-	-
FA	- (*)	-		-

Notes: (*) Much larger impact than the others in the regression

Cross-Correlation Decomposition

Considering the cross-correlations with the external variables, we obtain:

Table 4.34. *Principal Components, Cross-correlations with External Variables: – Portuguese Evidence*

	Original Variables				Smoothed Variables			
	Mean (s.d)	PCYX1	PCYX2	PCYX3	Mean (s.d)	PCSYX1	PCSYX2	PCSYX3
Eigenv.		30.904402	1.9920577	1.5747891		30.908680	2.1343665	1.6734623
% Cum. Exp Var.		0.88298291	0.93989884	0.98489281		0.88310514	0.94408704	0.99190025
Factor Loadings:								
IPOMINE	-0.13329 (0.46228)	0.88173	0.38065	0.26580	-0.10409 (0.43598)	0.73414	0.14550	0.66259
TXNAT	-0.29965 (0.61621)	0.99743	-0.010393	0.066446	-0.35043 (0.65530)	0.99704	-0.062578	0.042389
ESVIFN	0.27029 (0.60659)	-0.99620	-0.0085559	0.016870	0.31889 (0.67424)	-0.99620	0.015098	-0.011764
LONGEV	0.26818 (0.41991)	-0.88692	0.21113	-0.40488	0.30576 (0.43044)	-0.83410	0.51109	-0.18247
P65M	0.29656 (0.64717)	-0.99191	-0.081707	-0.063743	0.33252 (0.68783)	-0.99387	-0.045702	-0.069713
IDEJOV	-0.30551 (0.67374)	0.99855	-0.0051414	-0.043941	-0.34543 (0.70986)	0.99742	0.037685	-0.057194
IDEID	0.29334 (0.67490)	-0.99520	0.015875	0.092467	0.33325 (0.71309)	-0.99375	-0.056568	0.096055
TXFEC	-0.29528 (0.59596)	0.99292	-0.030881	0.11122	-0.34731 (0.62810)	0.99058	-0.11685	0.069018
TXNUP	-0.12005 (0.58931)	0.93803	0.33180	0.053400	-0.17082 (0.60242)	0.91570	0.22698	0.33049
ID1CASH	0.27438 (0.67455)	-0.99601	-0.021511	0.081938	0.32404 (0.71388)	-0.99595	-0.066439	0.057010
INDMASC	-0.049873 (0.26052)	0.62088	0.13991	-0.75178	-0.10519 (0.51653)	0.83455	0.44029	-0.32050
POPED1	-0.23864 (0.38478)	0.82377	-0.21289	0.50766	-0.27408 (0.39109)	0.74809	-0.58766	0.26907
POPED4	0.28219 (0.62644)	-0.99362	-0.055103	0.065089	0.30908 (0.70621)	-0.99362	-0.10010	0.019865
TXRESTR	0.25108 (0.69258)	-0.99046	-0.12364	0.051662	0.28671 (0.72687)	-0.98897	-0.14692	-0.013985
TXREURO	0.26434 (0.69346)	-0.99336	-0.084645	0.071096	0.30096 (0.72884)	-0.99123	-0.12862	0.028366
TXRAFR	0.22806 (0.68384)	-0.98538	-0.14853	0.064646	0.26344 (0.72129)	-0.98430	-0.17085	-0.025327
TXRBRAS	0.25350 (0.69523)	-0.98968	-0.11202	0.081880	0.28610 (0.72967)	-0.98648	-0.16206	0.020164
TXACTC	0.31306 (0.54918)	-0.95850	0.014007	-0.10948	0.34181 (0.64550)	-0.97229	-0.010338	0.054227
PTCO	0.26500 (0.57901)	-0.97430	0.028634	0.19415	0.31724 (0.68277)	-0.97821	-0.12859	0.15622
IG	-0.28343 (0.68216)	0.99660	0.060061	-0.045041	-0.31931 (0.72215)	0.99587	0.089208	-0.015248
PQESQ	-0.30589 (0.57158)	0.96550	-0.25033	-0.045167	-0.34580 (0.62381)	0.95760	-0.15842	-0.23257
HORNOR	-0.24473 (0.48741)	0.98419	-0.029991	0.090539	-0.29277 (0.57282)	0.98006	-0.10283	0.048878
TXDESCE	-0.27868 (0.39673)	0.64946	-0.71064	-0.21060	-0.31543 (0.48778)	0.80443	-0.28535	-0.51423
PIBPPC	0.30718 (0.66461)	-0.99173	0.054150	0.10710	0.34075 (0.70516)	-0.98874	-0.048959	0.13876
REMPC	0.25736 (0.63256)	-0.96546	0.030592	0.24929	0.28374 (0.68270)	-0.96067	-0.16782	0.22013
SALRTCC	0.085834 (0.17756)	-0.52230	0.79494	0.062788	0.22833 (0.28374)	-0.70393	0.64626	0.22966
SALPIB	-0.16485 (0.39174)	0.87319	-0.049023	0.45686	-0.20044 (0.39246)	0.75322	-0.50877	0.38504
WQSNQ	0.27269 (0.66728)	-0.99558	0.029612	0.072618	0.31796 (0.71688)	-0.98833	-0.040574	0.13578
ICPRIV	-0.22258 (0.58795)	0.98085	-0.0076569	-0.073482	-0.30196 (0.63972)	0.98900	-0.010420	-0.0024305
EMSECU	-0.24211 (0.64294)	0.97803	0.19084	0.042598	-0.28424 (0.68210)	0.97857	0.14912	0.13208
EMTERC	0.28944 (0.67188)	-0.99436	-0.071826	0.060665	0.32350 (0.71758)	-0.99198	-0.11740	0.026046
CFAPCE	0.26171 (0.41895)	-0.91945	0.35112	-0.11179	0.33879 (0.50975)	-0.91552	0.37787	0.11037
INVPIB	-0.20134 (0.58208)	0.94999	0.24912	0.12401	-0.25430 (0.60404)	0.94697	0.14285	0.25469
TXDBPR	0.083795 (0.39353)	-0.90518	-0.32597	-0.00038904	0.14862 (0.54393)	-0.89192	-0.27981	-0.33494
FONOH	0.27960 (0.62705)	-0.97660	0.11588	0.12917	0.32566 (0.68242)	-0.97505	-0.026760	0.20990

Correlation with “Correlations with”								
ANO	0.29740 (0.67871)	-0.99911 *	-0.025195	0.027112	0.33828 (0.71262)	-0.99856 *	-0.046179	0.023937
POMINEN	0.13218 (0.46379)	-0.88089 *	-0.38318 **	-0.26477	0.10278 (0.43627)	-0.73267 *	-0.14814	-0.66370 *
tcPIBppc	0.098416 (0.26434)	-0.023141	0.82992 *	-0.37649	0.15217 (0.32908)	-0.064489	0.95469 *	0.13061
TXDESCE	-0.27868 (0.39673)	0.64946 *	-0.71064 *	-0.21060	-0.31543 (0.48778)	0.80443 *	-0.28535	-0.51423 *
IPPIB	-0.24229 (0.60236)	0.98036 *	-0.026710	-0.10407	-0.30351 (0.66619)	0.98827 *	0.013334	-0.070061
ICPRIV	-0.22258 (0.58795)	0.98085 *	-0.0076569	-0.073482	-0.30196 (0.63972)	0.98900 *	-0.010420	-0.0024305
IIPPIB	0.29451 (0.68043)	-0.99803 *	-0.028787	0.051877	0.33407 (0.71647)	-0.99688 *	-0.067816	0.038807
IICPRIV	0.29556 (0.68068)	-0.99817 *	-0.030636	0.045680	0.33544 (0.71621)	-0.99703 *	-0.066469	0.034319

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Table 4.35. *Unstandardized Principal Components, Cross-correlations with External Variables, full sample, weighted – Portuguese Evidence*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PCYX1	PCYX2	Mean (s.d)	PCSYX1	PCSYX2
Eigenv.		31.45443	1.84747		31.73434	1.76336
% Cum. Exp Var.		0.89870	0.951485		0.90670	0.957082
Factor Loadings:						
IPOMINE	-0.39294 (0.53877)	0.92164	-0.29794	-0.41115 (0.53714)	0.91054	-0.28318
TXNAT	-0.46616 (0.56265)	0.96233	-0.24972	-0.48808 (0.61327)	0.96126	-0.24047
ESVIFN	0.33784 (0.61585)	-0.97815	-0.075486	0.33776 (0.67174)	-0.97425	-0.11911
LONGEV	0.43202 (0.52007)	-0.97330	0.10822	0.45208 (0.53675)	-0.97406	0.087081
P65M	0.31026 (0.67941	-0.97520	-0.19937	0.30361 (0.75244)	-0.98367	-0.14345
IDEJOV	-0.46459 (0.62380)	0.98849	-0.13051	-0.47160 (0.67474)	0.98565	-0.15642
IDEID	0.45956 (0.62368)	-0.96845	0.22029	0.47524 (0.67452)	-0.96704	0.22655
TXFEC	-0.33816 (0.57469)	0.91695	-0.27686	-0.29785 (0.63184)	0.96597	-0.034122
TXNUP	-0.32072 (0.53383)	0.98335	0.00046399	-0.34525 (0.58568)	0.97918	-0.037351
ID1CASH	-0.043966 (0.43866)	-0.76636	-0.60125	-0.063872 (0.53130)	-0.83478	-0.50620
INDMASC	0.37161 (0.46066)	-0.87696	0.20850	0.41698 (0.43893)	-0.85426	0.15091
POPED1	-0.29373 (0.50972)	0.92700	0.19344	-0.30463 (0.55646)	0.92587	0.22885
POPED4	0.30915 (0.65555)	-0.98027	-0.16924	0.29968 (0.75325)	-0.98538	-0.12006
TXRESTR	0.43143 (0.64386)	-0.99141	0.081716	0.43064 (0.70046)	-0.99005	0.12381
TXREURO	0.37169 (0.61328)	-0.97921	0.023015	0.35734 (0.67443)	-0.98310	0.095493
TXRAFR	0.42348 (0.64496)	-0.99244	0.087363	0.42567 (0.69509)	-0.99028	0.12399
TXRBRAS	0.42952 (0.64314)	-0.98962	0.079904	0.42552 (0.69992)	-0.98841	0.12645
TXACTC	0.30134 (0.66087)	-0.96737	-0.19217	0.29161 (0.75562)	-0.97218	-0.16899
PTCO	0.29498 (0.63606)	-0.96934	-0.18157	0.30706 (0.72116)	-0.97578	-0.14688
IG	-0.23751 (0.74236)	0.98849	0.078918	-0.26013 (0.77000)	0.98710	0.029755
PQESQ	-0.23511 (0.64418)	0.98038	-0.012167	-0.26248 (0.67087)	0.97423	-0.066310
HORNOR	-0.17518 (0.59405)	0.97001	0.047174	-0.21187 (0.64838	0.96189	-0.0032927
TXDESCE	0.24120 (0.31540)	-0.54429	0.69618	0.27152 (0.27117	-0.26450	0.78407
PIBPPC	0.45456 (0.62085)	-0.97483	0.16624	0.46226 (0.68646)	-0.97329	0.19603
REMPC	0.41635 (0.56765)	-0.94252	0.23438	0.41140 (0.63476)	-0.94022	0.28158
SALRTCC	-0.15072 (0.23511)	0.77007	-0.33919	-0.20001 (0.24967)	0.73394	-0.44129
SALPIB	0.022940 (0.37827)	0.68205	0.64929	-0.025223 (0.51137)	0.75434	0.58556
WQSNQ	0.21198 (0.72252)	-0.98588	-0.038151	0.23581 (0.75364)	-0.98642	0.016786
ICPRIV	0.049191 (0.44046)	0.79512	0.57522	0.018338 (0.55154)	0.83731	0.52030
EMSECU	-0.19449 (0.37115)	0.75250	0.11811	-0.20163 (0.48485)	0.91833	-0.0035775
EMTERC	0.31334 (0.68407)	-0.97793	-0.18154	0.30877 (0.75951)	-0.98364	-0.13474
CFAPCE	-0.15798 (0.18874)	0.13372	-0.45949	-0.16166 (0.20328)	-0.30041	-0.12689
INVPIB	-0.13373 (0.43148)	0.76846	0.47819	-0.16139 (0.53655)	0.84427	0.43634
TXDBPR	0.24188 (0.42506)	-0.95972	-0.090386	0.29473 (0.51704)	-0.96190	-0.062301
FONOH	0.33699 (0.55344)	-0.96898	0.0085752	0.29651 (0.66086)	-0.98553	-0.059726

Correlation with “Correlations with”						
ANO	0.46536 (0.61671)	-0.97302 *	0.20652	0.47853 (0.67067)	-0.97045 *	0.21815
POMINEN	0.39747 (0.54206)	-0.92737 *	0.28890	0.41512 (0.54280)	-0.91582 *	0.27639
PIBppc	0.45456 (0.62085)	-0.97483 *	0.16624	0.46226 (0.68646)	-0.97329 *	0.19603
tcPIBppc	-0.15176 (0.19201)	-0.11104	-0.52950 *	-0.13527 (0.25416)	-0.20229	-0.69656 *
TXDESCE	0.24120 (0.31540)	-0.54429 *	0.69618 *	0.27152 (0.27117)	-0.26450	0.78407 *
IPPIB	0.060040 (0.42834)	0.76923 *	0.60771 *	0.041716 (0.54386)	0.83141 *	0.52434 *
ICPRIV	0.049191 (0.44046)	0.79512 *	0.57522 *	0.018338 (0.55154)	0.83731 *	0.52030 *
IIPPIB	0.44231 (0.63814)	-0.99271 *	0.072217	0.44464 (0.69048)	-0.99143 *	0.11371
IICPRIV	0.44631 (0.63665)	-0.99285 *	0.077884	0.44890 (0.68898)	-0.99131 *	0.11732

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Plotting the first two components:

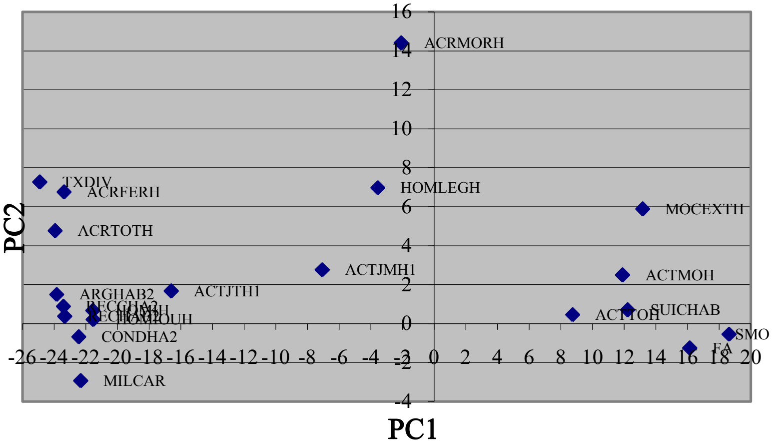

Figure 4.5. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Sample, Portugal*

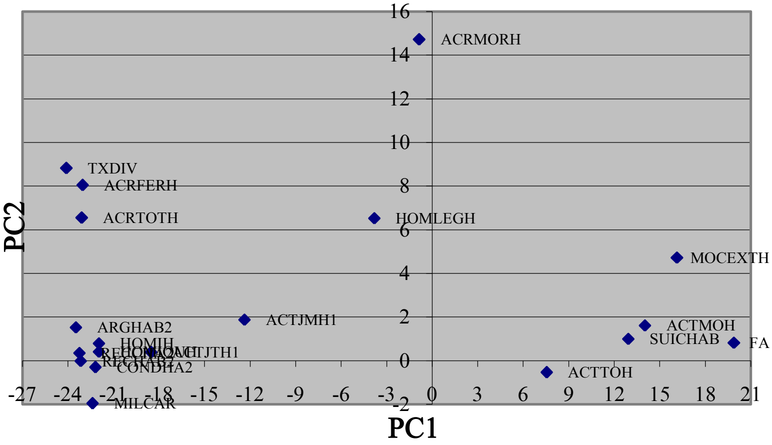

Figure 4.6. *First Two Principal Components, Correlations with External Variables Decomposition, Unbalanced Smoothed Sample, Portugal*

Considering the cross-correlations significance levels we obtain:

Table 4.36. *Principal Components, Significance Levels of Cross-correlations with External Variables: – Portuguese Evidence*

	Original Variables				Smoothed Variables			
	Mean (s.d)	PCYX1	PCYX2	PCYX3	Mean (s.d)	PCSYX1	PCSYX2	PCSYX3
Eigenv.		28.507181	2.7644327	1.4341919		28.714233	2.5363352	1.5785969
% Cum. Exp Var.		0.81449089	0.89347468	0.93445159		0.82040667	0.89287339	0.93797616
Factor Loadings:								
IPOMINE	0.25158 (0.40919)	0.92772	0.32191	0.024577	0.24914 (0.40406)	0.92656	0.31421	0.018598
TXNAT	0.28679 (0.44594)	0.95634	0.21190	0.16894	0.28503 (0.44563)	0.96028	0.20073	0.15306
ESVIFN	0.65031 (0.46960)	-0.96452	0.085622	0.072645	0.64855 (0.47371)	-0.96455	0.079671	0.14189
LONGEV	0.74416 (0.39981)	-0.94518	-0.18400	-0.10328	0.75090 (0.39822)	-0.94234	-0.10135	-0.23836
P65M	0.60936 (0.47944)	-0.95359	0.21504	0.11660	0.61822 (0.48295)	-0.95435	0.18499	0.16610
IDEJOV	0.29947 (0.46064)	0.95857	0.18931	0.18362	0.29497 (0.45844)	0.96130	0.19571	0.14834
IDEID	0.70227 (0.46171)	-0.95665	-0.19709	-0.18488	0.70590 (0.45940)	-0.95993	-0.20154	-0.14827
TXFEC	0.30822 (0.42626)	0.92001	0.16653	0.23224	0.33050 (0.43109)	0.95616	0.068597	0.10421
TXNUP	0.33511 (0.45016)	0.99251	0.017342	0.015031	0.32534 (0.44981)	0.99239	0.080303	-0.011586
ID1CASH	0.45441 (0.43696)	-0.79166	0.48253	0.11015	0.46360 (0.45630)	-0.79483	0.44577	0.15666
INDMASC	0.80847 (0.35201)	-0.83198	-0.33243	0.16540	0.82618 (0.34027)	-0.79775	-0.19965	-0.11646
POPED1	0.32595 (0.42407)	0.87887	-0.26733	-0.25516	0.32611 (0.43414)	0.86521	-0.35884	-0.097091
POPED4	0.60929 (0.47845)	-0.95242	0.21653	0.11648	0.61528 (0.48323)	-0.95262	0.19194	0.16209
TXRESTR	0.68991 (0.46302)	-0.96437	-0.16946	-0.17430	0.69453 (0.46539)	-0.96389	-0.19639	-0.11403
TXREURO	0.67116 (0.45322)	-0.97349	-0.10924	-0.17824	0.68502 (0.45928)	-0.97237	-0.16118	-0.10824
TXRAFR	0.68945 (0.46304)	-0.96525	-0.16577	-0.16767	0.69344 (0.46542)	-0.96468	-0.19372	-0.11037
TXRBRAS	0.69050 (0.46308)	-0.96350	-0.17310	-0.17996	0.69593 (0.46546)	-0.96305	-0.20073	-0.11680
TXACTC	0.62090 (0.47785)	-0.93766	0.23281	0.13798	0.61847 (0.48237)	-0.93260	0.25991	0.13761
PTCO	0.61786 (0.47852)	-0.92782	0.25550	0.13494	0.62075 (0.47986)	-0.93461	0.25808	0.12977
IG	0.39177 (0.46691)	0.96555	-0.16771	-0.030968	0.36147 (0.46572)	0.97195	-0.031377	-0.082497
PQESQ	0.35098 (0.42952)	0.96329	-0.10591	0.090634	0.31467 (0.42464)	0.95415	-0.039960	0.23135
HORNOR	0.41039 (0.44750)	0.93922	-0.18081	0.037478	0.39263 (0.44366)	0.92966	-0.071002	0.091090
TXDESCE	0.75703 (0.35558)	-0.58094	-0.65191	0.35658	0.78320 (0.28488)	-0.29760	-0.77288	0.46183
PIBPPC	0.69865 (0.45707)	-0.96104	-0.17261	-0.18306	0.70592 (0.45422)	-0.96282	-0.17631	-0.16362
REMPC	0.70017 (0.45449)	-0.95894	-0.17651	-0.20154	0.70627 (0.45663)	-0.96059	-0.19176	-0.16075
SALRTCC	0.27143 (0.30877)	0.82983	0.43211	-0.30088	0.26035 (0.32331)	0.78510	0.50318	-0.18871
SALPIB	0.49735 (0.42027)	0.74596	-0.41044	-0.35020	0.46994 (0.44841)	0.74007	-0.47559	-0.22998
WQSNQ	0.61229 (0.45401)	-0.96814	0.13737	-0.024758	0.64263 (0.44151)	-0.98797	0.042845	-0.021268
ICPRIV	0.54228 (0.44934)	0.81056	-0.44595	-0.15744	0.51092 (0.46158)	0.81714	-0.43925	-0.17833
EMSECU	0.32809 (0.36895)	0.72047	-0.18457	0.31349	0.36513 (0.44187)	0.93501	0.045875	-0.0018674
EMTERC	0.61054 (0.48101)	-0.95106	0.21546	0.12142	0.61691 (0.48402)	-0.95106	0.19528	0.16533
CFAPCE	0.28484 (0.26740)	0.28590	0.68895	-0.58181	0.28104 (0.26825)	-0.22251	0.39729	-0.83109
INVPIB	0.40782 (0.42699)	0.84318	-0.21221	-0.14211	0.39771 (0.45144)	0.91774	-0.12792	-0.19792
TXDBPR	0.66484 (0.42363)	-0.96746	0.10645	0.16791	0.66291 (0.44214)	-0.97982	0.039851	0.14493
FONOH	0.68503 (0.43836)	-0.97084	-0.064093	-0.15832	0.65811 (0.45107)	-0.98162	0.11270	0.040717

Correlation with “Correlations with”								
ANO	0.70091 (0.46250)	-0.95716 *	-0.19763	-0.18255	0.70381 (0.46172)	-0.95979 *	-0.20812	-0.13694
POMINEN	0.74543 (0.41182)	-0.93191 *	-0.31486	-0.033202	0.74774 (0.40705)	-0.93125 *	-0.30887	-0.024862
tcPIBppc *	0.29789 (0.26654)	0.032470	0.38239 **	0.38832 **	0.37091 (0.32196)	-0.16899	0.58021 *	0.083549
TXDESCE	0.75703 (0.35558)	-0.58094 *	-0.65191 *	0.35658	0.78320 (0.28488)	-0.29760	-0.77288 *	0.46183 *
IPPIB	0.55283 (0.44593)	0.78750 *	-0.46937 *	-0.14145	0.51969 (0.46166)	0.80142 *	-0.45576 *	-0.16609
ICPRIV	0.54228 (0.44934)	0.81056 *	-0.44595 *	-0.15744	0.51092 (0.46158)	0.81714 *	-0.43925 **	-0.17833
IIPPIB	0.69232 (0.46087)	-0.96430 *	-0.16888	-0.17622	0.69902 (0.46061)	-0.96473 *	-0.18934	-0.13132
IICPRIV	0.69350 (0.46132)	-0.96330 *	-0.17280	-0.17748	0.69959 (0.46084)	-0.96411 *	-0.19170	-0.13220

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

Table 4.37. *Unstandardized Principal Components, Cross-correlations with External Variables Significance Levels – Portuguese Evidence*

	Original Variables			Smoothed Variables		
	Mean (s.d)	PCYX1	PCYX2	Mean (s.d)	PCSYX1	PCSYX2
Eigenv.		29.57241	2.42555		29.95762	2.28549
% Cum. Exp Var.		0.84493	0.913231		0.85593	0.92123
Factor Loadings:						
IPOMINE	0.25158 (0.40919)	0.91976	-0.32953	0.24914 (0.40406)	0.91887	-0.30725
TXNAT	0.28679 (0.44594)	0.95332	-0.27857	0.28503 (0.44563)	0.95585	-0.26807
ESVIFN	0.65031 (0.46960)	-0.96671	-0.088922	0.64855 (0.47371)	-0.96794	-0.098896
LONGEV	0.74416 (0.39981)	-0.94174	0.23295	0.75090 (0.39822)	-0.93695	0.19800
P65M	0.60936 (0.47944)	-0.95889	-0.22591	0.61822 (0.48295)	-0.95986	-0.21409
IDEJOV	0.29947 (0.46064)	0.95630	-0.26297	0.29497 (0.45844)	0.95719	-0.26248
IDEID	0.70227 (0.46171)	-0.95418	0.27058	0.70590 (0.45940)	-0.95573	0.26815
TXFEC	0.30822 (0.42626)	0.91542	-0.24575	0.33050 (0.43109)	0.95417	-0.12769
TXNUP	0.33511 (0.45016)	0.99316	-0.041231	0.32534 (0.44981)	0.99170	-0.093872
ID1CASH	0.45441 (0.43696)	-0.79867	-0.47507	0.46360 (0.45630)	-0.80264	-0.45966
INDMASC	0.80847 (0.35201)	-0.82010	0.27769	0.82618 (0.34027)	-0.78487	0.20321
POPED1	0.32595 (0.42407)	0.88377	0.31990	0.32611 (0.43414)	0.87059	0.36747
POPED4	0.60929 (0.47845)	-0.95785	-0.22677	0.61528 (0.48323)	-0.95820	-0.21996
TXRESTR	0.68991 (0.46302)	-0.96247	0.24061	0.69453 (0.46539)	-0.96022	0.24960
TXREURO	0.67116 (0.45322)	-0.97236	0.18234	0.68502 (0.45928)	-0.96933	0.21328
TXRAFR	0.68945 (0.46304)	-0.96349	0.23519	0.69344 (0.46542)	-0.96109	0.24558
TXRBRAS	0.69050 (0.46308)	-0.96146	0.24564	0.69593 (0.46546)	-0.95927	0.25503
TXACTC	0.62090 (0.47785)	-0.94384	-0.24735	0.61847 (0.48237)	-0.93896	-0.27694
PTCO	0.61786 (0.47852)	-0.93467	-0.26724	0.62075 (0.47986)	-0.94085	-0.27220
IG	0.39177 (0.46691)	0.96852	0.15782	0.36147 (0.46572)	0.97390	0.032017
PQESQ	0.35098 (0.42952)	0.96571	0.053546	0.31467 (0.42464)	0.95262	-0.067502
HORNOR	0.41039 (0.44750)	0.94154	0.15128	0.39263 (0.44366)	0.93006	0.016842
TXDESCE	0.75703 (0.35558)	-0.55926	0.48662	0.78320 (0.28488)	-0.28368	0.51674
PIBPPC	0.69865 (0.45707)	-0.95925	0.24761	0.70592 (0.45422)	-0.95885	0.24941
REMPC	0.70017 (0.45449)	-0.95692	0.25647	0.70627 (0.45663)	-0.95640	0.26350
SALRTCC	0.27143 (0.30877)	0.81443	-0.31391	0.26035 (0.32331)	0.77192	-0.37884
SALPIB	0.49735 (0.42027)	0.75017	0.47853	0.46994 (0.44841)	0.74672	0.52886
WQSNQ	0.61229 (0.45401)	-0.97032	-0.11106	0.64263 (0.44151)	-0.98896	-0.0091079
ICPRIV	0.54228 (0.44934)	0.81645	0.45550	0.51092 (0.46158)	0.82522	0.46129
EMSECU	0.32809 (0.36895)	0.72352	0.075088	0.36513 (0.44187)	0.93505	-0.070000
EMTERC	0.61054 (0.48101)	-0.95653	-0.22733	0.61691 (0.48402)	-0.95674	-0.22416
CFAPCE	0.28484 (0.26740)	0.26324	-0.44165	0.28104 (0.26825)	-0.22208	-0.065091
INVPIB	0.40782 (0.42699)	0.84330	0.23559	0.39771 (0.45144)	0.92169	0.16085
TXDBPR	0.66484 (0.42363)	-0.96866	-0.14116	0.66291 (0.44214)	-0.98198	-0.070825
FONOH	0.68503 (0.43836)	-0.97179	0.13758	0.65811 (0.45107)	-0.98447	-0.095762

Correlation with “Correlations with”						
ANO	0.70091 (0.46250)	-0.95465 *	0.27011	0.70381 (0.46172)	-0.95561 *	0.27002
POMINEN	0.74543 (0.41182)	-0.92422 *	0.32631	0.74774 (0.40705)	-0.92370 *	0.30540
PIBppc	0.29789 (0.26654)	-0.95925 *	0.24761	0.37091 (0.32196)	-0.95885 *	0.24941
tcPIBppc	0.75703 (0.35558)	0.030255	-0.46952 *	0.78320 (0.28488)	-0.17239	-0.59791 *
TXDESCE	0.55283 (0.44593)	-0.55926 *	0.48662 *	0.51969 (0.46166)	-0.28368	0.51674 *
IPPIB	0.54228 (0.44934)	0.79374 *	0.47242 *	0.51092 (0.46158)	0.80955 *	0.47279 *
ICPRIV	0.69232 (0.46087)	0.81645 *	0.45550 *	0.69902 (0.46061)	0.82522 *	0.46129 *
IIPPIB	0.69350 (0.46132)	-0.96246 *	0.24099	0.69959 (0.46084)	-0.96095 *	0.24974
IICPRIV	0.25158 (0.40919)	-0.96137 *	0.24513	0.24914 (0.40406)	-0.96028 *	0.25236

Notes: * Significant at 5% (Note: Two-tail cut-off absolute correlation at 5%: for 20 observations 0.44378.)
** Significant at 10% (Note: Two-tail cut-off absolute correlation at 10%: for 20 observations 0.37833.)

3. Regressing the components:

Table 4.38. *Linear Regressions, Principal Components, Cross-Correlations – Portugal*

	Original Variables				Smoothed Variables			
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY4	PCYY1	PCYY2	PCYY3	PCYY4
PCYX1	-.997033	-.024214	.020064	.068232	-.994667	-.014180	.100731	.013135
	(.988389E-2)	(.096674)	(.155740)	(.193920)	(.010396)	(.065305)	(.115294)	(.203605)
	[.000]	[.805]	[.899]	[.729]	[.000]	[.831]	[.394]	[.949]
PCYX2	-.045329	.915082	.108617	-.356518	-.060662	-.714767	-.676321	-.161303
	(.988389E-2)	(.096674)	(.155740)	(.193920)	(.010396)	(.065305)	(.115294)	(.203605)
	[.000]	[.000]	[.495]	[.084]	[.000]	[.000]	[.000]	[.439]
PCYX3	.047008	.056208	.758593	.478490	.071561	-.645296	.553593	.518723
	(.988389E-2)	(.096674)	(.155740)	(.193920)	(.010396)	(.065305)	(.115294)	(.203605)
	[.000]	[.569]	[.000]	[.025]	[.000]	[.000]	[.000]	[.021]
SSR	.031554	3.01871	7.83439	12.1464	.034909	1.37750	4.29357	13.3900
SER	.043083	.421392	.678857	.845279	.045315	.284657	.502556	.887494
RBAR2	.998144	.822429	.539154	.285504	.997947	.918970	.747437	.212355

Table 4.39. *Linear Regressions, Principal Components, Cross-Correlations – Portugal, SUR*

	Original Variables				Smoothed Variables			
Indep. Var.	PCYY1	PCYY2	PCYY3	PCYY4	PCYY1	PCYY2	PCYY3	PCYY4
PCYX1	-.998740				-.997142			
	(.333425E-2)				(.205726E-2)			
	[.000]				[.000]			
PCYX2	-.042583	.951421		-.273558	-.068130	-.666341	-.763768	
	(.833491E-2)	(.075864)		(.140762)	(.367833E-2)	(.018471)	(.032637)	
	[.000]	[.000]		[.052]	[.000]	[.000]	[.000]	
PCYX3	.041930		.807683	.375027	.071561	-.645296	.553593	.518723
	(.408008E-2)		(.122574)	(.068162)	(.958464E-2)	(.060291)	(.108656)	(.191171)
	[.000]		[.000]	[.000]	[.000]	[.000]	[.000]	[.007]
SSR	.032243	3.11497	8.11198	12.5690	.036085	1.42588	4.63165	13.8876
SER	.040152	.394650	.636866	.792750	.042476	.267009	.481230	.833295
R2	.998305	.837375	.575464	.356022	.998110	.926164	.761242	.269074
BP1 (pv)	35.39674	38.94831	16.80357	40.94467	53.74692	55.74286	54.36707	53.37283
Df = 3	(.00000)	(.00000)	(.00078)	(.00000)	(.00000)	(.00000)	(.00000)	(.00000)
	BP (df, pv) =		CH (df,pv) =		BP (df, pv) =		CH (df,pv) =	
	66.04664		5.5489550		108.61484		147.06826	
	(6, .00000)		(5, .35261)		(6, .00000)		(4, .00000)	

Table 4.40. *Linear Regressions, Principal Components, Unstandardized Weighted Cross-Correlation – Portugal*

	Dependent Variables:			
	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
Intercept	.167984	1.43131	.105778	-.977207
	(.190290)	(.495168)	(.258250)	(.464401)
	[.390]	[.010]	[.687]	[.051]
PCYX1	-.710665	-.100225E-2	-.739124	.748563E-2
	(.888938E-02)	(.023132)	(.011445)	(.020581)
	[.000]	[.966]	[.000]	[.721]
PCYX2	-.054929	.608275	-.141639	-.657986
	(.036680)	(.095447)	(.048552)	(.087309)
	[.153]	[.000]	[.010]	[.000]
SSR	7.00661	47.4440	12.9762	41.9616
SER	.641992	1.67058	.873674	1.57109
RBAR2	.997036	.670231	.995472	.742994

Table 4.41. *Linear Regressions, Principal Components, Unstandardized Weighted Cross-Correlations – Portugal, SUR*

	Dependent Variables:			
	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
Intercept	.169217	1.44029	.102642	-1.04147
	(.173464)	(.414681)	(.237961)	(.397497)
	[.329]	[.001]	[.666]	[.009]
PCYX1	-.710527		-.739490	
	(.765361E-02)		(.010511)	
	[.000]		[.000]	
PCYX2	-.054929	.608275	-.141639	-.657986
	(.033817)	(.088002)	(.044763)	(.080807)
	[.104]	[.000]	[.002]	[.000]
SSR	7.00671	47.4492	12.9770	42.2881
SER	.591891	1.54028	.805512	1.45410
R2	.997348	.704911	.995949	.768258
BP1 (pv)	2.557829	2.557829	0.1552866	0.1552866
Df = 1	(.10975)	(.10975)	(.69353)	(.69353)
	BP (df, pv) =	CH (df,pv) =	BP (df, pv) =	CH (df,pv) =
	2.557829	).22086084E-02	0.1552866	0.15563632
	(1, .10975)	(1, 0.96252)	(1, .69353)	(1, .69321)

Table 4.42. *Linear Regressions, Principal Components, Cross-Correlations Significance Levels – Portugal*

	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
PCYX1	-.994277	.026555	-.990883	-.034264
	(.025504)	(.174116)	(.025815)	(.181571)
	[.000]	[.881]	[.000]	[.853]
PCYX2	.016403	-.646189	.076643	-.630866
	(.025504)	(.174116)	(.025815)	(.181571)
	[.529]	[.002]	[.009]	[.003]
PCYX3	-.930883E-2	-.257596	.030769	-.200946
	(.025504)	(.174116)	(.025815)	(.181571)
	[.720]	[.157]	[.259]	[.284]
SSR	.210092	9.79220	.215253	10.6486
SER	.111168	.758955	.112525	.791448
RBAR2	.987642	.423988	.987338	.373610

Table 4.43. *Linear Regressions, Principal Components, Cross-Correlations Significance Levels – Portugal, SUR*

	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
PCYX1	-.996058		-.990064	
	(.021322)		(.024425)	
	[.000]		[.000]	
PCYX2		-.695922	.076643	-.630866
		(.143381)	(.024775)	(.173495)
		[.000]	[.002]	[.000]
PCYX3		-.229372		
		(.143381)		
		[.110]		
SSR	.216911	9.86773	.233254	11.4382
SER	.104142	.702415	.107994	.756246
R2	.988587	.482120	.987724	.397992
	BP (df, pv) =	CH (df,pv) =	BP (df, pv) =	CH (df,pv) =
	4.065991	0.67074517	0.5612237	4.2358172
	(1, .04376)	(3, .88006)	(1, .45377)	(3, .23710)

Table 4.44. *Linear Regressions, Principal Components, Unstandardized Cross-Correlations Significance Levels – Portugal*

	Dependent Variables:			
	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
Intercept	.269758	-1.64905	.304351	-1.44945
	(.059463)	(.100339)	(.062594)	(.081046)
	[.000]	[.000]	[.000]	[.000]
PCYX1	-.739409	-.303695E-2	-.754050	.010134
	(.016097)	(.027162)	(.018200)	(.023565)
	[.000]	[.912]	[.000]	[.673]
PCYX2	-.133671E-2	-.563440	-.183338	-.622988
	(.056205)	(.094842)	(.065893)	(.085317)
	[.981]	[.000]	[.013]	[.000]
SSR	.469063	1.33561	.619530	1.03862
SER	.166108	.280295	.190900	.247175
RBAR2	.991067	.636753	.989088	.730513

Table 4.45. *Linear Regressions, Principal Components, Unstandardized Cross-Correlations Significance Levels – Portugal, SUR*

	Dependent Variables:			
	Original Variables		Smoothed Variables	
Indep. Var.	PCYY1	PCYY2	PCYY1	PCYY2
Intercept	.267974	-1.64397	.306033	-1.46442
	(.040323)	(.082278)	(.057595)	(.067846)
	[.000]	[.000]	[.000]	[.000]
PCYX1		-.564140	-.752912	
		(.083154)	(.016599)	
		[.000]	[.000]	
PCYX2	-.739967		-.183338	-.622988
	(.014108)		(.060750)	(.079085)
	[.000]		[.003]	[.000]
SSR	.469111	1.33660	.619672	1.04992
SER	.153152	.258515	.176022	.229120
R2	.992007	.674750	.990237	.756257
BP1 (pv)	1.925831	1.925831	0.4278112	0.4278112
Df = 1	(.16522)	(.16522)	(.51306)	(.51306)
	BP (df, pv) =	CH (df,pv) =	BP (df, pv) =	CH (df,pv) =
	1.925831	0.15372724E-01	0.4278112	0.21756906
	(1, .16522)	(2, 0.99234)	(1, .51306)	(1, .64090)

5. The Hand of Justice: Conviction Rates, Armed Forces and Exogeneity Tests

International Evidence

We consider the regressions on crime and violence and considered one-by-one exogeneity tests with respect to possible counteractive effects of people made prisoners - PPRESAS –, imprisoned people - PRISION, armed forces – FA98P -, military expenditures – DPMIPNB. We report, for each case, the coefficient, t-statistic and p-value of the extra regressors included in regressions, and of the IV coefficient estimate, also performed for each case (considering as instruments the variables in the regression and the additional exogenous variables also included in the best regressions found for the instrumented variable).

The newly included variables were important and had the correct (negative) sign in general crime deterrence and sometimes in homicide regressions, but preformed poorly in drug offenses and rapes. Inmates did not show the correct sign, implying the regression may still capture endogeneity.

Prison sentences are endogenous and dissuade homicides according to the second equation in HOMIC. PPRESAS usually has the correct sign in two-stage least squares regression; however that is the only regression where it showed also significance.

Armed Forces are endogenous and dissuade general crime according to the second equation in CRIMREG. They also dissuade homicides, being exogenous according to the first regression in HOMIC.

Interestingly, military expenditures reproduces the same sign and significance effects as Armed Forces. Now their dissuasive properties appear in both homicide regressions. And, even if not significant, they always exhibit a negative coefficient when added to plain OLS equations.

Table 5.1. *Linear Regressions, Exogeneity – International Evidence*

	Dependent Variables:					
	CRIMREG		DELDRO	HOMIC		VIOLA
Regressors:	(1)	(2)	(2)	(1)	(2)	(1)
PPRESAS	-1.33408 (3.31139) [0.692]	-0.984157 (2.13969) [0.662]	0.133222 (0.117456) [0.272]	-0.295342E-2 (0.023460) [0.901]	-0.036793 (0.013735) [0.013]	-0.177751 (0.238778) [0.470]
PPRESAS	-4.54157 (4.43853) [0.321]	-1.09660 (2.06230) [0.623]	0.189259 (0.146088) [0.216]	-0.012958 (0.038497) [0.740]	-0.063140 (0.018767) [0.003]	-0.163755 (0.420672) [0.705]
RESPRES	8.75099 (7.84686) [0.280]	6.48214 (5.79788) [0.326]	0.017380 (0.216964) [0.937]	0.015765 (0.050879) [0.760]	0.057542 (0.029567) [0.065]	-0.333227 (0.624055) [0.604]
FITPRES	-4.54157 (4.43853) [0.321]	-1.09660 (2.06230) [0.623]	0.189259 (0.146088) [0.216]	-0.012958 (0.038497) [0.740]	-0.063140 (0.018767) [0.003]	-0.163755 (0.420672) [0.705]
RESPRES	4.20942 (6.01396) [0.493]	5.38553 (5.74097) [0.401]	0.206639 (0.175813) [0.259]	0.00280767 (0.032622) [0.932]	-0.0055980 (0.021128) [0.794]	-0.496981 (0.394822) [0.234]
PPRESAS	4.20942 (6.01396) [0.493]	5.38553 (5.74097) [0.401]	0.206639 (0.175813) [0.259]	0.00280767 (0.032622) [0.932]	-0.0055980 (0.021128) [0.794]	-0.496981 (0.394822) [0.234]
FITPRES	-8.75099 (7.84686) [0.280]	-6.48214 (5.79788) [0.326]	-0.017380 (0.216964) [0.937]	-0.015765 (0.050879) [0.760]	-0.057542 (0.029567) [0.065]	0.333227 (0.624055) [0.604]
PPRESAS (2SLS)	-4.50774 (4.14603) [0.277]	-1.12772 (2.17785) [0.605]	0.100762 (0.141722) [0.477]	-0.012547 (0.036382) [0.730]	-0.056893 (0.018761) [0.002]	-0.284248 (0.335624) [0.397]

Table 5.2. *Linear Regressions, Exogeneity – International Evidence*

	Dependent Variables:					
	CRIMREG		DELDRO	HOMIC		VIOLA
Regressors:	(1)	(2)	(2)	(1)	(2)	(1)
PRISION	2.35614 (1.10492) [0.045]	-0.128326 (0.687273) [0.857]	0.043583 (0.032852) [0.199]	-0.540334E-2 (0.727441E-2) [0.464]	-0.779378E-2 (0.584302E-2) [0.193]	0.015922 (0.084464) [0.853]
PRISION	3.24020 (1.16222) [0.024]	0.373203 (0.886707) [0.691]	0.472974E-2 (0.056998) [0.937]	0.00989709 (0.00378347) [0.023]	0.00761459 (0.00329751) [0.038]	0.022232 (0.108343) [0.841]
RESPRIS	-3.38030 (1.78368) [0.095]	0.994300 (1.86660) [0.617]	0.158836 (0.168155) [0.388]	-0.013504 (0.00765615) [0.103]	-0.00850787 (0.00780821) [0.296]	-0.136382 (0.207286) [0.522]
FITPRIS	3.24020 (1.16222) [0.024]	0.373203 (0.886707) [0.691]	0.472974E-2 (0.056998) [0.937]	0.00989709 (0.00378347) [0.023]	0.00761459 (0.00329751) [0.038]	0.022232 (0.108343) [0.841]
RESPRIS	-0.140097 (1.40422) [0.923]	1.36750 (1.60280) [0.433]	0.163565 (0.151860) [0.331]	-0.00360663 (0.00654001) [0.591]	-0.00089328 (0.00683003) [0.898]	-0.11415 (0.170850) [0.516]
PRISION	-0.140097 (1.40422) [0.923]	1.36750 (1.60280) [0.433]	0.163565 (0.151860) [0.331]	-0.00360663 (0.00654001) [0.591]	-0.00089328 (0.00683003) [0.898]	-0.11415 (0.170850) [0.516]
FITPRIS	3.38030 (1.78368) [0.095]	-0.994300 (1.86660) [0.617]	-0.158836 (0.168155) [0.388]	0.013504 (0.00765615) [0.103]	0.00850787 (0.00780821) [0.296]	0.136382 (0.207286) [0.522]
PRISION (2SLS)	3.42566 (1.45656) [0.019]	0.644671 (0.726558) [0.375]	0.018520 (0.052372) [0.724]	0.00924871 (0.00408987) [0.024]	0.00693708 (0.00320139) [0.030]	-0.00494401 (0.101644) [0.961]

Table 5.3. *Linear Regressions, Exogeneity – International Evidence*

	Dependent Variables:					
	CRIMREG		DELDRO	HOMIC		VIOLA
Regressors:	(1)	(2)	(2)	(1)	(2)	(1)
FA98P	30.0035	-82.3161	0.488159	-0.758041	-0.417281	-6.16168
	(66.8655)	(47.1427)	(2.02220)	(0.330285)	(0.307987)	(5.07989)
	[0.657]	[0.111]	[0.811]	[0.029]	[0.185]	[0.239]
FA98P	11.7545	-92.6452	-5.85987	0.592547	0.414887	-3.88129
	(201.597)	(267.481)	(5.56410)	(0.632631)	(0.441911)	(13.5267)
	[0.955]	[0.741]	[0.327]	[0.364]	[0.361]	[0.778]
RESFA	68.9861	-42.4345	14.9465	-0.399581	-0.538312	-6.85037
	(275.197)	(264.187)	(8.98526)	(0.741532)	(0.536305)	(15.0299)
	[0.808]	[0.878]	[0.140]	[0.598]	[0.330]	[0.655]
FITFA	11.7545	-92.6452	-5.85987	0.592547	0.414887	-3.88129
	(201.597)	(267.481)	(5.56410)	(0.632631)	(0.441911)	(13.5267)
	[0.955]	[0.741]	[0.327]	[0.364]	[0.361]	[0.778]
RESFA	80.7406	-135.080	9.08662	0.192965	-0.123425	-10.7317
	(129.947)	(78.4662)	(6.85787)	(0.446993)	(0.359861)	(8.34499)
	[0.552]	[0.136]	[0.227]	[0.672]	[0.736]	[0.217]
FA98P	80.7406	-135.080	9.08662	0.192965	-0.123425	-10.7317
	(129.947)	(78.4662)	(6.85787)	(0.446993)	(0.359861)	(8.34499)
	[0.552]	[0.136]	[0.227]	[0.672]	[0.736]	[0.217]
FITFA	-68.9861	42.4345	-14.9465	0.399581	0.538312	6.85037
	(275.197)	(264.187)	(8.98526)	(0.741532)	(0.536305)	(15.0299)
	[0.808]	[0.878]	[0.140]	[0.598]	[0.330]	[0.655]
FA98P	45.0162	-145.420	-1.47929	0.605975	0.402519	7.69241
(2SLS)	(99.9986)	(82.5876)	(5.21554)	(0.635597)	(0.456566)	(17.3263)
	[0.653]	[0.078]	[0.777]	[0.340]	[0.378]	[0.657]

Table 5.4. Linear Regressions, Exogeneity – International Evidence

	Dependent Variables:					
	CRIMREG		DELDRO	HOMIC		VIOLA
Regressors:	(1)	(2)	(2)	(1)	(2)	(1)
DPMIPNB	-91.7245 (171.900) [0.598]	-242.856 (140.996) [0.116]	-0.312377 (9.46280) [0.974]	-2.00569 (0.966943) [0.047]	-1.79712 (0.859363) [0.045]	-13.5741 (14.3675) [0.356]
DPMIPNB	-249.299 (432.451) [0.571]	-77.9623 (856.714) [0.931]	-5.84234 (15.8601) [0.717]	-0.014238 (3.02002) [0.996]	1.72470 (3.24033) [0.599]	5.98603 (47.6347) [0.902]
RESDMI	249.912 (498.721) [0.622]	-475.794 (1172.60) [0.702]	2.90172 (19.0030) [0.880]	-2.48780 (3.45917) [0.479]	-4.28120 (3.68987) [0.256]	-39.5038 (51.6873) [0.457]
FITDMI	-249.299 (432.451) [0.571]	-77.9623 (856.714) [0.931]	-5.84234 (15.8601) [0.717]	-0.014238 (3.02002) [0.996]	1.72470 (3.24033) [0.599]	5.98603 (47.6347) [0.902]
RESDMI	0.613617 (252.841) [0.998]	-553.756 (404.124) [0.229]	-2.94062 (12.8159) [0.821]	-2.50204 (1.24382) [0.056]	-2.55649 (1.09459) [0.028]	-33.5177 (21.4517) [0.140]
DPMIPNB	0.613617 (252.841) [0.998]	-553.756 (404.124) [0.229]	-2.94062 (12.8159) [0.821]	-2.50204 (1.24382) [0.056]	-2.55649 (1.09459) [0.028]	-33.5177 (21.4517) [0.140]
FITDMI	-249.912 (498.721) [0.622]	475.793 (1172.60) [0.702]	-2.90172 (19.0030) [0.880]	2.48780 (3.45917) [0.479]	4.28120 (3.68987) [0.256]	39.5038 (51.6873) [0.457]
DPMIPNB (2SLS)	-443.113 (387.120) [0.252]	-384.189 (216.380) [0.076]	-1.27756 (13.4168) [0.924]	0.087343 (1.92687) [0.964]	0.145609 (1.80459) [0.936]	-8.33665 (45.7702) [0.855]

Portugal

It is unclear whether defendants and convicted by courts are crime variables or a result of law enforcement. Imprisonment seems more clearly related to a system response to criminality. Hence, we considered the impact of convictions, imprisonment and military forces on the regressions explaining homicides and crime and the two latter in regressions explaining defendants and convictions in courts.

1. We presented instrumented variable inference based on the predictions of the regressions previously reported. This choice – against the 2SLS inference – was dictated by the lack of observations, rendering total instruments in larger number than observations.

In general, results were of poor quality. Yet, negative and significant (at 10%) impact was found in IV estimation of:

- in levels, convictions (CONDHA2) on number of defendants (ARGHAB2) and almost significantly in crime (CRPOLHA)

- in filtered series, inmates (RECHAB2 and RECCHA2) on violent deaths presumed homicides (HOMIOUH)
- in filtered series, permanent armed forces (MILCAR) on defendants (ARGHAB2) and almost significantly on convictions (CONDHA2)
- in levels, almost significantly, military service (SMO) on number of convictions (CONDHA2)

Table 5.5. *Linear Regressions, Exogeneity – Portuguese Evidence*

	Dependent Variables:									
Specifications (2)	CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
ARGHAB2	0.00709622	-0.147624	0.025160	0.171624	0.106708	-0.704745	0.024578	-0.00583939	0.00192343	-0.028628
	(0.028274)	(0.198328)	(0.146613)	(0.270209)	(0.047942)	(0.492286)	(0.150841)	(0.204200)	(0.181294)	(0.067566)
	[0.812]	[0.478]	[0.869]	[0.553]	[0.068]	[0.212]	[0.875]	[0.979]	[0.992]	[0.700]
ARGHAB2	0.00727224	0.287546	0.033957	0.138300	0.117300	0.316650	0.00246818	-0.041306	-0.059039	-0.082559
	(0.025678)	(0.396917)	(0.164661)	(0.321361)	(0.052710)	(1.06741)	(0.134979)	(0.435001)	(0.166990)	(0.200280)
	[0.791]	[0.501]	[0.843]	[0.689]	[0.077]	[0.781]	[0.986]	[0.933]	[0.736]	[0.720]
RESARG	-0.187871	-1.36254	-0.249214	0.184156	-0.127210	-2.76837	1.45731	0.053824	1.26717	0.110282
	(0.130819)	(1.01735)	(1.32353)	(0.649327)	(0.189373)	(2.57737)	(0.830569)	(0.540798)	(0.773764)	(0.374551)
	[0.224]	[0.238]	[0.857]	[0.791]	[0.532]	[0.343]	[0.123]	[0.930]	[0.153]	[0.796]
FITARG	0.00727224	0.287546	0.033957	0.138300	0.117300	0.316650	0.00246818	-0.041306	-0.059039	-0.082559
	(0.025678)	(0.396917)	(0.164661)	(0.321361)	(0.052710)	(1.06741)	(0.134979)	(0.435001)	(0.166990)	(0.200280)
	[0.791]	[0.501]	[0.843]	[0.689]	[0.077]	[0.781]	[0.986]	[0.933]	[0.736]	[0.720]
RESARG	-0.180599	-1.07499	-0.215258	0.322457	-0.00991065	-2.45172	1.45978	0.012518	1.20814	0.027723
	(0.133195)	(0.703056)	(1.28654)	(0.610173)	(0.180745)	(1.69719)	(0.828935)	(0.310254)	(0.754315)	(0.207828)
	[0.247]	[0.187]	[0.873]	[0.625]	[0.958]	[0.222]	[0.122]	[0.971]	[0.160]	[0.906]
ARGHAB2	-0.180599	-1.07499	-0.215258	0.322457	-0.00991065	-2.45172	1.45978	0.012518	1.20814	0.027723
	(0.133195)	(0.703056)	(1.28654)	(0.610173)	(0.180745)	(1.69719)	(0.828935)	(0.310254)	(0.754315)	(0.207828)
	[0.247]	[0.187]	[0.873]	[0.625]	[0.958]	[0.222]	[0.122]	[0.971]	[0.160]	[0.906]
FITARG	0.187871	1.36254	0.249214	-0.184156	0.127210	2.76837	-1.45731	-0.053824	-1.26717	-0.110282
	(0.130819)	(1.01735)	(1.32353)	(0.649327)	(0.189373)	(2.57737)	(0.830569)	(0.540798)	(0.773764)	(0.374551)
	[0.224]	[0.238]	[0.857]	[0.791]	[0.532]	[0.343]	[0.123]	[0.930]	[0.153]	[0.796]
FITARG	0.013821	-0.129122	0.029442	0.114934	0.117237	-0.799656	-0.014003	-0.040852	-0.057091	-0.064271
	(0.027252)	(0.319149)	(0.150735)	(0.294471)	(0.048121)	(0.812455)	(0.151308)	(0.355203)	(0.184714)	(0.119741)
	[0.634]	[0.700]	[0.851]	[0.712]	[0.051]	[0.370]	[0.929]	[0.916]	[0.766]	[0.629]
ARGHAB2	0.014341	-0.093054	0.028837	0.123913	0.116497	-0.549473	-0.014163	-0.039423	-0.056999	-0.038726
(IV)	(0.029003)	(0.223850)	(0.147737)	(0.310978)	(0.050086)	(0.518783)	(0.153492)	(0.345031)	(0.187065)	(0.073643)
	[0.621]	[0.678]	[0.845]	[0.690]	[0.020]	[0.290]	[0.926]	[0.909]	[0.761]	[0.599]

Table 5.6. Linear Regressions, Exogeneity – Portuguese Evidence

	Dependent Variables:									
Specifications (2)	ARGHAB2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
CONDHA2	-0.808422	-0.200424	-0.796313	-0.205585	0.102279	0.925729	0.104236	0.00445969	-0.328641	-0.052576
	(0.293429)	(0.218192)	(0.548813)	(0.313521)	(0.180090)	(0.524457)	(0.343180)	(0.122077)	(0.366186)	(0.101081)
	[0.040]	[0.400]	[0.190]	[0.541]	[0.591]	[0.138]	[0.769]	[0.973]	[0.399]	[0.639]
CONDHA2	-0.659425	-0.115524	-0.775760	-0.459822	0.244986	0.842761	0.032656	-0.045303	-0.371922	-0.099254
	(0.281843)	(0.249311)	(0.586793)	(0.392313)	(0.136446)	(0.593911)	(0.361292)	(0.387516)	(0.383082)	(0.155753)
	[0.079]	[0.667]	[0.234]	[0.306]	[0.133]	[0.229]	[0.931]	[0.735]	[0.369]	[0.589]
RESCON	-4.07896	-0.362406	-2.72081	0.713545	-2.42542	0.346858	5.65728	0.504139	3.54099	0.081614
	(2.74635)	(0.447977)	(6.63464)	(0.675121)	(0.897949)	(0.705705)	(6.92000)	(0.387516)	(4.78113)	(0.178203)
	[0.212]	[0.464]	[0.696]	[0.350]	[0.043]	[0.649]	[0.441]	[0.323]	[0.487]	[0.692]
FITCON	-0.659425	-0.115524	-0.775760	-0.459822	0.244986	0.842761	0.032656	-0.045303	-0.371922	-0.099254
	(0.281843)	(0.249311)	(0.586793)	(0.392313)	(0.136446)	(0.593911)	(0.361292)	(0.116495)	(0.383082)	(0.155753)
	[0.079]	[0.667]	[0.234]	[0.306]	[0.133]	[0.229]	[0.931]	[0.735]	[0.369]	[0.589]
RESCON	-4.73839	-0.477930	-3.49657	0.253723	-2.18043	1.18962	5.68994	0.458836	3.16907	-0.017640
	(2.65910)	(0.410868)	(6.61043)	(0.533762)	(0.854427)	(0.782623)	(6.84143)	(0.366188)	(4.73785)	(0.140323)
	[0.149]	[0.309]	[0.616]	[0.659]	[0.051]	[0.203]	[0.433]	[0.337]	[0.528]	[0.911]
CONDHA2	-4.73839	-0.477930	-3.49657	0.253723	-2.18043	1.18962	5.68994	0.458836	3.16907	-0.017640
	(2.65910)	(0.410868)	(6.61043)	(0.533762)	(0.854427)	(0.782623)	(6.84143)	(0.366188)	(4.73785)	(0.140323)
	[0.149]	[0.309]	[0.616]	[0.659]	[0.051]	[0.203]	[0.433]	[0.337]	[0.528]	[0.911]
FITCON	4.07896	0.362406	2.72081	-0.713545	2.42542	-0.346858	-5.65728	-0.504140	-3.54099	-0.081614
	(2.74635)	(0.447977)	(6.63464)	(0.675121)	(0.897949)	(0.705705)	(6.92000)	(0.387516)	(4.78113)	(0.178203)
	[0.212]	[0.464]	[0.696]	[0.350]	[0.043]	[0.649]	[0.441]	[0.323]	[0.487]	[0.692]
FITCON	-0.790836	-0.072654	-0.774814	-0.452262	0.158896	0.389044	0.090444	-0.041020	-0.353194	-0.093792
	(0.325869)	(0.255130)	(0.555784)	(0.360373)	(0.183134)	(0.576831)	(0.347649)	(0.127027)	(0.366668)	(0.122605)
	[0.060]	[0.787]	[0.206]	[0.265]	[0.419]	[0.530]	[0.801]	[0.768]	[0.368]	[0.500]
CONDHA2 (IV)	-0.769495	-0.079813	-0.775024	-0.439176	0.152860	0.628907	0.089535	-0.040640	-0.351119	-0.135856
	(0.295398)	(0.269209)	(0.551031)	(0.405892)	(0.183267)	(0.788590)	(0.343670)	(0.130871)	(0.367459)	(0.205902)
	[0.009]	[0.767]	[0.160]	[0.279]	[0.404]	[0.425]	[0.794]	[0.756]	[0.339]	[0.509]

Table 5.7. *Linear Regressions, Exogeneity – Portuguese Evidence*

Dependent Variables:

Specifications (2)	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
RECHAB2	-0.428249	-0.156112	-0.086182	0.114254	2.92302	0.099308	0.287408	-0.463203	-0.890243	-0.768356	0.727583	0.760548
	(2.07463)	(0.416067)	(0.301909)	(0.355470)	(2.30916)	(0.389219)	(0.727499)	(0.499051)	(1.96490)	(0.063924)	(1.61375)	(0.464504)
	[0.845]	[0.723]	[0.787]	[0.756]	[0.246]	[0.809]	[0.706]	[0.396]	[0.663]	[0.001]	[0.666]	[0.200]
RECHAB2	3.67028	-0.107584	-0.557666	0.454973	2.21754	0.119825	0.030055	-0.462311	-0.453080	-0.825261	1.95977	0.626773
	(2.64623)	(0.387403)	(0.462609)	(0.448720)	(2.75306)	(0.495932)	(1.61553)	(0.560680)	(2.15636)	(0.330117)	(1.80920)	(0.635047)
	[0.238]	[0.795]	[0.294]	[0.344]	[0.451]	[0.821]	[0.986]	[0.456]	[0.840]	[0.130]	[0.320]	[0.428]
RESRE	-4.35845	-0.514646	0.653527	-0.675405	2.85923	-0.049541	0.292422	0.017420	-1.57059	0.044952	-2.72442	0.093835
	(2.20137)	(0.381744)	(0.506547)	(0.565510)	(5.21432)	(0.576166)	(1.59849)	(1.08162)	(2.48020)	(0.253454)	(2.09887)	(0.227339)
	[0.119]	[0.249]	[0.267]	[0.271]	[0.603]	[0.936]	[0.862]	[0.988]	[0.547]	[0.876]	[0.242]	[0.720]
FITRE	3.67028	-0.107584	-0.557666	0.454973	2.21754	0.119825	0.030055	-0.462311	-0.453080	-0.825261	1.95977	0.626773
	(2.64623)	(0.387403)	(0.462609)	(0.448720)	(2.75306)	(0.495932)	(1.61553)	(0.560680)	(2.15636)	(0.330117)	(1.80920)	(0.635047)
	[0.238]	[0.795]	[0.294]	[0.344]	[0.451]	[0.821]	[0.986]	[0.456]	[0.840]	[0.130]	[0.320]	[0.428]
RESRE	-0.688172	-0.622230	0.095860	-0.220432	5.07677	0.070283	0.322477	0.444890	-2.02367	-0.780309	-0.764644	0.720609
	(1.65363)	(0.518003)	(0.316805)	(0.445526)	(4.62073)	(0.550419)	(0.817087)	(1.26652)	(2.71605)	(0.102841)	(1.92190)	(0.554622)
	[0.699]	[0.296]	[0.777]	[0.636]	[0.314]	[0.905]	[0.709]	[0.743]	[0.480]	[0.017]	[0.705]	[0.323]
RECHAB2	-0.688172	-0.622230	0.095860	-0.220432	5.07677	0.070283	0.322477	-0.444890	-2.02367	-0.780309	-0.764644	0.720609
	(1.65363)	(0.518003)	(0.316805)	(0.445526)	(4.62073)	(0.550419)	(0.817087)	(1.26652)	(2.71605)	(0.102841)	(1.92190)	(0.554622)
	[0.699]	[0.296]	[0.777]	[0.636]	[0.314]	[0.905]	[0.709]	[0.743]	[0.480]	[0.017]	[0.705]	[0.323]
FITRE	4.35845	0.514645	-0.653527	0.675405	-2.85923	0.049541	-0.292421	-0.017420	1.57059	-0.044952	2.72442	-0.093835
	(2.20137)	(0.381744)	(0.506547)	(0.565510)	(5.21433)	(0.576166)	(1.59849)	(1.08162)	(2.48020)	(0.253454)	(2.09887)	(0.227339)
	[0.119]	[0.249]	[0.267]	[0.271]	[0.603]	[0.936]	[0.862]	[0.988]	[0.547]	[0.876]	[0.242]	[0.720]
FITRE	4.28572	0.208578	-0.585261	0.499417	2.01052	0.094660	-0.144411	-0.358507	0.352805	1.21526	2.22492	-0.145370
	(2.00479)	(0.296586)	(0.410267)	(0.418372)	(2.78694)	(0.407879)	(1.44041)	(0.432703)	(1.81287)	(0.853114)	(1.57762)	(0.248201)
	[0.086]	[0.513]	[0.213]	[0.267]	[0.494]	[0.826]	[0.923]	[0.445]	[0.851]	[0.250]	[0.201]	[0.599]
RECHAB2 (IV)	40.5509	0.424034	-0.821836	0.625540	2.09599	0.147454	-0.314633	-0.467612	0.586279	-0.752475	3.40598	2.03269
	(232.314)	(0.734621)	(1.00256)	(0.634025)	(2.74135)	(0.635625)	(3.27303)	(0.555902)	(3.08512)	(0.098547)	(3.18478)	(4.98093)
	[0.861]	[0.564]	[0.412]	[0.324]	[0.445]	[0.817]	[0.923]	[0.400]	[0.849]	[0.000]	[0.285]	[0.683]

Table 5.8. *Linear Regressions, Exogeneity – Portuguese Evidence*

	Dependent Variables:											
Specifications (2)	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
RECCHA2	-0.540272	-0.173289	-0.041196	0.241278	2.68403	0.131952	0.213878	-0.497894	-0.874529	-0.783629	0.750911	0.712305
	(2.00654)	(0.459878)	(0.310384)	(0.468682)	(2.37687)	(0.404905)	(0.751194)	(0.537765)	(1.99814)	(0.113648)	(1.66778)	(0.339495)
	[0.798]	[0.722]	[0.900]	[0.621]	[0.296]	[0.758]	[0.785]	[0.397]	[0.673]	[0.006]	[0.666]	[0.127]
RECCHA2	-2.93919	0.226324	-0.571838	0.458755	1.18839	0.283921	2.33730	-0.748574	-1.72895	-0.723480	0.484760	0.724945
	(5.24143)	(0.967715)	(0.516755)	(0.572475)	(2.71227)	(0.506384)	(1.33474)	(0.633977)	(2.31248)	(0.150916)	(1.93766)	(0.468591)
	[0.605]	[0.827]	[0.331]	[0.449]	[0.677]	[0.605]	[0.140]	[0.303]	[0.479]	[0.041]	[0.811]	[0.262]
RESREC	3.21496	-0.700527	0.957670	-0.290406	6.82124	-0.546187	-2.97654	1.25764	4.82295	-0.116965	1.84661	-0.010825
	(6.39069)	(1.45261)	(0.766562)	(0.408511)	(6.22655)	(0.934544)	(1.64243)	(1.52816)	(6.08157)	(0.165739)	(5.26020)	(0.185635)
	[0.641]	[0.655]	[0.280]	[0.500]	[0.315]	[0.590]	[0.130]	[0.457]	[0.454]	[0.553]	[0.738]	[0.959]
FITREC	-2.93919	0.226324	-0.571838	0.458755	1.18839	0.283921	2.33730	-0.748574	-1.72895	-0.723480	0.484760	0.724945
	(5.24143)	(0.967715)	(0.516755)	(0.572475)	(2.71227)	(0.506384)	(1.33474)	(0.633977)	(2.31248)	(0.150916)	(1.93766)	(0.468591)
	[0.605]	[0.827]	[0.331]	[0.449]	[0.677]	[0.605]	[0.140]	[0.303]	[0.479]	[0.041]	[0.811]	[0.262]
RESREC	0.275763	-0.474203	0.385832	0.168348	8.00963	-0.262266	-0.639239	0.509069	3.09399	-0.840444	2.33137	0.714119
	(2.71377)	(0.799484)	(0.451064)	(0.494635)	(5.39674)	(0.802364)	(0.793909)	(1.34397)	(5.40635)	(0.148299)	(4.84234)	(0.416607)
	[0.924]	[0.585]	[0.441]	[0.744]	[0.188]	[0.760]	[0.457]	[0.724]	[0.585]	[0.030]	[0.647]	[0.229]
RECCHA2	0.275763	-0.474203	0.385832	0.168348	8.00963	-0.262266	-0.639239	0.509069	3.09399	-0.840445	2.33137	0.714119
	(2.71377)	(0.799484)	(0.451064)	(0.494635)	(5.39674)	(0.802364)	(0.793909)	(1.34397)	(5.40635)	(0.148299)	(4.84234)	(0.416607)
	[0.924]	[0.585]	[0.441]	[0.744]	[0.188]	[0.760]	[0.457]	[0.724]	[0.585]	[0.030]	[0.647]	[0.229]
FITREC	-3.21496	0.700527	-0.957670	0.290406	-6.82124	0.546187	2.97654	-1.25764	-4.82294	0.116965	-1.84661	0.010825
	(6.39069)	(1.45261)	(0.766562)	(0.408511)	(6.22655)	(0.934544)	(1.64243)	(1.52816)	(6.08158)	(0.165739)	(5.26020)	(0.185635)
	[0.641]	[0.655]	[0.280]	[0.500]	[0.315]	[0.590]	[0.130]	[0.457]	[0.454]	[0.553]	[0.738]	[0.959]
FITREC	-2.82679	0.028083	-0.460783	0.319243	1.50311	0.289388	2.19241	-0.730662	-1.60143	-0.392943	0.507975	-0.012950
	(4.58840)	(0.847255)	(0.486574)	(0.376898)	(2.92706)	(0.458682)	(1.28321)	(0.575518)	(2.20285)	(0.469393)	(1.82769)	(0.237505)
	[0.565]	[0.975]	[0.387]	[0.422]	[0.623]	[0.556]	[0.138]	[0.260]	[0.488]	[0.464]	[0.789]	[0.960]
RECCHA2 (IV)	-2.00820	0.019804	-0.357798	1.86374	1.44628	0.295549	1.78727	-0.705826	-1.53803	-0.647660	0.502967	0.388987
	(3.53199)	(0.599532)	(0.450194)	(3.57153)	(2.68929)	(0.489449)	(1.66690)	(0.599450)	(2.17355)	(0.254434)	(1.79666)	(5.18544)
	[0.570]	[0.974]	[0.427]	[0.602]	[0.591]	[0.546]	[0.284]	[0.239]	[0.479]	[0.011]	[0.780]	[0.940]

Table 5.9. *Linear Regressions, Exogeneity – Portuguese Evidence*

	Dependent Variables:											
Specifications (2)	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
MILCAR	-0.485461	-0.428996	0.059221	-0.00273535	-0.919812	0.051647	0.059736	0.033467	0.188296	0.079717	0.045372	-0.018402
	(0.471169)	(0.212393)	(0.059398)	(0.085382)	(0.940131)	(0.099984)	(0.086807)	(0.296734)	(0.483850)	(0.129477)	(0.388015)	(0.023641)
	[0.350]	[0.099]	[0.365]	[0.975]	[0.357]	[0.624]	[0.511]	[0.913]	[0.705]	[0.565]	[0.909]	[0.472]
MILCAR	-0.425484	-0.424572	0.042180	-0.142901	-0.919499	0.043931	0.076002	0.405421	0.083423	0.028743	0.000401839	0.118431
	(0.530615)	(0.300896)	(0.061288)	(0.078416)	(1.00346)	(0.111282)	(0.087207)	(0.321411)	(0.465432)	(0.170291)	(0.363926)	(0.071235)
	[0.468]	[0.231]	[0.529]	[0.128]	[0.390]	[0.709]	[0.412]	[0.263]	[0.862]	[0.877]	[0.999]	[0.195]
RESMIL	-0.561419	-0.016677	0.221163	1.15781	0.307117	0.237606	-0.425154	-0.422599	2.45745	-0.055376	2.00885	-0.094881
	(1.24065)	(0.696777)	(0.214382)	(0.397989)	(2.06138)	(0.763830)	(0.393081)	(1.06614)	(1.70485)	(0.434628)	(1.32480)	(0.163803)
	[0.674]	[0.982]	[0.361]	[0.033]	[0.886]	[0.768]	[0.315]	[0.708]	[0.183]	[0.907]	[0.168]	[0.603]
FITMIL	-0.425484	-0.424572	0.042180	-0.142901	-0.919499	0.043931	0.076002	0.405421	0.083423	0.028743	0.000401839	0.118431
	(0.530615)	(0.300896)	(0.061288)	(0.078416)	(1.00346)	(0.111282)	(0.087207)	(0.321411)	(0.465432)	(0.170291)	(0.363926)	(0.071235)
	[0.468]	[0.231]	[0.529]	[0.128]	[0.390]	[0.709]	[0.412]	[0.263]	[0.862]	[0.877]	[0.999]	[0.195]
RESMIL	-0.986903	-0.441249	0.263343	1.01491	-0.612383	0.281537	-0.349152	-0.017179	2.54087	-0.026633	2.00925	0.023550
	(1.22143)	(0.564344)	(0.206478)	(0.383936)	(2.29453)	(0.746944)	(0.387679)	(1.09926)	(1.69561)	(0.439402)	(1.34497)	(0.138936)
	[0.464]	[0.478]	[0.271]	[0.046]	[0.797]	[0.722]	[0.398]	[0.988]	[0.168]	[0.955]	[0.174]	[0.876]
MILCAR	-0.986903	-0.441249	0.263343	1.01491	-0.612383	0.281537	-0.349152	-0.017179	2.54087	-0.026633	2.00925	0.023550
	(1.22143)	(0.564344)	(0.206478)	(0.383936)	(2.29453)	(0.746944)	(0.387679)	(1.09926)	(1.69561)	(0.439402)	(1.34497)	(0.138936)
	[0.464]	[0.478]	[0.271]	[0.046]	[0.797]	[0.722]	[0.398]	[0.988]	[0.168]	[0.955]	[0.174]	[0.876]
FITMIL	0.561418	0.016677	-0.221163	-1.15781	-0.307117	-0.237606	0.425154	0.422600	-2.45745	0.055376	-2.00885	0.094881
	(1.24064)	(0.696777)	(0.214382)	(0.397989)	(2.06138)	(0.763830)	(0.393081)	(1.06614)	(1.70485)	(0.434628)	(1.32480)	(0.163803)
	[0.674]	[0.982]	[0.361]	[0.033]	[0.886]	[0.768]	[0.315]	[0.708]	[0.183]	[0.907]	[0.168]	[0.603]
FITMIL	-0.348009	-0.477550	0.040852	-0.126241	-0.801876	0.047243	0.079937	0.406665	0.00159587	0.031031	-0.103065	0.119928
	(0.503436)	(0.281542)	(0.065006)	(0.110481)	(0.847548)	(0.102698)	(0.086063)	(0.284272)	(0.490158)	(0.143896)	(0.380939)	(0.061507)
	[0.520]	[0.151]	[0.557]	[0.297]	[0.372]	[0.662]	[0.380]	[0.203]	[0.997]	[0.840]	[0.793]	[0.123]
MILCAR (IV)	-0.377657	-0.426360	0.041059	-0.124202	-0.992513	0.046693	0.080848	0.438414	0.00164898	0.033947	-0.108660	0.112761
	(0.522065)	(0.234129)	(0.062561)	(0.116636)	(1.04579)	(0.101076)	(0.089349)	(0.311678)	(0.506403)	(0.157820)	(0.406456)	(0.061384)
	[0.469]	[0.069]	[0.512]	[0.287]	[0.343]	[0.644]	[0.366]	[0.160]	[0.997]	[0.830]	[0.789]	[0.066]

Table 5.10. *Linear Regressions, Exogeneity – Portuguese Evidence*

	Dependent Variables:											
Specifications (2)	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
SMO	0.061449	0.212455	-0.012377	-0.058942	0.463424	0.225342	0.040807	-0.164379	-0.210995	0.340608	-0.196785	0.104730
	(0.265129)	(0.289447)	(0.043723)	(0.139635)	(0.234396)	(0.201890)	(0.073028)	(0.720231)	(0.247012)	(0.256180)	(0.417468)	(0.096921)
	[0.826]	[0.496]	[0.788]	[0.684]	[0.083]	[0.307]	[0.592]	[0.826]	[0.413]	[0.241]	[0.649]	[0.329]
SMO	-0.146576	0.047153	0.017727	-0.199157	0.353309	0.305730	-0.00728173	0.037764	-0.304977	1.27808	-0.631612	0.115758
	(0.219224)	(0.251156)	(0.048241)	(0.250283)	(0.218162)	(0.186594)	(0.073661)	(0.843229)	(0.216533)	(0.424731)	(0.301477)	(0.118017)
	[0.540]	[0.860]	[0.732]	[0.462]	[0.149]	[0.162]	[0.924]	[0.966]	[0.193]	[0.040]	[0.069]	[0.382]
RESSMO	2.30719	1.66307	-0.322346	-1.35082	3.45716	1.65462	0.597364	-1.44904	3.84435	-1.77538	4.28267	-0.095963
	(1.03780)	(0.881349)	(0.261378)	(1.37159)	(1.97296)	(1.65462)	(0.378703)	(2.63311)	(1.79782)	(0.72705)	(1.20397)	(0.420632)
	[0.090]	[0.132]	[0.285]	[0.370]	[0.123]	[0.170]	[0.159]	[0.602]	[0.061]	[0.071]	[0.007]	[0.831]
FITSMO	-0.146576	0.047153	0.017727	-0.199157	0.353309	0.305730	-0.00728173	0.037764	-0.304977	1.27808	-0.631612	0.115758
	(0.219224)	(0.251156)	(0.048241)	(0.250283)	(0.218162)	(0.186594)	(0.073661)	(0.843229)	(0.216533)	(0.424731)	(0.301477)	(0.118017)
	[0.540]	[0.860]	[0.732]	[0.462]	[0.149]	[0.162]	[0.924]	[0.966]	[0.193]	[0.040]	[0.069]	[0.382]
RESSMO	2.16061	1.71023	-0.304618	-1.54998	3.81047	1.96035	0.590083	-1.41128	3.53937	-0.497299	3.65106	0.019795
	(0.964813)	(0.827912)	(0.240593)	(1.23768)	(1.92151)	(1.09696)	(0.354615)	(2.38954)	(1.76664)	(0.388250)	(1.11628)	(0.387549)
	[0.089]	[0.108]	[0.274]	[0.266]	[0.088]	[0.134]	[0.140]	[0.576]	[0.076]	[0.269]	[0.011]	[0.962]
SMO	2.16061	1.71023	-0.304618	-1.54998	3.81047	1.96035	0.590083	-1.41128	3.53937	-0.497299	3.65106	0.019795
	(0.964813)	(0.827912)	(0.240593)	(1.23768)	(1.92151)	(1.09696)	(0.354615)	(2.38954)	(1.76664)	(0.388250)	(1.11628)	(0.387549)
	[0.089]	[0.108]	[0.274]	[0.266]	[0.088]	[0.134]	[0.140]	[0.576]	[0.076]	[0.269]	[0.011]	[0.962]
FITSMO	-2.30719	-1.66307	0.322346	1.35082	-3.45716	-1.65462	-0.597364	1.44904	-3.84435	1.77538	-4.28267	0.095963
	(1.03780)	(0.881349)	(0.261378)	(1.37159)	(1.97296)	(1.65462)	(0.378703)	(2.63311)	(1.79782)	(0.72705)	(1.20397)	(0.420632)
	[0.090]	[0.132]	[0.285]	[0.370]	[0.123]	[0.170]	[0.159]	[0.602]	[0.061]	[0.071]	[0.007]	[0.831]
FITSMO	-0.032728	0.082405	-0.00360223	-0.344230	0.432145	0.164714	0.021433	-0.025549	-0.268541	0.951980	-0.466692	0.116602
	(0.286339)	(0.322205)	(0.047853)	(0.232130)	(0.250762)	(0.197595)	(0.079134)	(0.796534)	(0.246144)	(0.361091)	(0.428417)	(0.104551)
	[0.913]	[0.808]	[0.943]	[0.189]	[0.123]	[0.436]	[0.793]	[0.975]	[0.301]	[0.046]	[0.304]	[0.315]
SMO (IV)	-0.031090	0.080740	-0.00336651	-0.314769	0.423385	0.177481	0.020438	-0.024452	-0.265804	0.574955	-0.446522	0.111834
	(0.274191)	(0.308095)	(0.044581)	(0.202805)	(0.236223)	(0.205612)	(0.074730)	(0.761614)	(0.249422)	(0.313111)	(0.439284)	(0.100947)
	[0.910]	[0.793]	[0.940]	[0.121]	[0.073]	[0.388]	[0.784]	[0.974]	[0.287]	[0.066]	[0.309]	[0.268]

Table 5.11. *Linear Regressions, Exogeneity – Portuguese Evidence*

	Dependent Variables:											
Specifications (2)	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
Regressors:	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
FA	-0.053954	0.00459031	0.013651	-0.015301	0.449444	0.066719	0.031116	0.025297	-0.136570	0.168343	-0.066220	-0.00676946
	(0.219666)	(0.172037)	(0.035401)	(0.060142)	(0.263882)	(0.087020)	(0.047387)	(0.453954)	(0.230152)	(0.163751)	(0.264716)	(0.039164)
	[0.816]	[0.980]	[0.716]	[0.806]	[0.127]	[0.472]	[0.530]	[0.957]	[0.566]	[0.351]	[0.808]	[0.870]
FA	-0.059758	-0.00872316	-0.005775	-0.099496	0.448669	0.072930	0.033565	-0.178687	-0.141480	0.095270	-0.169807	0.022187
	(0.255332)	(0.178043)	(0.045986)	(0.08006)	(0.286334)	(0.081740)	(0.039790)	(0.527486)	(0.216873)	(0.158109)	(0.299566)	(0.041640)
	[0.826]	[0.963]	[0.906]	[0.269]	[0.161]	[0.413]	[0.431]	[0.746]	[0.532]	[0.579]	[0.589]	[0.622]
RESFA	0.233284	0.741204	0.359669	-1.44938	-0.057592	0.869504	1.43113	-2.66026	4.54154	0.344539	2.67357	0.300868
	(2.83615)	(0.882375)	(0.499529)	(0.956843)	(3.64640)	(0.644230)	(0.719943)	(3.24745)	(2.54921)	(0.243422)	(2.47278)	(0.217357)
	[0.938]	[0.448]	[0.511]	[0.190]	[0.988]	[0.235]	[0.094]	[0.444]	[0.113]	[0.230]	[0.315]	[0.239]
FITFA	-0.059758	-0.00872316	-0.005775	-0.099496	0.448669	0.072930	0.033565	-0.178687	-0.141480	0.095270	-0.169807	0.022187
	(0.255332)	(0.178043)	(0.045986)	(0.08006)	(0.286334)	(0.081740)	(0.039790)	(0.527486)	(0.216873)	(0.158109)	(0.299566)	(0.041640)
	[0.826]	[0.963]	[0.906]	[0.269]	[0.161]	[0.413]	[0.431]	[0.746]	[0.532]	[0.579]	[0.589]	[0.622]
RESFA	0.173525	0.732481	0.353894	-1.54888	0.391077	0.942433	1.46469	-2.83894	4.40006	0.439808	2.50376	0.323054
	(2.77645)	(0.884486)	(0.474014)	(0.954523)	(3.70622)	(0.653944)	(0.724268)	(3.52724)	(2.55561)	(0.243142)	(2.39702)	(0.240981)
	[0.953]	[0.454]	[0.497]	[0.166]	[0.919]	[0.209]	[0.090]	[0.452]	[0.123]	[0.145]	[0.331]	[0.251]
FA	0.173525	0.732481	0.353894	-1.54888	0.391077	0.942433	1.46469	-2.83894	4.40006	0.439808	2.50376	0.323054
	(2.77645)	(0.884486)	(0.474014)	(0.954523)	(3.70622)	(0.653944)	(0.724268)	(3.52724)	(2.55561)	(0.243142)	(2.39702)	(0.240981)
	[0.953]	[0.454]	[0.497]	[0.166]	[0.919]	[0.209]	[0.090]	[0.452]	[0.123]	[0.145]	[0.331]	[0.251]
FITFA	-0.233284	-0.741204	-0.359669	1.44938	0.057592	-0.869504	-1.43113	2.66026	-4.54154	-0.344539	-2.67357	-0.300868
	(2.83615)	(0.882375)	(0.499529)	(0.956843)	(3.64640)	(0.644230)	(0.719943)	(3.24745)	(2.54921)	(0.243422)	(2.47278)	(0.217357)
	[0.938]	[0.448]	[0.511]	[0.190]	[0.988]	[0.235]	[0.094]	[0.444]	[0.113]	[0.230]	[0.315]	[0.239]
FITFA	-0.056720	-0.025309	0.012121	-0.097817	0.441240	0.051672	0.022634	0.069323	-0.168321	0.00278865	-0.108976	-0.012753
	(0.224310)	(0.171265)	(0.037468)	(0.090292)	(0.259825)	(0.087316)	(0.047328)	(0.417216)	(0.238754)	(0.180432)	(0.295519)	(0.034968)
	[0.810]	[0.888]	[0.759]	[0.320]	[0.128]	[0.576]	[0.647]	[0.873]	[0.499]	[0.988]	[0.722]	[0.730]
FA (IV)	-0.055745	-0.025896	0.011538	-0.097923	0.449784	0.052865	0.022804	0.075959	-0.169354	0.00353117	-0.106391	-0.014300
	(0.220531)	(0.176153)	(0.035524)	(0.088461)	(0.264650)	(0.087890)	(0.047384)	(0.458359)	(0.242754)	(0.227651)	(0.290192)	(0.039755)
	[0.800]	[0.883]	[0.745]	[0.268]	[0.089]	[0.548]	[0.630]	[0.868]	[0.485]	[0.988]	[0.714]	[0.719]

2. We completed the analysis with the inspection of two-by-two VAR-based causality between crime and enforcement proxies. Causality tests under unrestricted VAR systems are of very simple structure; they rely on a system in which each of the variables is regressed on a given number of lags of all the variables in the system; the literature suggests previous differencing of the variables till stationarity is achieved. Causality is inspected (rejected) by the analysis of the joint significance of the lagged values of one variable on the right hand-side one.

We consider systems of two variables, one potentially measuring deviant behavior, Y, and another, X, an hypothetic dissuasive effect. We consider only one lag in the structures – that allows us to infer from the sign of the corresponding coefficient the sign of causality, releasing us (under model stability[88], and because it is not our purpose to inspect or compare system dynamics here) from analyzing impulse response simulations. Ideally, we would find that Y causes X (Y → X) positively – due to adequate or authomatic policy reaction - and X causes Y (X → Y) negatively – the subsequent deterrent effect.

We considered a first inspection in the levels of all the variables but included a trend on the right hand-side as well. The results are presented in the first table. In a second round, we differenced and double differenced the variables according to unit roots. Characteristic values of the matrix of the lagged coefficients of the estimated systems was always in modulus smaller than one, pointing to system stationarity.

We found the correct signs and significance in the relationship between smoothed series of imprisonment (RECHAB2 and specially RECCHA2) and: convictions, reported crimes and homicides; significance was not so strong with the original series.

MILCAR exhibited the same pattern, as significant in the smoothed as in the original series.

Results in differences (in the second table) were not so robust. Yet, defendants had, for the smoothed series, the correct signs and almost significant relations towards general crimes and homicides.

Permanent Armed forces and Mandatory military service usually exhibited the correct causality signs, yet insignificant to the exception of convictions and general crime. The evidence may thus

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[88] Departing from a stationary state, the first impact of a (positive) shock in the error of the equation explaining one variable on the level of the other has the sign of the coefficient of the lagged first variable on the regression where the second is the dependent one; being the system stable, the effect of such shock vanishes.

accrue to the evaluation of changes in military contingents: they do appear effective in counteracting crime under different econometric methodologies. And if in the cross-section sample we may hypothesize that a raise in armed forces may elicit war episodes during which, if internal, crime is under-recorded, thus yielding the same sign of the coefficients, that was not the environment of the working sample period covered in our Portuguese series.

In both tables, HOMIOUH and HOMIH show insignificant coefficients – recall that HOMIOUH represent presumed homicides, but not necessarily so; HOMIH is the sum of HOMLEGH and HOMIOUH, being mainly determined by the latter.

Defendants and convictions show a very interrelated association, and causality between both appears positive and significant.

Table 5.12. *Causality Tests – Portuguese Evidence*

Y X	ARGHAB2		CONDHA2		CRPOLHA		HOMLEGH		HOMIOUH		HOMIH	
	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
ARGHAI												
X → Y			0.172749	0.012275	-0.077344	-1.65471	-0.060354	-0.357999	0.024902	-0.058092	-0.034138	-0.077073
			(.058124)	(.235460)	(.502110)	(.447031)	(.044165)	(.371555)	(.254742)	(.156756)	(.260699)	(.157256)
			[0.006]	[0.959]	[0.881]	[0.008]	[0.184]	[0.346]	[0.923]	[0.714]	[0.897]	[0.629]
Y → X			1.25795	0.229077	0.051987	0.351330	-0.446487	0.024521	-0.034000	-0.015287	-0.046190	-0.00958139
			(.383427)	(.098151)	(.155528)	(.173498)	(.512554)	(.015767)	(.087249)	(.029897)	(.086608)	(.031098)
			[0.003]	[0.028]	[0.746]	[0.083]	[0.392]	[0.134]	[0.700]	[0.614]	[0.599]	[0.761]
CONDHA												
X → Y	1.25795	0.229077			3.14911	-0.868994	-0.060524	-0.181077	-0.237743	-0.114708	-0.294631	-0.124777
	(.383427)	(.098151)			(1.58032)	(1.15872)	(.097799)	(.231705)	(.546456)	(.098874)	(.558202)	(.098788)
	[0.003]	[0.028]			[0.077]	[0.478]	[0.542]	[0.443]	[0.667]	[0.258]	[0.602]	[0.220]
Y → X	0.172749	0.012275			-0.070821	0.987345	-0.149576	0.029914	0.011875	0.092671	0.00756128	0.105167
	(.058124)	(.235460)			(.065819)	(.431802)	(.162672)	(.022748)	(.027763)	(.040142)	(.027692)	(.040525)
	[0.006]	[0.959]			[0.310]	[0.056]	[0.367]	[0.202]	[0.673]	[0.031]	[0.787]	[0.017]
RECHAB2												
X → Y	4.73774	-0.090400	0.077240	-0.158408	-8.96410	-0.677437	-0.412817	-0.483481	2.09395	0.325241	1.70573	0.309884
	(1.28569)	(.085481)	(0.467564)	(0.097008)	(3.40989)	(.124977)	(.392702)	(.455533)	(2.12742)	(.171847)	(2.21134)	(0.174120)
	[0.001]	[0.302]	[0.870]	[0.117]	[0.027]	[0.001]	[0.304]	[0.301]	[0.335]	[0.072]	[0.448]	[0.090]
Y → X	-0.00827542	0.165814	0.042791	0.085500	0.025927	0.285429	-0.038418	0.031525	-0.017483	-0.150692	-0.018630	-0.149982
	(.016944)	(.113659)	(.032935)	(.055830)	(.014519)	(.101515)	(.045286)	(.025045)	(.00661088)	(.026977)	(.00650733)	(.029314)
	[0.630]	[0.159]	[0.206]	[0.141]	[0.108]	[0.026]	[0.405]	[0.222]	[0.014]	[0.000]	[0.009]	[0.000]
RECCHA2												
X → Y	3.95025	-0.113001	-0.070041	-0.201686	-9.33992	-0.728286	-0.490702	-0.887938	1.97395	0.428635	1.47472	0.395249
	(1.34551)	(.081868)	(0.460028)	(0.096833)	(3.35177)	(.13554)	(.393834)	(.511803)	(2.20664)	(0.192575)	(2.28774)	(0.197737)
	[0.007]	[0.182]	[0.880]	[0.050]	[0.021]	[0.001]	[0.225]	[0.097]	[0.380]	[0.037]	[0.525]	[0.059]
Y → X	-0.00787278	0.111988	0.033957	0.065699	0.024885	0.253625	-0.027203	0.043710	-0.018260	-0.150108	-0.019032	-0.147719
	(.016281)	(.099437)	(.032216)	(.051597)	(.014051)	(.093255)	(.044549)	(.025018)	(.00650531)	(.028071)	(.0064156)	(.030691)
	[0.633]	[0.273]	[0.302]	[0.217]	[0.110]	[0.030]	[0.547]	[0.095]	[0.010]	[0.000]	[0.007]	[0.000]
MILCAR												
X → Y	0.066685	-0.042534	-0.121213	-0.207547	-2.41561	-0.817441	-0.046253	-0.375930	-1.85793	-0.118668	-1.89738	-0.179590
	(.535300)	(.073713)	(0.172462)	(0.087749)	(1.29889)	(.145666)	(.126274)	(.248513)	(1.02496)	(0.265329)	(1.03042)	(0.247469)
	[0.902]	[0.571]	[0.491]	[0.030]	[0.093]	[0.001]	[0.718]	[0.147]	[0.084]	[0.660]	[0.080]	[0.477]
Y → X	0.092170	0.485283	0.309332	0.302947	0.177663	1.26000	0.297108	0.137355	-0.061097	-0.218193	-0.054443	-0.157114
	(.059986)	(.267903)	(.113506)	(.121494)	(.036425)	(.162551)	(.223060)	(.052279)	(.028822)	(.123438)	(.029109)	(.125910)
	[0.141]	[0.088]	[0.013]	[0.023]	[0.001]	[0.000]	[0.197]	[0.017]	[0.046]	[0.093]	[0.075]	[0.227]

SMO												
X → Y	0.041227	0.024592	0.026603	0.098454	0.258682	0.516843	0.033283	0.454654	0.095094	0.037040	0.129238	0.077808
	(.054145)	(.039571)	(0.016912)	(0.054861)	(.851384)	(.553917)	(.012410)	(.199606)	(.109184)	(.147333)	(0.107746)	(0.141805)
	[0.456]	[0.543]	[0.132]	[0.091]	[0.767]	[0.378]	[0.014]	[0.034]	[0.394]	[0.804]	[0.244]	[0.590]
Y → X	-0.437375	-0.643921	-0.858343	-0.340081	0.036574	0.165038	-1.33022	-0.120670	0.011187	0.094881	-0.00817565	0.076063
	(.175414)	(.151320)	(.378310)	(.081671)	(.063465)	(.094188)	(.694245)	(0.069719)	(0.091349)	(0.103523)	(.089971)	(.105665)
	[0.022]	[0.001]	[0.035]	[0.001]	[0.577]	[0.118]	[0.069]	[0.100]	[0.904]	[0.371]	[0.928]	[0.480]
FA												
X → Y	0.041538	0.013337	0.024961	0.051998	-0.430988	-0.136459	0.031081	0.239186	0.071401	0.0068657	0.103205	0.026480
	(.053769)	(.029851)	(0.016848)	(0.042678)	(.766975)	(.362218)	(.012272)	(.155000)	(.105957)	(.100840)	(0.105080)	(0.097513)
	[0.449]	[0.661]	[0.155]	[0.240]	[0.587]	[0.716]	[0.019]	[0.139]	[0.508]	[0.946]	[0.337]	[0.789]
Y → X	-0.272878	-0.287779	-0.406430	-0.139306	0.176136	0.728454	-1.04106	-0.067056	-0.075571	-0.122953	-0.088057	-0.131649
	(.201996)	(.290310)	(.434747)	(.154336)	(.088759)	(.278970)	(.757389)	(.100688)	(0.093450)	(0.131461)	(.091577)	(.132767)
	[0.193]	[0.335]	[0.362]	[0.379]	[0.075]	[0.031]	[0.184]	[0.513]	[0.428]	[0.361]	[0.347]	[0.334]

Table 5.13. *Causality Tests – Portuguese Evidence*

Y X	DARGHAB2		DCONDHA2		DCRPOLHA		DHOMLEGH		DHOMIOUH		DHOMIH	
	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH	PLAIN	SMOOTH
DARGHA												
X → Y			0.162741	0.447242	0.112437	-0.767260	-0.012429	-1.19602	0.311781	0.163885	0.305873	0.060813
			(.053032)	(.218134)	(.382914)	(.429476)	(.071338)	(.849819)	(0.363615)	(.354795)	(.377399)	(.359366)
			[0.005]	[0.051]	[0.776]	[0.117]	[0.863]	[0.173]	[0.400]	[0.649]	[0.426]	[0.867]
Y → X			0.837978	0.463487	0.204038	0.502607	0.458015	0.032004	-0.069618	-0.098975	-0.053607	-0.079640
			(.550833)	(.138997)	(.267680)	(.215294)	(.648403)	(.028896)	(.111971)	(.070851)	(.109865)	(.071158)
			[0.139]	[0.003]	[0.465]	[0.052]	[0.487]	[0.280]	[0.540]	[0.176]	[0.630]	[0.275]
DCONDHA												
X → Y	0.837978	0.463487			1.82430	0.312478	0.123336	-0.713829	0.430362	-0.172910	0.561355	-0.241002
	(.550833)	(.138997)			(1.43717)	(0.677414)	(.215394)	(.636167)	(1.15607)	(.273886)	(1.19519)	(.270842)
	[0.139]	[0.003]			[0.236]	[0.659]	[0.572]	[0.274]	[0.713]	[0.534]	[0.643]	[0.383]
Y → X	0.162741	0.447242			-0.070125	0.725865	-0.086561	0.040214	-0.033965	0.125881	-0.035083	0.137171
	(.053032)	(.218134)			(.097469)	(.364521)	(.199295)	(.029269)	(.034957)	(.075197)	(.034095)	(.072459)
	[0.005]	[0.051]			[0.490]	[0.087]	[0.668]	[0.183]	[0.341]	[0.108]	[0.314]	[0.072]
DDRECHA												
X → Y	6.01783	0.600013	-0.617887	-0.091507	4.55266	0.584667	1.33018	0.549102	0.242960	-0.976677	1.57389	-0.796348
	(2.28311)	(.227411)	(0.718487)	(0.287810)	(4.30120)	(.543680)	(.677834)	(1.78685)	(4.07711)	(.866569)	(4.19306)	(0.798791)
	[0.014]	[0.016]	[0.398]	[0.754]	[0.317]	[0.318]	[0.061]	[0.762]	[0.953]	[0.273]	[0.711]	[0.331]
Y → X	-0.043569	-0.081481	-0.023058	-0.039875	-0.00367448	0.140547	-0.063277	0.020556	-0.017270	0.00503464	-0.018446	0.013211
	(.021345)	(.139821)	(.064548)	(.101754)	(.028089)	(.220987)	(.058358)	(.025445)	(.010546)	(.078960)	(.010150)	(.070963)
	[0.052]	[0.567]	[0.724]	[0.699]	[0.899]	[0.545]	[0.289]	[0.429]	[0.115]	[0.950]	[0.082]	[0.854]
DDRECCH												
X → Y	5.79564	0.548642	-0.727619	-0.081206	3.94478	0.595703	1.71120	1.42595	0.917425	-1.08381	2.61175	-0.838730
	(2.23845)	(.231908)	(0.763558)	(0.282946)	(4.48783)	(.586716)	(.658155)	(1.79731)	(4.13027)	(0.786934)	(4.21254)	(0.741877)
	[0.016]	[0.028]	[0.350]	[0.777]	[0.402]	[0.344]	[0.016]	[0.437]	[0.826]	[0.184]	[0.541]	[0.272]
Y → X	-0.035270	-0.092951	-0.035230	-0.060589	-0.00181909	0.125057	-0.078231	0.021470	-0.017113	0.045486	-0.018596	0.045613
	(.020348)	(.133677)	(.065572)	(.095964)	(.028099)	(.201411)	(.056066)	(.024988)	(.010196)	(.069515)	(.00973419)	(.063307)
	[0.096]	[0.495]	[0.596]	[0.535]	[0.950]	[0.554]	[0.176]	[0.400]	[0.106]	[0.520]	[0.068]	[0.480]
DDMILCA												
X → Y	-1.11887	-0.157198	0.121227	0.168607	-0.022940	0.097995	-0.051401	-0.612389	-0.750393	-0.472154	-0.835237	-0.515493
	(.598441)	(.142586)	(0.184965)	(0.149606)	(0.998177)	(.240784)	(.131147)	(.574406)	(1.23746)	(0.319704)	(1.22500)	(0.300792)
	[0.078]	[0.287]	[0.520]	[0.276]	[0.982]	[0.695]	[0.699]	[0.300]	[0.551]	[0.157]	[0.503]	[0.104]
Y → X	0.055903	0.025734	0.409661	0.092173	0.113644	0.283352	0.064089	0.120979	-0.043387	-0.125709	-0.042585	-0.103521
	(.088436)	(.416249)	(.235291)	(.268048)	(.081266)	(.425888)	(.328306)	(.074942)	(.042218)	(.125660)	(0.042422)	(.130548)
	[0.535]	[0.951]	[0.099]	[0.735]	[0.192]	[0.525]	[0.847]	[0.124]	[0.316]	[0.330]	[0.327]]	[0.438]

DDSM(												
X → Y	-0.127897	-0.07780	-0.064100	-0.136872	-1.20580	-0.554746	-0.037882	-0.342588	-0.188323	-0.034766	-0.225821	-0.059435
	(.114940)	(.058160)	(0.035062)	(0.057608)	(.557559)	(.394503)	(.026520)	(.251120)	(.237748)	(.152511)	(0.234160)	(0.147131)
	[0.280]	[0.200]	[0.084]	[0.030]	[0.056]	[0.197]	[0.169]	[0.189]	[0.438]	[0.822]	[0.346]	[0.691]
Y → X	-0.223138	0.20800	1.42623	0.325160	0.137495	0.158772	-0.057599	0.127279	-0.062916	-0.075081	-0.064199	-0.049632
	(.382910)	(.301460)	(1.18763)	(.188784)	(.147848)	(.225514)	(1.47402)	(0.055204)	(0.177099)	(0.100939)	(.177699)	(.105805)
	[0.567]	[0.500]	[0.245]	[0.104]	[0.374]	[0.501]	[0.969]	[0.033]	[0.726]	[0.467]	[0.722]	[0.645]
DDFA												
X → Y	-0.144419	-0.053820	-0.048462	-0.078999	-0.569133	-0.109669	-0.035051	-0.264128	-0.172711	-0.031551	-0.207589	-0.051763
	(.104632)	(.039436)	(0.033576)	(0.041110)	(.425565)	(.201505)	(.024596)	(.167420)	(.220210)	(.103880)	(0.216740)	(0.099793)
	[0.184]	[0.191]	[0.166]	[0.073]	[0.211]	[0.601]	[0.170]	[0.132]	[0.442]	[0.765]	[0.350]	[0.610]
Y → X	-0.352468	0.140201	1.70650	0.427340	0.260099	0.310063	-0.00207031	0.262492	-0.146807	-0.185390	-0.147662	-0.134357
	(.437369)	(.556683)	(1.36834)	(.359931)	(.184387)	(.484313)	(1.70086)	(.093895)	(0.202057)	(0.179448)	(.202609)	(.188745)
	[0.431]	[0.804]	[0.228]	[0.252]	[0.189]	[0.540]	[0.999]	[0.012]	[0.476]	[0.315]	[0.475]	[0.486]

6. Summary and Conclusions

1. This research explored empirical patterns in crime and other social disruption related variables. It considered:

- principal component aggregation of the effects of several variables.
- linear regressions of each series and derived components on economic indicators.
- inspection of potential deterrent effects of several policy driven indicators on crime related series

2. Applications and combinations of several econometric techniques were proposed and/or tested. Theoretical interpretations were forwarded, namely, of application of principal components to correlation matrices.

Time series filtering by the application of PC to a series and some of adjacent leads and lags was essayed. PC time series decomposition of sets of such variables originating trend and cyclical main principal components.

Digressions in missing data issues and unbalanced samples treatment were pursued.

Finally, estimation formats in cross-product of observations were derived and some justification for its use in some instances presented.

3. Overall, we did not find many unexpected conclusions as far as common wisdom would predict – others confirmed in previous literature. Inference was not always consistent. However, the gathering of such a variegated set of variables provided different insights and conclusions than usual, even if referred with caution, possibly illustratively, given the small number of observations generally involved. Some of the exploited links are new to the literature – even if, we believe, not in practice - and point to the possible convenience of juxtaposing law enforcement and defense policy.

Appendix A.

Social Unrest Indicators: Descriptive Statistics and Simple Cross-Correlation Matrices

1. Table A.1 contains the mean and standard deviation of each variable, the coefficient of the logarithm of per capita GDP in US dollars (PPP) of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GDP in US dollars (PPP), the coefficient of the logarithm of per capita GNP in US dollars of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GNP in US dollars.

In Table A.2 we include the cross-correlations between country indicators.

Table A.1. *Descriptive Statistics, Endogenous Variables – International Evidence*

Variable	N. Obs	Mean	St. Dev.	Elast. PIBpc98	Corr PIBpc98	N. Obs	Elast. PNBpc98	Corr PNBpc98	N. Obs
MFERAR	48	308.125	258.9719	0.856471	0.681076	48	0.508805	0.545516	48
DELDRO	59	76.77797	104.192	0.77764	0.489208	59	0.554901	0.603902	59
VIOLA	64	38.31094	75.19113	0.181091	0.102164	64	0.102479	0.041879	64
HOMIC	60	12.1	15.88887	-0.14465	-0.06519	60	-0.11822	-0.10134	60
SUICIH	82	19.10732	16.62764	0.277028	0.063986	82	0.16014	0.065576	81
SUICM	82	5.958537	4.52035	0.282915	0.149567	82	0.17148	0.222128	81
DIVOR	47	35.7234	20.89383	0.285944	0.226555	47	0.153258	0.195651	47
DESASP	170	294.0698	773.4101	-0.60873	-0.21491	170	-0.40906	-0.17229	165
DESAIP	170	207.1664	709.2747	-0.61957	-0.17391	170	-0.41918	-0.14043	165
PRISION	76	233.425	240.897	0.149867	0.016684	76	0.093391	-0.01091	76
PPRESAS	58	144.3138	124.3499	-0.10442	-0.05657	58	-0.06619	-0.0598	58
CRIMREG	66	2656.985	2864.912	0.810839	0.550509	66	0.512571	0.562973	66
GREVET	82	0.051505	0.111767	0.025303	-0.05621	82	0.01749	-0.05352	81
TRAGRET	76	10.35081	15.30012	0.269828	0.168762	76	0.185513	0.114047	75
DIAGRET	74	63.92992	130.9795	-0.32769	-0.11251	74	-0.24624	-0.13813	73
TXDIGRE	20	37.1925	53.48019	-1.72887	-0.22358	20	-0.84041	-0.26216	20
DPMIPNB	131	2.665649	2.570058	0.002951	0.006196	131	0.008346	-0.00559	129
FA98P	154	5.815072	5.464227	0.370779	0.223851	154	0.248964	0.188925	149

Table A.2. *Descriptive Statistics – International Evidence*

Corr (nobs)	MFERAR	DELDRO	VIOLA	HOMIC	SUICIH	SUICM	DIVOR	DESASP	DESAIP	PRISION
DELDRO	0.31976 (31)									
VIOLA	0.15051 (34)	0.13885 (58)								
HOMIC	-0.38030 (31)	0.22774 (54)	0.30501 (59)							
SUICIH	-0.11734 (44)	-0.14802 (42)	0.13809 (46)	-0.15133 (43)						
SUICM	-0.019674 (44)	0.029386 (42)	0.034710 (46)	-0.30033 (43)	0.80952 (82)					
DIVOR	0.074672 (46)	0.12378 (30)	0.53960 (33)	0.60745 (30)	0.68836 (43)	0.63362 (43)				
DESASP	-0.15415 (47)	-0.10406 (57)	0.043024 (62)	0.048077 (58)	-0.19187 (80)	-0.21758 (80)	0.16775 (46)			
DESAIP	-0.16794 (47)	-0.098811 (57)	0.051791 (62)	0.037390 (58)	-0.10673 (80)	-0.17017 (80)	0.27506 (46)	0.99110 (170)		
PRISION	-0.078552 (38)	-0.011007 (47)	0.039881 (52)	0.044562 (48)	0.39298 (49)	0.23110 (49)	0.40214 (36)	-0.048910 (73)	-0.043943 (73)	
PPRESAS	0.061837 (31)	-0.17860 (43)	0.16845 (46)	0.060312 (44)	0.53590 (43)	0.26869 (43)	0.53501 (30)	-0.15925 (56)	-0.14701 (56)	0.60203 (54)
CRIMREG	0.33532 (35)	0.61445 (58)	0.29786 (62)	0.04000 (58)	-0.0058497 (47)	0.12767 (47)	0.29399 (34)	-0.088655 (64)	-0.065400 (64)	0.15197 (51)
GREVET	-0.15130 (31)	0.16071 (39)	0.045686 (43)	0.21604 (39)	0.098914 (53)	0.13143 (53)	0.026659 (29)	-0.095007 (82)	-0.098350 (82)	0.32090 (52)
TRAGRET	0.17557 (32)	0.11366 (38)	0.22611 (42)	0.033824 (38)	-0.15167 (50)	-0.20885 (50)	-0.27148 (30)	-0.14782 (76)	-0.14296 (76)	0.033468 (51)
DIAGRET	0.24207 (32)	-0.083371 (38)	0.17700 (42)	-0.023350 (37)	-0.096501 (52)	-0.017695 (52)	-0.10428 (30)	0.059296 (74)	0.10881 (74)	0.22885 (51)
TXDIGRE	-0.23928 (14)	-0.22308 (12)	-0.020506 (15)	0.16274 (13)	-0.032183 (18)	-0.31087 (18)	-0.29029 (14)	0.51865 (20)	0.39080 (20)	0.22245 (17)
FA98P	0.055723 (47)	-0.097307 (54)	-0.24532 (59)	-0.23431 (54)	-0.10617 (76)	-0.096114 (76)	-0.37006 (46)	-0.17149 (151)	-0.14224 (151)	0.056272 (67)
DPMIPNB	0.28151 (47)	0.00040462 (51)	-0.15095 (57)	0.14115 (52)	-0.14776 (69)	-0.088223 (69)	-0.27236 (46)	-0.017954 (129)	-0.0055777 (129)	-0.017882 (67)
Mean (s.d;obs)	308.125 (258.9719;48)	76.77797 (104.192;59)	38.31094 (75.19113;64)	12.100 (15.88887;60)	19.10732 (16.62764;82)	5.95854 (4.52035;82)	35.72340 (20.89383;47)	294.06976 (773.410;170)	207.1664 (709.275;170)	233.4250 (240.897;76)

Corr (nobs)	PPRESAS	CRIMREG	GREVET	TRAGRET	DIAGRET	TXDIGRE	FA98P	DPMIPNB
CRIMREG	-0.078293 (47)							
GREVET	0.085295 (39)	0.23005 (42)						
TRAGRET	-0.086706 (38)	0.11705 (41)	0.39263 (75)					
DIAGRET	0.012516 (38)	-0.020275 (40)	0.23212 (73)	0.55786 (72)				
TXDIGRE	-0.056842 (13)	-0.30567 (13)	0.56143 (19)	0.66589 (20)	0.93763 (20)			
FA98P	0.063114 (52)	-0.16689 (60)	-0.075781 (73)	0.031175 (68)	-0.059678 (67)	0.47800 (17)		
DPMIPNB	0.014580 (53)	-0.18768 (56)	-0.10010 (67)	0.083464 (63)	0.00025854 (63)	0.41296 (19)	0.56012 (127)	
Mean (s.d;obs)	144.31379 (124.349;58)	2656.98 (2864.9;66)	0.051505 (0.11177;82)	10.35081 (15.3001;76)	63.9299 (130.9795;74)	37.19250 (53.4801;20)	5.81507 (5.46423;154)	2.66565 (2.57006;131)

2. In Table A.3 and A.4 we summarize identical information for Portuguese time series used.

We provide in Table A.3, the mean and standard deviation of each variable, its instantaneous growth rate (derived from the regression of the logarithm of the series in a trend), the correlation with the trend (ANO), the coefficient of the logarithm of per capita GDP of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GDP.

Table A.3. *Descriptive Statistics, Endogenous Variables – Portuguese Evidence*

Variable	N. Obs	Mean	St. Dev.	Inst. gr	Corr ANO	N. Obs	Elast. PIBPPC	Corr PIBPPC	N. Obs
ARGHAB	33	5.351417	2.846509	4.58	0.880759	33	1.360137	0.916552	33
CONDHAB	33	2.19767	0.971475	3.10	0.76654	33	0.928205	0.831323	33
RECHAB	30	0.805037	0.320947	3.97	0.898213	30	1.258631	0.91121	30
RECCHAB	30	0.76692	0.334053	4.55	0.911125	30	1.43572	0.916045	30
CRPOLHA	15	30.78942	5.039043	3.52	0.943344	15	0.886831	0.934542	15
ACRMORH	40	19.01953	5.704358	2.12	0.626629	40	0.651039	0.587597	40
ACRFERH	40	4.327136	1.676201	3.43	0.951208	40	0.950872	0.965772	40
ACRTOTH	38	6.55387	4.388155	5.47	0.906617	38	1.436764	0.948362	38
SUICHAB	34	8.382675	1.245112	-0.71	-0.44719	34	-0.19612	-0.5321	34
ACTJTOH	28	121.7675	24.7852	2.02	0.763239	28	0.637039	0.713055	28
ACTJMOH	26	6.809695	1.826122	1.38	0.413151	26	0.436244	0.374457	26
ACTTOH	18	26.20429	3.107481	-1.03	-0.42087	18	-0.19201	-0.30011	18
ACTMOH	18	3.426834	1.32602	-4.96	-0.63332	18	-1.58018	-0.73108	18
HOMLEGH	31	1.382033	0.303726	1.04	0.320707	31	0.277483	0.219758	31
HOMIOUH	31	8.712471	3.25267	3.69	0.867461	31	1.1367	0.841167	31
HOMIH	31	10.0945	3.335331	3.32	0.875167	31	1.015539	0.840332	31
MOCEXTH	31	65.60282	7.36113	-0.46	-0.34718	31	-0.16073	-0.46535	31
TXDIV	40	0.62475	0.49442	8.88	0.955173	40	2.26728	0.940027	40
TGRPT	13	51.69231	36.41059	-14.32	-0.71639	13	-3.87403	-0.66718	13
HGRPT	13	65	43.27432	-11.01	-0.66457	13	-3.0113	-0.62033	13
MILCAR	26	2.393797	0.852343	4.30	0.923542	26	1.309664	0.929617	26
SMO	26	5.73709	4.27428	-7.54	-0.74041	26	-2.20538	-0.65161	26
FA	26	8.153933	3.802923	-3.24	-0.63232	26	-0.90135	-0.53044	26

Table A.4. *Descriptive Statistics – Portuguese Evidence*

Corr (nobs)	CONDHAB	CONDHA1	CONDHA2	ARGHAB	ARGHAB1	ARGHAB2	RECHAB	RECHAB1	RECHAB2	RECCHAB	RECCHA1	RECCHA2	CRPOLHA
CONDHA1	0.96654												
	(32)												
CONDHA2	0.91557	0.96649											
	(31)	(32)											
ARGHAB	0.94481	0.96162	0.94799										
	(33)	(32)	(31)										
ARGHAB1	0.92551	0.94456	0.96161	0.96260									
	(32)	(33)	(32)	(32)									
ARGHAB2	0.89138	0.92525	0.94440	0.94037	0.96261								
	(31)	(32)	(33)	(31)	(32)								
RECHAB	0.93422	0.91996	0.90311	0.96130	0.96611	0.93260							
	(30)	(29)	(28)	(30)	(29)	(28)							
RECHAB1	0.92439	0.93405	0.91981	0.94327	0.96116	0.96597	0.97377						
	(30)	(30)	(29)	(30)	(30)	(29)	(29)						
RECHAB2	0.89107	0.92422	0.93402	0.94593	0.94317	0.96108	0.92847	0.97366					
	(30)	(30)	(30)	(30)	(30)	(30)	(28)	(29)					
RECCHAB	0.92897	0.91400	0.89536	0.96046	0.96379	0.93130	0.99709	0.97493	0.93414				
	(30)	(29)	(28)	(30)	(29)	(28)	(30)	(29)	(28)				
RECCHA1	0.91469	0.92879	0.91397	0.94165	0.96033	0.96380	0.96973	0.99713	0.97487	0.97514			
	(30)	(30)	(29)	(30)	(30)	(29)	(29)	(30)	(29)	(29)			
RECCHA2	0.87292	0.91445	0.92874	0.93850	0.94150	0.96026	0.92204	0.96961	0.99715	0.92941	0.97504		
	(30)	(30)	(30)	(30)	(30)	(30)	(28)	(29)	(30)	(28)	(29)		
CRPOLHA	0.94885	0.96485	0.95981	0.89512	0.91021	0.92182	0.78112	0.86082	0.93745	0.77809	0.85657	0.93491	
	(15)	(15)	(14)	(15)	(15)	(14)	(15)	(15)	(14)	(15)	(15)	(14)	
ACRMORH	-0.27326	-0.093953	0.038803	-0.15480	0.011984	0.14266	-0.46763	-0.29095	-0.10913	-0.48216	-0.28245	-0.085200	-0.14113
	(33)	(33)	(33)	(33)	(33)	(33)	(30)	(30)	(30)	(30)	(30)	(30)	(15)
ACRFERH	0.72890	0.77277	0.78680	0.81636	0.83536	0.84189	0.78344	0.78940	0.79455	0.78622	0.79391	0.79926	0.74848
	(33)	(33)	(33)	(33)	(33)	(33)	(30)	(30)	(30)	(30)	(30)	(30)	(15)
ACRTOTH	0.88283	0.90407	0.92143	0.94357	0.95030	0.95373	0.90584	0.91415	0.92131	0.89801	0.90740	0.91547	0.93894
	(31)	(32)	(33)	(31)	(32)	(33)	(28)	(29)	(30)	(28)	(29)	(30)	(14)
SUICHAB	-0.58684	-0.45458	-0.33357	-0.58452	-0.47455	-0.35251	-0.56827	-0.43392	-0.32088	-0.54790	-0.41931	-0.31011	-0.69101
	(31)	(30)	(30)	(31)	(30)	(30)	(30)	(30)	(29)	(30)	(30)	(29)	(15)
ACTJTOH	0.57178	0.64352	0.68408	0.63630	0.63743	0.68614	0.58396	0.63216	0.72308	0.61868	0.65911	0.73297	0.35959
	(28)	(27)	(26)	(28)	(27)	(26)	(28)	(27)	(26)	(28)	(27)	(26)	(15)
ACTJTH1	0.48928	0.56997	0.64272	0.58432	0.63457	0.63634	0.55133	0.58186	0.63033	0.58699	0.61634	0.65725	0.23754
	(28)	(28)	(27)	(28)	(28)	(27)	(28)	(28)	(27)	(28)	(28)	(27)	(15)
ACTJMOH	0.24048	0.31862	0.34727	0.30690	0.33579	0.35427	0.25595	0.30359	0.34135	0.29360	0.33168	0.34390	0.065726
	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(14)
ACTJMH1	0.11981	0.23796	0.31700	0.24702	0.30426	0.33407	0.20717	0.25318	0.30101	0.24373	0.29041	0.32894	-0.018187
	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(26)	(13)
ACTTOH	-0.55514	-0.46589	-0.39659	-0.53872	-0.52466	-0.47114	-0.63897	-0.66316	-0.61462	-0.62988	-0.65585	-0.61340	-0.44820
	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(14)
ACTMOH	-0.68195	-0.68453	-0.71410	-0.61706	-0.70446	-0.71969	-0.54006	-0.57041	-0.55761	-0.53744	-0.56346	-0.54894	-0.73752

	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(14)
HOMLEGH	0.038433	0.20654	0.29736	0.062595	0.20941	0.32921	-0.011604	0.17235	0.26598	-0.010489	0.19189	0.30412	-0.016262
	(31)	(30)	(29)	(31)	(30)	(29)	(30)	(30)	(29)	(30)	(30)	(29)	(15)
HOMIOUH	0.69756	0.71418	0.75121	0.77536	0.78426	0.79121	0.81082	0.78202	0.75200	0.81609	0.79051	0.76330	0.12024
	(31)	(30)	(29)	(31)	(30)	(29)	(30)	(30)	(29)	(30)	(30)	(29)	(15)
HOMIH	0.68538	0.71239	0.75556	0.76359	0.78067	0.79732	0.79537	0.77503	0.75334	0.80064	0.78510	0.76791	0.12494
	(31)	(30)	(29)	(31)	(30)	(29)	(30)	(30)	(29)	(30)	(30)	(29)	(15)
MOCEXTH	-0.70609	-0.55941	-0.41867	-0.62245	-0.49076	-0.37034	-0.64292	-0.51176	-0.41136	-0.63423	-0.48598	-0.37190	-0.85865
	(31)	(30)	(29)	(31)	(30)	(29)	(30)	(30)	(29)	(30)	(30)	(29)	(15)
TXDIV	0.78937	0.78666	0.77419	0.88602	0.87127	0.86256	0.85660	0.85918	0.87336	0.87565	0.88195	0.89332	0.92063
	(33)	(33)	(33)	(33)	(33)	(33)	(30)	(30)	(30)	(30)	(30)	(30)	(15)
TGRPT	-0.71686	-0.68302	-0.69882	-0.72994	-0.74157	-0.56474	-0.73240	-0.67849	-0.68027	-0.73145	-0.67403	-0.67929	-0.68802
	(13)	(12)	(11)	(13)	(12)	(11)	(13)	(12)	(11)	(13)	(12)	(11)	(12)
HGRPT	-0.67662	-0.63346	-0.72351	-0.64636	-0.72006	-0.56227	-0.65587	-0.62677	-0.69530	-0.65395	-0.61980	-0.69193	-0.70829
	(13)	(12)	(11)	(13)	(12)	(11)	(13)	(12)	(11)	(13)	(12)	(11)	(12)
MILCAR	0.94292	0.94163	0.91389	0.93538	0.93946	0.92957	0.91301	0.93361	0.93645	0.90999	0.92776	0.93301	0.95440
	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(15)
SMO	-0.65744	-0.64107	-0.57731	-0.69025	-0.67817	-0.60768	-0.68417	-0.66289	-0.65511	-0.71789	-0.71361	-0.67908	-0.89650
	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(15)
FA	-0.52791	-0.50862	-0.44401	-0.56742	-0.55150	-0.47480	-0.56647	-0.53618	-0.52632	-0.60543	-0.59450	-0.55380	-0.67436
	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(26)	(25)	(24)	(15)
ANO	0.77223	0.77115	0.77035	0.88254	0.88211	0.88179	0.90132	0.90062	0.89997	0.91406	0.91344	0.91286	0.94349
	(33)	(33)	(33)	(33)	(33)	(33)	(30)	(30)	(30)	(30)	(30)	(11)	(15)
Mean	2.19767			5.35142			0.80504			0.76692			30.78942
(s.d;obs)	(0.97147;33)			(2.84651;33)			(0.32095;30)			(0.33405;30)			(5.03904;15)
Mean (W.)	2.21938			5.44025			0.81389			0.77677			30.77413
(s.d;obs)	(0.98174;33)			(2.86344;33)			(0.32165;30)			(0.33407;30)			(5.04343;15)

Table A.4 (Cont.). *Descriptive Statistics – Portuguese Evidence*

	ACRMORH	ACRFERH	ACRTOTH	SUICHAB	ACTJTOH	ACTJTH1	ACTJMOH	ACTJMH1	ACTTOH	ACTMOH
ACRFERH	0.63422									
	(39)									
ACRTOTH	0.45341	0.92647								
	(37)	(37)								
SUICHAB	0.051070	-0.48088	-0.48147							
	(33)	(33)	(31)							
ACTJTOH	-0.37034	0.71041	0.62535	-0.12712						
	(28)	(28)	(26)	(28)						
ACTJTH1	-0.10254	0.74767	0.59788	-0.20151	0.84755					
	(28)	(28)	(27)	(28)	(27)					
ACTJMOH	-0.32327	0.31946	0.24036	0.17994	0.72969	0.62857				
	(26)	(26)	(26)	(26)	(26)	(26)				
ACTJMH1	0.031821	0.37874	0.25505	-0.032205	0.54376	0.72826	0.40284			
	(26)	(26)	(26)	(26)	(25)	(26)	(25)			
ACTTOH	0.73960	0.041815	-0.39358	0.18368	0.19882	0.58050	0.20181	0.50978		
	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(17)		
ACTMOH	0.082469	-0.62028	-0.67981	0.23366	-0.48416	-0.43081	-0.50400	-0.25849	0.17878	
	(18)	(18)	(18)	(18)	(18)	(18)	(18)	(17)	(18)	
HOMLEGH	0.52134	0.25147	0.25188	0.37250	0.11753	0.20092	0.17046	0.31306	0.022770	-0.43128
	(31)	(31)	(29)	(31)	(28)	(28)	(26)	(26)	(18)	(18)
HOMIOUH	0.014805	0.82967	0.77641	-0.35740	0.57205	0.64309	0.13921	0.26932	-0.025528	-0.12134
	(31)	(31)	(29)	(31)	(28)	(28)	(26)	(26)	(18)	(18)
HOMIH	0.060958	0.83352	0.77562	-0.31619	0.57723	0.64949	0.15208	0.29144	-0.023350	-0.15061
	(31)	(31)	(29)	(31)	(28)	(28)	(26)	(26)	(18)	(18)
MOCEXTH	0.63395	-0.35054	-0.42478	0.71014	-0.31546	-0.12978	-0.038499	0.13116	0.50514	0.44839
	(31)	(31)	(29)	(31)	(28)	(28)	(26)	(26)	(18)	(18)
TXDIV	0.42746	0.87646	0.89125	-0.47493	0.72588	0.73053	0.40831	0.39351	-0.50778	-0.60110
	(39)	(39)	(37)	(33)	(28)	(28)	(26)	(26)	(18)	(18)
TGRPT	0.68518	-0.17685	-0.63871	0.39449	0.083966	0.30056	0.10051	0.39657	0.74692	0.21825
	(13)	(13)	(11)	(13)	(13)	(12)	(11)	(10)	(11)	(11)
HGRPT	0.62817	-0.17576	-0.63582	0.29557	0.0091441	0.23103	0.035754	0.33055	0.72606	0.28545
	(13)	(13)	(11)	(13)	(13)	(12)	(11)	(10)	(11)	(11)
MILCAR	-0.53040	0.80269	0.93317	-0.56909	0.62282	0.51556	0.24972	0.10362	-0.61750	-0.65561
	(26)	(26)	(24)	(26)	(26)	(25)	(24)	(23)	(18)	(18)
SMO	0.40313	-0.58622	-0.57323	0.31404	-0.63360	-0.62563	-0.38356	-0.38615	0.51735	0.66473
	(26)	(26)	(24)	(26)	(26)	(25)	(24)	(23)	(18)	(18)
FA	0.33550	-0.48081	-0.43493	0.22236	-0.57727	-0.58961	-0.37503	-0.40459	0.35331	0.55845
	(26)	(26)	(24)	(26)	(26)	(25)	(24)	(23)	(18)	(18)
ANO	0.58172	0.94582	0.90635	-0.46526	0.75423	0.75301	0.39625	0.39376	-0.42098	-0.63366
	(39)	(39)	(37)	(33)	(28)	(28)	(26)	(26)	(18)	(18)
Mean	19.01953	4.32714	6.55387	8.38268	121.76750		6.80969		26.20429	3.42683
(s.d;obs)	(5.70436;40)	(1.67620;40)	(4.38815;38)	(1.24511;34)	(24.7852;28)		(1.82612;26)		(3.10748;18)	(1.32602;18)
Mean (W.)	19.45855	4.46181	6.83306	8.36025	122.50773		6.84708		26.19979	3.43058
(s.d;obs)	(5.35469;39)	(1.63899;39)	(4.42655;37)	(1.28387;33)	(24.48294;28)		(1.82716;26)		(3.10764;18)	(1.32707;18)

Table A.4 (Cont.) *Descriptive Statistics – Portuguese Evidence*

	HOMLEGH	HOMIOUH	HOMIH	MOCEXTH	TXDIV	TGRPT	HGRPT	MILCAR	SMO	FA
HOMIOUH	0.20824									
	(31)									
HOMIH	0.29275	0.99619								
	(31)	(31)								
MOCEXTH	0.46865	-0.23047	-0.18353							
	(31)	(31)	(31)							
TXDIV	0.30614	0.79093	0.80053	-0.38972						
	(31)	(31)	(31)	(31)						
TGRPT	0.36766	-0.085235	-0.052601	0.66376	-0.70130					
	(13)	(13)	(13)	(13)	(13)					
HGRPT	0.21580	0.046652	0.073921	0.60371	-0.62598	0.97151				
	(13)	(13)	(13)	(13)	(13)	(13)				
MILCAR	-0.25487	0.65648	0.64695	-0.73507	0.90081	-0.76049	-0.74603			
	(26)	(26)	(26)	(26)	(26)	(13)	(13)			
SMO	0.10861	-0.53782	-0.53710	0.42839	-0.82314	0.72262	0.67840	-0.64102		
	(26)	(26)	(26)	(26)	(26)	(13)	(13)	(26)		
FA	0.064520	-0.46184	-0.46326	0.31386	-0.72561	0.53855	0.48306	-0.49683	0.98453	
	(26)	(26)	(26)	(26)	(26)	(13)	(13)	(26)	(26)	
ANO	0.29958	0.86357	0.87096	-0.37186	0.95896	-0.71615	-0.66453	0.92245	-0.74349	-0.63181
	(31)	(31)	(31)	(31)	(39)	(13)	(13)	(26)	(26)	(26)
Mean	1.38203	8.71247	10.09450	65.60282	0.62475	51.69231	65	2.39380	5.73709	8.15393
(s.d;obs)	(0.30373;31)	(3.25267;31)	(3.33533;31)	(7.36113;31)	(0.49442;40)	(36.41059;13)	(43.27432;13)	(0.85234;26)	(4.27428;26)	(3.80292;26)
Mean (W.)	1.38928	8.82394	10.21322	65.62209	0.66160	51.67045	64.99930	2.40759	5.62744	8.05735
(s.d;obs)	(0.29644;31)	(3.25020;31)	(3.32460;31)	(7.40328;31)	(0.49192;39)	(36.44002;13)	(43.29558;13)	(0.85012;26)	(4.11100;26)	(3.63885;26)

Appendix B.

Descriptive Statistics on the External Variables: the Macroeconomic Indicators

B.1. International Evidence

Variables used in the cross sample set are listed below:

1. Demographic Variables:
Popul – Population (millions), 1998, PNUD
Popul98 – Population, millions, midyear estimates, 1998, IMF
DENSPO – population density (people per square kilometer), TRINOVA
ESPVN – Life Expectancy at Birth (years), 1995-2000, PNUD
ESPVN98 – Life Expectancy at Birth (years), 1998, PNUD
Popm65 – Population 65 or older (% of total), 1998, PNUD
CoeDep – Dependency Coefficient (%), 1998, PNUD
TxAlA98 – Adult Literacy Rate (%, 15 years and older), PNUD
TxEsc98 – Combined Schooling Rate, primary, secondary and higher education (%), PNUD
IEDUC98 – Education Index, 1998, PNUD

2. Employment and Workweek Hours
TxAcM98 – Female Participation Rate, 15 years and older (%), 1998, PNUD
TxAMH98 – Female Participation Rate, 15 years and older, in % of male rate, 1998, PNUD
TXAH98=100*TXACM98/TXAMH98, Male Participation Rate, 15 years and older (%), 1998, PNUD
TaxDes – Unemployment Rate (% of active population) 1998, PNUD

3. Income or Product; National Expenditures
PIB98 – Gross Domestic Product, millions of national currency, 1998, IMF
PIBpc98 – per capita GDP, 1998 (dollars PPP), PNUD
PNBpc98 –per capita GNP (dólares EUA), 1998, PNUD
PNBpcgr – growth rate of real per capita GNP (US dollars, 1995 constant prices, %), PNUD

5. Inequality
Pob10 – Income or consumption share of poorest 10% (%), PNUD
Pob20 – Income or consumption share of poorest 20% (%), PNUD
Ric20 – Income or consumption share of richest 20% (%), PNUD
Ric10 – Income or consumption share of richest 10% (%), PNUD
IG – Gini Index, consumption or income distribution (in percentage), PNUD

6. Prices

TxInfav – Average Annual Inflation Rate (%), 1990-98, PNUD
TxInf98 – Average Annual Inflation Rate (%), 1998, PNUD

7. Urbanization and Sector Decomposition
PopUrb – Urban Population (% of total), 1998, PNUD
PAgr98 – GDP from Agriculture (% of total), 1998, PNUD
PInd98 – GDP from Industry (% of total), 1998, PNUD
PServ98 – GDP from Services (% of total), 1998, PNUD

8. Public Sector
AflVo – Voting Participation Rate in Last Elections (%), PNUD
GasPu98 – Government Consumption, millions of national currency, 1998, IMF
GASPI98=100*GASPU98/PIB98, IMF
CPPIB98 – Public Consumption (in % of GDP), 1998, PNUD
DPuPI98 – Central Government Expenditures (in % of GDP) 1998, PNUD
SOrPI98 – Global Public Budget Balance (in % of GDP) 1998, PNUD
DPEdPNB – Public Expenditures in Education (in % of GNP) 1995-1997, PNUD
DPSaPNB – Public Expenditures in Health (in % of GNP) 1996-1998, PNUD

9. Capital Markets – Interest Rates
InPIB98 – Gross Domestic Investment (in % of GDP) 1998, PNUD
PoPIB98 – Gross Domestic Savings (in % of GDP) 199, PNUD
DepRa98 – Deposit Rate, Percent Per Annum, 1998, IMF
LenRa98 – Lending Rate, Percent Per Annum, 1998, IMF
DiscR98 – Discount Rate, Percent Per Annum, end of period, 1998, IMF
DepR98 =(100*(100+ DepRa98)/(100+TxInf98))-100, IMF
LenR98 =(100*(100+LenRa98)/(100+TxInf98))-100, IMF
DiR98 =(100*(100+DiscR98)/(100+TxInf98))-100
SPRE98 = LenR98 – DepR98, IMF
CREDIT – Domestic Credit, monetary survey comprising monetary authorities and deposit money banks (millions of national currency; item 32), 1998, IMF
CREPI98 = CREDIT/PIB98, IMF
ICRGD98 – Investment Risk Evaluation Indicator, ICRG, December 1998, TRINOVA

11. International Relations
BGSI98 – Balance of Goods, Service and Income, millions of US dollars, 1998, IMF
BGSIP98=BGSI98/Popul98, IMF
BGSPI98=100*BGSI98/(PIB98/TxCam98), IMF
TxCam98 - Exchange Rate, price of US dollars in national currency, period average, 1998, IMF

SDR97ep – Exchange Rate, price of SDR in national currency, end of period, 1997, IMF

SDR98ep – Exchange Rate, price of SDR in national currency, end of period, 1998, IMF

DSDR98e= SDR98ep/ SDR97ep, (1 plus) devaluation rate of national currency, IMF

DAPDD – Disbursed Development Public Aid (millions of US dollars), 1998, PNUD

DAPDP – Disbursed Development Public Aid (in % of GNP), 1998, PNUD

RAPDD – Receipts of Development Public Aid (millions of US dollars), 1998, PNUD

RAPDP – Receipts of Development Public Aid (in % of GNP), 1998, PNUD

APD – Net Disbursed Development Public Aid (millions of US dollars; - when received), 1998, PNUD

APDP=APD/Popul, PNUD

Table B.1 contains the mean and standard deviation of each variable, the coefficient of the logarithm of per capita GDP in US dollars (PPP) of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GDP in US dollars (PPP), the coefficient of the logarithm of per capita GNP in US dollars of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GNP in US dollars.

Elasticities obtained for series that had (at least some) original negative numbers are in italics.

Table B.1. *Descriptive Statistics, Exogenous Variables – International Evidence*

Variable	N. Obs	Mean	St. Dev.	Elast. PIBpc98	Corr PIBpc98	N. Obs	Elast. PNBpc98	Corr PNBpc98	N. Obs
Popul	174	33.45023	124.218	-0.17917	-0.03139	174	-0.14493	-0.02925	169
Popul98	174	33.23862	123.5554	-0.18238	-0.03089	174	-0.14736	-0.02885	169
DENSPO	173	144.1908	414.9866	0.197769	0.214865	173	0.139148	0.225698	168
ESPVN	166	65.32651	11.12439	0.13546	0.673216	166	0.090063	0.57229	161
ESPVN98	174	65.78793	10.9886	0.133828	0.658631	174	0.088835	0.558286	169
Popm65	166	6.640361	4.584255	0.388407	0.683917	166	0.268856	0.643361	161
CoeDep	166	68.17651	18.62367	-0.19287	-0.64826	166	-0.12967	-0.53997	161
TxAlA98	174	79.25575	21.07012	0.207677	0.5453	174	0.140212	0.446968	169
TxEsc98	174	65.57471	20.26451	0.261226	0.656468	174	0.173549	0.554717	169
IEDUC98	174	0.745862	0.198995	0.219214	0.600522	174	0.147434	0.496199	169
TxAcM98	163	52.45337	15.18679	-0.10066	-0.24113	163	-0.06818	-0.16622	159
TxAMH98	163	65.70429	17.75283	-0.04798	-0.05206	163	-0.03279	0.00365	159
TXAH98	163	79.84808	6.991483	-0.05268	-0.58342	163	-0.0354	-0.51032	159
TaxDes	50	8.16	6.57683	0.186602	-0.13837	50	0.083083	-0.18582	50
PIB98	137	4.45E+08	4.58E+09	-0.04071	-0.01709	137	-0.01585	-0.02941	135
PIBpc98	174	7299.282	7616.543	1	1	174	0.688012	0.95173	169
PNBpc98	169	5961.479	9278.157	1.385895	0.95173	169	1	1	169
PNBpcgr	159	0.693082	3.672841	*0.126128*	0.214365	159	*0.067918*	0.17267	159
Pob10	110	2.620909	1.039945	0.113274	0.318285	110	0.073519	0.321033	110
Pob20	110	6.476364	2.265535	0.104866	0.386191	110	0.070137	0.384382	110
Ric20	110	46.45545	8.168126	-0.06709	-0.48436	110	-0.04686	-0.47275	110
Ric10	110	31.22636	7.689964	-0.09797	-0.48914	110	-0.06872	-0.47454	110
IG	110	39.47545	10.01557	-0.09721	-0.46813	110	-0.06746	-0.45854	110
TxInfav	169	58.58402	164.8852	*-0.60016*	-0.18638	169	*-0.49941*	-0.17511	167
TxInf98	166	9.091566	14.84807	*-0.47367*	-0.25866	166	*-0.37675*	-0.25683	164
PopUrb	174	54.06609	23.50293	0.350342	0.669964	174	0.24725	0.598429	169

PAgr98	155	19.14839	16.61515	-0.85224	-0.53448	155	-0.62842	-0.44619	153
PInd98	150	28.90933	10.51828	0.141265	0.194383	150	0.090216	0.113818	148
PServ98	153	51.9085	14.0824	0.151742	0.492714	153	0.111122	0.439357	151
AflVo	144	70.45833	16.6254	0.052522	0.125703	144	0.030117	0.084498	141
GasPu98	126	59925088	5.92E+08	0.231525	-0.01898	126	0.176992	-0.03072	125
GASPI98	125	16.67094	5.815582	0.133391	0.326383	125	0.091147	0.261079	124
CPPIB98	157	15.72866	6.990956	0.127075	0.220693	157	0.091085	0.163962	156
DPuPI98	101	29.38713	11.62654	0.149548	0.351996	101	0.100297	0.3093	100
SOrPI98	100	-2.267	3.639182	*0.628942*	0.262064	100	*0.39517*	0.272726	99
DPEdPNB	149	4.657718	1.946903	0.165143	0.236399	149	0.105213	0.190205	147
DPSaPNB	165	3.275152	2.028198	0.355878	0.590505	165	0.237173	0.562217	163
InPIB98	159	22.70252	9.325098	0.064728	-0.01326	159	0.0371	-0.04051	157
PoPIB98	159	15.52138	13.05782	0.373233	0.461006	159	0.254854	0.397263	157
DepRa98	148	10.99153	10.14748	-0.2227	-0.30247	148	-0.20228	-0.319	146
LenRa98	137	19.84823	13.9107	-0.34268	-0.47257	137	-0.25268	-0.45105	135
DiscR98	111	15.68982	15.84653	-0.30685	-0.3215	111	-0.25711	-0.34159	109
Spre98	134	9.168664	8.494837	*-0.40122*	-0.3679	134	*-0.28395*	-0.33127	132
DepR98	142	2.953825	8.74444	*-0.04503*	0.03506	142	*-0.03451*	0.006178	141
LenR98	132	11.50221	13.61511	*-0.20485*	-0.18737	132	*-0.13759*	-0.18576	131
DiR98	108	6.561734	12.52539	*-0.12334*	-0.10146	108	*-0.10806*	-0.11352	107
CREDIT	160	1.54E+08	1.63E+09	0.394755	0.016049	160	0.316247	0.002247	157
CREPI98	132	0.507698	0.391539	0.524305	0.605502	132	0.373812	0.572037	130
ICRGD98	124	67.89677	11.87516	0.120057	0.740792	124	0.087427	0.68793	120
BGSI98	131	74.9755	21290.65	*1.135098*	0.056562	131	*0.643106*	0.142072	129
BGSIP98	130	-8.60792	1013.865	*1.788604*	0.348336	130	*1.104497*	0.475899	128
BGSPI98	113	-65.2873	628.6871	*1.359125*	0.073837	113	*0.837348*	0.060996	111
TxCam98	167	2212.341	20217.2	-1.18547	-0.02796	167	-0.82108	-0.03943	163
SDR97ep	167	2449.279	21528.17	-1.1658	-0.0302	167	-0.80269	-0.04124	163
SDR98ep	167	3600.331	34305.56	-1.20762	-0.02533	167	-0.84252	-0.03728	163
DSDR98e	167	1.190698	0.587426	-0.04182	-0.13215	167	-0.03982	-0.14824	163
DAPDD	21	2471	2920.247	1.029667	0.193023	21	0.870106	0.181829	21
DAPDP	21	0.4	0.251873	0.660304	0.293465	21	0.655106	0.457928	21
RAPDD	151	272.2013	370.6009	-0.83016	-0.24248	151	-0.68559	-0.22339	146
RAPDP	144	6.752778	9.921651	-1.13917	-0.38038	144	-0.87044	-0.29004	143
APD	172	62.72442	1388.955	*1.029667*	0.558527	172	*0.870106*	0.594794	167
APDP	171	-23.6864	77.11798	*2.337142*	0.557291	171	*1.640377*	0.635623	166

B.2. Portugal

Notation and economic aggregates used in the regressions are thoroughly described below, along with sources and sample period available.

ANO – Year (linear trend), 1953-1999

1. Demographic Variables:

POPMBA – (Mid-year) Population, thousands, Portugal, 1961-1999, de Barreto

POPMABA – Male (Mid-year) Population, percentage, Portugal, 1961-1999, de Barreto

POMINEN – (Mid-year) Population, thousands, Portugal, 1961-1999, de INE

IPOMINE – Inverse of POMINEN

TXNAT – Birth Rate, per one thousand, 1960-1999, Barreto

TXMORT – Death Rate, per one thousand, 1960-1999, Barreto

TxMORTI – Infant Death Rate, per one thousand, 1960-1999, Barreto

ESVIFN – Life Expectancy at Birth, 1971-1999, INE

LONGEV – Longevity (Percentage of 75-year old and older on the population 65-year old and older), 1960-1999, INE

P014 – Proportion of the Population less than 15 years old, percent, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

P1524 - Proportion of the Population 15 or more to 24 years old, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

P2534 - Proportion of the Population 25 or more to 34 years old, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

P3544 - Proportion of the Population 35 or more to 44 years old, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

P4564 - Proportion of the Population 45 or more to 64 years old, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

P65M - Proportion of the Population 65 years old or more, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

Note: P014+ P1524+ P2534+ P3544+P4564+P65M = 100

P1534 - Proportion of the Population 15 or more to 34 years old, middle of the year, 1974-1999, INE (Continent, Inquérito ao Emprego, till 1984)

POPIDME - Mean Age of Population, years, middle of the year, 1974-1999, Continent, INE

IDEJOV – Youth Dependence Index (population with less than 15 years over population with 15 to 64 years old), percent, 1960-1999, INE

IDEID - Aged Dependence Index (population 65 years or older over population with 15 to 64 years old), percent, 1960-1999, INE

IDETOT = IdeJov + IdeId - Total Dependence Index, percent, 1960-1999, INE

TXFEC – Fertility Rate, per one thousand, 1980-1999, Barreto

TXNUP – Marriage Rate, per one thousand, 1960-1999, Barreto

ID1CASH – Mean Age at First Marriage, Men, 1960-1999, Barreto

ID1CASM – Mean Age at First Marriage, Women, 1960-1999, Barreto

DIMFAM – Size of (Restricted) Family Unit, individuals, 1981, 1983-1998, INE

INDMASC –Masculinity Index, percentage, Portugal, 1960-1999, de INE

PopEd1 – Proportion of Population with less than 1st Grade (less than “1º Ciclo”), 1974-1999, INE

PopEd2 - Proportion of Population with 1st or 2nd Grade (“1º” or “2º Ciclo”), 1974-1999, INE

PopEd21 - Proportion of Population with more than Mandatory Schooling, 1974-1999, INE

PopEd31 - Proportion of Population with more than Mandatory Schooling or Secundary, 1974-1999, INE

PopEd3 - Proportion of Population with 3rdnd Grade or Secundary, 1974-1999, INE

PopEd4 – Proportion of Population with a B.A. or B.S. or similar, 1974-1999, INE

Note: PopEd1+ PopEd2+ PopEd3+ PopEd4 = PopEd1+ PopEd21+ PopEd31+ PopEd4 = 100

POPESTU – Proportion of Students out of Total Population, percent, 1983-1999

POPDOM - Proportion of Housewives out of Total Population, percent, 1974-1999

POPREFOR - Proportion of Retired out of Total Population, percent, 1983-1999

POPOUT – Proportion of Other Inactive Individuals out of Total Population, percent, 1983-1999

TXRESTR - African Residents out of Total Population, percent (midyear average), 1961-1999

TXREURO – European (Foreign) Residents out of Total Population, percent (midyear average), 1961-1999

TXRAFR - African Residents out of Total Population, percent (midyear average), 1961-1999

TXRBRAS - Brazilian Residents out of Total Population, percent (midyear average), 1961-1999

TXROUT – Other Foreign Residents out of Total Population, percent (midyear average), 1961-1999

2. Employment and Workweek Hours

ACTFAM – Active Individuals per (Restricted) Family Unit, 1983-1998, INE

EMPFAM – Employed Individuals per (Restricted) Family Unit, 1983-1998, INE

TXACTC – Activity (Participation) Rate, Continent, percent, 1974-1999, INE

TXACTFE – Female Activity (Participation) Rate, percent, 1974-1999, Barreto

PPACTFE – Proportion of Female in Active Population, percent, 1974-1999, de Barreto

PEMPFE – Proportion of Female Employment, percent, 1974-1999, de Barreto

PTCO – Non-Self-Employment out of Total Employment, percentage, 1974-1999, INE

TCOBP – Non-Self-Employment out of Total Employment, percentage, 1953-1999, BP

TCOMBP - Non-Self-Employment out of Total Employment, percentage, mean of consecutive years, 1953-1999, BP

PPATR – (Employed) Employers out of Total Employment, percentage, 1974-1999, INE

PISOL – Individual Employment out of Total Employment, 1974-1999, INE

DIMEMP – Firm Size in Personnel, 1979-1999, Quadros de Pessoal

IG – Gini Concentration Index of Firm (Size in)'s Personnel, 1979-1999, Quadros de Pessoal

DIMEST – Plant Size in Personnel, 1979-1999, Quadros de Pessoal

EMPEDC – Mean Years of Schooling of Concluded Schooling Level of Total Employment, 1981-1999, QP

EMPEDM – Mean Years of Schooling of Total Employment, 1981-1999, QP

QUMESU – Proportion of Highly and Medium Skilled Technical Staff, 1981-1999, QP

ENCPAQ - Proportion of Foremen and Highly Qualified/Skilled Professionals Out of Non Self-Employment, 1981-1999, QP

PQESQ – Proportion of Qualified and Semi-Qualified/Skilled Professionals Out of Non Self-Employment, 1981-1999, QP

PNQEAP - Proportion of Unqualified Professionals and Apprentices Out of Non Self-Employment, 1981-1999, QP

ANTIG – Mean Years of Tenure of Employed Population, 1983-1999, QP

HORNOR – Workweek Standard Hours, 1981-1999, QP

HORTOT - Workweek Total Hours, 1982-1999, QP

HORTOAG - Workweek Total Hours, Agriculture, 1970-1999, QP

HORTOIN - Workweek Total Hours, Industry, 1970-1999, QP

HORTOBA - Workweek Total Hours, Banking and Insurance, 1975-1999, QP

HORTOCO - Workweek Total Hours, Commerce, 1970-1999, QP

TXDESCE – Unemployment Rate, percent, 1960-1999, CE 2000

TXDESBA - Unemployment Rate, percentage, 1974-1999, Barreto

3. Income or Product; National Expenditures

PIBPPC – Per capita GDP, 1990 prices, thousand escudos, 1960-1999, Barreto

tcPIBPPC – Growth rate of per capita GDP, 1990 prices, percentage, 1961-1999, Barreto

REMPC – Per capita Wage Bill, 1990 prices, thousand escudos, 1960-1999, Barreto

tcREMPC – Growth rate of per capita Wage Bill, 1990 prices, percentage, 1961-1999, Barreto

4. Labor Earnings

SALMI90 – Monthly Minimum Wages in Industry and Services (escudos) 1974-1999, 1990 constant prices, Barreto

ISARTCP – real wages index, deflated by GDP deflator, base 100 in 1960, 1960-1999, CE 2000

ISARTCC - real wages index, deflated by Private Consumption deflator, base 100 in 1960, 1960-1999, CE 2000

SALRTCP – real wages growth rate, percent, deflated by GDP deflator, 1961-1999, CE 2000

SALRTCC – real wages growth rate, percent, deflated by Private Consumption deflator, 1961-1999, CE 2000

SALPIB – Wage Bill over GDP, percent, 1960-1999, CE 2000

5. Wage Inequality

WQSSQ – Earnings of Superior Top Level over Semi-Skilled Personnel, 1981-1999, QP

WQSNQ - Earnings of Superior Top Level over Unskilled Personnel, 1981-1999, QP

WQSPA - Earnings of Superior Top Level over Trainees and Apprentices, 1981-1999, QP

WQMSQ - Earnings of Medium Top Level over Semi-Skilled Personnel, 1981-1999, QP

WQMNQ - Earnings of Medium Top Level over Unskilled Personnel, 1981-1999, QP

WQMPA - Earnings of Medium Top Level over Trainees and Apprentices, 1981-1999, QP

WFEMAS – (Symmetric of) Female Wage Earnings Differential, 1981-1999, QP

6. Prices, National Expenditures

IIPPIBC - Price Index, GDP Deflator, base 100 in 1960, 1960-1999, Séries Longas CE

IIPPIB – Price Index, GDP Deflator, base 100 in 1953, 1953-1999, Séries Longas BP e AE

IIPCPCE - Price Index, Private Consumption Deflator, base 100 in 1960, 1960-1999, Séries Longas CE

IICPRIV – Price Index, Private Consumption Deflator, base 100 in 1953, 1953-1999, Séries Longas BP e AE

IICPUB - Price Index, Public Consumption Deflator, base 100 in 1953, 1953-1999, Séries Longas BP e AE

IPPIBCE - Prices Growth Rate, GDP Deflator, percent, 1961-1999, Séries Longas CE

IPPIB - Prices Growth Rate, GDP Deflator, percent, 1954-1999, Séries Longas BP e AE

IPCPCE - Prices Growth Rate, Private Consumption Deflator, percent, 1961-1999, Séries Longas CE

ICPRIV – Prices Growth Rate, Private Consumption Deflator, percent, 1954-1999, Séries Longas BP e AE

7. Sector Decomposition

EMPRIM – Proportion of Employment in Primary Sector, percent, 1974-1999, de Barreto

EMSECU – Proportion of Employment in Secundary Sector, percent, 1974-1999, de Barreto

EMTERC – Proportion of Employment in Tertiary Sector, percent, 1974-1999, de Barreto

8. Public Sector

REPHA90 - Per capita Administrative Public Sector Total Expenditures/Revenue, 1990 prices, thousand escudos, 1960,1970,1980-1997, Barreto

RECHA90 - Per capita Administrative Public Sector Current Revenue, 1990 prices, thousand escudos, 1960,1970,1980-1997, Barreto

RFIHA90 - Per capita Fiscal Revenue, 1990 prices, thousand escudos, 1960,1970,1980-1997, Barreto

IDIHA90 – Per capita Direct Taxes, 1990 prices, thousand escudos, 1960,1970,1980-1997, Barreto

IINHA90 - Per capita Indirect Taxes, 1990 prices, thousand escudos, 1960,1970,1980-1997, Barreto

RECCRH - Per capita Administrative Public Sector Current Revenue, 1972 prices, thousand escudos, 1972-1998

IMPDRH – Per capita Direct Taxes and Social Security Revenue, 1972 prices, thousand escudos, 1972-1998

IMPINRH - Per capita Indirect Taxes, 1972 prices, thousand escudos, 1972-1998

SAESRH – Per capita Administrative Public Sector Surplus, 1972 prices, thousand escudos, 1972-1998

SEGSRH - Per capita Social Security Revenue, 1972 prices, thousand escudos, 1972-1998

DESPURH - Per capita Administrative Public Sector Total Expenditures, 1972 prices, thousand escudos, 1967-1999

RECCPIB – Administrative Public Sector Current Revenue as a Percentage of GDP, PIB95, 1972-1998

IMPDPI – Direct Taxes and Social Security Contributions as a Percentage of GDP, PIB95, 1972-1998

IMPINPI - Indirect Taxes as a Percentage of GDP, PIB95, 1972-1998

SAESPIB - Administrative Public Sector Total Surplus as a Percentage of GDP, PIB95, 1972-1998

SEGSPIB - Social Security Contributions as a Percentage of GDP, PIB95, 1972-1998

DESPUPI - Administrative Public Sector Total Expenditures as a Percentage of GDP, PIB95, 1967-1999

CFAPCE – Public Administration Surplus (Financing Capacity) as a proportion of GDP, percentage, 1970-1999, CE

9. Capital Markets – Interest Rates

INVPIB – Investment over GDP (percentage), Séries Longas BP, 1995, INE-internet after 1994; 1953-1999

TXDPM1 – Banks Deposit Interest Rate, Term Deposits, 181 days to 1 year, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TXDPM2 – Banks Deposit Interest Rate, Term Deposits, more than 1 year, percentage, 1974-1999, Séries Longas and Boletim Estatístico BP

TXACM1 – Banks Lending Interest Rate, Loans to Private Individuals, 181 days to 1 year, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TXACM2 – Banks Lending Interest Rate, Loans to Private Individuals, 2 to 5 years, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TJURCP – Short-run Interest Rate, percentage, 1966-1999, Séries Longas CE

TJURLP – Long-run Interest Rate, percentage, 1985-1999, Séries Longas CE

TXDBP – Central Bank Discount Rate, percentage, 1953-1999, Séries Longas e Boletim Estatístico do BP

TXDPM1R – Real Banks Deposit Interest Rate, Term Deposits, 181 days to 1 year, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TXDPM2R – Real Banks Deposit Interest Rate, Term Deposits, more than 1 year, percentage, 1974-1999, Séries Longas and Boletim Estatístico BP

TXACM1R – Real Banks Lending Interest Rate, Loans to Private Individuals, 181 days to 1 year, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TXACM2R – Real Banks Lending Interest Rate, Loans to Private Individuals, 2 to 5 years, percentage, 1954-1999, Séries Longas and Boletim Estatístico BP

TJURCPR – Real Short-run Interest Rate, deflated by GDP deflator (CE), percentage, 1966-1999, Séries Longas CE

TJURLPR – Real Long-run Interest Rate, deflated by GDP deflator (CE) , percentage, 1985-1999, Séries Longas CE

TXDBPR – Real Central Bank Discount Rate, deflated by GDP deflator (BP), percentage, 1953-1999, Séries Longas and Boletim Estatístico BP

SPRE1 = TXACM1 - TXDPM1, 1954-1999

SPRE2 = TXACM2 – TXDPM2, 1974-1999

10. Housing

EDNOH – Finished New Housing Constructions, per thousand inhabitants, 1960-1967,1970-1998

SPANOH – Surface in Finished New Housing Constructions, square-meters per thousand inhabitants, 1960-1967,1970-1998

PAVNOH – Floors in Finished New Housing Constructions, per thousand inhabitants, 1960-1967,1970-1998

FONOH – Finished New Housing Dwellings, per thousand inhabitants, 1960-1967,1970-1998

SHANOH – Tenantable Surface in Finished New Housing Constructions, square-meters per thousand inhabitants, 1970-1998

DIVNOH – Finished New Housing Rooms, per thousand inhabitants, 1970-1998

NEDAMH – Finished New Housing Constructions and Extensions, per thousand inhabitants, 1960-1967,1970-1998

SPANAMH – Surface in Finished New Housing Constructions and Extensions, square-meters per thousand inhabitants, 1960-1967,1970-1998

PAVNAMH – Floors in Finished New Housing Constructions and Extensions, per thousand inhabitants, 1960-1967,1970-1998

FONAMH – Finished New Housing Dwellings and Extensions, per thousand inhabitants,, 1960-1967,1970-1998

SHANAMH – Tenantable Surface in Finished New Housing Constructions and Extensions, square-meters per thousand inhabitants, 1970-1998

DIVNAMH – Finished New Housing Rooms and Extensions, per thousand inhabitants, 1970-1998

11. International Relations

EXIMPIB – Exports minus Imports over GDP (percentage), Séries Longas BP, 1995, INE-internet after 1994; 1953-1999

12. Severity of Justice and Law Enforcement

CONDARG – Conviction Rate (Convicted over Defendants) in Criminal Causes, percentage, 1967-1999

PRESARG – (Midyear) Prison Inmates over Defendants in Criminal Causes, 1967-1999

PRESCON – (Midyear) Prison Inmates over Convicted in Criminal Causes, 1967-1999

DPREARG – Change in Prison Inmates over Defendants in Criminal Causes, 1967-1999

DPRECON – Change in Prison Inmates over Defendants in Criminal Causes, 1967-1999

We provide in Table B.2, the mean and standard deviation of each variable, its instantaneous growth rate (derived from the regression of the logarithm of the series in a trend), the correlation with the trend (ANO), the coefficient of the logarithm of per capita GDP of the regression on the logarithm of the row variable, and the correlation with (plain) per capita GDP.

Growth rates and elasticities obtained for series that had (at least some) original negative numbers are in italics.

Table B.2. *Descriptive Statistics, Exogenous Variables – Portuguese Evidence*

Variable	N. Obs	Mean	St. Dev.	Inst. gr	Corr ANO	N. Obs	Elast. PIBPPC	Corr PIBPPC	N. Obs
ANO	47	1976	13.71131	0.05	1	47	0.013375	0.984669	40
POPMBA	39	9472.09	522.2146	0.42	0.855618	39	0.103819	0.772674	39
POPMABA	39	47.92266	0.329422	0.04	0.677596	39	0.009272	0.59314	39
POMINEN	39	9497.833	547.2092	0.45	0.883156	39	0.112073	0.810471	39
IPOMINE	39	0.105637	0.006227	-0.45	-0.87207	39	-0.11207	-0.79731	39
TXNAT	40	16.9535	4.904896	-2.49	-0.98135	40	-0.64791	-0.94706	40
TXMORT	40	10.38525	0.571879	-0.23	-0.4945	40	-0.05792	-0.38255	40
TxMORTI	40	33.425	24.86696	-7.29	-0.96424	40	-1.90781	-0.92487	40
ESVIFN	29	72.50379	2.508185	0.39	0.941703	29	0.118694	0.848033	29
LONGEV	40	35.2725	3.022733	0.60	0.820631	40	0.140754	0.783996	40
P014	26	22.39425	3.779158	-2.20	-0.97276	26	-0.66775	-0.96133	26
P1524	26	16.94733	1.016946	-0.58	-0.737	26	-0.16497	-0.69606	26
P2534	26	13.61091	1.657817	1.51	0.931929	26	0.4608	0.906584	26

P3544	26	12.48897	0.846646	0.74	0.851388	26	0.230585	0.889789	26
P4564	26	22.07012	0.862013	0.25	0.493442	26	0.065754	0.447149	26
P65M	26	12.48829	1.807956	1.82	0.959378	26	0.543438	0.939803	26
P1534	26	30.55823	1.217652	0.34	0.653293	26	0.111596	0.652974	26
POPIDME	26	34.81751	2.752906	1.00	0.961677	26	0.297634	0.937508	26
IDEJOV	40	38.475	8.076612	-1.84	-0.95817	40	-0.46805	-0.96193	40
IDEID	40	17.5475	3.099627	1.54	0.99522	40	0.413816	0.983377	40
IDETOT	40	55.98	5.321037	-0.74	-0.88483	40	-0.18378	-0.89896	40
TXFEC	22	1.795955	0.487615	-2.37	-0.94786	22	-0.61864	-0.87829	22
TXNUP	40	7.94575	1.162909	-0.88	-0.68413	40	-0.2025	-0.65891	40
ID1CASH	40	26.355	0.673281	-0.04	-0.19285	40	-0.01381	-0.06641	40
ID1CASM	40	24.265	0.658884	0.02	0.077896	40	0.000833	0.200961	40
DIMFAM	17	3.110665	0.147791	-0.89	-0.97056	17	-0.24188	-0.9704	17
INDMASC	40	92.0675	1.243524	0.08	0.692909	40	0.017927	0.616524	40
PopEd1	26	32.79418	13.37967	-3.83	-0.78871	26	-1.0954	-0.68344	26
PopEd2	26	53.33683	12.64164	0.70	0.209444	26	0.156786	0.083694	26
PopEd21	26	57.09356	11.75382	1.85	0.617684	26	0.514724	0.501166	26
PopEd31	26	6.362003	1.947121	3.04	0.749538	26	0.904661	0.742732	26
PopEd3	26	10.11874	7.435747	7.33	0.816578	26	2.243261	0.844403	26
PopEd4	26	3.75029	2.011181	7.10	0.911403	26	2.140021	0.898651	26
POPESTU	17	18.39749	0.554457	-0.12	-0.1927	17	-0.02572	-0.20916	17
POPDOM	26	10.82006	3.514332	-4.05	-0.9596	26	-1.22067	-0.90873	26
POPREFOR	17	13.30715	4.053159	5.16	0.815441	17	1.369393	0.797627	17
POPOUT	17	10.90894	2.94695	-4.27	-0.77263	17	-1.13222	-0.7652	17
TXRESTR	39	0.722448	0.526722	6.48	0.941157	39	1.709707	0.955266	39
TXREURO	39	0.262478	0.104654	2.53	0.813842	39	0.668977	0.875162	39
TXRAFR	39	0.268594	0.287697	21.23	0.941203	39	5.639922	0.944228	39
TXRBRAS	39	0.070039	0.066255	10.00	0.930644	39	2.707965	0.953326	39
TXROUT	39	0.121336	0.080346	7.07	0.972234	39	1.935697	0.955325	39
ACTFAM	16	1.494103	0.050763	-0.61	-0.85567	16	-0.15163	-0.81146	16
EMPFAM	16	1.385497	0.03772	-0.26	-0.45587	16	-0.04706	-0.31616	16
TXACTC	26	47.21097	2.010598	0.52	0.937276	26	0.156726	0.911371	26
TXACTFE	26	38.76538	3.728693	1.25	0.980889	26	0.376126	0.958071	26
PPACTFE	26	42.6542	2.229468	0.67	0.970861	26	0.203345	0.950103	26
PEMPFE	26	41.33393	2.496042	0.76	0.962165	26	0.235393	0.980908	26
PTCO	26	68.73769	3.072924	0.53	0.904978	26	0.163068	0.890216	26
TCOBP	47	74.92833	1.468385	0.06	0.417144	47	0.010147	0.082321	40
TCOMBP	47	73.20048	1.416601	0.06	0.439214	47	0.010953	0.106702	40
PPATR	26	4.140385	1.618141	4.90	0.932048	26	1.493786	0.940186	26
PISOL	26	19.07423	2.797748	1.02	0.499424	26	0.261901	0.367065	26
DIMEMP	21	15.90548	3.547961	-3.69	-0.98259	21	-1.06965	-0.97789	21
IG	21	0.493732	0.054046	-1.76	-0.99189	21	-0.5055	-0.96974	21
DIMEST	21	13.40053	2.812314	-3.47	-0.98249	21	-1.00313	-0.97677	21
EMPEDC	19	6.122054	0.735614	2.10	0.989361	19	0.567104	0.969466	19
EMPEDM	19	7.228882	0.806725	1.96	0.991971	19	0.529757	0.97217	19
QUMESU	19	4.97996	1.489096	4.61	0.913082	19	1.206956	0.883782	19
ENCPAQ	19	8.895739	0.651878	1.17	0.910982	19	0.311482	0.888912	19
PQESQ	19	63.01736	1.345065	-0.35	-0.91241	19	-0.0988	-0.92702	19
PNQEAP	19	23.10694	1.416171	-0.58	-0.51284	19	-0.12923	-0.45799	19
ANTIG	17	8.046202	0.463958	-0.93	-0.81939	17	-0.26568	-0.88406	17
HORNOR	19	39.53684	1.871485	-0.73	-0.87252	19	-0.19116	-0.81992	19
HORTOT	18	39.85	1.890611	-0.75	-0.85178	18	-0.1892	-0.79201	18
HORTOAG	30	41.03667	3.690667	-0.91	-0.88626	30	-0.28682	-0.86303	30
HORTOIN	30	41.85333	2.25262	-0.55	-0.90229	30	-0.16722	-0.82844	30
HORTOBA	25	34.91076	0.938213	-0.13	-0.36159	25	-0.03411	-0.29255	25
HORTOCO	30	41.015	1.828753	-0.45	-0.88508	30	-0.13799	-0.81657	30
TXDESCE	40	5.045	2.423914	3.34	0.647797	40	0.856683	0.523862	40
TXDESBA	26	5.507692	1.71042	1.54	0.317989	26	0.285549	0.13791	26
PIBPPC	40	724.395	290.3934	3.64	0.984669	40	1	1	40
tcPIBPPC	39	4.054006	3.800903	*-1.27*	-0.26513	39	*-0.41599*	-0.21165	39
REMPC	40	363.9475	130.5601	3.28	0.946136	40	0.931791	0.963536	40
tcREMPC	39	4.157831	5.031813	*-2.78*	-0.31806	39	*-0.6765*	-0.21136	39
SALMI90	26	36566.38	3158.206	-0.05	-0.06987	26	0.024811	0.096209	26
ISARTCP	40	285.0626	109.5705	3.76	0.96925	40	1.041414	0.945024	40
ISARTCC	40	267.6623	97.48113	3.48	0.966615	40	0.967028	0.953223	40
SALRTCP	39	3.928205	4.753722	*-4.20*	-0.45348	39	*-0.94185*	-0.38546	39
SALRTCC	39	3.84359	4.994565	*-3.53*	-0.37108	39	*-0.84321*	-0.31192	39
SALPIB	40	73.32	6.785399	0.13	0.145168	40	0.047736	0.094311	40
WQSSQ	19	2.476219	0.401391	2.87	0.98825	19	0.796665	0.985048	19
WQSNQ	19	2.869325	0.409458	2.55	0.982424	19	0.707761	0.974782	19
WQSPA	19	3.728486	0.1606	0.57	0.721637	19	0.143239	0.642745	19
WQMSQ	19	1.481764	0.215415	2.47	0.952002	19	0.663229	0.92167	19
WQMNQ	19	1.763442	0.218568	2.07	0.919043	19	0.55508	0.879087	19
WQMPA	19	2.386215	0.14205	-0.17	-0.16623	19	-0.0815	-0.28851	19
WFEMAS	19	0.229534	0.008428	0.43	0.647543	19	0.131975	0.705718	19
IIPPIBC	40	1505.124	1708.697	12.46	0.91067	40	3.19936	0.938121	40
IIPPIB	47	1288.131	1612.086	10.34	0.873299	47	3.089041	0.939997	40
IIPCPCE	40	1615.891	1819.295	12.73	0.915078	40	3.270346	0.939729	40
IICPRIV	47	1145.429	1395.646	10.05	0.880022	47	3.01135	0.942731	40
IICPUB	47	1405.511	1819.659	10.42	0.86039	47	3.081887	0.934289	40

IPPIBCE	39	10.83077	7.971038	*1.95*	0.184128	39	*0.675684*	0.068811	39
IPPIB	46	9.084039	7.563595	*4.44*	0.396812	46	*0.968119*	0.118695	40
IPCPCE	39	10.97179	8.600243	2.59	0.133299	39	0.925702	0.029717	39
ICPRIV	46	8.712144	7.748811	*3.59*	0.370852	46	*0.509869*	0.101388	40
EMPRIM	26	21.78886	7.991191	-4.88	-0.97251	26	-1.49716	-0.94507	26
EMSECU	26	34.04291	1.460093	-0.17	-0.28674	26	-0.0516	-0.31125	26
EMTERC	26	44.15982	8.581948	2.48	0.955002	26	0.747763	0.933996	26
REPHA90	20	301.19	143.3169	7.18	0.902349	20	1.889529	0.945328	20
RECHA90	20	173.26	73.32986	6.02	0.924089	20	1.601769	0.979777	20
RFIHA90	20	160.7	70.56259	6.64	0.931297	20	1.765393	0.983692	20
IDIHA90	20	62.13	29.07714	6.55	0.897691	20	1.732763	0.959292	20
IINHA90	20	96.625	42.02073	6.96	0.936297	20	1.854604	0.980044	20
RECCRH	27	15.21942	7.198302	6.21	0.980204	27	1.991141	0.990988	27
IMPDRH	27	7.969236	4.406263	7.25	0.968892	27	2.322348	0.989428	27
IMPINRH	27	6.056146	2.222619	4.86	0.990216	27	1.542103	0.977209	27
SAESRH	27	-2.77701	1.244026	*154.21*	-0.31507	27	*1.542103*	-0.12516	27
SEGSRH	27	4.25053	2.411038	7.00	0.945413	27	2.250039	0.970512	27
DESPURH	33	14.71105	8.777658	7.18	0.975325	33	2.163174	0.964712	33
RECCPIB	27	29.87544	7.037956	3.05	0.98191	27	0.942156	0.935306	27
IMPDPI	27	15.05856	4.247316	3.64	0.965715	27	1.117662	0.928233	27
IMPINPI	27	12.20479	1.745925	1.70	0.887292	27	0.493117	0.762673	27
SAESPIB	27	-5.94861	2.96777	*49.31*	0.078147	27	*0.493117*	0.281219	27
SEGSPIB	27	8.03175	2.372179	3.39	0.885575	27	1.045353	0.866674	27
DESPUPI	33	28.04867	10.12067	3.87	0.957317	33	1.13884	0.914487	33
CFAPCE	30	-4.53899	3.61719	*-23.91*	-0.28233	30	*-3.15731*	-0.10392	30
INVPIB	47	27.69116	4.967008	0.64	0.436572	47	0.066982	0.042393	40
TXDPM1	46	9.051196	7.56812	4.34	0.510567	46	1.013298	0.267496	40
TXDPM2	26	14.30012	7.184224	-4.83	-0.51516	26	-1.56668	-0.61618	26
TXACM1	46	12.48082	8.973787	4.68	0.702191	46	1.278763	0.532299	40
TXACM2	46	12.60283	8.156302	4.05	0.679687	46	1.0806	0.488654	40
TJURCP	34	10.87353	6.170178	2.80	0.35112	34	0.804414	0.204867	34
TJURLP	15	13.54	6.288175	-10.85	-0.92634	15	-2.634	-0.88867	15
TXDBP	47	9.005319	8.058941	5.25	0.584111	47	1.401895	0.364454	40
TXDPM1R	46	0.029172	3.35073	*3.61*	0.227056	46	*0.746765*	0.27884	40
TXDPM2R	26	0.728421	3.823243	*-1.59*	0.466749	26	*0.053323*	0.375199	26
TXACM1R	46	3.188106	5.601071	*4.41*	0.531007	46	*1.328167*	0.589783	40
TXACM2R	46	3.312113	4.712344	*2.97*	0.482821	46	*0.839294*	0.553963	40
TJURCPR	34	-0.95352	4.579865	*3.22*	0.564364	34	*0.99621*	0.58617	34
TJURLPR	15	3.684149	1.963473	*-7.37*	-0.1554	15	*-1.89594*	-0.10879	15
TXDBPR	46	0.131422	4.294154	*2.41*	0.346696	46	*0.508719*	0.409938	40
SPRE1	46	3.429619	3.493766	*4.57*	0.697608	46	*1.539773*	0.739013	40
SPRE2	26	4.078917	3.164695	*13.11*	0.872105	26	*3.601265*	0.8104	26
EDNOH	36	2.212011	0.364454	0.63	0.452979	36	0.177423	0.541674	36
SPANOH	36	606.6464	368.5164	5.19	0.888016	36	1.439718	0.931368	36
PAVNOH	36	4.538965	1.234769	1.66	0.735823	36	0.448858	0.809947	36
FONOH	36	4.630473	1.344527	1.77	0.737574	36	0.488849	0.829329	36
SHANOH	29	339.9814	130.6475	3.64	0.863773	29	1.265347	0.943549	29
DIVNOH	29	23.19585	6.593634	2.46	0.786856	29	0.901483	0.901485	29
NEDAMH	29	2.60744	0.394931	0.94	0.577562	29	0.361855	0.703067	29
SPANAMH	29	732.3467	354.2949	4.51	0.857712	29	1.531133	0.919982	29
PAVNAMH	29	5.070198	1.290249	2.11	0.767992	29	0.759778	0.871117	29
FONAMH	29	5.055112	1.415349	2.37	0.767116	29	0.878339	0.887209	29
SHANAMH	29	357.1413	134.2879	3.59	0.866862	29	1.247587	0.945275	29
DIVNAMH	29	24.49382	6.726045	2.40	0.788069	29	0.878049	0.901892	29
EXIMPIB	47	-9.7065	3.832361	*87.80*	-0.43673	47	*0.878049*	-0.16832	40
CONDARG	33	43.62853	8.778341	-1.48	-0.73485	33	-0.43193	-0.64918	33
PRESARG	30	0.156414	0.029326	-1.50	-0.70542	30	-0.50237	-0.71687	30
PRESCON	30	0.375725	0.063373	-0.18	-0.09401	30	-0.12065	-0.23967	30
DPREARG	30	0.004523	0.026587	*-5.28*	0.15412	30	*-1.57225*	0.060688	30
DPRECON	30	0.00945	0.058677	*-4.15*	0.151562	30	*-1.2539*	0.066768	30

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