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ABSTRACT

The global crisis of 2008-9 and the ongoing Euro crisis raise many questions regarding the long-term response to crises. We know that households that lost access to credit, for example, were forced to adjust and increase saving. But, will households remain bigger savers than they would have been had the global financial crisis not occurred? And for how long will this increased saving persist? We also ask similar questions about the public sector 's saving decisions. We hypothesize that it is only dramatic shocks that have a long-lasting effect on saving behavior. For a sample of 23 high-income countries, we examine the impact of catastrophic shocks from 1900 onward (defined as a time period in which the cumulative decline in per capita income was larger than 10 percentage points) on patterns of saving during 1980-2010. We find evidence consistent with history-dependent dynamics: more experience of past crises tends to increase savings among households, but lead to decreased public sector saving. This decrease in public saving, however, is about 1/3 in magnitude than the corresponding increase in private/household saving. We follow up on these findings with an investigation of the importance of historical exposure for current account dynamics, but find no strong indication that our measure of past exposure is important to the current account 's determination. We conclude by examining the likely impact of the 2008-9 GFC on future saving.

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1. Introduction

The global financial crisis of 2008-9 and the evolving crisis in Europe raise many intriguing questions regarding the long-term response to crises. Households that lost access to credit, for example, were forced to adjust and increase saving. It is not clear, however, whether that forced transition will last; will households remain bigger savers than they would have been had the global financial meltdown not occurred? For how long will this increased saving last? Will it have a perceptible impact in the decades to come?

In contrast, the public sector typically does not need to adjust its saving behavior immediately in the face of a crisis, and may find delayed adjustment preferable and attainable.[1] Does exposure to crises, however, change the public sector's saving policy in the long-term? Do political actors persist in a new behavior or alternatively if and when do they revert back to a previous one? These questions, of course, are also related to concerns about fiscal sustainability and fiscal adjustment that plague almost all high-income countries at this time.

Here, we study the degree to which past catastrophic income shocks increase the saving rates of affected households, as will be the case if painful past adjustment increases the demand for precautionary saving, and the proliferation of 'neither a borrower nor a lender be' attitude. We also investigate if this past personal exposure of the general population to crises has any impact on the saving behavior of the public sector. In this case, our *a priori* expectations are less well formed, since there are several channels through which the public sector's policy can be affected.

[1] This delay may be preferable as it entails a "gambling for resurrection" as in Hellmann et al. (2000); or because the public sector will attempt to minimize their adjustment burden in a 'war of attrition as in Alesina and Drazen (1991); or because a smoother/slower adjustment process is less costly in present-value terms.

Our results are consistent with this history-dependent dynamics, and we find strong evidence for a different impact on the private and public sectors. Specifically, we find evidence that the experience of past crises tend to increase savings among households, but lead to decreased public sector saving. We follow up on these findings with an investigation of the importance of historical exposure for current account dynamics, but find no strong indication that our measure of past exposure is important to the current account's determination.

Section 2 discusses the limited relevant literature, section 3 details our construction of a measure of past exposure, and section 4 focuses on the empirical results. We close with a discussion of limitations, policy ramifications, and the potential long-term impact of the recent global financial crisis.

1. Literature on History and Saving Behavior

The theory on the ways households deal with adverse income shocks does not lead to clear-cut predictions. An important question is whether previous income shocks had any impact on the households' perceptions of future uncertainty; an income shock that occurred decades ago is only important in that it might affect both the degree of risk averseness and decision maker's awareness of the possibility of future shocks (her perception of the probability distribution of future events). The literature on uncertainty and saving behavior is extensive, with early contributions by, for example, Levhari and Srinivasan (1969) and Sandmo (1970) – this question, however, remains an empirically open question, and our contribution is empirical.[2]

[2] See Browning and Lusardi (1996) for overview of the micro theories and empirical regularities of household savings.

A spate of recent papers, starting from Barro (2006) has looked at various implications of the probability of large catastrophic income shocks to macroeconomic variables, with a particular emphasis on prices in asset markets.[3] More recently, Gurio (2012) shows how, in a real business cycle framework, a shift in disaster risk can change macroeconomic dynamics and lead to business cycles that are not related to shifts in productivity. An increase in disaster risk, in his model, leads to more precautionary saving and a movement toward safer assets, and ultimately to declines in employment and income. In Nakamura et al. (2013), the persistence of the income shock leads households to increase saving for a longer period of time; and this increased saving dampen the effect of the shock on asset prices.

Previous empirical research on the determinants of saving behavior focuses almost exclusively at the household level.[4] Given our interest in the importance of aggregate country-level historical experiences and the implications for macroeconomic dynamics, we prefer to investigate this using country-wide data.[5]

Several recent papers have shown that personal experiences matter for individuals when making financial decisions: Malmendier and Nagel (2011) examined the impact of exposure to stock-market return history on household investment risk-taking in the U.S., Malmendier et al. (2011) investigated the impact of the Great Depression on the behavior of company CEOs who grew up during that period, while Giuliano and Spilimbergo (2009) show

[3] See also Barro (2009), Gabaix (2012) and Barro and Tin (2011).
[4] The literature on the determinants of saving behavior at the micro level (for households or individuals) is much too extensive for us to discuss here. A few projects examine aggregate macro-economic data at the local/regional level within a country (e.g., Horioka and Wan, 2007, for an investigation of Chinese saving rates at the provincial level).
[5] Recent evidence also suggests that individuals respond to peer pressure in making financial decision, so that our aggregate macro approach may be more relevant than a micro/household one (e.g., Kaustia and Knüpfer, 2012).

that people's beliefs regarding the merits of individual efforts and government interventions are affected by exposure to recessions over their lifetime.[6, 7]

We hypothesize that past large and adverse income shocks are empirically important in determining current saving behavior, in both the private and the public sector. We examine this by constructing an index that measures the past exposure to 'income catastrophes' across the generations and examine whether this index is correlated with domestic saving. We are not aware of any investigation of this question by other authors, nor of any work that used an index similar to ours—a demographically-weighted measure of past exposure to aggregate income shocks.

2. The Data

In order to examine the possibility that the historical experience of income shocks affect present behaviour we need to construct an 'exposure to income catastrophes' index (henceforth EIC index) for every country and time observation in our dataset. The EIC index is essentially constructed from country-wide demographic data on the size of each cohort and the history of each cohort's exposure to catastrophic recessions since birth. Since the EIC index does not change much every year (neither the population demographics nor the historical record changes that rapidly), we construct our dataset in 5 year gaps: since saving data is typically available reliably only from the 1980s, we calculate the index for 5 observations per country (for the years 1985, 1990, 1995, 2000, 2005). We construct five

[6] Instead of relying on market-wide exposure, Kaustia and Knüpfer (2008) and Choi et al. (2009) show that individuals' past experiences with investment decisions affects their consequent investment decision making.
[7] Schrooten and Stephan (2005) observe that saving rates increased significantly in the 1990s in the transition countries, following a few years of dramatic economic decline (and declining saving rates). While they examine different reasons for that, our hypothesis seems consistent with this observation. Households increased their saving after they were exposed to significant negative economic shocks, and this effect degenerates over time. Similarly, Mody et al. (2012) observation of a large increase in saving following the 2008 global financial crisis, and their examination of its dependence on labor market uncertainty, is also consistent with our premise.

alternatives of our EIC index. For demographic cohort-size data we use the World Bank's World Development Indicators while for data on catastrophic income shocks since 1900 we use the data from Barro and Ursua (2012).

3.1. The historical shocks

The Barro and Ursua (2012) dataset includes annual income per capita and consumption data for a large set of countries going back to the 19th century. Most of this data was collected from national sources. Following their own work, we define a catastrophic shock as a time period in which the cumulative decline in per capita income was larger than 10 percentage points. For our sample of high-income countries, the peak occurrences of these catastrophic shocks are both World Wars, with some countries experiencing very dramatic declines in per capita incomes.[8] The last catastrophic shock (until the recent GFC) was experienced by Singapore in the late 1950s (11.3% decline in per capita income). We only examine these catastrophic shocks, rather than the annual fluctuations in incomes as we hypothesize that it is only these dramatic shocks that have a long-lasting effect on saving behavior.

We next examine the exposure of a typical person from each age group for each country (for all age groups between 25 and 80 in five year gaps). A typical 30 year old in 1985, for example, was exposed to all crises occurring in her country starting in 1955. We calculate a weighted average of her exposure; with linearly declining weights. Our choice to use linearly declining weights with zero weight at birth is based on the findings from Malmendier and Nagel (2011).

[8] Belgium, for example, experiences a 47% decline associated with WWI, while Germany experienced a 73% at the end of WWII.

Malmendier and Nagel (2011) experimented with several functional forms for the weights and concluded that linearly declining weights fit their dataset better than non-linear alternatives. Thus, for a person born in year *s,* is of age (*t*-s) at time *t.* For her, the weight for a shock she experienced at time *f is w(t-s,f),* and is defined by the following conditions:

$\sum_{f=s}^{t} w(t-s,f) = 1$

$w(t-s,f) - w(t-s,f-1,) = b(t-s) > 0$ for all $s\text{-}1 < f \leq t$

$w(t-s,s-1) = 0$

The first equation imposes the condition that weights sum up to 1, the second that the difference between the weight on a shock in a fixed period (*f*) and the period before that (*f*-1) is constant for a person of a certain age cohort (*t*-*s*), as long as that person was alive at time *f*, and the last that the weights will linearly decline to zero at the last period before birth (period *s*-1).[9]

Figure 1 describes the weights for people of several age groups (30 through to 70); as can be seen from the graph, the assumption of linear weights implies that young people put significantly more weight (importance) on the recent past, and they do not place any importance to anything that happen before their birth while an older person will put significantly less weight on the recent past and will have a significantly longer backward horizon going back to her birth (the slope of their declining weight would be much smaller in absolute terms).

Once we have calculated the (weighted) average exposure of a representative person from each age group/cohort, we use demographic data to calculate the (weighted) average of the exposure of the saving-age population. We collected data on the demographic

[9] In the Malmendier and Nagel (2011) notation, we assume $\lambda = 1$ in their equation (1), page 383.

composition of each country during the time period of interest (1985-2005).[10] The demographic data is available from the *World Development Indicators* for 5-year cohorts, and we collect the data for all people aged over 25.

The weighted average of the EIC index for 2005 in New Zealand, for example, is thus the calculated exposure for each cohort living in 2005 as described above, weighted by their number in the overall living population of people aged over 25.

$$EIC1(t) = \sum_{s=t-80}^{t-25} d(s,t) \sum_{f=s}^{t} w(s,f,t)c(f) \qquad (1)$$

The New Zealand index for the year 2005 (t=2005) is constructed for each cohort (*s*) size as share of the national population $d(s,t)$, the magnitude of the reduction in per capita income for each catastrophic income shock in the historical record $c(f)$, and the weights $w(t-s,f)$ constructed as described above. For the 2005 index for New Zealand we used information about New Zealand income shocks going back to 1925; to account for the experience of those people who were born in the cohort of 1925-1929. Similarly to the New Zealand index for 2005 described above, we calculate the index, for New Zealand, for the years 1985, 1990, 1995, and 2000; the index for 1985, in this case, used the catastrophic shocks data going back to 1905 to account for the experience of those born in the cohort of 1905-1909. We calculate similarly the index for the other countries in our sample.

Overall, we have data for 23 high-income countries; the constraint on the list of high-income countries included is availability of information about past recessions going back to 1900. We thus have 115 observations of our index (23 countries with 5 observations per country for the years 1985-2005). We later describe an additional more recent observation

[10] Given that the demographic composition changes only very slowly, we collected this data in five-year gaps (1985, 1990, 1995, 2000, and 2005).

of the index for 2010, in an attempt to evaluate the likely impact of the global financial crisis that started in 2008 on future saving behavior.

3.2. Alternative EIC indices

In order to verify the robustness of any results we present, and since there is no precedent or a previously used alternative to our EIC measure, we use several different ways to construct our EIC index. All of these variants of the index are constructed from demographic data and the history of past exposure to income shocks; each cohort's exposure to income shocks is calculated as a weighted average of its history (linearly declining weights) and the overall population exposure is the weighted average of each cohort's exposure (weighted by the cohort's share of the population).

In a second version of this index, the benchmark index undergoes a log transformation.

$$EIC2(t) = 2 + \log[EIC1(t)] \quad (2)$$

In the third alternative, we calculate the EIC Index by using only the cohorts aged 40-65 since these are the prime 'saving' cohorts.

$$EIC3(t) = 2 + \log[\sum_{s=t-65}^{t-40} d(s,t) \sum_{f=s}^{t} w(s,f,t)c(f)] \quad (3)$$

Our fourth and fifth alternatives EIC indices are calculated by assuming a non-linearity of the income catastrophe's impact (i.e., we use convex and concave functions of the measured per capita income decline during the recession).

$$EIC4(t) = 2 + \log[\sum_{s=t-80}^{t-25} d(s,t) \sum_{f=s}^{t} w(s,f,t)c(f)^{\frac{1}{2}}] \quad (4)$$

$$EIC5(t) = 2 + \log[\sum_{s=t-80}^{t-25} d(s,t) \sum_{f=s}^{t} w(s,f,t)c(f)^{2}] \quad (5)$$

Index 4 and 5 are concave and convex transformations of the crisis depth measure. For the concave transformation, we are hypothesizing that the measurable depth of the

downturn is less important than the actual event occurring, and with the convex transformation we are examining whether especially catastrophic collapses in incomes have a more pronounced effect on saving behavior.

3.3. Other Data

In the regressions described below, we estimate the determinants of measures of saving rates across countries.

$$SAV^{T}_{it} = \alpha_{it} + \beta X_{it-1} + \delta EIC_{it} \qquad (6)$$

where SAV^{T}_{it} is either household saving, public sector saving, or private sector saving (calculated as total saving minus public sector saving) for country *i* and time *t* (*t*=1985, 1990,…,2005). The exposure to income catastrophes index is similarly varied by country and time period. Throughout, we report results for the various versions of the index, but in cases where the results were nearly identical we report the *EIC1* version of the index. Details about these measures and their sources, as well as details about the other variables included, are all available in a data appendix.

Recent papers most similar to ours in their empirical estimation of saving behavior at the aggregate level are Loayza et al. (2000) and Kinugasa and Mason (2007), though the latter's interest is the demographic determinants of national saving. Loayza et al. (2000) use a panel dataset of saving rates for 1965-1994 and a very large sample of countries to estimate their determinants. They pursue a reduced-form approach that attempts to identify broad regularities in the data rather than be wedded to a specific theory of saving. In their view, the theoretical literature, as well as the micro-empirical literature, is not cohesive enough to suggest a specific structural specification that would be empirically preferable.

Our main independent variable of interest is the *EIC* described in the previous section, but we rely on Kinugasa and Mason (2007), who have also estimated the determinants of saving rates across countries, and we use their list of controls (X_{it-1}) in determining the appropriate RHS variables in our regression specifications. We use: average GDP growth in previous five years period; the real interest rate (average for previous five years); labour participation rate (average for previous five years); and a proxy for institutional strength (we use the *International Country Risk Guides* political risk measure[11]).

3. Descriptive Statistics

We first examine some of the properties of the index we constructed. Figure 2 includes a detailed comparison of the index, calculated for the year 2005, for all the countries in our sample. Germany has the highest index, given its exposure to very catastrophic declines in income in the interwar period and most notably after 1945. Singapore also has a high index, as it experienced large income shocks later than most high-income countries; for whom most of the post WWII period has been benign. All the Scandinavian countries tend to have low index levels, while the English-speaking countries tend to have median readings of the index.[12]

In the figures 3A-3C, we document the evolution, over our sample period, of the index for the countries in our dataset. We distinguish between emerging high-income countries over this period (Korea, Greece, Iceland, Portugal, Singapore and Spain), continental

[11] The ICRG political risk index ranges from 1-100 with higher numbers signifying a less risky political environment. To simplify the analysis, we change the sign so that higher numbers register more political risk.
[12] In a companion paper that looks at the recent global financial crisis, we point out that many countries that have experiences the recent banking crisis most severely have index measures that are close to the median (including the USA, UK, Greece, Iceland, and Spain). We speculate that lack of a culture of thrift, related to fairly benign past experiences, is related to the asset bubbles that appeared in these markets (Aizenman and Noy, 2013).

Western Europe, and a group of English speaking countries (and Japan). In all cases, the most noticeable observation is the consistent decline in the measured index over this time period. The most obvious reason for this decline is that all these countries have not experienced any dramatic negative shocks to per capita income (more than 10%) since the beginning of the sample in 1980, and as the memory of the earlier shocks receded, so did the measured index.

Next, we begin examining the relationship between our measured EIC index and saving behavior by examining the bi-variate correlations. Figures 4A-4D contain plots of all the observations in our data, and the bi-variate relationship between the EIC index (EIC1) and our measures for household saving, private saving, government saving, and the current account. For the first two, there appears to be a positive correlation between these variables: higher measures of the index (higher exposure to past crises) are correlated with higher household/private saving. We measure the coefficient for a linear bi-variate regression, with an intercept, and find similar results: 7.7 percentage points increase of household saving (as percent of GDP) for each one unit of the index and 6.2 percentage points for the private saving measure.

In contrast, in figures 4C-4D, we observe a negative correlation between government saving and the EIC index, and a weaker negative correlation between the current account surplus and the index. For the government saving measure, an increase of the index by one unit decreases government saving by 3.2 percentage points (as share of GDP) – again calculated from the bi-variate regression with an intercept. The current account, in contrast, only experiences a 0.58 percentage point decline for a one unit increase of the index. [13]

[13] As we discuss later, in our full multi-variate regression model, the results for the current account are all statistically indistinguishable from zero; suggesting there is little effect from the index to the current account. Given our contrasting findings for public and private saving, that finding might not be such a surprise.

4. Regression Results

Tables 1 reports results for household saving, while table 2 reports results for government saving. In separate specifications, we also investigated the determinants of private saving (calculated as total minus government saving) and the current account. For our sample (5-year averages for high-income countries for 1980-2005) the models for estimating our private saving and current account measures are empirically unsuccessful in uncovering any regularities. While the fixed effects have significant explanatory power, none of the other variables we use does, including the EIC index. We therefore do not include the results for private saving and the current account in our reported tables. Readers should note we already identified very weak correlation between these variables and the index in the bi-variate information we discussed above in figures 4C and 4D.

For table 1 reporting on the determinants of household saving, we note that the coefficients for the control variables do not appear to have significant explanatory power. About 30% of the variation in the dependent variable appears to be explained by constant cross-country differences (the fixed effects). The political risk variable is statistically significant and negative when the fixed effects are not included; i.e., a higher political risk implies lower household saving. This result is as expected given the correlation between political risk measures and institutional instability and the likelihood of expropriation. Beyond that, however, none of the other control variables we included are able to further explain the level of household saving. The EIC index, in contrast is always statistically significant, usually at the 1% level. More importantly, its real impact appears to be quite

substantial, with a one standard deviation increase in the index associated with an increase of about 3-4 percentage points in household saving (as percent of GDP).[14]

Table 2 provides a similar equation specification for the government saving measure. For the control variables we include, we observe significantly more explanatory power, and in general the models we estimate have a higher R^2 (between 0.54-0.79). The real interest rate is negative and significant, implying that a higher interest rate (usually associated with periods of inflation or contractionary monetary policy) is associated with lower government saving (higher deficits). The GDP growth measure is positive, as expected, so that periods of higher growth are also accompanied by higher government saving. The labor participation rate is statistically significant in some specifications, pointing to a correlation between higher labor participation rate and higher public saving. Maybe intriguingly and counter intuitively, higher political risk is associated with higher public saving as well.

As for the EIC index, as we noted above, the results for public saving are dramatically different than for household saving with the index consistently negative, and frequently also statistically significant. Interestingly, the index is negatively significant only when we include the country fixed-effects, suggesting that the time invariant cross-country differences are associated with the government's saving choice so that only once we control for these can we identify the impact of the index.

Table 3 compares the real economic significance of the various alternatives of the EIC index on the measures of interest, household and public saving. We find that the impact of the EIC on household saving is quite significant, with an increase of 3-4 GDP percentage points for a one standard deviation increase in the index, while the impact on public saving, as is probably intuitively expected, is half as big, and has the opposite sign (an impact of 1.4-

[14] The real economic significance of our results is described in detail in table 3.

1.7 GDP percentage point decrease in public saving for every one standard deviation change in the index).

5. Saving after the Global Financial Crisis of 2008 and beyond

We document that households respond to past shocks by increasing their saving rates, and that this effect is long-lasting; countries whose households experienced large adverse shocks in the past (even the distant past) have higher household saving rates. Public saving, in contrast, is not similarly responsive and may be compensating for higher household saving with larger deficits. This decrease in public saving, however, is about 1/3 in magnitude than the corresponding increase in private/household saving. We document this relationship for high-income countries, and leave an investigation of the relationship between past shocks and household and public saving in emerging markets for when better data may become available.

A better understanding of the effects we describe may require some insights into households' expectations regarding the viability and credibility of public safety nets and their ability to cushion against large income shocks. Our findings also raise important questions about the unintended consequences of policies that aim to assist households in dealing with adverse macroeconomic environments. Without the exposure to the discipline imposed by shocks, households precautionary saving may be insufficient.[15] After all, a pervasive concern in almost all high income countries is that saving rates do not reflect the demographic trends that lead to much longer life in retirement and changes in the aggregate dependency ratios that will place gradually increasing strains on public finances.

[15] This comment does not imply we necessarily view this cushioning as a policy mistake. It, however, may suggest that governments should find ways to increase saving rates with the realization that the low rates are somewhat a function of public safety nets.

The dynamic impacts we document are bound to play important roles in the coming decades given the unprecedented nature of the 2008-2010 global financial crisis (GFC). Table 4 documents one possible measure of the cumulative output loss in the aftermath of the GFC in the countries in our sample.[16] Given the global nature of this event, all countries experienced some loss with the highest loss recorded for Finland (13.9%).[17] Barro and Ursua use a threshold of 10% decline in income per capita to denote a catastrophic shock, and we have followed them in the empirical work that this paper presented. Only three countries have experienced such a catastrophic shock, and given the benign nature of the last few decades, we use a somewhat lower threshold of 8%.

Figure 5 describes the calculation of the EIC index for the six countries that have experienced a cumulative decline of at least 8% in per capita income. Clearly, all experienced an increase in their exposure index, with the most notable increase for Finland, given its low previous index level and the very large drop of incomes that they experienced. In contrast, Germany experienced the mildest increase, given both its very high level before the crisis and its relatively milder drop in incomes during the GFC.

Table 5 records the impact of the increase in the exposure (EIC) index on public and household saving that we project given our empirical results. Not surprisingly, Finland is projected to experience the largest increase in household saving and the largest decrease in public saving, but the average increase in the household saving rate for this group of countries that have experienced catastrophic income shocks during the GFC is about four percentage points (of GDP). The corresponding figure for public saving is -1.6 (% of GDP). These are substantial impacts.

[16] For alternative ways to measure the GDP declines associated with an crisis/recession, see Hutchison et al. (2010).

[17] Greece's loss is ongoing and is likely to surpass Finland. We use WDI data which only has the information until the end of 2011 – at that time the cumulative Greek loss was 10.1%.

None of these countries, except perhaps Germany, is systematically important to the world economy and the imbalances in global saving that have persisted even in the aftermath of the GFC. Neither of the three largest economies—the US, Japan, and China—have experienced as large a catastrophic shock as the ones we have focused on in this paper. It is possible, however, that at least in the case of the US the shock was drastic enough to engender long term changes in households saving rates. Yet, the distribution of the cost of the global crisis in the US may have been such that households that provided much of the saving in the pre-crisis period were less affected and the crisis would thus not lead to very big changes in aggregate household saving behavior.

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Figures

Figure 1:

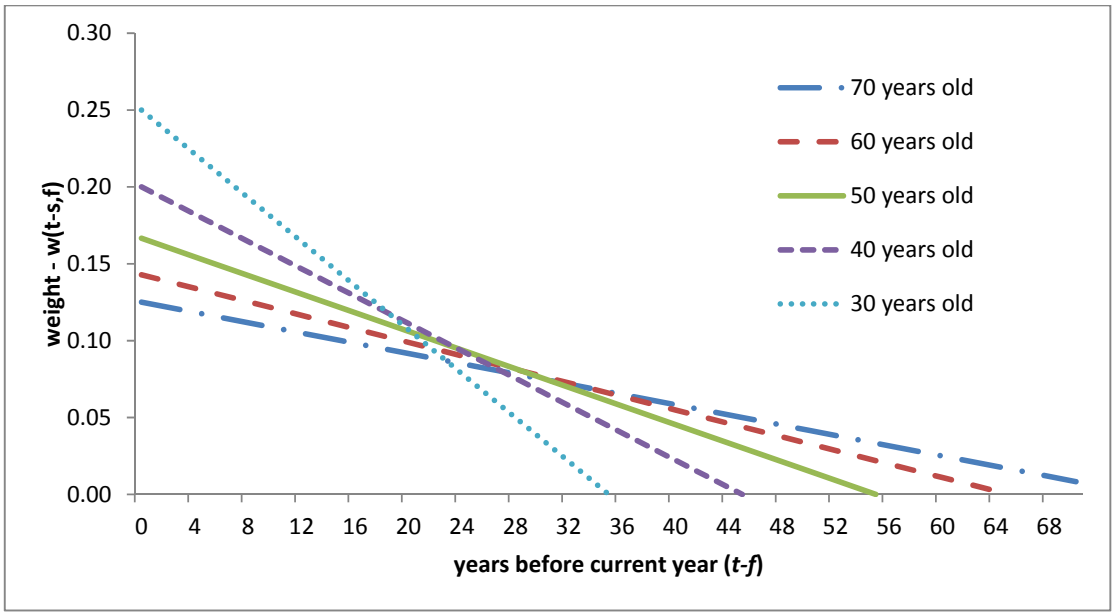


Figure 2:

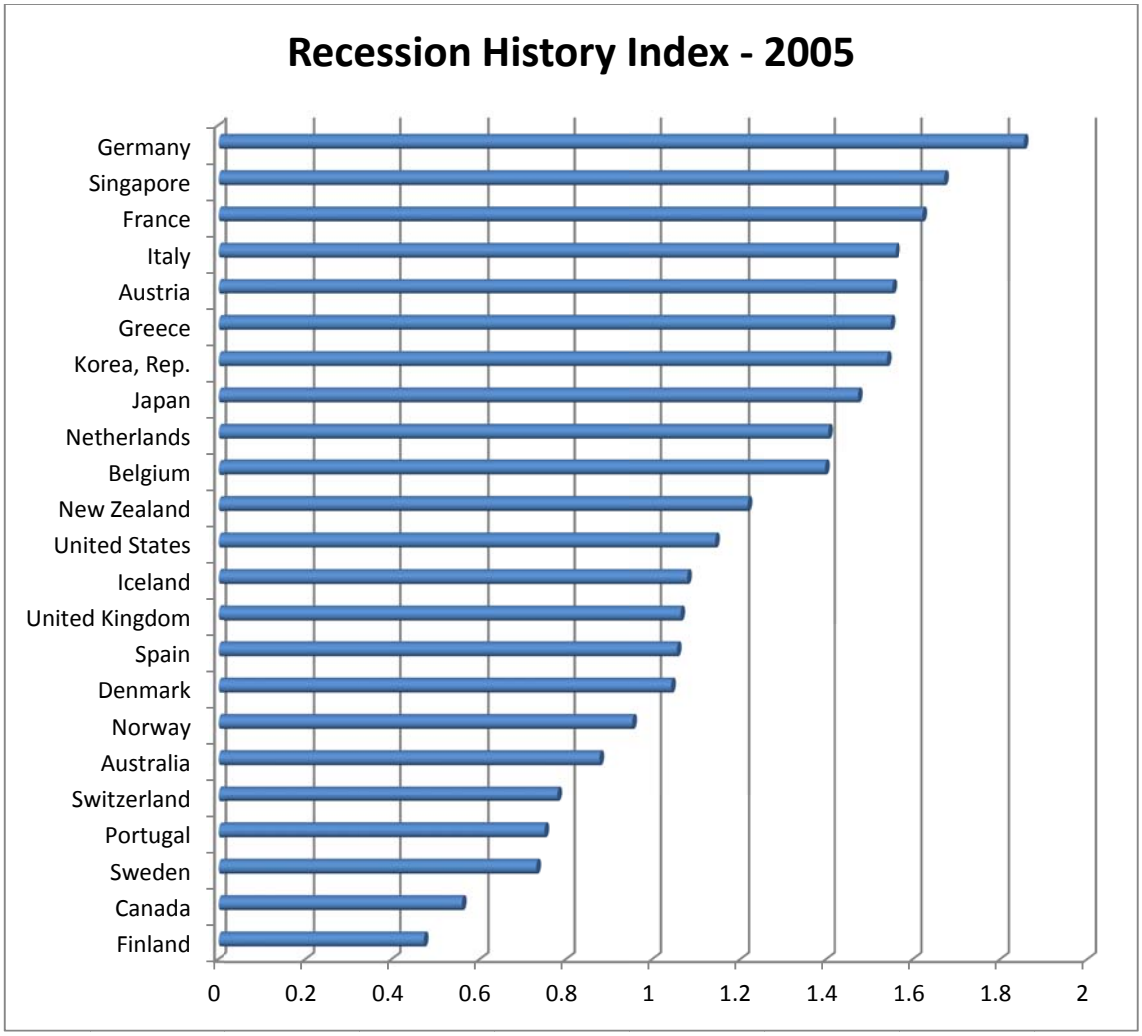
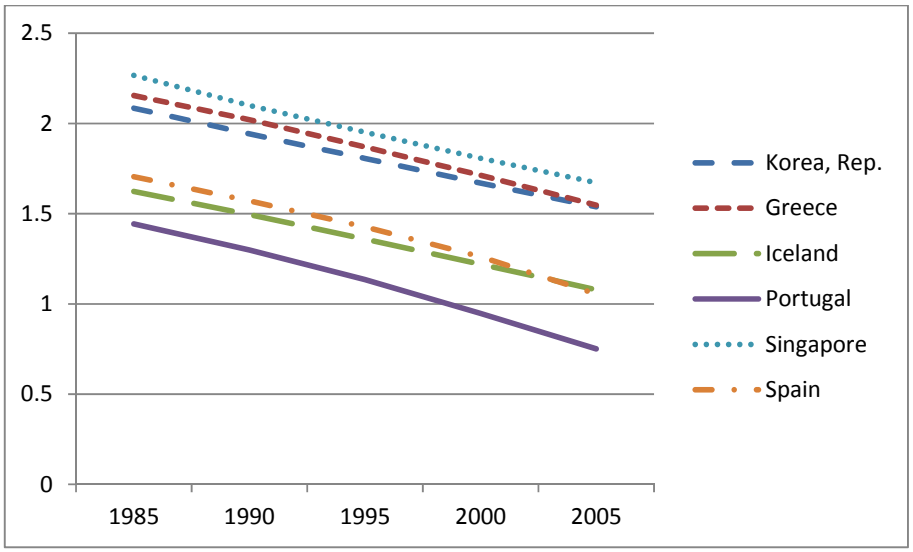
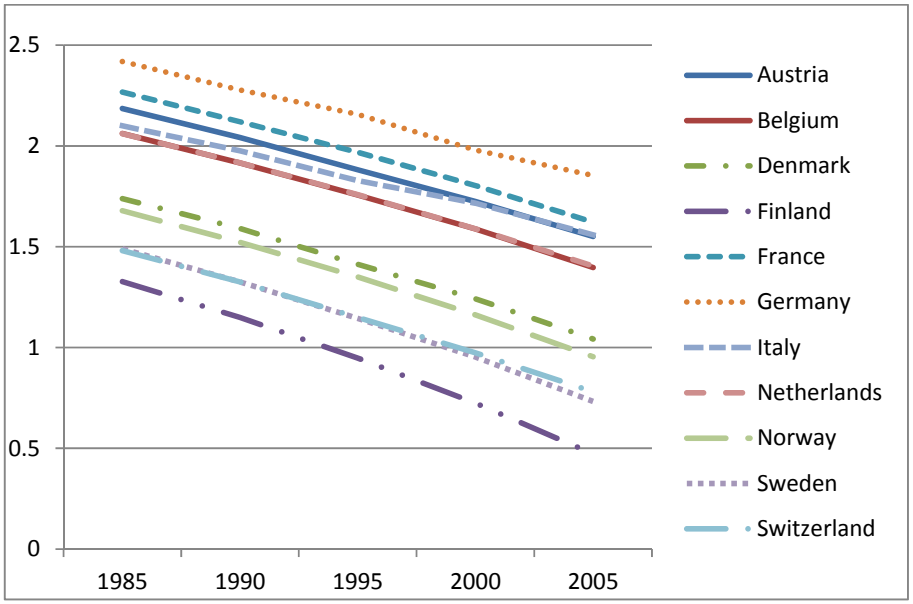

Recession History Index - 2005
Germany
Singapore
France
Italy
Austria
Greece
Korea, Rep.
Japan
Netherlands
Belgium
New Zealand
United States
Iceland
United Kingdom
Spain
Denmark
Norway
Australia
Switzerland
Portugal
Sweden
Canada
Finland
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

Figure 3: The Index over time

3a: Emerging high-income



3B: Continental Europe



3C: Other

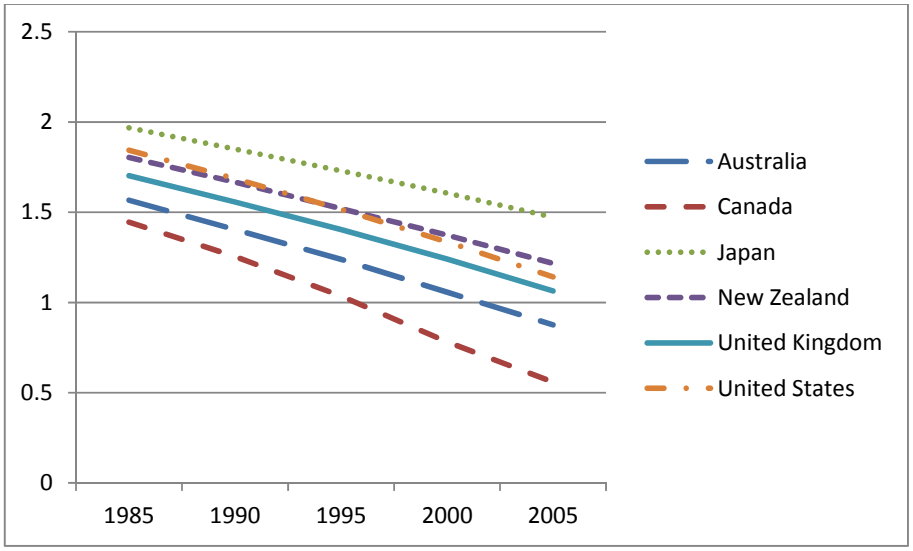

2.5
2
1.5
1
0.5
0
1985
1990
1995
2000
2005
Australia
Canada
Japan
New Zealand
United Kingdom
United States

Figure 4A: Bi-variate: Household saving and the index

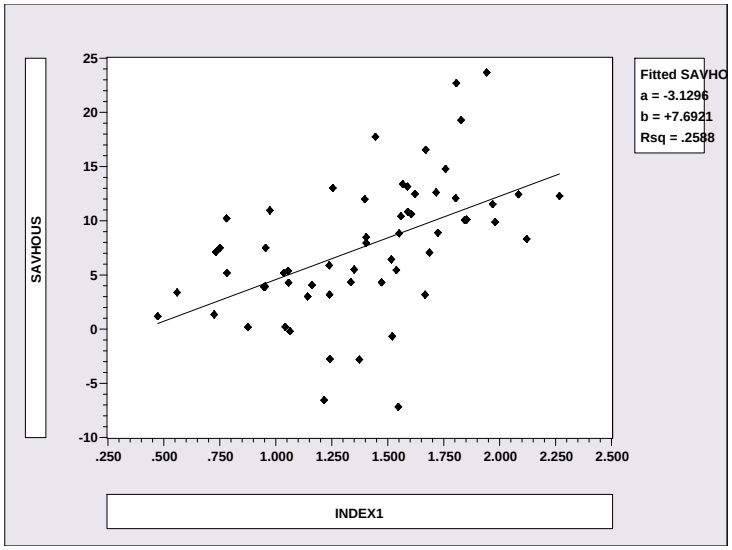


Figure 4B: Bi-variate: Private saving (total minus government) and the index

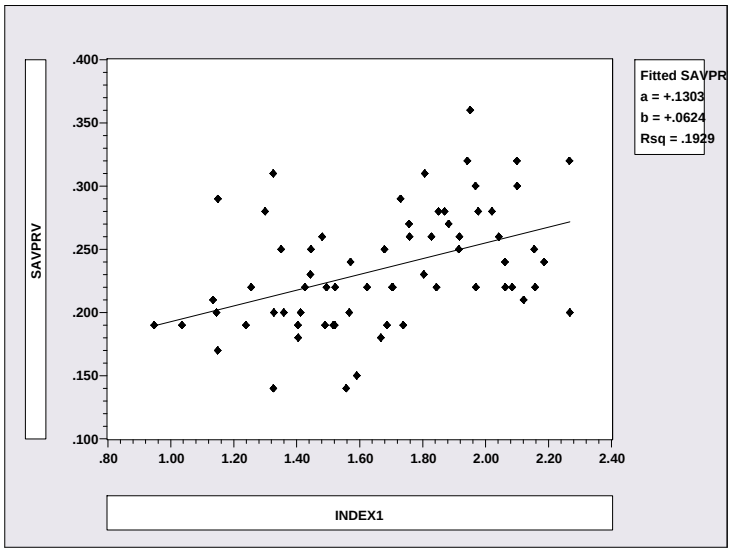


Figure 4C: Bi-variate: Government saving and the index

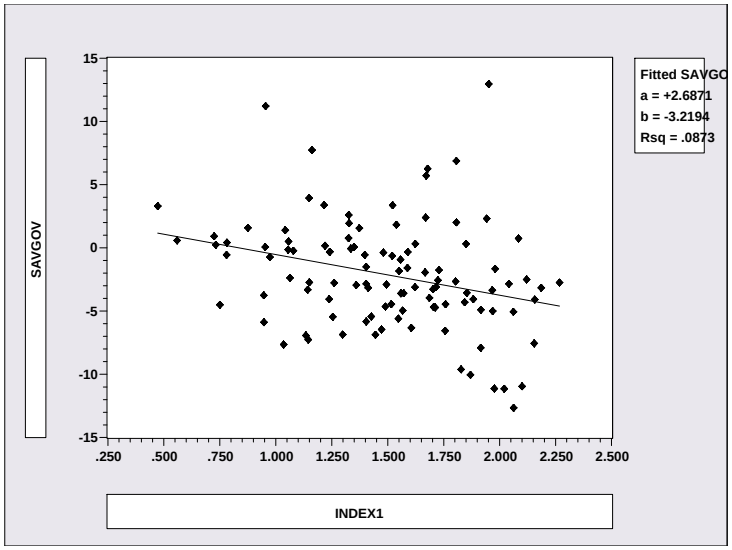


Figure 4D: Bi-variate: Current account surplus and the index

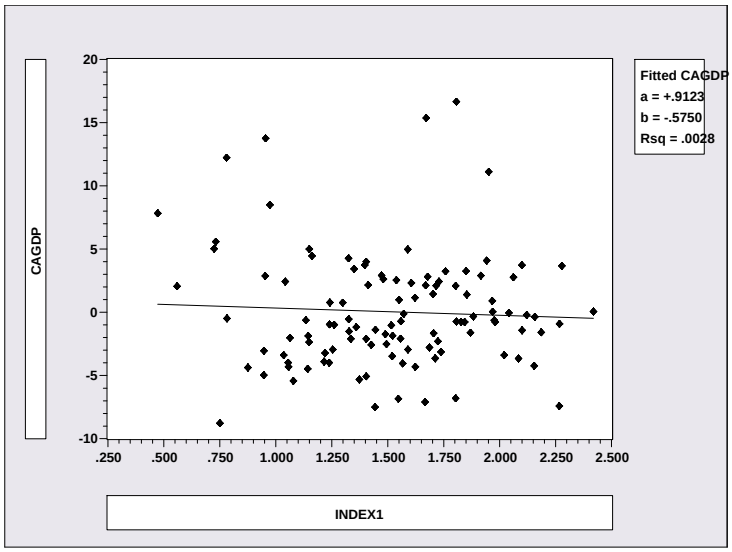


Figure 5: Countries with GFC Income Loss higher than 8%

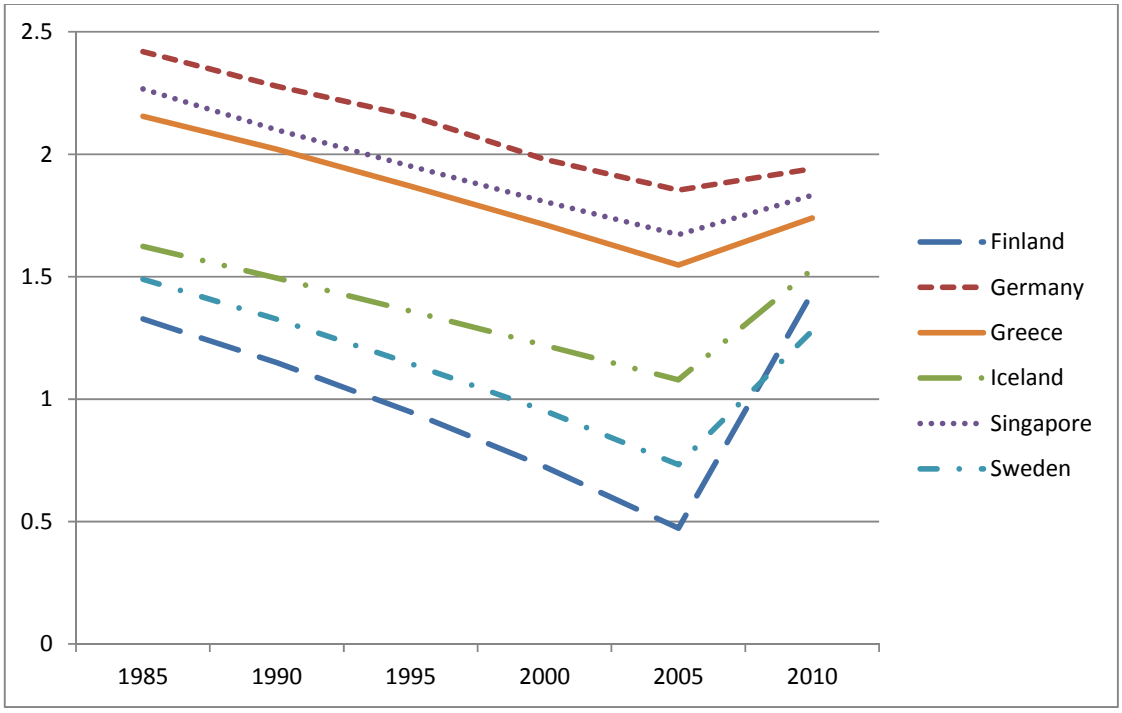


Table 1

LHS	Household Saving rate					
INDEX1	5.63**	10.07***				
	(2.36)	(3.97)				
INDEX4			6.28**	10.07***		
			(2.31)	(4.00)		
INDEX5					2.04**	2.92***
					(2.42)	(2.97)
Real interest rate	-0.09	0.05	-0.14	0.04	-0.05	0.15
	(0.35)	(0.23)	(0.49)	(0.20)	(0.21)	(0.62)
GDP growth	-0.39	0.38	-0.55	0.39	-0.40	0.30
	(0.67)	(0.56)	(0.94)	(0.57)	(0.67)	(0.41)
Labour part. rate	-0.01	-0.07	-0.04	-0.09	0.00	-0.17
	(0.03)	(0.19)	(0.26)	(0.22)	(0.00)	(0.40)
Political risk (ICRG)	-0.32*	-0.03	-0.34	-0.03	-0.32*	-0.07
	(1.96)	(0.29)	(2.10)	(0.26)	(1.98)	(0.63)
N	54	54	54	54	54	54
Adjusted R2	0.32	0.66	0.31	0.66	0.32	0.63
Fixed effects	N	Y	N	Y	N	Y

All specifications were estimated with LIMDEP. Details about the variables are available in the data section and the appendix. Fixed effects were estimated with correction for country-specific heteroskedasticity in the error terms. The t-statistics for each estimated coefficient are given in the parentheses. *, **, and *** represent the conventional statistical significance at the 10, 5, and 1%, respectively.

Table 2

LHS	Government/Public Saving rate					
INDEX1	-1.32	-3.95***				
	(1.47)	(3.97)				
INDEX4			-1.34	-4.01***		
			(1.31)	(4.74)		
INDEX5					-0.45	-1.38***
					(1.43)	(4.38)
Real interest rate	-0.19*	-0.25***	-0.19*	-0.25***	-0.19*	-0.27***
	(1.89)	(3.99)	(1.88)	(3.99)	(1.95)	(4.10)
GDP growth	1.48***	0.97***	1.49***	0.97***	1.48***	0.98***
	(7.69)	(6.50)	(7.69)	(6.50)	(7.69)	(6.45)
Labour part. rate	0.10*	0.23	0.11**	0.23	0.10*	0.19
	(1.83)	(1.54)	(2.11)	(1.48)	(1.77)	(1.22)
Political risk (ICRG)	0.18***	0.07*	0.18***	0.07*	0.18***	0.07*
	(3.75)	(1.78)	(3.76)	(1.74)	(3.78)	(1.79)
N	98	98	98	98	98	98
Adjusted R2	0.54	0.79	0.54	0.79	0.54	0.79
Fixed effects	N	Y	N	Y	N	Y

All specifications were estimated with LIMDEP. Details about the variables are available in the data section and the appendix. Fixed effects were estimated with correction for country-specific heteroskedasticity in the error terms. The t-statistics for each estimated coefficient are given in the parentheses. *, **, and *** represent the conventional statistical significance at the 10, 5, and 1%, respectively.

Table 3: The Real Significance of the Index (in percentage points)

	household saving	government saving
Index 1	4.13	-1.62
Index 4	3.52	-1.40
Index 5	3.62	-1.71

The table describes the impact on the saving rate/GDP ratio of a one standard deviation increase in the EIC index.

Table 4: Income shocks during the GFC (as percent of per capita GDP)

Country Name	Peak	Trough	Cumulative Decline
Australia	2007	2009	2.7
Austria	2007	2009	7.4
Belgium	2007	2009	5.7
Canada	2007	2009	5.1
Denmark	2007	2009	7.3
Finland	2007	2009	13.9
France	2007	2009	5.3
Germany	2007	2009	8.3
Greece	2007	2011	10.1
Iceland	2007	2009	10.2
Italy	2007	2009	7.0
Japan	2007	2009	7.6
Korea, Rep.	2007	2009	4.8
Netherlands	2007	2009	7.9
New Zealand	2007	2008	4.4
Norway	2007	2009	4.5
Portugal	2007	2009	5.1
Singapore	2007	2009	8.3
Spain	2007	2009	6.2
Sweden	2007	2009	8.4
Switzerland	2007	2009	6.1
UK	2007	2009	7.6
USA	2007	2009	5.3

The table describes the cumulative per capita income decline experienced during the global financial crisis in the countries in our sample of high-income countries. The decline is calculated as the cumulative reduction in per capita GDP growth from the peak (2007) to the trough of the crisis experienced in each country. For most, the trough was in 2009, with the exception of New Zealand, that experienced a briefer one year decline and Greece whose decline appears to be continuing (our data ends with the 2011 data). GDP growth data is from the *Word Development Indicators* (NY.GDP.PCAP.KD.ZG).

Table 5: The Impact of the GFC on Saving Rates (in percentage points of GDP)

	Index in 2005	Index in 2010	Increase in index [a]	Δ in household saving	Δ in public saving
Finland	0.5	1.4	1.0	9.7	-3.8
Germany	1.9	1.9	0.1	0.9	-0.3
Greece	1.5	1.7	0.2	1.9	-0.8
Iceland	1.1	1.5	0.5	4.5	-1.8
Singapore	1.7	1.8	0.2	1.6	-0.6
Sweden	0.7	1.3	0.5	5.5	-2.2

The table describes the impact on the saving rate/GDP ratio of the increase in projected saving rates (household and public) for the countries in our sample whose per capita output loss during the global financial crises exceeded 8%. Finland, Greece and Iceland also exceeded 10% (as in the Ursua-Barro dataset).

[a] Rounded numbers.

Appendix Tables

Table A1: Descriptive Statistics

	Mean	STD
Index 1	1.53	0.41
Index 2	0.50	0.47
Index 3	1.08	0.57
Index 4	1.83	0.35
Index 5	2.50	1.24

Table A2: Cross-correlations

	Index 2	Index 3	Index 4	Index 5
Index 1	0.89	0.94	0.95	0.99
Index 2		0.82	0.85	0.94
Index 3			0.97	0.92
Index 4				0.94

Table A3: Data Sources

Explanatory Variables	**Data Source**
EIC index	Barro and Ursua (2012) and WDI
Real interest rate	World Development Indicators
GDP growth	World Development Indicators
Labor force part.	World Development Indicators
Political risk	International Country Risk Guides