Economic crises and Inequality[1]

A B Atkinson, Nuffield College, Oxford and London School of Economics
Salvatore Morelli, University of Oxford

---

[1] Paper prepared for the 2011 Human Development Report, funded by the United Nations Development Programme. The research forms part of the work of the Institute for Economic Modelling (EMoD) at the University of Oxford, supported by the Institute for New Economic Thinking (INET) and the Oxford Martin School.

The paper develops the analysis of financial crises reported in Atkinson and Morelli (2010), a study carried out with the support of the International Labour Organisation. The paper is based on a data-base for 25 countries covering 100 years described in Atkinson and Morelli (2011), which draws on earlier research by Atkinson (2003), Brandolini (2002) and by the authors of the country studies in the top incomes project published in Atkinson and Piketty (2007 and 2010). None of these institutions or authors should be held responsible for the views we have expressed.

Appendix: The identification of crises

1. Introduction: Sustainability, crises and inequality

Sustainability for a society means long-term viability but also the ability to cope with economic crises and disasters. Just as with natural disasters, we can seek to minimise the chance of them occurring and can set in place policies to protect the world's citizens against their consequences. Both avoidance and protection are essential. Indeed, in the case of economic crises and disasters, the balance is more favourable to avoidance than with natural phenomena. Economic crises typically concern the institutions created by humans and, in principle at least, are more subject to influence by governments and international organisations. Historically, economic crises have often led to changes in these human institutions, such as the introduction of Social Security in the United States in the 1930s.

The paper is concerned both with the impact of economic upheavals on the inequality of resources and with the reverse direction of causality: the impact of inequality on the probability of economic crises. These are two related, but different, questions. The first question asks how far economic crises lead to rising inequality in access to resources. Is it the poor who bear the brunt? Or are crises followed by a reversal of a previous boom in top incomes? Or do both occur? The period prior to the 2007-8 financial crisis did see rising income inequality in a number of countries, notably an increased share of total income accruing to those at the very top. Has the current crisis reversed this trend? What can we learn from past crises? The answer will depend not only on impact of the initial crisis but also on the policy responses of governments and monetary authorities, as is illustrated for the case of financial crises in Figure 1. The consequences depend on whether the financial crisis is followed by a deep recession. These different factors may work in different directions. The impact of bankruptcies and falling asset prices may have greater impact on the better-off, but an ensuing recession may hit hardest those at the bottom. It is for this reason that we look, not only at financial crises, but also at macro-economic disasters. As we shall see, they do not necessarily come together.

But are the effects of a crisis today the same as those in the past? In the US, is the recent crisis like that of 1929? Some crises may be "defining moments", leading to a permanently changed level of inequality or to a change in direction of its trend. Such change may, like US introduction of Social Security, or like increased financial regulation, work to increase the level of protection for individuals and their families and reduce inequality. The recent study by Roine, Vlachos and Waldenström using data covering the period 1900-2000 for 16 countries concluded that a banking crisis

would permanently reduce the share of the top 1 per cent by about 0.2 percentage points for each year of the crisis[2] (2009, Table 7). But change today may work in the opposite direction. Pressures for fiscal consolidation may lead to a permanent scaling-down of the welfare state. Put the other way round, the avoidance of economic crises may be necessary to ensure the sustainability of the social institutions we have developed to keep inequality in check, such as the welfare state and the stability of democratic political governance. (In this paper, we focus on inequality *within countries*, but the same issues apply in the case of global inequality.)

The second question approaches the issue the other way round and asks how far inequality has increased the probability of crises. Was the recent financial crisis the result of the prior rise in income inequality? Have previous periods of high inequality led to the increased risk of economic crisis? The last 100 years has seen a broad pattern where inequality within countries was high before the Second World War, was lower and, in some cases, falling, over the next 35 years of the "Golden Age", and then rose in the latter part of the century. Banking crises, as we shall see, almost all occurred before 1945 or after 1980. Is there then a "smoking gun"? On the other hand, we shall see that economic crises in the form of sharp falls in consumption or output are spread more evenly over the century (abstracting from wartime). Is inequality causally linked with financial crises, but not directly with collapses in consumption?

The two causal processes can be mutually self-reinforcing. Increased inequality may have increased the probability of a crisis, and the crisis may have had distributional effects that have strengthened the link. This may have happened if the underlying mechanism is a political one, where money buys influence, for example to secure the liberalisation of previously regulated financial markets, which in turn increased earnings in the financial sector (Philippon and Reshef, 2008). It has been argued that liberalisation increased the probability of financial crises: "the number of banking crises per year more than quadruples in the post-liberalisation period" (Kaminsky and Reinhart, 1999, page 476). On a political economy explanation, the crisis strengthens the hand of those in control of the financial sector, giving them political influence, and allowing them to protect their earnings, transfer the cost of crisis-resolution to the taxpayer, and resist the re-introduction of regulation.

On the other hand, it is possible that we have a case of co-incidence, rather than causality. The common experience of crises and inequality may be due to a third causal mechanism. Liberalisation and rising top incomes may be a common result of a rightward shift in political thinking, as has been argued by Krugman (2010) and Acemoglu (2011). If that is the case, then there may be an intermediate path, where

[2] Morelli (2010) undertakes a similar study focusing entirely on US and using a different methodology.

market de-regulation is combined with effective progressive taxation to secure social justice.

In examining these questions, the paper takes a long-term perspective, drawing on data for the past hundred years from 1911-2010. A long-run view is essential since crises are, fortunately, relatively rare events. As was noted by Reinhart and Rogoff, the study of financial crises requires a much longer run of years: "a data set that covers only twenty-five years simply cannot give one an adequate perspective" (2009, pages xxvii and xxviii).

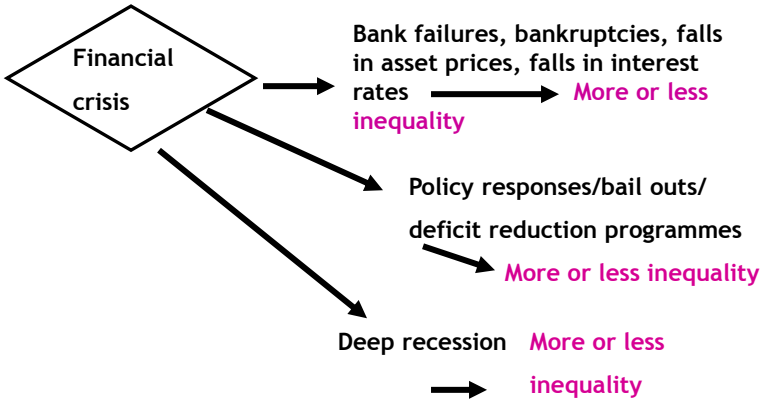
The paper considers the history of crises over the 100 year period in 25 countries.[3] Looking across countries is valuable for several reasons. First, the fact that economic crises are rare means that we have few observations for a single country, even when we take a 100-year perspective. To quote Barro, "to use history to gauge the probability and size distribution of macroeconomic disasters, it is hopeless to rely on the experience of a single country" (2009, page 246). Secondly, the comparative experience of different countries, with differing institutions, is a potential source of evidence about the two relationships we are investigating. For instance, Norway, Sweden and Finland all experienced financial crises in the early 1990s, but did inequality follow the same path? In selecting the countries covered, we have sought to include those from whose experience we can learn about economic crises. We have also chosen those for which evidence is available over a long run of years. This limits the geographic coverage, and our set of countries is weighted towards the OECD, but it does include 11 countries outside North America and Europe. A global reach is important, since financial crises have – historically and today – a major international dimension. Global contagion means that we may have to seek causal factors abroad. If US inequality causes a US financial crisis that spreads across the world, then it has global ramifications. A crisis may stop of being global, but have wide regional ramifications. Singapore, for example, is not recorded as having a banking crisis in 1997, but was undoubtedly influenced by the crises in neighbouring countries.

The issues raised in this paper involve interplay between a complex set of mechanisms – economic, social and political. We cannot do them justice in this paper. Rather our more modest aim is to set out the factual picture about the pattern of change in inequality before and after economic crises. This will be the subject matter

[3] The countries covered are Argentina, Brazil, Australia, Canada, Finland, France, Germany, Iceland, India, Indonesia, Italy, Japan, Malaysia, Mauritius, Netherlands, New Zealand, Norway, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, the UK and the US.

of Sections 4, 5 and 6. First we need to clarify what we mean by crises (Section 2) and by inequality (Section 3).

Figure 1 Financial crises and inequality



2. Macro-economic crises

Sustainability is a property associated with groups of people, with countries, with regions, and with the world as a whole. In the same way, economic crises are typically seen as affecting countries (such as the Great Depression in the US), or groups of countries (such as sterling crises or the Asian financial crisis). However, while crises are discussed at an aggregate level, it is the impact on people that is our ultimate concern. It is this link with individual experience that makes inequality of particular salience. A crisis for a family is when their income falls precipitately, when their crops fail, when they cannot get money out of the bank, or when their savings turn out to be worthless.

As these examples illustrate, economic "crises" take many different forms; and the different types of crisis impinge differently on a country's citizens. In this paper, we are concentrating on two major types of crisis: systemic banking crises and consumption/GDP "collapses". These are only two of the many possible approaches, and some of the limitations should be stressed at the outset. We are concerned with banking crises not with stock market collapses. Banking crises are typically associated with stock market crashes, but the converse is not true. There have been many steep falls in share prices that have not threatened the stability of the financial system. In the US, stock prices fell sharply in 2000, but this was not associated with a banking crisis (see Mishkin and White, 2003). We consider crises associated with sharp falls in aggregate output and consumption but we do not give explicit consideration to famines. We do not consider as such natural disasters, although they may be

associated with the crises we examine. For example, the 1923 banking crisis in Japan occurred at the time of the Great Kanto earthquake and the financial problems have been attributed to actions taken by the Bank of Japan to rediscount "earthquake bills". In 1997, the Philippines was hit by both the financial crisis and by El Niño (see Datt, Gauray and Hoogeveen, 2000).

As has been emphasised by Reinhart and Rogoff, "crises often occur in clusters" (2009, page xxvi). Banking crises are often linked to balance of payments problems (Kaminsky and Reinhart, 1999) and external debt crises. Domestic financial crises may indeed originate as currency crises. This may be relevant when considering the relation between inequality and the risk of crisis, and may also be important with the reverse hypothesis if there are systematic differences between the distributional impact of banking crises that are linked to currency crises and those that are not so linked.

2.1 Systemic banking crises

We are concerned with *systemic* banking crises, not events limited to a single bank or a few banks. So, for example, the failure of Barings in the UK in 1995 is not classified as a banking crisis. A systemic banking crisis is a situation in which, in the words of Laeven and Valencia, "a country's corporate and financial sectors experience a large number of defaults and financial institutions and corporations face great difficulties repaying contracts on time. As a result, non-performing loans increase sharply and all or most of the aggregate banking system capital is exhausted. This situation may be accompanied by depressed asset prices (such as equity and real estate prices) on the heels of run-ups before the crisis, sharp increases in real interest rates, and a slowdown or reversal in capital flows. In some cases, the crisis is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress" (2008, page 5).

The classification of Laeven and Valencia (2010) is one of the three on which we base our analysis, but does not start until 1970. The two other major data sets on which we draw go back much further in time. These are the widely-used databases on systemic banking crises of Bordo et al (2001), and Reinhart and Rogoff (2008, 2009, and Reinhart 2010). In many cases, these sources coincide in their identification of banking crises, but there are a substantial number of disagreements. The latter reflect in part differences in approach and in part differences in judgment. In order to arrive objectively at a definition of the start dates of banking crises, we have combined these three different sources in a way that is explained in the Appendix. The resulting total 72 cases are shown in Appendix Table A.1.

2.2 Consumption and GDP collapses

The negative macro-economic consequences of banking crises have been much discussed: "downturns following banking crises are found to be more protracted with larger output losses" (Haugh, Ollivaud and Turner, 2009, Abstract). Here we turn the telescope round and consider crises defined in macro-economic terms, drawing on the recent work of Barro and colleagues (Barro, 2009, and Barro and Ursúa, 2008). Barro and Ursúa (2008) have identified consumption and GDP "disasters", which they define to be cumulative declines from peak to trough of at least 10 per cent in real per capita personal consumption expenditure or real per capita GDP. We implement independently their methodology and confirm most of their listed disasters, but we also include milder crises for the post-1950 period. Our definitions are explained in the Appendix, and the list of Consumption and GDP collapses is given in Tables A.2 and A.3.

In this way, we identify 100 consumption disasters (in 24 countries only: the missing country is Mauritius) and 101 GDP disasters over the period from 1911 to 2006. (The data do not cover the recent recession.) . The appendix tables show in each case the peak and trough years. So that, for example, consumption in Argentina fell from a peak in 1998 to a trough in 2002 by 22.5 per cent, and between 1991 and 1993 there was a 6.9 per cent fall in Sweden. 65% percent of these economic crises present some combination of consumption and GDP collapse. Moreover, economic collapses could coincide with other financial crises. The collapse of consumption in Sweden coincides with a systemic banking crisis, and this is the first reason why we are interested in the consumption (or GDP) based identification of crises. On the other hand, the overlap is far from complete. Of the 66 cases of banking shocks excluding the recent 2007 events, 18 co-incided with both GDP or Consumption crises that we have identified. This consideration is extremely relevant in order to disentangle the impact of different macro-shocks on inequality. This paper will not give full justice to such arguments and further research steps will need to take into account the overlapping feature of different set of macro-shocks.

3. Inequality

UNDP in its *Human Development Reports* has from the outset emphasised deprivation and inequality. The theme of distributional equity is given even greater prominence in the 2010 20th anniversary edition with the introduction of the Inequality-adjusted Human Development Index (IHDI). The IHDI encompasses life expectancy and education, as well as income, on which we focus here. The findings show for example that the loss due to inequality is 38 per cent in Brazil, and 29 per cent in Malaysia, compared with 13 per cent in Norway (2010 HDR, Table 3). But, as the *Human Development Report* makes clear, inequality can be assessed in different ways and we need to clarify its precise usage here. Inequality of what? Should we be

looking at inequality of income or consumption? Is it income or wealth? Inequality among whom? Newspaper coverage of the recent economic crisis has tended to focus on top income shares, but others have pointed to those at the bottom taking on sub-prime mortgages, or to the squeezed "middle".

3.1 Identifying inequality

Economic inequality has many dimensions. Differences exist between people in their individual earnings, and this has been the main concern of labour economics. These differences do not however necessarily lead to inequality of household incomes, where we have to add the earnings of different household members, add income from capital and from transfers, and subtract taxes to arrive at disposable income. Rising dispersion of earnings may be offset by less inequality of capital income, or by progressive taxation. During the "Golden Age" of the 1950s, the earnings gap widened in a number of countries, including the US, but this did not lead to a rise in the inequality of household incomes. But should we be looking at household consumption rather than household income? Inequality in consumption may indeed appear a more natural concern. On the other hand, people may only be able to sustain their consumption by going into debt. This consideration points to the need to measure household net worth, or the difference between its assets and its liabilities. Net worth may also help us take a longer time perspective. Household income is usually measured on an annual basis, but inequality may be better seen in terms of differences in lifetime economic status, reflecting the ebb and flow of each person's life history.

In the empirical implementation of these different concepts of inequality, we are limited by data availability. There are no regular time series on the distribution of lifetime economic status, and official statistics tell us much less about consumption than about income. We do however try to cover both earnings and income, and to cover wealth. Much of the evidence presented below relates to the annual distribution of household disposable income, adjusted for differing needs by use of an equivalence scale (i.e. recognising that $X for a family of 4 goes less far than for a single person), but this is not the sole indicator employed.

Choices have also to be made concerning the part of the distribution on which we should focus. For some observers, it is not inequality as such that is their concern, but *poverty*: the fact that families or households have an unacceptably low level of resources or standard of living. It is the first part of the income "parade" (see Figure 2) that we should be watching. In assessing the impact of economic crises, this does indeed seem the right starting point. The working of a society is not ultimately sustainable if it fails to protect its weakest members. Poverty may be defined in terms of either low income or low consumption, and measured either relatively (e.g. 60 per cent of median) or absolutely ($X in terms of purchasing power), or more

broadly in terms of social exclusion. But, however it is measured, the concern is with the lower part of the distribution.

Concern with poverty is not however likely to be the sole objective. And in seeking to examine the reverse relationship – from inequality to crisis – we certainly need to consider the distribution as a whole. It is inequality as a whole that enters the IHDI. There are however difficulties in reducing a whole parade to a single number. A single number, such as that used in constructing the IHDI, or the Gini coefficient of inequality that is also reported in the *Human Development Report* 2010, cannot tell us *where* in the distribution inequality is rising or falling. We want to be able to distinguish "top inequality", affecting the upper percentiles, from situations where it is the middle income groups which have lost out to those at the tails – sometimes referred to as polarisation.

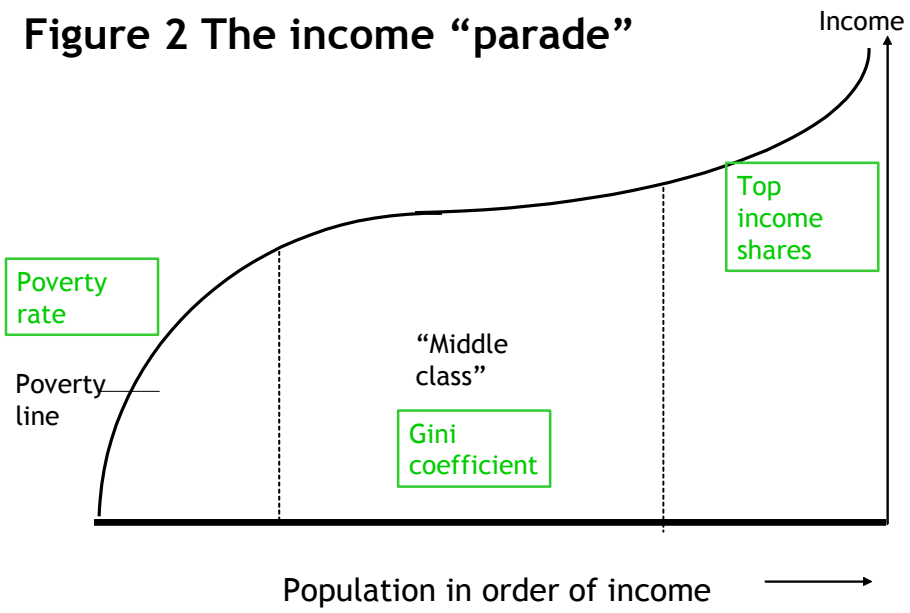
In view of these considerations, we seek evidence for each country regarding the following five indicators:

- Overall inequality (Gini coefficient);

- Top income shares; } Different points on the parade
- Income-based poverty measure;
- Dispersion of individual earnings;

} Different sources of income

- Top wealth shares.



3.2 The data challenge

The study of crises poses a major challenge with regard to distributional data. We need sources covering a long span of years and with annual data so that we can track the periods before and after the crisis.

For this paper, we have drawn on a new annual data-set on inequality that we have assembled from national data sources (Atkinson and Morelli, 2011). The first, over-riding, consideration is for consistency over time. To this end, we have adjusted the national data to ensure, as far as possible, a continuous series. This has typically involved linking series where there are discontinuities. Discontinuities are indeed frequent, even where series are published as continuous. The US Census Bureau "selected measure of household income dispersion" cover the period 1967 to 2008 but there are no fewer than 17 footnotes indicating changes in the processing method. The second consideration is extent of coverage over time. Our aim in this paper is to set the recent events in historical perspective. We have therefore sought to go back, wherever possible, to the beginning of the twentieth century. This criterion is, on occasion, in direct conflict with the first criterion, in that the earlier data may be hard to compare with those for recent years. In a number of cases, we have shown separate series.

The required information is not available for all years or for all countries, but it provides a basis for beginning to answer the questions addressed in this paper. To be

more specific, we can draw on evidence from one or more indicators covering around half of the banking crises and a third of economic crises that we have identified.

3.3 Methodology

As mentioned above, our focus will be on the poverty rate, top income shares and overall measures of income inequality such as Gini coefficient. In order to study the evolution of inequality around crisis episodes we will outline the rules which define the time horizon and the nature of inequality measures to be analyzed. First of all, in order to maximize the number of observations, we will base the classification on the "short-term" movements in inequality. Essentially we compare T-1 with the average for T-4, T-5 and T-6 for the so called "Before" period, where T is the crisis year. The period named "After" compares the average of E+3, E+4 and E+5 to E where E represents the end of the crisis period. The change from T-1 to E represents the evolution of inequality during crises ("Crisis" period).Information about an overall measure of inequality, typically the Gini coefficient, will be given priority with respect to any other measure of inequality in our database. In the absence of an overall measure, we will turn to Top income shares and ultimately to the poverty index. Positive variations of any of the above measures of inequality are taken as identifying an increase in inequality. Similarly any negative variation of any of the three measures is considered as a reduction in inequality. This is indeed a strong assumption but it will be effectively used only in those cases where an overall measure is not available. Moreover any change in the inequality measure has to be higher or equal to a third of what we consider to be "salient" variation in inequality indexes (2 Gini points and 3 points change in the share of the top 1 per cent) in order to be recorded.[4] Any smaller variations will be considered as a situation of unchanged inequality. This also helps minimizing the role of measurement errors in the data.

Finally we recognize that not all available information could be effectively used for the sake of our analysis. For example, in a scenario of multiple subsequent crises of similar nature it may be ambiguous to classify the period as preceding or following the crises. Indeed in a few cases the same period could be subsequent to a specific crisis but preceding the following one. Therefore we allow a maximum of two years overlap of reference periods in between different crises. All the remaining periods will be substituted with missing values and considered as not usable information. Furthermore, in view of the special circumstances surrounding the war

[4] Hence we require a minimum 1 percentage point variation in top 1% income shares and approximately 0.7 percentage point change for the Gini measure (we effectively approximate those thresholds to 0.95 and 0.65),

times we have concentrated on those crisis periods which do not overlap, even partially, to the years of the two World Wars, 1914-1918 and 1939-1945. Similar considerations apply for the years of the Spanish civil War (1936-1939), the Malayan Emergency in Malaysia (1948-1960), the Portuguese Carnation revolution (1974-1975) and Indian Independence (1947).

4 Crises, inequality and policy: Case studies

In order to understand the relationship between economic crises and inequality, we need empirical data. This may not be evident at first sight. Where we are considering financial crises, then these involve losses for investors, and, while there are small savers, are not investors as a class drawn mainly from the top of the income distribution? A financial crisis typically occurs after a boom in financial markets, with rising stock market and land prices, which disproportionately benefited the rich. After the crash, it is the rich who have lost most. This generates what we call a "classic" **Λ**-shaped pattern with the crisis preceded by rising inequality and followed by falling inequality. The financial collapse affects only a small minority; in 1934 the US Senate Committee on Banking and Currency estimated that only 1 family in 20 had been actively associated with the stock market in 1929 (Galbraith, 1954, page 78). But this may be different today. In 2007, in the US, the proportion of households with direct or indirect ownership of stocks had reached 51 per cent (Moore and Palumbo, 2010, Table 3). If a substantial part of savings finance the retirement of the elderly, then the impact of a financial crisis may be quite widely diffused. On the other hand, a much larger fraction of the income of those at the top now comes from their occupation, and these earnings are much more closely tied to the performance of the financial markets. It is in order to see whether things are indeed different today that we need empirical evidence as to how the distribution has changed.

In the same way, the initial presumption in the case of consumption/GDP collapses may be that these are associated with rising inequality. As the economy enters a serious downturn, it is those at the bottom who are least able to maintain their consumption. Rising unemployment will lead to increased poverty. When, following the 1929 crisis, real consumption per head in the US fell by 21 per cent (between 1929 and 1933), this reduction was not equally shared. On the other hand, the situation today, with much more extensive income transfers, is different. In 1929, transfers in the US accounted for 1.4 per cent of total personal gross income; in 2007 they were 12.9 per cent, and this increased during the crisis to 15.7 per cent in 2009 (Bureau of Economic Analysis website, NIPA tables, Table 2.1). If, as has been argued by Parker and Vissing-Jorgensen (2009 and 2010), there has been an increase in income cyclicality of top income shares, then the distributional consequences of a consumption collapse may be different from one in the interwar period. Again empirical evidence is needed.

The arguments seeking to attribute to inequality a causal role in bringing about economic crises also appeal to empirical evidence. In 2009, Milanovic stated that "to go to the origins of the crisis, one needs to go to rising income inequality within practically all countries in the world, and the United States in particular, over the last thirty years" (2009, page 1). He refers to "rising" inequality, but much has been made of the fact that, in the US, top income shares in 2007 were at essentially the same level as in 1929. In order to assess these arguments, we need to establish the empirical picture, and to investigate whether it is *growing* inequality that is responsible for setting off the crisis or whether it is the *high level* of inequality that is the cause. The policy implications could be quite different.

In this and the next two sections, we examine the evidence about changes in inequality before and after systemic banking crises and consumption collapses. We begin with two case studies: of the Nordic crises of the 1990s, and of the Asian financial crisis of 1997. (In both cases we also consider, by way of background, some of the earlier crises in these countries.) The Nordic crises are of interest because they have often been used as a point of reference when discussing the events of 2007-2008 and because in all three countries studied (Finland, Norway and Sweden) there was both a financial crisis and a consumption collapse (in the case of Finland a consumption disaster). The Asian crisis is of interest as affecting non-OECD countries. In both cases, there has been extensive discussion of the role of government policies.

4.1 The Nordic crises of the 1990s

The Nordic countries have a history of banking crises, as may be seen from Table A, but here we focus on those in the 1990s. We begin with Norway, where the history of this crisis produced by economists at the Bank of Norway concluded "that there is little doubt that the Norwegian crisis was systemic. During the crisis, banks accounting for almost 60 per cent of bank lending to the non-financial domestic sector were in trouble" (Moe, Solheim and Vale, 2004, page ix). There had been problems in the banking sector from 1987, and this is the starting point shown by the heavy vertical line in Figure NO1, but it was in 1991 that "a systemic banking crisis broke out, involving all the commercial banks" (Steigum, 2004, page 34). According to Vale (2004, page 2), the crisis reached a peak in the autumn of 1991 with the second and fourth largest banks losing all their capital and the largest bank facing serious difficulties.

The onset of the Norwegian banking crisis came after the economy entered a downturn. The banking crisis may have lengthened the recession, but it did not precede it: the downturn had already started: between 1986 and 1989 real consumption per head had fallen by 5 per cent (this consumption collapse is shown by the blue rectangle in Figure NO1). The macro-economic decline, which has in turn been attributed to the monetary and foreign exchange policies pursued, may have

been a causal factor contributing to the banking crisis. A further policy that has been held responsible for the crisis is that of financial market deregulation. Many commentators see the origins of the Norwegian crisis as lying in the abolition in 1984 of the quantitative limits on bank lending, and in 1985 of the cap on lending rates. Vale comments that: "neither bankers nor supervisors had any experience of competitive credit markets. It became evident that many bank managers focused largely on capturing market shares" (2004, page 4). At the same time, the on-site inspection of banks had been scaled back.

How was the distribution of income changing before and after this Norwegian crisis episode? From Figure NO1, it may be seen that the share of the top 1 per cent was essentially flat from 1980: the de-regulation of the banking industry did not appear to lead immediately to a rise in top income shares, nor did the banking crisis lead to a clear fall from 1987. The same is true of the wealth shares and of overall inequality. Following the crisis, there was little immediate change, but from 1989 inequality did however begin to rise. Gustafsson et al refer to "an upward trend in Norwegian inequality" (1999, page 220), noting a spike in 1989. Overall l income inequality as measured by the Gini coefficient rose by 2½ percentage points between 1991 and 1996. From 1991 onwards (or 1992 in the case of wealth), the top shares too began to rise steeply. The graph does not show any rise in the top decile of earnings until later (from 1996), but there is an increase in the percentage with incomes below 60 per cent of the median.

In sum, after an initial pause there was a clear rise in all three distributional indicators in the years following the banking crisis of the 1990s, with little apparent upward trend in the years before the crisis period. It does not follow that the crisis caused the rise in inequality. The upward movement may, for instance, be a lagged response to the earlier deregulation of the financial system. This could however be expected to show up in terms of increased earnings dispersion, with remuneration in financial services racing away at the top of the earnings distribution, whereas the rise in the top decile as a percentage of the median does not take place until the mid-1990s.

In Sweden, as in Norway, the crisis of the 1990s followed, a period of boom and rising asset prices. House prices in particular rose rapidly, in part fuelled by tax advantages. The banking crisis emerged later but more sharply than that in Norway. According to Drees and Pazarbaşioğlu, "the surge of loan losses was particularly abrupt in Sweden" (1998, page 1), reaching 7 per cent in 1992. As noted by Englund, "at least until the autumn of 1989 there were no signs of an impending financial crisis" (1999, page 89). There had been a decline in the stock market from the peak of August 1989, and the real estate market price index had fallen by the end of 1990. Englund describes September 1990 as a key date, when one of the major finance companies found itself unable to roll over its financing, and this spread to cause a number of bankruptcies among finance companies. Bank credit losses rose steadily to reach a peak in April 1992, at which point, bank losses on loans were some twice the operating

profits of the banking sector (Englund, 1999, Figure 6). In terms of explanations, "much has been made", as Englund says, "of the 1985 deregulation" (of the banks and credit markets). He goes on to argue that one has to distinguish the different stages. The prior boom, he concludes, was due more to macroeconomic policies, but that deregulation was important in amplifying the movements of asset prices and leading to the subsequent financial crisis: "deregulation stimulated competition between different financial institutions, where the upside potential from rapid expansion was given too much weight relative to the long-term risks" (1999, page 95).

What was happening to the distribution? In Sweden, inequality prior to the crisis had been increasing: "in Sweden inequality increased profoundly from 1983" (Gustaffsson et al, 1999, page 221). Up to (and including) 1991, the Gini coefficient and the share of the top 1 per cent had been trending upwards. The prior pattern of change in overall inequality is therefore different from that in Norway. During the immediate period of the crisis, as has been shown by Fritzell, Bäckman and Ritakallio (2010), the overall degree of inequality was relatively unchanging. In Figure SWE1, the 1991-1993 period of consumption collapse may be seen as a hiatus. For the next few years the increase was less: the Gini coefficient in 1993 was less than 1 percentage point higher than in 1990. At the same time, the distributional change may have been different at different points in the income distribution. Different groups were affected differently. According to Gustafsson et al, "there is a clear pattern in how the deep recession … hit people of different ages. The median equivalent income of people below 50 years of age decreased by at least 10 per cent from 1990 to 1995, while decreases for those aged 50 and over [were smaller, and actually increased for those aged above 65]" (1999, page 226). These findings may reflect differences for different types of income. The series for top wealth shares (shown on the right hand axis in Figure SWE1) suggests that the share of the top 1 per cent fell from 1990 to 1992. But, as pointed out by Waldenström, "while top wealth holders lost ground to the rest of the population, no such pattern can be traced in the share of the top income percentile" (2009, page 17). As he notes, this may reflect the growth of large earned incomes in the corporate sector. As may be seen from Figure SWE1, the distribution of earnings had been relatively stable: the top decile had not greatly varied as a percentage of the median up to 1991. But after 1991, the top decile began a steady rise for the next 10 years. To the extent that this contributed to the movements in overall inequality, it does not seem that it can be attributed directly to the banking crisis (although it may be linked to the deregulation of the financial sector). The rise in earnings dispersion must have contributed to the ending of the hiatus in overall distributional change, which seems to have ended around 1993.

In Finland, the banking crisis of the 1990s occurred during a period of major macroeconomic turbulence for the Finnish economy. An economic boom, with rapid growth and high inflation, came to an end in 1990. The collapse of the Soviet Union led to a sharp reduction in Finnish exports to Russia. Real consumption per head fell by 14 per cent between 1989 and 1993, and it was 1998 before it regained its 1989

level. Non-performing loans began to accumulate in 1991, particularly as a result of the depreciation of the currency, combined with the fact that many loans were denominated in foreign currency. The banking problems reached their peak in 1992. The government injected funds to support the banking sector and set up a Government Guarantee Fund in 1992.

What happened to the distribution? In Finland, as in Norway, there is little evidence of an upward trend in inequality before 1991. After the banking crisis, there are again signs that different parts of the distribution are differently affected. Interestingly there was a fall in the proportion below the EU at-risk-of-poverty line (60 per cent of median), suggesting that, at the bottom, incomes were being reduced less sharply. Overall inequality was little changed in 1992 but then began to rise. The top share by 1995 was nearly a fifth higher than in 1991. There is not necessarily a causal link. The upward movement, found in top earnings as well as income, may, for instance, be a lagged response to the earlier deregulation of the financial system. The top decile in Finland did in fact follow a similar time-path to that in Sweden, being relatively flat up to 1991 and then beginning to climb.

The Nordic crises were much bound up with macro-economic developments, but it is widely agreed that these were not the sole cause. Drees and Pazarbaşioğlu concluded, for example, that "factors in addition to business cycle effects explain the financial problems that the Nordic countries have experienced. Although the timing of the deregulation in all three countries coincided with a strongly expansionary macroeconomic momentum, the main causes of the banking crises were the delayed policy responses, the structural characteristics of the financial system, and – last but not least – banks' inadequate internal risk-management controls" (1998, page 1). Although overall inequality, and top income shares, had been increasing in Sweden before the banking crisis, this was not the case in Finland or Norway. From our reading of the English-language literature, it does not appear that rising inequality has been invoked as a cause of the crises.

Lessons

The three countries differed in terms of their prior distributional experience. The banking crisis in Sweden, like the later 2007 crisis in Iceland, followed a period of rising inequality; those in Norway and Finland were preceded by periods of relative stability in the distribution. There is no general pattern.

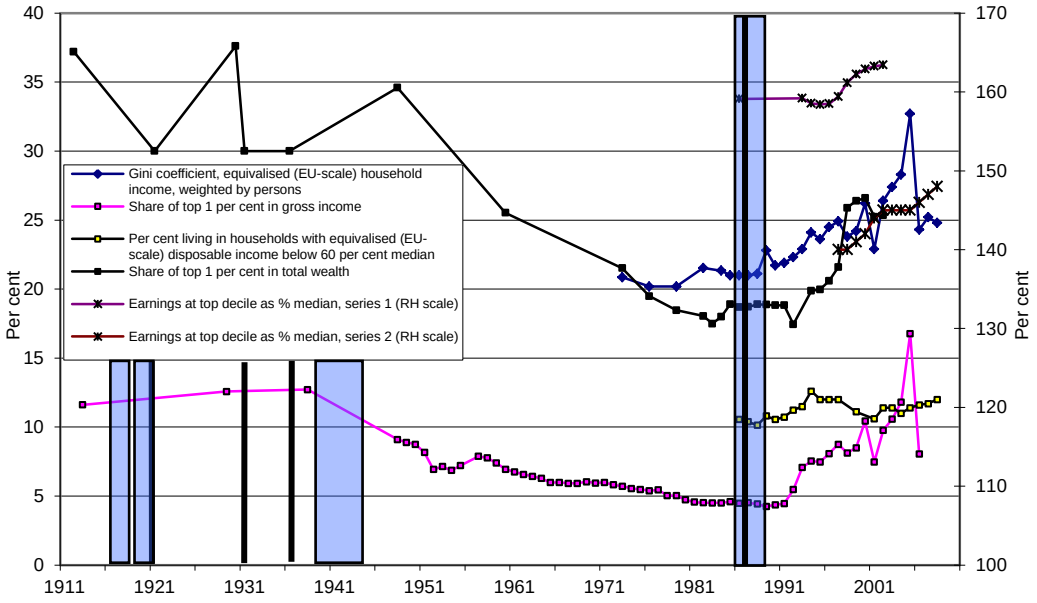
In contrast, the patterns of change during and after the three Nordic banking crises of the 1990s were relatively similar: a hiatus followed by rising inequality. This may reflect the fact that we are considering countries with relatively similar welfare states and fiscal policies that serve to moderate the initial distributional impact of the crisis. As indicated earlier in the paper in Figure 1, the observed changes in inequality are the combined result of the impact of the crisis and of policy reactions, whether

automatic or discretionary. The automatic policy responses are likely to moderate any rise in inequality in gross incomes, operating via compensatory transfers or via progressive taxation. The discretionary measures, on the other hand, may operate in the opposite direction: for example, where transfers are cut for budgetary reasons.

The contribution of different elements of policy change can only be investigated on the basis of a detailed analysis of each episode. Here we limit ourselves to considering the difference between disposable incomes (as measured in the Gini coefficients shown for each country) and factor incomes, that is incomes from work and from savings. The difference is the impact of transfers (adding to income) and direct taxes (subtracted from income). This difference tells us part of the story but is only partial and may be misleading. It is only partial because it leaves out all other policy measures, such as changes in food or housing subsidies, or changes in indirect taxes. It may be misleading because factor incomes may themselves have been affected by the policies. One purpose of unemployment insurance, for example, is to allow people more time to find a new job.

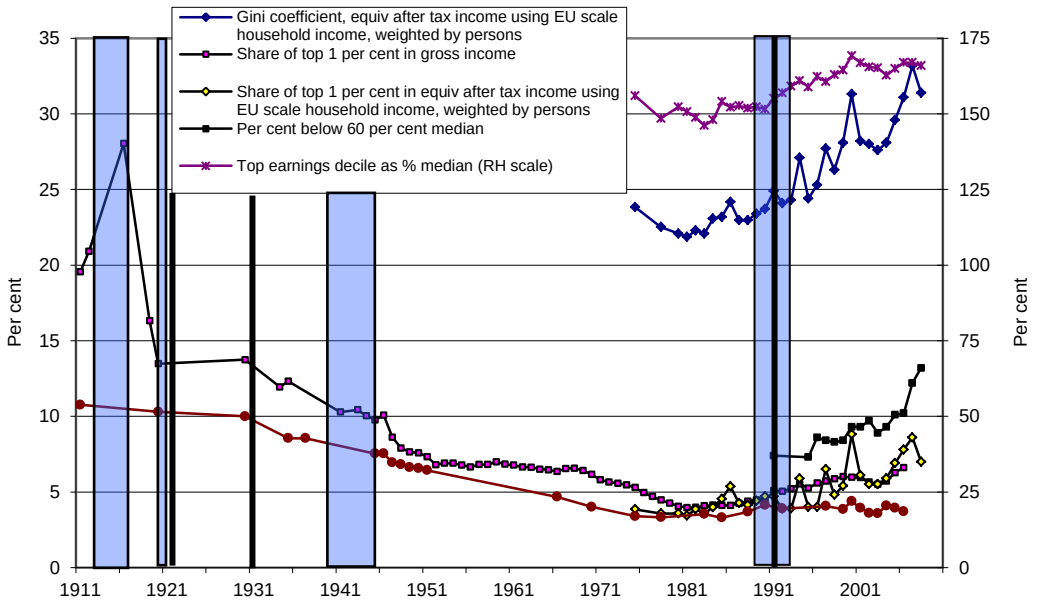
In Figure 3, we compare the movements in the two measures of overall inequality, measured by the Gini coefficient, following the 1991 crisis in Finland and Sweden. The graph shows the changes relative to 1990. The series move very similarly in the two countries (the spikes in 1991 and 1994 in Sweden are the result of tax reforms – see Waldenström, 2009, page 33). The most striking difference is that between the rise in inequality in factor income (reaching some 6-7 percentage points) and in disposable income (around 2 percentage points). Inequality may have increased following the crisis, but – subject to the qualifications made above – it appears that the welfare state and fiscal provisions were a powerful moderating force.

Figure NO1 Economic crises and inequality in Norway 1911-2010



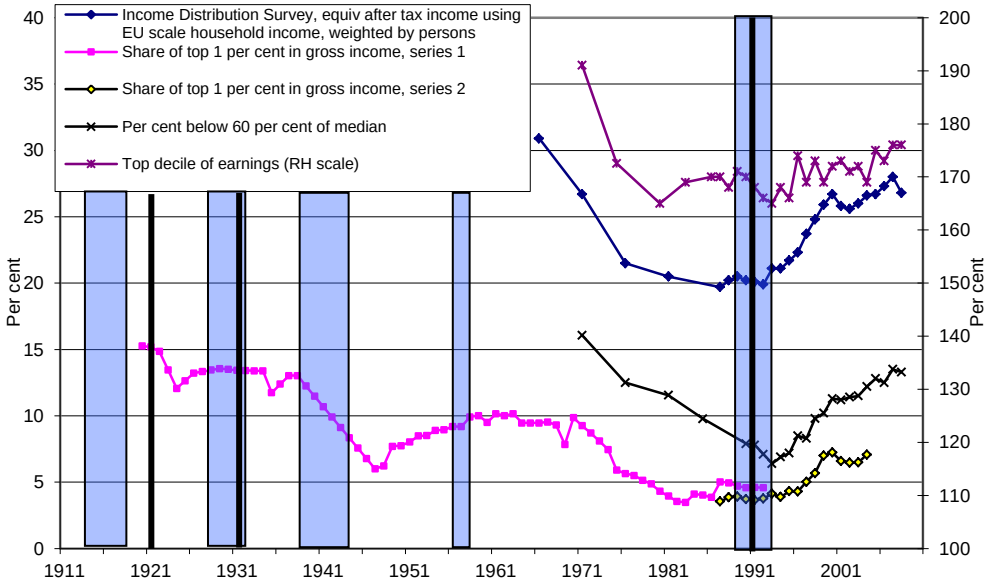
Vertical line indicates start of banking crisis; rectangle shows consumption collapse (peak to trough)

Figure SWE1 Economic crises and inequality in Sweden 1911-2010



Vertical line indicates start of banking crisis; rectangle shows consumption collapse (peak to trough)

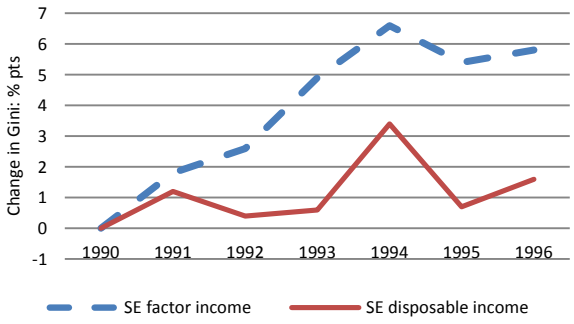
Figure FIN1 Economic crises and inequality in Finland 1911-2010



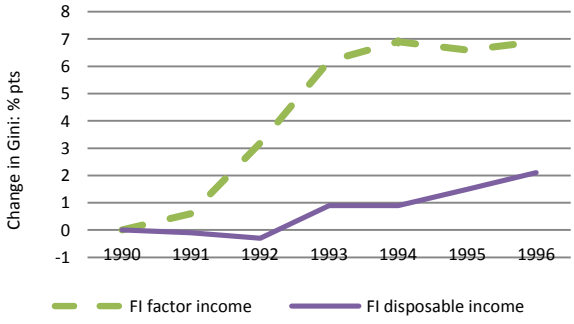
Vertical line indicates start of banking crisis; rectangle shows consumption collapse (peak to trough)

Figure 3 Comparing Gini coefficients: Factor income vs. Disposable income
The case of Sweden and Finland

Sweden : 1991 crisis



Finland: 1991 crisis



4.2 Asian financial crises

Financial crises have a long history in Asia. In the period covered here, both India and Japan had three systemic banking crises in the period before the Second World War. The 1923 banking crisis in Japan occurred after a period of increases in the shares of the top 1 and 0.1 per cent, and it was followed by a fall in top shares. (We have no evidence about overall inequality for this period.) It has a classic **Λ** shape. It was also the time of the Great Kanto earthquake, which led to financial problems as a result of the actions taken by the Bank of Japan to rediscount "earthquake bills". This led to a second banking crisis, the Shōwa crisis, in 1927, when there was no such **Λ** pattern. In neither case was there a decline in per capita real consumption.

After the Second World War, Japan had no major banking failures until the financial crisis of the 1990s following the asset price bubble. This crisis is dated here as starting in 1992, when there began to be sporadic failures of financial institutions, although it was 1994 before major bank failures occurred (Nakaso, 2001). What happened to the distribution of income? Figure JA1 shows that overall inequality and top income shares were relatively stable for much of the post-war period. The period immediately before the 1992 crisis is classified in Section 5 as showing no change, although we should note that the picture is a mixed one (and for some key variables we lack annual observations). The Gini coefficient in 1993 was more than 2 percentage points higher than in 1987. On the other hand, there was no increase in top income shares over this period, and that the series for the earnings of the top decile relative to the median peaked in 1990 and then fell. (It may be noted that there was no collapse of real consumption in Japan in this period.) Interpretation of the crisis period and the following years is also complicated by the lack of annual data, but the pattern is consistent with a hiatus followed by rising inequality.

Post independence India had a banking crisis in 1993, a year that saw major changes in banking legislation. From Figure INDIA1, it may be seen that this was preceded by a period of falling inequality, both overall and top income shares; and that it was followed by a period of broad stability. There was no fall in per capita real consumption in this period.

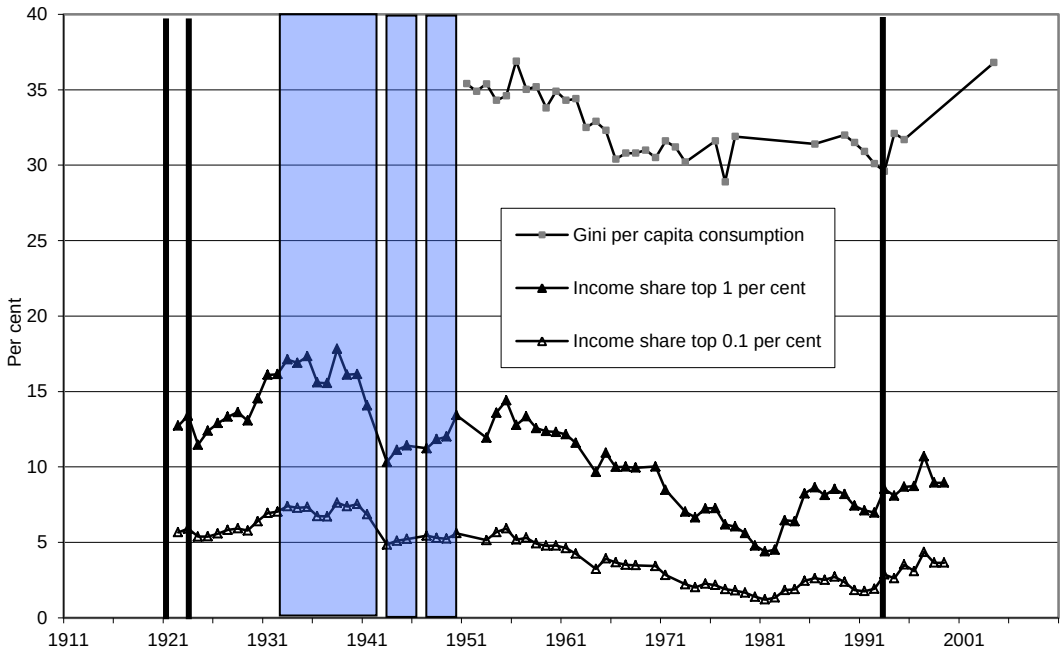
It is the financial crisis of 1997 in Asia that has attracted most attention. The distributional impact of the regional 1997 Asian financial crisis is illustrated here by the graphs for Indonesia, Malaysia, Singapore and Mauritius. The latter two countries are not identified as having a systemic banking crisis in 1997, but Singapore suffered an 8 per cent fall in per capita real consumption between 1997 and 1998 (the data do not cover Mauritius). The graphs also show the effect of the earlier banking crises in Singapore (1982), Malaysia (1985) and Indonesia (1992). In the first of these, there was little distributional change either side of the banking crisis; the second exhibited falling overall inequality before and after the crisis; and the 1992 crisis in Indonesia was not preceded by clear evidence of rising overall inequality. It may be noted that Singapore had a 3.5 per cent fall in per capita real consumption between 1980 and

1982, that Indonesia showed no fall around 1992, but that Malaysia suffered a 14.5 per cent fall between 1984 and 1986.

What distributional pattern was associated with the 1997 crisis? For Malaysia, where there was again a consumption disaster (a 12 per cent fall), the pattern is not easy to characterise. Overall inequality, and top income shares, were rising for 3-4 years before the crisis, but were not greatly different from 10 years before. For Singapore, where there was no banking crisis but an 8 per cent fall in real per capita consumption, there is little evidence of prior rising inequality (and the top decile of earnings was lower than ten years earlier). The Singapore earlier experience of distributional stability makes even more remarkable the rise after 1997 in top income shares, overall inequality and top earnings. Top income shares similarly rose in Malaysia post-1997. These countries provide evidence of economic crises being followed by rising inequality, and the same was found in other countries affected by the Asian crisis. South Korea is not included in our sample, but formed part of the 1997 Asian financial crisis.[5] Two studies of the income distribution find that income inequality has increased. "After nearly a decade of either declining or stable trend since the mid 1980s, the family income inequality in Korea sharply increased in the course of the financial crisis, and remained high even after the economy recovered from the recession" (Lee, 2002, page 3). Hagen (2007) investigates "the emerging pattern of social inequality in South Korea since the financial crisis in 1997" and finds that "economic inequality has grown significantly over the past decade" (2007, Abstract). On the other hand, in Mauritius there is no sign of rising inequality post-1997 and overall inequality fell in Indonesia. The latter evidence relates to expenditure, rather than income, and the two dimensions of inequality may have moved in opposite directions.

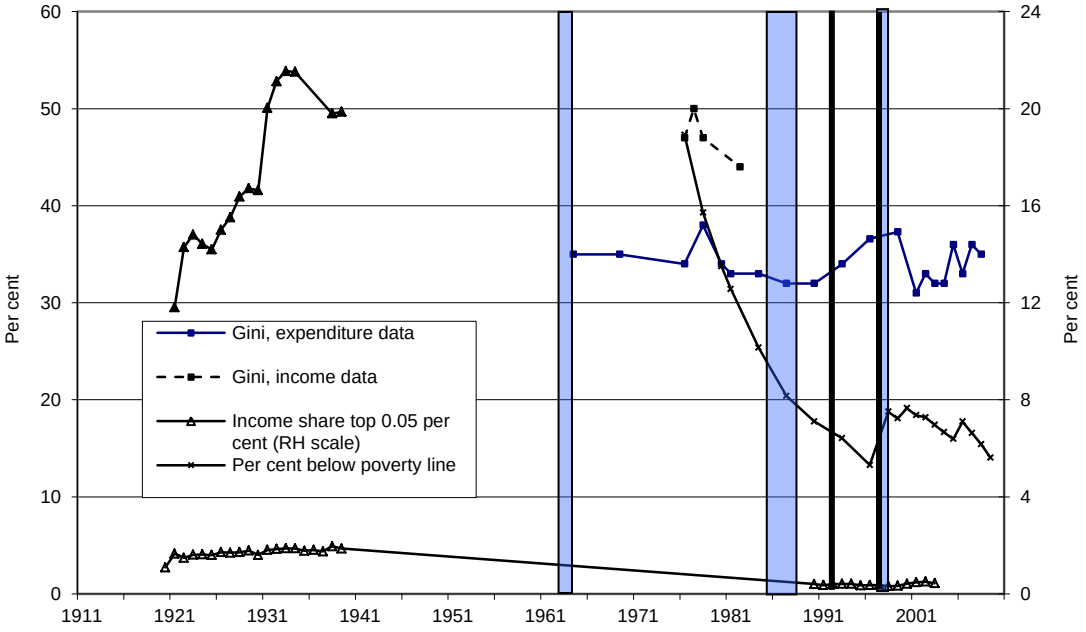
[5] South Korea is identified as having a banking crisis in 1997 by Bordo et al (2001), Laeven and Valencia (2008), and Reinhart (2010)); real per capita consumption fell by 14 per cent between 1997 and 1998.

Figure INDIA1 Economic crises and inequality in India 1911-2010



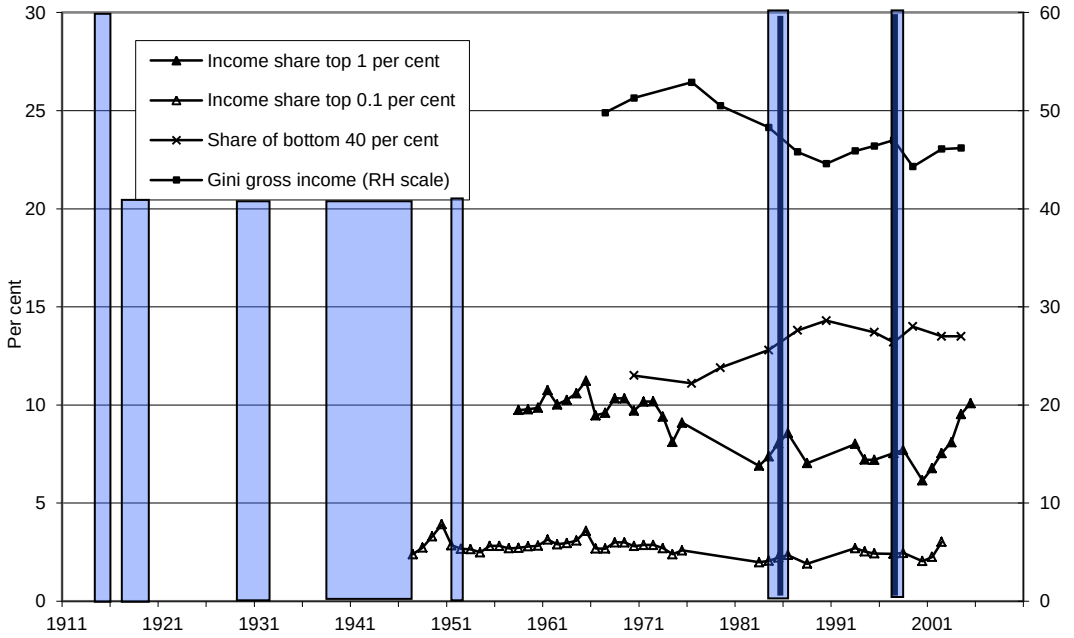
Vertical line indicates start of banking crisis; rectangle shows consumption collapse (peak to trough

Figure INDON1 Economic crises and inequality in Indonesia 1911-2010



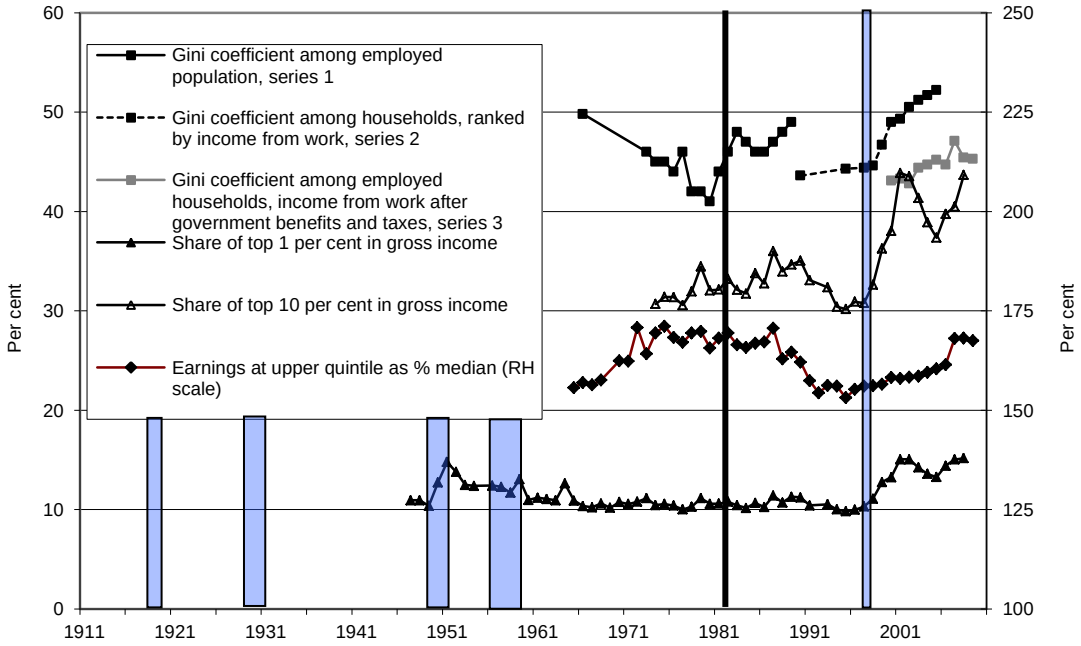
Vertical lines indicate start ofbanking crises; rectangles show consumption collapses (peak to trough)

Figure MYA1 Economic crises and inequality in Malaysia 1911-2010



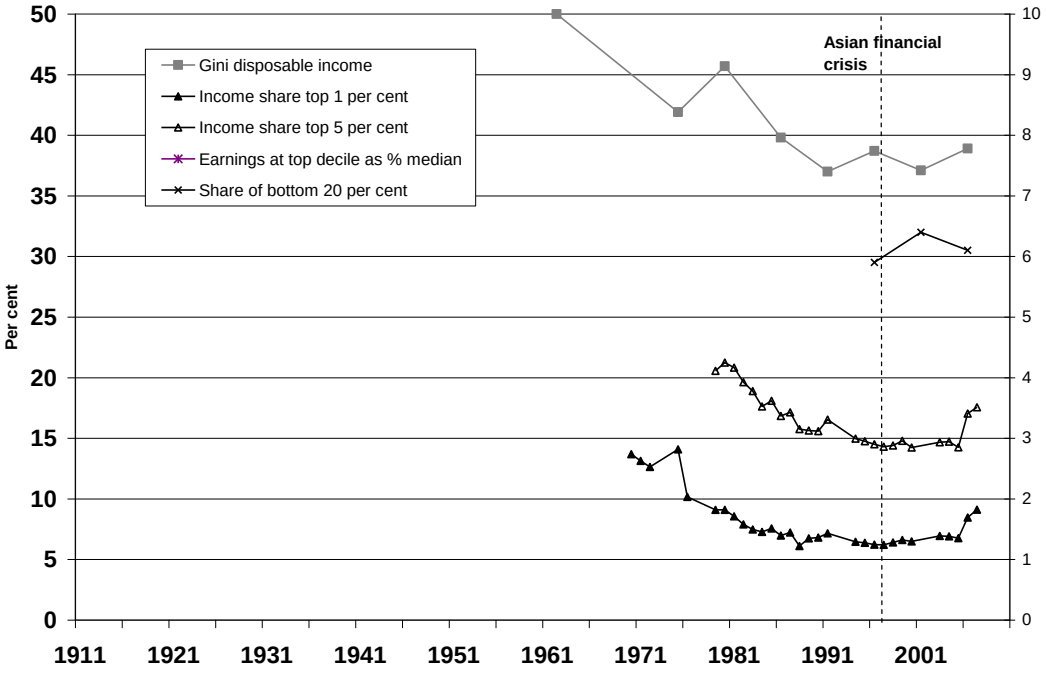
Vertical lines indicate start of banking crises; rectangles show consumption collapses (peak to trough)

Figure SI1 Economic crises and inequality in Singapore 1911-2010



Vertical line indicates start of banking crisis; rectangle shows consumption collapse (peak to trough)

Figure MAU1 Income inequality in Mauritius 1911-2010



5 Do economic crises lead to inequality?

We now consider the full set of financial and economic crises identified in this study. Of the 72 systemic banking crises identified in our set of 25 countries over the period 1911-2010, we have located useable distributional data for 37, or slightly more than half. The data coverage for economic shocks reduces to 35% of total crises for both GDP and consumption disasters. As is to be expected, distributional data are more readily available for the post-war period: more than 60% of GDP/consumption economic shocks under analysis occur after 1945. Nevertheless, only 18 out 37 banking crises episodes with useable inequality information fall within post-1945 period, namely less than half. The coverage is therefore weighted in this direction for economic disasters analysis only. Similarly, only for the economic shocks the coverage of OECD countries is very similar to their representation among the identified crises (56% and 58% respectively for GDP and Consumption disasters) [6]. The coverage of OECD countries for banking crises is instead slightly higher. While 48 out of 72 banking crises occurred in OECD countries (67%), the representation of OECD countries within the database under analysis goes up to 73% (27 out of 37 banking crises).

Banking crises may lead to macro-economic recessions, and economic downturns may generate put pressure on financial systems. In the case of the 1990 Nordic crises examined in the previous section all three involved both a banking crisis and a collapse of consumption. Of the 6 countries studied in the section on Asian crises in the 1990s, 3 had both types of crisis and 1 had neither. There was therefore a relatively high degree of overlap. This was however not typical of the full set of crises considered here. The – quite independent – definitions of the two types of crisis have led to a classification where the 72 banking crises and both 100 and 101 collapses in consumption/GDP co-incide in only 18 cases. This relatively low degree of overlap may reflect errors in identification, but it suggests that banking crises fail more often than not to be accompanied by a collapse of consumption or GDP, and that collapses of consumption and GDP are not usually associated with a banking crisis.

5.1 Window event study

As mentioned within the methodological paragraph above, in order to examine the distributional change in these different cases, we have observed the variations in the distributional variables (potentially five indicators) taking a 5 year "window" either side of the crisis date, t: i.e. from t-5 to t+5. We refer to them as "clear glass" windows, since they make no attempt to control for other factors likely to influence

[6] As mentioned in the Appendix, GDP crises occurring in OECD countries are 59% of the total identified disasters in our sample. The figure is 56% for Consumption disasters. Hence the final sample slightly over-represents consumption shocks cases and slightly under-represents GDP collapses initial sample.

the pattern of inequality. Inequality may for example have been trending up for many years and irrespective of the banking crisis inequality could therefore be expected to be lower before the crisis and higher afterwards. We return below to the issue of a counter-factual.

Following our methodology we have classified each crisis according to whether inequality was increasing, constant or decreasing before and after the crisis, Thus a crisis may be classified as being preceded by rising inequality, shown as /, and followed by a fall in inequality, shown as \, giving an overall **Λ** pattern. The US 1929 crisis is an example. The direction of change is not always easy to characterise, since variables may exhibit volatility, and since different dimensions of inequality may move differently. The period prior to the 2007 crisis in the US is classified as = on the grounds that inequality was increasing at the top but not overall.

It should be emphasised that these classifications depend on the availability/quality of data and that they involve the exercise of judgment. It would be desirable to apply a standard statistical test, but not all the data lend themselves to this approach. In quite a number of cases we do not have full annual data for all five indicators for the periods before and after a crisis.

5.2 Banking Crises and Inequality: a summary

We now consider the full set of 25 countries and crises spanning the century. Table 1 summarises the findings, where we have in each case sought to classify them as described above, or as not known/excluded observations[7] (**#**). For 35 of the 72 crises, we have not so far been able to obtain sufficient data to classify the periods either before or after the crisis. As explained above, the classification is based on the "short-term" movements in inequality, comparing T-1 with the average for T-4, T-5 and T-6, where T is the crisis year. It is immediately evident that the "classic" **Λ** shape is not prevalent. If we concentrate first on the column totals – the situation after the crises – we see that inequality increased for nearly half of the 29 crises that could be classified. The cases of increase include the Nordic crises discussed earlier, and Japan, India and Singapore.

Here, as in all the following analysis, we should stress that the conclusions could be over-turned by new evidence for the crises not so far classified (and we are actively seeking to add to the database). Indeed any type of systematic pattern in Table 2 could be sustained in theory by the "silent information" contained by the set

[7] Exclusion conditions have been stated in "methodology" paragraph. These, we recall, broadly refer to war and conflict periods and to those cases in which the proximity of two consecutive crises did not allow an appropriate categorization of the time-period under analysis.

of non analysable 37 banking crises. Left-out information is considerable larger for the case of economic shocks analyzed below.

Testing the hypothesis that banking crises affect inequality requires a counterfactual. We have to move beyond the clear-glass window: we need a refractive lens that adjusts for the direction that the inequality index would have taken. The standard approach to determining the counterfactual is to specify a number of variables that are expected to influence the extent of inequality and then to estimate the model using panels of countries, such as the data assembled here. In order to do this satisfactorily, the specification has to be related to a theoretical model of the processes underlying the distribution. Such a model should probably start with the decomposition of income into its major components, since these are subject to different forces. For example, in the case of the US, there has been discussion of a shift away from capital as the principal income source for those at the top of the distribution, and of a trend in recent years for remuneration to be more cyclically sensitive at the top (e.g. Parker and Vissing-Jorgensen, 2009 and 2010).

In this paper, there is not scope to develop such theoretical models. Instead, we simply make use of the prior direction of trend in inequality as a "predictor" of what would have happened in the absence of the crisis. The "diagonal" in Table 1 shows combinations where the trajectory was unchanged; above the "diagonal" are cases where the trajectory "bent" downward; below the diagonal are cases where the trajectory "bent" upward. The former, for example, include not just the classic **Λ** pattern but also cases where inequality was previously stable but fell after the crisis, as in Malaysia 1985. If our observations are "refracted" in this way, then we have a crude indicator as to the direction in which inequality has changed after the crisis. It turns out that there are more cases below than above the "diagonal": in 3 cases inequality changed direction downwards, and in 7 cases inequality changed direction upwards. The latter cases become 13 if we count those events for which we do not have information prior the shock. The empirical evidence suggests that cases in which inequality tend to increase following the crisis are in majority, although we should caution that the sample size is too limited to draw firm conclusions.

Finally , we should note that there are surprisingly few cases on the diagonal[8] (4 out of 37). It appears that crises are indeed associated with changes in inequality, but that this could go in either direction.

[8] We should however point out that elements on the diagonal could be even lower if structural breaks could be detected. Indeed inequality may keep growing following a macroeconomic shock, though at a pace which could be structurally different. No steps in such a direction have been undertaken in this paper.

Table 1 Inequality and Systemic Banking shocks: empirical evidence

		After				
		\	=	/	#	Totals
Before	/	1	0	2	3	6
	=	2	1	4	3	10
	\	1	2	1	2	6
	#	4	5	6	35	50
	Totals	8	8	13	43	72

5.3 GDP/consumption collapses and Inequality: a summary

Table 2 and 3 summarise the findings for the 37 and 36 GDP and Consumption collapses[9] for which we have distributional data, where we have in each case sought to classify them as described above. As with banking crises, the "classic" **Λ** shape is not prevalent.

We begin by analysing the consumption collapses and we note that the raw totals in Table 2 – the situation after the consumption crises – show almost equal numbers in the up and down columns, with a higher number in the = column. In other words the change in inequality has been considered not wide enough to be considered either a rise or a fall in 12 out of 36 cases. This finding is reinforced in the case of GDP collapses in Table 3 where the greater majority of recorded cases are classified as "no change" (18 out of 37 GDP crises).

If we consider the changes in direction, then the number of cases above the diagonal (7) is visibly higher than the number below the diagonal (2) for the case of Consumption crises. This is the reverse of the finding for financial crises, whereas the figures for GDP crises are rather similar above and below the diagonal (5 vs. 4). Indeed, for GDP collapses, there are surprisingly more cases on the diagonal (7 out of 36) than in the case of Consumption crises. As with banking crises, the numbers are

[9] The number of economic shocks is very similar only by chance. These events do not necessarily coincide.

too small to draw firm conclusions, but the empirical evidence concerning "change in direction" suggests that consumption crises are more associated with reduction in inequality. No particular pattern stands out from the analysis of GDP crises.

Table 2 Inequality and Consumption collapses: empirical evidence

		After				
		\	=	/	#	Totals
Before	/	**0**	**5**	**2**	2	9
	=	**2**	**2**	**2**	9	15
	\	**1**	**0**	**0**	1	2
	#	4	5	1	64	74
	Totals	7	12	5	76	100

Table 3 Inequality and GDP collapses: empirical evidence

		After				
		\	=	/	#	Totals
Before	/	**1**	**3**	**2**	3	9
	=	**1**	**4**	**1**	9	10
	\	**1**	**3**	**0**	1	6
	#	1	8	3	64	76
	Totals	4	18	6	73	101

6 Does higher inequality lead to crises?

The idea that inequality is a cause of economic crises may appear an outlandish suggestion. In the case of financial crises, on which we concentrate here, most mainstream accounts of their origins give no role to distributional considerations. The indexes to three authoritative studies of financial crises, by Kindleberger and Aliber (2005), Krugman (2009) and Reinhart and Rogoff (2009), contain neither "inequality" nor "income distribution". On the other hand, a number of influential economists including Branko Milanovic, Joe Stiglitz, Raghuram Rajan, and Jean-Paul Fitoussi, have recently argued that income inequality was a contributory factor leading to the *occurrence* of the 2007-8 US financial crisis.

6.1 Different possible mechanisms

There have been few complete economic models showing how inequality can generate a greater risk of crisis (although see Kumhof and Rancière, 2010), but a number of possible mechanisms have been suggested. Here we list a number of these mechanisms. In each case we draw three distinctions. The first is that between theories that relate the occurrence of crises to the *level* of inequality and those that relate the occurrence to *increases* in inequality. Secondly, we ask whether the relevant inequality is *overall* inequality, or inequality at the *top,* or inequality at the *bottom* of the distribution. Thirdly, we indicate in each case whether the relationship is causal or co-incident, the latter referring to the possibility that both the crisis and the rise in inequality may have a common cause.

The Stiglitz (2009) hypothesis is that, in the face of stagnating real incomes, households in the lower part of the distribution borrowed to maintain a rising standard of living. This borrowing later proved unsustainable, leading to default and pressure on over-extended financial institutions. As such, this focuses on the bottom of the distribution, but a link has also been made with rising inequality at the top by Frank et al (2010). This is of particular relevance in the US, since the decade leading up to the 2007-8 crisis saw rising inequality at the top but much more muted change at the bottom of the distribution. The link draws on the model of savings first advanced by Duesenberry (1949), the "relative income hypothesis": "people do not exist in a social vacuum. … the rich have been spending more … Their spending shifts the frame of reference that shapes the demands of those just below them, who travel in overlapping social circles. So this second group, too, spends more, which shifts the frame of reference for the group just below …" (Frank, 2010, page 3). In this case, the risk of financial crisis arises on account of the *increase* in inequality, and the mechanism is *causal*.

An alternative is the "under-consumption" thesis, dating back at least to Marx: "the ultimate reason for all real crises always remains the poverty and restricted consumption of the masses as opposed to the drive of capitalist production to develop

the productive forces as though only the absolute consuming power of society constituted their limit" [Karl *Marx - Capital*, Volume III, Chapter 30]. In his classic study of the Great Crash of 1929, Galbraith identified five "weaknesses" of the US economy that led to the Crash and the Depression. The first of these was "the bad distribution of income", identified as the fact that the top 5 per cent received a third of total personal income, and that the share of interest, dividends and rent was double that when he was writing (1954, page 177). He argued that this highly unequal income distribution meant that the maintenance of a high level of demand in the economy depended on a high level of investment or a high level of luxury consumer spending or both. The contemporary relevance of this kind of argument is spelled out by Fitoussi and Saraceno, there was

> "an increase in inequalities which depressed aggregate demand and prompted monetary policy to react by maintaining a low level of interest rate which itself allowed private debt to increase beyond sustainable levels. On the other hand the search for high-return investment by those who benefited from the increase in inequalities led to the emergence of bubbles. Net wealth became overvalued, and high asset prices gave the false impression that high levels of debt were sustainable. The crisis revealed itself when the bubbles exploded, and net wealth returned to normal level. So although the crisis may have emerged in the financial sector, its roots are much deeper and lie in a structural change in income distribution that had been going on for twenty-five years" (2009, page 4).

In this case again, the risk of financial crisis arises on account of the *increase* in inequality, and the mechanism is *causal*. The specific role of policy in seeking to stimulate housing consumption (the spread of home ownership) is identified by Rajan, "growing income inequality in the United States stemming from unequal access to quality education led to political pressure for more housing credit. This pressure created a serious fault line that distorted lending in the financial sector" (2010, page 43).

The quotation from Fitoussi and Saraceno referred to both the demand side and the supply side of the credit market. The supply side has been the focus of a number of theories where the growth of the financial services sector has driven the rise in income inequality. Financial sector attracts skilled workers by sharing rents, and growth drives asset bubbles (Cahuc and Challe, 2009). There has been a shift in remuneration practices, so that pay has become more closely tied to sales, so that banks behave more like sales maximisers than maximisers of shareholder value. In this case, it is the *increase* in inequality that is relevant, but the story is of *co-incidence*, not causality. In contrast, an explanation in terms of the introduction of securitisation can provide a causal mechanism, but one that is linked to the *level* of inequality. There has been a change in banking practices with introduction of securitisation (Shleifer and Vishny, 2010), and the degree of risk-taking by banks depends on the distribution of income among their clients, taking on greater risk to an extent that is

greater the higher the degree of inequality. In this case, the *level* of inequality is *causal*.

Rajan refers to "political pressure" and there are several possible political economy explanations. The first is that implicit in the financial market supply-side story. In response to a rise in inequality, the government does not increase redistributive tax and benefit policy, but uses deregulation of banking to ease access to credit/mortgages. In this case, the *increase* in inequality has a *causal* effect. There are a number of reasons why this policy choice may be adopted, not least that such deregulation may be sought by those seeking to profit. In this case, it is inequality at the top that may be driving the explanation from the supply-side, rather than inequality at the bottom driving the explanation from the demand side.

A different political economy explanation is that related to the welfare state. In countries where governments have decided to reduce size of welfare state, the loss of income to current beneficiaries causes inequality to rise. Households respond to cuts in expected future benefits by saving more in private pensions, driving up equity prices, and in the form of "buy-to-let" purchases of housing, driving up house prices. In this case, the asset price boom has its origins in the change in government policy. The rise in inequality is *co-incident,* not *causal*

6.2 Inequality and Crises: The historical record as a whole

Testing these different explanations is a major challenge. First, causality is evidently difficult to establish. Secondly, the evidence we have assembled on income inequality is designed with an eye to comparability over time but not across countries. This means that we cannot, at this stage, draw conclusions about the *level* version of the hypothesis. Here we limit ourselves to summarising the implications of the patterns of inequality *change* set out in the previous section. We should note that, in this case, it is the *clear-glass* window that is relevant. The relevant variable is the actual change in inequality, not the change relative to a counterfactual.

From Table 1 we can see that banking crises were preceded by falling inequality as many times as by rising inequality(6 out of the 37 cases). There are 10 cases where inequality was stable and the remaining 15 cases are either unknown or excluded from the analysis. Put differently, for the 22 banking crises for which we have evidence about inequality change before the crisis, in only 6 cases was there clear evidence of rising inequality. There are "classic" financial crises that were preceded by rising overall inequality, but these are far from the only, or even the predominant, pattern. The classic pattern was found in the recent financial crisis in Iceland, but the earlier Nordic crises of the 1990s saw no preceding rise in inequality in Finland or Norway. There was a salient rise in inequality before the crisis in Sweden, and before that in India (1993), but not in the case of Japan (1992) or Malaysia (1985) or Singapore (1982). In reaching this conclusion, we have – as

explained – given priority to the changes in overall inequality. There may be cases where, for example, top income shares were rising, but this movement towards greater inequality was offset by changes in the opposite direction lower down the distribution. This appears to have been the case in the US before the 2007-8 crisis.

Were macro-economic crises different? In the case of the consumption collapses (Table 2), there are 9 out of 36 cases where there was rising inequality before the event, only 2 cases where inequality was falling, 15 cases in which inequality was stable and 10 non-classifiable cases. For GDP collapses (Table 3) as well the cases for where inequality increased before the shock were 9 out of 37. In 10 cases inequality was stable, in 6 reducing and 13 non-classifiable. In other words, for the 26 (24) macro-economic crises for which we have evidence about inequality change before the crisis, in 9 cases was there clear evidence of rising inequality.

Taken together, the findings indicate only limited support for the *increase* hypothesis. In a third of cases, only, does there appear to be a smoking gun. However we have not investigated whether inequality level was relatively higher before identified macroeconomic shocks. Therefore the level hypothesis cannot be ruled out at this stage.

7 Conclusions

This paper would attract many more readers if we had reached a firm conclusion that *rising* inequality causes economic crises. In fact, we find that economic crises differ a great deal in whether or not they were preceded by rising inequality, and, in any case, where there was such a rise, causality is not easy to establish. (However we have not investigated whether inequality level was relatively higher before identified macroeconomic shocks. Therefore the level hypothesis cannot be ruled out at this stage.) There is more evidence that financial crises are followed by rising inequality. We saw that this happened, after a hiatus during the crisis, in the Nordic countries, and in other crises in the 1990s (Japan and Italy). This finding is interesting, since we do not find the same with collapses in consumption or GDP.

Overall, however, our findings suggest that there is no hard and fast pattern. The experience of 25 countries and a hundred years shows that economic crises differ greatly from each other, and that different types of crisis may have different causes and outcomes. As far as inequality is concerned, "this time is may be different". Of course, there are many aspects of inequality not covered by the empirical evidence presented here. Economic inequality has many dimensions. We have focused on inequality of current income, and its components (earnings and capital income), but other dimensions may be more relevant to social well-being and to issues of sustainability. In particular, we highlight inequality of opportunity, where the most lasting impact of the crisis may be on those cohorts who are at vulnerable stages of the life-cycle, and horizontal as well as vertical inequalities (in particular to the impact of the crisis on the gender distribution). Finally, we should re-iterate that we have been concerned with the distribution *within countries*, and we need also to look at the distribution between countries.

References

Acemoglu, D, 2011, "Thoughts on inequality and the financial crisis", AEA meeting, Denver.

Atkinson, A B, 2003, "Income inequality in OECD countries: Data and explanations", *CESifo Economic Studies*, vol 49: 479-513.

Atkinson, A B and Morelli, S, 2010, "Inequality and banking crises: A first look", report for the International Labour Organisation.

Atkinson, A B and Morelli, S, 2011, "An inequality database for 25 countries 1911-2010", discussion paper.

Atkinson, A B and Piketty, T, editors, 2007, *Top incomes over the twentieth century: A contrast between Continental European and English-speaking countries,* Oxford University Press, Oxford.

Atkinson, A B and Piketty, T, editors, 2010, *Top incomes: A global perspective,* Oxford University Press, Oxford.

Barro, R J, 2009, "Rare disasters, asset prices and welfare costs", *American Economic Review,* vol 99: 243-264.

Barro, R J and Ursúa, J F, 2008, "Macroeconomic crises since 1870", *Brookings Papers on Economic Activity*, 1: 255-350.

Bordo, M, Eichengreen, B, Klingebiel, D and Martina-Peria, M S, 2001, "Is the crisis problem growing more severe?", *Economic Policy*, 32, Spring 2001: (and web appendix).

Boyd, J, De Nicolò, and Loukoianova, E, 2009, "Banking crises and crisis dating: Theory and evidence", IMF Working Paper 09/141, International Monetary Fund, Washington, D.C.

Brandolini, A, 2002, "A bird's eye view of long-run changes in income inequality", Bank of Italy Research Department, Rome.

Cahuc, P and Challe, E, 2009, "Produce or speculate? Asset bubbles, occupational choice and efficiency", IZA Discussion Paper 4630.

Caprio, G and Klingebiel, D, 1996, "Bank insolvencies: Cross-country experience", Policy Research Working Paper No 1620, World Bank, Washington, D.C.

Caprio, G and Klingebiel, D, 1999, "Episodes of systemic and borderline financial crises", World Bank.

Caprio, G, Klingebiel, D, Laeven, L and Noguera, G, 2005, "Appendix: Banking crisis database", in P Honohan and L Laeven, editors, *Systemic financial crises: Containment and resolution,* Cambridge University Press, Cambridge.

Cheong, K S, 1999, "Economic crisis and income inequality in Korea", Working Paper No 99-6R.

Datt, Gauray, Hoogeveen, H, 2000, "El Niño or El Peso? Crisis, Poverty and Income Distribution in the Philippines", *Policy Research Working Paper* 2466, The World Bank, Washington DC.

Drees, B and Pazarbaşioğlu, C, 1998, *The Nordic banking crises: Pitfalls in financial liberalization?,* IMF Occasional Paper 161, Washington, D.C.

Duesenberry, J, 1949, *Income, saving and the theory of consumer behaviour,* Harvard University Press, Cambridge, Mass.

Eichengreen, B and Bordo, M D, 2002, "Crisis now and then: What lessons from the last era of financial globalization", NBER Working Paper 8176.

Englund, P, 1999 "The Swedish banking crisis: Roots and consequences", *Oxford Review of Economic Policy,* vol 15, no 3: 80-97.

Fitoussi, J-P and Saraceno, F, 2009, "How deep is a crisis? Policy responses and structural factors behind diverging performances", OFCE Document de Travail, 2009-31.

Frank, R H, 2010, "Income inequality: Too big to ignore", *New York Times,* 17 October 2010.

Frank, R H, Levine A S and Dijk, O, 2010, "Expenditure cascades", working paper.

Fritzell, J, Bäckman and Ritakallio, 2010, working paper.

Galbraith, J K, 1954, *The Great Crash, 1929,* Houghton Mifflin, New York.

Gerdrup, K R, 2004, "Three booms and busts involving banking crises in Norway since the 1890s" in Moe et al (2004).

Glover, A, Heathcote, J, Krueger, D, and Ríos-Rull, 2010, "Inter-generational redistribution in the Great Recession", working paper.

Gustafsson, B, Aaberge, R, Cappelen, A, Pedersen, P J, Smith, N, and Uusitalo, H, 1999, "The distribution of income in the Nordic countries: Changes and causes" in M Kautto, M Heikkilä, B Hvinden, S Marklund, and N Ploug, editors, *Nordic social policy,* Routledge, London.

Hagen, K, 2007, “The changing faces of inequality in South Korea in the age of globalization”, *Korean Studies*, vol 31: 1-18.

Haugh, D, Ollivaud, P and Turner, D, 2009, “The macroeconomic consequences of banking crises in OECD countries”, *OECD Economics Department Working Papers*, No 683, OECD, Paris.

Joung-Woo, L, 2002, “The financial crisis and economic inequality in Korea”, *Korea Journal*, vol 42: 178-203.

Kaminsky, G L and Reinhart, C M, 1999, “The twin crises: The causes of banking and balance-of-payments problems”, *American Economic Review*, vol 89: 473-500.

Kindleberger, C P and Aliber, R, 2005, *Manias, panics, and crashes: A history of financial crises*, fifth edition, John Wiley, Hoboken.

Krugman, P, 2009, *The return of depression economics and the crash of 2008*, W W Norton, New York.

Krugman, P, 2010, Inequality and Crises, New York Times blog "The Conscience of a liberal, (June), http://krugman.blogs.nytimes.com/2010/06/28/inequality-and-crises/

Kumhof, M and Rancière, R, 2010, “Inequality, leverage and crises”, working paper.

Laeven, L and Valencia, F, 2008, “Systemic banking crises: A new database”, IMF Working Paper 08/224, International Monetary Fund, Washington, D.C.

Laeven, L and Valencia, F, 2010, "Resolution of banking crises: The good, the bad, and the ugly", IMF working paper 10/146, International Monetary Fund, Washington, D.C.

Lee, C, 2003, “Structural changes in household income inequality in Korea: A new decomposition including labor supply changes”, School of Economics, Seoul National University.

Milanovic, B, 2009, Yale Global Online, 4 May.

Mishkin, F S, 1991, "Asymmetric information and financial crises: A historical perspective", in R G Hubbard, editor, *Financial markets and financial crises*, University of Chicago Press, Chicago, pp. 69-108.

Mishkin, F S, and White E N, 2003, "U.S. stock market crashes and their aftermath: Implications for monetary policy," in W C Hunter, G G Kaufman, and M Pomerleano, editors, *Asset price bubbles: The implications for monetary, regulatory, and international policies*, MIT Press, Cambridge, Mass, pp. 53-79.

Moe, T G, Solheim, J A and Vale, B, 2004, editors, *The Norwegian banking crisis*, Norges bank, Oslo.

Moore, K B and Palumbo, M G, 2010, “The finances of American households in the past three recessions: Evidence from the Survey of Consumer Finances”, Finance and Economics Discussion Series 2010-06, Federal Reserve Board, Washington, D.C.

Morelli, S, 2010, “Banking crises and stock market crashes in US: the response of top-income and top-wealth shares in historical perspective”, draft (September), University of Oxford.

Nakaso, H, 2001, “The financial crisis in Japan during the 1990s: how the Bank of Japan responded and the lessons learned”, BIS paper No 6, Bank for International Settlements, Basel.

OECD, 2008, *Growing unequal?,* OECD, Paris.

Olafsson, S and Kristjansson, A S, 2010, “Income inequality in a bubble economy: The case of Iceland 1992-2008”, Luxembourg Income Study conference, June 2010.

Parker, J A, and Vissing-Jorgensen, A, 2009, " Who bears aggregate fluctuations and how?", *American Economic Review,* vol 99, no2: 399-405.

Parker, J A, and Vissing-Jorgensen, A, 2010," The increase in income cyclicality of high-income households and its relation to the rise in top income shares ", Working Paper.

Philippon, T and Reshef, A, 2008, “Wages and human capital in the U.S. financial industry: 1909-2006”, New York University.

Rajan, R G, 2010, *Fault lines: How hidden fractures still threaten the world economy*, Princeton University Press, Princeton.

Reinhart, C M, 2010, “This time is different chartbook: Country histories on debt, default, and financial crises”, NBER Working Paper 15815.

Reinhart, C M and Rogoff, K S, 2008, “Is the 2007 U.S. sub-prime financial crisis so different? An international historical comparison”, *American Economic Review*, vol 98: 334-339.

Reinhart, C M and Rogoff, K S, 2009, *This time is different,* Princeton University Press, Princeton.

Roine, J, Vlachos, J and Waldenström, D, 2009, „The long-run determinants of inequality: What can we learn from top income data?“, *Journal of Public Economics,* vol 93: 974-988.

Shleifer, A and Vishny, R W, 2010, “Unstable banking”, *Journal of financial economics,* vol 97: 306-318.

Steigum, E, 2004, “Financial deregulation with a fixed exchange rate: lessons from Norway’s boom-bust cycle and banking crisis”, in Moe et al (2004).

Stiglitz, J E, 2009, , “Joseph Stiglitz and why inequality is at the root of the recession”, *Next Left website*, posted 9 January 2009.

Vale, B, 2004, “The Norwegian banking crisis” in Moe et al (2004).

Vale, B, 2004a, "The banking crisis in Norway" in Reidhill, J, editor, "Bank Fail.ures in Mature Economies", Working Paper No 13, Basel Committee on Banking Supervision, Basel.

Waldenström, D, 2009, *Lifting all boats?,* Lund Studies in Economic History, Lund

APPENDIX: The identification of crises

Systemic Banking Crises

As explained in the text, we combine evidence from three sources. These are the widely-used databases on systemic banking crises of Bordo et al (2001), Reinhart and Rogoff (2008, 2009, and Reinhart 2010), which cover the whole period, and of Laeven and Valencia (2010), which starts in 1970. In many cases, these sources coincide in their identification of banking crises, but there are a substantial number of disagreements. The latter reflect in part differences in approach and in part differences in judgment. The US Savings and Loans crisis provides an example. Bordo et al identify it as a banking crisis, and give 1984 as the start date. Reinhart-Rogoff give the same start date, but describe it as a non-systemic crisis (it is listed in italics), although they comment that "it is just a notch below the 'Big Five'" protracted large-scale financial crises that they examine (Reinhart and Rogoff, 2008, page 340). Laeven-Valencia identify it as a "systemic banking crisis", but give the date as 1988.

In order to arrive objectively at a definition of the start dates of banking crises, we have combined these three different sources by following a "majoritarian" rule for a particular country and year:

a) where there are three sources, we identify a banking crisis where it is identified as such by at least 2 of the 3 sources;
b) where there is a single source, we follow the identification;
c) where there are 2 sources, we follow the identification where they are in agreement (the treatment of cases of disagreement is described below).

In applying the rules, we have in the case of Reinhart-Rogoff only taken crises described as "systemic" in Reinhart (2010). Thus, in the case of the US Savings and Loan, we do not count Reinhart-Rogoff (but it is still identified by our rules as a systemic crisis, since the other two sources agree in so classifying it). On the other hand, in the case of the United Kingdom, Reinhart and Rogoff (2009, page 388) refer to a "secondary "banking crisis in 1974-6, to the failure of Johnson Matthey in 1984, of BCCI in 1991 and of Barings in 1995. However, Reinhart (2010) lists 1974 and 1984 as only "non-systemic", and has no entries for the 1990s. And no banking crises are registered in the UK in the post-war period by Bordo et al (2001) or by Laeven and Valencia (2010). Taking the majority view, we have therefore treated the UK as not having had a systemic banking crisis in these years.

We have applied the majoritarian rules to the 25 countries studied here. In the greater part of cases, the identification is determined by rules a) and b). In case c) there are a number of ties. These mostly arise where the crisis was identified by Reinhart-Rogoff but not by Bordo et al. We note here that the latter "dropped crises for which there was insufficient data to estimate the years required to return to the pre-crisis rate of GDP growth (because of the intervention of a war or because of data problems)" (2001, Web Appendix, page 3). These cases are not identified as such in the Bordo et al database, and we therefore decided to include all tied cases. The

resulting 72 cases are shown Table A.1. Of these 72, 6 relate to the recent 2007-8 crisis.

GDP and consumption disasters

GDP and consumption disasters are defined following the study by Barro and Ursúa (2008). Disasters are identified by the two authors using a threshold of 10 percent cumulative percentage drop, from peak to trough, in per-capita real GDP and per-capita real consumption.

Using the raw data made available on the web[10] we have implemented independently the Peak to Trough methodology and obtained a list of GDP and consumption disasters that could be matched with that found in the work of Barro and Ursúa in tables C1 and C2 (2008). The peak-to trough methodology is indeed not entirely mechanical, and we prefer doing so in order to unveil the potential role of implicit arbitrary assumptions in the choice of crises. Indeed we expect that in few cases the role of such implicit assumptions could be crucial in the data interpretation. In turn, the identification of disasters may differ in the starting year or in duration and it may be possible that few crises have been left unnoticed in the identification process. Such concerns are dictated by the fact that the precise identification of beginning and duration of the disasters could be one of the key factors in our empirical analysis. As far we are concerned we will explore data only for the set of countries and years under our investigation, but similar considerations could apply for the remainder of countries and years.

The main goal is to state clearly our assumptions underlining the identification of economic disasters. Barro and Ursúa(2008) adopt an implicit rule of identifying disaster if the cumulative drop from peak to trough is higher than 9.5%. Adopting the same rule and using the Peak to Trough methodology we observe that three Consumption disasters and seven GDP disasters (within our subsample) remained unnoticed in the Barro and Ursúa Tables without evident reasons. For example, Brazil experienced a 9.56% cumulative drop in real per-capita consumption from 1912 to 1913. Similarly Argentina and Canada suffered a real per-capita GDP cumulative drop of 9.5% and 9.9% respectively from 1913 to 1914 and from 1949 to 1952. We therefore add those three cases to our list of disasters. There are also cases of unidentified disasters whose associated cumulated drops in per-capita consumption and GDP are higher than the 10% threshold. For GDP data we have added Brazil 1980-1983 (-12,5%), Indonesia 1961-1967 (-11,3%), New-Zealand 1920-1922 (-14,5%) and 1929-1932 (-18%), South Africa 1928-1932 (-11,8%). As far as Consumption data are concerned we have added Argentina 1949-1953 (-14%) and Japan 1928-1935 (-12%).

We then observe that potential disagreement around disasters identification could arise depending on the assumption on how to treat periods with positive growth

[10] http://www.economics.harvard.edu/faculty/barro/files/MacroCrisesSince1870_08_0614.xls accessed on 10 March 2011.

rates of GDP or consumption per-capita. For our own purpose, we assume that two consecutive periods with positive growth of Per-capita consumption or GDP could not reasonably form part of a disaster or crisis scenario. We instead allow only one year of positive growth rate occurring between any peak and trough. By so doing we have only two cases of disagreement with Barro and Ursúa (2008) referring to GDP per-capita disasters in Malaysia and Switzerland . In the case of Malaysia, Barro and Ursúa (2008) identify two GDP disasters, one from 1929 to 1935 and the other one from 1936 to 1937. Using our rule, we identify one disaster event from 1929 to 1932 and the other one from 1934 to 1937. Similarly they identify a GDP disaster for Switzerland from 1912 to 1918. We instead consider two episodes, one from 1912 to 1914 and one from 1916 to 1918. (Another minor difference in our database consists in identifying the Spanish real per-capita consumption disaster as 1911-1915 instead of 1913-1915.)

Ultimately, following our exercise, we have added 8 GDP disasters, 3 Consumption disasters and dropped one GDP disaster event[11] from the list presented in Barro and Ursúa (2008). The total tally of disasters reaches 80 and 74 respectively for GDP and Consumption disasters. Besides the peak and trough years and the depth of the crisis, we create crisis and disaster dummy variables which take value 1 one year after the detected peak (in per capita real GDP or consumption) and zero otherwise. Similarly we construct dummy variables that take the value of 1 from one year after the peak until the trough (included).

The role of expectations and time trend

In our analysis above we have distinguished between gdp/consumption disasters and crises (the terms are used interchangeably by Barro and Ursúa) making use of absolute thresholds. It may however be useful to distinguish between absolute falls in consumption and falls relative to expectations or to time trend. In the latter cases it would be appropriate to consider a time-varying threshold. It can be argued that the post-1950 acceleration of growth, and the widespread adoption of growth and development strategies, created a climate in which the expectation was of rising consumption per capita. In such a situation, a decline of even 5 per cent (what in absolute terms we refer to a "crisis") may regarded as a "disaster". A very simple way around this problem is to complement the "disasters" list with those cases, during post-1950, where one could record a fall in economic performance of 5 per cent or more from peak to trough. In addition, this allows us to increase the sample of

[11] The GDP crisis in Argentina from 1958 to 1959 is mistakenly indicated as a disaster in tableC2 (Barro and Ursúa 2008). The drop in Per-capita GDP, however, is only 8.1 per cent (a crisis and not a disaster following our methodology). The authors seem to have confused the drop in Consumption with that of GDP. We therefore eliminate this event from the list of GDP disasters.

disasters taken into consideration. More precisely the final tally of GDP and consumption disasters goes up respectively from 74 to 100 and from 80 to 101.

The Final Database

Our final dataset is therefore obtained from the original contribution of Barro and Ursúa (2008) with a few subsequent modifications. We implement independently their methodology and confirm most of their listed disasters and add a few others left unnoticed. Finally we include milder crises for post-1950 period in order to take into account the role of time trend and expectations. The full list is given in Tables A.**2** and A.3. The length of the shock is the number of year elapsing from the beginning of the disaster to the trough year. The depth of the crisis is the cumulative percentage drop from peak to trough. The frequency distributions of crises length and depth for our subsample are not particularly distant from the ones calculated in Barro and Ursua (2009), despite the (minor) differences in methodology (see above) and lower sample size. The average length of a crisis is 3.3 and 3.2 respectively for our 100 consumption disasters and 101 GDP disasters. Barro and Ursúa find slightly higher averages of 3.6 and 3.5 using a broader coverage of countries and years. Similarly the average cumulative drop in our crisis database is respectively 18% for both real per-capita GDP and Consumption, compared to an average downswing of around 21% recorded in their data[12].

Surprisingly, the degree of overlap between the consumption and GDP collapses years is lower than one would initially expect. Only 56% of the years listed as a "GDP disaster" also, contemporaneously, witness a consumption collapse. Similarly, only 54% of years of consumption disaster also experience, in the same years, a drop in GDP that is classified as disastrous.[13] We could instead consider individually the crisis episodes, rather than crisis years, and we observe that 33% of consumption/GDP disasters start contemporaneously (exactly the same year), 21% of consumption crises precede economic disasters and only 11% of GDP disasters are followed by a consumption one in turn. Therefore 65% percent of economic crises present some combination of consumption and GDP crisis.

As we have mentioned in the text, some two-thirds of the countries under analysis are from the OECD group (or are High Income Countries according to the Atlas income classification of the World Bank). Nonetheless, the subsample of crises episodes we have identified represent a more balanced mix of OECD and non-OECD countries, with the latter accounting for more than 40 per cent.

[12] Lower average crisis length and depth was indeed expected given the methodology we have adopted.

[13] The figures are very similar, 54% and 52%, for the whole disaster database (including war periods etc.).

Table A.1 Systemic Banking Shocks (1911-2010)

Country	Period		
	1911-1944	*1945-1979*	*1980-2010*
Argentina	**1931, 1934**		**1980, 1989, 1995, 2001**
Australia	**1931**		
Brazil	**1923, 1926, 1929**	**1963**	**1990, 1994**
Canada	**1912, 1923**		
Finland	**1921, 1931**		**1991**
France	**1930**		
Germany	**1925, 1931**		**2007**
Iceland			**2007**
India	**1921, 1929**		**1993**
Indonesia			**1992, 1997**
Italy	**1921, 1930, 1935**		**1990**
Japan	**1923, 1927**		**1992**
Malaysia			**1985, 1997**
Mauritius			
Netherlands	**1914, 1921**		**2008**
New Zealand			
Norway	**1921, 1931, 1936**		**1987**
Portugal	**1920, 1923, 1931**		
Singapore			**1982**
South Africa			
Spain	**1920, 1924, 1931**	**1977**	**2008**
Sweden	**1922, 1931**		**1991**
Switzerland	**1921, 1931, 1933**		
UK			**2007**
US	**1929**		**1984, 2007**

Notes: Systemic Banking Shocks are identified from Laeven and Valencia (2010), Bordo et al (2001), and Reinhart and Rogoff (2008, 2009, and Reinhart 2010). Dates in the table represent the beginning year of the banking shock.

Table A.2 Real per-capita GDP disasters (1911-2006)

Country	*1911-1944*	*1945-1979*	*1980-2006*
Argentina	1912-1917; 1929-1932,	1948-1952	1980-1982; 1987-1990 1998-2002
		1958-1959; 1961-1963	1984-1985
Australia	1910-1918; 1926-1931 1943-1946		
Brazil	1928-1931		1980-1983; 1987-1992
Canada	1913-1914; 1917-1921 1928-1933		1989-1992
Finland	1913-1918; 1938-1940		1989-1993
France	1912-1918; 1939-1944 1929-1935		
Germany	1913-1919; 1922-1923 1928-1932; 1943-1946.		
Iceland	1913-1920	1948-1952,	
			1987-1993,
India	1916-1918	1943-1948 (1947 India Independence)	
		1964-1966; 1978-1979	
Indonesia	1930-1933; 1940-1945	1961-1967	1997-1999
		1957-1958	1981-1982
Italy	1918-1920; 1939-1945.		
Japan	1940-1946		
Malaysia	1929-1932; 1934-1937 1939-1941; 1942-1947.		
			1997-1998
Mauritius (not covered)			

Notes: GDP disasters are identified from Bordo and Ursúa (2008) data on real GDP per-capita. Disasters are identified every time we record a cumulative percentage drop (from peak trough) of at least 9.5% for 1911 to 1950. The threshold is 5% for post-1950 period (1950-2006). More specifically those events in which the cumulative drop of GDP is between 5% and 9.5% are highlighted, where applicable, for every country, as those placed underneath the dashed line. Dates in the table represent the Peak and Trough respectively. The disaster itself is assumed to be a year following the Peak.

Table A.2 Continued: Real per-capita GDP disasters (1911-2006)

Country	*1911-1944*	*1945-1979*	*1980-2006*
Netherlands	1913-1918; 1929-1934 1939-1944		
New Zealand	1911-1918; 1920-1922 1925-1927; 1929-1932 1939-1944.	1947-1948; 1950-1951	
		1966-1968; 1974-1978	1986-1991
Norway	1916-1918; 1920-1921 1939-1944		
Portugal	1927-1928; 1934-1936		
Singapore	1910-1913; 1915-1916 1917-1920; 1925-1927 1929-1932; 1937-1938.	1950-1952; 1956-1957	
		1954-1955	2000-2001
South Africa	1912-1917; 1919-1920 1928-1932		1981-1987; 1989-1993
Spain	1929-1933; 1935-1938 (1936-1939 Spain Civil War)		
Sweden	1916-1918; 1920-1921 1939-1941		
			1990-1993
Switzerland	1916-1918; 1939-1942		
			1974-1975
UK	1918-1921; 1943-1947		
US	1913-1914; 1918-1921 1929-1933 ; 1944-1947.		

Notes: GDP disasters are identified from Bordo and Ursúa (2008) data on real GDP per-capita. Disasters are identified every time we record a cumulative percentage drop (from peak trough) of at least 9.5% for 1911 to 1950. The threshold is 5% for post-1950 period (1950-2006). More specifically those events in which the cumulative drop of GDP is between 5% and 9.5% are highlighted, where applicable, for every country, as those placed underneath the dashed line. Dates in the table represent the Peak and Trough respectively. The disaster itself is assumed to be a year following the Peak.

Table A.3 Real per-capita Consumption disasters (1911-2006)

Country	*1911-1944*	*1945-1979*	*1980-2006*
Argentina	1912-1917; 1928-1932	1949-1953; 1958-1959	1980-1982; 1987-1990 1998-2002
		1961-1963; 1974-1976	1994-1995
Australia	1913-1918; 1927-1932 1938-1944		
		1950-1953	
Brazil	1912-1913; 1918-1919; 1920-1921; 1928-1931		1984-1990
		1952-1953; 1968-1969 1974-1975	
Canada	1912-1915; 1918-1921 1929-1933		
Finland	1913-1918; 1928-1932 1938-1944		1989-1993
		1956-1958	
France	1912-1915; 1938-1943		
Germany	1912-1918; 1922-1923 1928-1932; 1939-1945.		
Iceland (from 1945)		1947-1952; 1967-1969 1974-1975	1987-1993
		1956-1957	1982-1983; 2000-2002
India	1932-1942	1943-1946; 1947-1950 (1947 India Independence)	
Indonesia (from 1960)			1985-1988
		1962-1964	1997-1998
Italy	1939-1945.		
Japan	1928-1935; 1937-1945		
Malaysia	1914-1916; 1917-1920; 1929-1932; 1938-1947	1951-1952 (1948-1960 Malayan Emergency)	1984-1986; 1997-1998
Mauritius (not covered)			

Notes: Consumption disasters are identified from Bordo and Ursúa (2008) data on real GDP per-capita. Disasters are identified every time we record a cumulative percentage drop (from peak trough) of at least 9.5% for 1911 to 1950. The threshold is 5% for post-1950 period (1950-2006). More specifically those events in which the cumulative drop of Consumption is between 5% and 9.5% are highlighted, where applicable, for every country, as those placed underneath the dashed line. Dates in the table represent the Peak and Trough respectively. The disaster itself is assumed to be a year following the Peak.

Table A.3 continued: Real per-capita Consumption disasters (1911-2006)

Country	*1911-1944*	*1945-1979*	*1980-2006*
Netherlands	1912-1918; 1939-1944		
		1979-1982	
New Zealand (from 1939)	1939-1944.		
		1952-1953; 1958-1960 1974-1980	
Norway	1916-1918; 1919-1921 1939-1944		
			1985-1989
Portugal	1914-1919; 1934-1936 1939-1942;	1974-1976 (19147-1975 Carnation Revolution)	
Singapore	1918-1920; 1928-1931;	1949-1951; 1956-1959	
			1997-1998
South Africa	1912-1917; 1919-1920 1928-1932		1981-1987; 1989-1993
Spain	1911-1915; 1929-1930; 1935-1937; 1940-1945 (1936-1939 Spain Civil War)	1946-1949	
Sweden	1913-1917; 1920-1921 1939-1945		
			1989-1993
Switzerland	1912-1918; 1939-1942		
UK	1915-1918; 1938-1943		
US	1917-1921; 1929-1933		

Notes: Consumption disasters are identified from Bordo and Ursúa (2008) data on real GDP per-capita. Disasters are identified every time we record a cumulative percentage drop (from peak trough) of at least 9.5% for 1911 to 1950. The threshold is 5% for post-1950 period (1950-2006). More specifically those events in which the cumulative drop of Consumption is between 5% and 9.5% are highlighted, where applicable, for every country, as those placed underneath the dashed line. Dates in the table represent the Peak and Trough respectively. The disaster itself is assumed to be a year following the Peak.