HOW DO POLICY ACTIONS AFFECT SHORT-TERM POST-CRISIS RECOVERY?

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April 1, 2013

This paper investigates the factors that determine how countries recover after crises, using a sample of 61 crises in 29 countries in the last 30 years. Several findings emerge. First, the most important factors associated with higher post-crisis growth are expansionary monetary and fiscal policy, exchange rate depreciation and prudent banking regulation. Second, the Great Recession does not seem to differ from the other crises in terms of how the policy actions affect the recovery. Third, the fiscal multiplier does not seem to be smaller during episodes of high public debt, and public debt does not seem to affect the speed of recovery through channels other than government spending.

JEL classification: E52, E62, E63, G01

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I. Introduction

Although no country was spared the recent Great Recession, it affected different countries in different ways. Many studies have investigated which factors determined these differences – Berglof, Korniyenko and Zettlemeyer (2009), Berkmen and others (2009), Blanchard, Das and Faruqee (2010), Cecchetti, King and Yetman (2011), Giannone, Lenza and Reichlin (2010), IMF (2010), Lane and Milesi-Ferretti (2011), Rose and Spiegel (2009) and Crespo Cuaresma and Feldkircher (2012). Now, in the aftermath of the crisis, it is evident that different countries are recovering differently. While policy makers seem to be well aware of these differences in the speed of recovery (see, for instance IMF, 2011), there is a lack of research on the factors that explain them.

On the other hand, several existing studies have investigated the factors that affected how countries recovered from some previous crises – Abiad and others (2009), Hong and Tornell (2005) and Park and Lee (2003). However, these studies fail to provide a clear answer to the question of the role of policy decisions in the recovery.

The present study will try to fill in these gaps. It will investigate which factors affect short-term GDP growth after economic crises, focusing on policy actions, i.e. on the monetary policy, fiscal policy and banking regulation and supervision policy, and on the role of public debt. It will analyze both the 2008 crisis and several other crises that occurred during the last three decades all over the world. Pooling the recent global crisis together with some smaller crises from the past will enable us to test whether the recent crisis differs from the previous crises in terms of how countries recover. These findings can be linked to the present debate in the literature on the uniqueness of the Great Recession. For instance, Reinhart and Rogoff (2009b) and Laeven and Valencia (2010) argue that there are many

similarities between the 2008 crisis and the previous crises, in terms of the causes and the policy responses, while Imbs (2010) claims that the 2008 crisis was unique.

The empirical approach that will be used is standard in the empirical crises literature – the post-crisis GDP growth will be regressed on a set of explanatory variables that measure monetary policy, fiscal policy, regulatory policy and other factors that may affect the short-term GDP. From the econometric point of view, this approach poses two problems. The first one is that many factors affect cross-country growth rates (recall all the literature on the empirics of growth), so that the omission of some of these factors can bias the results. The second one is the problem of reverse causality: output growth can affect some of the explanatory variables, too. For instance, if policy reaction and output are measured contemporaneously, a positive coefficient on the policy variable can be obtained because policy really affects output growth positively, but also because higher output growth allows more supportive policy. Reverse causality, again, can lead to wrong inference.

A careful modelling strategy will help us to alleviate, if not completely avoid, these problems. Regarding the omitted variables problem, the dependent variable will be defined as growth after the crisis, minus the average long-run growth rate. In this way, the unobserved time-invariant country heterogeneity will be wiped out, so that the remaining variability can be attributed to the policy actions. Certain variables that can affect short-run growth (like capital inflows) will not be removed by this de-meaning. Because of that, a set of control variables, measuring post-crisis trade and financial flows and certain structural reforms, will be included as well.

The timing of our variables will help us to avoid the second problem – reverse causality. Specifically, the dependent variable, output growth, will be measured after the crises, while the policy variables will be measured during or before the crises. Hence, it is unlikely

that the economic policies during the crisis will be more supportive because the output growth after the crisis allows them to be, simply because policy makers during crises do not anticipate that output will start growing soon. The euro area experience during the 2008 crisis suggests that this is likely to be the case: the GDP of the euro area started growing (on a quarterly basis) in the third quarter of 2009; the European Central Bank (ECB) was rather surprised by this, since in its June 2009 projections it expected the GDP to start increasing one year later, in mid-2010 (see ECB, 2009:p.2). Expectations can induce another form of endogeneity: expectations that economic activity will be subdued can indeed result in slow output growth, and will, at the same time, result in expansionary policy. In our case, however, even if present, this channel will push the coefficients in the opposite direction of the true effect (because expectations are positively correlated with future economic outcomes and negatively correlated with policy support), which means that the true effects of the policy variables can only be higher than estimated. The unavailability of data on policy makers' expectations does not allow us to control for the effect of the expectations. However, when some proxy variables for policy makers' expectations are included (the projected GDP growth, from the International Monetary Fund's World Economic Outlook), the results remain roughly unchanged, yielding further support for our findings.

Two econometric techniques will be used in the analysis: ordinary least squares (OLS) and Bayesian model averaging (BMA). The most important findings can be summarised as follows. First, all the three policy variables appear to be significant determinants of the post-crisis recovery; more supportive monetary and fiscal policies during the crisis and more prudent banking regulation and supervision before the crisis are associated with higher GDP growth after the crisis. Second, the 2008 crisis does not seem to be different from the previous crises in terms of how the policy response affects the recovery. Finally, the effect of

the fiscal policy on the recovery does not appear weaker in highly indebted countries, and government debt does not appear to affect the recovery per se, but only through government spending. This implies that fiscal policy during crises should be expansionary even in highly indebted countries, in order to ensure a solid recovery.

The paper is structured as follows: section II overviews the existing related literature, section III presents the analyzed crises and describes how crises and recoveries are defined, section IV presents the empirical analysis and section V concludes.

II. Related literature

The literature investigating economic growth after crises is rich. The papers include those by Barro (2001), Bordo and Haubrich (2012), Cerra and Saxena (2008), Howard, Martin and Wilson (2011), Lopez-Salido and Nelson (2010), Reinhart and Reinhart (2010) and Reinhart and Rogoff (2009a). However, these studies investigate mainly whether post-crisis growth is higher when the crisis is more severe and whether crises have permanent or transitory effects. On the other hand, very few papers investigate the determinants of post-crisis recoveries.

Park and Lee (2003) analyze which factors influence short-term output growth after currency crises, using a sample of 176 crisis episodes between 1970 and 1995. They find that depreciation of the exchange rate and supportive monetary and fiscal policy help post-crisis recovery. Still, their study may have endogeneity problems, as the output growth and policy variables are measured over the same period.

Similarly, Hong and Tornell (2005) investigate how countries recover from currency crises, with a sample of around 100 countries. They regress the output growth after crises on various variables, including credit growth and reserve adequacy before the crisis (as initial

conditions) and credit growth and government deficit after the crisis (as policy variables). They find that credit expansion and reserve inadequacy before the crisis depress growth after the crisis, but fail to find any clear relationship between policy variables and recovery. As the authors point out, their policy variables can be criticised for being endogenous, since they are included with values contemporaneous with the dependent variable.

Using a sample of 88 banking crises from the last four decades, Abiad and others (2009) analyse the medium-term behaviour of output after crises. Amongst other things, they investigate the factors that are correlated with higher post-crisis medium-term growth, using both OLS and BMA. They find evidence that expansionary fiscal policy (measured through real government consumption) is correlated with higher growth, but only limited evidence about the role of monetary policy (measured through the interest rate and the real exchange rate depreciation). As the authors themselves point out, the way they define their variables does not eliminate the endogeneity problem. They are both defined for the post-crisis period: the dependent variable is defined as the average growth rate in the fourth to the eighth year after the crisis, minus the average growth before the crisis, while the policy variables are defined for the crisis year and the following three years. Although their dependent and policy variables are defined over different time periods, they are both from the post-crisis period, which implies that higher spending today can be because policy makers anticipate higher growth in the future.

To our knowledge, no paper yet analyzes the cross-country differences in GDP growth after the 2008 crisis in a rigorous econometric manner. Dwyer and Lothian (2012) provide some evidence that the recovery after the 2008 crisis has been slower than after previous crises and that the monetary expansion during the crisis has helped the post-crisis recovery, but their analysis is mainly qualitative and based on stylised facts. Aizenman and Pasricha

(2010) analyze certain aspects of the recovery after the 2008 crisis, but their analysis focuses only on the financial sector, not on the overall economic activity. Blanchard and Leigh (2013) investigate the relation between growth and fiscal consolidation during the 2008 crisis, but their analysis does not delve with other determinants of growth, apart from the fiscal policy.

The present paper, therefore, contributes to the existing literature in several ways. To begin with, it will juxtapose the 2008 crisis with some previous crises, with the aim of investigating whether the Great Recession is unique in terms of the factors that determine how countries recover from it. Also, differently from the existing studies that use annual data, this study will use quarterly data, which will enable better measurement of the recovery and better identification of the policy measures. Finally, by the careful definition of the variables that measure the recovery and the policy reactions, our study will arguably avoid the endogeneity problem.

III. Analysed crises

The reasoning that policy actions during crises are likely to be exogenous with respect to the economic growth afterwards because policy makers in times of crises do not expect output to start growing soon is likely to hold only for big crises, like the recent Great Recession. Because of that, our analysis will be conducted on financial, current account or sovereign debt crises that are accompanied by recessions. Therefore, our selection of the crises was made in the following way. First, we selected all the crises since 1980[1] listed in the major papers related to this issue: Caprio and Klingebiel (2003), Detragiache and Spilimbergo (2001), Jacome (2008), Laeven and Valencia (2008), Levy Yeyati and Panizza (2011), Reinhart (2010) and Reinhart and Rogoff (2008). Similarly to Babecky and others

1. Data collection for the period before 1980 becomes problematic.

(2012), and with the purpose of ending up with as many crises as possible, a crisis was selected even if it was listed in only one of the papers. Accordingly, our selection resulted in a list of nearly 250 crisis episodes. Many of these crises were small, however, and because of that, in the second step, we selected only those episodes that were associated with significant decline in the economic activity. Therefore, we observed the evolution of the quarterly GDP (seasonally adjusted) for each of the countries around the crisis episode. If the GDP fell for two consecutive quarters, and if the decline was above 2% of the pre-crisis level of the GDP,[2] that episode was selected. Since many of the countries from the original list do not have quarterly GDP data, and because many of the crises in that list were not accompanied by a decline in the GDP, we ended up with 35 crises in 29 countries. Finally, we added the 2008 crisis for all these countries (except for Colombia, Indonesia and Israel, which did not meet our criterion for a recession), treating the Great Recession as a global crisis, despite the fact that some of the countries on our list did not have a financial, currency or sovereign debt crisis during the Great Recession according to the formal criteria.[3] In that way, we reached a total of 61 crises from 1980 to 2008, in 29 countries, as shown in Table 1.

Due to certain data unavailability, in our final regressions we will operate with 43 observations. It is not uncommon in this type of analysis to work with a low number of observations (see, for instance, Blanchard, Das and Faruqee, 2010, who use 29 observations). The relatively low number of observations will not allow us to distinguish between different types of crises in our analysis. Hence, we assume that there are no systematic differences in the effects of policy variables on post-crisis recovery from different types of

2. The 2% level was chosen somewhat arbitrarily so that we obtain a reasonable number of crises. Because it may seem low, in the robustness checks section, we investigate what happens if the threshold is increased to 4%.

3. See Laeven and Valencia (2012) for a list of countries that formally suffered a crisis during 2008. In the robustness check section, we investigate what happens to the results if the countries without a formal crisis in 2008 are excluded from the analysis.

crises.[4]

(Table 1 here)

The crises are dated in line with the conventional peak-to-trough logic, according to which a crisis starts when the GDP is at its peak and it ends when the GDP is at its lowest. More precisely, the crises are dated by observing the quarter-on-quarter growth rates of the seasonally adjusted GDP: a crisis starts when the GDP falls for two consecutive quarters, and ends when the GDP records the first positive growth rate after which there are no consecutive declines. While our definition of the start of a crisis is fairly standard, our definition of the end of a crisis differs from that used in some other studies. For instance, Cechetti, Kohler and Upper (2009) define the end of a crisis as the first quarter in which the GDP reaches the pre-crisis peak. This definition is, however, problematic for the 2008 crisis, since there is evidence of a slowdown in the potential output after the 2008 crisis (see, for instance, Benes and others, 2010), which may imply that it will take a long time for the GDP to reach its pre-crisis peak for some countries.

The recovery period refers to the three years following the end of the crisis; the three-year horizon is chosen because the primary objective of this paper is to assess the effects of policies on the recovery, and because these effects are usually believed to last for two to three years. The starting and ending dates of each of the crises are shown in Table 9 in the Appendix.

Some facts about the severity of the analyzed crises and the pace of the subsequent recovery are shown in Table 2. It can be seen that the crisis in Argentina in 1998–2001 lasted the longest (15 quarters). The most severe crisis in terms of the GDP decline during

4. We will just allow for different effects of the central bank's interest rate on recovery for *currency crises,* since it is well known that central banks are forced to increase the interest rate during currency crises, in order to defend their currencies, differently from other crises, when central banks usually decrease the interest rate, in order to support the economy.

the crisis was the crisis in Peru in 1988, when the GDP at the end of the crisis was 39% lower than the GDP at the begining of the crisis. The most severe crisis in terms of the GDP decline per quarter of the crisis was the crisis in Botswana in 2008, during which the annualized GDP decline per quarter was around 35% (the GDP fell by 17.7% in just 2 quarters). The fastest recovery after the crisis was in Turkey, after the 2008 crisis, when the annualized post-crisis GDP growth was 9.8%. The highest average GDP growth for the whole period belongs to Korea – 6.1%. Comparing the 2008 crisis with the other crises from the past, it is interesting to note that the GDP decline during the Great Recession was actually smaller than during the previous crises – the average GDP decline during the 2008 crisis was around 7.6% of the pre-crisis level, whereas it was 10.5% during the previous crises. On the other hand, the Great Recession is characterised by a weaker recovery – the average annualised GDP growth in the 12 quarters following the crisis was around 4.5%, vis-à-vis 5.5% during the past crises.

(Table 2 here)

IV. Econometric analysis

IV.A. Model

The model that will be employed is as follows:

$$
\begin{aligned}
recovery_{t+1} \quad = \quad & c + \alpha \begin{bmatrix} IR_t \\ M_t \\ NER_t \\ gov\_cons_t \\ cap\_adeq_{t-1} \\ bank\_regul_{t-1} \end{bmatrix} + \beta \begin{bmatrix} pub\_debt_{t-1} \\ ext\_debt_{t-1} \end{bmatrix} + \gamma \begin{bmatrix} fall_{t-1} \\ fixed\_ER_{t+1} \\ IMF_{t+1} \\ default_t \end{bmatrix} \\
& + \delta \begin{bmatrix} FDI_{t+1} \\ \exp orts_{t+1} \\ portfolio_{t+1} \end{bmatrix} + \epsilon \begin{bmatrix} D2008 \\ cur\_cri_t * IR_t \\ hi\_ext\_debt_{t-1} * NER_t \end{bmatrix} + u
\end{aligned}
\tag{1}
$$

where IR stands for the interest rate, M for money, NER for the nominal exchange rate, *gov_cons* for the government consumption, *cap_adeq* for capital adequacy, *bank_regul* for banking regulation, *pub_debt* and *ext_debt* for public and external debt, respectively, FDI, *exports* and *portfolio* for foreign direct investment, exports and potfolio flows, $fall$ for the fall in the GDP during the crisis, $fixed\_ER$ for a fixed exchange rate regime, IMF for IMF arrangements, $default$ for a sovereign default, $D2008$ - for the 2008 crisis dummy, *cur_cri* - for currency crises and *hi_ext_debt* for high external indebtedness. $\alpha, \beta, \gamma, \delta$ and ϵ are vectors of coefficients, c is the constant and u is the error term. The subscripts $t-1$, t and $t+1$ denote the time period over which the variables are defined, $t-1$ standing for *before the crisis*, t for *during the crisis* and $t+1$ for *during the recovery*, i.e. after the crisis.

The selection of variables is very similar to that of other papers from the empirical crisis literature (see the references in sections I and II), and, from a theoretical point of view, loosely speaking, the model corresponds to the standard New Keynesian models of the business cycle, which usually explain short-term output movements by the monetary and the fiscal policy, the financial sector and the external sector (see, for instance, Smets and

others, 2010 for an overview of the two main state-of-the-art New Keynesian models used by the European Central Bank). The explanatory variables that are employed can be separated into five groups: 1) variables measuring policy reaction (interest rate, money supply and exchange rate depreciation for the monetary policy; capital adequacy and banking regulation for the banking regulation and supervision; government consumption for the fiscal policy); these variables are the main interest of our analysis; 2) variables measuring the constraints for policy action (public debt and external debt); 3) variables measuring the short-term trade or financial flows that can affect the short-run post-crisis recovery (FDI, exports and portfolio investment flows); 4) variables measuring other factors that can affect the recovery, like IMF arrangements (positively, through structural reforms or improved confidence, or maybe even negatively, through restrictive policy), whether the country defaulted during the crisis (as Levy Yeyati & Panizza, 2011, argue, sovereign default is associated with higher growth), whether the country had a fixed exchange rate regime during the recovery (Benigno & Romei, 2012, argue that a fixed exchange rate can slow down the recovery) and the fall in the GDP during the crisis (due to the conventional understanding that deep crises are followed by fast recoveries); and 5) variables that allow the effects of certain factors to differ in some situations (the dummy for the 2008 crisis and the two cross-product variables). The 2008 dummy allows for the possibility that the average growth after the 2008 crisis is lower than after the other crises, regardless of the reasons. The cross-product between the currency crisis dummy and the interest rate allows for the differential effect of the interest rate during currency crises: during currency crises, when the exchange rate depreciates substantially, the optimal monetary policy response is to increase the interest rate in order to prevent further depreciation of the currency, not to decrease it, as in normal crises. Finally, the cross-product of the exchange rate depreciation and the high external debt allows for the

possibility that depreciation has adverse effects on the economy in situations in which the external debt is high, due to balance sheet effects, differently from normal situations, when positive effects on the domestic economy, through improved competitiveness, are expected.

IV.B. Addressing endogeneity

The main econometric problem with the above regression is the possible endogeneity emerging from two sources: omitted variables and reverse causality. The omitted variables problem might be present because there are many factors that can cause cross-country differences in GDP growth (for instance, Durlauf, Johnson and Temple, 2005, document around 150 different explanatory variables used in growth regressions), the omission of which could bias the results. To avoid this problem, the dependent variable will be defined as post-crisis growth, minus the average growth in the country since 1980 (or whenever the first GDP data are available). In this way, all the fixed effects that cause different countries to have different long-run growth rates will be eliminated.

The second potential source of endogeneity, reverse causality, emerges from the notion that it is not just more expansionary policy that leads to higher output, but that higher output can also imply more supportive policy. In order to avoid this problem, the policy actions and the output will be measured over different time periods – policy actions will be measured during a crisis, while output growth will be measured after a crisis. The output growth can still be correlated with the policy actions, despite the different timings, due to expectations, which are likely to affect both policy makers' decisions and future output. Hence, the most appropriate way to deal with this problem would be to control directly for policy makers' expectations. Unfortunately, expectations are unobservable and there are no data relating to them, so one has to circumvent the problem somehow. We will

use the following logic. At the onset of the recent financial crisis, many people, including Her Majesty the Queen, asked themselves how economists failed to see the crisis coming. While the issue may still be open to discussion, the prevailing answer is that, similarly to earthquakes, crises are almost impossible to predict. However, just as economists did not see the crisis coming, it seems that they did not see it ending, either. A good example of this is the ECB. In the second quarter of 2009, the ECB expected the GDP in the euro area to start growing in mid-2010 (see ECB, 2009:p.2). As a matter of fact, the GDP started growing the very next quarter. Additionally, it was not just the ECB that did not see the crisis ending, nor is this a unique feature of the 2008 crisis. Table 3 shows the projected GDP growth for the forthcoming period, from the IMF World Economic Outlook (WEO) published during the last quarter of the crisis, along with the actual GDP growth for the same period, for 30 of our crises (all the crises for which there is a projected GDP from the WEO). It is quite obvious that the forecasted GDP rarely coincides with the actual outcome. In only 4 of the 30 crises is the difference between the expected GDP growth (the WEO projection) and the actual GDP growth smaller than a percentage point, and the average absolute error in the projections is nearly 4 percentage points.

To give further credibility to our analysis, we will include this proxy for the policy makers' expectations as an additional variable in our final regression and we will compare the differences between the specification without the expectations and the specification with the expectations.

(Table 3 here)

To a certain extent, out approach to identifying exogenous policy variation is similar to the recently popular narrative approach, proposed by Riera-Crichton et al. (2012) and Romer and Romer (2010). While it cannot be claimed that our policy variables are inde-

pendent of the business cycle, as in these two studies, the similarity lies in using narrative justification for claiming that the proposed variables are exogenous from future output.

IV.C. Econometric techniques

If one accepts the above arguments for avoiding the endogeneity problem, the model can be safely estimated by OLS. The modelling strategy will resemble general-to-specific modelling (see Hendry, 2000, for more on general-to-specific modelling) – all the variables from equation 1 will be included in the initial specification, and then the insignificant variables will be excluded one by one until a parsimonious model is achieved.

The OLS analysis will be accompanied by a Bayesian model averaging exercise. BMA has gained prominence in recent years in analyses in which numerous explanatory variables are available and when there is significant uncertainty about the correct theoretical model to use. Instead of choosing one model, BMA draws inference using the weighted average of many models. Of all the available models, given by all the possible combinations of the explanatory variables, BMA selects only some (using Markov Chain Monte Carlo methods), estimates these models using Bayesian techniques and then weights them using a measure of their goodness-of-fit – their posterior model probability. Inference is then usually based on the grounds of the weighted averages of the posterior means and standard errors of the candidate variables, and on the posterior inclusion probability (PIP), which, loosely speaking, is the probability that the candidate explanatory variable is a robust determinant of the dependent variable, i.e. a measure of the significance of the variable. In the crises literature, Abiad and others (2009) and Crespo Cuaresma and Feldkircher (2012) conduct a BMA analysis.

IV.D. Variables

The variables that will be used in the analysis are those that enter equation 1. A detailed description of their definitions and the data sources is presented in Table 10 in the Appendix.

The dependent variable, the speed of recovery, is constructed as the average annualized GDP growth in the three years after the crisis, minus the average GDP growth since 1980 (or since GDP data have been available), as explained above, to remove the effects of the variables that cause different countries to have different long-run growth rates. The three-year horizon is chosen due to the conventional understanding that the effects of monetary and fiscal policy usually last for two to three years. It should be noted that the recovery for some countries after the 2008 crisis is measured over a time period that is shorter than 12 quarters, due to data unavailability.

The banking regulation variable is a disrete variable, taking values from 0 to 3 (0=un-regulated, 1=less regulated, 2=largely regulated, 3=highly regulated). Therefore, it will be included in the regression with three dummies, for less regulated, largely regulated and highly regulated banking systems.

The monetary and fiscal policy variables are measured during the crisis (i.e. before the recovery), to avoid the reverse causality problem. Regulatory policy (i.e. capital adequacy and banking regulation), on the other hand, is measured before the crisis, since the situation in the banking sector can worsen during crises, because the situation before the crisis is a better indicator of the quality of the regulation and supervision. Similarly, public debt and external debt are taken before the crisis, since they can also worsen during crises. Exports, FDI and portfolio investment are measured during the recovery, since they are included to capture other short-run determinants of the GDP in the recovery phase.

The variables that are measured before the crisis (capital adequacy, banking regulation,

public debt and external debt) are included with their averages for the year before the crisis. The monetary and fiscal policy variables are included as differences from the pre-crisis level. Similarly, the FDI, exports and portfolio flows are included as differences from the equilibrium levels (the equilibrium level is approximated by the average for the whole period). In some cases, when the FDI, exports or portfolio flows seemed to have structural breaks (for instance, in many of the ex-socialist countries the FDI levels were rather low in the early years, and then increased), the equilibrium level was calculated as the average for the corresponding stable period, not as an average for the whole period.

The data sources for most of the variables are standard – the International Financial Statistics of the IMF, the World Development Indicators of the World Bank and the central banks of the respective countries. Banking regulation comes from Abiad, Detragiache and Tressel (2008), public debt from Abbas and others (2010), external debt from Reinhart and Rogoff (2011) and exchange rate regime from Ilzetzki, Reinhart and Rogoff (2008).

The descriptive statistics for the variables are shown in Table 4. A preliminary assessment of the variables points out that the analysed crises are fairly big – the average GDP decline was nearly 10%. Also, it can be seen that the recovery period is marked by higher-than-average GDP growth, by 1.6 percentage points (p.p.). It is also interesting to note that the monetary policy during the analysed crises behaved in a contractionary manner – the average interest rate increase was around 14 p.p. However, this is completely due to the currency crises, during which the interest rate increased on average by 100 p.p.; during the other crises, the average interest rate declined by 4 p.p. Nevertheless, crises are marked by a decline in the money supply, regardless of their type. Similarly, most of the crises are characterised by a contractionary fiscal policy. Another prominent characteristic of the analyzed crises is the depreciation of the currency – in all but 6 crises, the national curren-

cies during the crises depreciated by more than 5%. The capital adequacy on average was relatively high, above Basel's 8%; however, there is a pronounced variation here – adequacy falls below 4% and rises above 15% in several cases. On the other hand, the average value for the banking regulation variable is 1.1, which corresponds to a "less regulated" system.

The correlation matrix is shown in Table 11 in the Appendix. It does not indicate potential multicollinearity problems; only the interest rate and the nominal exchange rate have a correlation exceeding 80%, but this is completely due to one extreme observation (Peru, 1988), when the interest rate was increased by 1,300 percentage points, and the exchange rate was devalued by 11,000 times. It is worth noting that the results remain virtually identical when this crisis is excluded.

(Table 4 here)

IV.E. OLS analysis

The OLS analysis is performed in accordance with the general-to-specific approach, i.e. starting from a model that includes all the potential explanatory variables (equation 1), we exclude the insignificant variables one by one, until we reach a model in which all the variables are significant. These results are shown in Table 5. Each column shows the results of one regression. In the first regression, most of the variables are insignificant, and we drop the default dummy because it has the highest p-value (0.8). We then exclude the IMF dummy, the public debt, the external debt, the portfolio flows, the exports, the dummy for the fixed exchange rate, the FDI and the money growth, one by one. In the tenth regression, all the variables appear significant (except the two dummies for the less regulated and highly regulated banking systems, which we still retain in the model due to the significance of the

"largely regulated" dummy).[5]

(Table 5 here)

Looking at this final specification, the first point to note is that the variable for the fall in the GDP during the crisis is significant and negative, pointing out that deeper crises are followed by faster recovery. For example, if the GDP fall during the crisis was higher by 8 p.p. (a move from the 75th percentile to the 25th), the recovery would be faster by roughly 0.6 p.p., on average, ceteris paribus. Thus, the regularity that sharp contractions are usually followed by rapid recoveries, first noted by Friedman (1969:p.273), is supported by our results. Turning to the policy variables, all three policies appear highly significant, both statistically and economically. The interest rate coefficient suggests that if the interest rate decreased by 5 p.p. during the crisis (a move from the 25th percentile to the 75th percentile of the variable), this would stimulate the post-crisis GDP growth by roughly 1.7 p.p., on average, ceteris paribus. The interest rate effect differs for currency crises, as suggested by the significant coefficient on the cross-product of the interest rate and the currency crises dummy. In currency crises, instead, lowering the interest rate by 5 p.p. would have no effect on the post-crisis growth, since the optimal monetary policy response in such cases requires the interest rate to be raised, in order to defend the exchange rate parity. The exchange rate effect is also sizeable – depreciation of the currency by 35 per cent during the crisis (a move from the 25th to the 75th percentile) leads to 0.4 p.p. higher growth after the crisis. Exchange rate depreciation, however, leads to higher growth only when the external debt is low; when the external debt is above 80% of the GDP, depreciation has no effect on the GDP, since the positive effects of the depreciation, through the improved competitiveness,

5. The residuals in all the specifications are well behaved – the usual diagnostic tests indicate that the null hypotheses of homoskedasticity and normality in the residuals cannot be rejected at conventional levels of significance, and the Ramsey RESET test does not indicate mis-specification, either.

are offset by the negative effects, through the worsened balance sheets. Equally strong is the fiscal policy effect: when government consumption growth is higher by 9 p.p. (a move from the 25th percentile to the 75th), this leads to 0.9 p.p. higher post-crisis growth. Turning to the banking supervision and regulation, having a higher capital/assets ratio of the banking sector by roughly 4 p.p. (a move from the 25th to the 75th percentile) implies faster recovery by roughly 1.2 p.p. Similarly, countries with a largely regulated banking system have a 2.5 percentage points faster recovery than countries with no regulated banking system. On the other hand, having a less regulated system, instead of no regulation, makes no difference to the recovery, as well as having a highly regulated system. The latter finding might seem strange, but it should be noted that only 5 countries in the sample have a highly regulated banking system. To sum up, bearing in mind that the average value of the recovery is 1.6 p.p., these figures indicate that policy actions have a rather strong effect on the post-crisis recovery.

On the other hand, the third monetary policy variable, money supply, is insignificant. Given that most of the policy stimuli during the 2008 crisis came through unconventional monetary policy measures, i.e. through monetary expansion, this finding questions the effectiveness of these efforts. At first sight, our finding seems to be at odds with the prevailing evidence in the existing literature, which finds that the unconventional monetary policy had positive effects on output (Baumeister & Benati, 2010, Bridges & Thomas, 2012, Chen, Curdia and Ferrero, 2012, Chung and others, 2012, D'Amico and others, 2012, Fahr and others, 2010, Giannone and others, 2011, Joyce, Tong and Woods, 2011, Kapetanios and others, 2012, Lenza, Pill and Reichlin, 2010, Peersman, 2011). However, it must be borne in mind that these studies investigate the immediate effects of the policy measures on the output, i.e. assess whether the interventions prevented larger output decline *during* the

crisis, while our analysis is focused on the effects that these measures have for the *post-crisis* output. Our findings are actually in line with the existing literature, which points out that the effect of the unconventional monetary policy are limited in their duration (see Joyce and others, 2012).

Also, public debt does not appear in the final specification, which might seem strange, especially given the discussion by Cottarelli and Jaramillo (2012), who point out two main channels through which public debt can affect post-crisis growth – through the interest rate spreads and through the potential GDP growth. The first channel works itself out primarily through limiting the scope for fiscal support, i.e. through the smaller space for government spending when the interest rate spreads are high. In our regression, however, the effect of the public debt is conditional on the government consumption, i.e. the coefficient on the public debt shows how the indebtedness affects the GDP growth, given a certain level of government consumption. Hence, the spreads channel that Cottarelli and Jaramillo (2012) discuss is already captured in our regression by the government consumption. The second channel they discuss is the effect that higher public debt can have on potential output through crowding out, i.e. through lower productivity growth. However, this channel is more likely to affect the GDP in the long run, not in the short run, so it may not be unexpected that it does not appear in our analysis, since our analysis refers to the short-run post-crisis GDP growth.

The dummy for the 2008 crisis is significant and negative. This may indicate a potential structural break in how policy actions affect the recovery for the 2008 crisis. To test whether the effects of the determinants of the post-crisis recovery are different for the 2008 crisis, we include the cross-products of the 2008 dummy with all the explanatory variables as additional variables in the regression. These results are shown in Table 12 in the Appendix.

The hypothesis that the cross-products of the variables with the 2008 dummy are jointly insignificant cannot be rejected at 10% (the p value is 0.17), and we have evidence to claim that the effects of the determinants of post-crisis recovery do not differ for the 2008 crisis, vis-à-vis the previous crises.

Therefore, we can interpret the 2008 dummy as a level shift in the recovery for the 2008 crisis. It points out that the annual GDP growth after the 2008 crisis, holding the policy response constant, is 1.9 p.p. lower than the growth after the previous crises. This comes as no surprise: Benes and others (2010) provide evidence that the potential GDP growth slowed down after the 2008 crisis. Apart from that, the slower recovery after the 2008 crisis may be due to the global nature of the crisis, i.e. due to the fact that this crisis affected almost all the countries in the world, while the previous crises were mainly local, or at most regional.

IV.F. OLS analysis - further investigation

We next investigate what happens to the results if a proxy variable for the policy makers' expectations is included. Hence, to the last specification from Table 5 we add the variable for GDP expectations (projected GDP growth for the next year, during the last quarter of the crisis, from the IMF's World Economic Outlook). These results are shown in Table 6, column 2 (column 1 presents the results of the final previous specification, for comparison). As can be seen, the number of observations drops substantially once the expectations variable is included (from 43 to 26), since the GDP projections from the WEO for most of the countries are available only since 2001. Still, most of the coefficients remain significant and with similar magnitudes to before (the exception is the nominal exchange rate, which turns out to have the opposite sign to the expected one). This observation yields further support for our

previous findings about the policy effects on the recovery and to our approach to defining the policy variables.

Next, in the context of the recent debate in the literature about the growth effects of fiscal consolidation (see Alesina, 2010; Alesina & Ardagna, 2009; Auerbach & Gorodnichenko, 2011; DeLong & Summers, 2012; Perotti, 2011; Romer, 2012), it may be interesting to investigate the fiscal policy effects on the recovery when the public debt is high. Specifically, there are arguments that expansionary fiscal policy when the debt is high can result in lower growth, or at least a lower multiplier, due to worsened market confidence. We next investigate this possibility by adding a cross-product variable between the government consumption and a dummy for high public debt. This dummy takes a value of one if the public debt was above 60% of the GDP before the crisis. The results are shown in Table 6, in column 3. The cross-product between government consumption and high public debt is positive, though insignificant. Hence, we find no evidence that the fiscal multiplier is smaller when the public debt is high.

Further, we check what happens to the results if the nominal exchange rate depreciation is substituted with the real exchange rate depreciation. The real exchange rate is a better variable, because it directly determines the competitiveness, but also because it incorporates internal devaluation measures (such as cutting public wages), but it is not as widely available as the nominal exchange rate. As can be seen, the number of observations drops substantially once it is included in the regression, from 43 to 25, and all the variables lose their significance. Nevertheless, the sizes of the coefficients remain mostly unchanged, which supports our previous findings. As for the exchange rate, its effect is 4 times higher when the real exchange rate is used (the real exchange rate is defined in the opposite way to the nominal exchange rate, hence the change in the sign), which indicates that the exchange rate pass-through to

prices is indeed substantial.

(Table 6 here)

Finally, we assess the robustness of the results with respect to changes in the sample of crises, in order to address concerns that the results might be representative only for the particular set of crises. These results are shown in Table 13 in the Appendix. First, we discard the 2008 episode for those countries that did not have a formal crisis in this period (Babecky and others, 2012, and Laeven & Valencia, 2012, report which countries had a formal crisis in 2008). These countries are: Argentina, Belarus, Chile, Croatia, the Czech Republic, Jamaica, Korea, Malaysia, Norway, Peru, the Philippines, Slovakia, Thailand and Turkey. These results are reported in column 2 of Table 13 (column 1 reports the results of the baseline specification). There are virtually no changes during this exercise: despite the substantial decrease in the sample size (from 43 to 30 observations), all the variables remain significant, with the exception of the government consumption, which becomes insignificant at 10% but maintains the size of its coefficient. In the second exercise, shown in column 3, we exclude the smallest crises from our sample, that is, the crises during which the GDP declined by less than 4% (Argentina 2008, Belarus 2008, the Czech Republic 1997, Denmark 1988, Israel 1985, Japan 1997, Norway 1991, Peru 2008, the Philippines 1998 and 2008 and Slovakia 1998). Again, there are only negligible changes in the coefficient's significance or size during this exercise. Finally, in the next 5 robustness checks, we randomly discard 12 crises from our sample (20% of the original sample of 61 crises) and see what happens to the results in those cases.[6] These results are presented in columns 4–8 in Table 13 in the Appendix. Again, there are only minor changes in the results during these exercises. The two coefficients that change the most, in our assessment, are the government consumption

6. The seed that was used for generating the random samples in Stata is **2601**.

and the dummy for a largely regulated banking system; the former varies from 0.05 to 0.13 (its value in the basic specification is 0.1), while the latter varies from 2.1 to 3.5 (2.5 in the baseline specification), which are not very large variations. Overall, we interpret the results of the robustness checks as providing support for our results not being a consequence of the particular sample of crises from the baseline specification, but rather a more general regularity.

IV.G. BMA analysis - introduction

Bayesian model averaging is particularly useful in empirical analyses in which there is uncertainty about the right theoretical model to use and when many explanatory variables are available. For instance, if there are 20 candidate explanatory variables, there are $2^{20} =$ 1,048,576 possible models (i.e. there are 1,048,576 different combinations of the 20 available variables), which can often produce conflicting results. Instead of selecting one model of all those available, BMA draws inference by estimating many of the potential models (sometimes even all the possible models) and by weighting their results. The models are estimated using Bayesian techniques, whereby the researcher's prior information/expectations about the model parameters are combined with information from the data, to obtain the posterior parameter estimates. Then each of the estimated models is weighted by its posterior probability (a measure of the goodness of fit), and these averages are used in inference (for a more detailed explanation of BMA, see Hoeting and others, 1999).

The application of BMA usually requires the setting of priors for the model parameters, the setting of priors for the models and the determination of how to choose from all the available models. In our case, since the number of explanatory variables is rather low, 19, and the number of potential models is therefore only $2^{19} = 524\,288$, instead of choosing

only a subset of models by Markov Chain Monte Carlo methods, we will estimate all the potential models. Regarding the model prior, we will use a uniform prior, i.e. we will assume that all the models have an equal prior probability of being correct, i.e. we will not favour smaller or bigger models. The most problematic part is specifying the priors for the model parameters. Usually, these priors are specified as uninformative priors with zero mean:

$$\beta|\sigma^2, M, g \sim N(0, \sigma^2 g(X'X)^{-1}) \tag{2}$$

where β stands for the model parameters, M for the model, σ is the standard deviation of the residuals, X are the regressors and g is a hyperparameter, which controls the variance of the conditional distribution of the model parameters. Since the model priors are set as uniform, it is clear that g also controls the posterior model probabilities (i.e. the overall results). The choice of g can affect the results to a great extent, with high values of g giving more weight to the few best models, and low values of g spreading the weights among more models. Several proposals have been suggested in the literature for g. Kass and Wasserman (1995), for instance, suggest the unit information prior (UIP), which sets $g = N$ (where N is the number of observations), while Fernandez, Ley and Steel (2001) show that setting $g = max(N, K\hat{}2)$, where K is the number of regressors, outperforms other choices of g in selecting the correct model. Instead of being a fixed number, g can also be "flexible", i.e. data- and model- dependent. For instance, Hansen and Yu (2001) propose local empirical Bayes g, i.e. they propose setting a different g for each separate model on the grounds of the marginal likelihood of the model (i.e. so that it achieves the best fit). Similarly, Liang and others (2008) propose setting g as a hyperprior, i.e. as a probability distribution, not as a fixed number. They propose such a distribution on g that the shrinkage factor $g/(1-g)$

follows a Beta distribution:

$$\frac{g}{1-g} \sim Beta(1, \frac{a}{2} - 1) \tag{3}$$

where the parameter a controls the distribution of g, and hence the overall results.

The crucial difference between a fixed and a flexible g is that with a fixed g, BMA works in a model selection way: it tries to determine which model is more likely to have generated the data, i.e. it concentrates the posterior mass on the few best models, while with flexible priors the posterior mass is spread more evenly across different models. As Feldkircher and Zeugner (2009) demonstrate, flexible g priors outperform fixed g priors when the data are noisy. Our data and variables appear to be noisy for at least two reasons: 1) there is no clear argument for why the variables would be defined in the way they have been defined; for instance, the interest rate variable is measured relative to the 4 quarters preeceding the crisis, but it can also be measured relative to the previous 6 or 8 quarters; 2) there may be differences in the measurement and definitions of the variables in different countries, as in all cross-country studies. Thus, we would a priori prefer the more flexible priors, like the hyperprior g and the local empirical Bayes. Still, we will implement all the above-mentioned priors, in order to see how sensitive the results are.

To conserve space, we will present only the posterior inclusion probabilities (PIP) and the posterior means and standard errors. The PIP, loosely speaking, is the probability that an explanatory variable is a robust determinant of the dependent variable, and is often treated as a measure of the significance of the variables, while the posterior means and standard errors refer to the averages of the posterior distributions of the variables in the estimated models.

IV.H. BMA analysis - results

The results of the BMA analysis are shown in Table 7.[7] All the four above-mentioned priors were used for the hyperparameter g. The first two columns, named "hyper g", show the results of the estimations that employ the prior of Liang and others (2008), the next two columns, entitled "EBL g" use the empirical Bayes local prior of Hansen and Yu (2001), the columns entiled "UIP g" implement the unit information prior of Kass and Wasserman (1995), while the results shown in the last two columns, named "BRIC g", are obtained using the prior of Fernandez, Ley and Steel (2001). For each of these estimations, the first column presents the PIPs of the candidate variables and the second column shows the averages of the posterior means and standard errors for the model parameters. The results shown refer to the 2000 models with the best fit. As is usual in the literature, we will treat parameters with a PIP above 0.5 as significant. All the available explanatory variables are included in the estimations (including those that were used in the further investigation part of the OLS analysis).[8]

The "hyper g" and the "EBL g" results seem rather unanimous – the same nine variables are "significant" in them both: capital adequacy, money, the dummy for a largely regulated banking system, the dummy for 2008, interest rate, exchange rate depreciation, the cross-product of the interest rate with the currency crises dummy, the cross-product of the depreciation with the high external debt dummy and FDI. The "UIP g" results are somewhat different – only the capital adequacy, money, the dummy for a largely regulated banking system and the dummy for 2008 are robust determinants of post-crisis recovery

7. The BMA analysis has been implemented using the BMS package in R, developed by Feldkircher and Zeugner (2009).

8. Except the expected GDP, which is available only for 30 crises, and its inclusion alongside the other variables will decrease the sample of crises substantially, and the dummies for IMF arrangement and for a default, which increase the estimation time substantially and were the least significant variables in the first estimation.

according to them, while the results obtained with the BRIC prior suggest that none of the included variables is a robust determinant of recovery. The higher number of significant variables in the first two estimations confirms that the hyper-g and EBL g priors spread the mass more evenly. Furthermore, the notion that the mass is spread evenly in the hyper g results suggests that our variables are indeed rather noisy (see Feldkircher & Zeugner, 2009). This then justifies our decision to attach more weight to the flexible priors.

The "hyper g" and "EBL g" results are also very similar to the OLS results: almost the same variables appear as determinants of post-crisis recoveries in them both. The only qualitative differences are that according to the BMA, FDI flows and money are significant, while government consumption and the fall during the crisis are not. Apart from this, the overall story obtained by BMA is very similar to the one explained previously – post-crisis growth depends mainly on expansionary monetary policy, measured both by the decline in the interest rate and the increase in the base money, on prudent banking regulation and supervision, measured by capital adequacy and the "largely regulated" dummy, and on depreciation of the currency. Again, the interest rate effect is opposite during currency crises, as well as the depreciation effect during episodes of high external debt. There are certain differences in the magnitudes of the coefficients, though.

(Table 7 here)

We next investigate the sensitivity of the BMA results to different assumptions about the number of models on which the results are calculated and about the hyperprior g. These results are presented in Table 8. In the "number of models" exercise, we first save only the 500 best models, instead of 2000, and then we save all the models. In the hyperparameter exercise, we increase the parameter a, which governs the distribution of the hyperprior g (see eq. 3) to 3 and 4 (instead of 2.1 as it was before), following Liang and others (2008).

As can be seen, the results remain virtually unchanged during these exercises.

(Table 8 here)

Hence, to summarise this section, the BMA analysis generally confirms the findings from the OLS analysis that higher post-crisis growth requires supportive monetary and fiscal policy and a healthy banking sector, that the 2008 crisis does not differ from the previous crises in terms of how the policy actions affect the recovery and that high public debt does not appear to slow down growth during recovery through channels different from government consumption.

V. Conclusion

This paper investigates how policy measures affect short-run GDP growth after economic crises. The measures that are in focus refer to the monetary policy, the fiscal policy and the banking regulation and supervision policy. The analysis is performed using a sample of 61 episodes of economic crisis in 29 countries from the last 3 decades. Careful definitions of the variables help us to avoid the two biggest problems in such an exercise – the problems of omitted variables and reverse causality. The results indicate that the effect of the three policies on short-term post-crisis growth is significant, both statistically and economically. The 2008 crisis does not seem to differ from the previous crises in terms of how the policy actions affect the recovery. The slower recovery after the 2008 crisis is explained by the global nature of this crisis. Regarding the current debate in the literature on the appropriate fiscal policy during crises, we fail to find evidence that the fiscal multiplier is smaller during episodes of high public debt. Furthermore, we fail to find evidence that high public debt slows down post-crisis recovery, once fiscal support is controlled for. If one believes that

people should look at history in order to make the correct decisions for the future, one can interpret the latter two findings as arguments in favour of pursuing expansionary fiscal policy during crises in order to ensure solid recovery, even in situations when the public debt is high. As DeLong and Summers (2012) argue, fiscal policy can often be self-financing.

The study has two main limitations. The first one is that it investigates short-term GDP growth after crises, not medium-term growth, and what is good for the short term might not be good for the medium term. However, it would still be impossible to investigate medium-term growth after the 2008 crisis, simply because the present moment (first quarter of 2013) belongs to the short term. This is certainly one issue that should be investigated in the future. The second limitation of the present study is its coverage of crises. It mainly covered episodes during which countries did not have problems with public debt – there are only 5 episodes with public debt exceeding 80% of the GDP (Japan in 1997 and 2008, Jamaica in 2008, Israel in 1985 and Bulgaria in 1996). Also, while most of the discussions in the related literature and among policy makers now concern the United States, they are not included in our sample, simply because it did not have a crisis in the last 30 years according to our criteria (excluding the 2007–2008 financial crisis). Therefore, the findings about the public debt and the parallels between our results and the related discussions should be treated with caution, although in a related paper, Jovanovic (2013) finds very similar results when a similar analysis is performed for 70 countries for the 2008 crisis.

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VI. Appendix

(Tables 9-13 here)

Table 1: Analyzed crises

Argentina	1994, 1998, 2008
Belarus	1995, 2008
Botswana	1995, 2008
Bulgaria	1996, 2008
Chile	1981, 2008
Colombia	1998
Croatia	1998, 2008
Czech Republic	1997, 2008
Denmark	1980, 1988, 2008
Estonia	1994, 2008
Finland	1990, 2008
Indonesia	1998
Israel	1985
Jamaica	1996, 2008
Japan	1997, 2008
Korea	1998, 2008
Malaysia	1998, 2008
Mexico	1982, 1995, 2008
Norway	1991, 2008
New Zealand	1985, 2008
Peru	1982, 1988, 2008
Philippines	1983, 1998, 2008
Portugal	1983, 2008
Russia	1998, 2008
Serbia	2000, 2008
Slovakia	1998, 2008
Sweden	1991, 2008
Thailand	1997, 2008
Turkey	1994, 2001, 2008

Table 2: Some data on the crises

Crisis	Cumulative fall in GDP during the crisis, in %	Duration of the crisis, in quarters	Annualized GDP fall per quarter during the crisis, in %	Average annualized GDP growth in the 12 quarters after the crisis, in %	Average annualized GDP growth since 1980, in %	Crisis	Cumulative fall in GDP during the crisis, in %	Duration of the crisis, in quarters	Annualized GDP fall per quarter during the crisis, in %	Average annualized GDP growth in the 12 quarters after the crisis, in %	Average annualized GDP growth since 1980, in %
arg94	-15.57	6	-10.38	6.48	4.6	mal98	-11.6	3	-15.47	5.72	6
arg98	-22.8	15	-6.08	8.16	4.6	mal08	-6.6	3	-8.8	6.68	6
arg08	-2.15	3	-2.87	8.64	4.6	mex82	-6.64	6	-4.43	1.56	2.52
blr95	-17.5	4	-17.5	8.4	5.72	mex95	-9.67	2	-19.35	6.2	2.52
blr08	-2.4	3	-3.2	6.64	5.72	mex08	-9.96	4	-9.96	5.44	2.52
bot95	-7.425	2	-14.85	11.9	6.5	nor91	-1.44	2	-2.88	4.64	2.56
bot08	-17.73	2	-35.46	9.52	6.54	nor08	-4.5	6	-3	2.2	2.56
bul96	-20.8	5	-16.64	6.92	3	nzl85	-5.84	4	-5.84	6.6	2.9
bul08	-7.7	5	-6.16	1.96	3	nzl08	-4.76218	5	-3.81	1.9	2.6
chi81	-22	5	-17.6	4.76	4.4	peru82	-12.84	6	-8.56	7.09	3.2
chi08	-4.7	4	-4.7	5.84	4.4	peru88	-39.29	11	-14.29	6.61	3.2
col98	-7.04	5	-5.63	3	3.28	peru08	-2.6	3	-3.46	7.91	3.2
cro98	-6.9	6	-4.6	8.8	3.2	phi83	-18.63	9	-8.28	6	3.12
cro08	-9.36	9	-4.16	1.36	3.2	phi98	-2.26	2	-4.53	4	3.12
cze97	-2.94	6	-2	1.8	3.28	phi08	-1.51	2	-3.02	5.22	3.12
cze08	-7.17	3	-9.56	2.28	3.28	por83	-4.87	5	-3.90	3.3	2.0
den80	-5.3	5	-4.24	2.8	1.4	por08	-4.01	3	-5.35	0.272	2.04
den88	-3.6	3	-4.8	1.5	1.4	rus98	-11.41	3	-15.22	8.92	4.32
den08	-8.28	5	-6.624	0.84	1.42	rus08	-11.28	4	-11.28	4.22	4.32
est94	-6.95	3	-9.27	8.6	4.4	ser00	-12.59	2	-25.18	7.04	3.04
est08	-19.32	5	-15.46	5.56	4.44	ser08	-5.45	5	-4.36	1.212	3.04
fin90	-14.3	13	-4.4	3.96	2.28	svk98	-3.78	7	-2.16	4.96	4.6
fin08	-10.5	5	-8.4	3	2.28	svk08	-6.6	2	-13.2	3.76	4.6
ind98	-18.4	4	-18.4	4.28	3.72	swe91	-4.59	9	-2.04	3.88	2.32
isr85	-2.92	2	-5.84	5.0	4.0	swe08	-7.55	5	-6.04	5.6	2.32
jam96	-4	3	-5.33	0.44	0.44	tha97	-15	5	-12	4.56	3.84
jam08	-6.1	9	-2.71	4	0.44	tha08	-7.25	4	-7.25	5.83	3.84
jpn97	-3.3	5	-2.64	1.28	2.12	tur01	-9.31	4	-9.31	8.12	4.32
jpn08	-10.25	4	-10.25	2.4	2.12	tur94	-13.44	2	-26.89	9.08	4.32
kor98	-8.8	2	-17.6	8.08	6.12	tur08	-15.54	4	-15.54	9.8	4.32
kor08	-4.2	3	-5.6	4.68	6.12						

Table 3 - Expected and actual GDP

Crisis	Projected GDP growth	WEO edition	Reference period	Actual GDP growth	Difference between projection and realization
arg98	-1.1	Dec-01	2002	-10.8	9.9
arg08	0.7	Apr-09	2010	9.1	-8.4
blr08	1.6	Apr-09	2010	7.4	-5.8
bot08	3.4	Jan-09	2009-2010	1.1	2.3
bul08	-2.5	Oct-09	2010	0.2	-2.7
chi08	3	Apr-09	2010	5.2	-2.2
cro08	2.5	Apr-10	2011	0.2	2.3
cze08	0.1	Apr-09	2010	2.8	-2.7
den08	0.9	Oct-09	2010	1.3	-0.4
est08	-2.6	Oct-09	2010	2.2	-4.8
fin08	-1.2	Apr-09	2010	3.6	-4.8
jam08	1.5	Jan-10	2010	-1.2	2.7
jpn97	1.3	May-98	1999	-0.0	1.3
jpn08	0.6	Jan-09	2010	4.1	-3.5
kor98	4.1	May-98	1999	9.4	-5.3
kor08	1.5	Apr-09	2010	6.2	-4.7
mal08	1.3	Apr-09	2010	7.3	-6.0
mex08	1	Apr-09	2010	5.4	-4.4
nor08	1.3	Oct-09	2010	0.7	0.6
nzl08	-0.6	Jan-09	2009-2010	1.1	-1.7
peru08	4.5	Apr-09	2010	8.8	-4.3
phi08	1	Apr-09	2010	7.6	-6.6
por08	-0.95	Jan-09	2009-2010	-0.8	-0.2
rus08	0.5	Apr-09	2010	4.1	-3.6
ser08	-1	Jan-09	2009-2010	-0.8	-0.2
svk08	1.9	Apr-09	2010	4.1	-2.2
swe08	1.2	Oct-09	2010	5.5	-4.3
tha08	1	Apr-09	2010	7.8	-6.8
tur01	4.1	Dec-01	2002	5.9	-1.8
tur08	1.5	Apr-09	2010	9.2	-7.7

Table 4: Descriptive statistics of the variables

	Recovery	Fall	IR	Money	NER	Cap_adeq	Bank_regul
Mean	1.6	-9.4	14.0	-5.2	19606.7	8.8	1.1
Max.	5.6	-1.4	1297.8	39.1	1191644.0	21.0	3.0
Min.	-1.8	-39.3	-584.6	-78.0	-12.6	3.3	0.0
St.Dev.	2.1	6.8	185.2	19.1	152565.3	3.7	1.0
25th p.	-0.1	-12.6	-1.0	-16.9	10.2	6.5	0.0
75th p.	3.6	-4.6	3.7	5.8	42.8	10.6	2.0
Obs.	61	61	61	60	61	49	53

	Gov_cons	Pub_debt	Ext_debt	FDI	exports	portfolio
Mean	-1.4	43.9	55.0	-0.1	3.0	0.0
Max.	20.6	284.0	197.9	9.2	16.9	5.8
Min.	-30.3	4.1	3.4	-5.5	-12.4	-9.7
St.Dev.	9.4	42.9	38.2	2.0	6.2	2.4
25th p.	-4.5	26.4	33.9	-0.5	-0.2	-0.5
75th p.	4.2	49.1	64.0	0.7	8.0	0.9
Obs.	58	59	57	56	51	47

Table 5 - Results of the OLS analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
fall	-0.04	-0.03	-0.03	-0.03	-0.04	-0.05	-0.09	-0.08*	-0.08*	-0.07*
	(0.08)	(0.08)	(0.07)	(0.07)	(0.06)	(0.06)	(0.05)	(0.05)	(0.04)	(0.04)
IR	-0.15	-0.15	-0.13	-0.14	-0.21	-0.23	-0.40*	-0.41**	-0.40**	-0.35**
	(0.27)	(0.25)	(0.25)	(0.23)	(0.22)	(0.20)	(0.20)	(0.19)	(0.17)	(0.16)
cur_cri*IR	0.19	0.19	0.17	0.18	0.26	0.27	0.44**	0.46**	0.45**	0.39**
	(0.27)	(0.26)	(0.26)	(0.23)	(0.22)	(0.20)	(0.20)	(0.18)	(0.17)	(0.16)
M	0.04	0.04	0.04	0.04	0.04	0.03	-0.00	-0.00		
	(0.04)	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)		
NER	0.01	0.01	0.01	0.01	0.01	0.01*	0.01**	0.01**	0.01**	0.01**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
hi_ext_debt*NER	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01*	-0.01**	-0.01**	-0.01**	-0.01**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
cap_adeq	0.40**	0.38**	0.35**	0.36***	0.39***	0.37***	0.32***	0.33***	0.33***	0.32***
	(0.17)	(0.14)	(0.13)	(0.12)	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.09)
less_regulated	-0.26	-0.22	-0.27	-0.27	-0.34	-0.31	0.23	0.28	0.27	0.24
	(1.11)	(1.09)	(1.05)	(1.02)	(1.05)	(0.90)	(0.87)	(0.84)	(0.83)	(0.81)
largely_regulated	2.47	2.51	2.44	2.44	2.23	2.14*	2.32*	2.39**	2.38**	2.48**
	(1.55)	(1.49)	(1.49)	(1.46)	(1.36)	(1.20)	(1.18)	(1.11)	(1.07)	(1.01)
highly regulated	0.61	0.60	0.54	0.54	0.70	0.21	0.22	0.20	0.18	0.11
	(1.64)	(1.62)	(1.60)	(1.56)	(1.64)	(1.32)	(1.24)	(1.23)	(1.21)	(1.12)
gov_cons	0.04	0.05	0.04	0.05	0.07	0.07	0.12**	0.12**	0.12**	0.10**
	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
pub_debt	-0.00	-0.00	-0.00							
	(0.01)	(0.01)	(0.01)							
ext_deb	0.00	0.00	0.00	0.00						
	(0.01)	(0.01)	(0.01)	(0.01)						
FDI	0.46	0.47	0.47*	0.46*	0.32	0.31	0.13	0.14	0.13	
	(0.30)	(0.27)	(0.27)	(0.26)	(0.21)	(0.20)	(0.24)	(0.24)	(0.25)	
exports	0.08	0.07	0.07	0.07	0.06	0.06				
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)				
portfolio	0.09	0.09	0.10	0.10	0.09					
	(0.15)	(0.14)	(0.14)	(0.14)	(0.13)					
fixed_ER	-0.35	-0.19	-0.13	-0.13	-0.35	-0.47	-0.19			
	(1.01)	(0.87)	(0.78)	(0.76)	(0.60)	(0.61)	(0.64)			
IMF	-0.33	-0.25								
	(0.66)	(0.62)								
default	-0.47									
	(1.66)									
D2008	-2.17*	-2.07*	-1.89*	-1.91*	-2.02**	-1.76**	-1.98**	-2.01**	-2.00**	-1.90**
	(1.03)	(1.00)	(1.07)	(0.96)	(0.93)	(0.83)	(0.89)	(0.84)	(0.82)	(0.78)
constant	-2.29	-2.23	-2.13	-2.19	-2.22*	-2.18*	-2.20*	-2.30**	-2.28**	-2.14**
	(1.92)	(1.90)	(1.94)	(1.63)	(1.28)	(1.16)	(1.12)	(1.04)	(0.99)	(0.91)
Observations	37	37	37	37	38	39	42	42	42	43
R-squared	0.68	0.68	0.67	0.67	0.68	0.68	0.61	0.60	0.60	0.58

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Dependent variable in all regressions is recovery

Table 6 - Further investigation

	(1)	(2)	(3)	(4)
fall	-0.071*	-0.259***	-0.092**	-0.035
	(0.040)	(0.065)	(0.040)	(0.067)
IR	-0.346**	-0.306*	-0.264*	-0.211
	(0.160)	(0.161)	(0.152)	(0.230)
cur_cri*IR	0.393**	0.289	0.321**	0.217
	(0.159)	(0.219)	(0.147)	(0.228)
NER	0.012**	-0.082***	0.013***	
	(0.004)	(0.020)	(0.005)	
hi_ext_debt*NER	-0.012**	0.079***	-0.013***	
	(0.004)	(0.020)	(0.005)	
cap_adeq	0.318***	0.416***	0.263***	0.239
	(0.094)	(0.106)	(0.086)	(0.165)
less_regulated	0.236	0.891	0.353	-1.446
	(0.808)	(0.724)	(0.711)	(1.326)
largely_regulated	2.480**	1.818**	2.543**	1.550
	(1.009)	(0.619)	(1.009)	(1.493)
highly_regulated	0.111		0.089	-1.261
	(1.122)		(1.103)	(1.709)
gov_cons	0.100**	0.093**	0.080*	-0.004
	(0.048)	(0.043)	(0.047)	(0.048)
Dum2008	-1.903**	-0.175	-1.479*	-0.839
	(0.780)	(1.141)	(0.827)	(1.413)
GDP_expected		0.829***		
		(0.175)		
hi_pub_debt*gov_cons			0.064	
			(0.074)	
REER				-0.050
				(0.034)
Constant	-2.141**	-5.332***	-2.242**	-0.392
	(0.911)	(1.556)	(0.869)	(1.381)
Observations	43	26	42	25
R^2	0.578	0.835	0.595	0.694

Dependent variable in all regressions is the recovery.
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7 - Results of the BMA analysis

	g = hyper		**g = EBL**		**g = UIP**		**g = BRIC**	
	PIP	Post. Mean (Post. SD)	PIP	Post. Mean (Post. SD)	PIP	Post. Mean (Post. SD)	PIP	Post. Mean (Post. SD)
cap_adeq	**0.98**	**0.220 (0.1)**	**0.99**	**0.231 (0.099)**	**0.71**	**0.179 (0.146)**	0.16	0.027 (0.076)
M	**0.94**	**0.036 (0.02)**	**0.96**	**0.037 (0.021)**	**0.54**	**0.025 (0.028)**	0.05	0.001 (0.008)
largely_regulated	**0.91**	**1.597 (0.79)**	**0.92**	**1.661 (0.797)**	**0.79**	**1.672 (1.07)**	0.33	0.564 (0.938)
D2008	**0.89**	**-1.051 (0.7)**	**0.92**	**-1.112 (0.696)**	**0.51**	**-0.744 (0.869)**	0.10	-0.109 (0.417)
cur_cri*IR	**0.69**	**0.059 (0.11)**	**0.70**	**0.064 (0.114)**	0.47	0.038 (0.091)	0.11	0.003 (0.018)
hi_ext_debt*NER	**0.61**	**-0.002 (0.01)**	**0.62**	**-0.002 (0.006)**	0.49	-0.003 (0.008)	0.13	-0.001 (0.004)
NER	**0.61**	**0.002 (0.01)**	**0.61**	**0.002 (0.006)**	0.48	0.003 (0.008)	0.13	0.001 (0.004)
FDI	**0.52**	**0.134 (0.2)**	**0.53**	**0.141 (0.202)**	0.38	0.153 (0.242)	0.17	0.079 (0.203)
IR	**0.51**	**-0.025 (0.11)**	**0.52**	**-0.028 (0.114)**	0.37	-0.008 (0.088)	0.11	0.002 (0.017)
exports	0.44	0.020 (0.03)	0.47	0.022 (0.036)	0.19	0.011 (0.028)	0.04	0.001 (0.011)
Fixed_ER	0.28	-0.160 (0.41)	0.29	-0.164 (0.423)	0.22	-0.224 (0.532)	0.15	-0.2 (0.567)
less_regulated	0.26	-0.195 (0.52)	0.27	-0.192 (0.523)	0.24	-0.341 (0.732)	0.26	-0.374 (0.739)
hi_pub_debt*gov_cons	0.25	0.014 (0.04)	0.26	0.014 (0.042)	0.11	0.008 (0.034)	0.05	-0.002 (0.018)
highly_regulated	0.24	-0.278 (0.83)	0.23	-0.258 (0.815)	0.29	-0.681 (1.296)	0.37	-1.058 (1.568)
portfolio	0.22	0.016 (0.05)	0.23	0.017 (0.055)	0.07	0.006 (0.034)	0.04	0.003 (0.031)
gov_cons	0.18	0.006 (0.03)	0.19	0.006 (0.026)	0.11	-0.002 (0.024)	0.12	-0.007 (0.025)
pub_debt	0.16	-0.001 (0)	0.17	-0.001 (0.004)	0.08	-0.001 (0.003)	0.04	0 (0.002)
fall	0.14	-0.002 (0.02)	0.13	-0.001 (0.022)	0.18	-0.013 (0.038)	0.16	-0.013 (0.036)
ext_debt	0.11	0.000 (0)	0.12	0 (0.003)	0.09	-0.001 (0.003)	0.13	-0.002 (0.005)

Standard errors in parentheses. "Signifficant" coefficients in bold (i.e. coefficients with PIP>0.5).

Table 8 - Sensitivity of the BMA results

	2000 models (base.)		**500 models**		**All models**		**2000 mod., a=3**		**2000 mod., a=4**	
	PIP	Post. Mean (Post. SD)	**PIP**	Post. Mean (Post. SD)	**PIP**	Post. Mean (Post. SD)	**PIP**	Post. Mean (Post. SD)	**PIP**	**Post. Mean (Post. SD)**
cap_adeq	**0.981**	**0.220 (0.1)**	**0.993**	**0.235 (0.093)**	**0.668**	**0.102 (0.112)**	**0.985**	**0.212 (0.097)**	**0.987**	**0.2 (0.095)**
M	**0.942**	**0.036 (0.02)**	**0.986**	**0.038 (0.019)**	**0.576**	**0.015 (0.021)**	**0.95**	**0.034 (0.02)**	**0.955**	**0.032 (0.02)**
largely_reg	**0.912**	**1.597 (0.79)**	**0.948**	**1.763 (0.717)**	**0.7**	**0.87 (0.869)**	**0.917**	**1.527 (0.768)**	**0.919**	**1.441 (0.745)**
dum2008	**0.891**	**-1.051 (0.7)**	**0.955**	**-1.167 (0.641)**	**0.53**	**-0.381 (0.651)**	**0.902**	**-1.014 (0.676)**	**0.908**	**-0.961 (0.658)**
cur_cri*IR	**0.692**	**0.059 (0.11)**	**0.713**	**0.061 (0.109)**	**0.538**	**0.028 (0.093)**	**0.696**	**0.058 (0.108)**	**0.698**	**0.055 (0.105)**
NER*hi_ext_debt	**0.613**	**-0.002 (0.01)**	**0.6**	**-0.002 (0.006)**	**0.564**	**-0.003 (0.007)**	**0.615**	**-0.002 (0.006)**	**0.616**	**-0.002 (0.006)**
NER	**0.610**	**0.002 (0.01)**	**0.595**	**0.002 (0.006)**	**0.563**	**0.003 (0.007)**	**0.611**	**0.002 (0.006)**	**0.613**	**0.002 (0.006)**
FDI	**0.516**	**0.134 (0.2)**	**0.51**	**0.136 (0.197)**	**0.53**	**0.124 (0.197)**	**0.521**	**0.128 (0.192)**	**0.526**	**0.122 (0.187)**
IR	**0.506**	**-0.025 (0.11)**	0.487	-0.026 (0.109)	**0.52**	**-0.007 (0.092)**	**0.517**	**-0.025 (0.108)**	**0.519**	**-0.024 (0.105)**
exports	0.440	0.020 (0.03)	0.459	0.022 (0.035)	0.449	0.013 (0.031)	0.453	0.02 (0.034)	0.461	0.019 (0.033)
ERR	0.281	-0.160 (0.41)	0.24	-0.141 (0.384)	0.471	-0.266 (0.543)	0.285	-0.152 (0.405)	0.287	-0.143 (0.393)
less_reg	0.263	-0.195 (0.52)	0.159	-0.115 (0.411)	0.504	-0.318 (0.635)	0.266	-0.183 (0.501)	0.27	-0.172 (0.483)
hi_pub_debt*gov_cons	0.251	0.014 (0.04)	0.177	0.009 (0.034)	0.436	0.015 (0.05)	0.26	0.013 (0.04)	0.263	0.013 (0.039)
highly_reg	0.235	-0.278 (0.83)	0.129	-0.158 (0.649)	0.48	-0.504 (1.07)	0.233	-0.254 (0.785)	0.236	-0.237 (0.753)
portfolio	0.218	0.016 (0.05)	0.181	0.013 (0.047)	0.398	0.014 (0.066)	0.224	0.015 (0.052)	0.23	0.015 (0.051)
gov_cons	0.181	0.006 (0.03)	0.126	0.005 (0.022)	0.416	0.001 (0.034)	0.186	0.006 (0.025)	0.19	0.005 (0.024)
pub_debt	0.160	-0.001 (0)	0.103	-0.001 (0.003)	0.402	-0.001 (0.005)	0.167	-0.001 (0.003)	0.17	-0.001 (0.003)
fall	0.137	-0.002 (0.02)	0.06	0 (0.014)	0.455	-0.017 (0.041)	0.136	-0.002 (0.022)	0.137	-0.002 (0.022)
ext_debt	0.112	0.000 (0)	0.065	0 (0.002)	0.409	0 (0.006)	0.116	0 (0.003)	0.119	0 (0.003)

Standard errors in parentheses. "Significant" coefficients in bold (i.e. coefficients with PIP>0.5).

Table 9 - Beginning and ending dates of the crises

Crisis	Begin date	End date	Crisis	Begin date	End date
Argentina, 1994	1994Q2	1995Q3	Malaysia, 1998	1998Q1	1998Q3
Argentina, 2001	1998Q3	2002Q1	Malaysia, 2008	2008Q3	2009Q1
Argentina, 2008	2008Q4	2009Q2	Mexico, 1982	1982Q1	1983Q2
Belarus, 1995	1995Q1	1995Q4	Mexico, 1995	1995Q1	1995Q2
Belarus, 2008	2008Q4	2009Q2	Mexico, 2008	2008Q3	2009Q2
Botswana, 1995	1995Q4	1996Q1	Norway, 1991	1991Q3	1991Q4
Botswana, 2008	2008Q4	2009Q1	Norway, 2008	2008Q3	2009Q2
Bulgaria, 1996	1996Q1	1997Q1	New Zealand, 1985	1985Q2	1986Q1
Bulgaria, 2008	2008Q4	2009Q4	New Zealand, 2008	2008Q1	2009Q1
Chile, 1981	1981Q4	1982Q4	Peru, 1982	1982Q2	1983Q3
Chile, 2008	2008Q3	2009Q2	Peru, 1988	1988Q1	1990Q3
Colombia, 1998	1998Q2	1999Q2	Peru, 2008	2008Q4	2009Q2
Croatia, 1998	1998Q1	1999Q2	Philippines, 1983	1983Q3	1985Q3
Croatia, 2008	2008Q2	2010Q2	Philippines, 1998	1998Q1	1998Q2
Czech Rep., 1997	1997Q1	1998Q2	Philippines, 2008	2008Q4	2009Q1
Czech Rep., 2008	2008Q4	2009Q2	Portugal, 1983	1983Q1	1984Q1
Denmark, 1980	1980Q2	1981Q2	Portugal, 2008	2008Q3	2009Q1
Denmark, 1988	1988Q1	1988Q3	Russia, 1998	1998Q1	1998Q3
Denmark, 2008	2008Q3	2009Q3	Russia, 2008	2008Q3	2009Q2
Estonia, 1994	1994Q1	1994Q3	Serbia, 2000	2000Q3	2000Q4
Estonia, 2008	2008Q3	2009Q3	Serbia, 2008	2008Q2	2009Q2
Finland, 1990	1990Q2	1993Q2	Slovakia, 1998	1998Q2	1999Q4
Finland, 2008	2008Q2	2009Q2	Slovakia, 2008	2008Q4	2009Q1
Indonesia, 1998	1998Q1	1998Q4	Sweden, 1991	1991Q1	1993Q1
Israel, 1985	1985Q3	1985Q3	Sweden, 2008	2008Q3	2009Q3
Jamaica, 1996	1996Q2	1996Q4	Thailand, 1997	1997Q3	1998Q3
Jamaica, 2008	2008Q2	2009Q3	Thailand, 2008	2008Q2	2009Q1
Japan, 1997	1997Q2	1998Q2	Turkey, 1994	1994Q1	1994Q2
Japan, 2008	2008Q2	2009Q1	Turkey, 2001	2001Q1	2001Q4
Korea, 1998	1998Q1	1998Q2	Turkey, 2008	2008Q2	2009Q1
Korea, 2008	2008Q2	2008Q4			

Table 10: Definitions of variables and data sources

Variable	The way it is constructed	Source
Recovery	Average annualized GDP growth in the 3 years after the crisis has ended, minus average annualised GDP for the period since 1980 (or whenever the first GDP data are available). In percentage points.	IFS
Fall	Cumulative fall in GDP during the crisis, as a percent of the pre-crisis GDP. In percent.	IFS
IR	Average interest rate of the central bank during the crisis, minus average interest rate 4 quarters before the crisis. In percentage points.	IFS
M	Increase in the real narrow money at the end of the crisis, vs. the last quarter before the crisis. In percents.	IFS and WDI
NER	Nominal exchange rate depreciation during the crisis, against the dollar, i.e. nominal exchange rate in the last quarter of the crisis vs. the exchange rate in the last quarter before the crisis. In percents. Positive values stand for depreciation.	IFS
REER	Appreciation in the real effective exchange rate during the crisis (i.e. real effective exchange rate in the last quarter of the crisis vs. the rate in the last quarter before the crisis). In percents. Positive values stand for appreciation.	Darvas (2012a and 2012b).
Cap_ adeq	Capital of the banking sector, as % of total assets in the banking sector, the year before the crisis.	WDI and central banks' reports
Less_ regulated	Dummy for countries that Abiad et al. (2008) classify as countries with "less regulated" banking supervision before the crisis (values 1 for the "bankingsuperv" variable in their excel file). See Abiad et al. (2008), pp. 18-19, for more details.	Abiad et al. (2008)
Largely_ regulated	Dummy for countries that Abiad et al. (2008) classify as countries with "largely regulated" banking supervision before the crisis (values 2 for the "bankingsuperv" variable in their excel file).	Abiad et al. (2008)
Highly_ regulated	Dummy for countries that Abiad et al. (2008) classify as countries with "highly regulated" banking supervision before the crisis (values 3 for the "bankingsuperv" variable in their excel file).	Abiad et al. (2008)
Gov_cons	Average year-on-year growth of real government consumption during the crisis, in percents. Real government consumption is obtained by dividing the nominal consumption by the CPI index.	IFS and WDI
Pub_debt	Public debt, the year before the crisis, as percentage of GDP.	Abbas et al. (2010).
Ext_debt	External debt the year before the crisis, as a percentage of GDP.	Reinhart and Rogoff (2011) and WDI.*
Exports	Exports during the recovery, as percentage of GDP, relative to average exports for the whole period.	IFS and WDI
FDI	Foreign Direct Investment (net foreign direct investment in the country, excluding exceptional financing) during the recovery, as percentage of GDP, relative to average for the whole period.	IFS and WDI
Portfolio	Portfolio investment flows during the recovery, as a percentage of GDP, relative to the average for the whole period (name of the series in IFS: Portfolio Investment Liabilities, excluding Financial Derivatives and Exceptional Financing).	IFS
ERR	Dummy for fixed exchange rate regime during the recovery (countries with values of 1 in the coarse classification in Ilzetzki et al., 2008): Argentina 1994, Bulgaria 1996 and 2008, Czech Republic 1997, Denmark 2008, Estonia 1994 and 2008, Finland 1990 and 2008, Malaysia 1998, Portugal 2008 and Slovakia 2008.	Ilzetzki et al. (2008)

*When data on external debt were not available from Reinhart and Rogoff (2011), data from WDI were used. The two sources are very similar - their correlation is 90% (for the crises on which data are available through them both).

Cur_crisis	Dummy for currency crises. Constructed as in Frankel and Rose (1996), as a situation when the currency depreciates more than 30%, which is at least 10 percentage points more than in the previous year. Currency crises are: Argentina 1998, Bulgaria 1996, Chile 1981, Finland 1990, Indonesia 1998, Israel 1985, Mexico 1982 and 1995, Philippines 1983, Peru 1982 and 1988, Russia 1998, Serbia 2000, Sweden 1991, Thailand 1997, Turkey 2001.	Author's calculations
IMF	Dummy for IMF arrangement during the recovery. Takes a value of 1 for the following crises: Argentina 1994 and 1998, Belarus 2008, Bulgaria 1996, Colombia 1998, Croatia 1998, Estonia 1994, Indonesia 1998, Jamaica 2008, Korea 1998, Mexico 1995 and 2008, Philippines 1998, Portugal 2008, Russia 1998, Serbia 2000 nd 2008, Thailand 1997, Turkey 1994 and 2001.	IMF
Default	Dummy if the country defaulted during the crisis. Countries that defaulted are Argentina 1998, Chile 1981, Indonesia 1998, Mexico 1982, Peru 1982, Philippines 1983, Russia 1998.	Reinhart and Rogoff (2008, 2009)
Hi_ext_debt	Dummy for high external debt. Takes unitary value if external debt was above 80% of GDP. Countries with high external debt are Argentina 1998 and 2008, Bulgaria 1996 and 2008, Chile in 1981, Denmark 1988 and 2008, Finland 1990 and 2008, Indonesia 1998, Jamaica 1996 and 2008, Japan 2008, Malaysia 1998, Norway 1991 and 2008, New Zealand 2008, Peru in 1988, Philippines in 1983, 1998 and 2008, Portugal 2008, Sweden 1991 and 2008, Thailand in 1997, Turkey in 2001.	Author's calculations
Hi_pub_debt	Dummy for high public debt. Takes unitary value if public debt before the crisis was above 60% of GDP. Highly indebted countries are: Argentina 2001, Bulgaria 1996, Chile 1981, Colombia 1998, Denmark 1988, Estonia 1994, Indonesia 1998, Israel 1985, Jamaica 1996 and 2008, Norway 1991, New Zealand 1985, Peru 1982 and 2008, Philippines 1983, 1998 and 2008, Portugal 2008, Sweden 1991, Turkey 1994 and 2001.	Author's calculations
GDP_exp	Expected GDP growth for the next year, for the corersponding country, in the last quarter of the crisis, from IMF's World Economic Outlook. In percent.	IMF's World Economic Outlook

TABLE 11: CORRELATION MATRIX

	recovery	fall	IR	M	NER	REER	cap_adeq	gov_cons	pub_debt	ext_debt	FDI	exports	portfolio	GDP_exp
recovery	1													
fall	-0.29	1												
IR	0.13	-0.58	1											
M	-0.09	0.30	-0.46	1										
NER	0.11	-0.57	0.90	-0.50	1									
REER	0.16	-0.44	0.58	-0.31	0.67	1								
cap_adeq	0.10	-0.04	-0.03	-0.16	-0.03	-0.01	1							
gov_cons	-0.10	0.50	-0.18	0.44	-0.29	-0.28	-0.04	1						
pub_debt	-0.02	0.15	-0.30	-0.01	-0.01	0.12	-0.23	-0.25	1					
ext_debt	-0.29	0.13	-0.03	0.20	-0.05	-0.08	-0.28	0.09	0.22	1				
FDI	0.14	0.09	0.02	-0.22	0.02	0.04	-0.13	-0.10	0.00	-0.14	1			
exports	-0.03	0.14	-0.13	0.08	-0.15	-0.36	-0.25	0.02	-0.08	0.13	-0.02	1		
portfolio	0.17	0.06	-0.03	0.01	-0.03	-0.01	0.10	0.05	-0.02	-0.23	-0.02	-0.03	1	
GDP_exp	0.40	0.22	-0.05	-0.26	0.21	-0.15	-0.06	0.10	-0.08	-0.39	0.37	-0.19	0.28	1

Table 12: Results of the structural break test

Variable	Coefficient	Standard Error
constant	-2.679***	(-0.808)
fall	-0.078	(-0.052)
IR	-0.646***	(-0.173)
NER	0.013***	(-0.004)
cap_adeq	0.346***	(-0.124)
less_regulated	0.718	(-0.863)
largely_regulated	3.349***	(-0.84)
highly_regulated	-0.822	(-1.89)
gov_cons	0.083	(-0.053)
cur_cri*IR	0.690***	(-0.177)
NER*hi_ext_debt	-0.013***	(-0.004)
DUM2008*less_regulated	-1.315	(-2.23)
DUM2008*largely_regulated	-1.913	(-2.103)
DUM2008*IR	0.468	(-0.3)
DUM2008*NER	-0.035	(-0.044)
DUM2008*cap_adeq	-0.009	(-0.237)
DUM2008*gov_cons	0.032	(-0.102)
DUM2008*fall	0.004	(-0.101)
R2	0.629	
Observations	43	

P value of the test that the coefficients of the cross products of the variables with the 2008 dummy: 0.17

Table 13: Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
fall	-0.07*	-0.10**	-0.12**	-0.09*	-0.10**	-0.06	-0.07*	-0.00
	(0.040)	(0.046)	(0.049)	(0.044)	(0.041)	(0.046)	(0.040)	(0.050)
IR	-0.35**	-0.45**	-0.45**	-0.32*	-0.28	-0.39**	-0.35*	-0.30*
	(0.160)	(0.199)	(0.205)	(0.158)	(0.170)	(0.173)	(0.177)	(0.153)
NER	0.01**	0.01**	0.01**	0.01***	0.01**	0.01	0.01**	0.01**
	(0.004)	(0.005)	(0.005)	(0.004)	(0.006)	(0.009)	(0.003)	(0.004)
cap_adeq	0.32***	0.27**	0.26*	0.35***	0.32***	0.44***	0.37***	0.33***
	(0.094)	(0.116)	(0.135)	(0.104)	(0.097)	(0.096)	(0.096)	(0.107)
less_regulated	0.24	0.35	0.65	0.18	0.53	-0.01	-0.26	-0.44
	(0.808)	(0.903)	(0.908)	(0.895)	(1.128)	(0.674)	(0.807)	(0.786)
largely_regulated	2.48**	3.24***	2.64**	3.00***	3.34**	2.35**	2.66**	2.06*
	(1.009)	(0.901)	(1.180)	(1.014)	(1.540)	(1.004)	(1.029)	(1.019)
highly_regulated	0.11	0.58	1.06	1.69	1.28	0.74	0.53	0.23
	(1.122)	(1.218)	(1.563)	(1.137)	(1.747)	(1.228)	(1.150)	(1.125)
gov_cons	0.10**	0.08	0.12	0.10*	0.10**	0.13**	0.10	0.05
	(0.048)	(0.062)	(0.083)	(0.053)	(0.048)	(0.049)	(0.071)	(0.056)
dum2008	-1.90**	-2.19***	-2.69**	-2.79***	-2.50**	-3.00***	-2.57***	-1.70*
	(0.780)	(0.721)	(0.959)	(0.821)	(1.013)	(0.914)	(0.794)	(0.871)
cur_cri*IR	0.39**	0.49**	0.50**	0.37**	0.34*	0.44**	0.39**	0.34**
	(0.159)	(0.198)	(0.206)	(0.157)	(0.168)	(0.174)	(0.174)	(0.154)
hi_ext_debt*NER	-0.01**	-0.01**	-0.01**	-0.01***	-0.01**	-0.01	-0.01**	-0.01**
	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)	(0.009)	(0.003)	(0.004)
Constant	-2.14**	-2.18**	-2.28*	-2.65**	-2.88*	-2.49**	-2.22**	-1.29
	(0.911)	(0.902)	(1.203)	(0.963)	(1.445)	(0.919)	(0.893)	(0.868)
Observations	43	30	33	33	34	35	37	35
R-squared	0.578	0.770	0.605	0.655	0.619	0.677	0.636	0.566

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1