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Policy Constraints and the Recovery from Banking Crises

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Recovery from Banking Crises: Local and Global Constraints

Preliminary Draft

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Abstract

While much research has been done on causes and effects of banking crises, little is known about what determines recovery from banking crises, despite of large variations in post-crises performances across countries. In order to identify local and global factors that determine the length of recovery (e.g. the time it takes until countries reach their pre-crisis level of per capita GDP), this paper employs event history analysis on 138 incidents of banking crises between 1970 and 2013. Cox Proportional Hazards show that countries that suffer from simultaneous currency crises as well as those with overvalued currencies tend to recover later. Regarding external factors, a low growth of world trade has a negative effect on recovery, and so does uncertainty in financial markets as reflected in high gold prices. Moreover, contractionary monetary policy of the US Fed as Central Bank of the international key currency has a negative effect on the length of recovery in middle-income countries with a strong reliance on foreign capital. In general, the dominance of global variables as well as variables related to the exchange-rate underline that crises policies and their effectiveness are particularly constrained by a country's position within the global economy.

JEL Classification: H12, E44, O23

I. Introduction and empirical puzzle

The most recent series of banking crises since 2008 has brought banking crises and their resolution back on the agenda, calling to mind that banking crises are a regular feature of market economies. Laeven and Valencia (2012) count 147 cases of banking crises since 1970, haunting advanced economies and developing countries alike (Reinhart and Rogoff, 2008).

The interest of this paper lies on the mid- to long-term effects of banking crises and how internal and external constraints determine the speed of recovery. The empirical puzzle that motivates this research is posed by the large differences that exist in the performance of countries

post-crises periods. While some countries recovered relatively quickly, others entered long-lasting recessions. In order to illustrate this empirical puzzle, Figure 1 plots the duration of recovery from banking crises incidents (e.g. number of years it takes to reach pre-crisis per capita GDP, on the vertical axis) on a time line from 1970 to 2013, for a subsample of banking crises incidents. While the length of recovery in most countries falls within a range of between one to five years, recovery took close to or even more than two decades in several cases (among others Argentina 1980, Burundi 1994, Ivory Coast 1988 and Cameroon 1987, see also Annex 1). The mean duration of recovery in the entire sample was 4.9 years and the median duration of recovery was three years, compared to a mean of eight years and a median of 6.5 years in 100 banking crises episodes studied by Reinhart and Rogoff (2014). At the same time, severity of banking crises alone seems not to be a very good predictor for the length of recovery and does not (fully) account for the large variation in post-crisis performances. In order to depict duration in relation to the severity of crises, the size of circles is drawn proportional to two alternative indicators, using data from Laeven and Valencia (2012). On the left hand side, the size of circles is drawn proportional to the size of bailout packages relative to GDP. On the right hand side, the size of circles reflects the share of peak non-performing loans (NPL) relative to all loans. Admittedly, neither of the two indicators is an optimal measure for the severity of a banking crisis. On the one hand, reporting standards and definitions of NPL across countries may not be strictly comparable. On the other hand, bailout packages are not only influenced by economic factors, but reflect bailout propensities of

governments as well, that may be affected by political conditions such as the degrees of democratic accountability (Rosas, 2006) or the institutional structure of banking sectors that has an influence on how rescue packages are negotiated (Grossman and Woll, 2014), among others. In spite of their limitations, these indicators are useful for a preliminary exploration of whether and how the duration of recovery is related to the type of banking crises. The point to be emphasized here is that large part of the variation in the duration of recovery seems not to be well explained by differences in size of NPL or fiscal costs of rescue packages. Whereas recovery from some of the "large" crises such as Argentina 1980 or Indonesia 1997 had long-lasting effects, others recovered relatively quickly in spite of a high share of NPL or large fiscal costs of crises (e.g. South Korea 1997 or Turkey 2000). On the other hand, some of the "smaller" crises were still followed by long recessions (such as Japan 1997 or the Philippines 1983). Note that most of the recent banking crises experiences are not included in Figure 1, because, in many countries, recovery had not yet occurred by 2013. Even so, differences in post-crisis performances of the European periphery (Greece, Spain, Portugal) too provide puzzling contrasts to the more rapid recovery of the European Center (Germany, Netherlands, Switzerland) or the European North (Great Britain, Ireland, Iceland) that can not be well explained from differences in the magnitude of banking crises alone.

[FIGURE 1]

This paper explores explanations for the duration of recovery and postulates that the speed of recovery from banking crises is the result of three main factors. First, recovery may last particularly long if large and costly economic adjustments are required. These could be related on the one hand to restructurings of the banking sector or costly bailouts, on the other hand to imbalances on other economic dimensions, for example to large fiscal or current account deficits. Second, recovery is expected to last longer under severe financing constraints. Financing may be constrained due to narrow tax bases (respectively political, social or economic impediments to cut expenditures), due to shallow financial markets for domestic borrowing, or due to a restricted access to international financial markets that tend to

charge high risk premiums in particular during crises episodes. Third, an unfavorable external environment is expected to postpone recovery. External conditions may be related to financing constraints (e.g. the level of international interest rates and degrees of uncertainty in financial markets) but also to the size and dynamics of export markets and the evolution of terms-of-trade that may act as a driver (or impediment) of export-led growth. All three factors are expected to have an effect on the ability of countries to effectively employ crises policies, either in the form of direct financing of rescue packages or through the implementation of anti-cyclical fiscal, monetary or exchange rate policies. A main argument of this paper is that exposure to these constraints is asymmetric and both country- and time-specific: Not all countries at all times are exposed to these constraints to the same degree. The empirical strategy therefore exploits variation in structural conditions across banking crises incidents and tests their impact on the duration of recovery.

The rest of the paper is structured as follows: The following chapter II relates this paper to existing research and identifies the negligence of country-specific contexts and the heterogeneous paths to recovery as a main research gap in most of the economic literature on banking crises. Chapter III presents the data and explains the use of a Cox Proportional Hazards model to estimate event histories. To the knowledge of the author, the application of survival models to the length of recovery from banking crises is a novel approach. The empirical chapter draws on more than 40 years of banking crises in developing countries and advanced economies from 1970 to 2013. Of the 147 incidents of banking crises counted by Laeven and Valencia (2012) during this period, 138 cases with data on per capita GDP will be used. The country sample provides considerable variation in context factors, both across time and across space, and both at the local and at the global level. Chapter IV presents results. Both domestic and external constraints play a key role for recovering from banking crises. In particular, countries that suffered from simultaneous currency crises as well as those with overvalued currencies tended to recover later. Regarding external factors, a low growth of world trade has a negative effect on recovery, and so does uncertainty in financial markets as reflected in high gold prices. Moreover, monetary policy of the US Fed as Central Bank of the international key currency affects recovery via the costs of international borrowing and via the direction of capital flows. This exposure to changes in the Federal Fund Rate is relevant for

emerging markets with a larger reliance on private foreign capital, but not for low-income developing countries. In general, the dominance of global factors as well as exchange-rate variables points to the relevance of a country's position within the global economy that restricts national policy space. Chapter V concludes and points to open questions and next research steps.

II. Related literature and contribution to research

The economic costs of banking crises are usually measured in three alternative ways (cp. Claessens et al., 2012, p. 14): Either via the direct fiscal costs of bailouts (e.g. Caprio and Klingebiel, 1996; Carstens et al., 2004; Grossman and Woll, 2014; Laeven and Valencia, 2012), as their broader fiscal costs as reflected in an the increase of debt levels (e.g. Furceri and Zdzienicka, 2012a; Laeven and Valencia, 2012; Reinhart and Rogoff, 2009; Schularick, 2012), or as deviations from an assumed long-term growth path over a given horizon (e.g. Angkinand, 2009; Furceri and Zdzienicka, 2012b; Hutchison and Noy, 2005; Laeven and Valencia, 2012). The largest cumulative effect from banking crises on output loss has been identified by these authors to occur after two to four years following banking crises. Estimates of absolute output losses can then be calculated by summing up differences between the actual output and a projection from trend output for a certain post-crisis period. Depending on how effects are measured, the evaluation of costs of banking crises may differ. Some cases had large costs in terms of GDP loss but relatively low direct fiscal costs and vice versa¹.

Despite of large variations in the effects of banking crises and contrasting paths of recovery, relatively little is known about how country-specific contexts shape and determine the effects of banking crises and the speed of recovery. A general lesson from country studies (e.g. Calomiris et al., 2004; De Luna Martinez, 2000; Hausmann and Rojas-Suárez, 1996; Hutchison and McDill, 1999; Ingves and Lind, 1996; Kanaya and Woo, 2000; Krueger and Tornell, 1999; Rojas-Suárez and Weisbrod, 1996) is that rapid and decisive action of cleaning bank balance sheets seems to have been favorable for resolving banking crises and quickly recovering growth. Countries

¹ Compare for example Chile 1981, Turkey 2000 or Jamaica 1996 with Philippines 1982, Brazil 1990 or Argentina 2000. See Annex 1 for details.

who have taken such decisive actions (the Swedish banking crisis in the 1990s often being cited as a positive example, see for example Claessens et al., 2012; Jonung, 2009) are generally considered to be success cases, while other countries who have been more hesitant in solving banking crises (e.g. Mexico 1994, see Haber, 2005) suffered prolonged periods of financial distress.

Furceri and Zdzienicka (2012b) have studied the effect of structural and policy variables on the short term growth effects of banking crises in a sample of developing countries and emerging markets. In line with Baldacci et. al. (2009), they find that additional supportive measures such as countercyclical fiscal and/or monetary policies have mitigated the negative effects of crises by stimulating aggregate demand. Also countries with flexible exchange rates, and those with lower external disequilibria were characterized by less severe drops in output (Furceri and Zdzienicka, 2012b).

Though exceptions exist, recommendations from policy-oriented research on banking crises resolutions often read as "wish lists", where institutional contexts and the restriction of policy space have hardly been taken into account. In contrast, political scientists have put a stronger emphasis on country-specific contexts and the institutional settings in which banking crises resolutions are implemented. Grossmann and Woll (2014) argue that business-government relationships partly explain the design of rescue packages during the recent financial crises. Countries where banks negotiated collectively developed solutions with a greater burden-sharing from private institutions. Rosas (2006) states that, among others, Central Banks' independence and a larger degree of transparency have limited bailout propensities of governments in emerging markets and developing countries. These studies are important for understanding banking crises policies as embedded within their country-specific contexts. Still, the empirical design of these studies permits to make inferences from a limited number of variables only that vary within the specific time periods and geographic areas of their samples: Four Western countries sampled from the recent financial crises in the case of Grossmann and Woll (2014), and a sample of 46 emerging markets and developing countries in the case of Rosas (2006). Also, these studies contain no information on the effect of different types of resolution on recovery; and they do not explicitly explore to what degree policy choices have been influenced by structural conditions and overall economic constraints.

Constraints in banking crises resolution are particularly severe in developing countries and emerging markets. Hutchison and Noy (2005), Dell’Ariccia et al. (2008) and Cerra and Saxena (2008) find that the effect of banking crises in emerging markets and developing countries is larger and more persistent, because the high risk of simultaneous twin or triple crises (i.e. simultaneous currency and/or sovereign debt crises) in emerging markets and developing countries, and, more generally, their limited capacity to set and enforce rules in the financial sector have been recognized as factors that may increase costs of banking crises. Laeven and Valencia (2012) emphasize that the mix of resolution tools differs among developed and emerging countries, reflecting a different set of available options. Emerging economies relied less on expansionary fiscal and monetary policies. Deposit freezes, while rare, were most frequently used by emerging economies, whereas guarantees on bank liabilities are more common among advanced economies. Also with respect to direct interventions, Calomiris et al. (2004) conclude from a comparison of seven cases of financial crises that success of resolution policies depends "on effective legal, regulatory, and political institutions [...]. The successful implementation of AMC [Government-owned Asset Management Companies] in developed economies, like other resolution mechanisms, has not been imitated in emerging market countries, largely because of institutional barriers to success" (Calomiris et al., 2004, p. 69).

In spite of their more restricted policy space, the general assessment that costs of banking crises are larger in emerging markets and developing countries has been questioned by recent studies that take into account the series of banking crises in advanced economies after 2008 (Laeven and Valencia, 2012). Here it seems that the large size of the financial sector in many of the advanced economies that recently suffered from banking crises led to large output losses, high direct fiscal costs and an increase in public debt. Also within developing countries and emerging markets, countries with higher financial deepening had larger output losses from banking crises (Furceri and Zdzienicka, 2012b).

This paper complements previous studies on banking crises outcomes by focusing on the case-specific context factors as determinants of recovery, rather than on average effects. For this purpose, estimating effects of banking crises via output loss or debt increase over a pre-defined period is of limited use because effects of a banking crisis may last much longer than the immediate post-crisis period that most papers have

focused on. The cumulative peak output loss that has been estimated to occur after two to four years following a banking crisis refers to average effects that hide large differences in times of recovery. Second, calculating output loss as deviations from inherent trend growth rates specific to each country relies on assumptions² that are empirically at odds with the typically volatile growth rates in developing countries and emerging markets. Moreover, economic booms often precede busts that bias the projection of trend growth based on previous growth rates. Hence, length of recovery seems more suitable in order to account for the diverse post-crises performances across countries. As in Reinhart and Rogoff (2014, 2009) for 100 banking crises episodes in a long historic perspective, the duration of recovery is measured as the number of years it takes to reach pre-crisis per capita income.

The hypothesis that recovery is a function of specific contexts relates to the argument by Rodrik (2008) that governance in developing countries is different from advanced economies in that developing nations face not only more challenges but also more constraints. Institutional answers that work in one country do not necessarily work in a "second best environment", where they face more and different types of constraints and conflicting policy goals. Best practice approaches to development problems are therefore inherently problematic because they are almost by definition non-contextual. Translated to banking crises policies, this means that not all countries dispose over the same set of available options; and the same type of crises policies may lead to very different outcomes, depending on the constraints and trade-offs these policies face under different settings.

This paper argues that case-specific factors have an effect on the ability of countries to effectively employ either direct or indirect crises policies. With respect to direct interventions in the banking sector, this means that the "bailout vs. bagehot" (Rosas, 2006) divide between interventionist rescue policies and market-oriented laissez-faire policies might not reflect deliberate choices, but policy constraints in a "second best" environment. Governments may not have sufficient resources available for the financing of large rescue packages; they may not have the financial means to substantiate deposit insurance schemes; and the institutional environment may not be

² For example, full capacity utilization is a typical assumption in neo-classical growth models.

favorable for the successful establishment of state-run asset management companies (AMC, or "bad banks" in modern jargon). Also countercyclical macro policies may be constrained in several ways. Fiscal policy may be limited by financial constraints, because of limited access to borrowing both domestically and internationally, and because of low tax bases and/or strongly cyclical government revenues that often depend on external conditions (for example, oil prices or prices for other export goods). Monetary policy might be constrained because of trade-offs with other policy goals such as inflation targets or exchange rate policies (e.g. impossible trinity: The incompatibility of monetary policy with fixed exchange rates and open capital accounts). Since expansionary monetary policies may adversely affect the capital account, the prevention of large-scale capital outflows might have primacy over domestic consideration, forcing countries into pro cyclical monetary policies during crises, as was the case, for example, during the East-Asian crisis of 1997. Dependence on external conditions is more severe for developing countries and emerging markets. Whenever capital is mobile, national monetary policies in the peripheries are constrained by the global financial cycle and monetary policies in the financial centers that are not aligned with countries' specific macroeconomic conditions (Flassbeck, 2001; more recently Rey, 2013). This creates an asymmetry in monetary policy space between countries at the center and the periphery of the international financial system (Fritz et al., 2014). The use of exchange rates as policy instrument may be limited either due to legal arrangements (such as currency unions, currency boards or official dollarization) or due to balance sheet considerations in dollarized economies. Because international lending is denominated in only few leading currencies, devaluations with respect to these currencies leads to sharp increases in the real values of foreign currency denominated debt. In economies where internal contracts are partly denominated in foreign currencies, unanticipated fluctuations in the exchange rate may provoke changes in the real asset positions among both private and public actors, with cumulative negative/destabilizing repercussions on the economy (see, for example, Allen et al., 2002). Hence, both internal and external dollarization restrict the use of exchange rates as anti cyclical policy tool.

III. Data and Method

This paper estimates duration of recovery as a result of country-level conditions and global factors. The sample used for the analysis consists of 138 countries that suffered from a systemic banking crisis between 1970 and 2012. Data on banking crises episodes is taken from Laeven and Valencia (2012) who count 147 cases of systemic banking crises during this period. Nine cases from the original sample were excluded from the analysis, because no data on per capita GDP was available for the crisis (or post-crisis) period.

The dependent variable is duration in quarterly years (DUR) until countries reach their pre-crisis level of per capita GDP. Defining the duration of recovery on a quarterly basis is preferred over a measurement in years, because it allows a finer distinction of the length of recovery between countries. Quarterly GDP data is taken from the International Financial Statistics (IFS) by IMF. Quarterly time series have been smoothed by taking out seasonal effects. For countries where no quarterly data was available, yearly data was transformed into quarterly data. Because of better coverage, yearly WDI data was used instead of yearly IFS data in some cases. Duration was then defined by counting the quarterly years from the first drop in real per capita incomes either in the year of the crisis or the following year until the quarter when countries reached their real income level as it existed before the drop in per capita incomes. As was shown above (Figure 1) for a subsample of cases, duration of recovery varies strongly from countries who did not suffer from any reduction in their per capita GDP to recoveries that lasted up to two decades or even more in extreme cases.

This paper is exploratory in nature: Rather than following a strong theory on the role of specific variables for recovery, the goal of the empirical analysis is to identify factors that are associated with the duration of recovery. The duration of recovery is therefore estimated conditional on a large number of country-specific variables previous to the outbreak of the crisis, as well as exogenous time-varying global factors that are observed for each of the quarterly period. Next to a set of standard growth predictors that will be used as control variables, regressions include a number of variables that are expected to be correlated with costs of adjustment and financing constraints. At the country level, variables relate to the growth history of countries, the type and severity of crisis, balance-of-payments and the exchange rate, the human

and physical capital stock of countries, general structural conditions, and indicators of macroeconomic policy. Next to these country-level variables, the regression uses time-varying indicators for external global economic conditions. The fact that (most of the) country-level variables refer to the year previous to the banking crises reduces endogeneity concerns by ensuring that country-specific variables are not themselves affected by the occurrence of a banking crisis.

A first set of country-specific variables controls for standard growth predictors. Recent growth history is accounted for by trend GDP measured as the average growth rate over a ten years period previous to the outbreak of the banking crisis (GDPTRD). In addition, GDPVOL measures the volatility of growth as the standard deviation of the growth rate over the same period.

Several variables are included to measure severity and type of crises. CURRCR and DEBTCR are binary indicators whether a currency crisis (CURRCR) or a sovereign debt crisis (DEBTCR) occurred in the year of the banking crises or the previous year. CURRCR captures the negative growth effects of sudden devaluations. Moreover, efforts to defend exchange rates in the context of currency crises may eventually conflict with other policy goals such as anti cyclical monetary policy. DBTCR captures additional financing constraints under sovereign defaults. Two additional variables are included that are related to the severity of banking crises, as compiled by Laeven and Valencia (2012). FISCST measures the direct fiscal costs of rescue packages relative to GDP. PKNPL measures peak non-performing loans as a share of bank assets.

A further set of variables is related to balance-of-payments positions and exchange rates. Variables related to the balance-of-payments may pose constraints on crises policies and the speed of recovery in several ways: Overvalued currencies might require more costly adjustments, low level of reserves may signal vulnerability to currency crises, and capital account openness may conflict with other monetary policy goals or exchange rate targets, among others. In order to take account of external debt positions, FORASS measures the external wealth of countries via their net foreign assets relative to GDP. RESRV indicates the level of reserve (excluding gold) as a share of GDP. KAOPEN is an index on cross-border financial transactions by Chinn and Ito (2008) that takes higher values the more open the country is to cross-border capital transactions. Following the method proposed in Rodrik (2009), UNIVAL is

an index of undervaluation, where positive values indicate that the value of the currency is lower (more depreciated) than indicated by purchasing power parity. Finally, XRFLEX is a binary indicator whether countries had adopted a fixed exchange rate.

The stock of human and physical capital is accounted for by the per capita capital stock at current PPPs (CAPSTK, in mil. 2005US\$). GCFSHR is the gross capital formation as a share of GDP. GCFd is the annual growth of gross capital formation in the year previous to the crisis. HUMCAP is included as an indicator for the level of human capital, measured as average years of schooling of the adult population.

A number of additional variables are included that are potentially correlated either with growth performances or with the ability of countries to effectively pursue anti-crises policies. INClog is the log of per capita GDP in 2005 USD, capturing different growth rates among advanced economies and developing countries; but also the generally larger vulnerability of emerging markets and developing countries to external shocks. In order to take account of potential scale effects in large countries (e.g. the possibility that large countries differ in terms of their productive structure or the structure of financial markets; or because large countries are able to negotiate with creditors or donors on better terms) GDPlog is included as a measure of the absolute economic size of the economy, while POPlog refers to the log of population size. Two distributional indicators are used: LABSHR measures labor compensation as a share of GDP, while GINI is used as a measure of income inequality. Income distribution might play a role for the length of recovery because of distributional conflicts over different resolution and growth policies; and because income inequality could be correlated with growth performances (Ostry et al., 2014). GVCSHR (government consumption as a share of GDP) is an indicator for the size of government, and possibly indicates more interventionist policy regimes. FINDEV is an indicator of financial development measured as total private credit relative to GDP, based on the notion that countries with large financial sectors are also more affected by banking crises. On the other hand, more developed financial markets also signal more options of borrowing in domestic markets. XPSH (merchandise trade relative to GDP) is included as a measure of trade openness. DBTGDP indicates the level of public debt relative to GDP, suspecting that already large levels of debt pose constraints on borrowing. Additionally, the average annual change of DBTGDP over the previous

five years (DBTGDPd) is included next to INFL (annual consumer prices inflation) as indicators of macroeconomic stability.

At the global level, several variables are included that potentially affect recovery. The federal fund rate (FFR) is used as indicator for the monetary policy stance of the Federal Reserve Bank as Central Bank of the leading global currency. On the one hand, US interest rates reflect economic conditions in the advanced economies. On the other hand, they have repercussions on economies in the rest of the world via prices of new international loans (and sometimes price for old loans, when debt contracts are linked to variable interest rates, as was the case with much of the sovereign debt contracted in the 1970s) and through their effects on the direction of international capital flows. An index of UK quarterly gold prices (GOLD) reflects uncertainty on financial markets. Quarterly world growth rate in real terms (WRLDTd) affects the length of recovery mainly through the size of export markets. Also quarterly crude oil prices (OILPR) possibly have an effect on the speed of recovery. These global variables are exogenously determined for most countries in the world.

See table 1 for summary statistics, a description of variables, coverage and sources. Imputation techniques (using the package “amelia” in the statistical software R, see Honaker et al., 2011) are used that allow making use of the full sample in spite of missing values for some covariates.

[TABLE 1]

In order to estimate the duration of recovery from banking crises conditional on structural and policy variables, this research employs survival analysis. While originally used mainly in clinical research (e.g. the estimation of survival rates of individuals), survival models have since been employed in a large number of disciplines and settings where interest lies on the duration of events. To the knowledge of the author, their application to the length of recovery from banking crises is a novelty.

A Cox proportional hazard model is used to estimate the likelihood of recovery at time t , conditional on a number of structural and policy variables at the domestic and

global level. The hazard rate $h_i(t)$ for the i th observation (the i -th episode where pre-crisis per capita GDP has not yet been reached) can be written as

$$h_i(t) = h_0(t)\exp(\beta' \mathbf{z}_i),$$

where $h_0(t)$ is the baseline hazard function of recovery from a banking crisis at time t , \mathbf{z} is a set of structural and policy variables, and β is a vector of parameters to be estimated. The Cox proportional hazard model permits inclusion of both constant and time-varying covariates in \mathbf{z} . Moreover, it can deal with the problems of censored observations - in this case right-censored observations where recovery has not yet occurred as in many of the recent banking crises. For countries that did not report any drop in their per capita GDP, $h_i(t)$ refers to the hazard of having recovered in the first quarter of a banking crisis.

In principle, duration analysis could be undertaken using other duration models such as the parametric Weibull model or the log logistic model. The advantage of the Cox proportional hazard model with respect to alternative models is that no assumptions have to be made regarding the distribution of the parameters. The shape of $h_0(t)$ is left unparameterized and is explained by the data.

Two assumptions are crucial to the model. First, the Cox proportional hazard model assumes that the effect of the covariates is proportional over the entire base line (does not depend on time). Second, interpretation of the results is based on the assumption that explanatory variables are exogenous. Exogeneity is a reasonable assumption for most of the global factors and country-specific structural conditions: Conditions such as debt levels, inflation, exchange rate regimes, etc. *previous* to the occurrence of a banking crisis are expected to have an effect on resolution policies and the duration of crises, but they are not themselves affected by the crisis. Even so, selection bias may exist. For example, a later recovery in countries that suffered a simultaneous currency crisis or sovereign debt crises is not *necessarily* (or maybe not only) the direct result of a twin or triple crisis. It could also reflect other underlying differences of countries who were prone to multiple crises that have not been adequately controlled for. While possibilities of selection bias cannot be entirely ruled out in a non-experimental setting, the inclusion of control variables mitigates such concerns. Moreover,

variables on fiscal costs of rescues (FISCST) and peak non-performing loans (PEAKNPL) are not strictly exogenous. On the one hand, the rescue of banks is a policy decision that is itself affected by structural constraints and politics. Also peak non-performing loans may be affected by the structural constraints or specific dynamics of crises. Second, peak non-performing are not measured at the onset of the crisis. Under particularly unfavorable crises dynamics, the share of non-performing loans would increase as a result of other structural and policy variables. A causal interpretation of FISCST and PKNPL is therefore problematic. Having this in mind, these variables are included for the purpose of comparison (to see if their inclusion affects results). Among global variables, the Federal Fund Rate is an endogenous variable not only in the case of the US but arguably also in the advanced economies more generally: During the recent financial crises, the main Central Banks of the world (the Fed, ECB, the Bank of England and the Central Bank of Japan) coordinated their policies of low interest rates as a response to financial crises in the advanced economy. Effects of the FFR will therefore be interpreted for a subset of emerging markets and developing countries only. For the latter, interest rates in the financial center are set exogenously.

IV. Results

Table 2 and Table 3 shows results from a Cox Proportional Hazard model on the length of recovery for ten different specifications. Missing values for some variables have been imputed. This way, no observations are lost, and the fact that all specifications are run on the same sample (with the exception of Spec. 6, 9, and 10 which exclude advanced economies) ensures comparability. Since uncertainty of the imputation is reflected in the standard errors, variables with many missing values (see Table 1) show larger standard errors. Specifications in Table 2 use local predictors on the full sample of 138 banking crises incidents. 110 countries (= number of events) out of 138 had recovered to their pre-crisis level of per capita GDP by 2013, while 28 right-truncated countries had not (yet) reached their pre-crisis level of per-capita GDP in 2013. Table 3 uses global time-varying predictors together with local predictor variables as controls.

Regressions in Table 2 are built up from the most basic model by consecutively adding variables. Spec. 1 includes a dummy for decades (1970s/1980s and 1990s with

the 2000s as a baseline) and indicators on the recent growth history (trend and volatility of GDP) only. Spec. 2 adds variables on whether a simultaneous currency crisis (CURRCR) or a simultaneous debt crisis (DEBTCR) had occurred together with a banking crisis. Spec. 3 includes variables that are related to exchange rates and balance-of-payment positions. Spec. 4 adds the entire set of local-level predictors. These include variables related to levels of physical and human capital (capital stock CAPSTK, levels of human capital HUMCAP, gross capital formation as a share of GDP GCFSHR, and growth of gross capital formation GCFd), variables related to macroeconomic policies (average annual change in debt ratios DBTGDPd and average inflation INFL over the previous ten years), as well as structural variables of countries that are constant or vary only little over the short term (log of income INClog, log of GDP GDPlog, log of population size POPlog, the inequality index GINI, share of labor compensation LABSHR, share of government consumption GVCshr, levels of financial development FINDEV, trade share XPSH and debt levels DBTGDP). In order to capture the magnitude of banking crises, Spec. 5 adds variables on fiscal costs of bailout packages (FISCST) and peak non-performing loans (PKNPL). Spec. 6 repeats Spec. 5 but excludes all advanced economies from the sample. In their majority, these are countries that had been affected by the recent series of banking crises since 2007/2008³.

[HERE: TABLE 2 WITH LOCAL PREDICTORS ONLY]

[HERE: TABLE 3 INCLUDING GLOBAL PREDICTORS]

A negative coefficient sign in Tables 2 and 3 indicates that a higher value of that variable is associated with later recovery. Hence, a higher trend GDP (GDPTRD) previous to the crisis is associated with earlier recovery in all specifications (except Spec. 6 where advanced economies are excluded), whereas the volatility of growth (GDPVOL) does not exert a statistically significant influence. The hazard rates can be obtained by exponentiating the coefficients. For example, expressed in hazard rates, countries that had a one percentage point higher trend GDP over the previous ten

³ The sample of advanced economies (32 incidents, of which 16 had recovered by 2013) alone is too small to run the regression.

years are associated with a 6 percentage points higher probability of recovery in any given year in Spec. 1 ($(\exp(0.058)-1)*100$). Recovery from the series of banking crises after 2008 has already lasted longer than during previous banking crises episodes: Time dummies for the 1970s/1980s and 1990s have a positive and statistically significant sign in the specifications on the full sample, as long as global conditions are not controlled for. Other than these, only three variables have a statistically significant effect in Spec. 4: First, countries with better-educated workforce (higher values of HUMCAP) recovered faster. However, this relationship vanishes when the size of fiscal costs FISCST and peak non-performing PKNPL loans are included (Spec. 5). Second, a strong effect is found for the undervaluation indicator (UNDVAL): In countries with overvalued currencies (negative values of UNDVAL), recovery lasted significantly longer. This negative association between overvaluation and recovery probably reflects high adjustment costs in countries that were characterized by large imbalances in their current accounts. Other variables related to balance-of-payments (exchange rate regimes, XRFIXED, the size of foreign assets FORASS, and reserves, RESRV) did not exert a measurable influence. Third, the simultaneous occurrence of a currency crisis (CURRC) had a strong negative effect on recovery, as would be expected. The same is not true for sovereign debt crises (DBTCR) that have the expected negative sign but are not statistically significant. Interestingly, currency crises enter the regression with a strong effect both in magnitude as well as in significance only when exchange rate overvaluation (undervaluation) is controlled for: Countries with overvalued currencies that also suffered from currency crises tended to recover much later. Likewise, countries with undervalued exchange rates were able to partly compensate for the negative effects of currency crises.

Overall, the large effect of exchange rate variables (UNDVAL and CURRCR) dominates all other predictors (with the exception of HUMCAP and GDPTRD). When advanced economies are removed from the sample (Spec. 5), the strong effect of exchange rate variables even increases in magnitude. While the size and significance of some of the coefficients change, the basic interpretations and signs of variables remain unchanged. Concerning the severity of crises characteristics, neither fiscal costs of rescue packages (FISCST) nor peak non-performing loans (PKNPL)

enter the regression with significant signs⁴. The basic message from the regression output remains unaffected when these variables are included.

Table 3 adds time-varying global predictors with quarterly frequency. In order to estimate the effects of time-varying variables, observations were split into quarterly units, generating a total of 2,696 quarterly episodes (“times at risk”) from which to estimate hazards in Table 3. Local predictors are used as controls in Table 3 but are not shown for matter of space. Spec. 7 includes global variables (the log of an index of gold prices GOLD, the log of an index of oil prices OIL, quarterly growth in world trade WRLTRd, and the Federal Fund Rate FFR) without additional controls other than a dummy for decades. Spec. 8 includes the full set of local level controls as in Table 2, additional to external constrains. Spec. 9 excludes advanced economies. Spec. 10 interacts FFR with the log of per capita income INClog for the subsample of emerging markets and developing countries.

In Spec. 7 without local-level controls, a low growth in world trade (WRLTRd) and high oil prices (OILPR) are associated with later recovery, whereas the Federal Fund Rate (FFR) and gold prices (GOLD) are not significant. It is noteworthy that the dummy for decades flips signs compared to Table 2: When controlling for global factors, banking crises in the 1970s/80s and 1990s are associated with later recovery compared to the 2000s. In Spec. 8 with the full set of local control variables, the price of gold (GOLD) as a measure of uncertainty in financial markets and the growth of world trade (WLRDTd) as an indicator of export demand have strong negative effects: Sentiments of uncertainty in financial markets and a lack of export opportunities postpone recovery. In contrast to Spec. 7, oil prices (OILPR) do on average not have a statistically significant effect when local variables are taken into account. Note that the dummy for decades loses significance as soon as global factors are controlled for together with local predictors. This means that much of the

⁴ The fact that these variables are not significant might also be related to the fact that information had to be imputed for 39% of all observations in the case of FISCST, and 27% of all observations in the case of PKNPL (compare Table 1). Since they are included as control variables, the main interest is not on their significance. Moreover, as was discussed above, FISCST and PKNPL are not strictly exogenous: They are measured after the outbreak of a crisis, and political processes and specific dynamics of crises affect their size. Still, their inclusion does underline the robustness of the results that are unaltered when controlling for crises characteristics.

variation across time can be captured by variation in both local and global conditions. Spec. 9 excludes advanced economies for two reasons: First, in order to test the robustness of findings on a subsample of emerging markets and developing countries. Second, the Federal Fund Rate (FFR) is exogenous only for peripheral economies: The major Central Banks of advanced economies made a coordinated effort of responding to the recent financial crisis with expansionary monetary policy. Spec. 7 to 9 show that the level of the FFR is not systematically associated with the speed of recovery neither in the full sample nor in the subset. However, exposure to interest rate policies in the global financial centers is asymmetric: The reliance on private capital flows is larger in middle income countries compared to low income countries who receive a larger share of foreign capital in the form of grants and multilateral lending. The interaction term between FFR and the log of per capita income $\ln Clog$ in Spec. 10 captures this asymmetric exposure to interest rates in the center countries within emerging markets and developing countries: Higher interest rates in the US have a more negative effect on recovery in middle-income countries compared to low-income countries. In order to facilitate interpretation of the interaction term, Figure 2 shows hazard rates for an increase of the FFR by one percentage point, conditional on the log of per capita income, and with 95% and 50% confidence intervals around the point estimates. In middle-income countries (countries above a per capita income of around 1,700 US Dollars at constant 2005 terms), an increase in the FFR has a negative effect on recovery⁵. In contrast, a higher FFR is associated with *earlier* recovery in low-income countries. An explanation for these asymmetric effects may be found in the different exposure to global conditions within emerging markets and developing countries. Interest rates in the center reflect economic conditions in the advanced economies that have an effect on the world economy both via a trade and a financial channel. On the one hand, a low FFR may reflect depressed economies in the center that affect the periphery via a trade channel. This would reflect the current situation of low center rates as a response the global financial crisis. On the other hand, a low FFR in the center affects peripheral economies also via a financial channel: A lower FFR is associated with lower borrowing costs on global

⁵ Based on the Atlas method, the World Bank classified as middle-income economies those with a GNI per capita of more than 826 USD but less than 10,065 USD in the year 2005. See World Bank (2015).

capital markets for peripheral countries, and with capital flows from the center to the periphery. The interaction term suggests that the trade channel effect dominates in low-income countries, while the financial channel dominates in middle-income countries that are more integrated into global financial markets. The Latin American countries who faced banking and financial crises in the 1980s following the Volcker-shock of exceptionally high interest rates in the US after 1979 fit that picture and may partly explain the negative Latin American post-crisis performance in the 1980s.

[HERE: FIGURE 2 WITH SIMULATED HAZARD RATES FOR FFR
CONDITIONAL ON INCOME]

[HERE: FIGURE 3 WITH SIMULATED HAZARD RATIOS]

Figure 3 illustrates some of the results from Tables 2 and 3 and plots hazard ratios for three continuous local and global indicators that have been identified as important predictors for the speed of recovery from banking crises⁶: The degree of undervaluation (UNDVAL), growth in world trade (WRLTRd) and the log of an index of gold prices (GOLD). Each graph plots hazards for a range of values depicted on the x-axes as a ratio to the hazards for a reference value. A hazard ratio below a value of one means that the probability of recovery is lower compared to the reference group. For the sake of graphical presentation, the plots for UNDVAL and WRLTRd use values of zero (no undervaluation and zero growth) as reference values, whereas in the case of GOLD, the minimum value over the period covered is used as a reference. As Figure 3 demonstrates, the hazard of recovery is lower for countries with overvalued currencies at the onset of crises (low values of UNDVAL). Also periods of low growth in world trade are associated with lower hazards of recovery. Finally, higher gold prices (measured as the log of an index of gold prices) that reflect uncertainty in financial markets and flight to safe assets such as gold are associated with lower hazards of recovery.

⁶ Binary variables that have also proven to be relevant such as the occurrence of a simultaneous currency crisis (CURRCR) are not plotted because they have a more straightforward interpretation.

V. Conclusion

This paper investigated the relationship between specific local and global factors and the length of recovery from banking crises using Cox proportional hazards. A main message to take away from the empirical exercise is that the position of a country within the global economy has a strong effect on prospects of recovery. Not only do global variables affect recovery via a trade channel and via a financial channel, also local-level predictors reflect patterns of insertion into the global economy. In this sense, variables related to the exchange rate (the degree of overvaluation and whether they suffered a simultaneous currency crisis) have the strongest effect on the duration of recovery. Next to these, only the growth record previous to the crisis and, to some degree, the levels of human capital have a measurable influence on the length of recovery. It is noteworthy that none of the macroeconomic variables such as debt levels and inflation that are commonly associated with healthy macroeconomics have a statistically significant effect.

The selection of variables was guided by the expectation that the speed of recovery is related to three main factors: The costs of restructuring, the severity of financing constraints and external conditions. Although it is not always possible to clearly classify variables along these categories, empirical results are generally in line with expectations. A high degree of exchange rate overvaluation signals the need to undergo large and costly external adjustments. For example, the experience of the Latin American crisis countries of the 1980s, who had inherited overvalued exchange rates from inward-looking development strategies in the post-war decades, provide an example for high adjustment costs due to overvalued currencies. Also the more sluggish post-crisis performance of the European periphery compared to the countries of the European center was preceded by a relative overvaluation of their real exchange rates (and, as members of the Euro, a lack of mechanisms to adjust the value of their currency). In contrast, the countries that were affected by the East-Asian crisis of the 1990s had followed undervaluation strategies to promote export-orientation and recovered more quickly in spite of large and severe drops in per capita incomes during and immediately after the crisis. In general, costs of adjustment are even larger, when countries are hit by a simultaneous currency crisis: Sudden devaluation may create currency mismatches in the balance sheets of private and public actors and trigger additional instability, or turn liquidity crises into solvency

crises. Also financing constraints are more severe under simultaneous currency crises. For one, foreign-currency denominated debt increases sharply as a response to devaluation. Second, the outflow of foreign capital during currency crises puts additional pressure on governments and aggravates financing constraints. The negative effect of additional currency crises on recovery underlines the adverse effects of currency crises both on adjustment costs and financing constraints. Although a similarly negative effect could be expected with respect to the simultaneous occurrence of sovereign debt crises, they did not show up in regressions with a statistically significant effect.

Global variables capture external conditions that potentially affect recovery via two channels: a trade channel and a financial channel. The quarterly growth of world trade is strongly related to the hazards of recovery and reflects the fact that favorable export dynamics provide positive impulses to growth. High gold prices have a negative effect on the probability of recovery. This relationship supports the expectation that high gold prices capture a flight to save assets such as gold in periods of uncertainty and a low willingness of investors to invest in risky assets. Finally, the Federal Fund Rate has ambivalent effects within a subset of emerging markets and developing countries. In middle-income countries, a higher FFR is associated with later recovery. It was argued that the negative effect of high FFR results from its effects on global financing conditions: A high FFR translates to larger borrowing costs on global capital markets and has an influence of the direction of international capital flows. In low-income countries, a higher FFR is associated with earlier recovery. Plausibly, access to private capital is not a main determinant of recovery for the poorest countries. It seems that economic conditions in the center countries as an important market for their commodity exports are more relevant for low-income countries. Consequently, periods of low growth performance and expansionary monetary policy in the center are associated with later recovery for this group.

The empirical analysis based on a broad sample of mainly developing countries and emerging markets plus a number of advanced economies covering more than 40 years of banking crises history bears relevant lessons also for the most recent series of banking crises in the advanced economies. It highlights that the combination of external and domestic constraints has important effects on recovery, and that crises policies and their effectiveness may therefore differ greatly across cases. In general,

the dominance of global factors as well as variables related to the exchange rate (e.g. overvaluation and the occurrence of currency crises) points to the necessity of understanding crises policies as embedded within a global economy that restricts national policy space. As in previous episodes, a high degree of uncertainty in financial markets and a low growth in world trade, among others, are external factors that might hinder quick recoveries from the ongoing crises. The question how exactly structural constraints affect banking crises outcomes and to what degree these outcomes are shaped by the choice of resolution tools and growth policies warrants further investigation including alternative methods of inquiry. Naturally, large-N analyses are limited by sample size and the availability of data. While this paper made a first step in opening the black box of country-specific determinants of the recovery from banking crises, small-N analyses of individual cases are necessary in order to include a broader set of institutional variables that are not easily captured in large-N regression analyses.

VI. Literature

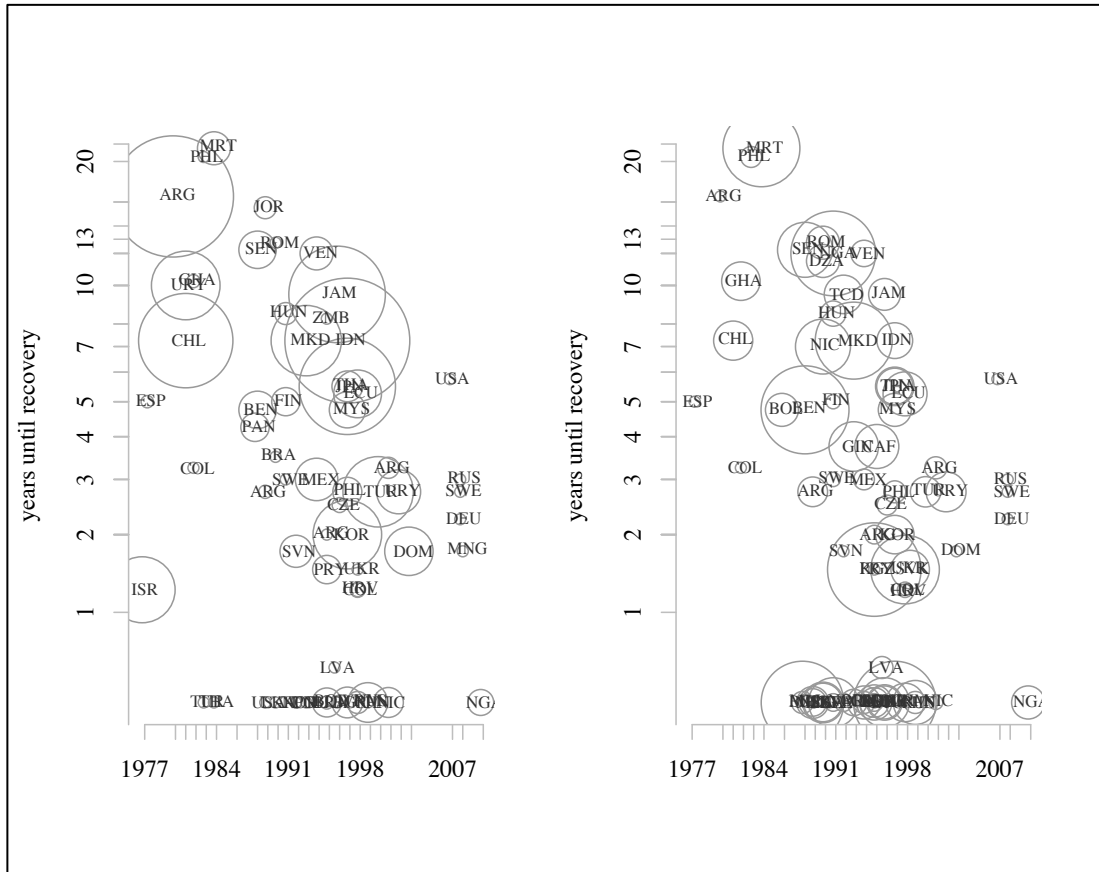
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VII. Tables and Figures

Figure 1: Banking Crises and Duration of Recovery



Both graphs plot the duration of recovery from banking crises on a time line, for a sub-sample of banking crises incidents. The size of circles on the left graph is proportional to the direct fiscal costs of rescue packages. The size of circles on the right graph is proportional to the share of peak non-performing loans. Y-axes are rescaled in logs for better representation.

Table 1: Variable Description

Variable Name	Description	Coverage (incidents/ "times at risk")
RECOV	Duration of recovery (in years, by quarters) ^{a), b)}	138/2696
DECADE	Categ. variable whether banking crisis occurred in the 1970s/80s, 1990s or 2000s	138/2696
A) GROWTH HISTORIES		
GDPTRD	Trend gdp measured as average growth rate over the previous ten years ^{a)}	137/2622
GDPVOL	Volatility of growth measured as standard deviation of the growth rate over the previous 10 years ^{a)}	137/2622
B) TYPE OF CRISIS		
CURRCR	Binary indicator whether a currency crisis occurred in the year of or previous year of the banking crisis ^{e)}	138/2696
DEBTCR	Binary indicator whether a sovereign debt crisis occurred in the year of or previous year of the banking crisis ^{g)}	138/2696
PKNPL	Peak share of non-performing loans during crises ^{e)}	101/2055
FISCST	Direct fiscal costs of rescue packages relative to GDP ^{e)}	84/1616
C) BALANCE OF PAYMENTS AND THE EXCHANGE RATE		
FORASS	Net foreign assets as a share of GDP ¹⁾	134/2607
KAOPEN	Index on cross-border financial transactions between 0 and 1, taking higher values the more open the country is to cross- border capital transactions ^{k)}	131/2545
UNDVAL	Index of undervaluation centered around zero, following the construction as proposed in Rodrik (2008). Values of RER greater than one indicate that the value of the currency is lower (more depreciated) than indicated by purchasing power parity ^{c)}	131/2494
XRFIXED	Binary indicator whether countries had adopted a fixed exchange rate ^{l)}	130/2688
RESRV	Level of reserve excluding gold as a share of GDP [FI.RES.XGLD.CD] ^{a)}	136/2609
D) HUMAN AND PHYSICAL CAPITAL STOCKS		
CAPSTK	Per capita capital stock at current PPPs (in mil. 2005US\$) [ck/pop] ^{c)}	131/2494
HUMCAP	Average years of schooling of the adult population ^{d)}	122/2386
GCFSHR	Gross capital formation as a share of GDP [NE.GDI.TOTL.ZS] ^{a)}	136/2656
GCFd	Gross capital formation (annual % growth) [NE.GDI.TOTL.KD.ZG] ^{a)}	117/2191
E) STRUCTURAL CONDITIONS		
INClog	Log of per capita GDP in 2005 USD [NY.GDP.PCAP.KD] ^{a)}	135/2554
GDPlog	Log of GDP in constant 2005 USD [NY.GDP.MKTP.KD] ^{a)}	138/2696
POPlog	log of population ^{a)}	138/2696
GINI	Gini index, based on the standardized world income inequality database SWIID ^{j)}	119/2198
LABSHR	Share of labour compensation in GDP at current national prices [labsh] ^{c)}	115/2312
GVCSHR	Share of government consumption at current PPPs [csh_g] ^{c)}	131/2494
FINDEV	Private credit relative to GDP [pcrdbgdp] ^{h)}	114/2145
XPSH	Merchandise trade relative to GDP [[TG.VAL.TOTL.GD.ZS] ^{a)}	137/2657
DBTGDP	Level of public debt relative to GDP ^{l)}	131/2426

Table 1: Variable Description (Continued)

Variable Name	Description	Coverage (incidents/ "times at risk")
F) MACROECONOMIC POLICIES		
DBTGDPd	Average annual change in DBTGDP over the previous five years ^{f)}	131/2426
INFL	Average consumer prices inflation (annual %) over the previous five years ^{a)}	118/2175
G) EXTERNAL FACTORS		
FFR	US Federal Fund Rate. Quarterly average ^{m)}	138/2696
WRLDTd	Quarterly growth in world trade [TXG] ^{b)}	138/2696
GOLD	Log of an index of UK quarterly gold prices (2010=100) [PZPIGOLD] ^{b)}	138/2696
OILPR	Log of an index of quarterly crude oil prices (2010=100) [PZPIOIL] ^{b)}	138/2696

Sources: ^{a)} World Development Indicators ^{b)} IMF International Financial Statistics ^{c)} Penn World Tables 8.0 ^{d)} (Barro and Lee, 2001) ^{e)} (Laeven and Valencia, 2012), ^{f)} (Abbas et al., 2010), ^{g)} (Furceri and Zdzienicka, 2012c) ^{h)} (Beck et al., 2000), ⁱ⁾ (Lane and Milesi-Ferretti, 2007) ^{j)} (Solt, 2009) ^{k)} (Chinn and Ito, 2008), ^{l)} (Ilzetzki et al., 2011) ^{m)} Federal Reserve Bank 2014. Names of data series in the original source is given in brackets. All variables under A), C), D), E), F) are measured before occurrence of the banking crisis

Table 2: Cox Prop. Hazards: Duration of Recovery from Banking Crises (Local Predictors)

	Spec. 1	Spec. 2	Spec. 3	Spec. 4	Spec. 5	Spec. 6
N	138	138	138	138	138	106
events	110	110	110	110	110	94
R ²	0.15	0.18	0.26	0.4	0.43	0.37
subset emerging	no	no	no	no	no	yes
DECADE70s/80s	0.832 ** [0.366]	0.946 ** [0.372]	0.599 [0.424]	1.334 ** [0.575]	1.362 ** [0.576]	0.554 [0.628]
DECADE90s	1.278 *** [0.35]	1.352 *** [0.352]	0.925 ** [0.395]	1.491 *** [0.495]	1.548 *** [0.496]	0.814 [0.56]
GDPTRD	0.065 ** [0.03]	0.078 ** [0.031]	0.072 ** [0.035]	0.095 ** [0.045]	0.088 * [0.048]	0.048 [0.05]
GDPVOL	-0.002 [0.029]	0.004 [0.029]	0.004 [0.037]	0.022 [0.039]	0.038 [0.046]	0.042 [0.051]
CURRCR		-0.284 [0.245]	-0.524 * [0.281]	-0.78 ** [0.337]	-0.786 ** [0.366]	-0.755 * [0.39]
DEBTCR		-0.26 [0.295]	-0.392 [0.307]	-0.443 [0.356]	-0.437 [0.363]	-0.436 [0.367]
FORASS			0.005 [0.064]	0.01 [0.122]	0.013 [0.127]	0.063 [0.138]
KAOPEN			-0.185 [0.398]	-0.155 [0.477]	-0.226 [0.515]	-0.383 [0.6]
RESRV			-0.285 [0.632]	-0.293 [0.678]	-0.381 [0.795]	-0.537 [1.064]
UNDFAL			0.709 ** [0.277]	0.943 ** [0.394]	0.903 ** [0.404]	1.04 ** [0.439]
XRFIXED			-0.319 [0.25]	-0.107 [0.291]	-0.1 [0.293]	0.064 [0.321]
CAPSTK				0.048 [3.903]	0.095 [3.827]	0.292 [4.091]
DBTGDP				0.003 [0.003]	0.004 [0.003]	0.005 [0.003]
DBTGDPg				-0.302 [0.572]	-0.353 [0.58]	-0.495 [0.693]
FINDEV				-0.008 [0.005]	-0.008 [0.005]	-0.006 [0.008]
GCFd				0.003 [0.006]	0.001 [0.007]	-0.001 [0.007]
GCFSHR				0.002 [0.022]	0.009 [0.023]	0.017 [0.024]
GDPlog				0.559 [0.413]	0.539 [0.438]	0.538 [0.479]
GINI				0.009 [0.018]	0.011 [0.018]	0.021 [0.02]
GVCSHR				-0.707 [1.064]	-0.612 [1.062]	-0.507 [1.094]
HUMCAP				0.189 ** [0.095]	0.165 [0.102]	0.116 [0.116]
INClog				-0.505 [0.355]	-0.504 [0.396]	-0.521 [0.45]
INFL				0 [0]	0 [0]	0 [0]
LABSHR				-1225 [1.275]	-1183 [1.332]	-1451 [1.399]
POPlog				-0.469 [0.412]	-0.456 [0.437]	-0.478 [0.477]
XPSH				-0.003 [0.008]	-0.002 [0.008]	-0.004 [0.01]
FISCST					-0.008 [0.013]	-0.003 [0.014]
PKNPL					-0.007 [0.011]	-0.01 [0.012]

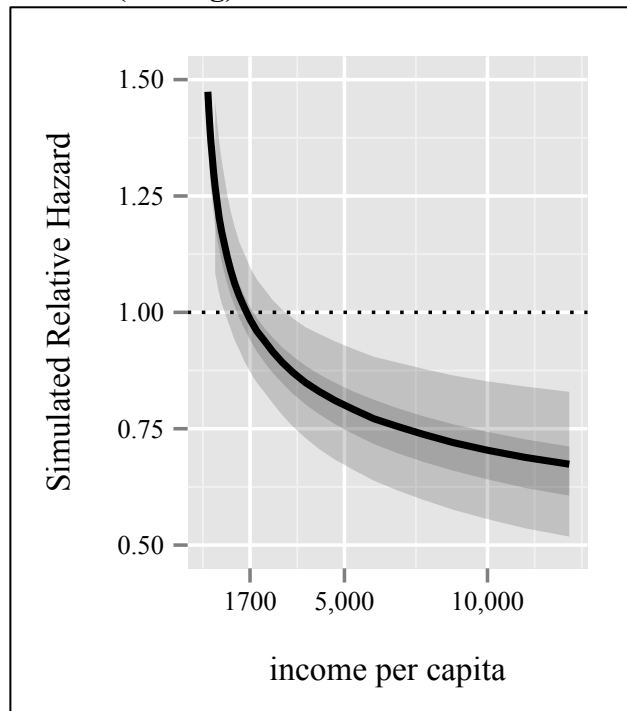
The table shows coefficients of a Cox proportional hazard model for quarterly years until pre-crisis per capita GDP is reached. A negative coefficient sign indicates that higher values of that variable are associated with longer duration of recovery. Stars denote significance at 1% (***) and 5% (**). Coefficients are averaged after running the regression on 50 imputed datasets following the method proposed in Honaker et al. (2011). Standard errors are adjusted accordingly and reflect uncertainty that arise from missing values. See text for details.

Table 3: Cox Prop. Hazards: Duration of Recovery from Banking Crises (Local and Global Predictors)

	Spec. 7	Spec. 8	Spec. 9	Spec. 10
N	2696	2696	2170	2170
events	110	110	94	94
R ²	0.02	0.07	0.08	0.09
local predictors	no	yes (full set)	yes (full set)	yes (full set)
subset emerging	no	no	yes	yes
DECADE70s/80s	-1.876 *** [0.565]	0.279 [0.886]	-0.158 [0.931]	0.798 [1.017]
DECADE90s	-1.045 ** [0.531]	0.442 [0.775]	0.169 [0.798]	1054 [0.904]
FFR	0.067 [0.047]	-0.007 [0.056]	0.003 [0.056]	1.532 *** [0.39]
GOLD	-0.661 [0.445]	-1.543 *** [0.571]	-1.585 *** [0.571]	-1.81 *** [0.656]
OILPR	-0.659 ** [0.314]	-0.141 [0.355]	0.05 [0.361]	0.141 [0.379]
WRLTRd	11.283 *** [2.305]	10.281 *** [2.294]	10.822 *** [2.306]	10.563 *** [2.568]
INClog * FFR				-0.208 *** [0.053]

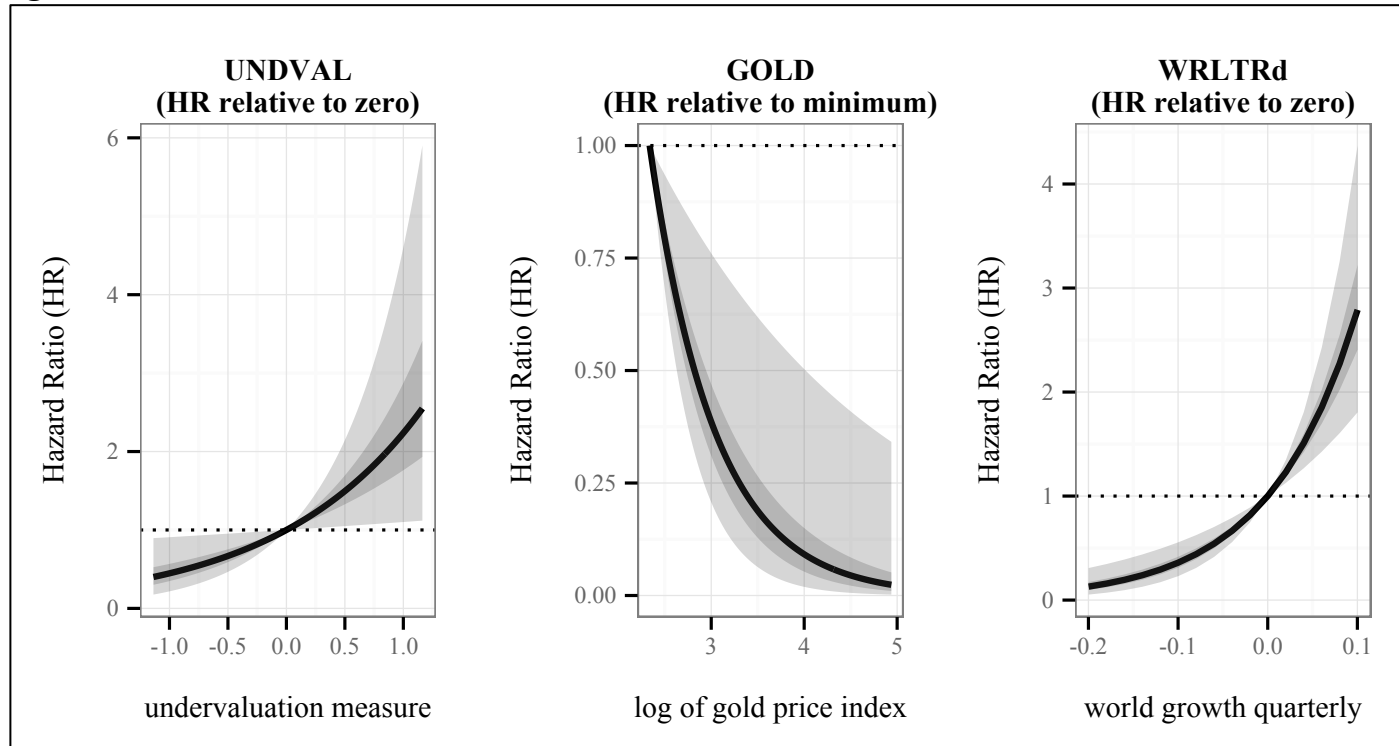
The table shows coefficients of a Cox proportional hazard model for quarterly years until pre-crisis per capita GDP is reached. In order to estimate the effects of time-varying variables, observations were split into quarterly units, generating a total of 2,696 quarterly episodes (“times at risk”). Spec. 8 to 10 use all local-level control variables from Table 2. Interpretations of coefficients as well as imputation procedures are as in Table 2. See text for details.

Figure 2: Simulated Relative Hazards for a One Percentage Point Increase in the Federal Fund Rate (FFR), Conditional on Per Capita Income (INClog)



All parameters are based on Spec. 10 in Table 3 on a subsample of emerging markets and developing countries. Shaded areas depict 95% (50%) confidence intervals. Hazard rates below 1 indicate that an increase in the Federal Fund Rate (FFR) is associated with more negative prospects of recovery. For the sake of graphical representation, the variable INClog has been transformed back from logs. R-Code for the graphical representation has been adapted from Gandrud (2013)

Figure 3: Simulation of Hazard Ratios for Three Variables



The figure plots hazard ratios for selected continuous variables from Table 2 and 3, in relation to reference values for a comparison group. Parameters for UNDVAL are based on Spec. 5 in Table 2. Parameters for GOLD and WLRtd are based on parameters from Spec. 8 in Table 3. Shaded areas depict 95% (50%) confidence intervals. The graph has been produced using the package simPH in R (Gandrud, 2013)

VIII. Annex

Annex 1: Country Level Variables

COUNTRY	CODE	CRISIS YEAR	RECOV	FISCST	PKNPL	CURRCR	DEBTCR	INC	GDPTRD	GDPVOL	HUMCAP	GINI	KAOPEN	FORASS	FINDEV	DBTGDP	DBTGDPg	LABSHR
Albania	ALB	1994	0.25	NA	26.8	0	0	1,359	-0.2	12.9	8.5	NA	0.41	-0.03	3.4	75.0	-10.2	NA
Argentina	ARG	1980	16.5	55.1	9	1	0	5,361	1.9	5.1	7.3	40.3	0.41	-0.14	19.0	21.3	1.5	0.51
Argentina	ARG	1989	2.75	6	27	0	0	4,124	-1.4	5.3	7.85	42.8	0.16	-0.13	12.8	55.8	-0.3	0.51
Argentina	ARG	1995	2	2	17	0	0	5,105	2.9	6.7	8.64	43.5	0.69	-0.20	19.2	35.6	-2.0	0.43
Argentina	ARG	2001	3.25	9.6	20.1	1	1	5,179	0.7	6.1	8.73	46.0	0.16	-0.70	17.9	165.0	26.0	0.36
Armenia	ARM	1994	0.25	NA	NA	1	0	610	-10.0	19.6	10.4	39.7	NA	NA	5.5	25.3	-16.7	0.77
Austria	AUT	2008	5.25+	4.9	2.8	0	0	39,895	1.7	2.2	9.29	27.2	1.00	-0.12	123.7	69.2	0.8	0.61
Azerbaijan	AZE	1995	3.5	NA	NA	0	0	651	-12.8	10.9	NA	41.8	0.16	-0.35	1.1	11.1	-2.7	0.48
Burundi	BDI	1994	18.5+	NA	25	0	0	191	0.7	4.9	1.74	33.9	0.16	-0.47	13.1	95.3	2.4	0.76
Belgium	BEL	2008	5.25+	6	3.1	0	0	37,583	1.5	1.9	10.59	25.4	1.00	0.53	96.3	95.7	0.3	0.62
Benin	BEN	1988	4.75	17	80	0	0	462	3.1	4.9	1.71	NA	0.41	-0.70	NA	84.5	3.8	0.65
Burkina Faso	BFA	1990	0.25	NA	16	0	0	269	4.1	4.5	NA	NA	0.41	-0.18	14.1	32.2	0.2	0.65
Bangladesh	BGD	1987	0.25	NA	20	0	0	262	3.4	1.3	2.82	35.9	0.00	-0.37	NA	39.5	1.8	NA
Bulgaria	BGR	1996	0.25	14	75	1	0	2,379	-2.5	6.5	8.86	28.0	0.22	-0.44	21.6	96.4	-14.8	0.50
Belarus	BLR	1995	1.5	NA	NA	0	0	1,519	-6.3	5.8	NA	24.8	0.16	-0.04	5.0	10.7	NA	0.54
Bolivia	BOL	1986	4.75	NA	30	0	0	800	-0.9	2.3	6.38	NA	0.37	-1.19	13.3	145.3	-2.0	0.53
Bolivia	BOL	1994	0.25	6	6.2	0	0	886	3.2	2.3	7.26	49.7	0.55	-0.67	45.2	81.7	-4.2	0.54
Brazil	BRA	1990	3.5	0	NA	0	0	3,999	2.2	4.2	4.69	52.9	0.00	-0.25	21.4	65.7	4.4	0.55
Brazil	BRA	1994	0.25	13.2	16	0	0	4,182	2.6	3.5	4.69	51.9	0.00	-0.16	38.0	36.6	-5.8	0.57
Cntr. Afr. Rep.	CAF	1976	0.25	NA	NA	0	0	491	3.0	2.5	1.15	NA	0.41	-0.27	NA	26.5	1.2	0.23
Cntr. Afr. Rep.	CAF	1995	3.75	NA	40	0	0	352	-0.2	4.3	2.99	54.5	0.16	-0.72	4.6	92.1	6.6	0.23
Switzerland	CHE	2008	5.25+	1.1	0.5	0	0	55,378	1.8	1.9	10.55	29.3	1.00	1.41	164.6	49.8	-4.0	0.70
Chile	CHL	1976	0.25	NA	NA	0	0	2,590	1.6	6.1	6.57	42.3	0.41	-0.56	NA	58.8	-1.0	0.44
Chile	CHL	1981	7.25	42.9	35.6	1	0	3,468	1.7	7.8	6.95	48.8	0.00	-0.67	NA	34.0	-5.0	0.44
China	CHN	1998	0.25	18	20	0	0	983	9.6	3.7	6.32	45.8	0.16	0.00	104.3	13.8	1.5	0.52
Cote d'Ivoire	CIV	1988	24.5+	25	50	0	0	1,131	-0.2	4.7	2.37	38.8	0.16	-1.44	36.0	103.4	4.1	0.61
Cameroon	CMR	1987	19.5+	NA	65	0	0	1,287	4.8	7.0	3.7	49.0	0.16	-0.27	26.7	29.4	0.3	0.56
Cameroon	CMR	1995	0.25	NA	30	0	0	787	-2.2	3.9	5	55.7	0.16	-0.86	7.7	98.3	9.8	0.50

COUNTRY	CODE	CRISIS YEAR	RECOV	FISCST	PKNPL	CURRCR	DEBTCR	INC	GDPTRD	GDPVOL	HUMCAP	GINI	KAOPEN	FORASS	FINDEV	DBTGDP	DBTGDPg	LABSHR
Congo, Rep.	COG	1992	8.5+	NA	NA	0	0	1,811	0.9	3.6	5.37	NA	0.16	-2.10	12.3	164.7	-0.7	NA
Colombia	COL	1982	3.25	5	4.1	0	0	2,431	4.0	2.3	4.89	52.7	0.00	-0.14	32.4	20.2	1.4	0.51
Colombia	COL	1998	1.25	6.3	14	0	0	3,179	2.9	3.1	6.47	50.3	0.16	-0.29	32.4	34.1	3.8	0.50
Cabo Verde	CPV	1993	0.25	NA	30	0	0	806	6.8	5.5	NA	45.5	0.16	-0.16	17.8	71.9	3.3	NA
Costa Rica	CRI	1987	0.25	NA	NA	0	0	3,041	2.3	4.4	6.7	39.0	0.00	-0.76	16.7	86.1	-4.8	0.61
Costa Rica	CRI	1994	0.25	NA	32	0	0	3,643	5.3	2.0	7.11	42.0	0.47	-0.21	11.0	34.6	-5.9	0.63
Czech Republic	CZE	1996	2.5	6.8	18	0	0	9,847	0.1	5.8	11.99	25.6	0.41	-0.05	66.5	13.1	-1.3	0.59
Germany	DEU	2008	2.25	1.8	3.7	0	0	36,469	0.9	2.5	11.65	28.9	1.00	0.31	113.0	74.5	1.7	0.61
Djibouti	DJI	1991	16.5+	NA	NA	0	0	1,145	-2.1	3.0	NA	NA	1.00	0.54	NA	NA	NA	0.62
Denmark	DNK	2008	5.25+	3.1	4.5	0	0	48,878	0.8	2.7	11.1	23.9	1.00	0.03	NA	40.7	-0.9	0.69
Dominican	DOM	2003	1.75	22	9	1	1	3,383	4.9	2.8	6.98	46.4	0.45	-0.43	23.3	36.9	2.7	0.35
Algeria	DZA	1990	11.5	NA	30	0	1	2,544	2.4	3.0	4.74	36.2	0.16	-0.55	40.0	71.7	2.2	NA
Ecuador	ECU	1982	12	NA	NA	1	1	2,649	5.0	4.0	6.15	60.5	0.31	-0.42	27.1	53.0	4.7	0.32
Ecuador	ECU	1998	5.25	21.7	40	1	1	2,824	2.3	2.7	7.1	50.4	0.47	-0.90	34.9	93.8	3.0	0.24
Egypt	EGY	1980	0.25	NA	NA	0	0	647	6.7	4.7	2.65	36.4	0.00	-0.74	18.9	127.6	10.5	0.35
Eritrea	ERI	1993	0.25	NA	NA	0	0	200	17.3	5.5	NA	NA	NA	NA	NA	NA	NA	NA
Spain	ESP	1977	5	5.6	5.8	0	0	14,501	4.8	2.9	5.91	32.5	0.41	-0.08	73.0	14.3	0.9	0.65
Spain	ESP	2008	5.25+	3.8	5.8	0	0	26,738	2.6	2.5	10.12	31.6	1.00	-0.98	210.0	54.0	1.5	0.65
Finland	FIN	1991	5	12.8	13	0	0	26,292	1.7	3.7	7.55	20.9	0.82	-0.40	93.3	39.4	4.4	0.70
France	FRA	2008	5.25+	1	4	0	0	34,759	1.3	1.9	10.12	28.6	1.00	-0.14	111.2	79.2	2.8	0.63
United	GBR	2007	6+	8.8	4	0	0	40,231	2.8	1.4	11.1	35.7	1.00	-0.06	197.4	51.9	1.0	0.63
Georgia	GEO	1991	21.5+	NA	33	1	0	1,958	-7.5	16.1	NA	33.3	NA	NA	NA	NA	NA	0.55
Ghana	GHA	1982	10.25	6	35	1	0	348	-1.5	6.3	4.53	NA	0.00	-0.14	1.4	7.1	-0.5	NA
Guinea	GIN	1993	3.75	NA	45	0	0	268	4.1	1.2	NA	39.7	0.16	-0.84	NA	99.2	-0.1	NA
Guinea-Bissau	GNB	1995	0.25	NA	45	0	0	519	4.7	2.9	NA	44.4	0.06	-1.00	3.7	322.4	11.1	NA
Greece	GRC	2008	5.25+	27.3	14.7	0	0	23,394	3.0	2.8	9.9	32.3	1.00	-0.94	95.7	129.7	6.2	0.52
Guyana	GUY	1993	0.25	NA	NA	0	0	844	2.1	5.2	7.09	44.0	0.25	-2.41	NA	526.8	-15.1	NA
Croatia	HRV	1998	1.25	6.9	10.5	0	0	7,798	3.3	3.6	9.08	29.0	0.41	-0.28	39.0	41.3	3.2	0.71
Haiti	HTI	1994	18.5+	NA	NA	0	0	NA	NA	NA	3.43	51.8	0.41	-0.26	11.8	43.8	-19.6	NA
Hungary	HUN	1991	8.5	10	23	0	0	7,448	-0.9	4.5	8.79	28.3	0.00	-0.43	34.6	119.6	1.4	0.66
Hungary	HUN	2008	5.25+	2.7	13.3	0	0	11,534	2.3	3.6	11.66	25.9	1.00	-1.28	NA	79.8	4.1	0.61
Indonesia	IDN	1997	7.25	56.8	32.5	1	1	1,235	5.7	6.7	4.62	59.7	0.65	-1.55	52.6	72.5	6.4	0.46
India	IND	1993	0.25	NA	20	0	0	425	5.3	2.1	3.45	49.2	0.16	-0.27	22.4	73.3	-1.2	0.62

COUNTRY	CODE	CRISIS YEAR	RECOV	FISCST	PKNPL	CURRCR	DEBTR	INC	GDPTRD	GDPVOL	HUMCAP	GINI	KAOPEN	FORASS	FINDEV	DBTGDP	DBTGDPg	LABSHR
Ireland	IRL	2008	5.25+	40.7	12.9	0	0	48,893	3.7	4.7	11.54	29.5	1.00	-1.01	237.2	64.4	7.0	0.53
Iceland	ISL	2008	5.25+	44.2	61.2	1	0	57,618	3.1	4.2	10.42	26.9	0.16	-7.01	119.5	88.0	10.7	0.75
Israel	ISR	1977	1.25	30	NA	0	0	11,220	6.5	4.9	9.56	25.8	0.41	-0.38	45.4	133.6	14.3	0.59
Italy	ITA	2008	5.25+	0.3	11	0	0	31,190	0.6	2.5	9.15	32.4	1.00	-0.31	109.6	116.4	2.5	0.55
Jamaica	JAM	1996	9.5	43.9	28.9	0	0	NA	3.4	3.2	8.18	41.0	0.82	-0.51	18.6	69.4	-12.3	0.56
Jordan	JOR	1989	15.5	10	NA	1	1	1,815	2.2	6.3	5.68	46.2	0.16	-0.92	59.5	219.7	NA	0.47
Japan	JPN	1997	5.5	14	35	0	0	34,163	2.0	2.3	10.51	27.2	0.94	0.30	194.9	117.3	8.1	0.56
Kazakhstan	KAZ	2008	1.25+	3.7	31.9	0	0	4,538	8.6	3.6	11.6	30.1	0.16	-0.40	50.6	10.2	-0.2	0.40
Kenya	KEN	1985	0.25	NA	NA	0	0	504	4.9	2.9	4.13	59.7	0.16	-0.37	17.6	41.7	2.2	0.68
Kenya	KEN	1992	14.5	NA	NA	1	0	523	3.5	2.7	4.78	50.0	0.00	-0.81	19.5	82.1	7.4	0.67
Kyrgyz	KGZ	1995	1.5	NA	85	0	0	341	-3.1	11.1	8.93	44.2	NA	-0.59	9.0	51.7	6.9	0.79
Korea, Rep.	KOR	1997	2	31.2	35	1	1	13,651	6.3	4.5	10.49	30.6	0.16	-0.16	62.3	15.4	1.6	0.54
Kuwait	KWT	1982	7.5+	NA	40	0	0	NA	-2.9	12.7	4.61	NA	1.00	2.82	72.9	16.5	3.2	0.22
Lebanon	LBN	1990	0.25	NA	NA	1	0	3,369	7.4	43.6	NA	NA	1.00	-0.42	NA	66.3	-38.8	0.42
Liberia	LBR	1991	9.75	NA	NA	0	0	155	-13.7	18.0	3.02	39.1	0.41	-	NA	NA	NA	NA
Sri Lanka	LKA	1989	0.25	5	35	0	1	675	4.2	1.6	7.62	41.2	0.16	-0.56	17.7	93.4	3.0	0.77
Lithuania	LTU	1995	0.25	3.1	32.2	0	0	3,956	-7.4	10.5	9.17	32.4	0.94	-0.14	11.7	11.8	2.0	0.51
Luxembourg	LUX	2008	5.25+	7.7	1.3	0	0	85,530	3.2	4.0	10.26	27.3	NA	0.88	197.8	15.3	1.8	0.50
Latvia	LVA	1995	0.5	3	20	0	0	3,306	-3.9	11.6	8.99	28.8	0.88	-0.08	7.0	10.7	0.6	0.69
Latvia	LVA	2008	5.25+	5.6	15.9	0	0	8,708	4.8	9.2	10.26	36.1	1.00	-0.87	NA	32.9	3.4	0.58
Morocco	MAR	1980	2	NA	NA	1	0	1,270	4.4	3.6	1.76	59.8	0.00	-0.63	15.4	75.4	6.9	0.53
Madagascar	MDG	1988	0.25	NA	25	0	0	325	0.4	3.9	NA	43.9	0.16	-0.97	13.5	159.9	12.5	NA
Mexico	MEX	1981	16.5	NA	NA	1	1	7,103	6.3	3.3	4.9	46.2	0.24	-0.37	14.2	47.6	-3.4	0.43
Mexico	MEX	1994	3	19.3	18.9	1	0	7,068	1.9	3.8	6.47	48.5	0.69	-0.46	32.1	56.8	0.7	0.38
Macedonia,	MKD	1993	7.25	32	70	0	0	2,488	-5.5	2.5	NA	32.1	NA	-0.16	37.1	NA	NA	0.70
Mali	MLI	1987	0.25	NA	75	0	0	310	0.4	6.8	0.78	NA	0.41	-0.98	13.2	105.9	2.4	NA
Mongolia	MNG	2008	1.75	4.2	NA	0	0	1,249	6.0	4.0	8.57	45.0	0.65	-0.65	41.3	46.6	-6.4	0.48
Mozambique	MOZ	1987	0.25	NA	NA	1	0	163	-0.3	9.6	1.17	NA	0.00	-1.61	NA	NA	NA	0.41
Mauritania	MRT	1984	21.5	15	70	0	0	656	1.9	3.7	2.13	NA	0.16	-1.88	NA	173.5	16.0	0.61
Malaysia	MYS	1997	4.75	16.4	30	1	0	4,879	7.5	5.3	8.39	46.3	0.53	-0.37	155.2	36.6	-3.8	0.53
Niger	NER	1983	29.5+	NA	50	0	1	365	0.5	8.3	0.65	NA	0.41	-0.45	18.3	54.7	8.0	0.56
Nigeria	NGA	1991	12	NA	77	0	0	572	0.8	7.8	NA	52.1	0.00	-1.27	9.5	127.8	-3.8	0.31
Nigeria	NGA	2009	0.25	11.8	30.1	0	0	949	9.2	8.9	NA	43.7	0.31	-0.05	31.3	15.5	-2.6	0.40

COUNTRY	CODE	CRISIS YEAR	RECOV	FISCST	PKNPL	CURRCR	DEBTCR	INC	GDPTRD	GDPVOL	HUMCAP	GINI	KAOPEN	FORASS	FINDEV	DBTGDP	DBTGDPg	LABSHR
Nicaragua	NIC	1990	7	NA	50	1	0	937	-1.8	4.3	4.49	NA	0.16	-2.91	NA	333.7	34.9	NA
Nicaragua	NIC	2000	0.25	13.6	12.7	0	0	1,061	3.7	2.4	5.51	50.0	1.00	-1.40	23.1	227.5	1.0	NA
Netherlands	NLD	2008	5.25+	12.7	3.2	0	0	42,467	1.6	2.3	10.8	27.4	1.00	0.14	209.5	60.8	1.7	0.61
Norway	NOR	1991	0.25	2.7	16.4	0	0	45,858	3.0	1.9	10.28	23.1	0.41	-0.06	55.9	51.1	1.7	0.59
Nepal	NPL	1988	0.25	NA	29	0	0	224	4.1	4.3	1.76	39.6	0.16	-0.24	11.3	53.3	2.8	NA
Panama	PAN	1988	4.25	12.9	NA	0	0	2,921	0.9	6.3	7.34	49.6	1.00	-1.17	44.3	105.6	4.8	0.45
Peru	PER	1983	3	NA	NA	0	1	2,221	1.5	5.3	6.1	57.7	0.24	-0.48	8.1	56.7	2.2	0.53
Philippines	PHL	1983	20.5	3	19	1	1	1,115	3.8	4.3	6.21	47.4	0.16	-0.59	26.9	45.8	4.7	0.44
Philippines	PHL	1997	2.75	13.2	20	1	0	1,057	3.1	2.6	7.56	52.0	0.45	-0.60	45.6	51.1	-3.6	0.43
Poland	POL	1992	0.25	3.5	24	0	0	4,476	-0.3	5.9	9.06	26.2	0.00	-0.42	18.6	67.4	2.0	0.63
Portugal	PRT	2008	5.25+	0	7.3	0	0	18,868	0.9	1.9	7.02	34.3	1.00	-1.21	181.9	83.7	5.2	0.67
Paraguay	PRY	1995	1.5	12.9	8.1	0	0	1,621	4.8	2.1	6.25	52.9	0.22	-0.15	26.6	24.1	-1.1	0.51
Romania	ROM	1990	12.75	0.6	30	0	0	3,820	-0.6	6.0	8.47	21.0	0.00	0.04	NA	2.7	1.7	NA
Russian	RUS	1998	0.25	0.1	40	1	1	3,283	-4.9	6.1	9.94	39.5	0.00	-0.07	11.3	88.7	5.0	0.53
Russian	RUS	2008	3	2.3	9.6	0	0	6,649	5.5	5.0	11.2	43.4	0.47	0.07	44.9	11.0	-2.3	0.65
Senegal	SEN	1988	12.25	17	50	0	1	702	2.4	4.2	2.43	44.7	0.41	-0.64	27.9	66.6	-1.8	0.37
Sierra Leone	SLE	1990	0.25	NA	45	0	0	366	0.9	4.5	2.09	59.2	0.41	-1.50	NA	139.8	6.6	0.63
El Salvador	SLV	1989	0.25	NA	37	0	0	1,756	-0.3	4.6	4.25	45.0	0.00	-0.32	3.4	55.5	-10.6	NA
Slovak	SVK	1998	1.5	NA	35	0	0	8,830	0.0	7.0	11.24	24.2	0.16	-0.20	52.8	22.8	0.3	0.59
Slovenia	SVN	1992	1.75	14.6	3.6	0	0	10,787	-3.8	6.0	10.77	19.8	NA	0.02	19.4	21.1	NA	0.74
Slovenia	SVN	2008	5.25+	3.6	12.1	0	0	20,707	3.1	4.1	11.59	23.1	0.88	-0.42	91.2	35.1	1.6	0.69
Sweden	SWE	1991	3	3.6	13	0	0	30,267	1.8	1.8	10.58	22.1	0.69	-0.23	51.2	73.3	2.3	0.69
Sweden	SWE	2008	2.75	0.7	2	0	0	43,046	2.0	2.9	11.81	25.5	1.00	-0.11	NA	42.6	-1.5	0.64
Swaziland	SWZ	1995	0.25	NA	NA	0	0	2,100	7.4	6.5	5	54.4	0.16	0.24	13.7	15.7	-0.8	0.63
Chad	TCD	1983	0.25	NA	NA	0	0	373	1.0	9.8	NA	NA	0.16	-0.32	NA	25.4	-4.4	0.56
Chad	TCD	1992	9.5	NA	35	0	0	450	3.4	10.8	NA	NA	0.41	-0.55	6.0	59.1	6.4	0.56
Togo	TGO	1993	2.75	NA	NA	1	0	320	1.3	7.8	3.99	NA	0.16	-1.39	21.2	122.5	10.2	0.85
Thailand	THA	1983	0.25	0.7	NA	0	0	981	6.8	2.1	3.64	51.0	0.41	-0.34	53.0	40.3	3.0	0.46
Thailand	THA	1997	5.5	43.8	33	1	1	2,333	6.0	6.9	5.5	57.9	0.41	-0.81	165.8	34.0	3.2	0.40
Tunisia	TUN	1991	0.25	3	NA	0	1	2,072	4.3	3.2	4.39	36.3	0.41	-0.90	50.7	55.5	0.8	0.51
Turkey	TUR	1982	0.25	2.5	NA	0	0	3,836	3.8	3.7	3.55	60.1	0.16	-0.20	17.0	32.7	1.4	0.34
Turkey	TUR	2000	2.75	32	27.6	1	0	6,119	3.1	5.6	6.1	48.3	0.16	-0.43	14.4	77.9	8.5	0.37
Uganda	UGA	1994	2.5	NA	NA	0	0	217	6.1	3.1	3.48	38.9	0.41	-0.49	3.7	78.3	-13.6	NA

COUNTRY	CODE	CRISIS YEAR	RECOV	FISCST	PKNPL	CURRCR	DEBTCR	INC	GDPTRD	GDPVOL	HUMCAP	GINI	KAOPEN	FORASS	FINDEV	DBTGDP	DBTGDPg	LABSHR
Ukraine	UKR	1998	1.5	0	62.4	1	1	1,123	-8.9	6.7	10.15	34.9	0.16	-0.44	7.2	61.0	7.2	0.58
Ukraine	UKR	2008	5.25+	4.5	15.5	1	0	2,206	4.7	7.5	10.97	27.2	0.00	-0.39	76.7	35.4	2.1	0.64
Uruguay	URY	1981	10	31.2	NA	0	0	4,272	2.4	4.8	6.7	43.2	0.71	-0.22	50.8	34.6	1.7	0.52
Uruguay	URY	2002	2.75	20	36.3	1	1	4,587	1.0	5.3	8.07	43.3	1.00	-0.10	52.8	99.3	12.5	0.43
United States	USA	1988	0.25	3.7	4.1	0	0	31,850	3.1	2.6	12.08	34.4	1.00	-0.06	57.0	60.3	2.2	0.64
United States	USA	2007	5.75	4.5	5	0	0	45,431	2.6	1.6	12.86	37.8	1.00	-0.24	63.0	73.3	3.0	0.64
Venezuela, RB	VEN	1994	12	15	24	1	1	5,497	3.1	5.4	4.97	40.6	0.16	-0.08	NA	NA	-6.2	0.41
Vietnam	VNM	1997	0.25	10	35	0	0	470	7.7	1.6	4.85	40.6	0.22	-0.81	18.9	79.3	-10.6	NA
Yemen, Rep.	YEM	1996	0.25	NA	NA	0	0	712	5.8	1.4	1.67	43.0	0.82	NA	NA	106.5	-2.3	NA
Zambia	ZMB	1995	8.25	1.4	NA	1	0	559	0.8	5.0	6.01	58.8	0.76	-2.93	7.5	236.3	4.6	NA
Zimbabwe	ZWE	1995	0.25	NA	NA	0	0	647	3.8	5.7	6.7	52.7	0.16	-0.42	19.7	72.5	7.1	0.56

Annex 1: Country Level Variables (Continued)

COUNTRY	CODE	CRISIS YEAR	RECOV	GVCshr	GCFshr	GCFd	INFL	XPSH	UNDVAL	XRFIXED	GDPlog	POPlog	RESRV	CAPSTK
Albania	ALB	1994	0.25	0.26	21.0	11.6	85.3	12.5	0.70	0	21.61	14.97	0.11	0.02
Argentina	ARG	1980	16.5	0.10	22.7	-15.0	NA	6.9	-0.78	0	25.09	17.17	0.06	0.01
Argentina	ARG	1989	2.75	0.07	14.0	-16.9	NA	10.4	-0.79	0	25.67	17.30	0.04	0.02
Argentina	ARG	1995	2	0.20	14.9	8.9	NA	8.6	-0.33	1	26.52	17.38	0.06	0.05
Argentina	ARG	2001	3.25	0.12	9.9	-36.4	NA	23.4	0.34	0	25.54	17.44	0.08	0.04
Armenia	ARM	1994	0.25	0.47	18.4	-16.4	1774.7	23.9	1.01	0	21.11	14.99	0.08	0.01
Austria	AUT	2008	5.25+	0.15	21.0	-11.2	1.9	50.1	-0.59	1	26.67	15.94	0.05	0.15
Azerbaijan	AZE	1995	3.5	0.43	29.0	111.4	642.2	29.5	0.82	1	21.88	15.86	0.07	0.01
Burundi	BDI	1994	18.5+	0.17	6.4	NA	11.5	12.9	-0.20	0	20.72	15.64	0.22	0.00
Belgium	BEL	2008	5.25+	0.19	19.8	-12.3	2.2	73.7	-0.62	1	26.88	16.19	0.05	0.13
Benin	BEN	1988	4.75	0.19	11.8	-23.3	NA	13.5	0.34	1	21.13	15.39	0.01	0.00
Burkina Faso	BFA	1990	0.25	0.17	21.2	14.2	0.6	10.4	-0.16	1	21.87	16.02	0.11	0.00
Bangladesh	BGD	1987	0.25	0.14	16.3	6.1	8.6	5.6	0.68	NA	23.97	18.44	0.04	0.00
Bulgaria	BGR	1996	0.25	0.31	10.2	13.6	282.2	58.7	0.72	1	23.03	15.93	0.25	0.02
Belarus	BLR	1995	1.5	0.43	23.5	7.2	1043.3	46.3	0.77	0	23.41	16.13	0.03	0.04
Bolivia	BOL	1986	4.75	0.23	13.5	17.5	2719.5	19.6	0.15	0	22.19	15.66	0.12	0.00
Bolivia	BOL	1994	0.25	0.30	15.2	12.3	12.0	22.6	0.26	0	22.63	15.85	0.15	0.00
Brazil	BRA	1990	3.5	0.13	19.8	5.1	1133.7	8.7	0.02	0	26.73	18.84	0.02	0.02
Brazil	BRA	1994	0.25	0.25	18.0	7.3	1090.9	7.3	-0.32	0	27.37	18.90	0.07	0.02
Cntr. Afr. Rep.	CAF	1976	0.25	0.26	11.6	NA	NA	25.2	-0.42	1	20.04	14.56	0.05	0.00
Cntr. Afr. Rep.	CAF	1995	3.75	0.12	7.3	NA	8.7	21.5	-0.04	1	20.73	15.02	0.23	0.00
Switzerland	CHE	2008	5.25+	0.08	19.3	-6.2	1.0	50.4	-0.78	0	26.96	15.86	0.27	0.15
Chile	CHL	1976	0.25	0.25	17.3	13.9	NA	20.6	0.06	0	23.32	16.19	0.05	0.01
Chile	CHL	1981	7.25	0.25	11.3	-51.2	NA	19.4	-0.05	0	23.92	16.26	0.11	0.01
China	CHN	1998	0.25	0.23	36.7	4.8	5.2	20.4	0.50	1	27.71	20.95	0.15	0.01
Cote d'Ivoire	CIV	1988	24.5+	0.23	8.9	-7.0	5.3	32.0	0.09	1	23.00	16.28	0.00	0.00
Cameroon	CMR	1987	19.5+	0.20	20.9	-27.7	8.5	16.0	-0.02	1	23.25	16.25	0.02	0.00
Cameroon	CMR	1995	0.25	0.08	14.2	8.4	9.0	23.4	0.32	1	23.00	16.48	0.00	0.00

COUNTRY	CODE	CRISIS YEAR	RECOV	GVCshr	GCFshr	GCFd	INFL	XPSH	UNDVAL	XRFIXED	GDPlog	POPlog	RESRV	CAPSTK
Congo, Rep.	COG	1992	8.5+	0.36	29.5	32.1	0.1	42.8	-0.34	1	21.38	14.76	0.00	0.00
Colombia	COL	1982	3.25	0.10	19.9	0.3	24.6	10.4	0.15	0	24.38	17.18	0.09	0.01
Colombia	COL	1998	1.25	0.12	12.9	-38.7	17.9	18.3	0.00	0	25.18	17.49	0.09	0.02
Cabo Verde	CPV	1993	0.25	0.22	NA	NA	6.5	15.0	-0.35	NA	19.82	12.87	0.10	0.01
Costa Rica	CRI	1987	0.25	0.17	17.9	-4.6	15.3	29.3	0.33	0	22.53	14.89	0.11	0.01
Costa Rica	CRI	1994	0.25	0.13	18.2	-5.4	19.4	37.6	0.07	0	23.18	15.06	0.09	0.01
Czech Republic	CZE	1996	2.5	0.29	30.5	-10.1	9.1	49.8	0.33	1	24.81	16.15	0.17	0.06
Germany	DEU	2008	2.25	0.17	16.4	-14.6	1.7	42.5	-0.56	1	28.82	18.22	0.05	0.13
Djibouti	DJI	1991	16.5+	0.39	19.2	35.7	NA	44.5	0.09	1	19.99	13.35	0.17	0.01
Denmark	DNK	2008	5.25+	0.24	16.9	-25.2	2.0	47.6	-0.85	1	26.46	15.52	0.25	0.14
Dominican	DOM	2003	1.75	0.15	14.9	-2.3	20.1	42.3	0.33	0	23.82	16.04	0.04	0.02
Algeria	DZA	1990	11.5	NA	31.8	-9.2	13.0	29.1	NA	0	24.55	17.11	0.08	NA
Ecuador	ECU	1982	12	0.31	20.7	-15.4	20.9	15.6	0.03	0	23.57	15.96	0.05	0.01
Ecuador	ECU	1998	5.25	0.20	19.6	-30.1	33.2	26.4	0.21	0	23.70	16.32	0.10	0.01
Egypt	EGY	1980	0.25	0.47	29.5	8.2	13.0	33.4	0.47	0	23.88	17.64	0.07	0.00
Eritrea	ERI	1993	0.25	NA	25.1	68.0	NA	28.0	NA	NA	20.09	15.03	NA	NA
Spain	ESP	1977	5	0.12	23.5	-5.5	18.9	14.2	-0.09	0	25.77	17.42	0.09	0.04
Spain	ESP	2008	5.25+	0.19	23.9	-18.3	2.7	23.9	-0.42	1	28.00	17.65	0.02	0.14
Finland	FIN	1991	5	0.20	18.8	-13.6	4.9	26.0	-0.93	0	25.42	15.43	0.05	0.09
France	FRA	2008	5.25+	0.21	18.9	-15.6	1.6	23.4	-0.63	1	28.59	17.99	0.05	0.13
United	GBR	2007	6+	0.19	17.1	-7.5	2.3	29.4	-0.56	0	28.62	17.94	0.02	0.09
Georgia	GEO	1991	21.5+	0.64	23.4	NA	NA	35.7	0.79	0	22.03	15.40	NA	0.01
Ghana	GHA	1982	10.25	0.15	3.7	NA	73.2	5.6	-0.03	0	22.12	16.29	0.07	0.01
Guinea	GIN	1993	3.75	0.16	21.0	-4.1	NA	22.8	0.47	0	21.94	15.83	0.03	0.00
Guinea-Bissau	GNB	1995	0.25	0.04	23.1	NA	45.8	10.5	-0.09	0	19.42	13.97	0.04	0.01
Greece	GRC	2008	5.25+	0.19	18.6	-25.0	3.0	19.3	-0.41	1	26.49	16.23	0.02	0.10
Guyana	GUY	1993	0.25	NA	27.2	NA	NA	105.0	NA	NA	20.11	13.50	0.46	NA
Croatia	HRV	1998	1.25	0.25	20.2	-3.9	4.6	36.5	0.00	0	23.86	15.33	0.13	0.03
Haiti	HTI	1994	18.5+	NA	26.1	123.5	26.3	9.1	NA	0	21.71	15.87	0.07	NA
Hungary	HUN	1991	8.5	0.30	15.5	-20.4	23.8	31.9	0.20	0	24.36	16.15	0.12	0.03
Hungary	HUN	2008	5.25+	0.28	17.9	-29.4	5.1	77.6	0.01	0	25.57	16.12	0.35	0.08
Indonesia	IDN	1997	7.25	0.17	16.8	-39.0	18.1	53.0	1.18	0	25.28	19.13	0.25	0.01
India	IND	1993	0.25	0.17	23.2	16.8	10.2	9.7	0.55	1	26.53	20.66	0.07	0.00

COUNTRY	CODE	CRISIS YEAR	RECOV	GVCshr	GCFshr	GCFd	INFL	XPSH	UNDVAL	XRFIXED	GDPlog	POPlog	RESRV	CAPSTK
Ireland	IRL	2008	5.25+	0.14	15.2	-30.0	2.2	90.2	-0.68	1	26.14	15.33	0.01	0.11
Iceland	ISL	2008	5.25+	0.22	13.9	-51.2	8.1	52.9	-0.48	0	23.22	12.67	0.32	0.15
Israel	ISR	1977	1.25	0.46	27.0	NA	39.1	49.6	-0.07	0	23.33	15.12	0.21	0.03
Italy	ITA	2008	5.25+	0.17	18.9	-16.9	2.0	23.7	-0.51	1	28.38	17.89	0.06	0.15
Jamaica	JAM	1996	9.5	0.28	29.2	NA	22.6	39.1	-0.41	0	22.73	14.75	0.09	0.01
Jordan	JOR	1989	15.5	0.38	30.8	13.4	9.7	59.8	0.13	0	22.15	14.97	0.27	0.01
Japan	JPN	1997	5.5	0.14	26.1	-7.6	0.6	10.8	-0.84	0	28.99	18.66	0.06	0.11
Kazakhstan	KAZ	2008	1.25+	0.12	29.4	2.3	10.3	42.0	0.16	0	25.47	16.59	0.20	0.04
Kenya	KEN	1985	0.25	0.26	21.8	-18.4	11.6	25.8	0.34	1	22.70	16.83	0.06	0.00
Kenya	KEN	1992	14.5	0.12	17.6	15.0	25.0	38.9	0.91	0	22.47	17.07	0.08	0.00
Kyrgyz	KGZ	1995	1.5	0.52	25.2	11.5	31.9	30.7	1.04	0	21.33	15.35	0.08	0.01
Korea, Rep.	KOR	1997	2	0.12	22.9	-30.6	5.5	42.4	0.00	0	26.65	17.65	0.14	0.05
Kuwait	KWT	1982	7.5+	0.17	24.8	NA	6.8	59.1	-0.43	0	23.76	14.27	0.30	0.05
Lebanon	LBN	1990	0.25	0.23	19.3	NA	NA	13.2	0.23	0	22.22	14.83	1.02	0.01
Liberia	LBR	1991	9.75	0.07	NA	NA	NA	NA	0.00	0	19.22	14.52	0.00	0.00
Sri Lanka	LKA	1989	0.25	0.31	22.2	1.6	12.5	30.2	0.83	1	22.81	16.65	0.06	0.01
Lithuania	LTU	1995	0.25	0.36	19.9	12.6	136.7	50.0	0.40	1	22.85	15.10	0.10	0.02
Luxembourg	LUX	2008	5.25+	0.14	16.8	-26.3	2.2	162.0	-0.66	1	24.62	13.12	0.02	0.23
Latvia	LVA	1995	0.5	0.32	17.4	22.2	86.1	46.8	0.31	0	22.44	14.71	0.13	0.02
Latvia	LVA	2008	5.25+	0.26	20.3	-44.8	8.5	43.9	-0.13	0	23.98	14.58	0.27	0.06
Morocco	MAR	1980	2	0.31	26.1	-4.1	10.5	20.2	0.03	0	23.45	16.82	0.03	0.00
Madagascar	MDG	1988	0.25	0.21	13.4	4.8	15.2	18.4	0.59	0	21.64	16.23	0.10	0.00
Mexico	MEX	1981	16.5	0.08	22.9	-24.5	29.8	15.3	0.39	0	25.88	18.11	0.01	0.02
Mexico	MEX	1994	3	0.16	16.9	-21.9	18.0	25.2	0.20	0	26.56	18.37	0.05	0.02
Macedonia,	MKD	1993	7.25	0.27	15.5	-4.1	126.6	38.2	0.12	0	21.94	14.49	0.05	0.01
Mali	MLI	1987	0.25	0.36	21.3	-3.4	NA	16.4	0.02	1	21.39	15.86	0.02	0.00
Mongolia	MNG	2008	1.75	0.28	34.4	-29.8	11.6	50.3	0.52	0	22.25	14.80	0.29	0.03
Mozambique	MOZ	1987	0.25	0.11	21.4	9.9	50.1	8.1	-0.34	NA	21.46	16.41	0.08	0.00
Mauritania	MRT	1984	21.5	0.20	28.2	18.7	NA	59.9	-0.27	0	20.34	14.38	0.09	0.01
Malaysia	MYS	1997	4.75	0.07	26.7	-43.0	3.7	115.7	0.17	0	25.00	16.92	0.36	0.03
Niger	NER	1983	29.5+	0.24	3.1	NA	10.1	22.9	-0.05	1	21.10	15.69	0.06	0.00
Nigeria	NGA	1991	12	0.06	12.8	NA	34.0	37.5	-0.76	0	24.10	18.43	0.04	0.00
Nigeria	NGA	2009	0.25	0.18	17.3	18.3	10.1	25.3	0.04	0	26.63	18.89	0.10	0.00

COUNTRY	CODE	CRISIS YEAR	RECOV	GVCshr	GCFshr	GCFd	INFL	XPSH	UNDVAL	XRFIXED	GDPlog	POPlog	RESRV	CAPSTK
Nicaragua	NIC	1990	7	NA	20.8	15.7	NA	21.8	NA	1	21.12	15.26	0.11	NA
Nicaragua	NIC	2000	0.25	NA	26.8	-12.1	6.5	19.0	NA	0	22.40	15.46	0.07	NA
Netherlands	NLD	2008	5.25+	0.24	18.4	-14.2	1.6	68.6	-0.61	1	27.40	16.62	0.05	0.14
Norway	NOR	1991	0.25	0.17	19.6	-1.2	4.2	37.9	-1.00	0	25.58	15.27	0.10	0.09
Nepal	NPL	1988	0.25	0.26	21.5	NA	11.1	11.1	0.75	0	21.98	16.69	0.08	0.00
Panama	PAN	1988	4.25	0.23	6.2	-27.4	0.5	78.9	0.02	1	22.31	14.71	0.02	0.01
Peru	PER	1983	3	0.24	20.6	-7.1	84.1	19.3	0.34	0	23.71	16.76	0.10	0.01
Philippines	PHL	1983	20.5	0.18	20.3	-37.0	20.4	24.0	0.36	0	24.17	17.78	0.03	0.00
Philippines	PHL	1997	2.75	0.14	23.4	-16.3	7.5	44.8	0.51	0	25.00	18.12	0.15	0.01
Poland	POL	1992	0.25	0.26	14.8	12.8	191.8	21.0	0.31	0	25.27	17.47	0.05	0.03
Portugal	PRT	2008	5.25+	0.21	20.2	-13.3	1.9	28.0	-0.33	1	26.18	16.17	0.07	0.10
Paraguay	PRY	1995	1.5	0.09	22.1	-5.5	15.4	52.7	-0.04	0	23.00	15.41	0.11	0.01
Romania	ROM	1990	12.75	NA	28.0	-12.3	230.6	17.6	NA	0	24.09	16.95	0.05	NA
Russian	RUS	1998	0.25	0.35	14.8	-6.6	74.7	43.2	0.95	0	26.00	18.81	0.06	0.05
Russian	RUS	2008	3	0.28	18.9	-41.0	11.4	27.9	0.29	0	27.83	18.77	0.36	0.05
Senegal	SEN	1988	12.25	0.26	9.3	-20.5	2.7	24.5	0.14	1	22.32	15.80	0.01	0.00
Sierra Leone	SLE	1990	0.25	0.16	10.9	NA	NA	31.2	0.82	NA	20.47	15.22	0.01	0.00
El Salvador	SLV	1989	0.25	0.34	13.9	-15.2	23.6	18.6	-1.14	1	22.29	15.49	0.12	0.00
Slovak	SVK	1998	1.5	0.27	27.8	-16.3	7.8	61.2	0.34	0	24.12	15.50	0.13	0.04
Slovenia	SVN	1992	1.75	0.21	19.3	20.5	32.9	58.8	0.02	0	23.26	14.50	0.06	0.04
Slovenia	SVN	2008	5.25+	0.20	22.4	-33.6	3.0	58.2	-0.33	1	24.62	14.53	0.02	0.09
Sweden	SWE	1991	3	0.24	18.6	-5.9	6.9	28.0	-1.10	0	26.32	15.98	0.09	0.07
Sweden	SWE	2008	2.75	0.24	16.5	-23.4	1.4	48.0	-0.62	0	26.73	16.05	0.12	0.09
Swaziland	SWZ	1995	0.25	0.14	17.0	-9.4	10.4	59.4	0.58	1	21.19	13.80	0.16	0.01
Chad	TCD	1983	0.25	0.86	4.8	NA	20.3	18.0	0.50	1	20.64	15.42	0.05	0.00
Chad	TCD	1992	9.5	0.88	9.8	8.6	-2.6	13.3	0.47	1	21.10	15.69	0.03	0.00
Togo	TGO	1993	2.75	0.13	15.0	87.1	8.2	30.5	0.25	1	20.71	15.25	0.10	0.00
Thailand	THA	1983	0.25	0.26	29.5	5.2	8.4	21.9	0.37	1	24.46	17.75	0.06	0.01
Thailand	THA	1997	5.5	0.21	20.4	-50.9	6.1	58.9	0.42	0	25.44	17.92	0.26	0.03
Tunisia	TUN	1991	0.25	0.17	29.2	19.8	7.1	39.5	0.18	0	23.46	15.95	0.06	0.01
Turkey	TUR	1982	0.25	0.12	16.3	NA	53.5	12.5	0.43	0	24.85	17.67	0.04	0.02
Turkey	TUR	2000	2.75	0.17	15.1	-34.0	68.9	27.4	0.31	0	26.00	17.98	0.10	0.02
Uganda	UGA	1994	2.5	0.21	12.4	42.0	8.5	11.8	0.14	0	22.47	16.85	0.08	0.00

COUNTRY	CODE	CRISIS YEAR	RECOV	GVCshr	GCFshr	GCFd	INFL	XPSH	UNDVAL	XRFIXED	GDPlog	POPlog	RESRV	CAPSTK
Ukraine	UKR	1998	1.5	0.32	17.5	0.1	101.3	53.7	0.95	0	24.18	17.72	0.03	0.03
Ukraine	UKR	2008	5.25+	0.15	17.1	-57.4	15.3	46.4	0.64	1	25.49	17.65	0.23	0.03
Uruguay	URY	1981	10	0.17	19.8	-17.3	45.6	14.3	-0.11	0	22.94	14.90	0.15	0.03
Uruguay	URY	2002	2.75	0.11	15.2	-1.6	9.6	27.4	0.09	0	23.21	15.02	0.17	0.03
United States	USA	1988	0.25	0.12	22.4	3.6	3.6	8.9	-0.43	0	29.36	19.32	0.03	0.09
United States	USA	2007	5.75	0.11	20.8	-7.0	3.2	12.5	-0.35	0	30.32	19.53	0.02	0.14
Venezuela, RB	VEN	1994	12	0.29	18.1	36.5	NA	27.1	-0.10	0	25.04	16.91	0.14	0.02
Vietnam	VNM	1997	0.25	0.17	29.0	12.6	5.4	44.8	0.78	NA	24.03	18.14	0.07	0.00
Yemen, Rep.	YEM	1996	0.25	0.35	24.6	NA	34.6	36.3	-0.35	NA	22.65	16.59	0.18	0.00
Zambia	ZMB	1995	8.25	0.20	12.8	-13.7	96.3	31.3	0.16	0	21.91	16.02	0.07	0.00
Zimbabwe	ZWE	1995	0.25	0.17	18.5	NA	27.2	36.1	0.74	0	22.87	16.29	0.10	0.00