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Banking Crises and Reversals in Financial Reforms

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Abstract

A number of countries have gone through banking crises since the early 1970s. This work links those episodes with the patterns of various financial reforms within those countries. As banking crises are endogenous, crisis exposures to major trading partners help identify the causality between crises and reforms. Consistent with the previous literature, the results of this work demonstrate that systemic banking crises reverse most financial reforms. However, they do so with various lags, whereas the impact of non-systemic crises is largely insignificant. The main results remain unaffected after numerous robustness checks. A rich set of policy implications is discussed which could help establish a growth-enhancing financial regulatory framework after banking crises.

Abstrakt

Řada zemí prošla od počátku sedmdesátých let minulého století bankovními krizemi. Tato práce spojuje tyto epizody se schémata různých finančních reforem v rámci těchto zemí. Protože bankovní krize jsou endogenní, vystavování se velkým obchodním partnerům během krize pomáhá identifikovat kauzalitu mezi krizemi a reformou. Výsledky této práce jsou konzistentní s předchozí literaturou a ukazují, že systémové bankovní krize zvrátí většinu finančních reforem. Děje se tak však se zpožděním různé délky, zatímco dopad nesystémových krizí je do značné míry nevýznamný. Výsledky se nemění po mnoha zkouškách robustnosti. Diskutujeme širokou škálu možných důsledků pro veřejné politiky, které by mohly vytvořit finanční regulační rámec po bankovních krizích, který posiluje růst.

JEL Codes: E58, G01, G18, G21, N20

Keywords: banking crises, financial reforms, crisis exposure

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1 Introduction

Despite the rich history of both systemic and non-systemic banking crises in many countries, and the variety of regulatory responses to them, the economic literature contains relatively little information on the specific *ex-post* financial reform patterns. It is still unclear which reform areas are more likely to be affected than others, how long it typically takes regulators to enact reforms in a given area, is the forcefulness of reforms related to the severity of crises, and whether a banking crisis concurrent with a recession induces faster reforms. To address those questions, economists need to look at many banking crises across a large number of countries over long periods of time. However, to date, the literature is scarce on panel data studies in this line of research.

One notable exception is the work by Abiad and Mody (2005). They study how banking crises affect the overall pattern of financial reforms across countries by using an ordered logit model. Implicitly, however, their model assumes banking crises are random events, which is arguably not the case. Banking crises are most likely determined endogenously and three channels for their incidence seem evident. First, Barth, Caprio, and Levine (2008), among others, conclude that banking system performance, hence its fragility, may be affected by banking regulations but leave empirical work in this direction for the future.¹ Demirgüç-Kunt and Detragiache (1998) also find that financial liberalization may positively influence the likelihood of a banking crisis, especially in countries with weaker banking supervision and judicial institutions.

Second, it has been shown that banking crises in a given country i can

¹In fact, Barth, Caprio, and Levine (2004) have already done some of this work on a cross-section of countries by using the data they collected in Barth, Caprio, and Levine (2001).

occur through numerous endogenous channels on both the assets and the liabilities sides of the bank balance sheet. Crises occurring on both sides have been studied by Allen and Gale (1998, 2000). In their earlier paper, an economic downturn in the real sector reduces the returns on bank assets. As a result, depositors put pressure on the banking sector by liquidating bank liabilities. A related mechanism of contagion is emerging from within the banking sector and is suggested by Allen and Gale (2000). In it, banks in region i liquidate claims on banks in region j when there is an excess demand for liquidity in region i . However, the liquidity may not be readily available in region j , which in turn causes banks in region j to contribute to the excess demand for liquidity, which drives contagion.

Third, the empirical literature adds cross-country trade and financial flows as contagion mechanisms. Bae, Karolyi, and Stulz (2003) present evidence of how regional interest rates, exchange rates and stock return volatility could affect cross-country contagion. Balakrishnan, Danninger, Elekdag, and Tytell (2011) also suggest that deeper financial links are a key factor for the increased financial distress running from developed to developing economies, a finding that is contrary to Rose and Spiegel (2009) to some extent. Rose and Spiegel (2009) use trade and financial exposures to the US alone to analyze crisis incidence elsewhere in a cross-section of 85 countries. Trade linkages are examined as an additional factor that may drive contagion in Eichengreen, Rose, and Wyplosz (1996) and in Gorodnichenko, Mendoza, and Tesar (2012). The work by Gorodnichenko et al. (2012) is one example of how trade linkages between the former Soviet Union and Finland caused the Finnish output collapse in the early 1990s which was followed by a banking crisis. At the same time, their trade relations had little to do with how financial reforms were shaped in Finland, apart from the indirect influence

running through the Finnish output collapse.

The notion that trade dependence might coexist with financial regulatory independence allows this paper to construct a novel instrumental variable which deals with the endogeneity problem of financial reforms and banking crises: a country's *crisis exposure*. The crisis exposure varies across countries and over time for each country, and reveals how a banking crisis in a given trading partner j could affect the likelihood of a banking crisis in a given economy i , without affecting i 's financial regulatory path directly. Thus, the paper identifies at least some part of the exogenous impact of banking crises on financial reforms and addresses one of the long-standing issues in the empirical literature of financial reforms: the implicit assumption of randomly occurring crises. This is the first contribution of this work.

Its second contribution is to acknowledge and incorporate the inherent dynamics of the financial regulatory process into an empirical study of how regulatory reforms depend on banking crises. The intuition supporting the inclusion of the reform dynamics is simple. First, if a country's financial system has not been liberalized at all, this may indicate high resistance to reform or a strong *status quo* bias, as in Abiad and Mody (2005). Thus, previous low levels of financial liberalization may also predict low levels in the current period. At the same time, however, high levels of financial liberalization in the past may mean that there is not much left to reform, even if the incumbent government is reform-oriented. Hence, at high levels of financial liberalization we may see slow reforms as well. This is by all means a path-dependent non-linear relationship which calls for inclusion of both linear and quadratic terms of lagged levels of reforms in any empirical model of reform dependence on banking crises.

The availability of data on systemic and non-systemic banking crises mo-

tivates this work to distinguish between the impact of these two types of crises on ex-post financial reforms. Thus, it is interesting to consider whether the impact of systemic crises on reforms is different from the impact of non-systemic ones. This distinction has been also largely ignored by the available literature.

However, post-crisis financial reforms may occur and may also be delayed for reasons other than banking crises and reform dynamics. Past recessions and exchange rate crises may well interfere with policy decisions on reforming the financial sector and should be included in a study of financial reforms. Also, once countries become more open and gain from trade, they might be more likely to open up to financial liberalization as well, as in Rajan and Zingales (2003). In addition, Abiad and Mody (2005) note that the *status quo* bias against financial reforms may significantly constrain financial liberalization. The *status quo* bias itself may change at various stages of the business cycle, which would surface as a higher likelihood of opening up or re-regulating some parts of the financial system at various stages of the cycle. Further, even if all other factors are identical across countries, a cross-country and time variation of the characteristics of the political system may play a role in how financial reforms evolve over time. Financial reforms would depend on the political orientation of the incumbent government and of the chief executive, on whether the government holds a majority in both chambers of parliament and reforms are undertaken in the first year of its mandate which might make reforms somewhat easier during the “honeymoon” stage with its constituency, as noted by Abiad and Mody (2005).

There are also potential differences in regulatory responses to banking crises due to legal origin or geography, which might prove important in determining how fast the country reacts with a given measure to a crisis, if it

reacts at all. Morck and Yeung (2009) also bring up legal origin, early land distribution, language, religion and culture as other possible fixed effects on a regulatory reform.

Finally, major events in a group of countries in a given period such as the economic transformation in Central and Eastern Europe in the early 1990s, the banking crises in Latin America, Asia and Eastern Europe in the late 1990s, and the current fiscal crisis in the Eurozone, may shape financial reforms as well.² Those regional events need to be taken into account in a study of any financial reform.

Based on the intuition above, the next section presents an empirical model to study financial reforms in a dynamic empirical framework with endogenously determined banking crises. The data and the core results are presented next. Since some econometric concerns may arise over how the dynamic model was constructed, necessary robustness checks are presented after the discussion of the results. Those robustness checks validate the major results and allow for intuitive policy recommendations and conclusions. The conclusions point to specific ways governments could change the way they react to financial crises, if faster economic recovery in the aftermath of crises is on their political agenda.

²For example, the privatization in the banking sector in the Czech Republic, Slovakia, Poland and Hungary in the 1990s shaped the financial flows both within and across those countries. See Kočenda, Hanousek, and Ondko (2007) for details.

2 Methodology

2.1 Baseline Model

To address the impact of a financial crisis on the ex-post financial reforms, I estimate the following model in differences:

$$R_{mit} = \beta_1 R_{mit-1} + \beta_2 R_{mit-1}^2 + \sum_{s=0}^2 \beta_s SBC_{it-s} + \sum_{n=0}^2 \beta_n NBC_{it-n} + \mathbf{Z}'_{it-1} \beta + f_i + f_r f_t + \varepsilon_{it}, \quad (1)$$

where R_{mit} is the regulatory measure m in country i in period t changing after a systemic banking crisis (SBC) or a non-systemic banking crisis (NBC) occurs in the same country in the current or previous two periods, and Z'_{it} is a vector of other controls. The measure R_{mit} is an index reflecting how the overall pattern of financial reforms or any of the other financial reforms monitored by Abiad, Detragiache, and Tressel (2010), changes over time. An increase in the reform index means a more liberalized financial system, with the exception of banking supervision reform, where stricter supervisory powers are associated with an increase in the index. The other controls include: a) lagged GDP and exchange rate dynamics; b) openness of the economy measured by the share of foreign trade in GDP; c) the liberalization gap: the difference between the highest level of the reform within the same region in year t and the country's level of reform in the manner of Abiad and Mody (2005), as well as an interaction of the liberalization gap with the GDP and the exchange rate dynamics; and d) political system variables. Those political indicator variables are taken from the Database of Political Institutions 2010 prepared by Beck, Clarke, Groff, Keefer, and Walsh (2001)³ and have already been explored to study the impact of ideology on financial

³The most recent update of the Beck et al. (2001) database was in December, 2010.

reforms by Abiad and Mody (2005). Country fixed effects, and region-time fixed effects complete the dynamic panel data model of financial reforms. It models how the country-specific occurrences of banking crises affect the changes in regulatory policies. Table 1 presents the results from estimating equation (1) by fixed effect panel data OLS with clustered standard errors to correct for heteroskedasticity.

However, despite correcting for heteroskedasticity, two additional issues in the model may bias the results and possibly even produce inconsistent estimates. The first issue is the endogeneity of crises. The second is the serial correlation in the presence of regulatory dynamics. The first issue is addressed by using an instrumental variable (IV) approach, combined with the above fixed effects panel data estimations. The second issue is addressed by using a difference GMM model in the spirit of Arellano and Bond (1991),⁴ which leads to consistent estimates even in the presence of serial correlation (Cameron & Trivedi, 2005, p.764-765).

2.2 Instrumental Variable Estimation

If a financial crisis is modeled as a purely random event occurring as a self-fulfilling prophecy, then the panel OLS approach to estimate the effect of a crisis would suffice for unbiased and consistent estimation. However, for reasons detailed above, a crisis is determined endogenously. Acknowledging the plethora of ways in which banking crises can spread across countries and over time, this work considers trade linkages to be a viable propagation mechanism of financial distress, as in Gorodnichenko et al. (2012). A crisis in country i will be more likely if it trades with country j , which happens to be in a crisis. If country j is in a crisis, it will likely demand less imports

⁴Thanks to Evangelia Vourvachaki of CERGE-EI for suggesting the GMM estimation.

from country i . This will reduce exports from country i , which may induce a recession in an open economy and shrink assets in its banking sector, which in turn raises the likelihood of an asset crisis, with a certain lag. A crisis in country i will be all the more likely if more than one trading partner experiences an episode of financial distress at the same time, or if its export share to a country in crisis is large, or both. Based on this premise, I construct a *crisis exposure* variable for each country and year. In its simplest form, the crisis exposure is an export-weighted crisis occurrence in country i 's trading partners at time t :

$$CrExp_{it} = \sum_j C_{jt} S_{ijt} \in [0; 1], \quad (2)$$

where $CrExp_{it}$ is the crisis exposure of country i in period t , C_{jt} is a dummy equal to 1 if a banking crisis occurs in country j in period t , and S_{ijt} is the share of i 's exports to j in period t . Since C_{jt} is either 0 or 1, and $\sum_j S_{ijt} = 1$, then the crisis exposure varies between 0 and 1.

Depending on the type of crisis occurring in country j , two instrumental variables can come from the crisis exposure variable simultaneously – a systemic banking crisis exposure, and a non-systemic banking crisis exposure. It is also important to note that a non-systemic crisis in a large trading partner may bring a disproportionately large effect in a small open economy. Therefore, both are used as instruments for the *SBC* and *NBC* in country i in the first stage of the 2SLS estimations. The results from those estimations, as well as the Sargan test of overidentification restrictions, are presented in Table 2.

2.3 Correcting for Serial Correlation

Standard panel data literature suggests that if the data contains a large time dimension, then fixed effects estimation may render consistent results even

in a dynamic panel (Cameron & Trivedi, 2005, p.764). However, in some cases the linked data on banking crises and financial reforms contains just a few years of data. In fact, the maximum number of years in my sample is just below 30, which cannot be considered a large number. Therefore, the way to consistently estimate the parameters of interest in the presence of dynamics is to use a difference GMM method (Arellano & Bond, 1991). In this method, the differences between the explanatory variables are instrumented with lagged levels of themselves. Roodman (2009) provides detailed assistance on how to apply the method and discusses its numerous advantages. The results from estimating equation (1) by a one-step difference GMM with robust standard errors to both heteroskedasticity and serial correlation, in which the crisis exposures are treated as strictly exogenous, are presented in Table 3.

Table 3 also presents results from the Sargan and Hansen tests of the overrideidentification restrictions. As Baum, Schaffer, and Stillman (2003) note, the Sargan statistic is not valid for an IV regression in the presence of conditional heteroskedasticity. Therefore, a significant difference between the Sargan test and the heteroskedasticity-robust Hansen test could be expected, and is indeed evident in the results presented in Table 3. However, even the robust Hansen test is prone to weaknesses in the presence of many instruments. Hence, a robustness check on the GMM method is required, which reduces the number of instruments significantly. A number of robustness checks on the GMM method are discussed after the main results of this work are presented.

3 Data

The data used here to feed the models above are a combination of four data sets. The first one is a data set constructed by Caprio and Klingebiel (2003). It features the timing of 117 episodes of systemic banking crises in 93 countries since the early 1970s and of 51 borderline systemic and non-systemic crises, thereby enabling this work to qualify which crises lead to the variety of financial reforms studied here. The Caprio and Klingebiel (2003) data have already been used in empirical work. Detragiache and Ho (2010) examine the fiscal responses to systemic banking crises. Further, Abiad and Mody (2005) study the impact of crises, among other factors, on the overall pattern of financial reforms.

The Caprio and Klingebiel (2003) data is supplemented by the newer Reinhart and Rogoff (2008) work, which dates further episodes of banking crises after 2002. In addition, the Reinhart and Rogoff data set eliminates some of the dating ambiguities in the former data set, especially the ones related to the end of some of the crises, and thus represents an important addition to it. The additional controls are taken from the Penn World Table 7.0.⁵ and from the Database of Political Institutions, 2010.

The third data set was assembled by Abiad et al. (2010). It has monitored seven financial reforms annually since 1973 across 91 countries. The reforms include imposition of credit controls, interest rate controls, entry barriers, restrictions on private ownership and banking privatization, securities and banking supervision regulations, and capital account restrictions. Each particular financial reform is coded into a discrete index $i \in [0; 3]$.⁶ In addition,

⁵See Heston, Summers, and Aten (2011). For a robustness check, I also use the data from the World Development Indicators, and the results are roughly consistent with the ones obtained using the PWT7.0.

⁶For each of the 7 policy reforms, Abiad et al. code the current situation as 0 if the policy is most restrictive, and 3 if the policy is most liberalized. I normalize these indices

Abiad et al. construct an overall index of financial reforms for each country and year, being equivalent to the sum of indices of each particular reform, and normalize it to 1. In each set of regressions – fixed effects, 2SLS, and difference GMM – I take the change in each of the normalized reforms as the main dependent variable.

The fourth data set consists of the systemic and the non-systemic crises exposures for each country. To construct this data, I use the Caprio and Klingebiel (2003) crises data and interact each crisis episode in country j in year t with the shares of exports from country i to country j in year t . If there is no crisis in any country j in a given year, then the crisis exposure in country i is 0. If there is a crisis in country j , then the crisis exposure is the share of exports of i going to country j . A crisis exposure for country i increases with the number of trading partners in crisis, and with the share of exports to a given partner in crisis. To construct a panel of bilateral export shares, I need a longitudinal bilateral trade data. Such data are available for 1970-2000 in Feenstra, Lipsey, Deng, Ma, and Mo (2005).⁷ An alternative source of bilateral trade data for 1948-2000 is Gleditsch (2002). Despite having a longer time coverage, the Gleditsch (2002) data has an identical matchable span to the Feenstra et al. data. Therefore, I use the Feenstra et al. data only. Finally, I drop countries with less than 10 time observations, capturing at least two electoral cycles. Thus, the final sample of banking crises and financial reforms, including the crisis exposures, consists of 76 countries.

to 1.

⁷Thanks to Seema Sangita of the GDN for suggesting the Feenstra et al. (2005) data.

4 Results

Table 1 reveals several policy response patterns to financial crises, taken from the experience of more than 70 countries, spanning roughly 30 years. Column (1) demonstrates the effect of banking crises on the overall pattern of financial reforms. The expected significant non-linearities in the reform dynamics are indeed present, indicated by a negative and significant coefficient on $Reform_{t-1}^2$. The sign also contributes evidence to an inverted U-shape of overall reform dynamics, which was found to be significant by Abiad and Mody (2005). This means countries that reversed their financial liberalization are less likely to reform and that those who reformed most in the previous period are also less likely to undertake further reforms.

The overall response pattern is affected by the crisis severity as well. Whereas non-systemic banking crises do not exert significant influence on the overall financial reforms, systemic banking crises reverse reforms, although with a certain lag. Given the complexity of changing financial regulations, and the likelihood of a strong lobbying process affecting the financial regulatory process, it is well within expectations that financial reforms will be delayed after systemic banking crises. An example of an overall lag is the adoption of the Dodd-Frank act, which was passed about two years after the collapse of Lehman Brothers in 2008 and introduced a swathe of new financial regulations in the entire U.S. financial industry.⁸

Similar to the overall reform patterns, credit controls are one of the areas of financial regulation in which an inverted U-shape of regulatory dynamics is observed. This is evident in column (2) of Table 1. Higher government intervention in the allocation of credit, indicated by higher required reserves and more directed credit to given industries, is also evident after systemic

⁸See Krainer (2012) for a broad review of the Dodd-Frank Act.

banking crises. However, both interest rate controls and entry barriers in the financial industry seem unaffected by either systemic or non-systemic banking crises, by recessions, by regulatory dynamics or by a reform learning effect. This is evident in columns (3) and (4) of Table 1. There, most of the parameter estimates are insignificant. The one notable exception is the significantly higher government intervention related to setting the market interest rates after an exchange rate appreciation. Intuitively, if exchange rate appreciation constrains local production by making it more expensive internationally, then intervening in the credit market by lowering deposit or lending rates would help restore competitiveness. It should be noted, though, that the effect is significant only at the 10% level, and disappears in the difference GMM estimations presented in Table 3. Table 3 also shows that both interest rate controls and entry barriers experience significant regulatory dynamics. It was not evident from previous estimations that this process takes place. The implications are that even a minor liberalization of interest rate controls is likely to lead to more liberalization in the future, and a minor relaxation of bank entry policies is likely to lead to further liberalization. However, it should also be noted that the reverse is also true: Tightening government control over entry and interest rates is also more likely to lead to increased intervention in the future.

The results in column (4) of Table 3 also demonstrate that systemic banking crises lead to tightening of the entry regulations in the banking industry. However, the more stringent entry policies are implemented with a sizable time lag, and the effect is significant only at the 10% level. On the one hand, this reform is rational. Limiting the number of participants in the sector, especially in combination with improved supervision on the incumbent banks, which is also evident in column (5), may impose higher costs on future

risk taking, thereby reducing the probability of future crises, as implied by Thakor (2012). On the other hand, abundant theory and evidence suggests that limiting entry into the banking sector is also associated with higher loan interest rates and lower deposit rates, which hampers investment.⁹ Therefore, there is an apparent trade-off between a possible prevention of future crises and a reduction of welfare and growth. The reform direction is ultimately determined by the local political economy.

It may be the case that banking supervision was improved in both Europe and the US after the latest financial crisis. The results in column (5) of both Table 1 and Table 2 reveal, however, that banking crises between the early 1970s and early 2000s did little to improve banking supervision. When the full set of available instruments for a financial crisis and for regulatory dynamics is taken into account in Table 3, systemic banking crises clearly bring more government-, and other independent regulatory intervention in the financial sector supervision. Still, the effect is significant only at the 10% level. This extended role of the regulators may include but is not limited to adoption of Basel capital requirement rules, establishing a financial regulatory body which is independent from the incumbent government or chief executive, and a more comprehensive supervisory coverage, including a more pronounced role of macroprudential supervision, which is increasingly necessary in the aftermath of the Great Recession.

After systemic crises, governments intervene in the financial sector through another important tool: ownership. Column (6) in all three tables demonstrates that the state increases its ownership in the banking sector immedi-

⁹For a theory argument, see Besanko and Thakor (1992). Evidence for both deposit and loan interest rates is available for Turkey (Denizer, 1997), Portugal (de Pinho, 2000), Philippines (Unite & Sullivan, 2003), China (Fu & Heffernan, 2009), Kyrgyzstan (Brown, Maurer, Pak, & Tynaev, 2009), the European Union (Corvoisier & Gropp, 2002), and for a wide cross-section of countries (Demirgüç-Kunt, Laeven, & Levine, 2004).

ately after or even during the crisis itself. This is hardly surprising given the ubiquitous bail-outs during a systemic crisis. Demirgüç-Kunt and Servén (2010, p.98) describe this trend as a “very common [way] of dealing with systemic banking crises” and discuss some pros and (more extensively) cons of increased government ownership in the banking sector. Unlike systemic banking crises, however, the results here suggest that non-systemic crises rarely induce governments to step in to prevent bank failure.

Governments also introduce more restrictions on capital inflows and outflows after systemic banking crises. The significant estimates in column (7) of all three tables on SBC_{t-s} show that systemic crises induce governments to impose stronger capital restrictions. Those might involve introducing a special exchange rate regime, e.g. a currency board, limiting the amount of claims that foreign banks can have on local ones, or enacting restrictions on capital outflows. The results in Table 3 also suggest that governments impose capital flows restrictions with a significant time lag.

This lag implies that capital controls may be adopted for all the wrong reasons: rather than containing a looming exchange rate crisis and limiting the risk of a subsequent banking crisis, capital controls are sometimes imposed long after the peak of the crisis. This implementation lag may limit the effectiveness of the policy and more importantly, may limit capital inflows exactly when they are needed most. Demirgüç-Kunt and Servén (2010) provide an excellent review of the drawbacks of using extensive capital account restrictions to deter a crisis.

The last dimension of financial reforms that can be analyzed with the Abiad et al. (2010) data is the securities markets policies, regulations and governing institutions. Those policies and regulations demonstrate the willingness of the incumbent government or chief executive to actively support

the development of securities markets within a given country. An example of such government support could be establishing a bonds market with various maturities on it, setting up a Securities and Exchange Supervisory body, enacting bonds-, stocks- and derivatives trade laws, and allowing foreign entry into the securities markets. The results in columns (8) demonstrate that, as with most financial policies, securities markets policies experience reform reversals after systemic crises. Those reversals may stall the development of a securities market or introduce more limitations on foreign participation in the stock market. However, on the normative side, this is hardly the way governments and politicians would spur growth when it is needed most.

It has been shown that systemic banking crises significantly influence financial regulations, and do so more strongly than non-systemic crises. In addition, this study has found an inherent financial regulatory dynamic adjustment process, in which the degree of current reforms is affected by how much was reformed in the immediate past, with the majority of the reforms exhibiting an inverted U-shape. This regulatory dynamic process implies that countries are gradually moving towards two plausible regulatory equilibria: a fully liberalized financial system or a fully repressed financial system, with neither system consisting of zero or of an infinite burden of financial regulations. Naturally, other factors also play a significant role in establishing the new financial regulatory realm after banking crises. Their impact can be seen in all tables. However, given the econometric advantages of estimating equation (1) by a difference GMM, only the results in Table 3 are reviewed below.

One of the additional factors affecting financial reforms after banking crises is the business cycle. When the economy is in a recession, governments respond to it by implementing financial liberalization reforms. This overall

pattern is indicated in Column (1) of Table 3, and is intuitive if governments are assumed to be rationally targeting financial development and growth. At a deeper level, three particular reform areas are affected most by a recession. They include liberalization of credit controls, improving banking supervision and reducing the ownership control over the banking sector.

First, a rational government would reduce credit controls in a recession by limiting the direct allocation of resources to favored sectors, and the monetary authorities would reduce the required reserves in the banking system to support credit activity. Second, improving banking supervision after recessions also makes sense – it could limit the riskier banking activities that likely caused the recession in the first place. Third, governments often reduce their ownership in the banking sector after a recession which may happen for two reasons. On the one hand, a recession makes losses in the banking sector more likely. If the government anticipates the losses, then it is rational to reduce its ownership in the sector for sure cash now instead of waiting for lackluster dividend prospects to materialize. On the other hand, privatizing some part of the banking system can spark competition in the sector, which can drive down interest rates and catalyze private activity.

Apart from the GDP dynamics, regional competition for capital inflows and policy learning also play a role in shaping financial reforms. This competition and policy learning effects, which Abiad and Mody (2005) introduced into the financial reforms literature, is evident from three variables: the liberalization gap, and the interaction of the gap with the GDP and the exchange rate dynamics. The higher the gap between the regional reform leaders and a given country, the more the country is lagging behind the regional leaders in financial reforms. Therefore, closing the gap also positions the country more favorably for attracting foreign investment. Based on the evidence in

Abiad and Mody (2005, p.80), one would expect the gap to be significant in shaping overall reform patterns, as well as many specific financial reforms. However, interestingly, the results in Table 3 demonstrate that reducing the liberalization gap does not play a significant role in shaping overall reform patterns.¹⁰ Zooming in on particular reforms, the reform gap affects only two of them: credit controls, and securities market policies and regulations. In those two reforms, reducing the gap increases the likelihood of pursuing further financial liberalization. This learning effect is significant at the 5% level for credit controls, and at 1% level for the securities policies.

In the reform of credit controls and in the reform of securities markets, the gap also plays a different role at various stages of the business cycle. Countries closer to the regional reform leaders in terms of financial liberalization tend to shed their credit controls more in recessions, and pursue more favorable policies to develop the securities markets than countries lagging behind with liberalization. This is indicated by the positive and significant parameter estimates on the interaction term between the liberalization gap and the GDP dynamics. The positive estimates imply that governments do learn to pursue growth-enhancing policies in recessions, particularly related to developing their financial markets and to enhancing competition in the real sector by reducing direct allocation of resources to favored industries. In times of economic growth, however, rather than pursuing further liberalization, governments closer to the reform frontier seem to extend favors for some industries more than the lagging countries do. This is perhaps only natural, since governments are also expected to have higher revenues in the

¹⁰In fact, in one of the robustness checks presented below on the overall reform pattern, the reform gap becomes significant at the 5% level when the political factors are taken into account. However, the gap has the unexpected positive sign which demonstrates that, rather than building up a reform momentum, closing in on the regional leaders reduces the overall reform drive.

good times. Hence, they have a stronger ability to allocate resources to particular industries during the growth phase. In recessions, they switch back to horizontal measures to support competition within and across industries which puts less pressure on the government finances.

In addition, an exchange rate appreciation would encourage countries closer to the regional reform leaders to pursue a more extensive capital account liberalization than the backward countries. This is seen from the positive and significant sign on $Gap * XR_{t-1}$, where reducing the gap is seen as closing in on the regional reform leaders, whereas reducing the XR is actually an exchange rate appreciation. To interpret this finding, we need to consider a dynamic trade-off between long-term benefits and short-term costs for the local economy. On the one hand, an exchange rate appreciation lowers the international competitiveness of the domestic firms in the short run and creates an incentive for the central bank to sterilize the appreciation or for the government to impose capital inflow restrictions. On the other hand, attracting new foreign capital and encouraging greenfield investment could boost potential GDP more than slowing an exchange rate appreciation.

Further research would determine whether that is indeed the proper trade-off to consider in the context of capital control liberalization. Further research is also needed to find out some of the reasons the liberalization gap is insignificant for other financial reforms. Additional research is also needed to inform why systemic banking crises affect different financial reforms with a different lag, and why interest rate controls do not depend on systemic crises, although it is quite intuitive to expect a more pronounced government intervention to direct pricing in the deposits and lending markets.¹¹

¹¹In fact, when the political factors are taken into account in one of the robustness checks, systemic banking crises become significant at the 10% level, while non-systemic crises retain their insignificance.

5 Robustness of the GMM results

Although the GMM estimations in this work deliver new insights into the policy making process after banking crises, they also require implicit assumptions when employing any given version of the GMM method.¹² Therefore, it would be useful to know if the GMM estimations hold when some of the main traits of the model here are altered. The baseline specification of the model included a one-step robust difference GMM with a full set of instruments in which the crisis exposures are treated as strictly exogenous. The robustness checks are done along the following lines: 1) a *two-step* robust difference GMM with full set of instruments; 2) a two-step robust *system* GMM with full set of instruments; 3) a one-step robust difference GMM with a *collapsed* set of instruments; and 4) a one-step robust difference GMM with a collapsed set of instruments in which the crisis exposures are treated as possibly *endogenous* rather than strictly exogenous.

The first robustness check is driven by the expected increase in efficiency that a two-step estimation creates, at least in theory. If indeed the two-step estimation is more efficient, then the significance of the baseline results here is not artificially inflated. Alternatively, if the two-step GMM estimations are less significant than the one-step estimations, then the reason is perhaps the existence of a small sample bias of the two-step GMM discussed in Cameron and Trivedi (2005, p.177). The second robustness check is needed to see if there is an additional gain from using the system GMM rather than the original Arellano-Bond type regression. The third robustness check is needed because both the difference and the system GMM create many instruments and could deliver Sargan/Hansen P-values that are suspiciously high. Thus,

¹²Roodman (2009) is a useful source on both the strengths and the pitfalls of the GMM method.

limiting the number of instruments may also increase the information value of the validity tests. Finally, endogenizing the crisis exposures is intuitive. If a banking crisis in a given economy influences the risk of a crisis in another economy, then that risk would feed back into the first economy, especially given a large trade and financial exposure between the two. If that is indeed the case, then the crisis exposures can no longer be treated as strictly exogenous. Therefore, I endogenize them in the last robustness check on the GMM method.

The results from the first and second robustness checks yield lower significance of the parameter estimates. This refers back to the possible small sample bias of the two-step GMM. A sample of approximately 1600 observations is not particularly small per se. However, the number of clusters is only 76, which cannot be considered a large number. Therefore, a small sample bias may well be among the reasons for the lower significance of crises for financial reforms.

The third robustness check confirms the magnitude and the significance of the baseline results. In this robustness check, the number of instruments is collapsed to about 300 from about 1400, with minor variations in the number of instruments across models. Collapsing the number of instruments is expected to weaken the robust Hansen overidentification test from the current level of 1.000 for all estimations. However, the Hansen p-value remains unchanged in all cases, which suggests that the instruments remain valid. Further, the still implausibly high Hansen p-value calls for further reducing the number of instruments by removing some of the lags. I continue to collapse the number of instruments but further limit the number of lags to 4 to accommodate most electoral cycles. This leads to a Hansen p-value of 0.387 for the overall reform model, and to similar p-values for the other reforms,

with the number of instruments down to 61, which is less than the number of clusters. At the same time, the magnitude and the significance of the results remain almost exactly the same. Thus, the main results remain robust to drastically reducing the number of instruments, while the Hansen J-test acquires plausible values and increases the credibility of the results.

The final robustness check is to endogenize the crisis exposure variables. This corroborates the main results. Specifically, the reform dynamics play an identical role as before, and banking crises exert a very similar influence on the reform process, with some of the reforms affected more by the crises than the main results suggest. This final robustness check of the GMM method supports the conclusion that the main results are rather conservative and that banking crises may exert an even stronger role on various financial reforms than previously thought.

For completeness, in one of the robustness checks I also include the political orientation of the incumbent government and of the chief executive, political system dummies, and whether the government holds a majority in both chambers of parliament and if it is in office during the first year of its mandate. Those political system variables are taken from the Database of Political Institutions created by Beck et al. (2001). The results remained almost identical, and some of the main variables gained significance, while most of the political variables were found insignificant, consistent with the results obtained by Abiad and Mody (2005). As a result, the most important messages of this work still stand.

6 Conclusion

This paper links a rich history of systemic and non-systemic crises to the patterns of financial regulatory reforms in seven areas: credit controls, inter-

est rate controls, entry barriers, banking supervision, state ownership in the banking sector, capital controls and securities markets policies. This work also analyzes how banking crises affect the overall reform pattern. To arrive at arguably efficient and consistent estimates, fixed effects panel data techniques, instrumental variable and GMM estimations are used. By constructing a crisis exposure for each country and year, this work adopts a more realistic transmission mechanism of crises across countries, which is at the heart of identification of the causal effect of banking crises on financial reforms. Thus, this work analyzes financial reforms in a dynamic empirical framework with endogenous financial crises, which is its core methodological contribution to the existing literature.

The results demonstrate that systemic banking crises reverse the overall pattern of financial reforms. They also reverse most of the other particular financial reforms, although with a varying reaction lag. In addition, systemic banking crises improve banking supervision, which is perhaps a natural policy reaction to a crisis occurring in the banking sector. Non-systemic banking crises, however, exert a much weaker influence on financial policies and regulations. Whenever some evidence of a policy reaction emerges, it is only marginally significant.

Whereas financial crises reverse reforms, recessions tend to induce financial liberalizations. After recessions, governments reduce their direct allocation of resources to particular industries, and reduce their ownership in the banking sector. A recession also makes banking supervision less independent from the incumbent government. Recessions also exert a more positive impact on financial liberalization of countries which are closer to the regional reform leaders. This is especially valid for credit controls and for securities markets policies and reforms.

Exchange rate movements rarely play a significant role in shaping financial reforms, except for capital controls. Further, in times of exchange rate appreciation, the countries which are closer to the regional reform leaders reduce their capital controls relatively more than the backward countries.

Finally, the results here suggest financial reforms tend to move to one of two states: a fully liberalized financial system or a fully repressed financial system. This is indicated by the inverted U-shape of the regulatory dynamics in the financial system, and remains robust to various tweaks in the GMM method. The other core results also remain robust to numerous robustness checks.

Naturally, this study has its limitations. Particularly, considering only seven areas of financial regulation and supervision in a myriad of proposed policy measures within each country is a low level of specificity. The paper also cannot say if financial reforms are moving towards a given regulatory optimum after crises. Perhaps this optimum is different across countries and is neither zero nor infinite regulation, and would ultimately be determined by the within-country political economy of growth and financial sector policies. However, until better panel data sets are available to measure reforms and crisis exposures at a deeper level, this is as far as this research can go. Therefore, this work identifies regulatory policy patterns rather than formulating precise regulatory measures to deal with the consequences of a banking crisis. Despite the lack of specific prescriptions, the analysis here is able to deliver intuitive policy implications. The paper concludes with them.

7 Policy Implications

A rich set of intuitive policy implications emerges from this work. First, governments should not rush to reverse the overall pattern of financial lib-

eralization after crises as they seem to be doing. This is so, because it has long been established that financial reforms lead to financial development and financial development leads to growth.¹³ If growth is the rational target after crises, then reversing the overall reform pattern, which this work shows is the norm, would certainly not lead to a quicker recovery.

Second, governments impose more controls on credit activity after crises. Specifically, they allocate favors to particular industries, which can reduce competition in those industries and may also reduce efficiency of the incumbent firms. Governments should reduce favors after crises in order to spur competition both within the private sector, and between the state-owned firms and the private sector, which is another channel for creating growth after crises.

Third, crises impose more entry barriers to the banking industry. However, more competition in the banking industry could reduce interest rates and spur private investment. Therefore, governments should reduce entry barriers in the industry.

Fourth, systemic crises induce more state ownership in the banking sector. This is perhaps natural given the importance of not letting systemically important financial institutions fail. However, in the more recent environment of aversion to fiscal expansion, other mechanisms to save or dismantle those institutions might be more plausible and efficient than making future generations pay for the rescue. An example, which perhaps needs refinement, is the orderly liquidation provisions in the Dodd-Frank Act. Further, once it is an active owner in the banking sector, the government should refrain from staying there too long and should privatize healthy banks.

Fifth, systemic crises lead to more capital inflow and outflow controls.

¹³See Levine (2005) for an extensive review of the argument.

This may be an efficient way to stem a looming crisis, but the evidence in this work points to the fact that more often than not governments implement capital account restrictions as a reaction to a crisis, rather than as means to prevent it. This might limit the usefulness of imposing the temporary capital controls in the first place, and may also raise the country risk premiums for long after the crisis is contained. To restore growth after a crisis, governments should refrain from the longer term usage of both inward and outward capital controls.

Sixth, crises slow the creation and development of securities markets. If the banking system in a country has no alternative as a channel between savings and investment, but it has recently undergone a major crisis, then slowing the securities market development is hardly the most efficient policy response to a crisis.

Seventh, if a recession occurs, the countries closer to the regional reform leaders create a growth-enhancing financial regulatory framework faster. If growth is on the policy agenda of the laggards in financial liberalization, they should also target adoption of a competitive regulatory framework to spur financial development.

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Table 1: Crises and Financial Reforms: Panel OLS Estimations

	Overall	CrC	IRC	EB	BS	Pr	CaC	SM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Reform_{t-1}$	.115 (.227)	-.006 (.067)	-.083 (.114)	-.053 (.077)	-.133*** (.042)	-.047 (.063)	.027 (.100)	-.095 (.058)
$Reform_{t-1}^2$	-.248*** (.072)	-.142*** (.053)	-.032 (.099)	-.073 (.055)	-.027 (.039)	-.085 (.052)	-.144* (.079)	-.016 (.044)
SBC_t	-.005 (.006)	.013 (.012)	-.014 (.016)	-.007 (.015)	-.004 (.011)	-.033** (.013)	.027 (.020)	-.015 (.010)
SBC_{t-1}	-.006 (.006)	.010 (.014)	-.008 (.019)	.009 (.015)	-.010 (.011)	-.035** (.017)	.006 (.016)	-.006 (.010)
SBC_{t-2}	-.022*** (.006)	-.036* (.018)	-.033 (.022)	-.019 (.018)	.016 (.011)	-.011 (.015)	-.050*** (.019)	-.011 (.014)
NBC_t	-.002 (.005)	.001 (.017)	-.022 (.020)	.024* (.012)	-.003 (.012)	-.020 (.013)	.005 (.012)	.008 (.012)
NBC_{t-1}	-.010 (.008)	-.007 (.013)	-.018 (.021)	.011 (.021)	.016 (.025)	-.054** (.021)	-.017 (.012)	-.001 (.008)
NBC_{t-2}	-.005 (.008)	-.002 (.017)	-.000 (.015)	.007 (.010)	-.000 (.016)	-.016 (.015)	-.021 (.029)	.002 (.019)
GDP/c_{t-1}	-.065 (.041)	-.103 (.072)	-.100 (.138)	-.032 (.084)	-.096 (.061)	-.098 (.078)	-.053 (.086)	-.057 (.071)
XR_{t-1}	.002 (.006)	-.006 (.010)	.038* (.023)	.001 (.009)	-.003 (.004)	-.019* (.011)	.003 (.016)	-.004 (.011)
$Openness_{t-1}$	.000 (.000)	-.000 (.001)	.001 (.001)	.001 (.001)	.000 (.001)	.000 (.001)	.000 (.001)	-.001 (.001)
$ReformGap_{t-1}$	.000 (.)	.451 (.600)	-1.108 (.670)	-.620 (.674)	.187 (.393)	-.713 (.474)	-.303 (.650)	-.196 (.360)
$Gap * GDP_{t-1}$	-.015 (.028)	-.076 (.070)	.120 (.073)	.038 (.078)	-.022 (.047)	.057 (.051)	.019 (.074)	.000 (.042)
$Gap * XR_{t-1}$	-.004 (.007)	.005 (.006)	-.025 (.021)	-.001 (.007)	.001 (.003)	.003 (.007)	.009 (.008)	.004 (.007)
Const.	.043*** (.013)	.048* (.026)	.072 (.070)	.000 (.020)	.009 (.013)	.021 (.020)	.065* (.038)	.039 (.026)
N	1589	1589	1589	1589	1589	1589	1589	1589
No. clusters	76	76	76	76	76	76	76	76
adj. R^2	.116	.049	.052	.040	.059	.061	.048	.052

Notes: The table presents estimates from equation (1) by fixed-effects OLS, as explained in the text. Standard errors are clustered on country, and are presented in parentheses. All estimations include country and region-time fixed effects. Dependent variables are: an overall index of financial reforms, as well as specific reforms, including credit controls (CrC), interest rate controls (IRC), entry barriers and pro-competition measures in the banking system (EB), banking supervision (BS), banking privatization (Pr), capital controls (CaC), policies on the securities markets (SM). The variables $Reform_{t-1}$ and $Reform_{t-1}^2$ represent the lags of the respective dependent variables. SBC and NBC stand for systemic and non-systemic banking crises. The rest of the explanatory variables are detailed in the methodology section. Symbols: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 2: Crises and Financial Reforms: 2SLS Panel Estimations

	Overall	CrC	IRC	EB	BS	Pr	CaC	SM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Reform_{t-1}$	.239*** (.075)	.008 (.067)	-.052 (.097)	-.012 (.065)	-.138*** (.046)	-.053 (.065)	.009 (.074)	-.050 (.054)
$Reform_{t-1}^2$	-.201*** (.073)	-.151*** (.057)	-.036 (.083)	-.094** (.047)	-.005 (.053)	-.057 (.058)	-.138** (.069)	-.043 (.042)
SBC_t	-.039** (.016)	-.013 (.039)	-.025 (.039)	-.018 (.033)	.005 (.027)	-.082* (.047)	-.074* (.042)	-.052* (.029)
SBC_{t-1}	-.006 (.019)	.026 (.054)	-.079 (.053)	.043 (.034)	.022 (.036)	-.035 (.052)	-.009 (.055)	-.034 (.025)
SBC_{t-2}	-.018 (.015)	.080** (.040)	-.048* (.029)	.016 (.035)	-.009 (.036)	-.025 (.035)	-.050 (.038)	-.046 (.029)
NBC_t	.044 (.030)	.152** (.074)	.148** (.073)	.009 (.060)	-.068 (.063)	-.015 (.052)	-.059 (.078)	-.055 (.053)
NBC_{t-1}	.069** (.033)	.132** (.058)	.095 (.083)	-.025 (.068)	.054 (.072)	.056 (.075)	-.036 (.072)	.003 (.053)
NBC_{t-2}	.016 (.029)	.047 (.051)	.009 (.077)	.055 (.047)	.109 (.066)	-.056 (.070)	.033 (.071)	-.038 (.053)
GDP/c_{t-1}	-.056 (.039)	.011 (.081)	-.138 (.138)	.092 (.073)	-.055 (.063)	-.065 (.092)	.058 (.084)	-.088 (.069)
XR_{t-1}	.007 (.006)	-.001 (.010)	.057*** (.017)	.001 (.008)	-.008 (.006)	-.010 (.009)	.011 (.015)	.004 (.010)
$Openness_{t-1}$	.000 (.000)	-.000 (.001)	.001 (.001)	.001* (.001)	.000 (.001)	.001 (.001)	.000 (.001)	-.001 (.001)
$ReformGap_{t-1}$	.024 (.164)	.477 (.443)	-.494 (.522)	-.245 (.483)	.090 (.323)	-.268 (.396)	.350 (.443)	.143 (.311)
$Gap * GDP_{t-1}$	-.004 (.021)	-.081 (.053)	.057 (.058)	.001 (.060)	-.011 (.040)	.013 (.046)	-.064 (.054)	-.035 (.036)
$Gap * XR_{t-1}$	-.001 (.007)	.005 (.007)	-.021 (.021)	-.003 (.006)	.001 (.004)	.003 (.006)	.011 (.007)	.005 (.007)
N	1589	1589	1589	1589	1589	1589	1589	1589
No. clusters	76	76	76	76	76	76	76	76
Sargan	127.2	100.1	91.79	84.67	51.15	121.9	116.0	86.33
Sargan P	.003	.125	.263	.428	.214	.008	.017	.380

Notes: The table presents estimates of equation (1) by 2SLS. Standard errors are clustered on country, and are presented in parentheses. All estimations include country and region-time fixed effects. Dependent variables are: an overall index of financial reforms, as well as specific reforms, including credit controls (CrC), interest rate controls (IRC), entry barriers and pro-competition measures in the banking system (EB), banking supervision (BS), banking privatization (Pr), capital controls (CaC), policies on the securities markets (SM). The variables $Reform_{t-1}$ and $Reform_{t-1}^2$ represent the lags of the respective dependent variables. SBC and NBC stand for systemic and non-systemic banking crises. The rest of the explanatory variables are detailed in the methodology section. Symbols: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 3: Crises and Financial Reforms: Difference GMM

	Overall	CrC	IRC	EB	BS	Pr	CaC	SM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Reform_{t-1}$	.973*** (.035)	.943*** (.058)	1.013*** (.082)	.886*** (.049)	.769*** (.038)	.887*** (.045)	.787*** (.073)	.756*** (.040)
$Reform_{t-1}^2$	-.180*** (.033)	-.153*** (.050)	-.240*** (.078)	-.108*** (.036)	-.001 (.032)	-.084* (.044)	-.059 (.062)	.013 (.033)
SBC_t	-.013** (.006)	.001 (.012)	-.011 (.018)	-.009 (.015)	-.003 (.010)	-.041** (.016)	.003 (.018)	-.020** (.009)
SBC_{t-1}	-.003 (.008)	.002 (.019)	.001 (.020)	.018 (.019)	-.014 (.014)	-.012 (.019)	-.017 (.019)	.009 (.011)
SBC_{t-2}	-.009 (.006)	-.030** (.013)	-.006 (.019)	-.025* (.013)	.019* (.010)	.019 (.014)	-.029** (.013)	-.006 (.012)
NBC_t	.002 (.005)	.011 (.016)	-.009 (.020)	.023* (.013)	.006 (.013)	-.013 (.013)	.018 (.013)	.004 (.012)
NBC_{t-1}	-.004 (.008)	.001 (.014)	.003 (.026)	-.009 (.017)	.027 (.025)	-.033 (.021)	-.006 (.013)	-.002 (.008)
NBC_{t-2}	.010* (.006)	.013 (.014)	.001 (.020)	-.007 (.017)	.022 (.017)	.033 (.021)	.016 (.017)	.005 (.011)
GDP/c_{t-1}	-.027** (.012)	-.105*** (.030)	-.043 (.057)	-.032 (.030)	.060** (.028)	-.140*** (.037)	.040 (.045)	-.015 (.027)
XR_{t-1}	.001 (.001)	-.000 (.002)	.006 (.004)	.001 (.002)	.001 (.001)	.000 (.002)	.001 (.002)	.004 (.002)
$Openness_{t-1}$	.000 (.000)	-.001** (.000)	.000 (.000)	-.000** (.000)	.000 (.000)	.000 (.000)	-.000 (.000)	-.000 (.000)
$ReformGap_{t-1}$	.100 (.103)	-.435** (.206)	-.347 (.311)	.053 (.178)	.122 (.157)	-.100 (.174)	.029 (.216)	-.564*** (.163)
$Gap * GDP_{t-1}$	-.016 (.012)	.040* (.023)	.042 (.035)	-.016 (.020)	-.021 (.019)	-.002 (.021)	-.012 (.026)	.059*** (.019)
$Gap * XR_{t-1}$	-.001 (.003)	.002 (.004)	-.009 (.013)	.001 (.004)	.000 (.002)	.004 (.003)	.011*** (.003)	.004 (.004)
N	1589	1589	1589	1589	1589	1589	1589	1589
No. groups	76	76	76	76	76	76	76	76
No. instr.	1409	1408	1402	1404	1372	1391	1406	1408
Hansen P	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Sargan test	1694.1	1510.2	1532.5	1597.4	1589.9	1644.9	1578.7	1592.6
Sargan P	0.000	0.004	0.001	0.000	0.000	0.000	0.000	0.000

Notes: The table presents estimates from equation (1) by Arellano-Bond (1991) one-step difference GMM with full set of instruments. Robust standard errors are presented in parentheses. All estimations include time fixed effects. Dependent variables are: an overall index of financial reforms, as well as specific reforms, including credit controls (CrC), interest rate controls (IRC), entry barriers and pro-competition measures in the banking system (EB), banking supervision (BS), banking privatization (Pr), capital controls (CaC), policies on the securities markets (SM). The variables $Reform_{t-1}$ and $Reform_{t-1}^2$ represent the lags of the respective dependent variables. SBC and NBC stand for systemic and non-systemic banking crises. The rest of the explanatory variables are detailed in the methodology section. Symbols: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 4: Episodes of Banking Crises

Year	Systemic Crises	Non-Systemic Crises
1974	-	UK
1975	-	UK
1976	Chile	UK
1977	Israel, Spain	-
1978	Israel, Spain	Germany, South Africa, Venezuela
1979	Israel, Spain	Germany
1980	Argentina, Israel, Spain	-
1981	Argentina, Chile, Colombia, Ecuador, Israel, Mexico, Spain	-
1982	Argentina, Chile, Colombia, Ecuador, Ghana, Israel, Mexico, Spain, Turkey	Hong Kong
1983	Chile, Colombia, Ghana, Israel, Morocco, Peru, Spain, Thailand	Canada, Hong Kong, Tai- wan
1984	Chile, Colombia, Ghana, Peru, Spain, Thai- land, Turkey	Canada, Hong Kong, Tai- wan, UK, US
1985	Chile, Colombia, Ghana, Peru, Spain, Thai- land, Turkey	Canada, Hong Kong, US, Venezuela
1986	Bolivia, Chile, Colombia, Ghana, Peru, Thailand	Hong Kong, US, Venezuela
1987	Bangladesh, Bolivia, Colombia, Costa Rica, Ghana, Norway, Peru, Philippines, Tanza- nia, Thailand	Denmark, New Zealand, US

Continued on next page

Table 4 – continued from previous page

Year	Systemic Crises	Non-Systemic Crises
1988	Bolivia, Burkina Faso, Costa Rica, Ghana, Madagascar, Nepal, Nicaragua, Norway, Senegal, Tanzania	Denmark, New Zealand, US
1989	Argentina, Burkina Faso, El Salvador, Ghana, Nicaragua, Norway, Senegal, Sri Lanka, Tanzania	Australia, Denmark, Jordan, New Zealand, South Africa, US
1990	Algeria, Argentina, Brazil, Burkina Faso, Nicaragua, Norway, Senegal, Sri Lanka, Tanzania	Australia, Denmark, Guatemala, Italy, Jordan, New Zealand, US
1991	Algeria, Burkina Faso, Finland, Hungary, Nicaragua, Nigeria, Norway, Poland, Senegal, Sri Lanka	Australia, Denmark, Greece, Guatemala, Italy, Tunisia, UK, US
1992	Albania, Algeria, Burkina Faso, Estonia, Finland, Hungary, Japan, Mozambique, Nicaragua, Nigeria, Norway, Poland, Sri Lanka, Sweden	Australia, Denmark, Greece, Italy, Tunisia
1993	Burkina Faso, Estonia, Finland, Hungary, Japan, Mozambique, Nicaragua, Nigeria, Norway, Poland, Sri Lanka, Sweden	Greece, India, Italy, Tunisia, Venezuela
1994	Bolivia, Brazil, Burkina Faso, Ecuador, Estonia, Finland, Hungary, Jamaica, Japan, Kyrgyz Republic, Mexico, Mozambique, Nigeria, Sweden, Uganda	Costa Rica, Ethiopia, France, Greece, India, Italy, Tunisia, Turkey

Continued on next page

Table 4 – continued from previous page

Year	Systemic Crises	Non-Systemic Crises
1995	Argentina, Bolivia, Brazil, Bulgaria, Ecuador, Estonia, Hungary, Jamaica, Japan, Kyrgyz Republic, Mexico, Mozambique, Nicaragua, Nigeria, Paraguay, Uganda	Costa Rica, Ethiopia, France, Greece, India, Italy, Taiwan, Tunisia, UK
1996	Brazil, Bulgaria, Jamaica, Japan, Mexico, Nicaragua, Paraguay, Uganda	Costa Rica, Dominican Republic, India
1997	Brazil, Bulgaria, China, Colombia, El Salvador, Jamaica, Japan, South Korea, Mexico, Paraguay, Romania, Taiwan, Thailand, Ukraine, Vietnam	Costa Rica, Nigeria
1998	Brazil, China, Colombia, Ecuador, El Salvador, Jamaica, South Korea, Paraguay, Philippines, Romania, Taiwan, Thailand, Ukraine, Vietnam	Estonia, Hong Kong
1999	Bolivia, Brazil, China, Ecuador, Jamaica, South Korea, Paraguay, Peru, Philippines, Thailand	-
2000	Jamaica, South Korea, Philippines, Thailand, Turkey, Vietnam	-

Notes: The crises episodes, as well as their classification into systemic- or non-systemic banking crises, are taken from Caprio and Klingebiel (2003). Whenever an ambiguity arises with respect to the end date of a crisis, the newer Reinhart and Rogoff (2008) work is used.

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