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Abstract: A large number of countries went through banking crises at some point in their modern history since the early 1970s. This work links those crises with the within-country patterns of various financial reforms. To deal with the endogeneity of the local crises, their exogenous component is identified with banking crises in major trading partners. In addition, GMM methods are used to ensure consistency of the results in the presence of financial regulatory dynamics. In accord with previous literature, the results suggest that systemic banking crises do reverse financial reforms with various lags, whereas the impact of non-systemic crises is largely insignificant. The main results remain unaffected after numerous robustness checks on the GMM method. The main contributions of this work are introducing a more realistic crisis transmission mechanism and incorporating the inherent regulatory dynamics into the empirical analysis of financial regulatory reforms. A rich set of policy implications for shaping financial reforms after banking crises is also discussed.

Dear Prof. Hasan,

Please find attached my *Banking Crises and Reversals in Financial Reforms* paper. It has a number of contributions to its field, including to some well cited works. This is my first submission of this paper to any journal. I chose to submit to the Journal of Financial Stability due to the fine match between the scope of the Journal and the manuscript. I hope that, if published, it would contribute to increasing the impact of the Journal on the Economics profession. I also declare that I do not have any relationship to any of the Journal editors, and have not received prior assistance from any of them in getting this paper to its current form. I will be happy to see my work published in the JFS after responding to and incorporating the editors' comments, if any.

Best wishes,

Petar Stankov

In Sofia, Bulgaria

June 25, 2012

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Banking crises and reversals in financial reforms

For author details please turn to the Cover Letter page

Abstract

A large number of countries went through banking crises at some point in their modern history since the early 1970s. This work links those crises with the within-country patterns of various financial reforms. To deal with the endogeneity of the local crises, their exogenous component is identified with banking crises in major trading partners. In addition, GMM methods are used to ensure consistency of the results in the presence of financial regulatory dynamics. In accord with previous literature, the results suggest that systemic banking crises do reverse financial reforms with various lags, whereas the impact of non-systemic crises is largely insignificant. The main results remain unaffected after numerous robustness checks on the GMM method. The main contributions of this work are introducing a more realistic crisis transmission mechanism and incorporating the inherent regulatory dynamics into the empirical analysis of financial regulatory reforms. A rich set of policy implications for shaping financial reforms after banking crises is also discussed.

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JEL Codes: G01, G18, G28

1. Introduction

In 2008 the political leaders in major developed economies were calling for tougher regulations in the banking industry. As the financial crisis of 2008-2009 began to phase out, however, divergent patterns of re-regulation were proposed. For example,

the US adopted the Dodd-Frank Act in which banking supervision and consumer protection was allegedly improved,[1] Europe advanced a number of proposals to refine early warning and to develop banking supervision on the EU-level and introduced three new regulatory bodies in the financial services sector in late 2010, while some countries did not change their financial regulatory framework at all due to a lower crisis exposure. A natural question emerges as a result of those policy choices: Do countries experiencing banking crises go along similar patterns of ex-post financial reforms? Answering this question is important for at least three reasons.

First, politicians may be quick to play along with the demand for regulation on banks after crises, and to impose measures which may hurt the credit growth originated in the banking system together with adopting measures which may make it more sound and robust to future shocks. If indeed some patterns of punitive re-regulation emerge, this could hamper financial development at the time when it is needed most – immediately after crises. Then, a financial crisis may lead to a nonsensical policy framework which undermines growth. It turns out governments do reverse financial reforms more often than not, especially after systemic banking crises.

Second, observing the areas in which governments reverse financial reforms also presents a chance to point out the policy areas where the government preserves a given status quo or adopts growth-enhancing financial liberalization reforms. This work points to policy areas in which governments could be quicker to implement growth enhancing measures but are not.[2] At the same time, those reforms could help restore growth in the aftermath of financial crises.

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

[2]Beck (2010) is among those advocating a careful distinction between growth-enhancing and punitive financial regulation policy measures after a crisis.

Third, the literature so far has approached the empirical treatment of regulatory reforms after crises in a rather ad-hoc fashion. The models used up to date lack a realistic cross-country crisis transmission mechanism and implicitly assume banking crises are random events which is clearly not the case. In addition, the literature has largely ignored the inherent dynamic nature of all within-country financial reforms which calls for a GMM estimation. This work addresses both those issues by constructing a novel time-varying instrumental variable for more than 70 countries: the crisis exposure. The crisis exposure variable reveals how a crisis in a given economy depends on a crisis in any of its trading partners. While the crisis exposure of any country is affected by a crisis in a major trading partner, their regulatory reform patterns are not necessarily mutually dependent. Thus, the crisis exposure identifies at least part of the exogenous variation of the local crisis to its ex-ante financial reforms. After constructing the crisis exposure, I use it in both IV and GMM estimations of the effect of banking crises on financial reforms. At the same time, financial reforms are further conditioned on a credible set of both observable and unobservable country-, and regional factors affecting reform choices. By doing so, the paper extends the work by Abiad and Mody (2005) and provides a new insight into how policy makers react to financial crises in various reform areas. As a result, this work points to policy areas in which governments could change the way they react to crises, if a faster economic recovery in the aftermath of financial crises is on their political agenda.

2. Literature

Despite the abundance of literature on the effects of financial liberalization on growth and development,[3] the literature on identifying the varieties of financial policy responses to major financial crises across a large number of countries is limited. The reason is that until the early 2000s there was no data which would allow linking episodes of financial distress with regulatory changes in a large number of countries over a long period of time. This became possible with the work by Caprio and Klingebiel (2003) who document episodes of 117 systemic banking crises in 93 countries since the early 1970s,[4] and the work by Abiad, Detragiache and Tressel (2008), who monitor the patterns of various financial reforms annually across 91 countries since 1973. Combining the two data sets reveals the patterns of financial reforms being adopted after systemic and non-systemic banking crises. Abiad and Mody (2005) examine the overall pattern of financial reforms after financial crises but do not point out any differences in how those crises shape reforms within the various reform areas.

There are some recent efforts to examine regulatory policy responses after crises both within and across countries. For example, Gigliobianco and Toniolo (2009) edit a collection of essays on various episodes of financial crises and their impact on financial regulation within several countries. Martín-Aceña, Pons and Bertrán (2010) study the history of financial crises and regulatory responses in Spain. The Spanish experience with crises and financial reforms is diverse. Some crises, especially those in the 19th century did not lead to regulatory overhauls, while those in the second part of the 20th century did. The regulatory changes in Norway during the

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[3]See Levine (2005) for an extensive review.
[4]In fact, their 2003 paper is an update to their initial work published in 1999.

crisis of 1988-1992 are the subject of Berg and Eitrheim (2009). Their study reveals that a stricter but not necessarily better, regulations have been imposed ex-post. The example of Germany between 1994 and 2008 is studied by Kick, Koetter and Poghosyan (2010) where decisive action of the regulators to improve supervision is seen as a significant factor to increase the probability of bank recovery. Demirgüç-Kunt and Servén (2010) also review the debate on the necessary banking supervision reforms after the current financial crisis. Extending this evidence to a larger pool of European countries and focusing on the current crisis, Beck, Coyle, Dewatripont, Freixas, and Seabright (2010) advocate strengthening financial supervision to prevent future crises. In addition, better banking supervision is believed to be well-suited as a factor to prevent further financial crises (Bordo and James, 2009; Claessens, Dell'Ariccia, Igan, and Laeven, 2010; Levine, 2010), including integration of the European supervisory and regulatory framework monitoring the multinational banks (Navaretti, Calzolari, Pozzolo and Levi, 2010), and intervention in the unregulated "shadow" banking system (Diamond and Rajan, 2009), a proposal which has been addressed to some extent in the Dodd-Frank act, and by the new financial regulatory authorities in Europe. In addition, White (2009) contrasts the experience of 1920s and the current crisis in the US and finds one of the roots of the banking crisis today in the less strict banking supervision.

However, looking at how Basel Core Principles affect the bank soundness in a large number of countries, Demirgüç-Kunt and Detragiache (2011) do not find a robust relationship between stricter supervisory powers of the regulators and risk in the banking system. Furthermore, they also find that stricter bank licensing regimes might actually increase risk taking in the industry. Calomiris (2009) also advances the argument that crises do not always lead to lower risk taking by the banks because of risk-inviting rules in the industry. The UK experience in the current crisis also

motivates Goodhart (2008) to expose some regulatory failures and to formulate likely areas of responses to the financial crisis, while Gorton (2008) proposes that the US regulatory system addresses the subprime factors that lead to the crisis of 2007-2009.

The current crisis also motivates Beltratti and Stulz (2009) to examine the cross-country variation in stock returns of large banks and arrive at the conclusion that "banks from countries with stronger capital supervision had higher returns" and performed better during the current crisis. In a supporting argument, Chan-Lau (2010) proposes a capital rule that would allegedly prevent a solvency problem for the large and systemically important financial institutions.

Capital requirements alone, however, are insufficient to prevent future crises, as Caprio and Honohan (1999) point out. They study the Asian financial crisis in the late 1990s and argue that a severe regulatory backlash would be a mistake in the aftermath of that crisis, while a richer set of regulatory measures for financial supervision would help prevent future crises. Allen and Carletti (2011) also provide an extensive literature on the various aspects of capital regulation and the need to understand its driving factors and consequences in new theories.

Apart from the within-country, and from the cross-country studies, there is also an emerging line of literature which zooms out on many episodes of financial distress in many countries over longer periods of time. Reinhart and Rogoff (2008a, 2008b) are two examples. However, they do not study policy responses to those episodes.

Despite the above efforts to reveal the mechanisms for after-crisis financial regulatory responses, the literature above has its limitations. First, it does not address systematically the crises experiences across a large number of countries over time which could shed light on some patterns of ex-post regulatory policy. One of the very few exceptions here is the work by Abiad and Mody (2005). However, their ordered logit model may bias the results in a dynamic panel framework. This brings

out the contribution of this work: none of the recent papers reviews the possible endogeneity between the crises and financial regulations. If crises are modeled as endogenous and financial regulation is assumed to be a dynamic process, difference GMM estimation becomes superior to an ordered logit. Abiad and Mody (2005) do not use an IV approach to identify the incidence of banking crises which implicitly assumes crises are random events, which is arguably not the case. This work uses their original idea of looking into regulatory reforms after crises but extends it with a superior methodology. Further, this work looks into a variety of financial reforms rather than studying the overall reform pattern alone. The methodology is detailed in what follows.

3. Methodology

3.1. Baseline Model

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

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

(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 ($NSBC$) occur 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 et al. (2008), 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)

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lagged GDP and exchange rate dynamics; b) the 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 *a la* 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.

The lagged GDP and exchange rate dynamics are included to account for the plausible policy recognition and response lags. Further, the openness of the economy captures the premise that 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, the gap is included to capture the likely existence of a status quo bias in some countries which constrains further financial liberalization. The interaction term of the gap with the GDP and the exchange rate dynamics indicates the plausible shifts in the status quo bias at various stages of the business cycle and the incentive to open up or re-regulate some parts of the financial system in the presence of significant exchange rate dynamics. For the robustness checks, some political characteristics of the country are also taken into account. Those are: the political orientation of the incumbent government and of the chief executive, political system dummies, as well as if the government holds majority in both chambers of parliament and if it is in office during the first year of its mandate which might make reforms somewhat easier while the "honeymoon" with the constituency lasts. Those political indicator variables are taken from the Database of Political Institutions 2010 prepared by Beck et al. (2001)[5] and have already been explored to study the impact of ideology on financial reforms by Abiad and Mody (2005).

The added explanatory power of the region-time fixed effects is that they could

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[5]The most recent update of the Beck et al. (2001) database is in December, 2010.

capture the impact of major regional events in a given period such as the Asian crisis in the end of the 1990s, and the financial crises in Latin America and Eastern Europe from the beginning to the mid-1990s. In addition, the country fixed effects capture the potential differences in the regulatory responses to financial crises due to legal origin or geography which might turn 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, the baseline model takes into account some possible dynamics of the financial regulatory process. Low levels of previous financial liberalization may indicate high resistance to reform. At the same time, high levels of financial liberalization may also 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 would also expect to see slow reforms. This intuition calls for inclusion of both a linear and a square term of lagged levels of financial liberalization. With the inclusion of those dynamics, the baseline empirical model for estimating the effects of a crisis on the ex-post regulatory process is allegedly complete. It models how the individual-specific occurrences of financial crises affect the changes in regulatory policies. Table 1 presents the results from estimating equation (1) by fixed effect panel data methods with clustered standard errors to correct for heteroskedasticity.

However, despite correcting for heteroskedasticity, additional two econometric issues in the above model may bias the results and even produce inconsistent estimates. The first issue is the endogeneity of crises. The second one 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 Arellano-Bond (1991) difference

GMM approach,[6] which leads to consistent estimates even in the presence of serial correlation (Cameron and Trivedi, 2005, p.764-765).

3.2. 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, naturally, a crisis is determined endogenously. Three channels for determining a crisis incidence are almost 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.[7] Demirgüç-Kunt and Detragiache (1998) also find that financial liberalization may influence positively the likelihood of a banking crisis, especially in countries with weaker banking supervision and judicial institutions. This may induce reverse causality in the panel OLS estimations of equation (1) which calls for an instrumental variable estimation.

Second, it has been shown that banking crises in country i can occur through numerous endogenous channels on both the assets and the liabilities sides of the balance sheet. Crises occurring on both sides have been studied by Allen and Gale (1998) and Allen and Gale (2000). In the first 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. Another 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

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[6]I thank Evangelia Vourvachaki of CERGE-EI for suggesting the Arellano-Bond estimation.

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

be readily available in region j which in turn makes banks in region j add up to the excess demand for liquidity, which drives contagion.

Third, those theoretical mechanisms are supported in the empirical literature which also 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 can affect cross-country contagion. Balakrishnan, Danninger, Elekdag, and Tyrrel (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 opposes Rose and Spiegel (2009) to some extent. Rose and Spiegel (2009) use trade and financial exposures to the US alone to analyze crises 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).

Acknowledging the plethora of ways in which crises may go across borders, this work considers trade linkages to be a viable propagation mechanism of financial distress. 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 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. In its simplest form, the crisis exposure is an export-weighted crisis occurrence in country

i's trading partners at time t:

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

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's support is between 0 and 1 as well.

Depending on the type of crisis occurring in country j, two instrumental variables can come from the crisis exposure variable – 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 are presented in Table 2.

3.3. 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 and Trivedi, 2005, p.764). However, in some cases the linked data on banking crises and financial regulatory measures contains just a few years of data. In fact, the maximum number of years in the sample is just below 30 which could hardly be considered a large number. Then, in the presence of dynamics, the way to consistently estimate the parameters of interest is to use a difference GMM method known as the Arellano-Bond estimator (Arellano and Bond, 1991). In this method, the differences of the explanatory variables are instrumented with lagged levels of themselves. Roodman (2009) provides a detailed assistance on how to apply

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the method and of 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.

4. Data

The data used here to feed the model above are a combination of three main data sets. The first one is the data set constructed by Caprio and Klingebiel (2003). It features 117 episodes of systemic banking crises in 93 countries since the early 1970s, and records their dates. It also records the timing of 51 borderline systemic and non-systemic crises, thereby enabling this work to qualify which crises lead to the variety of regulatory responses studied here. The Caprio and Klingebiel (2003) data was supplemented by the newer Reinhart and Rogoff (2008b) work on banking crises 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 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 number of crises incidence in their data, however, is smaller than the one here due to utilizing an earlier 1999 version of the Caprio and Klingebiel (2003) data.

The second main data set was assembled by Abiad, Detragiache and Tressel (2008), henceforth ADT. It monitors seven financial reforms annually since 1973 across 91 countries. Those reforms include: imposition of credit controls, interest rate controls, entry barriers, restrictions on private ownership and banking privatization,

securities and banking supervision regulations, as well as capital account restrictions. Each particular financial reform is coded into a discrete index $i \in [0; 3]$.[8] In addition, ADT construct an overall index of financial reforms for each country and year being the sum of each particular reform indices, and normalize it to 1. In each set of regressions – fixed effects, 2SLS, and difference GMM – I take the change of each of the normalized reforms as the main dependent variable. The additional controls are taken from the Penn World Table 7.0.[9] and from the Database of Political Institutions, 2010.

The third main data set consists of the systemic and the non-systemic crises exposures for each country. To be able 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 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 is increasing with the number of trading partners in crisis, and with the share of exports to a given partner in crisis. To be able 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).[10] An alternative source of bilateral trade data with for 1948-2000 is Gleditsch (2002). It is based on the IMF Direction of Trade Yearbook. As Gleditsch (2002) has an identical time coverage to Feenstra et al., I use the Feenstra data only. Finally, I drop countries with less than 10 time observations to capture at least

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[8]For each of the 7 policy reforms, ADT code the current situation as 0 if the policy is most restrictive, and 3 if the policy is most liberalized. I normalize these indices to 1.

[9]See Heston et al. (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 with the PWT7.0.

[10]I thank Seema Sangita of the GDN for suggesting the Feenstra et al. (2005) data.

two electoral cycles. Thus, the final sample of banking crises and financial reforms, including the crisis exposures, consists of 76 countries.

5. Results

Table 1 reveals several policy response patterns to financial crises, taken from the experience of more than 70 countries spanning over 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, given by the negative and significant coefficient on $\Delta Reform_{t-1}^2$. The sign also gives a supporting evidence to the inverted U-shape of the overall reform dynamics which was found significant by Abiad and Mody (2005). This means countries which reversed their financial liberalization are also less likely to reform, and, in addition, those who reformed most in the previous period are less likely to reform too. The overall response pattern is affected by the severity of crises as well. Whereas non-systemic banking crises do not exert any 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 likely strong lobbying process affecting the financial regulatory process, it might be expected that financial reforms could 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 financial industry.

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). 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 banking crises. However, both interest rate controls and entry barriers in the financial industry seem to be unaffected by 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. In those, the parameter estimates are mostly 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 an 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. What this process means is that even a minor liberalization of interest rate controls is likely to lead to more liberalization in the future, and even a minor opening of the banking entry is likely to lead to a further liberalization. However, it should also be noted that the reverse is also true: Tightening the government control over entry and interest rates is also more likely to lead to more intervention in the future.

The results in column (4) of Table 3 also demonstrate that systemic banking crises lead to tightening of the entry into banking. However, the tighter policy is implemented with a sizable time lag, and the effect is significant only at the 10% level. On one hand, this policy reaction is rational. Limiting the number of participants in the sector, especially combined 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).

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However, plenty of theory and evidence suggests that limiting bank entry is also associated with higher loan interest rates and lower deposit rates which hampers investment.[11] Therefore, there is an apparent trade-off between a possible prevention of future crises and a reduction of welfare and growth. The reform direction would ultimately be determined by the local political economy.

Perhaps 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 evidently make room for 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 immediately after or even during the crisis itself. This is hardly surprising given the ubiquitous need to bail out a

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

certain amount of banks 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 especially 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 prevent bank failure.

The government also introduces more restrictions on capital inflows and outflows after systemic banking crises, irrespective of how much it has liberalized its capital account in the previous periods. The significant estimates in column (7) of all three tables on ΔSBC_{t-s} show that systemic crises induce the 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 implies that capital controls may be adopted for all the wrong reasons: rather than containing a looming exchange rate and possibly 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 could be analyzed with the ADT (2008) 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, similarly to most financial policies, securities markets policies experience reform reversals after systemic crises. Those reversals after systemic crises may involve stalling the development of a securities market or introducing 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 influence significantly financial regulations, and they do so more strongly than non-systemic crises. In addition, the paper 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 dynamics implies countries are gradually moving towards two regulatory equilibria: a fully liberalized financial system and a fully repressed financial system, with neither system consisting of zero or an infinite number of financial regulations. However, other factors also play a significant role in establishing the new financial regulatory realm after banking crises. The impact of those 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 in what follows.

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 is 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. Those are: liberalization of credit

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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 more risky banking activities that have probably caused the recession in the first place. Third, governments reduce their ownership in the banking sector after a recession which might be happening for two main reasons. On one hand, a recession makes the losses in the banking sector more likely. If the government anticipates those losses, then it is rational to reduce government ownership in the sector for sure cash now instead of waiting for the lackluster dividend prospects to materialize. On the other hand, privatizing some part of the banking system could spark competition in the sector which could drive down interest rates and catalyze private activity.

Apart from the GDP dynamics, regional competition for capital inflows and policy learning of reform benefits also play a role in shaping financial reforms. This competition and policy updating process, 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 in a more favorable spot 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 the overall reform patterns, as well as most of the particular financial reforms. Interestingly, the results in Table 3 demonstrate that reducing the liberalization gap does not play a significant role

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in shaping the overall reform pattern.[12] Zooming in on the particular reforms, the reform gap affects two of them only: credit controls, and securities market policies and regulations. In those two reforms, however, 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 those two reforms, 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 be increasing favors for some industries more than the lagging countries. This is perhaps only natural, since governments are also expected to have higher revenues in times of economic growth, and hence a stronger ability to allocate resources to particular industries rather than to pursue horizontal measures to support competition within and across industries.

In addition, an exchange rate appreciation would make countries closer to the

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[12]In 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.

regional reform leaders pursue a more extensive capital account liberalization than countries further away from the leaders. 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 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. However, the longer term view to attract new foreign capital, encourage greenfield investment and boost long-term competitiveness is perhaps stronger than the need to slow 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. It is a matter of further research as well to determine some of the reasons the liberalization gap is insignificant for other financial reforms. Additional research is also needed on 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.[13]

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[13]In 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.

6. Robustness of the GMM results

Although the GMM estimations in this work deliver new insight into the policy making process after banking crises, they also require making implicit assumptions when employing any given version of the GMM method.[14] Therefore, it would be good 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 as in the baseline specification.

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 blown up. 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

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[14]Roodman (2009) is a useful source on the strengths but also on the pitfalls the GMM method may create.

good. Thus, limiting the number of instruments may also increase the information value that the validity tests present. Finally, endogenizing the crisis exposures is intuitive. If a banking crisis in a given economy affects the risk of a crisis in another economy, then that risk would feed back into the first economy, especially with a large trade and financial exposure between the two.

The results from the first and the second robustness checks yield lower significance of the parameter estimates. This refers back to the possible small sample bias of the two-step GMM. Indeed, a sample of about 1600 observations is not small per se. However, the number of clusters is only 76 which is hardly a large number either. Therefore, a small sample bias may well be one of 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 still 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 leads to a further corroboration of the main results, as the outlined dynamics play 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 included the political orientation of the incumbent government and of the chief executive, political system dummies, as well as if the government holds majority in both chambers of parliament and if it is in office during the first year of its mandate. Those new variables are taken from the Database of Political Institutions created by Beck et al. (2001) and last updated in December 2010. The main 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 main messages of this work still stand.

7. Conclusion

This paper linked a rich history of systemic and non-systemic crises to the patterns of financial regulatory reform in seven areas: credit controls, interest rate controls, entry barriers, banking supervision, state ownership in the banking sector, capital controls and securities markets policies. This work also analyzed how banking crises affect the overall reform pattern. To arrive at arguably efficient and consistent estimates, not only fixed effects panel data techniques are used but also instrumental variable and difference GMM estimations. By constructing a crisis exposure for

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each country and year, this work adopts a more realistic transmission mechanism of crises across countries. This more realistic transmission mechanism is at the heart of identifying the causal effect of banking crises on financial reforms.

On the one hand, 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, on the other hand, 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 make governments liberalize their financial systems. After recessions, governments reduce their direct allocation of resources to particular industries, and sell their ownership shares in the banking sector. A recession also makes banking supervision less independent from the incumbent government and might reduce the coverage of financial institutions. 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 regulations. Exchange rate movements rarely play a significant role for shaping financial reforms, except for capital controls. Countries which are closer to the regional reform leaders in liberalization reduce their capital controls in times of exchange rate appreciation relatively more.

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 main results also remain robust to numerous robustness checks.

On the more normative side, a rich set of intuitive **policy implications** emerges from this work. First, governments should not jump to reversing the pattern of financial liberalization 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. If growth is the rational target after crises, then reversing the reform pattern which this work shows is the case may not lead to a quicker recovery.

Second, governments impose more control on the credit activity after crises. Specifically, they allocate favors to particular industries which might reduce competition in those industries and might 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 in the banking industry. However, more competition in the banking industry could reduce interest rates and spur private investment. To do so, governments should reduce those barriers.

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 of saving or dismantling those institutions might be more plausible and efficient than making future generations pay for the save. An example, which perhaps needs a future refinement, is the orderly liquidation provisions in the Dodd-Frank Act. Further, once an active owner in the banking sector, the government should refrain from staying there too long and privatize the healthy businesses. Plenty of evidence suggests that increased government ownership in the banking sector hampers financial development.

Fifth, systemic crises lead to more capital inflow and outflow controls. This might 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, not as means to prevent it. This might limit the good of imposing the temporary capital controls in the first place, and may also raise the country risk 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 down 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 just undergone a major crisis, then slowing down 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 adopting a competitive regulatory framework for spurring financial development.

Naturally, this study has its limitations. Namely, looking at only seven areas of financial regulation and supervision in a myriad of proposed policy measures within each country is an inappropriate level of specificity. However, until better panel data sets are available to measure reforms at a deeper level, this is as far as this research can go for now. Therefore, this work identifies regulatory policy patterns rather than formulate the precise regulatory measures to deal with the consequences of a banking crisis. The paper also does not 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 be ultimately determined by the within-country political economy of growth and financial sector policies.

8. Acknowledgements

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	Overall	Cr Cont	IR Cont	Ent Bar	B Sup	Priv	Cap Cont	Sec Mkt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Reform_{t-1}$	.115	-.006	-.083	-.053	-.133***	-.047	.027	-.095
	(.227)	(.067)	(.114)	(.077)	(.042)	(.063)	(.100)	(.058)
$\Delta Reform^2_{t-1}$	-.248***	-.142***	-.032	-.073	-.027	-.085	-.144*	-.016
	(.072)	(.053)	(.099)	(.055)	(.039)	(.052)	(.079)	(.044)
ΔSBC_t	-.005	.013	-.014	-.007	-.004	-.033**	.027	-.015
	(.006)	(.012)	(.016)	(.015)	(.011)	(.013)	(.020)	(.010)
ΔSBC_{t-1}	-.006	.010	-.008	.009	-.010	-.035**	.006	-.006
	(.006)	(.014)	(.019)	(.015)	(.011)	(.017)	(.016)	(.010)
ΔSBC_{t-2}	-.022***	-.036*	-.033	-.019	.016	-.011	-.050***	-.011
	(.006)	(.018)	(.022)	(.018)	(.011)	(.015)	(.019)	(.014)
ΔNBC_t	-.002	.001	-.022	.024*	-.003	-.020	.005	.008
	(.005)	(.017)	(.020)	(.012)	(.012)	(.013)	(.012)	(.012)
ΔNBC_{t-1}	-.010	-.007	-.018	.011	.016	-.054**	-.017	-.001
	(.008)	(.013)	(.021)	(.021)	(.025)	(.021)	(.012)	(.008)
ΔNBC_{t-2}	-.005	-.002	-.000	.007	-.000	-.016	-.021	.002
	(.008)	(.017)	(.015)	(.010)	(.016)	(.015)	(.029)	(.019)
$\Delta GDP/c._{t-1}$	-.065	-.103	-.100	-.032	-.096	-.098	-.053	-.057
	(.041)	(.072)	(.138)	(.084)	(.061)	(.078)	(.086)	(.071)
ΔXR_{t-1}	.002	-.006	.038*	.001	-.003	-.019*	.003	-.004
	(.006)	(.010)	(.023)	(.009)	(.004)	(.011)	(.016)	(.011)
$\Delta Openness_{t-1}$	.000	-.000	.001	.001	.000	.000	.000	-.001
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
$\Delta ReformGap_{t-1}$	.000	.451	-1.108	-.620	.187	-.713	-.303	-.196
	(.)	(.600)	(.670)	(.674)	(.393)	(.474)	(.650)	(.360)
$\Delta Gap * GDP_{t-1}$	-.015	-.076	.120	.038	-.022	.057	.019	.000
	(.028)	(.070)	(.073)	(.078)	(.047)	(.051)	(.074)	(.042)
$\Delta Gap * XR_{t-1}$	-.004	.005	-.025	-.001	.001	.003	.009	.004
	(.007)	(.006)	(.021)	(.007)	(.003)	(.007)	(.008)	(.007)
Const.	.043***	.048*	.072	.000	.009	.021	.065*	.039
	(.013)	(.026)	(.070)	(.020)	(.013)	(.020)	(.038)	(.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 results from estimating equation (1) by fixed-effects OLS, as explained in the text. Standard errors are clustered on countries, and are presented in parentheses. All estimations include country and region-time fixed effects. Cr Cont means overall credit controls, IR Cont - Interest rate controls, Ent Bar - entry barriers and pro-competition measures in the banking system, B Sup - banking supervision, Priv - banking privatization, Cap Cont - international capital controls, Sec Mkt - policies on the securities markets, Overall - the overall index of reforms as constructed originally by ADT. The variables $\Delta Reform_{t-1}$ and $\Delta Reform^2_{t-1}$ are model-specific, representing the lags of the respective dependent variables. Symbols: * $p < .10$, ** $p < .05$, *** $p < .01$

	Overall	Cr Cont	IR Cont	Ent Bar	B Sup	Priv	Cap Cont	Sec Mkt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Reform_{t-1}$	.239***	.008	-.052	-.012	-.138***	-.053	.009	-.050
	(.075)	(.067)	(.097)	(.065)	(.046)	(.065)	(.074)	(.054)
$\Delta Reform^2_{t-1}$	-.201***	-.151***	-.036	-.094**	-.005	-.057	-.138**	-.043
	(.073)	(.057)	(.083)	(.047)	(.053)	(.058)	(.069)	(.042)
ΔSBC_t	-.039**	-.013	-.025	-.018	.005	-.082*	-.074*	-.052*
	(.016)	(.039)	(.039)	(.033)	(.027)	(.047)	(.042)	(.029)
ΔSBC_{t-1}	-.006	.026	-.079	.043	.022	-.035	-.009	-.034
	(.019)	(.054)	(.053)	(.034)	(.036)	(.052)	(.055)	(.025)
ΔSBC_{t-2}	-.018	.080**	-.048*	.016	-.009	-.025	-.050	-.046
	(.015)	(.040)	(.029)	(.035)	(.036)	(.035)	(.038)	(.029)
ΔNBC_t	.044	.152**	.148**	.009	-.068	-.015	-.059	-.055
	(.030)	(.074)	(.073)	(.060)	(.063)	(.052)	(.078)	(.053)
ΔNBC_{t-1}	.069**	.132**	.095	-.025	.054	.056	-.036	.003
	(.033)	(.058)	(.083)	(.068)	(.072)	(.075)	(.072)	(.053)
ΔNBC_{t-2}	.016	.047	.009	.055	.109	-.056	.033	-.038
	(.029)	(.051)	(.077)	(.047)	(.066)	(.070)	(.071)	(.053)
$\Delta GDP/c._{t-1}$	-.056	.011	-.138	.092	-.055	-.065	.058	-.088
	(.039)	(.081)	(.138)	(.073)	(.063)	(.092)	(.084)	(.069)
ΔXR_{t-1}	.007	-.001	.057***	.001	-.008	-.010	.011	.004
	(.006)	(.010)	(.017)	(.008)	(.006)	(.009)	(.015)	(.010)
$\Delta Openness_{t-1}$	.000	-.000	.001	.001*	.000	.001	.000	-.001
	(.000)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
$\Delta ReformGap_{t-1}$	.024	.477	-.494	-.245	.090	-.268	.350	.143
	(.164)	(.443)	(.522)	(.483)	(.323)	(.396)	(.443)	(.311)
$\Delta Gap * GDP_{t-1}$	-.004	-.081	.057	.001	-.011	.013	-.064	-.035
	(.021)	(.053)	(.058)	(.060)	(.040)	(.046)	(.054)	(.036)
$\Delta Gap * XR_{t-1}$	-.001	.005	-.021	-.003	.001	.003	.011	.005
	(.007)	(.007)	(.021)	(.006)	(.004)	(.006)	(.007)	(.007)
N	1589	1589	1589	1589	1589	1589	1589	1589
No. clusters	76	76	76	76	76	76	76	76

Notes: The table presents results from estimating equation (1) by 2SLS, as explained in the text. Standard errors are clustered on countries, and are presented in parentheses. All estimations include country and region-time fixed effects. Cr Cont means overall credit controls, IR Cont - Interest rate controls, Ent Bar - entry barriers and pro-competition measures in the banking system, B Sup - banking supervision, Priv - banking privatization, Cap Cont - international capital controls, Sec Mkt - policies on the securities markets, Overall - the overall index of reforms as constructed originally by ADT. The variables $\Delta Reform_{t-1}$ and $\Delta Reform^2_{t-1}$ are model-specific, representing the lags of the respective dependent variables. Symbols: $^*\ p < .10$, $^{**}\ p < .05$, $^{***}\ p < .01$

Table 3: Crises and Financial Reforms: Difference GMM

	Overall	Cr Cont	IR Cont	Ent Bar	B Sup	Priv	Cap Cont	Sec Mkt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta Reform_{t-1}$	.973***	.943***	1.013***	.886***	.769***	.887***	.787***	.756***
	(.035)	(.058)	(.082)	(.049)	(.038)	(.045)	(.073)	(.040)
$\Delta Reform_{t-1}^2$	-.180***	-.153***	-.240***	-.108***	-.001	-.084*	-.059	.013
	(.033)	(.050)	(.078)	(.036)	(.032)	(.044)	(.062)	(.033)
ΔSBC_t	-.013**	.001	-.011	-.009	-.003	-.041**	.003	-.020**
	(.006)	(.012)	(.018)	(.015)	(.010)	(.016)	(.018)	(.009)
ΔSBC_{t-1}	-.003	.002	.001	.018	-.014	-.012	-.017	.009
	(.008)	(.019)	(.020)	(.019)	(.014)	(.019)	(.019)	(.011)
ΔSBC_{t-2}	-.009	-.030**	-.006	-.025*	.019*	.019	-.029**	-.006
	(.006)	(.013)	(.019)	(.013)	(.010)	(.014)	(.013)	(.012)
ΔNBC_t	.002	.011	-.009	.023*	.006	-.013	.018	.004
	(.005)	(.016)	(.020)	(.013)	(.013)	(.013)	(.013)	(.012)
ΔNBC_{t-1}	-.004	.001	.003	-.009	.027	-.033	-.006	-.002
	(.008)	(.014)	(.026)	(.017)	(.025)	(.021)	(.013)	(.008)
ΔNBC_{t-2}	.010*	.013	.001	-.007	.022	.033	.016	.005
	(.006)	(.014)	(.020)	(.017)	(.017)	(.021)	(.017)	(.011)
$\Delta GDP/c._{t-1}$	-.027**	-.105***	-.043	-.032	.060**	-.140***	.040	-.015
	(.012)	(.030)	(.057)	(.030)	(.028)	(.037)	(.045)	(.027)
ΔXR_{t-1}	.001	-.000	.006	.001	.001	.000	.001	.004
	(.001)	(.002)	(.004)	(.002)	(.001)	(.002)	(.002)	(.002)
$\Delta Openness_{t-1}$	.000	-.001**	.000	-.000**	.000	.000	-.000	-.000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
$\Delta ReformGap_{t-1}$	.100	-.435**	-.347	.053	.122	-.100	.029	-.564***
	(.103)	(.206)	(.311)	(.178)	(.157)	(.174)	(.216)	(.163)
$\Delta Gap*GDP_{t-1}$	-.016	.040*	.042	-.016	-.021	-.002	-.012	.059***
	(.012)	(.023)	(.035)	(.020)	(.019)	(.021)	(.026)	(.019)
$\Delta Gap*XR_{t-1}$	-.001	.002	-.009	.001	.000	.004	.011***	.004
	(.003)	(.004)	(.013)	(.004)	(.002)	(.003)	(.003)	(.004)
N	1589	1589	1589	1589	1589	1589	1589	1589
No. clusters	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

Notes: The table presents results from estimating equation (1) by Arellano-Bond (1991) one-step robust difference GMM with full set of instruments, as explained in the text. Cr Cont means overall credit controls, IR Cont - Interest rate controls, Ent Bar - entry barriers and pro-competition measures in the banking system, B Sup - banking supervision, Priv - banking privatization, Cap Cont - international capital controls, Sec Mkt - policies on the securities markets, Overall - the overall index of reforms as constructed originally by ADT. The variables $\Delta Reform_{t-1}$ and $\Delta Reform_{t-1}^2$ are model-specific, representing the lags of the respective dependent variables. 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, Taiwan
1984	Chile, Colombia, Ghana, Peru, Spain, Thailand, Turkey	Canada, Hong Kong, Taiwan, UK, US
1985	Chile, Colombia, Ghana, Peru, Spain, Thailand, Turkey	Canada, Hong Kong, US, Venezuela
1986	Bolivia, Chile, Colombia, Ghana, Peru, Thailand	Hong Kong, US, Venezuela

Table 4 – continued from previous page

Year	Systemic Crises	Non-Systemic Crises
1987	Bangladesh, Bolivia, Colombia, Costa Rica, Ghana, Norway, Peru, Philippines, Tanzania, Thailand	Denmark, New Zealand, US
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

Table 4 – continued from previous page

Year	Systemic Crises	Non-Systemic Crises
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
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	-

Table 4 – continued from previous page

Year	Systemic Crises	Non-Systemic Crises
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 (2008b) work is used.

Highlights

for the

Banking crises and reversals in financial reforms paper.

- A large number of countries went through banking crises at some point in their modern history since the early 1970s. This work links those crises with the within-country patterns of various financial reforms.
- To deal with the endogeneity of the local crises, their exogenous component is identified with banking crises in major trading partners. This is the first contribution of the paper.
- GMM methods are used to ensure consistency of the results in the presence of financial regulatory dynamics which is also novel in the financial crises and ex-post financial reforms literature.
- The results suggest that systemic banking crises do reverse financial reforms with various lags, whereas the impact of non-systemic crises is largely insignificant. In addition, the ex-post reforms depend on the phase of the business cycle the country is in, and on the relative position of the financial liberalization to the regional reform leaders.
- The main results remain unaffected after numerous robustness checks on the GMM method.
- The main contributions of this work are introducing a more realistic crisis transmission mechanism and incorporating the inherent regulatory dynamics into the empirical analysis of financial regulatory reforms.
- A rich set of policy implications for shaping financial reforms after banking crises is also discussed.