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Financial Sector Ups and Downs and the Real Sector

Big Hindrance, Little Help

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Abstract

This paper examines how financial expansion and contraction cycles affect the broader economy through their impact on eight real economic sectors in a panel of 28 countries over 1960–2005, paying particular attention to large, or sharp, contractions and magnifying and mitigating factors. Overall, the construction sector is the most responsive to financial sector growth, with a number of others—such as government, public utilities, and transportation—also exhibiting significant sensitivity to lagged financial sector growth. Sharp fluctuations in the financial sector have asymmetric effects, with the majority of real sectors adversely affected by contractions but not helped by expansions. The adverse effects of financial contractions are transmitted almost exclusively by the financial openness channel with foreign reserves mitigating these effects with a sizeable (10 to 15 times greater) impact during sharp financial contractions. Both effects are magnified during particularly large financial contractions (with coefficients on interaction terms two to three times greater than when all contractions are considered). Consequent upon a financial contraction, the most severe real sector contractions occur in countries with high financial openness; relative predominance of construction, manufacturing, and wholesale and retail sectors; and low international reserves. Finally, the analysis finds that abrupt financial contractions are more likely to follow periods of accelerated growth, indicative of "up by the stairs, down by the elevator dynamics."

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1. Introduction and overview

The risks associated with premature liberalization and external integration of the financial sector in emerging markets have been known at least since the documentation of the Southern Cone experience by Diaz-Alejandro (1985). However, the subprime mortgage crisis which began in 2006 in the U.S. and then morphed into the Great Recession of 2008-09 shows that financial systems even in the advanced economies are vulnerable. Notably, evidence in Philippon (2008) shows that the U.S. crisis was preceded by a massive and unprecedented expansion of the financial sector between 2002 and 2007. Philippon does not find an explanation for this expansion based on the needs of the corporate sector, although as others have pointed out, this may be because of the rise of household borrowing in connection with subprime mortgage loans combined with moral hazard and excessive risk-taking.

The point emerging from the above is that the financial sector must be assessed in terms of its impact on the growth of the real sector, which is where the social costs and benefits ultimately reside. For example, the authors of the 2010 Squam Lake Report (French et al. 2010) on fixing the U.S. financial sector note (p. 26) that "…effective financial regulations require that politicians, and ultimately, the public, have an adequate understanding of the financial system. The political turmoil surrounding the Crisis suggests the importance of disseminating expert knowledge about finance to a broader audience …" The starting point of conveying such understanding in order to gain support for regulatory reform must be an analysis of the links between the financial sector and growth in the nonfinancial sector. This paper contains such an analysis looking at 8 nonfinancial sectors in 28 countries over 1960-2005.

The analysis focuses on the symmetry/asymmetry patterns of financial deepening cycles (slower increases, more abrupt collapses). Similar questions arise regarding the boom-bust cycles triggered by financial depth cycles, measured as discrete positive/negative jumps in the growth rate of real financial sector value-added. The presence of what Rajan (2006) dubbed the "hidden tail risk" manifests itself in negative skewness and high degree of kurtosis in the real growth rate of the financial sector. The asymmetries in the patterns of financial deepening are evident in the statistical analysis of higher moments (skewness, kurtosis) of financial sector growth rates. Furthermore, we find that a higher rate of financial sector growth relative to GDP raises the likelihood of future financial contractions. Philippon (2008) pointed out that such a

pattern is present in the GDP share of the financial industry in the U.S. At the aggregate level, Hassan, Sanchez and Yu (2011) study the association between financial deepening and economic growth while Cardarelli, Elekdag and Lall (2011) study determinants of financial stress transmission to the real sectors.

Given the negative skewness and "fat tail" feature of financial sector growth rates, we pay special attention to the asymmetric association between rare *sharp* financial expansions and contractions and the growth rates of the various sectors. This section complements earlier work by Rajan and Zingales (1998), Tong and Wei (2011) as well as a study by Do and Levchenko (2007) and two studies conducted by Aizenman and Sushko (2011a, 2011b), who examine how financial development and capital flows interact with external financial dependence of firms to contribute to their market values and growth. The present paper is unique in three ways: first, we focus explicitly on the determinants and the subsequent impact of "rare" events in financial sector development on the real economy; second, we analyze the impact of financial sector boom-bust cycles on different real economic sectors, allowing us to identify the ones that are most vulnerable; third, we examine how the adverse effect of such rare yet large events is amplified/mitigated by a country's financial openness and holdings of international reserves.

Our analysis proceeds in the following stages. First, for each of the sectors in the economy we run a benchmark panel regression accounting for the sector's real value added growth by lagged value added growth, the sector's productivity level, the lagged growth rate of real value added of the financial sector, and country-level macro controls: banking and currency crisis dummies, inflation, share of government spending in the economy, financial and trade openness, and the real interest rate. In addition to the baseline controls, we consider a specification that includes additional controls for structural and institutional features of each country, including the GDP shares of agriculture and industry, political stability, rule of law, and regulatory quality. This allows us to obtain rich results regarding the sensitivity of the sectors to financial expansions and contractions. The construction sector is the most sensitive, with a 1 percent higher financial sector value added growth translating into a 0.2 percent higher growth of construction sector value added the following year. Public utilities and transportation follow construction as the most sensitive sectors. Currency crises have the biggest adverse impact on construction sector growth, while public utilities are most affected by banking crises followed by the manufacturing sector.

Next, we identify financial contractions (expansions) as structural breaks in the growth rate of value added of the financial sector in each country followed by a positive (negative) growth rate. The benchmark sectoral panel regressions are modified by substituting the financial contraction or expansion dummy for the lagged financial sector growth rate. Overall, all sectors except for mining and public utilities are affected by sharp contractions in the financial sector within a year's time. Once again, the construction sector is the most sensitive. In contrast, virtually none of the sectors is affected by sharp expansions of the financial sector.

A key focus of our analysis is in identifying factors that magnify or mitigate the impact of financial contractions. We proceed by adding an interaction term between financial contractions and financial openness, and find that all the adverse effect of financial contractions on the real economy works through the financial openness channel. In addition, we include the international reserves to GDP ratio and its interaction with financial contractions. We find that reserves buffer the economy during episodes of sharp financial contraction, mitigating the adverse growth effects of financial busts. These findings are consistent with the notion that countries in which the severity of the financial shock is magnified by financial openness may rely on foreign exchange reserves to mitigate the adverse impact of such capital flight on the real sectors. The non-linear impact of reserves is most prominent in the sectors identified as most vulnerable to financial contractions: for construction sector, a 1 percentage point higher reserves to GDP ratio is associated with a 0.2 percentage point higher value added growth rate on average, but a 2.8 percentage point higher growth rate in times of financial contraction, hence partially offsetting the effect of financial contractions.

In order to examine the impact of particularly large contractions, we classify as contractions only those episodes in which the fall in the growth rate of the financial sector real value added exceeded the median of all contractions in absolute value. We find that the negative impact of financial openness and the offsetting positive effect of the stock of foreign exchange reserves are magnified during particularly large financial contraction episodes. This applies to construction and other sensitive sectors (manufacturing, wholesale and retail, and transportation).

We conclude with an economic impact analysis, and with the determinants of financial contractions. Applying a probit specification, we find that abrupt financial contractions are more likely to take place following a period of accelerated growth of the financial sector. We validate the "up by the stairs, down by the elevator" dynamics (see Breedon (2001) who coined in the

expression in the context of foreign exchange markets) – the faster the acceleration of the financial sector the greater its predictive power of a subsequent bust.

Section 2 overviews the data, section 3 outline the methodology, section 4 discusses the results. Section 5 concludes.

2. Data

We obtain annual data on real value added and employment in 10 broad economic sectors covering a panel of 28 countries constructed by Timmer and de Vries (2009) through Groningen Growth and Development Centre (GGDC), 10-Industry Database (http://www.ggdc.net). The data cover the years 1947 through 2005; however, up to 1949 data on only 4 countries are available with the coverage jumping sharply to 26 in 1950 and to 28 in 1960. The 10 sectors are agriculture, mining, manufacturing, public utilities (electricity, gas, and water), construction, wholesale and retail (including hotels, restaurants); transport, storage, and communication; community, social, and personal services; government services, and finance, insurance, and real estate. Previous studies using the GGDC data include McMillan and Rodrik (2011). Following these authors, we increase the level of aggregation to 9 sectors by combing the data on community, social, and personal services with government services, because a number of countries, especially in Latin America, do not distinguish between the two when reporting employment or value added. We refer to the consolidated sector collectively as government.[1]

The additional controls, including real GDP per capita, inflation rates, real interest rates, and the agricultural and industrial shares of the economy, were obtained from World Bank's World Development Indicators (WDI) database. Political stability, rule of law, and regulatory quality indicators were obtained from the World Bank Governance Indicators database (http://www.govindicators.org) from indexes constructed by Kaufmann et al (2009). Data on government consumption as a share of GDP and annual value of imports and exports as a share of GDP were obtained from Penn World Tables (Heston, Summers and Aten (2009)). We construct de-facto financial openness measures using the updated and extended version of the

[1] As Timmer and de Vries (2007) point out, some activities in government services are nevertheless traded through markets. For example many personal services, but also private education and health services should be part of "market services". Government services may also include value added from public investment projects. However, the data is not detailed enough to distinguish market from non-market in these sectors.

External Wealth of Nations Mark II database developed by Lane and Milesi-Ferretti (2007) as the ratio of the sum of total financial assets and financial liabilities to GDP. Finally, we relied on Calvo and Reinhart (2000) to construct banking crisis and currency crisis.[2]

Table 1 [about here]

Table 1 shows summary statistics for financial sector real value added growth rates (calculated as log differences of dollar amounts at 1995 prices) for each country. The mean growth rate for each country is positive; however, the series for 17 out of the 28 countries exhibit negative skewness. These countries, mostly emerging markets, are: Argentina; Bolivia; Chile; Colombia; Costa Rica; Denmark; Hong Kong SAR, China; India; Indonesia; Italy; Korea; Mexico; Philippines; Singapore; Sweden; Thailand; United States; and Venezuela. In contrast, as can be seen from Table 1, countries with positively skewed financial sector growth series include mostly OECD economies.

Figure 1 [about here]

Furthermore, the average level of kurtosis is higher for countries with negative skew in the series (6.619 compared to 5.527). Figure 1 illustrates the significance of the difference in the skew via a probability plot. The difference is seen in a greater degree of deviation from the normal distribution (Gaussian bell curve) in the tails of the distribution of financial sector growth rates for the subsample of countries with negative skew. The difference is substantial: for instance, an annual growth rate of minus 20 percent in financial sector real value added has 0.0 probability of occurrence under normality, while the empirical probability in countries with positive skew is 0.1% (0.001 on the vertical axis) and an order of magnitude greater at 1.0% (0.01 on the vertical axis) in countries with negative skew. Overall, the predominance of a large number of outliers in the tails of the negative skew subsample indicates that the estimated difference in kurtosis between the two series is economically significant.

[2] The period from 2000 through 2005 represents a time of stable economic growth in most countries in our sample, also known as the "Great Moderation" (Stock and Watson (2002)). The exception to this is Argentina, where a crisis lasted from 1999 through 2002.

Combined, the summary statistics indicate fat tails and higher frequency of occurrences of sudden declines in financial sector value added than predicted by a symmetric normal distribution, corroborating that notion that financial industry, while growing over the long-run, is subject to abrupt, periodic contractions. Furthermore, this feature is more pronounced in emerging markets and a sub-group of developed countries, namely Denmark, Italy, Sweden, and the United States.

Table 2 [about here]

Table 2 shows pairwise correlation statistics for sectoral growth rates. The highest degree of contemporaneous correlation is observed between public utilities and financial sector followed by construction and financial sector (with correlation coefficients of 0.84 and 0.66 respectively).

3. Methodology

a. Regression analysis

Let $FIN.GROWTH_t = \ln\left(Real\ Value\ Added_{FIN,t}\right) - \ln\left(Real\ Value\ Added_{FIN,t-1}\right)$ denote the growth rate of real value added of the financial sector. First, we examine data stationary. Non-stationary data can results in spurious correlation biasing coefficients upward. We implement the Augmented Dickey-Fuller (ADF) panel unit root test to test the null of $\theta = 0$ against the alternative that $\theta < 0$ in the following specification:

$$\Delta FIN.GROWTH_t = \theta FIN.GROWTH_{t-1} + \alpha_1 \Delta FIN.GROWTH_{t-1} + \alpha_2 \Delta FIN.GROWTH_{t-2} + \cdots + \alpha_p \Delta FIN.GROWTH_{t-p} + \alpha_t \quad (1)$$

Table 3 reports the results. The p-values indicate that the null of unit root is strongly rejected, indicating that the financial sector growth series is stationary. Furthermore, Table 4 reports intermediate ADF test results, with p-values indicating that the null of unit root is rejected for each country in the sample in favor of stationarity.

Tables 3 & 4 [about here]

Our baseline regression model is based on Hassan, Sanchez and Yu (2011), but focusing on sectoral rather than aggregate growth rates. Let $ROWTH_{i,k,t}$ denote the real value added growth rate of sector *i* in country *k* in year *t*. Diminishing returns in the neoclassical growth model imply a positive convergence parameter λ such that:

$$GROWTH_{i,k,t} = \lambda \left[\left(\frac{Value\ Added}{Worker} \right)^{*}_{i,k} - \frac{Value\ Added}{Worker}_{i,k,t} \right] \quad (2)$$

where $\left(\frac{Value\ Added}{Worker} \right)^{*}_{i,k}$ denotes the long-run real value added per worker implicitly determined by structural parameters in the economy. According to equation (2), the growth rate of real sectors is expected to diminish as their value added per worker converges to the latent potential level of output per worker, $\left(\frac{Value\ Added}{Worker} \right)^{*}_{i,k}$. Since the technological frontier in each sector in each country is unobservable, following Hassan, Sanchez and Yu (2011) we assume that it is a function of economic fundamentals in each country. Therefore, for each sector *i* we estimate the following model:

$$GROWTH_{i,k,t} = \alpha GROWTH_{i,k,t-1} + \beta FIN.GROWTH_{k,t-1} + \boldsymbol{\gamma}' \boldsymbol{X}_{k,t} + \delta \left(\frac{Value\ Added}{Worker}_{i,k,t-3} \right) + \varepsilon_{i,k,t} \quad (3)$$

The first term on the RHS captures any persistence in the annual value added growth rate of sector *i* in country *k*. The second term on the RHS captures perturbations due to changes in the growth rate of the financial sector and third term (the vector of controls, $\boldsymbol{X}_{k,t}$) represent determinants of long-run growth. The vector of country-level controls includes:

$$\boldsymbol{X} = \begin{bmatrix} banking\ crisis \\ currency\ crisis \\ \log\left(\frac{GDP}{cap}\right) \\ \log(inflation) \\ \log(gov't\ spending) \\ de\ facto\ financial\ openness \\ \log(trade\ openness) \\ real\ interest\ rate \end{bmatrix} \quad (4)$$

As equation (4) shows, we control for exogenous economic downturns with banking and currency crises dummies. Following Hassan, Sanchez and Yu (2011) we also control for income, inflation, share of government spending in the economy, financial and trade openness defined, and the real interest rate. As explained in greater detail in the data section, we use de-facto measures for both financial and trade openness. Financial openness is defined as the sum of a country's total foreign assets and liabilities relative to GDP while trade openness is defines as exports plus imports relative to GDP.

In addition to the baseline controls, we consider a specification that includes additional controls for economic and institutional features of each country:

$$\boldsymbol{X_{additional}} = \begin{bmatrix} agricultural\ share\ of\ economy \\ industry\ share\ of\ economy \\ political\ stability \\ rule\ of\ law \\ regulatory\ quality \end{bmatrix} \qquad (5)$$

Finally, following specification (2) we controls for an industry's relative output difference with the long-run level via the lagged real value added per worker term, $\left(\frac{Value\ Added}{Worker}_{i,k,t-3}\right)$. Since the dependent variable and the first term on the RHS are constructed using contemporaneous and up to 2nd lag value of real value added we include 3rd lag of real value added per worker in order to avoid serial correlation in the error term of regression (3).

b. Identification of sharp financial sector expansions and contractions

We define financial contractions (expansions) as structural breaks in the growth rate of value added of financial sector in each country (identified according to the innovational outlier (IO) break unit-root test in Clemente, Montanes, Reyes (1998)) followed by positive (negative) growth. The panel regression (3) is modified by substituting the financial contraction or expansion dummy for lagged financial sector growth rate:

$$GROWTH_{i,k,t} = \alpha GROWTH_{i,k,t-1} + \beta FIN.CONTRACTION/EXPANSION_{k,t-1} + \boldsymbol{\gamma}' \boldsymbol{X}_{k,t} + \delta \left(\frac{Value\ Added}{Worker}_{i,k,t-3} \right) + \varepsilon_{i,k,t} \quad (6)$$

4. Results

a. Regression results

i. Association in growth rates

Tables 5 and 6 report panel regression results based on specification (3).[3] The coefficient on lagged financial sector value added growth represents the percentage change in sector's growth rate in response to 1 percent higher financial growth.[4]

Table 5 [about here]

The regression results indicate that various sectors exhibit different degrees of sensitivity to financial growth and contractions. All the statistically significant coefficients are positive, indicating a positive association between growth in the financial sector and the real sectors. Specifically, construction, public utilities, and transportation sectors exhibit statistically significant sensitivity to growth and contractions in the financial sector. Construction is the most sensitive with a coefficient of 0.17 (statistically significant at 1 percent confidence level) indicating that a 1 percent increase in financial sector value added growth translates into a 0.2 percent increase in construction sector value added growth the following year. The coefficient of 0.08 for public utilities sector is also significant at the 1 percent level, followed by a 0.05 coefficient for the transportation sector regressions (significant at the 10 percent level).

[3] As a robustness check, we also conducted panel regressions excluding the lagged value added per worker term (fourth term on the RHS of equation (3)) due to concern about possible serial correlation in the errors. The coefficients on lagged financial sector growth, except for government sector, are robust to the exclusion of the 3-lag "convergence factor."

[4] The panel estimation was performed with fixed effects specification, as the coefficients are statistically significantly different under the random effects as reported in the Hausman test results.

Consistent with diminishing marginal returns and the convergence hypothesis of the neoclassical growth theory, all the statistically significant coefficients on the "convergence factor" (3-lag value added per worker) are negative, ranging from -0.038 for the mining sector to -0.018 for wholesale and retail sector. The coefficient on the "convergence factor" for the construction sector is -0.015, but not significant at the 10 percent level, indicating that construction industry does not exhibit statistically significant diminishing returns.

The coefficients on banking and currency crises are negative in all the specifications; however, the sectors exhibit different degrees of sensitivity to such episodes. Currency crises have the most adverse impact on construction sector growth (coefficient of -0.04), while public utilities sectors are most affected by banking crises followed by the manufacturing sectors (coefficients of approximately -0.03). The coefficients on remaining controls are generally consistent with theory. Inflation and government spending exhibit a negative association with sectoral value added growth, while trade openness has a positive association.[5] Interestingly, the coefficient on de-facto financial openness is only significant for the construction sector regression, and is negative and significant at the 1 percent level.

Table 6 [about here]

Table 6 reports analogous regression results with the additional set of controls for agricultural versus industrial shares, and institutional quality of each economy. The results discussed above are robust to the inclusion of additional controls, with the coefficient on lagged financial growth in the construction sector regression exhibiting a higher magnitude than in the baseline specification (0.22 compared to 0.17).

ii. Financial shocks

Tables 7 and 8 report panel regression results based on specification (6) with lagged financial value added growth replaced by the financial sector contraction and expansion dummy

[5] The data on government spending obtained from Heston, Summers and Aten (2009), which includes collective consumption of government for public good type activities, like police (at constant prices).

variables. The coefficients on other controls are omitted for brevity. Overall, more sectors exhibit sensitivity to sharp financial contractions rather than in the continuous growth rates specification.

Tables 7 & 8 [about here]

The results in Table 7 show that all sectors except for mining and public utilities are affected by sharp contractions in the financial sector within a year's time. Once again, the construction sector is the most sensitive. In contrast, as Table 8 shows, virtually none of the sectors is affected by sharp expansions of the financial sector[6].

Table 9 [about here]

The next specification reported in Table 9 addresses the association between financial openness of an economy and the degree to which sharp contractions in financial sector growth translate into contractions of the real economy. This specification adds an interaction term between financial contractions and financial openness. Once the interaction term is included in the regressions, the coefficients on financial contraction dummies themselves become either insignificant or positive, indicating that the entire adverse effect of financial contractions on the real economy works through the financial openness channel. Again, the construction sector exhibits the highest sensitivity to financial contractions propagated through cross-border capital flows, with a coefficient of -0.23 (bottom panel of Table 9), followed by retail and transportation (-0.16), government (-0.13), wholesale and retail (-0.13), and manufacturing (-0.11).

In addition to the interaction with financial openness, the regression specification used in Table 9 includes the reserves to GDP ratio and its interaction with financial contractions. This extension is motivated by an extensive literature on foreign exchange reserves that points out the merits of reserve accumulation stemming from precautionary motives to mitigate the adverse effects of capital flight. The coefficients on both the linear reserves/GDP ratio and its interaction with financial contractions are positive – a higher reserves chest is associated with higher value added growth rates of the real sectors. Furthermore, comparing the coefficients on *Lag (reserves/gdp)* and on *Lag fin. contraction × (reserves/gdp)* in both top and bottom panels of

[6] These results are robust to alternative lag structures of up to 5years

Table 9, the coefficients on the interaction terms are 10 to 15 times greater in magnitude. Since the interaction term captures the association between foreign exchange reserves specifically in times of financial contractions (when *Lag financial contraction* dummy takes on the value 1), this indicates that the positive effect of reserves on real sector growth is especially prominent during the episodes of sharp financial contraction. This finding suggests that countries in which the severity of the financial shock is magnified by financial openness rely on foreign exchange reserves to mitigate the adverse impact of such capital flight on the real sectors. The non-linear impact of reserves is most prominent in the sectors identified as most vulnerable to financial contractions: for construction sector, a 1 percentage point higher reserves to GDP ratio is associated with 0.2 percent higher value added growth rate on average, but a 2.8 percent higher growth rate in times of financial contractions (hence partially offsetting the effect of financial contractions).[7]

Figure 2 [about here]

Figure 2 illustrates the degree to which foreign exchange reserves have served to mitigate the impact of sharp financial contractions in financially open economies on real sector value added growth rates. The four panels in the figure focus on sectors most affected by financial contractions: construction, manufacturing, wholesale and retail, and transportation. The figure plots predicted contribution of financial openness (solid line) and financial openness plus reserves (dotted line) to real value added growth rates of each sector during financial contractions episodes. Predicted contribution is calculated by multiplying the coefficients from panel regression in the full specification reported in Table 9 by the values of financial openness and reserve to GDP ratio (conditioning on financial contraction dummy taking on the value of

[7] Regression coefficients on financial openness and the reserves-to-GDP ratio have different interpretations because of the way the data have been normalized: reserves-to-GDP ratio is in integer percentage points (1 unit increase in the variable represents a 1 percentage point rise) as in the WDI database, whereas other variables are in decimal percentage points (1 unit increase in the variable represents a 100 percentage point rise). The coefficient of 0.028 on interaction with the reserves-to-GDP ratio indicates that a 1 percentage point higher reserves relative to GDP during contractions is associated with 2.8 percent higher growth rate of construction sector real value added. In contrast, the coefficient of -0.233 on the interaction term with financial openness indicates a 1 percentage point greater de-facto openness during contractions is associated with 0.2 percent lower growth rate of construction sector real value added. The economic significance of these offsetting effects depends not only on the elasticities, but on the average values of each variable as discussed later in the text.

1).[8] As the panels for all sectors show, a rise in financial openness is associated with much greater contractions of real value added growth rate in the four sectors during years following sharp contractions in the financial sector. The association is steepest for construction sector (with over 50 percent decline predicted in the most severe case of Indonesian contraction in 1998) followed by transportation sector (with decline in Indonesia exceeding 30 percent). These represent counterfactual predictions holding reserves and other explanatory variables fixed at zero. The inclusion of reserves diminishes the negative association with financial openness significantly. In all cases, accounting for foreign exchange reserve holdings of each country during a contraction episode shifts the curve upward and reduces the slope, indicating a dampening effect. For the less sensitive sectors (manufacturing along with wholesale and retail) reserves alone offset the negative effect of financial openness on average. However, the contribution of reserves, while significantly positive, is not enough to eliminate the negative impact of financial openness as the propagation mechanism in the most sensitive sectors of construction and transportation. For instance, taking the case of Argentina in 1989 (which had total foreign financial assets and liabilities summing to approximately 130 percent of GDP), its stockpile of foreign exchange reserves is estimated to have reduced the decline in the construction industry from over 30 to less than 10 percent. Similar observations, albeit of differing magnitude, can be made regarding other financial contraction episodes.

The dominance of financial openness in accounting for the negative effect of financial contractions on the real economy suggests that most of the significant financial sector contractions during our sample period probably resulted from sharp reversals in foreign financial capital inflows, or sudden-stops. Table 10 lists year-country pairs of the financial contraction episodes along with the magnitude of the actual contraction (the percentage change in financial sector real value added relative to the previous year). The third column indicates whether that episode matches with an episode of sudden-stop identified by past literature. Of the 12 post-1980 financial contraction episodes, 9 are associated with a sudden-stop.

Table 10 [about here]

[8] By construction, the points associated with sole impact of financial openness form a straight line, as they represent regression coefficients scaled by the values of the variable on the horizontal axis.

The economic literature on sudden stops was motivated by the 1994 Mexican crisis, with episodes of sudden-stops subsequently identified for many emerging market economies going back to the 1980s, the period of substantial cross-border private capital flow liberalization. The link between sudden stops and output loss has also been excessively investigated in recent years. In particular, consistent with short-run dynamics between financial contractions and drops in real sector value added growth rates identified in this paper, Hutchison and Noy (2006) find that sudden-stop crises have a large but short-lived negative effect on output over and above that of currency crises. Calvo and Reinhart (2000) attribute the link between sudden-stops and output collapses to the credit channel, whereby abrupt stops in foreign capital inflows cause local credit markets to dry up, thus reducing investment and domestic demand. A related channel, emphasized by Mendoza (2001), concerns the combined effect of sudden-stops and currency crises, whereby the deterioration of collateral in the financial sector causes debt deflation followed by real contraction. Against this theoretical backdrop, our regression results identify industries most susceptible to credit contractions and deteriorations in financial collateral values induced by a sudden-stop. The construction sector appears the most sensitive, followed by transportation (which also includes the highly credit-based shipping industry), wholesale and retail trade, and manufacturing.

Given the complex non-linear associations between financial contractions and real sector growth rates, we repeat the exercise of interacting financial contraction dummies with financial openness and foreign exchange reserves focusing only on the right-hand side of the distribution of financial contraction episodes, i.e., really big contractions. As Table 10 shows, the size of the contraction varies greatly by for each episode. Latin American economies experienced some of the largest drops in financial sector growth: with Venezuela experiencing a 35.9 percent drop in 1960, Costa Rica experiencing a 55.0 percent drop in 1959, and Chile experiencing a whopping 83.5 percent contraction in real financial sector value added in 1982. Several Asian economies also underwent large financial contractions, with Indonesia experiencing a 28.4 percent drop in 1997 during the Asian Financial Crisis. On the other hand, financial contractions in other, especially European economies, tended to be much smaller in magnitude. For instance, in 1951 Britain's financial sector growth rate simply declined to zero, while Sweden experienced mild contractions of 0.6 and 2.8 percent in 1975 and 1992 respectively.

Table 11 [about here]

In order to examine the impact of particularly large contractions, we reclassify as contractions only those episodes in which the fall in the growth rate of the financial sector real value added exceeded the median of all contractions in absolute value (those exceeding the sample median of -9.34 percent drop in financial sector real value added over one year).[9] As the results in Table 11 show, the negative impact of financial openness and the offsetting positive effect of the stock of foreign exchange reserves are magnified during particularly large financial contraction episodes. In the construction sector regressions, the coefficient on the interaction of financial contraction with financial openness is -0.66 (compared to -0.23 when all negative structural breaks in financial growth are counted as contractions as in Table 9). Similarly, the coefficient on the interaction of financial contraction with the reserves to GDP ratio is 0.083 (compared to 0.028 in the unrestricted specification). A similar pattern is observed for other sensitive sectors (manufacturing, wholesale and retail, and transportation), with the coefficient on the interaction terms doubling or tripling in absolute value.

b. Economic impact analysis

This section quantifies the economic magnitude of the impact of financial contractions on growth of various sectors based on the regression estimates and values of state variables during the contraction episodes. Based on regression specification (6), the partial effect of financial contraction on the growth rate of sector *i* in country *k* in period *t* can be expressed as follows:

[9] The cutoff is given by Argentina's contraction episode in 2000, when during the onset of the crisis the annual growth rate of the financial sector fell to -9.43 percent. The Argentine crisis lasted several years; however we are interested in the immediate impact of financial contractions on the real sector, as during the subsequent years of the crisis the channels of contagion are likely to multiply and become more complex. Moreover, only the initial phase of each crisis in our sample is characterized by a negative structural break in the financial sector growth rate, with subsequent years either exhibiting a reversal or a persistently low (or negative) growth rate, making it appropriate to rely on the quasi-event study approach employed in this paper with dummy variables for the year of structural break. Finally, to the extent that we control for currency and banking crises years, we are able to pick up the impact of financial contractions on the real sectors in isolation and irrespective of the cause of the underlying contraction or the duration of the crisis.

$$\frac{\partial GROWTH_{i,k,t}}{\partial FIN.CONTRACTION_{k,t-1}} = \hat{\beta}_{CONTRACT.} + \hat{\beta}_{CONTRACT.\times OPEN} \times Fin.Open_{k,t} + \hat{\beta}_{CONTRACT.\times IR} \times IR_{k,t} \quad (7)$$

In addition, we estimate the impact on the aggregate real sector growth rate as the sum across all *i* sectors of partial impact on each sector weighted by that sector's share in total real economy value added in country *k* in period *t*:

$$\frac{\partial GROWTH_{k,t}}{\partial FIN.CONTRACTION_{k,t-1}} = \sum_i \frac{\partial GROWTH_{i,k,t}}{\partial FIN.CONTRACTION_{k,t-1}} \times w_i \quad (8)$$

Table 12 lists relative shares, w_i, of each sector during each financial contraction episode in our sample. In computing the real value added shares, financial and government sectors are excluded from the denominator. India boasted the largest share of agricultural sector, at 53.1 percent of total real non-government sectors [when], followed by Latin American countries such as Colombia and Costa Rica (at 33.1 and 38.6 percent), and Asian economies such as Philippines and Malaysia (at 27.0 and 25.5 percent). In contrast, OECD countries such as United Kingdom and Sweden, as well as Taiwan, China, exhibit the largest relative shares of manufacturing sector value added, 40.6, 41.0, and 46.4 percent respectively. Wholesale and retail sector is another important component for a number of countries under consideration, especially Latin American economies such as Costa Rica and Argentina with relative weights of this sector at 31.7 and 28.6 percent respectively. Overall, construction sector ranks behind agriculture, manufacturing, and wholesale and retail sectors for most of the economies, occupying similar share as transportation and storage. As such, we expect the sensitivity of the construction sector to financial shocks to be dampened by its smaller size relative to other sectors, reducing the transmission of financial contractions when considering the entire real sector. Public utilities sector is the smallest in relative size for all cross-sections.

Table 12 [about here]

Table 13 shows the estimates of the marginal impact of financial contractions on each sector's value added growth rate as well as the impact on the sum of all the sectors following

equations. The third column of Table 13 shows the actual magnitude of the financial contraction. The left-most column of each sector's panel displays the impact of a given contraction on the sector's growth rate calculated according to equation (7), the center column excludes the predicted impact of foreign exchange reserves (the last term on the RHS of (7)), giving a counterfactual estimate of the predicted decline in the growth rate of a particular sector had the country's reserves/GDP ratio been zero. The right-most column of each panel thus shows the marginal impact of reserves in offsetting the negative impact of financial contractions (difference between left-most and middle columns of each panel). The panel entitled Real Economy Total display analogous results as each individual sector panel aggregated according to equation (8).

Table 13 [about here]

The financial contraction episodes associated with the largest predicted cumulative impact belong to Taiwan, China in 1982 and Argentina in 1989, with predicted declines in total real economy value added of 11.0 and 10.5 percent respectively. For comparison, the actual contraction of GDP in Argentina in 1989 was 7.5 percent. These predicted declines are associated with a 1.7 percent financial contraction for Taiwan, China and 5.5 percent contraction for Argentina. In contrast to the majority of other episodes listed in the table, in which the pass-through of the financial contraction to real sector contraction was imperfect, the effect of financial contractions appears to have been magnified for Taiwan, China and Argentina. According to our empirical estimates, this would have been due to two reasons. First, both countries boast a high degree of de-facto financial openness, with the sum of financial assets and liabilities having been 75.7 percent of GDP for Taiwan, China in 1982 and 132.3 percent of GDP in Argentina in 1989. Second, while the most sensitive construction sector was relatively small in both countries, these economies were highly reliant on the second-most sensitive sectors, namely manufacturing and wholesale and retail (see Table 12). Combined, these factors would have served to amplify rather than dampen the financial shock. In addition, unlike Argentina, Taiwan, China entered its financial contraction episode in 1982 with virtually no foreign exchange reserves, which explains while the amplification of the financial shock is estimated to have been on the order of 10 for Taiwan, China compared to the order of 2 for Argentina. As the middle column of the panel titled "Real Economy Total" shows, we estimate

that the decline in Argentina's real non-government sectors would have been 17.1 rather than 10.4 percent had it not entered the period with substantial foreign exchange reserves. Overall, while each episode decomposed in Table 13 is unique, the impact of foreign exchange reserves is unambiguously positive in all sectors, sometimes enough to prevent a real economy decline in response to a negative financial shock altogether (as indicated by our estimate of the zero reserve counterfactual for Chile in 1982 and Malaysia in 1985).

c. Determinants of financial contractions

Given the significant adverse impact of financial contractions on the growth of real sectors, this section examines the determinants of the likelihood of such financial contractions. Specifically, negative skewness of the growth rate of financial sector real value added (see Table 1), along with high degree of kurtosis, may indicate "up by the stairs, down by the elevator" dynamics, whereby sharp financial contraction are more likely to occur following periods of sustained growth accelerations of the financial sector. We use a probit estimation methodology: for a country *k* we estimate the conditional probability of *LARGE* financial contractions, $FIN.CONTRACTION_{k,t}=1$, given the set of controls:

$$\Pr\left(FIN.CONTRACTION_{k,t}=1\middle|x_{k,t},\boldsymbol{Controls}_{k,t},\beta,\boldsymbol{\gamma},\right)=1-\Phi(\beta x_{k,t}+\boldsymbol{Controls}_{k,t}{}'\,\boldsymbol{\gamma}) \quad (9)$$

where $x_{k,t}\equiv\frac{1}{n}\sum_{s=1}^{n}dlog(Fin.\ value\ added_{t-s})-\frac{1}{n}\sum_{s=1}^{n}dlog(GDP_{t-s})$, denotes the difference of either 3-year or 5-year average growth rate of financial sector real value added to the average GDP growth rate, one year before the contraction episode. Thus, the ratio captures the degree to which the growth rate of the financial sector exceeded the growth rate of GDP. A positive β would indicate that the likelihood of sharp financial contraction is increasing in the excess growth of financial sector relative to GDP 3 or 5 years prior. $\Phi(\ )$ denotes the cumulative distribution function of a standard normal variable and the vector of controls includes currency crisis dummy and lagged logarithm of government spending one year prior.[10,11] We also repeat

[10] Under a logistical distribution: $\Phi=e^{-\left(\beta x_{k,t}+\boldsymbol{Controls}_{k,t}{}'\,\boldsymbol{\gamma}\right)}/\left(1+e^{-\left(\beta x_{k,t}+\boldsymbol{Controls}_{k,t}{}'\,\boldsymbol{\gamma}\right)}\right)$

the exercise using a logit model, because it has the advantage of producing a better fit to the extremes of the distribution. The banking crisis dummy is dropped from the controls because it predicts the outcome of large financial contractions perfectly, that is all large negative financial sector shocks are also accompanied by banking crises in our sample. The estimation is conducted with robust standard errors clustered by country, as several countries in the sample undergo more than one contraction episode.

Table 14 [about here]

Table 14 shows the estimation results. Columns (1), (2), (5), and (6) show results based on probit while columns (3), (4), (7), and (8) show results based on logit regressions, with and without lagged government spending as a control variable. The top panel calculates the excess of the financial sector growth rate relative to GDP using 3-year averages while the bottom panel uses 5-year averages. As expected, the coefficients on currency crises are highly significant, indicating a strong association with sharp contractions in financial sector growth. Despite the inclusion of the crises dummies, the coefficients on growth rate of financial sector relative to GDP growth preceding sharp contractions are also significant, indicating that excess financial sector growth is a strong predictor of a large subsequent contraction. Both the magnitude and the level of significance of the coefficients are higher when 3-year rather than 5-year averages are used, indicating that is it the immediate acceleration of financial sector that has the highest probability of resulting in a bust. This confirms our primary hypothesis that financial sector growth is subject to abrupt reversals, which are more likely to take place following period of accelerated growth ("up by the stairs, down by the elevator dynamic"). This feature of asymmetric booms and busts in financial industry was pointed out previously by Philippon (2008) for the U.S. and we find that it applies more universally to large number of developing and developed countries in our sample.[12]

[11] We government spending in the vector of controls, because in preliminary specification test of equation (9) with country level controls taken from baseline panel regressions lagged government spending consistently featured significant coefficients.

[12] The statistically significant positive association between size of government spending and financial contractions may have several interpretations, including : the crowding out of private investment and deficits financed through inflationary policies; we leave these questions for further research.

Having obtained the coefficient vector, we can evaluate the marginal effect of financial sector growth accelerations on the conditional expectation of a *LARGE* financial contraction:

$$\frac{\partial E(FIN.CONTRACTION_{k,t}=1|x_{k,t},\boldsymbol{Controls}_{k,t},\hat{\beta},\hat{\gamma},)}{\partial x_{k,t}} = \Phi'(-(\hat{\beta}\bar{x}_{k,t} + \boldsymbol{Controls}_{k,t}{}'\hat{\boldsymbol{\gamma}}))\hat{\beta}. \qquad (10)$$

where the marginal contribution of each conditioning variable to the probability of $FIN.CONTRACTION_{k,t}=1$ is estimated at the sample average of government expenditures and currency crisis dummy set to 1. We use coefficient estimates of $\hat{\beta}$ from probit specification (2) and logit specification (4) in Table 14 to calculate lower and upper bounds of the marginal effect of excess financial sector growth on the probability of a future financial contraction according to equation (10). The marginal effect based on the probit specification (2) in Table 14 is 0.038 while that based on the logit specification (4) is 0.043, indicating financial contractions have approximately 4 percent greater probability of occurrence if during the preceding 3 years the growth rate of the financial sector value added was double that of the average GDP growth over the same period.

5. Conclusion and future research

Our empirical study validates the asymmetric nature of financial intermediation whereby financial contractions are associated with a large decline in the value added of key real sectors but financial expansions do not seem to have much effect. This asymmetric feature was pointed out previously by Philippon (2008) for the U.S., and we find that it applies more universally to a large number of developing and developed countries. This finding is important, as the U.S.'s position as the supplier of the key global currency allows it to buffer its exposure to financial contractions by the FED's quantitative easing policies, *de facto* supplying the key reserve currency elastically. Emerging markets and developing countries, which lack this capacity, would therefore benefit by paying more attention to the factors magnifying and mitigating their exposure to costly financial contractions.

For this latter group of countries, our finding that the adverse effects of abrupt financial contractions are magnified by financial openness and mitigated by international reserves has

special significance. Remarkably, 9 out of the 12 post-1980 financial contraction episodes were identified as sudden stops in capital flows, all except for Sweden in 1992 in emerging markets. This demonstrated vulnerability to capital account openness finds its echo in the prevalent "self-insurance" trend among emerging markets, where the growing financial integration of the last two decades exposed them to sudden stops and capital flight crises, propagating an unprecedented accumulation of international reserves to serve as a financial buffer in turbulent times [see Aizenman and Lee (2007) and Obstfeld, Shambaugh and Taylor (2010). Aizenman and Pinto (2011) review the policy lessons].

We also find that abrupt financial contractions are more likely to take place following periods of accelerated growth in the financial sector– the more immediate the acceleration of the financial sector, the greater its predictive power of a subsequent bust. Our analysis can be extended in numerous ways. With more detailed data, one would be able to evaluate the contribution of financial accelerations and contractions to the productivity of the economy, identifying more precisely the conditions under which too rapid expansion of financial intermediation is inefficient and destabilizing to the real economy.

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Tables and Figures

Table 1: Summary statistics for yr/yr % chng. in value added (1995 prices) of financial sector.

Country	Mean	Max	Min.	Std. Dev.	Skew.	Kurt.	Obs.
Argentina	0.022	0.185	-0.220	0.076	-0.382	4.255	55
Bolivia	0.038	0.347	-0.405	0.118	-0.615	5.782	55
Brazil	0.054	0.231	-0.084	0.065	0.159	2.801	55
Chile	0.050	0.650	-0.835	0.172	-1.833	16.186	55
Colombia	0.061	0.247	-0.152	0.070	-0.404	5.097	55
Costa Rica	0.061	0.341	-0.550	0.120	-2.204	14.817	55
Denmark	0.040	0.140	-0.034	0.032	0.763	4.240	58
France	0.039	0.101	-0.008	0.028	0.561	2.350	55
Germany	0.060	0.116	0.025	0.023	0.565	2.503	41
Hong Kong SAR, Chin	0.068	0.189	-0.070	0.061	-0.132	3.126	31
India	0.081	0.195	-0.100	0.059	-0.568	3.375	55
Indonesia	0.095	0.542	-0.284	0.131	-0.209	6.926	43
Italy	0.034	0.071	-0.007	0.020	-0.092	2.149	54
Japan	0.068	0.358	-0.191	0.079	0.550	7.044	51
Korea, Rep.	0.047	0.131	-0.075	0.041	-0.347	3.308	52
Malaysia	0.112	0.550	-0.019	0.092	3.071	15.946	35
Mexico	0.060	0.148	-0.084	0.048	-0.417	3.768	55
Netherlands	0.050	0.253	-0.031	0.043	2.443	12.883	45
Peru	0.050	0.222	-0.117	0.062	0.336	4.364	55
Philippines	0.047	0.148	-0.216	0.077	-1.588	6.415	34
Singapore	0.090	0.171	-0.026	0.048	-0.347	2.303	45
Spain	0.044	0.142	-0.018	0.035	0.524	3.192	58
Sweden	0.031	0.065	-0.028	0.016	-1.008	5.808	55
Taiwan	0.095	0.261	-0.025	0.069	0.280	2.509	44
Thailand	0.093	0.437	-0.399	0.144	-1.073	6.074	54
United Kingdom	0.034	0.090	-0.011	0.021	0.226	2.961	58
United States	0.042	0.070	0.000	0.015	-0.707	3.560	58
Venezuela, RB	0.049	0.332	-0.359	0.117	-0.341	4.888	55

Notes: The table shows summary statistics for real value added growth rates (calculated as log differences of dollar amounts at 1995 prices) for each country for financial sector. Note that the GGDC 10-Industry Database includes insurance and real estate services into the financial sector. The mean growth rate for each country is positive; however, the series for 17 out of the 28 countries exhibit negative skewedness. Furthermore, the average level of kurtosis is higher for countries with negative skew in the series (6.619 compared to 5.527). Combined, the summary statistic indicate fat tails and higher frequency of occurrences of sudden declines in financial sector value added then predicted by a symmetric normal distribution, corroborating that notion that financial industry, while growing in the long-run, is subject to abrupt periodic contractions.

Table 2: Pairwise correlations of value added growth rates for the 9 sectors.

	Finance	Agriculture	Construction	Government	Mining	Manufacturing	Public utilities	Transportation
Agriculture	0.0533*	1						
	(0.0444)							
Construction	0.6573*	0.1091*	1					
	(0.0000)	(0.0000)						
Government	0.2544*	0.1084*	0.2766*	1				
	(0.0000)	(0.0000)	(0.0000)					
Mining	0.039	0.0419	0.0861*	0.1039*	1			
	(0.1410)	(0.1143)	(0.0012)	(0.0001)				
Manufacturing	0.1699*	0.1537*	0.4036*	0.3125*	0.1745*	1		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
Public utilities	0.8433*	0.0284	0.5896*	0.2001*	0.0723*	0.2069*	1	
	(0.0000)	(0.2838)	(0.0000)	(0.0000)	0.0064	(0.0000)		
Transportation	-0.1583*	0.1147*	0.1195*	0.2897*	0.1018*	0.5314*	-0.1714*	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
Wholesale, retail	-0.4761*	0.0918*	-0.0777*	0.3582*	0.1084*	0.4539*	-0.4989*	0.6070*
	(0.0000)	(0.0005)	(0.0034)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Notes: * indicates correlation coefficients significant at 10 percent level of higher, p-values in parentheses. The highest degree of contemporaneous correlation is observed between public utilities and financial sector followed by construction and financial sector (with correlation coefficients of 0.84 and 0.66 respectively).

Table 3: Augmented Dickey-Fuller (ADF) Panel Unit Root Test Results

Method	Statistic	Prob.**
ADF - Fisher Chi-square	1010.22	0.0000
ADF - Choi Z-stat	-28.7669	0.0000

Notes: Null Hypothesis: Unit root (individual unit root process). ** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality. 1388 total number of observations with 28 cross-sections. The number of augmenting lags (p) is determined by minimizing the Schwartz Bayesian information criterion. Exogenous variables: Individual effects. The p-values indicate that the null of unit root is strongly rejected, indicating that the financial sector growth series is stationary.

Table 4: Intermediate ADF test results

Cross section	Prob.	Lag	Max Lag	Obs
Argentina	0.000	0	10	54
Bolivia	0.000	0	10	54
Brazil	0.000	0	10	54
Chile	0.000	0	10	54
Colombia	0.000	0	10	54
Costa Rica	0.000	0	10	54
Denmark	0.000	2	9	38
France	0.000	1	10	56
Germany	0.000	0	10	57
Hong Kong SAR, China	0.000	0	10	54
India	0.000	0	10	57
Indonesia	0.001	0	6	30
Italy	0.000	0	9	44
Japan	0.000	1	10	53
Korea, Rep.	0.000	0	10	53
Malaysia	0.000	0	10	50
Mexico	0.000	0	10	51
Netherlands	0.000	0	10	54
Peru	0.000	0	8	34
Philippines	0.000	0	9	44
Singapore	0.000	0	10	54
Spain	0.001	0	7	33
Sweden	0.005	0	9	44
Taiwan	0.000	1	10	53
Thailand	0.000	1	10	52
United Kingdom	0.000	0	9	43
United States	0.000	1	10	56
Venezuela, RB	0.000	0	10	54

Notes: Null Hypothesis: Unit root (individual unit root process). The number of augmenting lags (p) is determined by minimizing the Schwartz Bayesian information criterion. Exogenous variables: Individual effects. The p-values indicate that the null of unit root is strongly rejected, indicating that the financial sector growth series is stationary.

Table 5: Panel regressions of sectoral real value added growth rates on lagged financial sector growth – baseline.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependent var.: value added growth rate	agriculture	construction	government	mining	manufacturing	public utilities	wholesale, retail	transportation
lag financial value added growth	0.043	**0.137****	**0.082***	-0.040	0.018	**0.069****	0.029	**0.050****
	(0.029)	**(0.058)**	**(0.045)**	(0.052)	(0.029)	**(0.029)**	(0.028)	**(0.023)**
banking crisis	-0.014	-0.018	-0.007	0.003	**-0.028****	**-0.029****	**-0.018***	-0.006
	(0.012)	(0.021)	(0.018)	(0.022)	**(0.011)**	**(0.012)**	**(0.011)**	(0.009)
currency crisis	-0.010	**-0.041*****	-0.006	0.003	**-0.016****	**-0.017****	**-0.014****	**-0.014****
	(0.008)	**(0.014)**	(0.012)	(0.015)	**(0.008)**	**(0.008)**	**(0.007)**	**(0.006)**
log(gdp/cap)	0.001	0.003	**-0.014****	**-0.016****	**-0.021*****	**-0.013*****	-0.004	**-0.009****
	(0.005)	(0.008)	**(0.007)**	**(0.008)**	**(0.004)**	**(0.005)**	(0.004)	**(0.003)**
log(inflation)	**-0.004****	**-0.014*****	-0.004	**-0.007****	**-0.012*****	**-0.004****	**-0.009*****	**-0.005*****
	(0.002)	**(0.003)**	(0.003)	**(0.003)**	**(0.002)**	**(0.002)**	**(0.002)**	**(0.001)**
log(govt spending)	-0.019	-0.035	0.009	-0.008	**-0.027****	-0.013	**-0.024***	**-0.036*****
	(0.014)	(0.025)	(0.021)	(0.025)	**(0.013)**	(0.014)	**(0.012)**	**(0.011)**
de-facto financial openness	**-0.004***	**-0.013*****	-0.006	**-0.008***	-0.002	-0.003	-0.002	**-0.005****
	(0.002)	**(0.004)**	(0.004)	**(0.004)**	(0.002)	(0.002)	(0.002)	**(0.002)**
log(trade openness)	-0.015	-0.010	**0.033****	0.002	0.008	**-0.021****	-0.007	**0.016****
	(0.010)	(0.018)	**(0.015)**	(0.018)	(0.009)	**(0.010)**	(0.009)	**(0.008)**
lag dependent variable	**-0.257*****	**0.237*****	0.015	**0.192*****	**0.139*****	-0.052	**0.167*****	**0.203*****
	(0.034)	**(0.037)**	(0.036)	**(0.035)**	**(0.037)**	(0.035)	**(0.038)**	**(0.035)**
Constant	**0.144*****	**0.172***	0.014	**0.194****	**0.277*****	**0.286*****	**0.172*****	**0.165*****
	(0.052)	**(0.091)**	(0.078)	**(0.093)**	**(0.048)**	**(0.051)**	**(0.045)**	**(0.039)**
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	827	827	827	827	827	827	827	827
R-squared	0.083	0.148	0.023	0.069	0.163	0.095	0.106	0.148
Number of countries	24	24	24	24	24	24	24	24
Hausman fixed versus random effects specification test. Ho: difference in coefficients not systematic								
chi2(8)	<0	14.71	49.95	43.47	231.07	<0	38.42	84.64
Prob>chi2	see note	0.0992	0.0000	0.0000	0.0000	see note	0.0000	0.0000

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Panel regressions of sectoral real value added growth rates on lagged financial sector growth – additional controls.

dependent var.: value added growth rate	(1) agriculture	(2) construction	(3) government	(4) mining	(5) manufacturing	(6) public utilities	(7) wholesale, retail	(8) transportation
lag financial value added growth	0.048	**0.219*** **	0.076	-0.091	0.010	**0.061***	0.040	**0.046***
	(0.038)	**(0.073)**	(0.065)	(0.062)	(0.036)	**(0.032)**	(0.034)	**(0.026)**
banking crisis	-0.003	0.003	0.002	0.008	-0.012	**-0.037*** **	-0.008	0.012
	(0.017)	(0.029)	(0.029)	(0.028)	(0.015)	**(0.014)**	(0.013)	(0.011)
currency crisis	-0.004	**-0.056*** **	-0.007	-0.006	**-0.017***	**-0.026*** **	-0.007	**-0.013***
	(0.012)	**(0.019)**	(0.020)	(0.019)	**(0.010)**	**(0.010)**	(0.009)	**(0.007)**
log(gdp/cap)	**0.018***	**0.038** **	-0.002	-0.009	-0.006	0.000	**0.023*** **	**0.026*** **
	(0.010)	**(0.016)**	(0.015)	(0.015)	(0.009)	(0.007)	**(0.007)**	**(0.006)**
log(inflation)	**-0.007** **	**-0.014*** **	0.005	-0.008	**-0.016*** **	-0.002	**-0.012*** **	**-0.006*** **
	(0.003)	**(0.005)**	(0.006)	(0.005)	**(0.003)**	(0.003)	**(0.002)**	**(0.002)**
log(govt spending)	-0.012	0.012	0.057	**-0.068***	-0.021	-0.013	0.003	**-0.038** **
	(0.024)	(0.041)	(0.042)	**(0.041)**	(0.021)	(0.020)	(0.019)	**(0.015)**
de-facto financial openness	-0.001	**-0.019*** **	-0.001	0.000	-0.001	0.001	0.002	-0.003
	(0.004)	**(0.006)**	(0.006)	(0.006)	(0.003)	(0.003)	(0.003)	(0.002)
log(trade openness)	0.014	0.025	**0.078** **	0.039	**0.046*** **	0.006	-0.006	**0.035*** **
	(0.020)	(0.031)	**(0.032)**	(0.031)	**(0.016)**	(0.015)	(0.015)	**(0.012)**
real interest rate	-0.000	-0.000	0.001	**0.001** **	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	**(0.000)**	(0.000)	(0.000)	(0.000)	(0.000)
agricultural share of economy	**0.004** **	**0.008*** **	0.003	0.001	**0.004*** **	**0.002***	**0.003*** **	0.001
	(0.002)	**(0.003)**	(0.003)	(0.002)	**(0.001)**	**(0.001)**	**(0.001)**	(0.001)
industry share of economy	**0.002** **	**0.003***	0.001	0.002	**0.003*** **	-0.000	**0.002*** **	0.000
	(0.001)	**(0.002)**	(0.002)	(0.002)	**(0.001)**	(0.001)	**(0.001)**	(0.001)
political stability	-0.015	-0.025	0.018	0.001	**-0.027***	0.002	-0.001	0.014
	(0.017)	(0.028)	(0.029)	(0.028)	**(0.014)**	(0.014)	(0.013)	(0.011)
rule of law	0.000	-0.022	0.044	0.052	**0.057** **	0.020	0.007	**-0.037***
	(0.033)	(0.055)	(0.055)	(0.054)	**(0.028)**	(0.027)	(0.026)	**(0.021)**
regulatory quality	0.002	0.046*	-0.044	-0.007	0.005	0.008	**0.023***	**0.017***
	(0.016)	(0.027)	(0.028)	(0.026)	(0.014)	(0.013)	**(0.013)**	**(0.010)**
lag dependent variable	**-0.279*** **	**0.156*** **	-0.015	0.056	**0.100** **	-0.045	0.063	0.058
	(0.041)	**(0.046)**	(0.043)	(0.042)	**(0.045)**	(0.042)	(0.045)	(0.043)
3 lag value added per worker	**-0.030** **	-0.022	0.004	**-0.049*** **	-0.017	**-0.033*** **	**-0.066*** **	**-0.080*** **
	(0.015)	(0.019)	(0.007)	**(0.010)**	(0.016)	**(0.009)**	**(0.013)**	**(0.012)**
Constant	-0.138	**-0.482***	**-0.475***	0.289	-0.095	0.202	-0.005	0.134
	(0.151)	**(0.256)**	**(0.263)**	(0.248)	(0.131)	(0.127)	(0.125)	(0.097)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	590	590	578	590	590	590	590	590
R-squared	0.099	0.148	0.025	0.098	0.151	0.123	0.158	0.196
Number of countries	24	24	24	24	24	24	24	24

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Panel regressions of the effect of sharp financial contractions on sectoral real value added growth rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependent var.: value added growth rate	agriculture	construction	government	mining	manufacturing	public utilities	wholesale, retail	transportation
				Baseline				
Lag financial contraction	**-0.034***	**-0.124*****	-0.041	-0.007	**-0.030***	-0.007	**-0.032****	**-0.037*****
	(0.018)	**(0.031)**	(0.028)	(0.031)	**(0.016)**	(0.016)	**(0.015)**	**(0.013)**
Observations	813	813	755	813	813	813	813	813
R-squared	0.094	0.155	0.020	0.090	0.164	0.120	0.118	0.164
Number of countries	24	24	24	24	24	24	24	24
				Additional controls				
Lag financial contraction	**-0.057****	**-0.132*****	-0.042	-0.006	**-0.035***	-0.006	-0.020	**-0.049*****
	(0.023)	**(0.038)**	(0.038)	(0.037)	**(0.019)**	(0.019)	(0.018)	**(0.014)**
Observations	590	590	578	590	590	590	590	590
R-squared	0.107	0.153	0.025	0.095	0.156	0.117	0.158	0.208
Number of countries	24	24	24	24	24	24	24	24

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients on controls in each specification omitted for brevity. Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Montanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by negative growth rate.

Table 8: Panel regressions of the effect of sharp financial expansions on sectoral real value added growth rates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependent var.: value added growth rate	agriculture	construction	government	mining	manufacturing	public utilities	wholesale, retail	transportation
				Baseline				
Lag financial expansion	-0.005	0.032	0.007	-0.009	0.014	-0.002	0.012	0.012
	(0.011)	(0.020)	(0.019)	(0.020)	(0.010)	(0.010)	(0.010)	(0.008)
Observations	813	813	755	813	813	813	813	813
R-squared	0.090	0.140	0.017	0.090	0.163	0.119	0.115	0.157
Number of countries	24	24	24	24	24	24	24	24
				Additional controls				
Lag financial expansion	-0.005	0.010	0.006	-0.015	0.008	0.001	-0.002	-0.006
	(0.014)	(0.024)	(0.024)	(0.024)	(0.012)	(0.012)	(0.011)	(0.009)
Observations	590	590	578	590	590	590	590	590
R-squared	0.097	0.135	0.023	0.096	0.151	0.117	0.156	0.192
Number of countries	24	24	24	24	24	24	24	24

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients on controls in each specification omitted for brevity. Financial expansion defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Motanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by positive growth rate.

Table 9: Panel regressions of the effect of sharp financial contractions on sectoral real value added growth rates; controlling for financial openness and reserve accumulation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependent var.: value added growth rate	agriculture	construction	government	mining	manufacturing	public utilities	wholesale, retail	transportation
				Baseline				
Lag financial contraction	-0.023	-0.007	-0.007	0.016	-0.010	0.027	0.059*	0.051*
	(0.041)	(0.072)	(0.065)	(0.073)	(0.037)	(0.037)	(0.035)	(0.030)
Lag fin. contraction × fin. openness	-0.015	**-0.205*** **	-0.091	-0.073	**-0.088** **	-0.033	**-0.084** **	**-0.147*** **
	(0.038)	**(0.066)**	(0.060)	(0.067)	**(0.034)**	(0.034)	**(0.033)**	**(0.027)**
Lag (reserves/gdp)	**0.001** **	**0.001***	0.000	0.000	**0.001*** **	-0.000	**0.001*** **	0.000
	(0.000)	**(0.001)**	(0.001)	(0.001)	**(0.000)**	(0.000)	**(0.000)**	(0.000)
Lag fin. contraction × (reserves/gdp)	0.001	**0.015***	0.009	0.008	**0.010** **	0.000	0.001	**0.010*** **
	(0.005)	**(0.008)**	(0.007)	(0.008)	**(0.004)**	(0.004)	(0.004)	**(0.003)**
Observations	813	813	755	813	813	813	813	813
R-squared	0.099	0.169	0.023	0.092	0.184	0.122	0.138	0.194
Number of countries	24	24	24	24	24	24	24	24
				Additional controls				
Lag financial contraction	-0.036	-0.056	0.032	-0.020	-0.053	0.067	-0.023	**0.079***
	(0.071)	(0.118)	(0.120)	(0.118)	(0.059)	(0.059)	(0.055)	**(0.043)**
Lag fin. contraction × fin. openness	0.003	**-0.233*** **	**-0.132***	-0.065	**-0.105*** **	-0.057	**-0.131*** **	**-0.156*** **
	(0.046)	**(0.077)**	**(0.079)**	(0.077)	**(0.039)**	(0.039)	**(0.036)**	**(0.028)**
Lag (reserves/gdp)	**0.001** **	**0.002** **	-0.000	-0.000	**0.002*** **	0.000	**0.002*** **	**0.001** **
	(0.001)	**(0.001)**	(0.001)	(0.001)	**(0.000)**	(0.000)	**(0.000)**	**(0.000)**
Lag fin. contraction × (reserves/gdp)	-0.003	**0.028** **	0.012	0.012	**0.019*** **	0.000	**0.022*** **	**0.009***
	(0.008)	**(0.013)**	(0.013)	(0.013)	**(0.007)**	(0.007)	**(0.006)**	**(0.005)**
Observations	590	590	578	590	590	590	590	590
R-squared	0.115	0.176	0.030	0.097	0.199	0.122	0.207	0.257
Number of countries	24	24	24	24	24	24	24	24

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients on controls in each specification omitted for brevity. Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Montanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by negative growth rate.

Table 10: Contraction episodes in financial sector growth rates

Year	Country	Contraction	Sudden Stop	Source:
1951	United Kingdom	0.00%		
1956	Colombia	-13.54%		
1959	Costa Rica	-55.01%	Most countries in the sample, except for	
1960	Venezuela	-35.94%	U.K. and Sweden, closed to private capital	
1973	India	-10.02%	flows in the pre-1980 period.	
1975	Sweden	-0.59%		
1979	Bolivia	-1.15%		
1981	Chile	-7.16%	Yes	Calvo and Reinhart (2000)
1982	Bolivia	-18.64%	No	
1982	Chile	-83.53%	Yes	Calvo and Reinhart (2000)
1982	Taiwan	-1.73%	No	
1983	Phillippines	-21.59%	Yes	Hutchison and Noy (2006)
1983	Chile	-20.73%	Yes	Calvo and Reinhart (2000)
1985	Malaysia	-1.86%	Yes	Hutchison and Noy (2006)
1988	Bolivia	-1.97%	No	
1989	Argentina	-5.48%	Yes (1991)	Calvo and Reinhart (2000)
1992	Sweden	-2.82%	Yes	Calvo, Izquierdo, Mejia (2004)
1997	Indonesia	-28.37%	Yes	Calvo, Izquierdo, Mejia (2004)
2000	Argentina	-9.34%	Yes	Calvo, Izquierdo, Mejia (2004)

Notes: Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Montanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by negative growth rate.

Table 11: Panel regressions of the effect of LARGE sharp financial contractions (above the median in absolute value) on sectoral real value added growth rates; controlling for financial openness and reserve accumulation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
dependent var.: value added growth rate	agriculture	construction	government	mining	manufacturing	public utilities	wholesale, retail	transportation
				Baseline				
Lag financial contraction	-0.016	-0.050	-0.029	-0.002	-0.036	-0.005	-0.025	0.050
	(0.054)	(0.095)	(0.086)	(0.097)	(0.049)	(0.049)	(0.046)	(0.039)
Lag fin. contraction × fin. openness	0.093	**-0.503*** **	-0.106	-0.021	**-0.201*** **	-0.012	**-0.342*** **	**-0.218*** **
	(0.063)	**(0.111)**	(0.100)	(0.113)	**(0.058)**	(0.057)	**(0.054)**	**(0.046)**
Lag (reserves/gdp)	**0.001** **	**0.001***	0.000	0.000	**0.001*** **	-0.000	**0.001*** **	0.000
	(0.000)	**(0.001)**	(0.001)	(0.001)	**(0.000)**	(0.000)	**(0.000)**	(0.000)
Lag fin. contraction × (reserves/gdp)	**-0.030** **	**0.085*** **	0.012	-0.002	**0.037*** **	-0.001	**0.070*** **	**0.025*** **
	(0.013)	**(0.023)**	(0.021)	(0.023)	**(0.012)**	(0.012)	**(0.011)**	**(0.010)**
Observations	813	813	755	813	813	813	813	813
R-squared	0.110	0.176	0.024	0.091	0.193	0.122	0.173	0.194
Number of countries	24	24	24	24	24	24	24	24
				Additional controls				
Lag financial contraction	-0.132	0.218	0.088	-0.001	0.061	0.113	**0.168** **	**0.199*** **
	(0.112)	(0.187)	(0.192)	(0.188)	(0.094)	(0.096)	**(0.085)**	**(0.069)**
Lag fin. contraction × fin. openness	**0.182***	**-0.656*** **	-0.207	-0.056	**-0.264*** **	-0.087	**-0.455*** **	**-0.289*** **
	(0.094)	**(0.156)**	(0.161)	(0.157)	**(0.079)**	(0.079)	**(0.071)**	**(0.058)**
Lag (reserves/gdp)	**0.001** **	**0.002** **	-0.000	-0.000	**0.002*** **	0.000	**0.002*** **	**0.001** **
	(0.001)	**(0.001)**	(0.001)	(0.001)	**(0.000)**	(0.000)	**(0.000)**	**(0.000)**
Lag fin. contraction × (reserves/gdp)	**-0.037*** **	**0.083*** **	0.019	0.008	**0.038*** **	0.001	**0.070*** **	**0.021** **
	(0.014)	**(0.024)**	(0.024)	(0.024)	**(0.012)**	(0.012)	**(0.011)**	**(0.009)**
Observations	590	590	578	590	590	590	590	590
R-squared	0.131	0.190	0.031	0.096	0.208	0.121	0.252	0.265
Number of countries	24	24	24	24	24	24	24	24

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficients on controls in each specification omitted for brevity. Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Montanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by a 9.34 percent (sample median) or greater contraction.

Table 12: Percentage shares of real value added within the total non-government, real economy sectors during financial contraction episodes.

Year	Country	Agriculture	Construction	Mining	Manufacturing	Public Utilities	Wholesale, Retail	Transportation
1951	United Kingdom	3.03%	9.38%	12.43%	40.58%	1.87%	23.11%	9.59%
1956	Colombia	33.10%	10.02%	4.96%	20.98%	1.82%	19.71%	9.41%
1959	Costa Rica	28.59%	7.33%	0.13%	23.61%	1.85%	31.70%	6.79%
1960	Venezuela	4.49%	9.07%	54.86%	12.70%	0.29%	14.87%	3.72%
1973	India	53.05%	6.46%	2.17%	16.32%	1.49%	14.31%	6.20%
1975	Sweden	7.53%	10.49%	1.09%	41.03%	4.05%	24.01%	11.80%
1979	Bolivia	20.37%	7.64%	17.00%	28.56%	1.64%	15.27%	9.51%
1981	Chile	7.89%	15.91%	11.42%	33.35%	4.61%	18.39%	8.43%
1982	Bolivia	22.84%	5.77%	18.24%	24.40%	2.12%	15.84%	10.79%
1982	Chile	9.15%	14.21%	14.21%	30.81%	5.39%	17.49%	8.74%
1982	Taiwan	9.58%	7.52%	2.80%	46.35%	2.83%	22.50%	8.42%
1983	Phillippines	26.98%	13.10%	1.72%	32.42%	2.94%	16.74%	6.09%
1983	Chile	9.12%	12.40%	14.18%	32.35%	5.72%	17.62%	8.62%
1985	Malaysia	25.52%	6.53%	16.81%	23.15%	3.20%	16.50%	8.29%
1988	Bolivia	24.22%	4.60%	13.51%	24.36%	2.34%	17.64%	13.34%
1989	Argentina	10.09%	9.53%	2.63%	33.50%	3.30%	28.63%	12.32%
1992	Sweden	6.24%	10.29%	0.70%	37.21%	6.63%	22.89%	16.04%
1997	Indonesia	17.24%	9.49%	13.60%	32.18%	0.56%	21.19%	5.75%
2000	Argentina	9.83%	9.37%	3.20%	28.76%	4.80%	28.61%	15.43%

Notes: Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Motanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by negative growth rate.

Table 13: Estimated partial effects of financial contractions on sectoral value added growth rates and the contribution of foreign exchange reserves.

		Fin. Cont.	Real Economy Total			Construction			Manufacturing			Wholesale, Retail			Transportation		
Year	Country	Size	δy/δCont.	IR=0	δIR	δy/δCont.	IR=0	δIR	δy/δCont.	IR=0	δIR	δy/δCont.	IR=0	δIR	δy/δCont.	IR=0	δIR
1973	India	-10.02%	-0.46%	-2.11%	1.66%	-4.24%	-9.62%	5.38%	-3.46%	-7.11%	3.65%	-0.33%	-4.56%	4.23%	6.94%	5.21%	1.73%
1975	Sweden	-0.59%	-0.11%	-7.25%	7.14%	-3.55%	-15.26%	11.71%	-1.71%	-9.65%	7.94%	1.47%	-7.73%	9.20%	5.20%	1.43%	3.76%
1979	Bolivia	-1.15%	-0.16%	-10.05%	9.89%	-6.08%	-29.58%	23.50%	-0.16%	-16.11%	15.95%	2.68%	-15.79%	18.47%	-0.60%	-8.16%	7.55%
1981	Chile	-7.16%	11.43%	-11.92%	23.35%	16.06%	-25.86%	41.92%	14.02%	-14.43%	28.44%	19.25%	-13.69%	32.94%	7.81%	-5.66%	13.47%
1982	Bolivia	-18.64%	-1.93%	-9.73%	7.80%	-11.34%	-31.74%	20.40%	-3.24%	-17.08%	13.84%	-0.97%	-17.00%	16.03%	-3.04%	-9.60%	6.56%
1982	Chile	-83.53%	3.35%	-13.89%	17.24%	0.93%	-32.43%	33.36%	5.25%	-17.39%	22.64%	8.83%	-17.39%	26.21%	0.66%	-10.07%	10.72%
1982	Taiwan	-1.73%	-10.97%	-10.97%	0.00%	-23.25%	-23.25%	0.00%	-13.25%	-13.25%	0.00%	-12.22%	-12.22%	0.00%	-3.92%	-3.92%	0.00%
1983	Phillippines	-21.59%	-4.42%	-11.01%	6.59%	-13.49%	-26.61%	13.12%	-5.86%	-14.77%	8.90%	-3.80%	-14.11%	10.31%	-1.95%	-6.16%	4.22%
1983	Chile	-20.73%	-1.72%	-16.95%	15.23%	-10.46%	-40.34%	29.88%	-0.68%	-20.95%	20.27%	1.65%	-21.83%	23.48%	-5.75%	-15.36%	9.60%
1985	Malaysia	-1.86%	2.54%	-11.08%	13.62%	-0.34%	-36.32%	35.98%	5.27%	-19.14%	24.41%	8.70%	-19.57%	28.27%	-1.10%	-12.67%	11.56%
1988	Bolivia	-1.97%	1.53%	-11.96%	13.49%	-3.38%	-37.72%	34.34%	3.53%	-19.78%	23.30%	6.62%	-20.36%	26.98%	-2.57%	-13.61%	11.04%
1989	Argentina	-5.48%	-10.37%	-17.09%	6.72%	-24.98%	-36.42%	11.44%	-11.42%	-19.19%	7.76%	-10.64%	-19.63%	8.99%	-9.06%	-12.74%	3.68%
1992	Sweden	-2.82%	-4.57%	-17.61%	13.05%	-14.56%	-36.79%	22.23%	-4.27%	-19.36%	15.09%	-2.37%	-19.84%	17.47%	-5.84%	-12.99%	7.15%
1997	Indonesia	-28.37%	1.72%	-10.18%	11.90%	-1.62%	-25.50%	23.89%	1.94%	-14.27%	16.21%	5.28%	-13.49%	18.77%	2.25%	-5.43%	7.68%
2000	Argentina	-9.34%	-1.21%	-15.86%	14.66%	-9.07%	-35.09%	26.02%	-0.93%	-18.59%	17.66%	1.56%	-18.88%	20.45%	-3.48%	-11.85%	8.36%

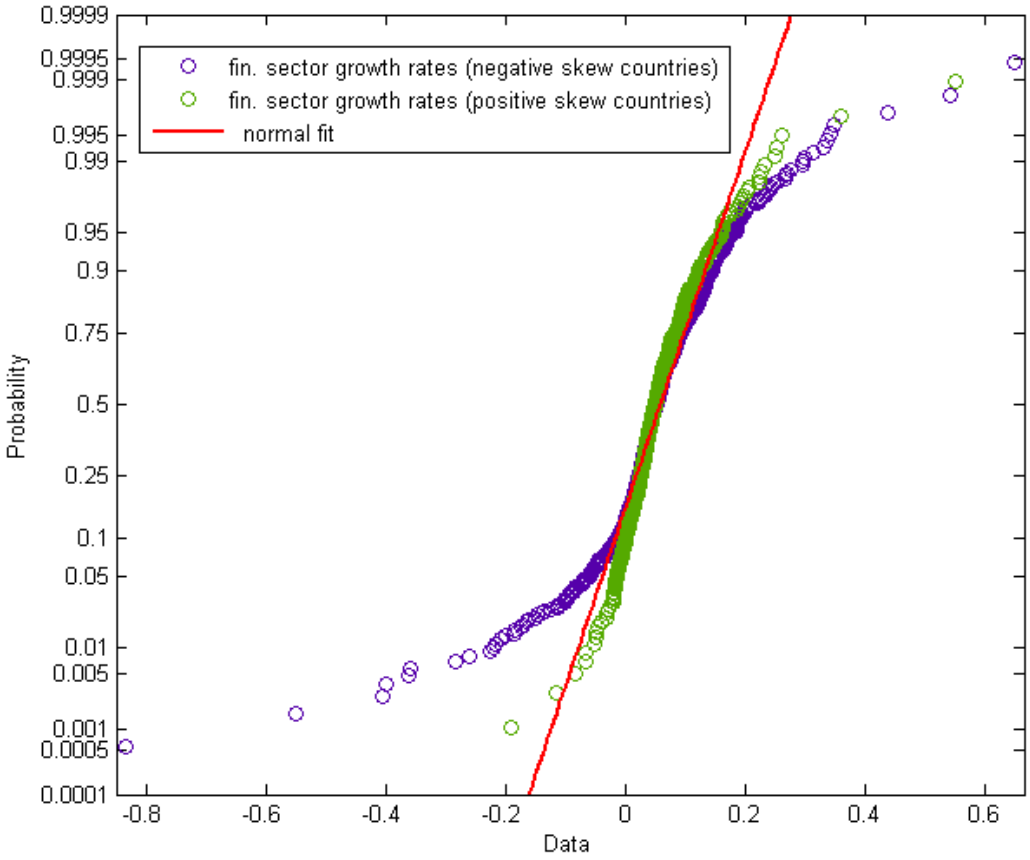
Notes: Financial contractions defined as structural breaks in the growth rate of value added of financial sector in each country (identified according to Clemente, Montanes, Reyes (1998) innovational outlier (IO) break unit-root test) followed by negative growth rate. The partial effect of financial contraction on real economy total is calculated as the sum of partial effects in individual sectors weighted by each sector's value added share.

Table 14: Determinants of financial contractions

	Probit		Logit	
dependent variable: *LARGE* financial contraction	(1)	(2)	(3)	(4)
lag dlog(value added fin.)-dlog(GDP), 3-yr. avg.	0.306**	0.297**	0.744***	0.717***
	(0.147)	(0.150)	(0.260)	(0.265)
currencycrisis	1.410***	1.376***	3.667***	3.472***
	(0.273)	(0.267)	(0.737)	(0.810)
lag log(govt spending)		0.804*		1.438
		(0.471)		(1.315)
Constant	-2.907***	-5.176***	-6.298***	-10.257***
	(0.215)	(1.274)	(0.691)	(3.427)
Pseudo R2	0.222	0.243	0.221	0.232
	(5)	(6)	(7)	(8)
lag dlog(value added fin.)-dlog(GDP), 5-yr. avg.	0.256*	0.247*	0.625**	0.601**
	(0.132)	(0.136)	(0.255)	(0.265)
currencycrisis	1.407***	1.373***	3.656***	3.462***
	(0.273)	(0.268)	(0.738)	(0.811)
lag log(govt spending)		0.804*		1.441
		(0.470)		(1.313)
Constant	-2.904***	-5.173***	-6.289***	-10.256***
	(0.216)	(1.272)	(0.691)	(3.422)
Pseudo R2	0.220	0.242	0.220	0.231
Clustering by country	yes	yes	yes	yes
Observations	1,119	1,089	1,119	1,089

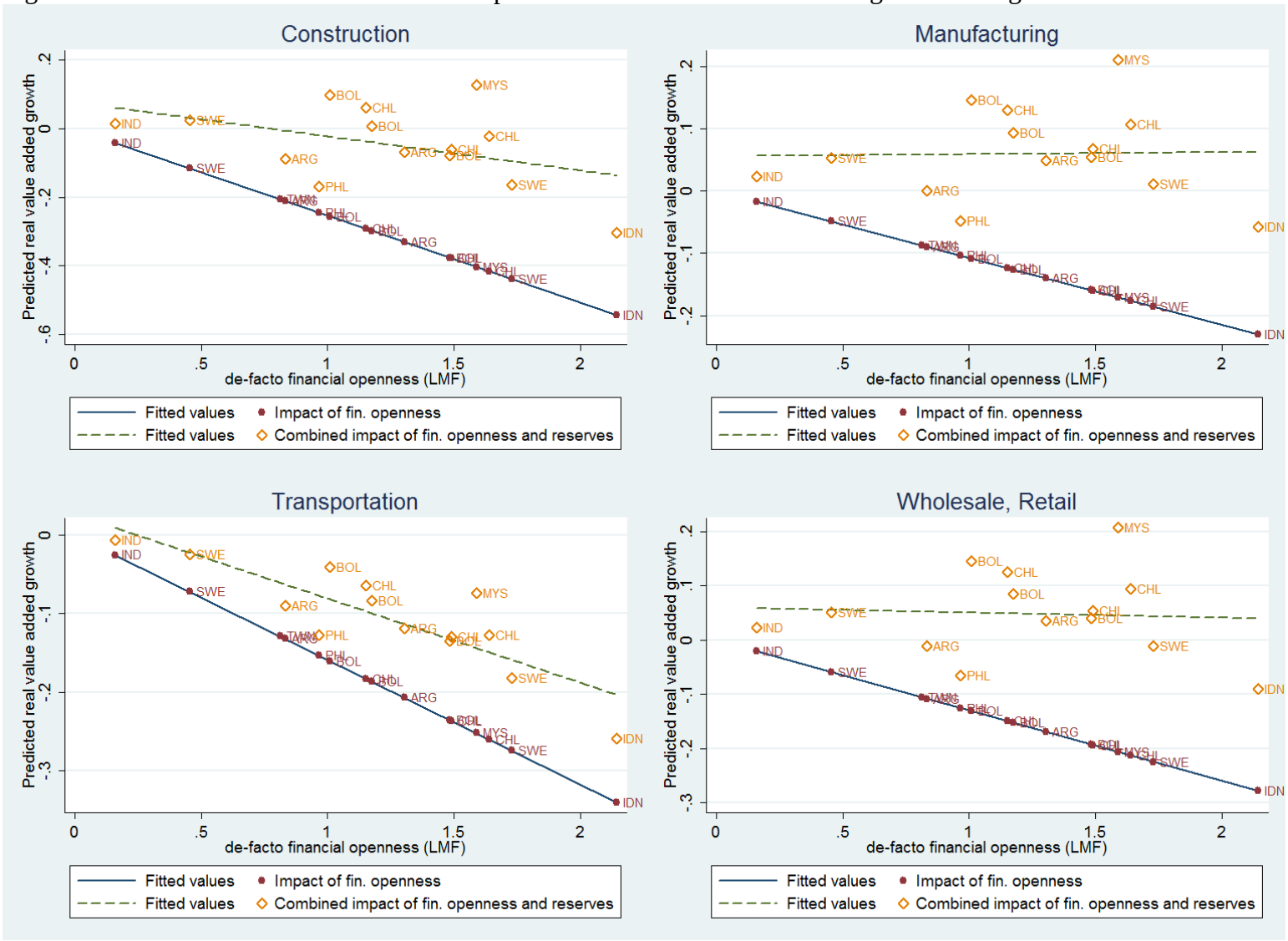
Notes: Probit and logit regression estimation results with clustering by country and robust standard errors in parentheses. *, **, and *** indicate coefficients significant at 10%, 5%, and 1% level respectively. Banking crisis dummy excluded from the control vector because it predicts outcomes perfectly. The top panel calculates the excess of the financial sector growth rate relative to GDP using 3-year averages while the bottom panel uses 5-year averages.

Figure 1: Probability plot of financial sector real value added growth rate.



Notes: The figure shows the empirical distribution of financial sector real value added growth rates plotted against a normal distribution fit. The average level of kurtosis is higher for countries with negative skew in the series (6.619 compared to 5.527), and this difference shows up in bigger deviations from the normal distribution (Gaussian bell curve) in the tails for the subsample of countries with negative skew.

Figure 2: Predicted contribution of financial openness and reserves to real sector growth during financial contractions.



Notes: Predicted real value added growth calculated by multiplying regression coefficients in the full specification in Table 9 by the values of explanatory variables during each financial contraction episode.