Financial Liberalization, Growth, and Risk*

Alexander Popov†
European Central Bank

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Abstract

We analyze output growth and risk as the joint outcomes of financial liberalization. Using an industry panel of 55 countries over 45 years, we find that financial liberalization results simultaneously in higher growth and in higher growth variability, measured both as the volatility and the left skewness of the growth process. These effects are stonger in industries that are more externally dependent and face better growth opportunities. Some of the effect of liberalization on growth goes through the channel of increased risk, implying that treating growth and risk independently may overestimate the direct growth effect of liberalization. We also find that the growth benefits of financial liberalization and its costs associated with higher risk are mitigated by strong institutions.

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†European Central Bank, Financial Research Division, Kaiserstrasse 29, D-60311 Frankfurt, email: Alexander.Popov@ecb.int

1 Introduction

The recent experience of many emerging economies with financial liberalization has generated considerable research interest in the benefits and costs of this process. To begin with, there seems to be little doubt about the positive effect of financial liberalization on the economy's long-term rate of growth. For example, Bekaert et al. (2005) show that equity market liberalization increases subsequent average annual real economic growth by about 1%, and effects of similar magnitude have been documented at the sector level (Gupta and Yuan (2009)). At the same time, there is a strong perception that foreign capital increases volatility both in the financial markets and in the real economy (Stiglitz (2000)). Empirical research into this question has provided some evidence confirming this view (Kose et al. (2003), Levchenko et al. (2009)).[1]

However, the literature that has looked at the effect of liberalization on the growth process 1) defines output risk only in terms of the *volatility* of output growth, and 2) looks *independently* at growth and risk. The first approach is questionable given persistent arguments - dating back to Lucas (1987) - that the welfare benefits of removing all of the business cycle volatility are miniscule. At the same time, Barro (2006) estimates, within a class of models which replicate how asset markets price consumption uncertainty, that individuals are willing to pay a high premium in exchange for eliminating all chances for rare, large, and abrupt macroeconomic contractions. To the extent that output and consumption risk are not completely uncorrelated, higher moments of output growth should capture better the growth risks associated with negative welfare implications. The second approach is not fully convincing either from a theoretical standpoint as the evolution of growth and risk must surely be the outcome of similar processes. Therefore, a more convincing empirical test would allow for the simultaneous determination of all moments of output growth.[2]

To address these conceptual issues, in this paper we investigate the impact of financial liberaliza-

[1] For a comprehensive review of the literature on the growth and volatility effects of financial liberalization, see Kose et al. (2006) and Henry (2007).

[2] In similar studies, Lundberg and Squire (2003) and Mobarak (2005) show that the simultaneous examination of various growth outcomes yields significantly different results and hence has different consequences for policy from independent studies.

tion on growth and risk using data on sector-level value added for a wide cross section of countries over the past 45 years. We define risk both as the volatility and as the left skewness of output growth. Unlike the variance, the third moment of growth captures asymmetic and abnormal distributional patterns and is thus related to the concept of tail risk. Because large contractions happen occasionally, they tilt the distribution of growth rates to the left. Second, we estimate the effect of liberalization on growth and risk in a simultaneous equation framework in which mean growth, the volatility of growth, and the skewness of growth are determined jointly. Average growth, its variability, and its skewness are moments of the same underlying process, and are likely to be jointly determined. For example, volatility is correlated with growth, both at the country level (Ramey and Ramey (1995), Aghion and Banerjee (2005), Aghion et al. (2010)) and at the industry level (Imbs (2007)), and mean growth and growth skewness may have common underlying determinants (Ranciere et al. (2008)). Therefore, it is important to distinguish, for example, the direct effect of liberalization on growth from its indirect effect on growth through the volatility channel.

We find that financial liberalization is followed by an increase in industry value-added growth and an increase in the variability of output growth, more so in the sense of negative skewness than in the sense of higher volatility. The first result is consistent with the view that financial constraints are reduced and investment is aligned with growth opportunities when financial markets are liberalized. The second result is consistent with the view that in financially liberalized economies, systemic risk taking raises the probability of a sudden collapse in financial intermediation and hence industrial output. We also find that these effects are stronger in industries that are more externally dependent and face better growth opportunities. We subject these findings to a wide variety of alternative experiments, including various liberalization taxonomies, accounting for the endogeneity of liberalization, controlling for the channels through which concurrent policy reforms and macroeconomic developments affect the rate and the variability of the growth process, using different subsets of countries, and alternating between *de jure* and *de facto* measures of financial openness. Our results remain remarkably robust.

As an illustration of the main result, consider Figure 1, which pits against each other Argentina and Panama. These two countries are similar in terms of per capita wealth, are a part of the same economic area, and share the same trade partners. By the definition of liberalization used in the paper, Argentina became fully liberalized in 1991. According to the same criteria, Panama is not liberalized. Figure 1 indicates that Argentina grew at a rate almost four times higher after 1991 (2.6% vs. 0.7%), while annual growth rates in Panama actually declined after 1991, from 3.8% to 2.9%. Aggregate volatility declined in Panama while it remained steady in Argentina. Finally, while the distribution of growth rates became more right-skewed in Panama, it went from symmetric to left-skewed in Argentina (-0.666 post-liberalization vs. -0.118 pre-liberalization). Thus, relative to non-liberalized Panama, liberalized Argentina experienced higher growth, higher volatility, and a higher incidence of abrupt macroeconomic contractions.

Second, estimating growth and risk jointly allows us to separate the direct from the indirect effect of liberalization. We find that at the level of the industrial sector, growth and volatility are positively correlated, and so part of the positive effect of liberalization on growth goes through the channel of increased volatility. Analogically, higher growth tends to be associated with a positively skewed distribution of growth rates, and so the direct effect of financial liberalization on tail risk is muted by the indirect effect through the channel of higher growth. To our knowledge, this is the first paper which accounts for these indirect channels of the effect of liberalization on growth and risk.

Third, we find that the growth effect is primarily realized through higher rate of capital accumulation, higher TFP growth, and higher employment growth, while the increase in tail risk is primarily realized through a more left-skewed distribution of investment and TFP growth. Employment growth seems to be relatively stable in the wake of financial market openness. These results expand on the analysis in Gupta and Yuan (2009) by shedding light on the effect of liberalization on the variability of the capital, productivity, and employment growth process.

Finally, we examine the role of institutional complementarities in determining the effect of

liberalization on growth and risk. We find that countries with more developed institutions benefit more from financial liberalization, both in terms of higher growth and in terms of lower risk, while countries with more developed domestic financial markets experience larger than average increase in average growth. In addition, in terms of growth, Latin American countries have benefited relatively more from liberalization, while Asian countries have benefited relatively less.

This paper contributes to the debate on the real effect of financial liberalization by demonstrating that the growth benefits of liberalization are accompanied by a higher variability of the growth process. In contrast, other studies estimate the growth effect of liberalization without accounting for risk (Bekaert et al. (2005), Gupta and Yuan (2009)). We also demonstrate that some of the growth benefits of liberalization at the sector level come through the channel of higher risk. In that sense, studies which do not estimate the effect of liberalization on growth and risk simultaneously - for example, Levchenko et al. (2009) - are likely to overestimate the effect of liberalization on growth.

Our paper also relates to studies pointing to how institutional complementarities affect the growth benefits of financial liberalization. Bekaert et al. (2005, 2006) and Kose et al. (2006) show that liberalization has a heterogeneous effect in different countries, depending on their economic, financial, and institutional development. We extend these results by showing that better institutions do not simply augment the growth benefits of liberalization, but they also mitigate the costs of liberalization in terms of higher output risk.

Finally, the empirical regularity investigated in this paper is related to Ranciere et al. (2008) who study the link between financial liberalization, growth, and crises. In their model, in a financially liberalized economy with limited contract enforcement, systemic risk taking reduces the effective cost of capital and relaxes borrowing constraints. This allows greater investment and generates higher long-term growth, but it raises the probability of a sudden collapse in financial intermediation when a crash occurs. Systemic risk thus increases mean growth even if crises have arbitrarily large output and financial distress costs. While the authors test empirically the link

between long-term growth and financial fragility, our paper is a direct test of the link between financial liberalization, growth, and tail risk.

The paper proceeds as follows. Section 2 describes the data. Section 3 presents the empirical methodology. Section 4 reports the main results, alongside a battery of robustness tests. Section 5 concludes.

2 Data

The main data used in the empirical analysis come from the 2010 UNIDO Industrial Statistics 2 Database. We use the version that reports data according to the 2-digit level of ISIC Revision 3 classification for the period 1963-2007. The data contain information on value added, capital, employment, and number of establishments for 21 manufacturing sectors in the best case, as well as for total manufacturing.[3] Similar to Levchenko et al. (2009) and following Heston et al. (2002), we use the data reported in current U.S. dollars and convert them into international dollars using the Penn World Tables.[4] We require that each sector contains data on at least 10 years before and at least 10 years after a liberalization event (for countries which experienced liberalization), and data on at least 10 years before and at least 10 years after the average liberalization year (for countries which did not), and that each country has at least 10 such sectors. The resulting dataset consists of 55 countries.[5]

For each country-industry-period, we calculate the first three moments of output growth. We calculate average real output growth in country c and industry s during period t, $\overline{g}_{cs}$, after taking differences in annual log output. The standard deviation of real output growth in country c and

[3]Data are not available for two additional industries, Motor vehicles, trailers, semi-trailers, and Recycling.

[4]The exact mechanism is as follows. Using the variable name conventions from the Penn World Tables, this deflation procedure involves multiplying the nominal U.S. dollar value by (100/P) *(RGDPL/CGDP) for output to obtain the deflated value. See Levchenko et al. (2009) for more details.

[5]In robustness tests, we require that the countries have data on at least 20 years for at least 3/4 and even 9/10 of all sectors, resulting in a further reduction in the number of countries available (reducing the cross section of countries to 45 and 20, respectively).

industry s during period t is defined as $\left(\frac{1}{T}\sum_{t=1}^{J}\left(g_{cst}-\overline{g}_{cs}\right)^2\right)^{\frac{1}{2}}$. Finally, the skewness of output growth of industry s in country c during period t is calculated as

$$Skew_{cst}=\frac{\frac{1}{T}\sum_{t=1}^{J}\left(g_{cst}-\overline{g}_{cs}\right)^3}{\left(\frac{1}{T}\sum_{t=1}^{J}\left(g_{cst}-\overline{g}_{cs}\right)^2\right)^{\frac{3}{2}}}$$

The literature on financial liberalization uses various measures of *de jure* and *de facto* liberalization. Quinn (1997), Bekaert et al. (2005), Bekaert et al. (2007), and most recently Kaminsky and Schmukler (2008) have dated various liberalization events pertinent to capital accounts, credit markets, and equity markets. Similar to Levchenko et al. (2009), we use the Kaminsky and Schmukler (2008) liberalization chronology, and we define a country as fully liberalized when all three indices of market liberalization - equity markets, credit markets, and international financial transactions - attain a value of 3 (fully liberalized). We complement this normative index with *de facto* measures of financial globalization, namely the gross capital flows measure from Lane and Milesi-Ferretti (2007), calculated as the sum of total foreign assets and total foreign liabilities, normalized by GDP. This measure is now standard in the international financial integration literature (see, for example, Bonfiglioli (2008) and Devereux and Sutherland (2009)).

Arguably, this definition of liberalization is rather noisy. From a neoclassical perspective, equity markets liberalization is expected to result in the largest effect on growth. Improved risk sharing post-liberalization should decrease the cost of equity capital (see, for example, Bekaert and Harvey (2000)) and increase investment (see, for example, Bekaert et al. (2005)), therefore affecting the distribution of growth rates. In that sense, our results should be interpreted as a lower bound of the effect of liberalization on the distribution of growth rates. In the context of a more disaggregated analysis of the effect of stock market liberalization, Gupta and Yuan (2009) show that industries exhibit strictly higher growth rates in countries with liberalized equity markets. In robustness

exercises, we use data from Bekaert et al. (2005) to investigate the research question focusing exclusively on equity market liberalization episodes, and show how these effects contrast with the effects when a broader measure of liberalization is used.

Table 1 summarizes the three moments of output growth for the countries in the sample. It also contains information on the liberalization events that are used in the empirical exercises. For one liberalized countries - Mexico - the data are not available for enough years after the liberalization event to calculate reliable estimates of the volatility and the skewness of growth rates, and so for practical purposes these countries are not used in the analysis.

Countries with liberalized financial markets are usually more developed in a host of other dimensions: they tend to have better institutions, more developed domestic financial markets, higher human capital, and be more open to trade. All of these parallel macroeconomic circumstances may be affecting both the rate (see Acemoglu et al. (2002)) and the variability (see Raddatz (2006)) of growth. Therefore, we collect data on creditors rights from La Porta et al. (1998), on domestic credit to private institutions from Beck et al. (2010), on school enrollment from the World Development Indicators, and on population and trade openness from the World Penn Tables, to control directly for these effects. Table 2 summarizes these control variables by country.

Next, we make use of the fact that we calculate the first three moments of growth at the industry level, and so we can control for various channels through which finance may affect the rate and variability of output growth. As argued by Rajan and Zingales (1998), the distribution of growth rates would be most sensitive to financial development in industries which are "naturally" dependent on external finance. Such "natural" dependence may arise due to variations in the scale of projects, gestation period, the ratio of hard vs. soft information, the ratio of tangible vs. intangible assets, follow-up investments, etc. We use the measure of external financial dependence originally proposed by Rajan and Zingales (1998) for SIC 3-digit industries and later adapted by Cetorelli and Strahan (2006) for SIC 2-digit industries. The benchmark is defined as the industry median value of the sum across years of total capital expenditures minus cash flow from operations, divided by

capital expenditures, for mature Compustat firms.[6] Industry growth rates also tend to be affected by growth opportunities at the country level (Fisman and Love (2007), Bekaert et al. (2007)). Sectors which face higher global growth opportunities should grow faster post-liberalization, with unclear effect on the volatility and skewness of growth. We use data from Fisman and Love (2007) on industry sales growth in the US to account for this channel. The variability of growth is also negatively affected by financial development if industries exhibit naturally high liquidity needs (Raddatz (2006)), and so we use this measure aggregated at the SIC 2-digit level.[7] These three industry benchmarks are interacted with data on private credit to GDP from Beck et al. (2010). Finally, in order to account for the effect of international trade on the asymmetric variability of output growth, we adapt the industry measures of the ratio of imports and exports to total output from di Giovanni and Levchenko (2009) for the SIC 2-digit level, and interact with data on trade openness from the Penn Tables.

Table 3 lists the industries included in the dataset and summarizes all industry benchmarks. For definitions of all variables included in the paper, alongside variable sources, see Appendix.

3 Econometric framework

We start by estimating the following system of equations:

$$Growth_{cst} = \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X^1_{ct} \cdot Q^1_s + \psi_{cst} + \varepsilon_{cst} \quad (1)$$

$$Stdev_{cst} = \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X^2_{ct} \cdot Q^2_s + \psi_{cst} + \varepsilon_{cst} \quad (2)$$

[6]The exact procedure involves subtracting from the sum across years of total capital expenditures (Compustat item #128) the cash flow from operations, i.e., revenues minus nondepreciation costs (Compustat item #110) for each firm in Compustat, and then taking the median industry value as the benchmark.

[7]The exact procedure involves dividing the value of total inventories (Compustat item #3) by the value of total sales (Compustat item #12) for each firm in Compustat, and then taking the median industry value as the benchmark.

$$Skew_{cst} = \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^3 \cdot Q_s^3 + \psi_{cst} + \varepsilon_{cst} \quad (3)$$

Post is a dummy variable equal to 1 after the liberalization event, for countries which liberalized their financial markets, and equal to 1 after the average liberalization year for the sample, for countries which did not. *Lib* is a dummy variable equal to 1 after the liberalization event, for countries which liberalized their financial markets. X_{ct}^i, $i = 1, 2, 3$, are various subsets of a matrix of country variables which are predicted by the theory to have affect the distribution of growth rates independent of financial liberalization. It includes mainly proxies for domestic economic and financial development, trade openness, and population size, to which we later add measures of institutional quality and human capital. Q_s^i, $i = 1, 2, 3$, are various subsets of a matrix of industry benchmarks (external financial dependence, growth opportunities, liquidity needs, and export/import intensity) interacted with the matrix of country variables in the second set of equations. S_{cst} is industry s's beginning-of-period share in total manufacturing value added in country c during period t. ψ_{cst} is a matrix of country, sector, and time dummies. These fixed effects control for a variety of omitted factors. Finally, ε_{cst} is the idiosyncratic error.

The basic econometric test is one in which the three equations are estimated independently using ordinary least squares (OLS). In that sense, this test relates to two disjoint sets of literature: the one which has studied the effect of financial liberalization and domestic financial development on growth (Beck et al. (2000), Bekaert et al. (2005, 2007), Gupta and Yuan (2009)), and the one which has studied the effect of the same processes on the volatility of output or consumption growth (Easterly et al. (2000), Bekaert et al. (2006), Raddatz (2006)). In addition, Levchenko et al. (2009) estimate the effect of financial liberalization on both output growth and volatility, but they treat the two processes independently. Neither approach is fully convincing from a theoretical standpoint: the evolution of growth and growth volatility, as well as skewness, must surely be the outcome of a similar process, and therefore they must be jointly determined by overlapping sets of factors.

To account for that possibility, we estimate equations (1)-(3) simultaneously using a three-stage leas square (3SLS) methodology. If there were no unobserved differences across countries and no endogeneity, the model could be estimated as a pair of seemingly unrelated regressions (SURE) on pooled data. However, we need to allow for the possibility that the volatility of growth affects growth rates (Ramey and Ramey (1995), Mobarak (2005)). Furthermore, we need to allow for the possibility that anticipated higher growth may affect the skewness of the distribution of growth rates through higher risk-taking (Ranciere et al. (2008)). Because in the joint estimation the standard deviation of growth appears as a regressor in the growth equation and average growth appears as a regressor in the skewness equation, they need to be instrumented out using exclusion restrictions. This condition is satisfied by the fact that as in the OLS case, the interactions of credit to the private sector with the sector's external financial dependence and growth opportunities are excluded from the volatility and skewness equations, and the log of population size (our diversification measure), as well as the interactions of the log of population size and credit to the private sector with the sector's liquidity needs are excluded from the growth equation.

The 3SLS empirical procedure therefore takes the following form:

$$\begin{aligned} Growth_{cst} &= \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X^1_{ct} \cdot Q^1_s + \theta \cdot Stdev_{cst} + \psi_{cst} + \varepsilon_{cst} \\ Stdev_{cst} &= \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X^2_{ct} \cdot Q^2_s + \psi_{cst} + \varepsilon_{cst} \\ Skew_{cst} &= \alpha \cdot Post_t + \beta \cdot Lib_{ct} + \gamma \cdot S_{cst} + \delta \cdot X^3_{ct} \cdot Q^3_s + \theta \cdot Growth_{cst} + \psi_{cst} + \varepsilon_{cst} \end{aligned} \tag{4}$$

Finally, by applying a 3SLS procedure, we account for the possibility that the error terms in the three equations may have a nonzero covariance (which we expect them to, given that the three moments of growth are jointly determined).

In various robustness tests, in both the OLS and the 3SLS case, we replace de jure liberalization with de facto liberalization to control for the possibility that de jure liberalization captures poorly the actual financial integration of the domestic economy in the world economy (Levchenko et al.

(2009)). To that end, we replace the de jure index of liberalization with a measure of capital flows from Lane and Milesi-Ferretti (2007).

The empirical approach so far is clearly based on a standard difference-in-differences analysis in which the coefficient of interest, β, measures the difference in change from pre- to post-liberalization between the treatment group and the control group. We choose two types of control groups for this exercise. First, we use all non-liberalized countries as a control group. This approach, however, does not account for the possible endogeneity of liberalization. Liberalization may be a strategic decision correlated with a variety of circumstances unobservable to the econometrician. For instance, it may be correlated with growth opportunities and thus made in anticipation of higher future growth (Bekaert et al. (2005)). To control for that possibility, we borrow from the propensity score literature pioneered by Rosenbaum and Rubin (1983) and first run a first-stage logistic regression on a set of country level variables to determine what macro variables were correlated with the decision to liberalize.[8] Based on the propensity score, we choose for each treated country a country that is most similar to it, and run the second-stage regression on this subset of control countries. The idea is to eliminate the potential selection bias arising from the fact that countries were not assigned the "treatment" randomly - that is, only systematically different countries liberalized their financial markets, and these systematic differences cannot be perfectly dealt with through the inclusion of covariates in the OLS regression because the distribution of the covariates does not overlap sufficiently across the two groups. This approach already has a respectable pedigree in research on international economics, going back to Persson (2001) and including contributions by Glick et al. (2006) and Levchenko et al. (2009).

We also want to investigate the impact of financial liberalization across industries. To that end, we modify our empirical strategy to take further advantage of our disaggregated data. In particular, we estimate the system of simultaneous equations

[8]The set includes pre-liberalization measures of economic development, financial development, institutional quality, human capital, and trade openness, among others.

$$
\begin{aligned}
Growth_{cst} = &\ \beta \cdot Fin\ lib_{ct} \cdot Q_s^1 + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^1 \cdot Q_s^1 + \theta \cdot Stdev_{cst} + \psi_{cst} + \varepsilon_{cst} \\
Volatility_{cst} = &\ \beta \cdot Fin\ lib_{ct} \cdot Q_s^2 + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^2 \cdot Q_s^2 + \psi_{cst} + \varepsilon_{cst} \\
Skew_{cst} = &\ \beta \cdot Fin\ lib_{ct} \cdot Q_s^3 + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^3 \cdot Q_s^3 + \theta \cdot Growth_{cst} + \psi_{cst} + \varepsilon_{cst}
\end{aligned} \tag{5}
$$

In this modification, *Fin lib* is, alternatively, the *de jure* index *Liberalized* from systems (1) and (2), or a *de facto* measure of financial globalization in the shape of the gross capital flows measure from Lane and Milesi-Ferretti (2007). These variables are interacted with Q_s^i, which again denotes the industry benchmarks identified above, which are associated with a theoretical case for a faster transmission of various developments in financial markets to the real sector. Clearly, this robustness check allows us to establish whether the effect of liberalization on growth and risk is equally strong for various measures of liberalization, and more so for industries which are naturally more sensitive to financial market development.

Finally, we study which attributes of the macroeconomic environment tend to alleviate/exacerbate the positive/negative effects of financial liberalization in terms of growth and risk. To that end, we estimate the system of equations

$$
\begin{aligned}
Growth_{cst} = &\ \alpha \cdot Post_t + \beta \cdot Lib_{ct} \cdot Z_{ct} + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^1 \cdot Q_s^1 + \theta \cdot Stdev_{cst} + \psi_{cst} + \varepsilon_{cst} \\
Stdev_{cst} = &\ \alpha \cdot Post_t + \beta \cdot Lib_{ct} \cdot Z_{ct} + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^2 \cdot Q_s^2 + \psi_{cst} + \varepsilon_{cst} \\
Skew_{cst} = &\ \alpha \cdot Post_t + \beta \cdot Lib_{ct} \cdot Z_{ct} + \gamma \cdot S_{cst} + \delta \cdot X_{ct}^3 \cdot Q_s^3 + \theta \cdot Growth_{cst} + \psi_{cst} + \varepsilon_{cst}
\end{aligned} \tag{6}
$$

Here, Z_{ct} is a matrix of country level variables including measures of financial development, economic development, institutional quality, human capital, etc. The idea in this model is to ask, does the same event - financial liberalization - have a qualitatively and/or quantitatively different effect on output growth and risk if the liberalized country has, for example, more developed financial markets, or stronger institutions. This model is consistent with tests of the heterogeneous effects of

financial globalization as in Bekaert et al. (2005) and Kose et al. (2006), and applied for the case of financial development and corruption control in Ahlin and Pang (2008). It also relates to the literature on the non-linear effect of finance on the distribution of growth rates. For example, Deidda and Fattouh (2002), Rioja and Valev (2004), and Shen and Lee (2006) find that in general, the relationship between financial development and economic growth is non-linear: when of moderate size, financial markets strongly promote growth, but when too large, their effect on growth weakens, and when too small, their effect on growth could even be negative.

4 Financial liberalization, growth, and risk

This section describes the estimates from our empirical tests. We report the main results in Section 4.1. Section 4.2 presents our strategy for dealing with endogeneity concerns. In Section 4.3, we investigate the impact of liberalization across industries. Section 4.4 presents a battery of robustness tests. Section 4.5 we study the channels through which liberalization affects the distribution of growth rates. Section 4.6 investigates the heterogeneous effect of liberalization across countries.

4.1 Financial liberalization, growth, and risk: Main results

We begin by presenting the empirical estimates of the main model. In particular, we test whether the higher growth and higher risk in the wake of liberalization, as implied by Figure 1 for two particular countries, is confirmed at the sector level in a large cross-section of countries. The first three columns of Table 4 report the estimates of equations (1)-(3) where the effect of liberalization on growth, volatility, and skewness is estimated individually. Columns (4)-(5) report the estimates from model (4) where the three effects are estimated jointly. In both cases, we apply a difference-in-differences approach where the control group is all countries that have not liberalized their equity markets, credit markets, and capital accounts during the sample period. The regressions include country, industry, and time fixed effects, as well as a host of covariates.

When we estimate the three equations individually, we find that liberalization increases the

industries' growth rate and risk, both in terms of volatility and in terms of left skewness. While the result on volatility is not statistically significant, the other two effects are, implying that liberalization is associated simultaneously with higher growth and higher tail risk (Columns (1) and (3)). These two effects are economically significant too. A financial liberalization event, captured by moving the *Lib* variable from 0 to 1, is associated with a sector-level growth rate higher by 2.4 percentage points. This is equivalent to 0.29 of a standard deviation of the average sector-level growth rate observed in the sample. The same financial liberalization event is associated with a sector-level left skewness higher by 28.2 percentage points. This is equivalent to 0.24 of a standard deviation of the average sector-level skewness observed in the sample.

In columns (4)-(6), we investigate to what degree the effects estimated from running models (1)-(3) are contaminated by the simultaneous determination of the three moments of growth. We include the volatility of growth in the growth equation, and average growth in the skewness equation, and then estimate the three equations in model (4) simultaneously. This allows us to dissect the effect of liberalization on the first three moments of growth into a direct effect (for example, liberalization affects the skewness of the distribution of growth) and an indirect effect (for example, liberalization affects growth, which in turn affects the skewness of the distribution of growth). We find once again a positive effect on growth and risk, but the magnitude of these effects changes somewhat. After controlling for the effect of financial liberalization on volatility, the effect on growth declines, and after controlling for the effect of liberalization on growth, the effect on skewness increases by a magnitude of almost three.

These results suggest that previous empirical work which has focused on the effect of financial liberalization on growth and risk separately, may have overestimated or underestimated the true effects. For example, at the industry level higher growth is associated with higher volatility (Imbs (2007)). Our tests imply that financial liberalization increases the volatility of growth at the sector level, and so tests which do not account for the indirect effect through volatility overstate the direct effect of liberalization on growth. Similarly, higher growth is associated with more positive

skewness (Column (6)). We find that the direct negative effect of financial liberalization on the skewness of the distribution of growth rates is counteracted by the indirect positive effect through the growth channel. The net effect is thus much more pronouncedly negative than the total effect, implying that a financial liberalization event is associated with a sector-level left skewness higher by 67.7 percentage points instead of the 28.2 percentage points calculated in column (3).

It is also informative to note the effect of the industry and country covariates on growth and risk. Larger sectors tend to be less volatile, but they tend to have a lower skewness. Importing sectors exhibit lower average growth rates. Countries with larger financial markets tend to have less volatile growth, especially for sectors with high liquidity needs, which is consistent with Raddatz (2006). Sectors with higher external financial needs and sectors which face higher growth opportunities exhibit lower growth rates in countries with more developed domestic financial markets. While this looks counterintuitive at first glance, going against the evidence in Rajan and Zingales (1998) and Fisman and Love (2007), the apparent contradiction is resolved by noticing that this effect is observed after netting out the effect of concurrent financial liberalization. Finally, diversification opportunities, proxied by larger population, are associated with lower risk, especially for industries with high liquidity needs, which is consistent with Mobarak (2005) and Raddatz (2006).

4.2 Financial liberalization, growth, and risk: Selection bias

Naturally, we want to check if our results are not driven by the non-discriminative choice of countries in the control group. Countries which were liberalized may have been systematically different, implying that liberalization may have been a strategic choice (Bekaert et al. (2005)). In this section, we explicitly account for this possibility. Table 5 reports estimates from regressions where each liberalized country is first matched with a similar non-liberalized country based on a propensity score derived from a logistic regression. The variables used in the first stage to estimate the propensity score include pre-liberalization economic development (proxied by GDP per capita and GDP growth volatility), trade openness, institutional quality (proxied by creditors rights), human

capital (proxied by secondary school enrollment), and financial development (proxied by the ratio of private credit to GDP). This procedure accounts for the possibility that, for example, countries liberalize in order to take advantage of a large pool of specialized human capital, and so the measured post-liberalization increase in growth rates is partly due to the independent effect of human capital on growth.

As implied by the reported estimates, we observe the same phenomenon as in Levchenko et al. (2009): the estimates from the propensity-score matching procedure are not weakened in a statistical sense when we restrict the control sample to the group of countries that are pair-wise most similar to the liberalized countries, based on the propensity score from a first-stage logistic regression. When models (1)-(3) are estimated, we find that a financial liberalization event, captured by moving the *Lib* variable from 0 to 1, is associated with a sector-level growth rate higher by 1.7 percentage points, a sector-level volatility higher by 1.8 percentage points, and a sector-level left skewness higher by 45.2 percentage points. (Columns (1)-(3)). In this case, the effect of liberalization on volatility is also significant at the 10% statistical level. As in the case when the full sample of non-liberalized countries is used as a control group, accounting for the indirect effect on growth through the volatility channel and on skewness through the growth channel results in a slightly lower effect of liberalization on growth and a slightly higher effect on the left skewness of the distribution of growth rates. We conclude that the estimated effects of financial liberalization are not due to liberalizing countries being systematically different from non-liberalizing ones over a range of observable macroeconomic characteristics.

4.3 Financial liberalization, growth, and risk: Industry effects

While the empirical approach in the previous subsection alleviated our concerns about estimation bias caused by selection on observables, concerns about selection on unobservables still linger. Because in our empirical model financial liberalization varies at the country $\times$ time level, we cannot include country $\times$ time fixed effects that would capture any other time-varying characteristics

not picked up by the controls. Recall, for example, the model in Ranciere et al. (2008) which implies that systemic risk taking increases the correlation between growth and crises. If countries liberalize when growth opportunities are abundant, regressions of future growth and skewness on a liberalization indicator will yield upward biased estimates. To that end, in this subsection we proceed to check whether our estimates so far are not driven by the fact that financial liberalization events may be correlated with other unobservable developments at the country level.

Our approach to dealing with this potentially confounding problem is to employ a cross-country cross-industry methodology in the spirit of Rajan and Zingales (1998). In particular, we interact our liberalization variable with industry benchmarks for external financial dependence, growth opportunities, and liquidity needs (Model (5)). We expect to register the following three effects:

1) By lowering the cost of external capital (Henry (2000), Bekaert and Harvey (2000)), financial liberalization will lead to higher growth in industries that are more dependent on external finance. We are ignorant about the effect of liberalization on output risk in such industries.

2) By improving the alignment between capital and growth opportunities (Fisman and Love (2007), Bekaert et al. (2007)), financial liberalization will lead to higher growth in industries that face better growth opportunities. We are ignorant about the effect of liberalization on output risk in such industries.

3) By reducing information asymmetries and alleviating firms' temporary cash flows and/or net worth problems (Caballero and Krishnamurty (2001)), financial liberalization will lead to lower output volatility in industries that have higher liquidity needs. We are ignorant about the effect of liberalization on output growth in such industries.

The first two hypothesis are identical to Gupta and Yuan (2009). In addition, Love (2003) shows that investment is less sensitive to internal funds at the firm level in financially developed countries. The third is consistent with the theory outlined and the evidence presented in Raddatz (2006).

The results from the set of regressions formulated in Model (5) are reported in Table 6. Consis-

tent with hypothesis 1 and 2, we find that industries that are more dependent on external finance and/or face higher growth opportunities grow significantly faster following liberalization. This effect is significant at least at the 10% statistical level (at 5% in Column (4)). Numerically, a financial liberalization event is associated with 0.4% higher growth if the industry is at the 75th rather than the 25th percentile of external financial dependence, and with 0.8% higher growth if the industry is at the 75th rather than the 25th percentile of growth opportunities. This evidence is fully consistent with the results in Gupta and Yuan (2009), although the numerical effect is somewhat lower. However, the lower effect we measure may fully be due to the more inclusive measure of financial integration we employ.

Turning to risk, we find mixed results. Financial liberalization is associated with lower volatility in industries dependent on external finance (Column (2)), but with higher volatility for industries with high liquidity needs (Column (8)). However, financial liberalization is uniformly associated with more negative skewness. For example, a financial liberalization event is associated with 20.2% higher left-skewness if the industry is at the 75th rather than the 25th percentile of liquidity needs. The effect of the rest of the industry- and country-level variables is broadly consistent with previous estimates.

4.4 Financial liberalization, growth, and risk: Data issues

We have so far established that financial liberalization generates a significant growth effect and a significant increase in risk, particularly as measured by the left skewness of the distribution of output growth rates. The two effects appear to be robust to countries' selection into the liberalization process based on factors both observable and unobservable to the econometrician. Nevertheless, further questions linger regarding the virtues of a *de jure* vs. a *de facto* measure of integration, the suitability of the composite measure of integration used, and the measurement of tail risk. In this subsection, we address these issues in turn.

4.4.1 De jure vs. de facto liberalization

It has been argued that a *de jure* measures of liberalization capture poorly the actual degree of financial market integration (see, for example, Lane and Milesi-Ferretti (2007)). While conducive to the increase in foreign investment in domestic securities, an act of market liberalization may result in different magnitudes of actual integration with the world's financial markets (Levchenko et al. (2009)). We aim to partially counter this problem by replacing our de jure indicator of liberalization with a *de facto* measure of financial globalization based on the gross capital flows measure from Lane and Milesi-Ferretti (2007). Essentially, this variable estimates the actual exposure of a country's economy to foreign investors. The advantage of this method is that it captures better the degree to which various degrees of financial globalization within the set of financially liberalized countries map into differences in growth and risk. The results of this version of Model (3) are reported in Table 7. As before, we account for the natural characteristics of the sector that are expected to augment the effect of liberalization on growth and risk. We find that higher capital flows are associated with higher growth rates for sectors which are more dependent on external finance (Column (1)) and face higher growth opportunities (Column (4)). Analogically, we find that such sectors register higher risk post-liberalization as measured by higher volatility (this effect is not significant though) and by higher left-skewness (Columns (3) and (6)). We find that financial liberalization does not affect, in a statistically meaningful sense, the growth-risk profile of industries with higher liquidity needs. Nevertheless, it is reassuring that the main estimates are broadly consistent across alternative definitions of financial markets liberalization.

4.4.2 Financial openness, growth, and risk: The case of stock market liberalization

Arguably, a measure of liberalization which requires that restrictions are lifted on all of equity markets, credit markets, and capital accounts, is somewhat noisy. For example, while a good empirical case has been built for the growth effects of stock market liberalization (Bekaert et al. (2005, 2007), Gupta and Yuan (2009)), evidence on the growth effect of capital accounts

liberalization is more mixed (see Eichengreen (2001) for a survey) or driven by developed economies (Edwards (2001)). A lack of growth effect in emerging markets may for example come from the increased amplitude of crashes when capital accounts are opened first, as documented by Kaminsky and Schmukler (2008), who argue that there is mild support for the claim that the capital account should be opened last.

These arguments imply that by combining data on three types of liberalization episodes, we might be measuring a lower bound of the effect of liberalization in the case of growth, and an upper bound in the case of risk. We investigate this possibility specifically in Table 8, where we replace our data on full liberalization from Kaminsky and Schmukler (2008) with data on stock market liberalization episodes from Bekaert and Harvey (2000) and Bekaert et al. (2005).[9] In this exercise, we again estimate Models (1)-(3) and (4), but this time the control group is countries which have not liberalized their stock market during the sample, period, regardless of whether they have opened their domestic markets and/or lifted restrictions on capital accounts. Relative to the liberalization events in Table 2, the following countries are now also treated as liberalized: Australia, Austria, Belgium, Greece, India, Israel, Jordan, Kenya, Malaysia, Netherlands, New Zealand, Netherlands, Philippines, and Turkey. The sample is now biased towards liberalized countries, with 36 liberalized ones and 18 non-liberalized ones.

Table 8 confirms our main hypothesis. Relative to the case for full financial liberalization presented in Table 4, we find a higher growth effect of stock market liberalization. Numerically, a stock market liberalization event is associated with a 3.1% percentage point higher growth when the growth equation is estimated individually (Model (1)), and with a 3.4% percentage point higher growth when it is estimated jointly with the volatility and the skewness equation (Model (4)). This is equal to a 0.37 and a 0.41 standard deviations of the average sector-level growth rate observed in the sample, respectively. Unlike full liberalization, stock market liberalization is associated with lower volatility, albeit this effect is not significant in the statistical sense. Finally, the liberalization

[9]For the most recent version of the data, see http://www.duke.edu/~charvey/chronology.htm.

effect on skewness is virtually not affected by the taxonomy of liberalization events.

4.4.3 Alternative measures of tail risk and data issues

In Table 9, we perform another robustness check based on the hypothesis that output skewness may poorly capture tail risk. In particular, while we require that for each country-sector pair in the sample there are at least 10 data points, the higher moments of a distribution can be estimated with a substantial bias in small samples (Kendall and Stuart, (1977)). We partially counter this concern by replacing our measure of the skew with the largest negative deviation from the long-term average observed pre- and post-liberalization. The results of this modified version of Model (4) are reported in Columns (1)-(3). The results remain qualitatively unchanged: industry growth rates increase following liberalization, and so does tail risk, implying that our previous estimates of a "longer left tail" as a result of liberalization are not off target.

In the next six columns of Table 7, we test the hypothesis that our results may be driven by the fact that the liberalized and non-liberalized countries in the sample contain non-overlapping sets of sectors. We require that each country has at least 10 sectors with at least 20 years of data, but given that there are 21 sectors all in all, it is possible that liberalized countries are a truncated sample of high-growth high-risk industries, biasing the estimates of our baseline model. Therefore, in order to ensure that there is a sufficient overlap, we require that all countries in the sample contain at least at least 3/4 (Columns (4)-(6)), and at least 9/10 (Columns (7)-(9)) of all possible sectors. If anything, our results are strengthened, both numerically and statistically, in the case of the first and the third moment of the distribution of growth rates.

4.5 Capital accumulation, productivity, new business creation, and employment

We next turn to some of the channels through which financial liberalization affects the distribution of growth rates. Previous studies using disaggregated data have found that at the sector level, financial liberalization tends to promote growth through the growth of existing establishments and

through higher capital accumulation (Levchenko et al. (2009), Gupta and Yuan (2009)), and it also stimulates new business creation if adopted by countries with lower barriers to entry (Gupta and Yuan (2009)). We wish to know how these results extend into the higher moments of the distribution of growth rate, and whether the growth effects of liberalization survive our simultaneous equation model.

The 2010 UNIDO Industrial Statistics 2 Database contains industry data on investment, number of establishments, and employment. We need to construct the capital series from the investment data, and the productivity measure from the capital and employment data.

In order to construct the capital series from the investment data in the dataset, we apply the perpetual inventory method proposed by Hall and Jones (1999) and followed by Bonfiglioli (2008) and Levchenko et al. (2009), among others. The initial stock of capital in country c in industry s is estimated as $\frac{I_{cst_0}}{g_{cs}+\delta}$, where g_{cs} is the average geometric growth rate of total investment between t_0 and $t_0 + 10$. A depreciation rate of $\delta = 0.06$ is assumed. t_0 is the first year for which investment data is available in the dataset, for each country-sector pair. Finally, the stock of capital in country c in industry s at time t is computed as

$$K_{cst} = (1 - \delta)K_{cst-1} + I_{cst}$$

Next, we construct the TFP data series in the following way: the production function of each industry s in country c is assumed to be

$$Y_{cst} = K_{cst}^{\alpha}(A_{cst}H_{ct}L_{cst})^{1-\alpha}$$

where Y_{cst} is total output in country c in industry s at time t, K_{cst} is the stock of physical capital in country c in industry s at time t, A_{cst} is labour-augmenting productivity in country c in industry s at time t, L_{cst} is total employment in country c in industry s at time t, and H_{ct} is a measure of the average human capital of workers in country c at time t. $H_{ct}L_{cst}$ is

therefore the human capital-augmented labour in country c in industry s at time t. The factor share is assumed to be constant in each industry and across countries, and is given the value of one third, which adequately represents national account data for developed countries. Following Psacharopulos (1994), the following formula for labour-augmenting human capital as a function of years of schooling ($educ_{ct}$) is used:

$$H_{ct} = e^{\phi(educ_{ct})}$$

where $\phi(educ_{ct})$ is a piecewise linear function with coefficients 0.134 for the first four years of education, 0.101 for the next four years, and 0.068 for all years thereafter.

Finally, using data on capital constructed as above, on employment, and on output from the 2010 UNIDO Industrial Statistics 2 Database, and data on years of schooling from the World Development Indicators, the TFP for each industry-country pair is calculated as

$$A_{cst} = \frac{Y_{cst}}{H_{ct} L_{cst}} \left(\frac{K_{cst}}{Y_{cst}} \right)^{\frac{\alpha}{1-\alpha}}$$

We follow the same basic approach as in Model (2), where averages of the mean, volatility, and skewness of the distribution of growth rates for these four measures are computed for each country-sector pair for the pre- and post-liberalization period. Table 10 reports the estimates from these empirical tests. All specifications are presented for the basic 3SLS case (the results are robust to a propensity score matching procedure).

The evidence is somewhat mixed. In Panel A, Columns (1)-(3), we confirm Gupta and Yuan's (2009) result that financial liberalization increases the growth rate of capital accumulation, and we also find that it raises the volatility and left skewness of this process. The increase in the probability of tail risk can be explained in the light of the argument in Eichengreen and Lebland (2003) about the link between financial liberalization and banking crises, if liberalizing countries tend to be dominated by industries dependent on external finance. Therefore, our finding somewhat qualifies

the result in Galindo et al. (2007) who find that liberalization has a beneficial long-term effect on economic performance by increasing the efficiency with which investment funds are allocated.

We find a somewhat similar effect of liberalization on TFP: growth rates increase following liberalization, and so does tail risk. While the former finding goes somewhat against the results documented in Levchenko et al. (2009) and Gupta and Yuan (2009), who find no robust effect of liberalization on TFP at the sector level, it confirms the findings in Bonfiglioli (2008) and Bekaert et al. (2010) who document a significant increase in aggregate TFP associated with financial openness. Our methodology qualifies somewhat this result as well. As Column (5) in Panel A indicates, financial liberalization decreases the volatility of TFP growth, and growth and volatility are positively correlated (Column (4) in Panel A). Hence, while liberalization increases TFP growth directly, it decreases it indirectly through the channel of lower volatility. The sum of the two effects may well amount to zero, reconciling our findings with the prior literature.

In Panel B, we look at the effect of liberalization on establishments and employment. In Columns (1)-(3), we find that liberalization decreases the rate of new business creation directly, but it increases it through the channel of higher volatility, reconciling our findings with the null results in Levchenko et al. (2009). Liberalization also increases tail risk (albeit not significantly so). This latter result informs the literature on the effect of the business cycle on business creation. For example, Barlevy (2007) finds that R&D investment is strongly pro-cyclical. If the entry of new firms follows the development of new technologies, then business cycle-exacerbating financial liberalization would also make the left tail of the distribution of new business creation longer.

Our final result is that financial liberalization has increased average employment growth, both directly and through the channel of higher volatility, with no significant effect on tail risk (Columns (4)-(6)). One possible story, reconciling this result with the result on establishments, would be that liberalization has enabled the emergence of larger and stabler firms, given that small firms are more sensitive to financial market developments (Beck et al. (2008)). It is also useful to think of this result and the result on new business creation jointly. One strand of literature has maintained the

Schumpeterian notion that recessions encourage agents to shift to a more efficient mode of production. A version of this hypothesis is the idea that recessions drive out or "cleanse" the least efficient production arrangements that are no longer profitable (see Davis and Haltiwanger (1990), Caballero and Hammour (1994), and Mortensen and Pissarides (1994)). A related version of this hypothesis, advanced by, for example, Aghion and Saint Paul (1998), argues that recessions encourage agents to engage in activities that contribute to future productivity instead of to current production given that the return to the latter declines in recessions. However, in a more recent study Barlevy (2003) argues (and presents evidence) that in the presence of credit market frictions, reallocation might direct resources from more efficient to less efficient uses if more efficient production arrangements are also more vulnerable to credit constraints. Our evidence seems to offer stronger evidence to the second theory: if financial liberalization is associated with higher risk, then agents may choose to engage in less productive employment than in more productive self-employment.

4.6 Financial liberalization, development, and institutions

In the final set of empirical exercises, we investigate how economic development and various institutions interact with financial liberalization in affecting the distribution of growth rates. There is a large body of theoretical work in development economics which advises us on what phenomena might be relevant in answering this question. To begin with, one strand of literature has looked at the evolution of growth and volatility over the development cycle. In a seminal study, Acemoglu and Zilibotti (1997) develop a model in which diversification occurs endogenously as a result of the agents' decisions to invest in a range of imperfectly correlated projects. Initial capital scarcity and the indivisibility of individual projects ensure that diversification is imperfect in the early stages of development. The number of open sectors grows with financial development, making it easier to reach a stage where idiosyncratic risk is removed by investing in all sectors, thereby increasing overall growth and decreasing overall volatility. Similarly, Koren and Tenreyro (2007) predict a demand-driven move over the development cycle towards sectors with lower intrinsic volatility, like

health provision, education, and government services. However, it is unclear how the reduction in overall volatility over the development cycle correlates with the probability of rare and abrupt contractions.

The next factor to consider is the role of institutions. Stronger democratic institutions tend to raise economic growth by offering stronger protection of investment, thus both increasing the return to and lowering the cost of entrepreneurship. In general, however, the direct effect on growth may differ from the indirect effect. For example, Mobarak (2005) estimates jointly the effect of democracy on growth and volatility and finds that through the direct channel, democracy decrease growth, but through the channel of lowering volatility it increases growth. Following Bekaert et al. (2005) and Gupta and Yuan (2009), we use creditor rights as a proxy for the country's level of institutional development.

Domestic financial market development and trade openness have also been argued by the literature to exhibit "threshold effects" in the context of liberalization (Bekaert et al. (2005), Kose et al. (2006)), and so we interact our liberalization proxy with proxies for these. Human capital has a positive effect on growth (see, for example, Barro (1991)), and so we include a proxy for years of schooling in the interactions. Finally, it is possible that for reasons of unobservable institutional quality, distance to trade centers, and social cohesion, among others, different regions will experience different responses, in terms of grwoth and risk, to the same event (liberalization). To that end, we include dummies for various regions of the world interacted with the dummy for financial liberalization.

We also instrument private credit using data on legal origin in the spirit of La Porta et al. (1998), who argue that the predetermined component of the country's legal system is strongly correlated with various issues of corporate finance, making it a good instrument for financial development. We also instrument the democracy proxy with data on settlers' mortality in the spirit of Acemoglu et al. (2001), who argue that the epidemiologic conditions on the ground in the new colonies affected the kind of institutions the European colonizers put in place (more extractive ones if mortality

rates were higher). For this reason, historic settlers' mortality is a good predictor for the quality of modern democratic institutions.

The estimates from these empirical tests are reported in Table 11. In the first three column, we estimate the effect of financial liberalization, interacted with various proxies for development and institutional quality, on growth, volatility, and skewness individually. In Columns (4)-(6), we estimate them jointly (Model (6)). Our main robust finding is that industries experience higher long-term growth following liberalization in countries with strong institutions. In addition, the distribution of growth rates becomes less skewed to the left, implying lower risk of abrupt contractions in output at the industry level. To the extent that investor protection is correlated with democracy, this finding is related to the evidence in Rodrik and Wacziarg (2005) that democratization events are associated with a positive effect on economic growth, at least in the short run. The evidence on growth and risk thus implies that liberalizing countries would achieve a Pareto improvement through liberalization if they already have strong institutions.

We also find that Latin American countries benefited relatively more from liberalization than Europe and North America (the control group) in terms of both higher growth and lower skewness. At the other extreme, Asian countries which liberalized their financial markets experienced on average lower growth and a higher tail risk. These findings are related to recent evidence pointing to the fact that after financial liberalization Latin American stock markets have become less volatile whereas Asian stock markets have become more volatile (Edwards et al. (2003)). The effect of liberalization on volatility does not seem to depend on the region of the world in which liberalization takes place. The rest of the macroeconomic variables do not have a robust effect across various specifications. For example, in the individually estimated models we find that following liberalization, output growth increases in countries with deeper financial markets (Column (1)) and tail risk increases in countries with higher human capital (Column(3)), but these effects go away once we estimate the growth and risk equations jointly.

5 Conclusion

The positive effect of financial liberalization on long-term growth appears to be an empirical regularity, both at the country (Bekaert et al. (2005)) and at the industry (Gupta and Yuan (2009)) level. However, its effect on the variability of the growth process is less well documented in empirical work, despite abundant arguments that foreign capital increases the potential for crises and a collapse in growth (Stiglitz (2000)). To gain more insight into this important question, we use data on 21 industries in 55 countries over 45 years to investigate the cross-sectional impact of liberalization on growth and risk. We define risk both as the volatility of output growth, which relates to the more symmetric variability of the growth process, and as the skewness of the distribution of output growth, which is more closely related to tail risk. In addition, we estimate the effect of liberalization on growth and risk jointly, which allows us to distinguish the direct from the indirect effect of liberalization.

We find that financial liberalization is followed by an increase in industry value-added growth, which is consistent with the view that financial constraints are reduced and investment is aligned with growth opportunities when financial markets are liberalized. We also find that financial liberalization is followed by an increase in the variability of output growth, more so in the sense of negative skewness than in the sense of higher volatility. This is consistent with the view that in financially liberalized economies, systemic risk taking raises the probability of a sudden collapse in financial intermediation. These results are remarkably robust to a wide variety of experiments, including an alternative set of liberalization events, accounting for the strategic choice associated with liberalization, controlling for the channels through which concurrent policy reforms and macroeconomic developments affect the rate and the variability of the growth process, using different subsets of countries, and alternating between *de jure* and *de facto* measures of openness.

In addition, estimating growth and risk jointly allows us to separate the direct from the indirect effect of liberalization. We find that at the level of the industrial sector, growth and volatility are positively correlated, and so part of the positive effect of liberalization on growth goes through the

channel of increased volatility. Analogically, higher growth tends to be associated with a positively skewed distribution of growth rates, and so the direct effect of financial liberalization on tail risk is muted by the indirect effect through the channel of higher growth.

We also dig deeper into the question of where the increase in growth and risk comes from. We find that the growth effect is primarily realized through higher rate of capital accumulation, higher TFP growth, and higher employment growth. The increase in tail risk is primarily realized through a more left-skewed distribution of investment and TFP growth, while employment growth seems to be relatively stable in the wake of financial market openness. We argue that these results are consistent with various theories linking credit constraints to business cycle fluctuations and to the dynamics of creative destruction.

Most of the empirical specifications force by construction a common coefficient relating liberalization to industry growth and risk in each country. However, we know that at the level of the aggregate economy, financial liberalization tends to bring different benefits countries at different levels of economic, financial, and institutional development (Bekaert et al. (2005)). We do find that countries with better creditor protection benefit more from financial liberalization, both in terms of higher growth and in terms of lower risk, while countries which are further along in terms of financial development experience larger than average increase in average growth. In addition, in terms of growth, Latin American countries have benefited relatively more from liberalization, while Asian countries have benefited relatively less. Our results confirm that liberalization cannot and should not be treated as a one-size-fits-all policy.

While we conclude that liberalization increases the variability of growth, our results do not necessarily point to possible negative welfare implications of liberalization. At first sight, the increase in tail risk we register is somewhat related to Barro (2006) who argues that within a class of models which replicate how asset markets price consumption uncertainty, changes in this uncertainty that reflect shifts in the probability of rare and abrupt macroeconomic contractions have major implications for welfare. However, our results concern the variability of output growth

rather than consumption growth, and they are observed at the industry level. Hence, any increase in sectoral tail risk may still be diversified away within the aggregate economy, and enhanced post-liberalization risk-sharing may actually decrease the variability of consumption growth even if the variability of output growth goes up. Nevertheless, as Figure 1 implies that at least the former may not fully be the case, investigating the interplay between financial liberalization, growth, and risk at the level of the aggregate economy seems like an exciting venue for future research.

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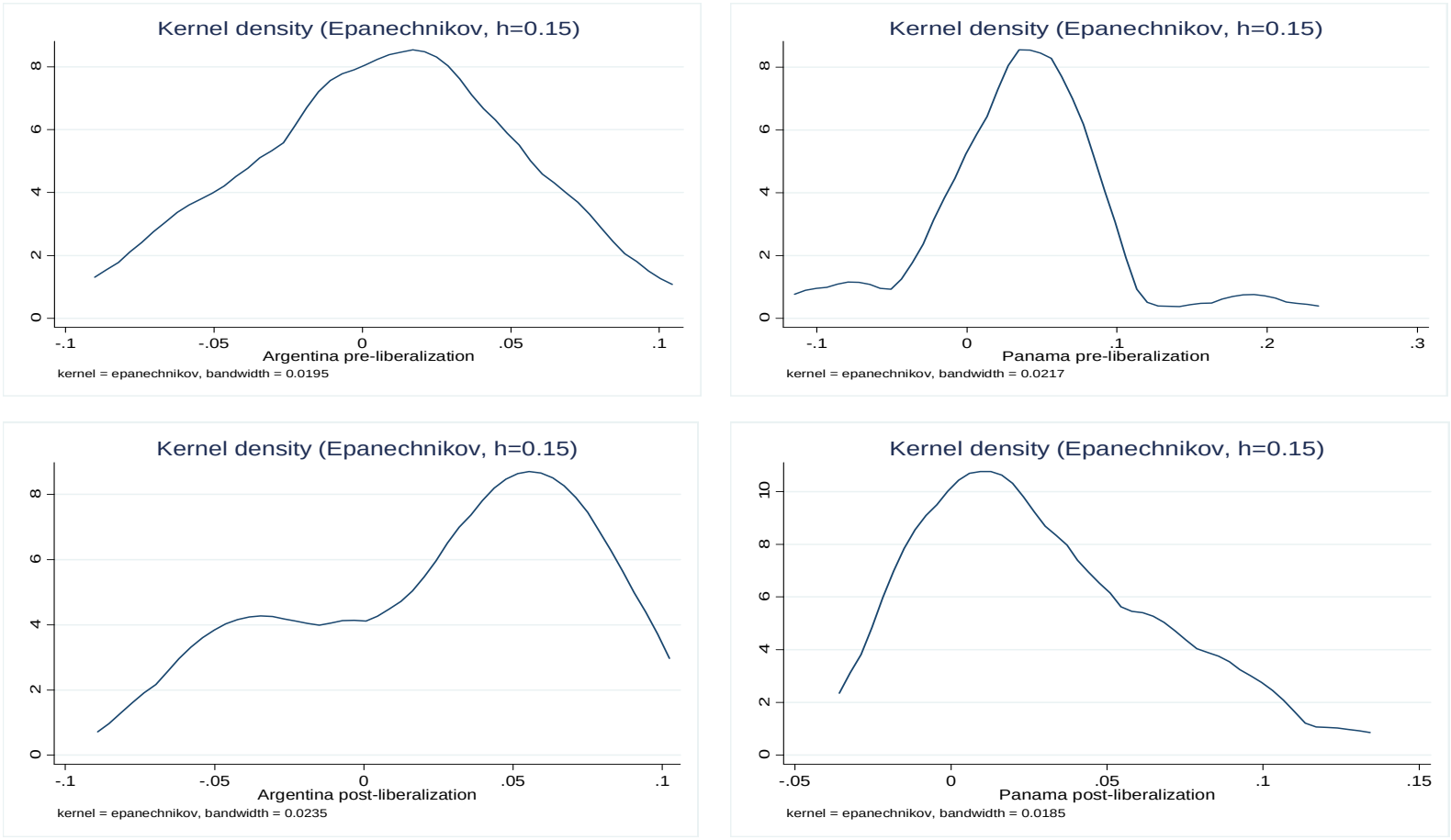
Figure 1.Kernel distribution of real GDP growth, pre- and post- liberalization: Argentina vs. Panama



Moments of real growth, pre- vs. post- liberalization event

	Argentina		Panama	
	Pre-	Post-	Pre-	Post
Mean	0.007	0.026	0.038	0.029
Standard deviation	0.042	0.043	0.059	0.034
Skewness	-0.118	-0.666	0.365	0.863

Table 1
Growth, volatility, skewness, and liberalization

Country	Average growth	Average volatility	Average skewness	Liberalization event	Country	Average growth	Average volatility	Average skewness	Liberalization event
Argentina	-0.014	0.116	0.497	1990	Kenya	0.033	0.249	0.063	
Australia	0.014	0.121	0.143		Korea	0.079	0.124	0.346	1999
Austria	0.026	0.111	0.114		Kuwait	0.042	0.401	0.043	
Belgium	0.021	0.160	0.009		Macao	0.047	0.328	0.516	
Bolivia	0.031	0.309	-0.123		Malawi	0.052	0.307	0.616	
Bulgaria	0.016	0.186	-0.429		Malaysia	0.094	0.156	-0.058	
Cameroon	0.024	0.313	0.234		Malta	0.044	0.226	0.240	
Canada	0.027	0.086	-0.620	1976	Mauritus	0.063	0.204	0.220	
Chile	0.030	0.175	-0.142	1999	Mexico	0.035	0.335	0.786	1992*
China	0.109	0.105	0.004		Morocco	0.049	0.224	0.252	
Colombia	0.039	0.128	-0.070	1999	Netherlands	0.004	0.085	-0.518	
Costa Rica	0.046	0.154	0.486		New Zealand	0.032	0.086	0.421	
Cyprus	0.043	0.154	-0.042		Norway	0.015	0.134	0.064	1989
Ecuador	0.056	0.265	0.223		Peru	-0.016	0.175	0.114	1992
Finland	0.026	0.110	-0.211	1990	Philippines	0.042	0.182	-0.135	
France	0.018	0.088	-0.604	1990	Qatar	0.020	0.189	0.431	
Germany	0.016	0.057	-0.095	1982	Singapore	0.060	0.191	-0.002	
Greece	0.010	0.122	-0.109		South Africa	0.043	0.123	0.528	
Hungary	0.011	0.124	0.204		Spain	0.036	0.108	0.467	1993
Iceland	0.028	0.128	0.132		Sri Lanka	0.075	0.289	0.448	
India	0.065	0.122	-0.174		Sweden	0.018	0.109	-0.021	1989
Indonesia	0.128	0.264	0.336	1990	Tonga	0.061	0.376	0.263	
Iran	0.089	0.524	0.807		Tunisia	0.065	0.122	0.090	
Ireland	0.033	0.134	-0.474	1992	Turkey	0.079	0.177	0.232	
Israel	0.037	0.175	0.019		United Kingdom	0.001	0.099	-0.530	1981
Italy	0.037	0.142	0.608	1992	United States	0.018	0.074	-0.309	1982
Japan	0.010	0.083	-0.436	1992	Uruguay	-0.002	0.223	-0.082	
Jordan	-0.014	0.116	0.497						

Note: Data on manufacturing industry output from UNIDO (2010) and on liberalization events from Kaminsky and Schmukler (2008). All countries included have data on at least 10 sectors for at least 10 years pre- and 10 years post-liberalization. * denotes liberalization events where the country has less than 10 years post-liberalization. All data sources in Appendix.

Table 2
Country characteristics

Country	Log GDP per capita	Private credit / GDP	Trade openness	Human capital	Creditors rights
Argentina	9.300	0.167	0.123	67.960	1
Australia	9.829	0.223	0.388	87.424	1
Austria	9.818	0.478	0.613	83.412	3
Belgium	9.781	0.965	0.240	93.024	2
Bolivia	8.052	0.437	0.144	67.739	na
Bulgaria	8.486	0.811	0.089	85.863	na
Cameroon	7.849	0.288	0.105	11.568	na
Canada	9.696	0.367	0.324	94.641	1
Chile	8.996	0.375	0.343	85.312	2
China	7.131	0.287	na	na	na
Colombia	8.540	0.253	0.208	57.943	0
Costa Rica	8.872	0.441	0.125	37.706	na
Cyprus	9.024	0.686	0.697	86.791	1
Ecuador	8.380	0.405	0.131	49.478	4
Finland	9.668	0.353	0.436	95.092	1
France	9.758	0.237	0.521	91.851	0
Germany	9.788	0.291	0.690	79.413	3
Greece	9.551	0.233	0.198	82.444	1
Hungary	9.207	0.316	0.185	87.210	na
Iceland	9.921	0.606	0.321	86.157	2
India	7.243	0.155	0.153	67.302	4
Indonesia	7.659	0.543	0.131	47.988	4
Iran	8.874	0.820	0.192	46.989	na
Ireland	9.408	0.519	0.473	84.354	1
Israel	9.508	0.518	0.411	88.202	4
Italy	9.731	0.324	0.507	91.045	2
Japan	9.745	0.130	0.853	99.514	2
Jordan	8.595	0.830	0.458	79.737	na
Kenya	7.543	0.527	0.177	38.131	4
Korea	8.919	0.260	0.744	89.499	3
Kuwait	10.831	0.895	0.158	78.506	na
Macao	9.714	1.431	0.509	67.729	1
Malawi	6.737	0.749	0.072	28.187	na
Malaysia	8.615	0.929	0.429	64.144	4
Malta	9.006	2.014	0.456	85.134	1
Mauritus	8.802	1.190	0.256	71.622	na
Mexico	8.704	1.290	0.147	61.407	2
Morocco	8.301	0.395	0.216	32.668	na
Netherlands	9.858	0.596	0.688	87.136	2
New Zealand	9.670	0.323	0.536	90.490	3
Norway	9.958	0.554	0.694	94.787	2
Peru	8.561	0.267	0.056	67.752	0
Philippines	8.019	0.533	0.189	53.252	0
Qatar	11.085	0.928	0.260	74.452	na
Singapore	9.328	2.925	0.635	80.442	4
South Africa	8.925	0.493	0.387	66.672	3
Spain	9.544	0.187	0.670	87.282	2
Sri Lanka	7.717	0.730	0.088	73.715	3

Sweden	9.814	0.420	0.602	96.425	2
Tonga	8.374	0.904	0.186	71.779	na
Tunisia	8.182	1.077	0.522	57.210	na
Turkey	8.291	0.146	0.117	57.938	2
United Kingdom	9.622	0.278	0.237	94.981	4
United States	9.953	0.103	0.853	87.274	1
Uruguay	8.956	0.289	0.182	67.738	2

Note: The Table reports summary statistics from country-specific control variables. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'Trade openness' is the average degree of openness to trade in the 10 years before and after a liberalization event. 'Human capital' is the ratio of secondary school enrollment to total enrollment. 'Creditors rights' is an index of rights aggregating various rights of creditors involved in bankruptcy and reorganization laws. All data sources in Appendix.

Table 3
Industry characteristics

Two-Digit ISIC Sector	External dependence	Growth opportunities	Liquidity needs	Exports/ Output	Imports/ Output
15. Food and beverages	-0.118	0.056	0.10	0.168	0.239
16. Tobacco manufacturing	-0.459	0.045	0.24	0.158	0.591
17. Textile mills products	-0.067	0.072	0.16	0.209	1.127
18. Wearing apparel and fur	-0.489	0.062	0.20	1.047	0.797
19. Leather and leather products	-0.996	0.027	0.245	0.654	2.057
20. Wood products	0.058	0.079	0.15	1.499	8.130
21. Paper and allied products	-0.052	0.074	0.11	0.184	0.729
22. Printing and publishing	-0.120	0.089	0.08	0.065	0.173
23. Petroleum and coal products	-0.065	0.009	0.105	0.201	1.037
24. Chemicals and allied products	0.306	0.031	0.14	0.413	1.417
25. Rubber and plastic products	-0.031	0.052	0.14	0.276	1.073
26. Stone, clay, glass and concrete	0.083	0.040	0.16	0.420	1.486
27. Primary metals	0.083	0.040	0.155	0.861	1.624
28. Fabricated metal products	-0.067	0.043	0.18	0.183	0.577
29. Industrial machinery and equipment	0.058	0.030	0.21	3.878	12.188
30. Office, accounting, and computing	0.058	0.030	0.21	0.484	2.205
31. Electrical and electronic equipment	0.441	0.044	0.21	0.484	2.205
32. Radio, television, and communications	0.244	0.044	0.21	0.484	2.205
33. Medical, precision, and optical instruments	0.473	0.026	0.21	0.484	2.205
34. Other transportation equipment	0.129	0.056	0.15	1.499	8.130
35. Furniture; miscellaneous manufacturing	0.031	0.049	0.21	1.035	4.941

Note: The Table reports summary statistics from country-specific control variables. 'External dependence' is the sector's median value of capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median value of total inventories divided by total sales. 'Exports/Output' is average exports in a particular sector divided by output in a particular sector. 'Imports/Output' is average imports in a particular sector divided by output in a particular sector. All data sources in Appendix.

Table 4
De jure financial liberalization, growth, and risk

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			3SLS		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	0.024	0.010	-0.282	0.018	0.011	-0.677
	(0.007)***	(0.013)	(0.140)**	(0.010)*	(0.012)	(0.231)***
Post	-0.089	-0.035	-0.536	-0.069	-0.037	0.924
	(0.022)***	(0.041)	(0.461)	(0.034)**	(0.040)	(0.821)
Growth						16.09
						(7.631)**
Volatility				0.606		
				(0.495)		
Initial share	-0.009	-0.200	-0.960	-0.003	-0.200	-0.893
	(0.028)	(0.053)***	(0.587)	(0.027)	(0.051)***	(0.520)*
Exports/Output × Trade openness	0.013	-0.004	-0.076	0.013	-0.004	-0.182
	(0.008)	(0.016)	(0.177)	(0.008)	(0.015)	(0.157)
Imports/Output × Trade openness	-0.004	0.005	0.015	-0.004	0.005	0.050
	(0.002)	(0.005)	(0.050)	(0.002)*	(0.004)	(0.045)
Log GDP per capita	-0.012	0.030	-0.989	0.002	0.007	0.228
	(0.004)***	(0.039)	(0.438)**	(0.001)	(0.010)	(0.103)**
Private credit/GDP	0.017	-0.107	-0.187	0.021	-0.107	0.187
	(0.019)	(0.043)**	(0.477)	(0.019)	(0.042)***	(0.423)
Private credit/GDP × External dependence	-0.021			-0.026		
	(0.010)**			(0.013)*		
Private credit/GDP × Growth opportunities	-0.522			-0.505		
	(0.253)**			(0.292)*		
Private credit/GDP × Liquidity needs		-0.019	-1.081		-0.037	-3.579
		(0.214)	(2.389)		(0.167)	(2.461)
Log population		0.016	-0.407		0.020	-0.613
		(0.020)	(0.223)*		(0.016)	(0.233)***
Log population × Liquidity needs		-0.043	-0.258		-0.041	0.145
		(0.035)	(0.387)		(0.032)	(0.412)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,626	1,626	1,626	1,626	1,626	1,626
R-squared	0.35	0.51	0.13	0.35	0.51	0.28

Note: The Table reports estimates from fixed effects regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before or immediately after an episode of financial liberalization. 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median inventories over sales. 'Log population' is the logarithm of total population. Estimates from OLS regressions (Columns labeled "OLS") and from three-stage simultaneous equations regressions (Columns labeled "3SLS"). All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 5
De jure financial liberalization, growth, and risk: Propensity score matching results

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			3SLS		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	0.017	0.018	-0.452	0.012	0.018	-0.615
	(0.006)***	(0.013)	(0.152)***	(0.007)*	(0.011)*	(0.169)***
Post	-0.050	-0.054	-0.299	-0.039	-0.053	0.203
	(0.019)**	(0.040)	(0.484)	(0.024)	(0.039)	(0.533)
Growth						10.865
						(6.919)*
Volatility				0.166		
				(0.191)		
Initial share	-0.006	-0.219	-1.316	0.029	-0.216	-1.228
	(0.037)	(0.078)***	(0.934)	(0.055)	(0.075)***	(0.826)
Exports/Output × Trade openness	0.005	0.037	-0.213	-0.001	0.036	-0.263
	(0.017)	(0.035)	(0.420)	(0.019)	(0.034)	(0.372)
Imports/Output × Trade openness	-0.001	-0.009	0.031	0.001	-0.009	0.043
	(0.005)	(0.010)	(0.120)	(0.005)	(0.010)	(0.106)
Log GDP per capita	-0.011	-0.004	0.968	0.002	0.042	0.544
	(0.008)	(0.030)	(0.357)***	(0.003)	(0.011)***	(0.139)***
Private credit/GDP	0.037	-0.059	0.283	0.051	-0.058	0.664
	(0.019)*	(0.045)	(0.545)	(0.028)*	(0.043)	(0.538)
Private credit/GDP × External dependence	-0.021			-0.022		
	(0.010)**			(0.011)**		
Private credit/GDP × Growth opportunities	-0.652			-0.666		
	(0.242)***			(0.248)***		
Private credit/GDP × Liquidity needs		-0.149	0.568		-0.155	-1.142
		(0.223)	(2.678)		(0.206)	(2.597)
Log population		-0.054	-1.155		-0.055	-1.048
		(0.021)***	(0.249)***		(0.020)***	(0.230)***
Log population × Liquidity needs		0.048	0.401		0.041	0.427
		(0.046)	(0.555)		(0.042)	(0.490)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,218	1,218	1,218	1,218	1,218	1,218
R-squared	0.42	0.39	0.15	0.42	0.39	0.30

Note: The Table reports estimates from fixed effects regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before or immediately after an episode of financial liberalization. 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median inventories over sales. 'Log population' is the logarithm of total population. In all regressions the control group is all countries which never liberalized their financial markets and which attained a minimum propensity score from a first-stage logistic regression of the probability of liberalization on the set of country level variables summarized in Table 2. Estimates from OLS regressions (Columns labeled "OLS") and from three-stage simultaneous equations regressions (Columns labeled "3SLS"). All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 6
De jure financial liberalization, growth, and risk: Industry characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Growth	Volatility	Skewness	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized × External dependence	0.024	-0.032	-0.219						
	(0.014)*	(0.012)***	(0.135)*						
Liberalized × Growth opportunities				0.387	0.197	-2.271			
				(0.171)**	(0.204)	(3.221)			
Liberalized × Liquidity needs							-0.178	0.594	-2.891
							(0.125)	(0.152)***	(1.898)
Post	-0.202	0.029	0.811	-0.242	-0.033	0.580	-0.053	-0.058	0.688
	(0.047)***	(0.029)	(0.409)*	(0.039)***	(0.039)	(0.353)*	(0.037)	(0.037)	(0.767)
Growth			13.243			7.585			15.970
			(6.102)*			(1.713)***			(7.619)**
Volatility	0.399			-0.135			0.594		
	(0.383)			(0.053)**			(0.449)		
Initial share	0.071	-0.198	-0.828	0.095	-0.178	-0.891	0.113	-0.195	-0.866
	(0.083)	(0.051)***	(0.528)	(0.103)	(0.051)***	(0.502)*	(0.100)	(0.047)***	(0.560)
Exports/Output × Trade openness	0.013	-0.004	-0.203	0.013	-0.004	-0.176	0.017	-0.004	-0.28
	(0.010)	(0.015)	(0.173)	(0.011)	(0.015)	(0.171)	(0.012)*	(0.015)	(0.194)
Imports/Output × Trade openness	-0.006	0.005	0.054	-0.006	0.005	0.049	-0.004	0.005	0.080
	(0.003)*	(0.004)	(0.050)	(0.004)	(0.004)	(0.050)	(0.002)*	(0.004)	(0.057)
Log GDP per capita	0.100	0.101	-0.082	-0.005	0.005	-0.033	-0.006	0.012	0.236
	(0.051)**	(0.005)	(0.080)	(0.007)	(0.008)	(0.061)	(0.007)	(0.006)**	(0.111)**
Private credit/GDP	0.064	0.023	0.402	0.060	-0.066	0.311	0.081	0.107	0.234
	(0.051)	(0.078)	(0.504)	(0.029)**	(0.040)*	(0.508)	(0.039)**	(0.087)	(0.507)
Private credit/GDP × External dependence	-0.036			-0.022			-0.028		
	(0.016)**			(0.009)**			(0.010)***		
Private credit/GDP × Growth opportunities	-0.559			-0.744			-0.558		
	(0.271)**			(0.242)***			(0.237)**		
Private credit/GDP × Liquidity needs		-0.059	-3.708		-0.032	-3.221		-0.311	-4.523
		(0.189)	(2.200)*		(0.022)	(2.383)		(0.207)	(2.699)
Log population		0.015	0.013		0.019	0.022		0.009	-0.586
		(0.017)	(0.067)		(0.016)	(0.063)		(0.006)	(0.229)**
Log population × Liquidity needs		-0.049	-0.077		-0.040	-0.101		-0.077	0.316
		(0.030)*	(0.369)		(0.032)	(0.365)		(0.033)**	(0.439)
Country fixed effects					Yes				
Industry fixed effects					Yes				
Time fixed effects					Yes				
Observations	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626

R-squared	0.29	0.58	0.29	0.29	0.58	0.29	0.29	0.58	0.29

Note: The Table reports estimates from fixed effects three-stage simultaneous equations regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before and immediately after an episode of financial liberalization. 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is the average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median value of capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median value of inventories over sales. 'Log population' is the logarithm of total population. All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 7
De facto financial liberalization, growth, and risk: Industry data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Growth	Volatility	Skewness	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Capital flows× External dependence	0.011 (0.006)*	0.013 (0.048)	-0.006 (0.003)*						
Capital flows × Growth opportunities				0.004 (0.003)*	0.008 (0.008)	-0.185 (0.100)*			
Capital flows × Liquidity needs							0.001 (0.001)	0.001 (0.003)	0.001 (0.034)
Growth			13.079 (7.312)*			12.987 (7.119)*			14.86 (7.413)**
Volatility	-0.301 (0.503)			-0.363 (0.521)			-0.321 (0.504)		
Initial share	-0.063 (0.085)	-0.158 (0.056)***	-0.990 (0.612)	-0.073 (0.088)	-0.160 (0.056)***	-0.986 (0.611)	-0.067 (0.086)	-0.158 (0.056)***	-0.970 (0.623)
Exports/Output × Trade openness	0.012 (0.010)	0.006 (0.016)	-0.134 (0.185)	0.012 (0.010)	0.006 (0.016)	-0.130 (0.184)	0.012 (0.010)	0.006 (0.016)	-0.154 (0.189)
Imports/Output × Trade openness	-0.002 (0.003)	0.003 (0.005)	0.034 (0.053)	-0.002 (0.003)	0.003 (0.005)	0.034 (0.053)	-0.002 (0.003)	0.003 (0.005)	0.04 (0.054)
Log GDP per capita	0.006 (0.007)	0.005 (0.009)	0.170 (0.117)	0.006 (0.007)	0.004 (0.009)	0.171 (0.116)	0.006 (0.007)	0.004 (0.009)	0.159 (0.118)
Private credit/GDP	-0.013 (0.075)	-0.117 (0.040)***	0.607 (0.536)	-0.020 (0.077)	-0.122 (0.040)***	0.603 (0.537)	-0.016 (0.076)	-0.116 (0.040)***	0.595 (0.544)
Private credit/GDP × External dependence	-0.024 (0.014)*			-0.023 (0.013)*			-0.023 (0.013)*		
Private credit/GDP × Growth opportunities	-0.47 (0.277)*			-0.508 (0.266)*			-0.446 (0.280)		
Private credit/GDP × Liquidity needs		0.015 (0.198)	-3.609 (2.458)		0.028 (0.194)	-3.515 (2.459)		0.001 (0.197)	-3.433 (2.512)
Log population		0.017 (0.018)	-0.415 (0.215)*		0.018 (0.018)	-0.421 (0.214)**		0.019 (0.018)	-0.402 (0.219)*
Log population × Liquidity needs		-0.014 (0.035)	0.215 (0.392)		-0.010 (0.033)	0.233 (0.390)		-0.015 (0.035)	0.279 (0.400)
Country fixed effects					Yes				
Industry fixed effects					Yes				
Time fixed effects					Yes				
Observations	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567	1,567
R-squared	0.10	0.13	0.14	0.10	0.13	0.14	0.10	0.13	0.14

Note: The Table reports estimates from fixed effects three-stage simultaneous equations regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before or immediately after an episode of financial liberalization. 'Capital flows' is the sum of capital assets and capital liabilities divided by GDP. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is the average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median value of capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median value of inventories over sales. 'Log population' is the logarithm of total population. All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 8
Stock market liberalization, growth, and risk

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			3SLS		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	0.031	-0.017	-0.261	0.034	-0.017	-0.675
	(0.007)***	(0.013)	(0.140)*	(0.008)***	(0.012)	(0.269)**
Post	-0.006	0.052	0.484	-0.014	0.052	0.576
	(0.010)	(0.018)***	(0.203)**	(0.016)	(0.018)***	(0.193)***
Growth						8.707
						(0.470)***
Volatility				0.030		
				(0.013)**		
Initial share	-0.006	-0.208	-0.904	0.026	-0.207	-0.814
	(0.028)	(0.053)***	(0.586)	(0.060)	(0.051)***	(0.533)
Exports/Output × Trade	0.012	-0.001	-0.062	0.013	-0.001	-0.061
openness	(0.008)	(0.016)	(0.176)	(0.008)	(0.015)	(0.171)
Imports/Output × Trade	-0.003	0.005	0.012	-0.003	0.005	0.012
openness	(0.002)	(0.005)	(0.050)	(0.002)*	(0.004)	(0.049)
Log GDP per capita	-0.020	-0.032	-0.256	0.020	-0.032	-0.256
	(0.004)***	(0.008)***	(0.086)***	(0.001)***	(0.003)***	(0.031)***
Private credit/GDP	0.038	-0.151	-0.608	0.056	-0.148	-0.230
	(0.022)*	(0.049)***	(0.537)	(0.041)	(0.047)***	(0.520)
Private credit/GDP × External	-0.022			-0.024		
dependence	(0.011)**			(0.012)**		
Private credit/GDP × Growth	-0.518			-0.467		
opportunities	(0.275)*			(0.265)*		
Private credit/GDP × Liquidity		0.154	-0.374		0.137	-2.586
needs		(0.236)	(2.610)		(0.227)	(2.592)
Log population		0.023	-0.435		0.019	-0.401
		(0.022)	(0.241)*		(0.021)	(0.218)*
Log population × Liquidity		-0.053	-0.283		-0.058	-0.032
needs		(0.035)	(0.385)		(0.034)*	(0.392)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,626	1,626	1,626	1,626	1,626	1,626

R-squared	0.36	0.51	0.28	0.36	0.51	0.28

Note: The Table reports estimates from fixed effects regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before or immediately after an episode of stock market liberalization. 'Liberalized' is a dummy variable equal to 1 if a country's stock market is liberalized in a given period. Liberalization periods are defined as in Bekaert and Harvey (2000) and Bekaert et al. (2005). 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median inventories over sales. 'Log population' is the logarithm of total population. Estimates from OLS regressions (Columns labeled "OLS") and from three-stage simultaneous equations regressions (Columns labeled "3SLS"). All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 9
De jure financial liberalization, growth, and risk: Alternative measures of tail risk and data issues

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Growth	Volatility	Minimum growth	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	0.018	0.011	-0.12	0.013	0.005	-0.491	0.020	-0.023	-0.818
	(0.010)*	(0.012)	(0.060)**	(0.006)**	(0.012)	(0.167)***	(0.010)*	(0.017)	(0.244)***
Post	-0.069	-0.037	0.240	-0.049	-0.047	0.058	-0.024	0.095	1.010
	(0.034)**	(0.040)	(0.210)	(0.027)*	(0.041)	(0.582)	(0.015)	(0.032)***	(0.334)***
Growth			3.470			14.220			2.954
			(1.725)**			(6.576)**			(12.892)
Volatility	0.608			-0.012			0.340		
	(0.495)			(0.369)			(0.074)***		
Initial share	0.115	-0.200	0.336	0.008	-0.186	-1.063	0.026	0.066	0.465
	(0.108)	(0.051)***	(0.177)*	(0.077)	(0.076)**	(0.856)	(0.061)	(0.114)	(1.768)
Exports/Output × Trade openness	0.014	-0.004	-0.063	0.006	0.007	-0.073	0.003	0.017	0.118
	(0.011)	(0.015)	(0.057)	(0.008)	(0.015)	(0.175)	(0.008)	(0.014)	(0.231)
Imports/Output × Trade openness	-0.007	0.005	0.009	-0.001	0.003	0.021	-0.002	-0.003	-0.037
	(0.004)*	(0.004)	(0.017)	(0.002)	(0.004)	(0.049)	(0.002)	(0.004)	(0.066)
Log GDP per capita	-0.001	0.005	-0.036	0.001	0.011	0.257	-0.004	-0.104	-0.431
	(0.009)	(0.008)	(0.036)	(0.005)	(0.010)	(0.126)**	(0.002)**	(0.016)***	(0.663)
Private credit/GDP	0.085	-0.104	0.283	-0.019	-0.139	0.729	-0.022	-0.314	-0.147
	(0.073)	(0.036)***	(0.163)*	(0.056)	(0.040)***	(0.634)	(0.024)	(0.046)***	(1.772)
Private credit/GDP × External dependence	-0.030			-0.022			-0.010		
	(0.013)**			(0.011)**			(0.010)		
Private credit/GDP × Growth opportunities	-0.411			-0.552			-0.287		
	(0.268)			(0.235)**			(0.249)		
Private credit/GDP × Liquidity needs		-0.036	-0.449		0.095	-2.917		0.521	-2.136
		(0.167)	(0.768)		(0.200)	(2.290)		(0.223)**	(3.219)
Log population		0.020	-0.024		0.007	-0.622		0.220	0.573
		(0.016)	(0.071)		(0.019)	(0.251)**		(0.031)***	(1.261)
Log population × Liquidity needs		-0.041	0.086		-0.029	0.475		-0.091	0.472
		(0.032)	(0.124)		(0.037)	(0.418)		(0.050)*	(0.839)
Country fixed effects					Yes				
Industry fixed effects					Yes				
Time fixed effects					Yes				
Observations	1,626	1,626	1,626	1,352	1,352	1,352	593	593	593
R-squared	0.35	0.51	0.13	0.35	0.51	0.14	0.35	0.51	0.14

Note: The Table reports estimates from fixed effects three-stage simultaneous equations regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), the skewness (Columns labeled 'Skewness'), or the minimum difference between

realized and mean output growth during the years immediately before or immediately after an episode of financial liberalization (Columns labeled 'Minimum growth') during the years immediately before or immediately after an episode of financial liberalization (Columns labeled 'Skewness'). In columns (1)-(3), the full sample of countries is used. In columns (4)-(6), countries with data on at least ¾ of all industries are used. In columns (7)-(9), countries with data on at least 9/10 of all industries are used. 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is the average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median value of capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median value of inventories over sales. 'Log population' is the logarithm of total population. All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 10
De jure financial liberalization, growth, and risk: Empirical channels

Panel A. Capital accumulation and TFP

	(1)	(2)	(3)	(4)	(5)	(6)
	Capital			TFP		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	0.060	0.034	-0.299	0.052	-0.041	-0.408
	(0.031)**	(0.015)**	(0.168)*	(0.020)**	(0.015)***	(0.190)**
Post	0.013	0.019	0.453	-0.142	0.062	0.022
	(0.121)	(0.044)	(0.424)	(0.052)***	(0.043)	(0.803)
Growth			-2.096			13.171
			(3.871)			(7.765)*
Volatility	-2.400			0.982		
	(1.635)			(0.203)***		
Initial share	-0.597	-0.236	-1.302	0.147	-0.141	0.610
	(0.422)	(0.063)***	(0.583)**	(0.072)**	(0.060)**	(0.668)
Exports/Output × Trade	-0.044	-0.010	-0.059	0.008	0.013	0.002
openness	(0.048)	(0.018)	(0.181)	(0.019)	(0.017)	(0.252)
Imports/Output × Trade	0.016	0.004	0.027	-0.006	0.001	-0.005
openness	(0.014)	(0.005)	(0.053)	(0.005)	(0.005)	(0.073)
Log GDP per capita	0.026	-0.007	-0.004	0.006	-0.067	0.578
	(0.015)*	(0.008)	(0.208)	(0.004)*	(0.012)***	(0.478)
Private credit/GDP	-0.268	-0.081	-0.874	0.175	-0.209	0.571
	(0.206)	(0.042)*	(0.500)*	(0.062)***	(0.040)***	(0.755)
Private credit/GDP × External	-0.041			0.006		
dependence	(0.048)			(0.017)		
Private credit/GDP × Growth	0.871			-0.629		
opportunities	(2.203)			(0.426)		
Private credit/GDP × Liquidity		0.152	3.236		0.134	-4.823
needs		(0.212)	(2.643)		(0.178)	(3.036)
Log population		0.028	0.165		0.127	-1.466
		(0.016)*	(0.356)		(0.024)***	(1.001)
Log population × Liquidity		0.026	0.431		0.017	-0.021
needs		(0.018)	(0.480)		(0.029)	(0.510)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,213	1,213	1,213	1,212	1,212	1,212
R-squared	0.35	0.51	0.28	0.35	0.51	0.28

Panel B. New business creation and employment

	(1)	(2)	(3)	(4)	(5)	(6)
	Establishments			Employment		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized	-0.056	0.036	-0.183	0.022	0.039	-0.522
	(0.014)***	(0.020)*	(0.367)	(0.013)*	(0.013)***	(0.358)
Post	0.001	0.201	0.001	-0.053	-0.026	0.573
	(0.001)	(0.022)***	(0.001)	(0.032)*	(0.042)	(0.813)
Growth			9.023			23.459
			(8.411)			(9.749)**
Volatility	0.511			0.531		
	(0.158)***			(0.484)		
Initial share	0.063	-0.066	0.076	0.079	-0.194	-1.046
	(0.048)	(0.079)	(0.726)	(0.109)	(0.053)***	(0.658)
Exports/Output × Trade	0.001	0.015	-0.136	0.010	-0.010	-0.528
openness	(0.015)	(0.024)	(0.219)	(0.011)	(0.016)	(0.194)***
Imports/Output × Trade	-0.001	-0.004	0.044	-0.006	0.007	0.140
openness	(0.004)	(0.007)	(0.063)	(0.004)	(0.005)	(0.058)**
Log GDP per capita	-0.005	0.061	-0.180	0.001	0.014	-0.072
	(0.003)*	(0.016)***	(0.269)	(0.003)	(0.010)	(0.142)
Private credit/GDP	0.183	-0.152	1.029	0.083	-0.021	-0.536
	(0.032)***	(0.061)**	(0.786)	(0.057)	(0.036)	(0.600)
Private credit/GDP × External	-0.013			-0.024		
dependence	(0.016)			(0.011)**		
Private credit/GDP × Growth	-0.491			-0.239		
opportunities	(0.426)			(0.536)		
Private credit/GDP × Liquidity		0.010	-1.305		-0.311	1.616
needs		(0.293)	(3.077)		(0.161)*	(2.633)
Log population		-0.116	0.434		-0.019	0.108
		(0.031)***	(0.568)		(0.018)	(0.248)
Log population × Liquidity		0.039	-0.783		-0.020	0.348
needs		(0.047)	(0.492)		(0.027)	(0.414)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,294	1,294	1,294	1,624	1,624	1,624
R-squared	0.35	0.51	0.28	0.35	0.51	0.28

Note: The Table reports estimates from fixed effects three-stage simultaneous equations regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of growth rates of capital and TFP (Panel A) and establishments and employment (Panel B). 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Initial share' is the beginning-of-period share of output in a sector in total manufacturing output. 'Exports/Output' are exports in a particular sector divided by output in a particular sector. 'Imports/Output' are imports in a particular sector divided by output in a particular sector. 'Trade openness' is the average degree of openness to trade. 'Log GDP per capita' is the logarithm of average GDP per capita in the period before and after a liberalization event. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'External dependence' is the sector's median value of capital expenditures minus cash flows divided by capital expenditures. 'Growth opportunities' is the sector's median sales growth. 'Liquidity needs' is the sector's median value of inventories over sales. 'Log population' is the logarithm of total population. All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level. All data sources in Appendix.

Table 11
Financial liberalization, growth, and risk: Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS (private credit and democracy instrumented)			3SLS (private credit and democracy instrumented)		
	Growth	Volatility	Skewness	Growth	Volatility	Skewness
Liberalized × Creditors rights	0.023	-0.012	0.879	0.015	0.003	0.179
	(0.014)*	(0.024)	(0.319)***	(0.008)**	(0.011)	(0.108)*
Liberalized × Private credit/GDP	0.103	0.013	1.424	0.017	-0.029	0.660
	(0.060)*	(0.120)	(1.558)	(0.043)	(0.054)	(0.639)
Liberalized × Trade openness	-0.037	0.071	-0.505	-0.003	0.007	0.594
	(0.039)	(0.070)	(0.906)	(0.053)	(0.072)	(0.815)
Liberalized × Human capital	-0.001	0.001	-0.024	0.001	0.001	0.003
	(0.001)	(0.001)	(0.014)*	(0.001)	(0.001)	(0.012)
Liberalized × Latin America dummy	0.071	0.004	1.560	0.075	-0.006	0.446
	(0.025)***	(0.050)	(0.647)**	(0.031)**	(0.045)	(0.681)
Liberalized × Asia dummy	-0.119	0.021	-1.590	-0.086	-0.028	0.368
	(0.034)***	(0.062)	(0.810)*	(0.032)***	(0.033)	(0.565)
Country fixed effects				Yes		
Industry fixed effects				Yes		
Time fixed effects				Yes		
Observations	1,064	1,064	1,064	1,064	1,064	1,064
R-squared	0.38	0.50	0.28	0.46	0.40	0.32

Note: The Table reports estimates from fixed effects regressions where the dependent variable is the mean (Columns labeled 'Growth'), the standard deviation (Columns labeled 'Volatility'), or the skewness (Columns labeled 'Skewness') of the distribution of the growth rates of output during the years immediately before or immediately after an episode of financial liberalization. 'Liberalized' is a dummy variable equal to 1 if a country is liberalized in a given period. Liberalization periods are periods during which all three liberalization criteria in Kaminsky and Schmukler (2008) are fulfilled. 'Post' is a dummy variable equal to 1 after a liberalization event for all countries, irrespective of whether they liberalized or not. 'Creditors rights' is an index of rights aggregating various rights of creditors involved in bankruptcy and reorganization laws. 'Private credit/GDP' is the ratio of credit to the private sector to GDP. 'Log GDP per capita' is the logarithm of average GDP per capita. 'Trade openness' is the average degree of openness to trade. 'Human capital' is the ratio of secondary school enrollment to total enrollment. 'Latin America dummy' is an indicator variable equal to 1 if the country is in Latin America. 'Asia dummy' is an indicator variable equal to 1 if the country is in Asia. The regressions include all other covariates from Table 5 (coefficients not reported for brevity). The private credit to GDP ratio has been instrumented using dummies for legal origin, from La Porta et al. (1998), and creditors rights have been instrumented using settlers' mortality, from Acemoglu et al. (2002). Three-stage simultaneous equations regressions in columns labeled "3SLS". All regressions include fixed effects as specified. White (1980) standard errors appear below each coefficient in parentheses, where *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Appendix. Variables and sources

Output	Total output in a particular industry in a particular country in a particular year, in constant US dollars. Source: INDSTAT 2010 Rev. 3.
Liberalized	Dummy variable equal to 1 following the year in which the country attains a liberalization status on all three liberalization dimensions – credit markets, stock markets, and capital controls – for countries which liberalized. Source: Kaminsky and Schmukler (2008).
Post	Dummy variable equal to 1 following the year in which the country attains a liberalization status on all three liberalization dimensions – credit markets, stock markets, and capital controls – for countries which liberalized. For countries which did not, it equals 1 after the mean liberalization year in the sample. Source: Kaminsky and Schmukler (2008).
Initial share	The industry's share of output out of total manufacturing output in this country for a particular year. Source: INDSTAT 2010 Rev. 3.
Minimum growth	Difference between minimum growth experienced during the pre- or post-liberalization period and the average growth experience during that period, for each industry. Source: INDSTAT 2010 Rev. 3.
Log population	Logarithm of the total population in the respective country. Source: Penn Tables.
Log GDP per capita	Logarithm of average GDP per capita for the pre- and post-liberalization period. Source: Penn Tables.
Trade openness	Average index of the country's openness to trade for the pre- and post-liberalization period. Source: Penn Tables.
Human capital	Average ratio of secondary school enrollment to total enrollment for the pre- and post-liberalization period. Source: World Bank Development Indicators.
Creditors rights	Index of rights aggregating various rights of creditors involved in bankruptcy and reorganization laws. Source: La Porta et al. (1998)
Credit	The value of total credits by financial intermediaries to the private sector in each country for the pre- and post-liberalization period. Source: Beck et al. (2010).
Capital flows	The average sum of total foreign assets and liabilities over GDP for the pre- and post-liberalization period. Source: Lane and Milesi-Ferretti (2007).
Settlers' mortality	Average mortality rates of European settlers in the respective country. Source: Acemoglu et al. (2001).
Legal origin	A matrix of dummies for the origin of the country's legal system. Dummies take on the value of 1 if the respective country has English, French, German, or Nordic legal origin. Source: La Porta et al. (1998)
Exports/Output	Average exports in a particular sector divided by output in a particular sector. Adapted for ISIC Rev. 3 from Di Giovanni and Levchenko (2007).
Imports/Output	Average imports in a particular sector divided by output in a particular sector. Adapted for ISIC Rev. 3 from Di Giovanni and Levchenko (2007).

External dependence	The sector's median value of capital expenditures minus cash flows divided by capital expenditures, for mature Compustat firms. Adapted for ISIC Rev. 3 from Cetorelli and Strahan (2006).
Growth opportunities	The sector's median value of capital expenditures minus cash flows divided by capital expenditures, for mature Compustat firms. Adapted for ISIC Rev. 3 from Fisman and Love (2007).
Liquidity needs	The sector's median value of total inventories divided by total sales, for mature Compustat firms. Adapted for ISIC Rev. 3 from Raddatz (2006).