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The Impact of International Financial Integration on Industry
Growth

by

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**DISCUSSION
PAPER**

The Impact of International Financial Integration on Industry Growth

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The Impact of International Financial Integration on Industry Growth

Abstract

The empirical relationship between financial openness and growth is examined in this paper. In contrast to a large body of cross-country work investigating this link, I study the impact of financial integration on growth at the industry level. This paper provides evidence that financial openness has a positive effect on growth of industrial sectors, regardless of their characteristics. Moreover, industries that rely relatively more on external finance grow disproportionately faster in countries with more integrated financial systems. However, this industry-specific effect of financial openness decreases when I control for the development of the domestic financial system. Finally, the hypothesis that financial integration improved growth also by enhancing the functioning of the domestic financial system is tested. I find evidence of this indirect transmission channel of financial openness.

JEL Codes: D92,F3, 04, 016

Key Words: Financial Integration, Financial Development, Growth

Introduction

The financial landscape has changed significantly since the beginning of the 1980s. Several factors, including the liberalization of international capital movements, financial deregulation and advances in information technology, have contributed to this change. The result is an increase in cross-border capital flows, a greater presence of foreign banks and more international financial integration.

The integration of national financial systems would be of little interest if it did not matter for long-run economic growth. But does it? Some economists argue that liberalizing the financial sector promotes the economy. A large literature finds that the level of a country's financial development has a causal impact on its long-run economic performance (see Levine, 1997). Thus, by enhancing the development of the domestic financial system, financial integration can positively affect the economic growth rate. Moreover, international financial integration may also directly affect economic performance. Financial openness permits better resource allocation, portfolio diversification and access of domestic firms to foreign funds, allowing higher profitability and growth. At the same time, sceptics argue that financial liberalization entails several risks. They refer to the financial and currency crises that have followed financial liberalization in both industrialized and developing countries in the 1980s and 1990s. These crises call into question the advisability of liberalizing restrictions on international capital flows.

When theory provides conflicting predictions about the growth effects of financial integration, it is particularly interesting to look at the empirical evidence. An extensive literature has been built up over the past five years on the impact of financial openness on economic growth. The majority of these studies augment standard growth regressions with indicators of financial integration. They all attempt to estimate whether economic growth is enhanced when a country allows its residents to borrow and lend internationally. However, these attempts to establish a robust empirical link between financial liberalization and economic growth have so far not been very successful.

This paper differs from previous research in several ways. First, I leave the cross-country approach and analyze growth effects at the industry level. I explore whether economic sectors that are relatively more in need of external finance grow disproportionately faster in more financially integrated countries. This analysis is based on the methodology developed by Rajan and Zingales (1998). Second, I examine the channels through which financial openness can have an impact on the economic activity of a country. Although financial integration may further a country's financial development, I try to investigate whether measures of domestic financial development can fully drive out the integration effect. In other words, it is tested whether financial integration directly impacts industry growth. Third, following Klein and Olivei (1999), I try to quantify the impact of financial openness on the development of the domestic financial system. The sample in my analysis covers a longer time-span, more indicators of international financial integration and other measures of financial development. Finally, I also investigate whether the impact of financial integration on industry growth is contingent upon a country's level of economic development.

To anticipate my conclusions, I find that financial openness has a positive effect on growth of industrial sectors, regardless of their characteristics. In addition, this paper provides evidence that industries that require relatively more external financing grow disproportionately faster in countries with more integrated financial systems. However, I also find that once I control for the level of domestic financial development, the industry-specific effect of financial openness decreases. One interpretation of this result is that the integration of financial

systems improved growth also by enhancing the development of the domestic financial system. I find evidence in favor of this indirect transmission channel. In particular, I find a significant effect of financial openness on the growth rate of financial development.

The remainder of the paper proceeds as follows. The next section presents a brief summary of the theory and empirical evidence on the relationship between financial integration and economic performance. In section II, the empirical methodology is presented. Section III describes the data. In an econometric evaluation in section IV, I try to assess the impact of financial openness on industry performance and on financial development. Section V concludes.

I. Theory and Previous Empirical Results

a. Theory

An extensive literature finds that the level of a country's financial development has a causal effect on its long-run economic performance. Thus, by improving the development of the domestic financial system, international financial integration can affect the economic growth rate. There are many ways in which financial openness may be associated with local financial development

First, financial integration is expected to enhance the development of the domestic banking system through increased competition in banking markets. Foreign bank entry may increase competitive pressure (Claessens and Laeven, 2004), thereby forcing domestic banks to cut costs and prices of financial services. Empirical evidence that foreign bank entry significantly reduces domestic bank profitability, net non-interest income and overhead expenses has been provided by Claessens, Demirgüç-Kunt and Huizinga (2001)². Their results are consistent with the hypothesis that in the long run, foreign bank entry improves the functioning of domestic banking markets³. Second, foreign banks may import best practices from abroad which domestic banks then copy. Thus, also by allowing countries to benefit from frontier financial technologies, foreign bank entry can enhance the functioning of the domestic financial system. Third, more financial integration can promote domestic financial development by improving national regulation (corporate governance, accounting standards, bank supervision). Convergence in regulatory standards is a prerequisite for an integrated market. It is expected that this convergence will result in an improvement in the national regulation of the less financially developed countries. Evidence that a good regulatory environment is important for the development of the domestic financial system has been provided by Laporta, Lopez-de-Silanes, Shleifer and Vishny (1997). Specifically, they show that countries with a good protection of shareholders have more valuable stock markets, a larger number of listed domestic firms per capita, and a higher rate of initial public offering activity than do countries with a weak protection. They also find that countries that protect creditors better have larger credit markets.

² Terell (1986), using aggregate accounting data for 14 developed countries, finds that countries which allowed foreign bank entry had lower gross interest margins, lower before-tax profits and lower operating costs. McFadden (1994) also provides a study of the effect of removal of restrictions on foreign financial services providers in Australia and finds that this has led to improved domestic bank operations. Evidence for the U.S. comes from Jayaratne and Strahan (1996,1998). They show that relaxed branching restrictions within states in the U.S. have been associated with increased credit availability, enhanced bank efficiency, and faster economic growth.

³ Buch and Heinrich (2002) replicate this analysis for OECD countries. In contrast to the previous study, the presence of foreign banks does not appear to significantly reduce profits or costs. One reason for the discrepancy could be that Claessens et al. are looking at the efficiency of domestic banks only, whereas Buch et al. include both domestic and foreign banks. In addition, the results of Claessens et al. may be driven primarily by the non-OECD, less developed countries in their sample. The results suggest that in OECD countries, the levels of foreign entry observed so far have not significantly increased competitive pressure.

Thus, creditor rights and shareholder rights encourage the development of lending and equity markets, respectively.

So far, I stated that financial integration can increase the economic growth rate by promoting the development of the domestic financial sector. However, financial openness can also have a direct impact on the economic activity of a country.

First, the integration of financial markets can increase the opportunities to diversify risk and thus improve risk sharing. Improved portfolio diversification implies lower portfolio risk and thus lower rates of return required by investors to hold these portfolios. This, in turn, should directly translate into a lower cost of capital inducing additional investment⁴. Hardouvelis, Malliaropoulos and Priestley (2004) find that, over the 1990s, the cost of equity capital within European Union sectors has fallen by between 0.5 and 3 percentage points. Also Bekaert and Harvey (2000) and Henry (2000 a,b) find that the cost of equity capital decreases significantly after financial liberalization. Stulz (1999), however, finds it difficult to detect strong effects of liberalization on the cost of capital in emerging economies. He argues that the existence of the home bias may well be the factor limiting the extent of the cost of capital decrease. Improved risk sharing can also enhance growth by inducing a shift towards investment in projects with higher expected returns. Obstfeld (1994) shows that international asset trade encourages countries to shift from low-return, safe investments towards high return, risky investments. Provided risky returns are imperfectly correlated across countries, and provided some risk free assets are initially held, a small rise in diversification opportunities always raises expected growth as well as national welfare.

Second, it is expected that financial integration has an impact on economic activity beyond its impact on the local financial development because the latter may not gauge fully the degree of financial development available to the economy (Levine 1997, 2003). As financial integration proceeds, firms of less financially developed countries can access more easily major financial centers by listing their shares abroad⁵. Moreover, the banks of more developed countries can provide cross-border loans to the firms of less advanced countries. These financial services are not included in the private domestic credit of both countries. Therefore, as financial markets become more integrated, the size of the financial market of a given country as a measure of its degree of financial development loses significance. Harrison, Love and McMillan (2002) state that the effect of financial liberalization on financing constraints in the host country can either be positive or negative. Global capital flows, by bringing in scarce capital, may ease host-country firm's financing constraints. However, if incoming foreign firms borrow heavily from domestic banks, they may exacerbate domestic firms' financing constraints by crowding them out of domestic capital markets. The results of their study suggest that the lifting of restrictions on the capital account is associated with a reduction in firm-level financing constraints⁶. Laeven (2003) also

⁴ European financial integration has also a direct effect on the cost of equity capital which consists of a reduction in real risk free rates. In fact, as a precondition to EMU entry, inflation and interest rates converged among EU countries towards the typically low levels of Germany, which used to be considered as benchmark. This convergence resulted in lower real rates, implying that the opportunity cost of investing in equity decreased, reducing the cost of equity capital (Hardouvelis et al., 2004)

⁵ According to Pagano, Roell and Zechner (2002), firms list abroad because this may strengthen the competitive position of the company in its industry, by enhancing its reputation with suppliers, employees and customers. Furthermore, firms cross-list for financial reasons: funding abroad may be cheaper or more easily available. Pagano, Randl, Roell and Zechner (2001) report that European companies are more likely to cross-list in more liquid and larger markets, and in markets where several companies from their industry are already cross-listed. They are also more likely to cross-list in countries with better investor protection and more efficient courts and bureaucracy. The higher standards of corporate governance or disclosure, improved liquidity, availability of analysts with superior technological knowledge of the industry, etc are expected to lower the cost of capital and increase the availability of equity finance.

⁶ They interpret the sensitivity of investment to the availability of internal funds as a proxy for the degree of financing constraints.

finds that financial liberalization relaxes external financing constraints in developing countries, but only for small firms.

b. Empirical Evidence⁷

Only recently, attention has been paid in the empirical literature to the role of financial system openness in promoting economic growth. The standard approach is to analyse the relation between different indicators of financial integration and economic growth across countries. A more recent strand of empirical studies used industry-level data to identify the effect of financial openness on growth. A schematic overview of these studies is provided in Appendix 1.

A first group of cross-country empirical studies attempts to study the direct impact of financial liberalization on economic growth. In a widely cited study, Rodrik (1998) regresses the growth of GDP per capita on the share of years when the capital account was free of restriction as measured by the binary indicator constructed by the IMF⁸. His sample includes almost 100 countries, industrialized as well as developing, and he uses data for the period 1975-1989. Rodrik finds no association between the level of capital account liberalization and economic growth. In contrast, Quinn (1997) identifies a positive result between the change capital account liberalization and growth. Using the Quinn index of capital account openness⁹, the empirical estimates suggest that the change in this index has a strongly significant effect on the growth in real GDP per capita in his cross section of 58 countries over the period 1960-1989. The controversy between Rodrik and Quinn can be due to the use of different indicators of capital account liberalization. Also important may be that the country coverage is different¹⁰. In particular, Quinn considers fewer low-income developing countries. This conjecture is supported by the results of Edwards (2001). This author finds that financial liberalization is negatively associated with growth in poor countries but positively associated with growth in rich countries¹¹. A plausible interpretation is that a good institutional and financial development is necessary to enjoy the positive growth effects of international financial integration¹².

A second round of cross-country studies directly tests the hypothesis that the effect of financial openness depends on institutional and financial development. Kraay (1998) tests whether the effect of financial liberalization depends on the strength of the financial system, the effectiveness of prudential supervision and regulation, and the quality of institutions. Similarly, Arteta, Eichengreen and Wyplosz (2001) interact the level of financial liberalization with measures of financial development. The results of both studies show that there is little evidence that the benefits of financial liberalization are contingent upon a country's level of financial and

⁷ Two other recent surveys of the effects of capital account liberalization on economic growth are Eichengreen (2001) and Edison, Klein, Ricci and Slok (2004).

⁸ The IMF restriction measure is a zero-one dummy variable that equals one in years where there are restrictions on capital account transactions and zero in years where there are no restrictions on these external transactions. The data are from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.

⁹ Quinn (1997) assigns scores associated to the intensity of official restrictions by reading through the IMF's narrative descriptions of capital account restrictions. This measure attempts to improve upon the IMF restriction measure by providing information about the magnitude of restrictions.

¹⁰ Arteta et al. (2001) and Eichengreen (2001) offer still other reasons for the differences in results between Rodrik and Quinn.

¹¹ In contrast to these results, Edison et al. (2002) find that the association of capital account liberalization with growth is stronger in non-OECD countries.

¹² This argument can also be used to explain the differences in results of Alesina, Grilli and Milesi-Ferretti (1994) and Grilli and Milesi-Ferretti (1995). The first study, using a sample of high income countries, finds evidence of a positive relation between capital account liberalization and economic growth. The second study finds a negative relation, using a sample dominated by low-income countries.

institutional development. However, Arteta et al. find that the elimination of macroeconomic imbalances is an essential prerequisite for capital account liberalization to have positive growth effects. Klein (2003) presents evidence of an inverted-U shaped relationship between the responsiveness of growth to capital account openness and income per capita. A similar inverted-U shaped relationship is found when they allow the effect of capital account openness on growth to vary with various indicators of government quality.

A third class of cross-country studies focuses on the channels through which capital account liberalization might enhance growth. That financial liberalization enhances financial development is supported by the results of Klein and Olivei (1999) and Levine and Zervos (1998). Both studies find that financial liberalization has a positive impact on domestic financial development. However, the former study finds that the correlation between capital account openness and financial deepening is limited to the OECD countries¹³. The results of the latter study indicate that the influence of financial liberalization on financial development is not restricted to high-income countries. Levine and Zervos (1998) find for 16 developing countries that stock markets become larger and more liquid after the capital account is opened. Also Levine (2000) provides evidence that international financial liberalization improves the functioning of the domestic financial markets. First, he shows that liberalizing restrictions on international portfolio flows tends to enhance stock market liquidity. Second, he provides evidence that allowing greater foreign bank presence tends to enhance the efficiency of the banking system. Further, Edison, Levine, Ricci and Slok (2002) find that, using data on capital flows and stocks, international financial integration is completely irrelevant for growth, once one controls for the level of domestic financial development. According to his study, financial integration has no additional effect on economic growth, beyond the impact that it may have on financial deepening of the domestic financial market: highly integrated countries show a high degree of financial development and, as a consequence, high growth rates. However, Bekaert, Harvey and Lundblad (2001) compare the growth performance of industrial and emerging economies before and after equity market liberalization. Their estimates point to an important transmission channel from equity market liberalization. Rising international capital inflow increases the availability of resources, this induces a rising investment share that spurs real output growth. They find that, in contrast with the previous studies, although financial liberalization furthers financial development, measures of financial development fail to fully drive out the liberalization effect.

To study the effect of financial openness on growth, the previous studies considered growth rates of country aggregates. In this paper, I approach the problem by analysing growth effects at the industry level, using the methodology of Rajan and Zingales (1998).

In their analysis, Vlachos and Waldenstrom (2002) also use the methodology of Rajan and Zingales. This is, they test if industries highly dependent on external financing experience a faster growth in countries with liberalized capital accounts, liberalized equity markets, and that are well-integrated with global capital markets. Their main result is that growth in value added is unrelated to all the investigated dimensions of liberalization. They do, however find significant positive effects of financial liberalization on the creation of new firms and growth in production, given that countries have relatively well developed financial markets. Giannetti, Guiso, Jappelli, Padula and Pagano (2002) study the potential impact of European financial integration on the ability of a country to grow faster. They first run the same regressions as Rajan and Zingales. Next, they simulate two

¹³ One interpretation of this result is that countries require a constellation of economic, legal and social institutions in order to have capital account liberalization translate to greater financial depth (Klein and Olivei, p2).

possible scenarios. First, they simulate the impact of raising the level of financial development in each EU country to the US level. They consider the latter to be a valid benchmark. In the second scenario, they estimate the impact of financial integration on growth raising the regulatory and legal standards to the highest current EU standard. Their simulations suggest that the benefits from financial openness can have potentially large effects on the growth of the European manufacturing industry, ranging from 0.75 to 0.94 percentage points per year depending on the assumed scenario. Furthermore, they conclude that countries that currently have a weak financial structure are expected to benefit most.

II. Empirical Methodology

In the empirical analysis, the impact of financial system integration on the ability of an industry to grow faster is examined. First, I investigate the economy-wide effect of financial integration on industry growth. Then I test whether there is evidence of an industry-specific effect. In particular, I ask whether financial openness promotes the growth of those industries that are more in need of external finance by facilitating credit access to these sectors. In addition, I am interested in the channels through which financial openness can contribute to industry growth. I already argued that financial integration may boost growth through enhancing the development of the domestic financial system and/or through risk diversification and easier access to foreign funds. In this paper, I try to identify these transmission channels in two ways. First, I test whether financial openness has an effect on industry growth beyond its impact on domestic financial development. This is, I test whether there's evidence of a direct transmission channel. Then, I investigate the relationship between financial integration and a country's level of financial development.

a. Financial Integration and Industry Growth

I begin by estimating the economy-wide effect or first-order effect of financial integration on industry growth. I ask whether industrial sectors, regardless of their characteristics, grow more or less if they are in countries with more open financial systems. The specification is

$$\begin{aligned}
 \text{Growth Value Added}_{i,j} = & \text{Constant} + \beta_1 \text{Fraction of Value Added}_{i,j} \\
 & + \sum \beta_{2,i} \text{Industry Dummy}_i \\
 & + \sum \beta_{3,j} \text{Country Control}_j \\
 & + \beta_4 \text{Financial Integration}_j \\
 & + \text{Error}_{i,j}.
 \end{aligned} \tag{1}$$

A subscript i indicates that the variable refers to the i th industry. Similarly, a subscript j denotes country specific variables. The dependent variable $\text{Growth Value Added}_{i,j}$ is the growth rate in industry i in country j over the period 1980 to 1997 of real value added. $\text{Fraction of Value Added}_{i,j}$ is industry i 's share of value added in manufacturing in country j in 1980. Cetorelli and Gambera (2001) suggest this variable captures an industry-specific convergence effect. Industries that have grown substantially in the past are less likely to continue to grow at a high rate in the future. Therefore, it is expected to have a negative sign. The industry dummies correct

for every possible industry specific effect. The country controls that should affect industry growth are explanatory variables used in standard cross-country growth regressions¹⁴. In particular, I include variables for initial economic development, human capital, government size, trade openness and financial development. Finally, the coefficient on the level of financial integration estimates the economy-wide effect of financial openness on industry growth. A positive and significant coefficient β_4 indicates that financial integration promotes growth of all industries, regardless of their characteristics.

The analysis of a first order effect is similar to the cross-country studies investigating the importance of financial openness for growth. The contribution of this paper to previous literature is that I introduce heterogeneity across industrial sectors. Rajan and Zingales (1998) argue that industries differ in their dependence on external finance. I want to investigate whether financially dependent industries are likely to be better off in countries with more open financial systems. If the integration of financial systems removes or reduces barriers to external financing, industries highly dependent on external finance should grow disproportionately faster in countries more integrated with international capital markets. This hypothesis is tested by running the following regression model

$$\begin{aligned}
 \text{Growth Value Added}_{i,j} = & \text{Constant} + \psi_1 \text{ Fraction of Value Added}_{i,j} \\
 & + \sum \psi_{2,i} \text{ Industry Dummy}_i \\
 & + \sum \psi_{3,j} \text{ Country Dummy}_j \\
 & + \psi_4 (\text{External Dependence}_i \times \text{Financial Integration}_j) \\
 & + \text{Error}_{i,j}.
 \end{aligned} \tag{2}$$

In this model, the interaction between the industry's external financial dependence and an indicator of financial openness is included. The existence of an industry specific effect is consistent with a positive and significant coefficient on the interaction term.

External Dependence_i is defined as the share of capital expenditures that the median firm in industry *i* cannot finance through internal cash flow. Since the problem of information acquisition is less severe for older firms, it is expected that these firms can more easily raise funds from foreign banks or financial markets. If this is the case, the financial openness effect should be stronger for more mature firms in the industry. Since Rajan and Zingales provide information on the financial needs of the more mature firms, I am able to test this hypothesis. Thus, I run the above regression model calculating the interaction term using both the financial dependence proxy for all firms and the dependence measure for firms more than ten years old.

Further, the country control variables from model (1) are replaced by country dummies. Using both country and industry dummies allows to control for the country and industry characteristics, and thus, to eliminate possible biases caused by omitted country- or industry-specific regressors, or model misspecification. In this specification, the effect of any omitted variable that does not vary simultaneously across countries and industries is absorbed by either the country dummy variables or the industry dummies.

¹⁴ See Cetorelli and Gambera (2001) and Bonaccorsi di Patti and Dell'Ariscia (2004)

I already discussed the channels whereby financial integration can affect growth. I stated that one way through which the integration of financial markets can increase the long-run growth rate is by fostering the development of the domestic financial sector. I also have seen that financial openness may offer risk diversification opportunities and possibilities to firms to find funds abroad, which in turn may have an effect on industry growth. Thus, financial integration may have an impact on industry growth beyond its effect on financial development. This hypothesis can be tested by adding to regression model (2) an interaction between industry i 's dependence on external financing and the level of financial development in country j . The estimated coefficient on this interaction term is the focus of Rajan and Zingales analysis. If this coefficient is significant and positive, then this implies that industries that are more dependent on external financing do better in countries with better financial systems. The focus of my analysis is on the coefficient on the interaction between financial integration and financial dependence. A positive and significant coefficient indicates that financial integration has an effect on industry growth beyond developing the domestic financial system. The model I estimate to test whether there is a direct transmission channel of financial openness is

$$\begin{aligned}
Growth\ Value\ Added_{i,j} = & \text{Constant} + \phi_1 \text{ Fraction of Value Added}_{i,j} \\
& + \sum \phi_{2,i} \text{ Industry Dummy}_i \\
& + \sum \phi_{3,j} \text{ Country Dummy}_j \\
& + \phi_4 (\text{External Dependence}_i \times \text{Financial Integration}_j) \\
& + \phi_5 (\text{External Dependence}_i \times \text{Financial Development}_j) \\
& + \text{Error}_{i,j}.
\end{aligned} \tag{3}$$

As is common in the growth regression framework, there may be potential concerns about the endogeneity of regressors. Therefore, I will run two-stage least squares instrumental variables regressions parallel to the ordinary least squares regressions in order to check for the potential reversed causality.

b. Financial Integration and Financial Development

Financial integration can have a positive effect on economic growth through its impact on domestic financial development. This is the next issue I want to investigate. More specifically, I want to know whether a high degree of financial integration leads to an increasing degree of financial development. If such a relation exists, then it would follow that financial integration has an indirect effect on economic growth through the promotion of financial development. Following Klein and Olivei (1999), I run the cross-sectional regression

$$\begin{aligned}
Growth\ Financial\ Development_j = & \text{Constant} + \gamma_1 \ln \text{ Financial Development } 1980_j \\
& + \gamma_2 \text{ Financial Integration}_j \\
& + \gamma_3 \text{ Country Control}_j \\
& + \text{Error}_j
\end{aligned} \tag{4}$$

where $Growth\ Financial\ Development_j$ is country j 's growth rate of financial development over the period 1980 to 1997. $Financial\ Integration_j$ is the variable of interest and indicates country j 's level of international financial integration. In the regression I take into account financial convergence, which is captured by the

logarithm of the level of financial development in the initial year. It is expected that countries with initially lower levels of financial development experience greater financial deepening over the period 1980-1997 than those countries that begin the period with more developed financial markets. Evidence of financial convergence would be obtained with the finding of significant and negative values of this coefficient. Klein and Olivei remark that including the initial level of financial depth is also important for obtaining accurate estimates of the effect of financial integration if the various indicators of initial financial development are correlated with the measure of financial integration. The sample correlation coefficients are between 0.26 and 0.37 and are statistically significant. Thus, if financial convergence is present, the omission of $(\log) \text{ Financial Development } 1980_j$ from the regression would cause a downward bias in the estimated coefficient on financial integration.

The control variable that is included in the regression is the (logarithm of the) 1980 level of real GDP per capita.

III. Data

In the empirical analysis, different datasets are merged. First, data on industry's dependence on external finance are taken from Rajan and Zingales (1998). Second, growth in value added is from the Industrial Statistics Database which is produced by the United Nations Statistical Division. Third, the measures of financial development are drawn from the dataset constructed by Demirgüç-Kunt and Levine (2001). Fourth, measures of financial integration are constructed with data from the IMF's Exchange Arrangements and Exchange Restrictions. The summary statistics of the employed variables are provided in Table 1¹⁵.

a. Data on Financial Integration

Measuring the extent to which a country is financially liberalized or integrated is not straightforward. In my analysis, I use two rule-based indicators. Both indicators are derived from information in the Annual Report of the International Monetary Fund's Exchange Arrangements and Exchange Restrictions (AREAER). In it, the IMF reports a dummy variable that takes a value of one if the country has capital controls in place in a given year, and zero otherwise. For each country, the variable *Share* is calculated, which represents the proportion of years between 1980 and 1995 in which the country had no restrictions on capital mobility. A higher value denotes a higher degree of capital mobility. A number of cross-country studies, including Grilli and Milesi-Ferretti (1995), Kraay (1998), Rodrik (1998) and Klein and Olivei (1999), Chanda (2001) and Klein (2003) used a similar variable, though using different time-spans. The measure has the advantage that it covers a wide range of countries. However, it is an imperfect proxy for financial openness as it does not distinguish between the type of flow that is being restricted. Moreover, it does not capture the intensity of capital controls.

The second measure for financial openness represents an effort to measure the intensity of enforcement of capital controls. Quinn (1997) attempts to capture this intensity through a careful reading of the narrative descriptions published in the AREAER. He scores separately the intensity of controls for capital account receipts and capital account payments. For each of these two categories the coding rule is as follows: a score of 0 indicates transactions are forbidden, 0.5 indicates that there are quantitative or other regulatory restrictions, 1 indicates

¹⁵ In this paper I use two different samples. The first sample includes 27 industries in 45 countries and is used for our industry-level regressions. The second sample includes 65 countries and is used to investigate the impact of financial integration on the development of the domestic financial sector.

that authorities have to approve the transaction or that transactions are subject to heavy taxes, the 1.5 score is used when there are less severe taxes, and 2 indicates that transactions are free of restrictions or taxes. The sum of the values for the two categories is an indicator of overall capital account openness that ranges between 0 and 4. A larger value indicates more financial openness. This measure is available annually from 1950 to 1997 for OECD countries, and for the years 1958, 1973, 1982, and 1988 for non-OECD countries. In this paper, the 1988 value, *Quinn88*, and the average value of Quinn's indicator for the years 1982 and 1988, *Quinn82-88*¹⁶ is used. Table 2 contains the list of countries in the dataset and the corresponding measures of financial openness. As can be seen from the correlation matrix, given in Table 3, the variables *Share*, *Quinn88* and, *Quinn82-88* are highly correlated with each other. The correlation coefficients for these variables are statistically significant at better than a one percent level¹⁷.

In order to check for potential reversed causality, I will run two-stage least squares instrumental variables regressions parallel to the ordinary least squares regression. Therefore, I need instruments for financial openness.

Figure 1 presents the evolution of financial openness for the sub-samples African, Asian, Latin-American and OECD countries. From this figure, you can infer that financial liberalization over the period 1980 to 1995 largely took place in industrial countries and to a much less extent in developing countries. I also find that within this last group, it are largely the Latin American countries that have re-opened their capital accounts since the mid 1980's. This dependence of financial liberalization on the region of the country offers a set of instrumental variables. Specifically, I use dummy variables for Asian, African and Latin American countries. I also include a dummy variable which equals one when a country had no restrictions on her capital account in the year 1985¹⁸. This is, I assume that countries maintained the same regime towards their capital account as in 1985. This dummy variable, however, may not be appropriate for solving the issue of reversed causality, since it may be a leading indicator rather than a cause of growth in financial development.

Table 4 presents the results of the regression of the financial integration proxy on the instruments mentioned above. Both the variable *Share* and the *Quinn88* index are used as indicator of financial openness. From columns (a) and (d), it can be seen that most countries maintained the same stance towards their capital account as in the year 1985. Columns (b) and (e) show that regional dummy variables also explain an important fraction of the variation in the degree of financial openness. It can be seen that, among the developing countries, the Latin American countries have the most open capital markets while the African countries have the largest restrictions on capital mobility. These results are consistent with the evidence provided in Figure 1. Column (c) and (f) present the results of the regressions including both a dummy indicating the stance of the capital controls in 1985 and regional dummies. The results show that these variables explain very well the variation in the degree of financial liberalization.

¹⁶ I thank Dennis Quinn for sharing his data with me.

¹⁷ See Edison, Klein, Ricci and Slok (2004) for a comparison of these indicators of financial openness.

¹⁸ These variables are also the instruments for financial liberalization used by Klein and Olivei (1999).

b. Data on other variables

Industry Growth. In this paper, the empirical relevance of financial openness on industry growth is tested. Therefore, the dependent variable in the model specification is the growth rate of real value added over the period 1980 to 1997. The data I use are from the United Nations Industrial Statistics Database and covers manufacturing firms¹⁹ at the three-digit International Standard Industrial Classification (ISIC) level. Value added was first expressed in U.S. dollars and then converted into real figures using the U.S. Producer Price Index deflator²⁰. The sample includes data for 27 manufacturing industries in 45 countries.

External Financial Dependence. The financial dependence of industry i is defined as the share of capital expenditures that the median firm in the industry cannot finance through internal cash flow. Therefore, it is computed as capital expenditures minus cash flow from operations, divided by capital expenditures. Rajan and Zingales employ data from Standard and Poor's Compustat for U.S. firms. In order to smooth temporal fluctuations and reduce the effects of outliers, data on the firm's external finance and capital expenditures are averaged over the period 1980-1990²¹. The median value is then used to indicate the external dependency for each respective industry.

I already mentioned that it is expected that the more mature firms in the industry will benefit the most from financial openness. As the problem of information acquisition is less severe for these companies, they can more easily have access to foreign funds. Since Rajan and Zingales report the external financial dependence of all companies as well as for mature companies (firms that were listed for more than ten years), I am able to test this hypothesis. Using the dependence measure of the older firms restricts the sample to 25 industries.

Financial Development. Recent literature has constructed a number of indicators that aim to proxy for development of financial intermediaries and stock markets across countries. I use four different indicators for financial development. The first measure is *Private Credit*, which equals the value of loans made by deposit money banks and other financial institutions to the private sector divided by GDP. This indicator excludes credit to the public sector and claims of one group of intermediaries on another. Second, to assess stock market development I employ *Stock Market Capitalization*, which is the value of listed domestic shares on domestic exchanges divided by GDP. This indicator measures the overall size of the equity market relative to the size of the economy. The overall size of the financial sector can be measured by the sum of *Stock Market Capitalization* and *Private Credit*, which I call *Financial Depth*. Another typical measure for the overall size of the financial system is *Liquid Liabilities*. This indicator equals currency plus demand and interest bearing liabilities of banks and non-bank financial intermediaries divided by GDP. The data for these four indicators are averages over the period 1980 to 1997. The correlation matrix in Table 3 shows that all measures of financial development are highly correlated with each other. The correlation coefficients are between 0.48 and 0.90 and are statistically significant at better than a one-percent level.

¹⁹ Rajan and Zingales (1998) note that the industries in the dataset all belong to manufacturing in order to reduce the dependence on country-specific factors, like natural resources.

²⁰ The U.S. PPI deflator is from the Federal Reserve Bank of Saint Louis. (www.stls.frb.org/fred/)

²¹ The time-period of our study is 1980-1997. However, the external finance dependence proxy, which is a crucial variable in our analysis, is calculated using 1980's data only and may vary over time. Therefore, a more updated version of this measure would be more correct. Rajan and Zingales (1998) find that the correlation between the external finance dependence proxy for the 1970's and this for the 1980's is 0.75.

IV. Empirical Results

Using the data and econometric techniques outlined above, this section presents the regression results concerning the relationship between financial integration, financial development and industry growth. First, I present evidence of an economy-wide effect of financial integration. Then, I concentrate on the industry-specific effect and test whether this effect is robust. Finally, I report whether financial integration can enhance growth through its impact on a country's financial development.

a. Economy-wide Effect

Before estimating the industry-specific effect of financial integration, this is, the differential effect of financial integration on growth across industries that differ in their dependence on external finance, it might be interesting to analyze first the economy-wide effect of financial openness. This means that I investigate whether financial integration has a positive or negative effect on industrial sectors, regardless of their characteristics. The model specification is given by (1). The country-specific variables are similar to the explanatory variables of standard growth regressions. I include variables for financial development, initial economic development, government size, education and trade openness²². *Financial Depth*, the ratio of the sum of private credit and stock market capitalization over GDP, is used as proxy for financial development. The expected sign for this term is positive. The logarithm of per capita income in 1980 captures a convergence effect, and is therefore expected to have a negative sign. The level of government expenditures is the ratio of government consumption to GDP. The level of human capital is measured as the average years of schooling attained by the population over 25 years in 1980, and is also expected to have a positive coefficient. Trade openness is measured as the sum of real imports and exports over GDP. It is expected that more open countries have higher growth rates. The model includes industry dummies to control for any industry-specific effect. The industry's fraction of value added is also included. The focus is on the sign and significance of the coefficient on the financial integration variable. The model specification (1) is estimated with ordinary least squares and two-stage instrumental variables regressions to account for the potential endogeneity of financial openness. Only the IV estimates are reported because the Durbin-Wu-Hausman statistic test rejects the unbiasedness of the OLS estimates. The instruments are region dummy variables and a dummy indicating one when a country had no restrictions on its capital account in 1985.

In Table 5, the results of the first-order effect of financial openness are presented. The dependent variable is the growth rate of real value added for each sector in each country over the period 1980 to 1997. Columns (a)-(d) report the regression results using *Share* as indicator of financial integration, adding one country control variable at a time. The fraction of value added in manufacturing is negative and significant different from zero, as a priori expected. The country control variables also have the expected sign, although some of them are not statistically significant. More important for this analysis, is that the coefficient on the indicator of financial integration is positive and statistically significant (at one- or five-percent level) in all regressions. This result suggests that, controlling for other variables, the integration of financial systems promotes growth of all industries, indiscriminately. To offer an indication of the economic significance of this financial openness effect, I focus on the results in column (d). When the financial openness measure, *Share*, increases from the first

²² These variables are drawn from the database of Demirgüç-Kunt and Levine (2001)

to the third quartile of its distribution, growth in value added will increase with 11 percentage points over the period 1980 to 1997. For comparison, the average growth rate of real value added is 38 percent. The economy-wide effect of financial openness on growth is thus significant, both statistically and economically.

It is worth noting that the above result is robust to the use of alternative indicators of financial integration. I re-estimate specification (1) using the *Quinn88* and *Quinn82-88* index. The results, not reported here, show that the coefficient on the level of financial openness remains positive and significant (at a one-percent level).

b. Sector-specific Effect

I now add to model (1) the interaction term between the industry's dependence on external finance and an indicator of financial integration. This model specification allows testing whether there is, besides an economy-wide effect, also a sector-specific effect of financial integration. If financial openness facilitates credit access, this effect should be especially noticeable on those industrial sectors where firms are highly dependent on external finance. Columns (e)-(h) of Table 5 report the results, again, adding one country control variable at a time. It can be seen that the coefficient on the level of financial openness, as well as the coefficient on the interaction term is positive and significant. This suggests that, besides a positive effect on growth of all industries, financial integration has an additional positive influence on sectors where firms are dependent on external finance, by facilitating credit access to these firms.²³

Next, I test whether the industry-specific effect of financial integration is robust by concentrating on the interaction term only. In particular, I exclude the country control variables from the model and, in addition to industry dummies, I add country dummies. Therefore, I eliminate possible biases due to omitted country-specific variables and reduce the concern of endogeneity of the financial openness indicator²⁴. This more robust specification is given by (2). It means that I analyze whether industries that are relatively more dependent on external finance grow disproportionately faster in countries with more integrated financial systems. The dependent variable is the growth rate in real value added in a particular sector in a particular country over the period 1980-1997. The indicator for financial openness is *Share*.

The results, using OLS, are presented in Table 6. First I report in column (a), as a benchmark, the results of the basic Rajan and Zingales specification using *Financial Depth* as proxy for financial development. I find that industrial sectors that rely relatively more on external finance develop disproportionately faster in countries with more developed financial systems, as the coefficient for the interactive variable external dependence times *Financial Depth* is statistically significant. This result is consistent with the findings of Rajan and Zingales. As can be seen from column (b), the coefficient estimate for the interaction term between *Share* and financial dependence is also positive and statistically significant. This result suggests that financial integration promotes growth of those industries that are more in need of external finance by facilitating credit access to firms. As column (a) and (b) show, there is also evidence of an industry-specific convergence effect. The coefficient estimate for the initial share of total value added in manufacturing is negative and statistically significant.

²³ I also included, as additional control variable, the interaction between external financial dependence and an indicator for domestic financial development. It appears that, once I control for the sector-specific effect of financial development, the coefficient on the financial openness interaction term falls substantially and becomes insignificant. This result, not reported in the paper, does not support the hypothesis that financial openness directly affects industry growth.

²⁴ See section 2.a.

Further it is tested whether there is evidence of a direct transmission channel from financial openness to growth. A way to test this hypothesis it is to augment regression model (2) with an interaction term between the industry's dependence on external finance and a measure of domestic financial development. The specification is given by model (3). If financial openness has an effect beyond developing the domestic financial system, the interaction term between financial dependence and an indicator of financial integration should have a positive and significant coefficient. The results, presented in Column (c) of Table 6, show that more financial integration does not seem to have any direct effects on industry growth in real value added. This is, once I control for the impact of domestic financial development, the coefficient on the interaction term between external dependence and financial openness becomes insignificant. This finding is consistent with the results of Edison et al. (2002), mentioned in section I.b.

I already mentioned that it is expected that financial openness is more favorable for the older companies, because of the problem of information acquisition on new and younger firms. If the integration of financial systems reduces the financing constraints of older, existing firms, then it should be that industries where mature firms are more in need of external finance grow disproportionately faster in countries with more open financial systems. To test this hypothesis, I re-estimate the regression models using a proxy for financial dependence of the more mature firms in the industries, that is, establishments more than ten years old. Columns (e)-(g) of Table 6 report the results of the regression models, this time calculating the interaction terms using the external financial dependence indicator of the older firms. Column (e) reports, as a benchmark, the results of the basic Rajan and Zingales regression. As can be seen from column (f), the coefficient estimate for the interaction term between *Share* and external dependence is positive and statistically significant. This result provides evidence that financial integration promotes growth of industries where older firms are relatively more dependent on external finance by facilitating credit access to these firms.

Further it appears that, in contrast to the findings when external dependence of all firms is used, more financial openness does have a direct impact on industry growth in real value added (see column (g)). This is, even when I control for the effect of domestic financial development, the coefficient on the interaction term between external financial dependence and *Share* remains significant (five-percent level). The results also show that the positive relation between the level of domestic financial development and industry growth in real value added is robust to controlling for financial integration. The coefficient of the interaction term between external dependence and *Financial Depth* remains positive and significant.

To see the economic significance, consider two industries: a sector where older firms are heavily dependent on external finance (Machinery) and a sector where older firms have a low dependence on external finance (Glass)²⁵. The coefficient estimate predicts that the Machinery sector will grow about 6 percent points faster relative to the other sector if financial integration were to increase from the first to the third quartile of its distribution. For comparison, the growth rate of real value added is, on average, 38 percent over the period 1980-1997. The industry-specific effect of financial openness is thus statistically and economically significant.

²⁵ The external financial dependence proxies for the mature firms in these industries are 0.2166 and 0.031, respectively.

c. Robustness Tests

In what follows, I continue testing the robustness of the industry-specific effect of financial openness. The dependent variable is still the growth rate of real value added in each industry in each country over the period 1980 to 1997. The interaction terms are calculated using both the external financial dependence proxy of all firms and the dependence proxy of the more mature firms in the sector.

A first concern is that the results depend on the choice of the financial openness measure. Therefore, I check whether the findings are robust to alternative definitions of financial integration. First, I run regression model (2) using *Quinn82-88* as indicator of financial openness. The results, not reported in the paper, are consistent with prior findings. Industries that are relatively more dependent on external finance grow disproportionately faster in countries with more open financial systems, irrespective of the choice of the external financial dependence proxy. Further, the results of model (3) using the *Quinn82-88* indicator are presented in column (d) and (h) of Table 6. As can be seen from column (d), when the external financial dependence proxy for all firms is used, the coefficient on the financial openness interaction term is not significant. However, when the terms of interaction are calculated using the external dependence of the older firms, the magnitude of the coefficient on this interaction term increases. The findings using the *Quinn82-88* indicator are thus similar to the results obtained using *Share* as measure of financial integration²⁶. Therefore, I continue to use *Share* as the benchmark indicator of financial openness.

Next, I investigate whether the results of model (3) are robust to the use of alternative measures of financial development. In particular, I employ the bank development indicator, *Private Credit*, and stock market development indicator, *Stock Market Capitalization*. The results are reported in Table 7. The financial development and financial openness indicators are, again, interacted using both the dependence of external finance of all firms (see column (a)-(d)) and the external dependence of the more mature companies (see column (e)-(h)). When running the basic Rajan and Zingales regression I find that, irrespective of the choice of the financial dependence measure, the coefficients on the financial development interaction terms are positive and statistically significant at a one- or five-percent level. I then add the interactive variable between financial integration and external dependence to the model. As Table 7 indicates, the financial openness interaction effect is positive and statistically significant when the terms of interaction are calculated using the external financial dependence of the more mature firms. Again, these results are consistent with the previous findings, using *Financial Depth* as indicator of financial development.

Another possible concern is that financial integration is a proxy for other country characteristics. Financial openness may be a proxy for the level of human capital, a country's economic or institutional development, or the level of trade openness²⁷. Consequently, the relationship I found between financial openness and industry growth could underlie a relationship between one of these country characteristics and growth in value added²⁸. Therefore, to test the robustness of my basic results to this argument, I add an interaction term between external financial dependence and an indicator for these country variables. In columns (a)-(d) from Table 8, I report the results of the regressions where the interaction between external financial dependence and, respectively, *Human*

²⁶ Similar results are also obtained when I replace the financial openness proxy by *Quinn88*.

²⁷ The correlation between financial openness and human capital, economic development, institutional development and trade openness is respectively 0.41***, 0.42***, 0.35*** and 0.20. Three stars denote that the correlation is statistically different from zero at the one-percent level.

²⁸ The results can only be explained by these country characteristics when the dependence of industries on these characteristics is strongly correlated with their external financial dependence.

Capital, *Log of income per capita*, *Rule of Law* and *Trade* are added to model (3). The terms of interaction are calculated using the external dependence of mature firms. The indicator for financial development is *Private Credit*²⁹. As the coefficient estimates show, the included interaction terms are not statistically significant (except the trade interaction term), while the financial openness interaction term remains positive and statistically significant. The results suggest that financial integration is not a proxy for other country characteristics.

Finally, I check whether the results are robust to the estimation technique. Ordinary least squares estimation assumes that there's no simultaneity or reversed causality problem. However, Kraay (1998) distinguishes two sources of the endogeneity problem. A first source of endogeneity is that capital controls may be correlated with other fundamental determinants of growth. The second is that policymakers may impose capital controls in response to cyclical fluctuations. This is, if countries relax controls in good times and impose them in bad times, one would find a spuriously positive effect of financial liberalization on growth. Therefore, I run the same regressions using instrumental variables for financial integration. I find that the financial openness interaction variable is statistically significant only when I do not control for domestic financial development. However, a Hausman test of the hypothesis that OLS is consistent cannot reject the null.

d. Sub-sample Stability

An important policy question is whether the effect of financial openness on industry growth is similar in industrialized as in developing countries. In the paper, this hypothesis is tested in two ways. First, I add an extra interaction term to specification model (3): the interaction between external financial dependence, a proxy of financial integration and a dummy variable indicating one when the country is a developed country. Second, I split the sample of countries into two sub-samples: industrialized and developing countries.

Column (a) of Table 9 presents the results of the extended model, using OLS. The indicators for financial development and financial openness are, respectively, *Financial Depth* and *Share*. Both the financial development interaction term and the financial integration interaction term maintain positive and significant. Moreover, the coefficient on the new interaction term is negative and statistically significant at better than a five-percent level, indicating that the effect of financial integration on industry growth is smaller for the developed countries. Focusing on the size of the coefficient on the new interaction term, it appears that the effect of financial openness on industry growth varies substantially across the sub-samples of countries. The magnitude of the financial openness effect is estimated to be approximately 80 percent weaker in countries characterized by a higher level of economic development. This finding is robust to the use of instrumental variables for financial integration. As can be seen from column (b), the magnitude of the dummy interaction term increases somewhat. The sub-sample regression results are also reported in Table 9. From column (c), it can be seen that financial integration has a positive effect on industry growth in developing countries. The coefficient on the financial openness interaction term remains significant at a one-percent level when we control for domestic financial development (see column (d)). Moreover, these findings are robust to the use of instrumental variables. The results using IV estimation are reported in columns (e) and (f).

²⁹ Similar results are obtained with *Financial Depth* as indicator of financial development, however, the number of observations is then smaller.

To see the economic significance, again, I consider two industries where mature firms differ in their dependence on external finance: Glass (low financial dependence) and Machinery (high financial dependence). The coefficient estimate for *Share* predicts that the Machinery industry will grow about 12 percentage points faster, over the period 1980-1997, than the Glass sector if financial openness were to increase from the first to the third quartile of its distribution. For comparison, the average growth rate in real value added for developing countries is 49 percent for the period 1980 to 1997. So the financial integration effect is both statistically and economically significant.

As can be seen from columns (g)-(j), the coefficient on the financial integration interaction term is not statistically different from zero when the sub-sample of industrialized countries is used. Both the evidence of the extended model and the evidence of the sub-samples thus suggest that financial integration only promotes growth in sufficiently poor countries. Similar results were found by Edison et al. (2002). In contrast, Edwards (2001) and Arteta et al. (2001) argue that financial liberalization positively affects growth only after a country has achieved a certain level of economic development.

It is interesting to note that if instead of using *Share* as indicator of financial openness, the *Quinn82-88* or *Quinn88* index is used, I obtain similar results. The above results are thus robust to alternative indicators of financial integration. The sub-sample regression results using the *Quinn88* index as indicator are presented in Table 10.

e. Financial Development Effect

The results reported above provide evidence of an industry-specific effect of financial openness. In particular, I find that industries where firms are more dependent on external finance have a relatively higher growth rate if they are in countries with more open financial systems. However, the evidence also indicates that when the financial development interaction term is added to the regression model, the coefficient on the interaction term between external financial dependence and financial openness decreases. One interpretation of this result may be that the integration of financial systems improved growth also by increasing the level of domestic financial development³⁰. This hypothesis of an indirect transmission channel from financial integration to industry growth will be examined here.

I use the approach of Klein and Olivei, which is given by specification (4). Following these authors, the proportion of years over a certain period in which there was no restriction on capital mobility is used as measure of financial openness. I extend their time-span from 1980 to 1995. Further, I add to their analysis by examining whether the relationship between financial openness and growth in financial development is robust to other indicators of financial integration. Moreover, I extend their number of measures of financial development. Specifically, four different indicators of domestic financial development are used: *Private Credit*, *Liquid Liabilities*, *Stock Market Capitalization* and *Financial Depth*³¹.

Estimation results for specification (4) using *Share* as proxy for financial integration are shown in Table 11. I find that the estimated coefficient on *Share* is positive and statistically different from zero at a 1- or 5-percent

³⁰ In this paper, I provided evidence that domestic financial development positively affects industry growth.

³¹ The three indicators of financial deepness used in the analysis of Klein and Olivei are: the ratio of liquid liabilities to GDP, the ratio of claims on the non-financial private sector to GDP and the ratio of deposit money bank domestic assets to the sum of deposit money bank domestic assets and central bank domestic assets.

level. This provides evidence that countries with open capital accounts over the period 1980 to 1995 had a significantly greater increase in the growth of domestic financial development than countries with continuing capital account restrictions, even after controlling for financial convergence. This result, however, does not hold when *Stock Market Capitalization* is used as measure of financial development (see column (e)). With this indicator, I find the correct sign for the coefficient on financial liberalization, but the effect is not statistically different from zero. Further, in all regressions, except when *Financial Depth* is used as indicator of financial development, I find that coefficient on the logarithm of initial financial development is negative and significant at a 1- or 5-percent level. This is evidence in favor of financial convergence. Countries with initially lower levels of financial development caught up to those countries that began the period with a higher level of development of their financial market.

It should be noticed that there might be a potential for simultaneity bias, since a country's policy towards the capital account may depend upon the level of development of its domestic financial system. Klein and Olivei argue that 'capital account convertibility is often seen as the logical culmination of developing a deep, mature, and efficient financial system (p.10)'. The results would be biased towards finding a positive relation between financial liberalization and financial development if countries experiencing a deepening of their financial system for reasons other than financial liberalization also open up their capital account. Therefore, I also estimate specification (4) using instrumental variables for financial openness. However, a Hausman test for the hypothesis that OLS is consistent can only reject the null when *Financial Depth* and *Stock Market Capitalization* are used as measures of financial development.

The results of the two-stage instrumental variables regressions are also presented in Table 11. Columns (b), (d), (f) and (h) provide evidence of a significant effect of financial liberalization on the growth of financial development. The IV estimates are positive and significant at a one- or five-percent level. The results using IV regression also provide strong support for financial convergence. All estimates of the coefficients on the logarithm of initial financial development are significantly different from zero, except when *Financial Depth* is used as measure.

To gauge the magnitude of the effect of financial liberalization on the growth in financial development I consider the ceteris paribus effect of an increase in the indicator *Share* from zero (no capital mobility) to the sample mean (0.3). The estimated coefficient on financial openness suggest that this would lead to an increase in the growth rate of *Financial Depth* of approximately 25 percentage points over the period 1980 to 1997. For comparison, the average growth rate of *Financial Depth* is 65 percent. Similarly, the increase in the growth rate of *Private Credit* and *Liquid Liabilities* would be about 22 and 13 percentage points, respectively. The indirect transmission channel of financial openness is thus both statistically and economically significant.

Further, I test whether the relationship between domestic financial development and financial openness is robust to other measures of financial integration. The results using *Quinn82-88* as measure of financial openness, reported in Table 12, are similar with the ones I find using the indicator *Share*. The only difference is that I do not find a statistically significant effect anymore of financial integration when growth in *Financial Depth* is used as dependent variable.

Finally, I investigate whether the effect of financial liberalization on financial development depends on a country's level of economic development. This hypothesis is tested in two ways. First, I run regression model (4) for the two sub-samples: industrialized countries and developing countries. The results can be seen from

Table 13. For the OECD countries I find, for both OLS and IV regressions, a statistically significant effect of financial openness on the growth in *Private Credit* and *Liquid Liabilities* (see column (a)-(d)). I also find evidence of a positive and significant effect of financial liberalization on the growth in *Private Credit* or *Liquid Liabilities* in the developing countries³² (see column (e)-(h)). The magnitude of the coefficient estimates is somewhat lower for these countries compared to the industrialized countries, but they remain significant at a 1- or 5-percent level. Second, I include in specification (4) an interaction term between *Share* and a dummy variable indicating one when the country is a developed country. The coefficient estimate on this interaction term, not reported in the paper, is not significantly different from zero³³. This provides evidence that financial liberalization offers more or less the same benefits to developing countries as to industrialized countries with respect to its promotion of domestic financial development.

V. Concluding Remarks

In this study, I examine the impact of financial system integration on the ability of an industry to grow faster. The analysis yields three main findings. First, the results presented in this paper provide empirical support for the idea that financial integration enhances growth of industries, regardless of their characteristics. This is, I find a positive first order effect of financial openness on growth in real value added. Second, my results suggest that economic sectors that are relatively more in need of external finance grow disproportionately faster in more financially open countries. This industry-specific effect of financial openness holds especially for the more mature firms in the sector, this is firms more than ten years old. A possible explanation is the integration of financial systems positively affects the financing needs of the older firms in a country, because the problem of information acquisition for these firms is less severe. The evidence also suggests that the industry-specific effect of financial openness is mainly driven by the developing countries in the sample. Third, the econometric results in this paper indicate that once I control for domestic financial development, the industry-specific effect of financial openness decreases substantially. Therefore, I also test whether the integration of financial systems improved growth by increasing the level of domestic financial development. I find evidence in favour of this indirect transmission channel of financial integration. In particular, the results show a statistically and economically significant effect of financial openness on the development of the domestic financial system. Moreover, in contrast to Klein and Olivei (1999), I find evidence of international financial integration promoting domestic financial development in industrialized as well as in developing countries.

³² I also did the regression for the sub-sample of Latin American countries. For this sub-sample I find no significant effect of financial liberalization on the growth of liquid liabilities or private credit. This result is in line with the evidence found by Klein and Olivei.

³³ I also included an interaction term between *Share* and a dummy variable indicating one when the country is a LAC. The coefficient on this interaction term was negative but not significantly different from zero.

Table 1. Summary Statistics

Variable	Num. Obs.	Mean	Std. Dev.	Min.	Max.
Sample 1					
<i>Growth Value Added_{ij}</i>	1081	0.382	1.015	-4.277	9.127
<i>Fraction of Value Added_{ij}</i>	1152	0.038	0.048	0.000	0.561
<i>External Dependence_i (Old Firms)</i>	1125	0.037	0.198	-0.572	0.329
<i>External Dependence_i (All Firms)</i>	1215	0.243	0.330	-0.451	1.140
<i>Financial Depth_j</i>	38	0.937	0.655	0.195	2.456
<i>Private Credit_j</i>	45	0.554	0.371	0.076	1.731
<i>Stock Market Capitalization_j</i>	38	0.331	0.353	0.008	1.382
<i>Liquid Liabilities_j</i>	45	0.551	0.277	0.153	1.721
<i>Share_j</i>	45	0.330	0.390	0.000	1.000
<i>Quinn88_j</i>	38	2.434	1.027	0.500	4.000
<i>Quinn82-88_j</i>	38	2.288	0.960	0.500	4.000
Sample 2					
<i>Growth Financial Depth_j</i>	42	0.652	0.567	-0.831	2.368
<i>Growth Private Credit_j</i>	65	0.258	0.666	-1.629	1.932
<i>Growth Stock Market Capitalization_j</i>	42	1.659	1.088	-0.469	6.098
<i>Growth Liquid Liabilities_j</i>	65	0.259	0.423	-0.980	1.282
<i>Log of per capita GDP_j</i>	65	8.083	0.026	6.199	9.407
<i>No Restriction 1985_j</i>	65	0.569	0.499	0.000	1.000

Note: Growth Value Added is the rate of growth of real value added for each industrial sector in each of the countries for the period 1980 to 1997. Fraction of Value Added is industry i 's share of manufacturing in country j in 1980. External Dependence refers to the borrowing needs of all establishments (all firms), and of establishments 10 years and older (old firms). Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Private Credit is the value of loans made by deposit money banks and other financial institutions to the private sector divided by GDP. Stock market capitalization is the value of listed domestic shares on domestic exchanges divided by GDP. Liquid liabilities is the ratio of currency plus demand and interest bearing liabilities of banks and non-bank financial intermediaries to GDP. The financial development measures are averages for the period 1980 to 1997. Share is the proportion of years between 1980 and 1995 in which there were no restrictions on capital mobility. Quinn88 is Quinn's 0-4 measure of capital account intensity in 1988. Quinn82-88 is the average of Quinn's intensity measure for the years 1982 and 1988. Growth Financial Depth is obtained as a difference in logs between financial depth in 1997 and financial depth in 1980. Growth Private Credit is the log of private credit in 1997 less the log of private credit in 1980. Growth Stock Market Capitalization is the growth rate of equity market capitalization for the period 1980-1997. Growth Liquid Liabilities is the growth rate of liquid liabilities over the period 1980 to 1997. Log of per capita GDP is the logarithm of per capita income in 1980. No Restriction 1985 is a dummy variable indicating one when there were no restrictions on capital mobility in 1985.

Table 2. List of Countries and Financial Integration Rule-based Measures

Country	Share	Quinn82-88	Quinn88	Country	Share	Quinn82-88	Quinn88
Argentina	0.1875	1.25	2	Malaysia	1	2.25	2.5
Australia	0.75	2.5	3	Mauritius	0		
Austria	0.3125	3	3	Mexico	0.125		
Bangladesh	0			Morocco	0	0.5	0.5
Bolivia	0.6875	2.25	3	Netherlands	1	3.5	4
Brazil	0	1.5	1.5	New Zealand	0.75	3	3.5
Botswana	0			Nepal	0		
Canada	1			Niger	0.0625		
Chile	0	2	2	Nigeria	0	1.5	2
Colombia	0	1.5	1.5	Norway	0.0625	2.5	3
Costa Rica	0.1875	1.75	2	Pakistan	0	1.25	1.5
Cote d'Ivoire	0			Panama	1	3.5	3
Denmark	0.5	3.5	4	Paraguay	0.125	1.5	1.5
Dominican R.	0	1.5	2	Peru	0.4375	1	0.5
Ecuador	0.75	2.25	2.5	Philippines	0	1	1
Egypt	0	1.5	1.5	Portugal	0.1875	2	2.5
Finland	0.3125	2.25	2.5	Rwanda	0		
France	0.375	2.75	3	Saudi A.	1		
Germany	1	4	4	Singapore	1	4	4
Greece	0	2.5	3	South Africa	0	1.5	1.5
Iceland	0			Spain	0.125	2.5	3
India	0	1	1	Sri Lanka	0	0.5	0.5
Indonesia	1	2.5	2.5	Sweden	0.1875	3	3
Iran	0	1.5	1.5	Switzerland	1	4	4
Ireland	0.25	3	3	Syr. Arab Rep.	0		
Israel	0	1.75	1.5	Thailand	0	1.5	1.5
Italy	0.375	3.5	4	Trinidad	0.125		
Jamaica	0			U.K	1	4	4
Japan	0.9375	2.5	2.5	U.S.	1	4	4
Jordan	0	1.5	1.5	Uruguay	0.8125	3.75	3.5
Kenya	0			Venezuela	0.25	2.5	2
Korea	0	2	2	Zimbabwe	0		
Madagascar	0						

Note: This table reports for each country the indicator for financial openness. Share is the proportion of years between 1980 and 1995 in which a country had no restrictions on the capital account. The data on capital account restrictions are from the IMF AREAER. Quinn88 is Quinn's 0-4 measure of capital account intensity in 1988. Quinn82-88 is the average of Quinn's intensity measure for the years 1982 and 1988.

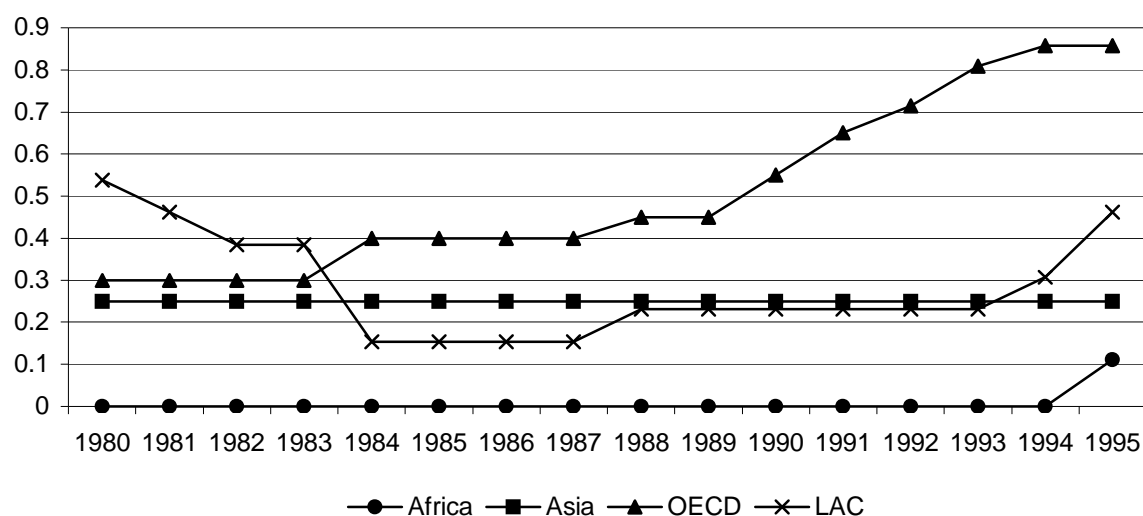
Table 3. Correlations

Variables	<i>Financial Depth</i>	<i>Private Credit</i>	<i>Stock M. Cap.</i>	<i>Liquid Liabilities</i>	<i>Share</i>	<i>Quinn88</i>	<i>Quinn82-88</i>	<i>Human Capital</i>	<i>Trade</i>	<i>Rule of Law</i>
<i>Financial Depth</i>	1.00									
<i>Private Credit</i>	0.90***	1.00								
<i>Stock M. Cap.</i>	0.89***	0.60***	1.00							
<i>Liquid Liabilities</i>	0.68***	0.73***	0.48***	1.00						
<i>Share</i>	0.51***	0.37**	0.47***	0.29**	1.00					
<i>Quinn88</i>	0.50***	0.53***	0.28	0.32*	0.56***	1.00				
<i>Quinn82-88</i>	0.51***	0.54***	0.31*	0.32*	0.63***	0.96***	1.00			
<i>Human Capital</i>	0.49***	0.62***	0.24	0.22	0.41***	0.54***	0.54***	1.00		
<i>Trade</i>	0.41**	0.21	0.53***	0.33**	0.20	0.25	0.29*	-0.10	1.00	
<i>Rule of Law</i>	0.61***	0.72***	0.32**	0.50***	0.35**	0.71***	0.65***	0.74***	0.18	1.00

Note: Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Private Credit is the value of loans made by deposit money banks and other financial institutions to the private sector divided by GDP. Stock market capitalization is the value of listed domestic shares on domestic exchanges divided by GDP. Liquid liabilities is the ratio of currency plus demand and interest bearing liabilities of banks and non-bank financial intermediaries to GDP. Share is the proportion of years between 1980 and 1995 in which a country had no restrictions on her capital account. Quinn88 is Quinn's 0-4 measure of capital account intensity in 1988. Quinn82-88 is the average of Quinn's intensity measure for the years 1982 and 1988. Human Capital is the average years of schooling attained by the population over 25 years in 1980. Trade is the ratio of the sum of real imports and exports to GDP, average over 1980-1995. Rule of Law is a measure of the law and order tradition of a country and ranges from 10, strong law and order tradition, to 1, weak law and order tradition, average over 1982-95.

Three stars denote that the correlations are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level

Figure 1. The Evolution of Financial Openness, 1980-1995



Note: The financial openness measure is the IMF's dummy variable which indicates one when there are no restrictions on the capital account and zero otherwise. I calculated for each sub-sample in each year the average of this indicator.

Table 4. Instrumental Variables for Financial Integration

Regressors	<i>Share</i>			<i>Quinn88</i>		
	(a)	(b)	(c)	(d)	(e)	(f)
<i>No restriction in 1985</i>	0.832*** (22.29)		0.792*** (16.69)	1.263*** (5.20)		0.870*** (4.00)
<i>Latin America</i>		-0.237*** (-1.98)	0.004 (0.05)		-1.239*** (-4.81)	-1.01*** (-4.27)
<i>Africa</i>		-0.525*** (-6.16)	-0.185*** (-4.49)		-1.941*** (-6.16)	-1.574*** (-4.86)
<i>Asia</i>		-0.280** (-1.99)	-0.138*** (-3.19)		-1.547*** (-5.52)	-1.381*** (6.02)
R-Squared	0.81	0.22	0.85	0.30	0.52	0.65
Number of Obs.	65	65	65	49	49	49

Note: The dependent variable is a proxy for the level of financial openness. Financial openness is *Share* in columns (a)-(c), and *Quinn88* in columns (d)-(f). *Share* is the proportion of years between 1980 and 1995 in which a country had no restrictions on her capital account. *Quinn88* is Quinn's 0-4 measure of capital account intensity. *No Restriction 1985* is a dummy variable indicating one when there were no restrictions on capital mobility in 1985. *Latin America*, *Africa* and *Asia* are dummy variables for respectively Latin American, African and Asian countries. As can be seen from Table 2, missing values in the *Quinn88* indicator restrict the sample to 49 countries. A constant is included in all the regressions, but I do not report it. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level

Table 5 . Economy-wide Effect of Financial Openness

Regressors	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
<i>Fraction of Value Added</i>	-2.624*** (-3.37)	-2.178*** (-2.92)	-1.985*** (-2.74)	-1.998*** (-2.78)	-2.854*** (-3.55)	-2.373*** (-3.13)	-2.146*** (-2.89)	-2.141*** (-2.85)
<i>Financial Depth</i>	0.211*** (3.80)	0.321*** (5.65)	0.304*** (5.40)	0.204*** (3.93)	0.275*** (4.99)	0.357*** (6.28)	0.331*** (5.89)	0.282*** (4.95)
<i>Share</i>	0.676*** (5.95)	0.366*** (3.07)	0.352*** (2.88)	0.245** (1.96)	0.279** (2.50)	0.188* (1.68)	0.200* (1.77)	0.169 (1.51)
<i>Ext. Dep. * Share</i>					0.436* (1.99)	0.444** (2.10)	0.370* (1.74)	0.374* (1.77)
<i>Log of per capita GDP</i>	-0.478*** (-10.72)	-0.328*** (-7.13)	-0.375*** (-6.42)	-0.433*** (-7.24)	-0.443*** (-10.07)	-0.338*** (-7.75)	-0.407*** (-6.95)	-0.427*** (-7.08)
<i>Government Size</i>		-0.047*** (-7.01)	-0.045*** (-6.68)	-0.046*** (-7.08)		-0.037*** (-5.87)	-0.032*** (-5.11)	-0.032*** (-4.98)
<i>Human Capital</i>			0.010 (0.57)	0.055*** (2.78)			0.018 (1.00)	0.036* (1.71)
<i>Trade</i>				0.002*** (3.89)				0.001** (2.07)
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Country Dummies</i>	No	No	No	No	No	No	No	No
R-Squared	0.19	0.26	0.29	0.31	0.20	0.24	0.27	0.27
Number of Obs.	847	821	781	781	847	821	781	781

Note: Instrumental Variable Regression. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Share is the proportion of years between 1980 and 1995 in which there are no restrictions on the capital account in country *j*. External Dependence refers to the borrowing needs of the median firm in industry *i*. Log of per capita GDP is the logarithm of per capita income in 1980 in country *j*. Government size is the ratio of government expenditures to GDP, average over 1980-1995. Human Capital is the average years of schooling attained by the population over 25 years in 1980. Trade is the ratio of the sum of real imports and exports to GDP, average over 1980-1995. The instruments for financial integration are the dummy variables: No restriction in 1985, Latin America, Africa and Asia. Missing values of Financial Depth restrict the sample. Similarly, the inclusion of the indicator of human capital and government expenditures implies that countries are dropped from the sample. Industry dummy variables are included in all regressions. The coefficients for the constant and the industry-fixed effects are not reported. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 6 . Industry-specific Effect of Financial Openness

Regressors	External Financial Dependence of							
	All firms				Old Firms			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
<i>Fraction of Value Added</i>	-2.330*** (-3.27)	-1.357* (-1.90)	-2.363*** (-3.29)	-1.936** (-2.44)	-2.424*** (-3.41)	-1.353* (-1.91)	-2.434*** (-3.41)	-2.061*** (-2.48)
<i>Ext. Dep.*Financial Depth</i>	0.259** (2.29)		0.185 (1.39)	0.182* (1.78)	0.654*** (3.06)		0.401* (1.67)	0.476** (2.21)
<i>Ext. Dep.*Share</i>		0.326* (1.92)	0.243 (1.24)			0.911*** (2.90)	0.779** (2.20)	
<i>Ext. Dep. *Quinn82-88</i>				0.031 (0.94)				0.118 (1.57)
<i>Country Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hausman Test (p-value)		1.31 (0.25)	0.30 (0.58)	0.26 (0.61)		0.55 (0.46)	0.53 (0.47)	0.00 (0.98)
R-Squared	0.55	0.48	0.55	0.60	0.53	0.46	0.54	0.58
Number of Obs.	847	1038	847	729	784	960	784	674

Note: Ordinary Least Squares Estimation. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Share is the proportion of years between 1980 and 1995 in which there are no restrictions on the capital account in country *j*. Quinn82-88 is the average of Quinn's intensity measure for the years 1982 and 1988. External Dependence refers to the borrowing needs of all firms (column (a)-(d)) and the financial needs of the more mature firms (column (e)-(h)) in industry *i*. Missing values of Financial Depth restrict the sample. Similarly, the inclusion of the Quinn82-88 index implies that countries are dropped from the sample. All regressions contain industry dummies and country dummies, but I do not report their coefficient estimates. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 7. Robustness Test: Measures Financial Development

Regressors	External Financial Dependence of							
	All Firms				Old Firms			
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
<i>Fraction of Value Added</i>	-1.953*** (-2.79)	-2.238*** (-3.18)	-1.973*** (-2.81)	-2.307 (-3.24)	-2.021*** (-2.87)	-2.282*** (-3.26)	-2.007*** (-2.84)	-2.356*** (-3.33)
<i>Ext. Dep.*Private Credit</i>	0.439** (2.09)		0.350 (1.43)		0.955** (2.32)		0.639 (1.37)	
<i>Ext. Dep. * Stock Market Capitalization</i>		0.377** (2.07)		0.230 (1.16)		1.041*** (3.03)		0.591* (1.79)
<i>Ext. Dep.* Share</i>			0.239 (1.13)	0.302* (1.67)			0.793** (2.12)	0.879*** (2.73)
<i>Country Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hausman Test (p-value)			0.19 (0.67)	0.00 (0.98)			1.80 (0.18)	0.24 (0.62)
R-squared	0.49	0.55	0.49	0.55	0.47	0.53	0.48	0.54
Number of Observations	990	847	990	847	915	784	915	784

Note: Ordinary Least Squares Estimation. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Private Credit is the value of loans made by deposit money banks and other financial institutions to the private sector divided by GDP. Stock market capitalization is the value of listed domestic shares on domestic exchanges divided by GDP. Share is the proportion of years between 1980 and 1995 in which there are no restrictions on the capital account in country *j*. External Dependence refers to the borrowing needs of all firms (column (a)-(d)) and the financial needs of the more mature firms (column (e)-(h)) in industry *i*. Missing values of Stock Market Capitalization restrict the sample. All regressions contain industry dummies and country dummies, but I do not report their coefficient estimates. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 8. Robustness Test: Other Country Characteristics

	Human Capital	Economic Dev.	Institutional Dev.	Trade Openness
Regressors	(a)	(b)	(c)	(d)
<i>Fraction of Value Added</i>	-2.093*** (-2.82)	-2.024*** (-2.85)	-2.254*** (-3.17)	-2.019*** (-2.86)
<i>Ext. Dep. *Private Credit</i>	0.499 (0.88)	0.333 (0.60)	0.518 (0.85)	0.610 (1.33)
<i>Ext. Dep.*Share</i>	0.704* (1.81)	0.699* (1.79)	0.743** (1.98)	0.721** (1.90)
<i>Ext. Dep. * Human Capital</i>	0.024 (0.36)			
<i>Ext. Dep.* Log of per capita GDP</i>		0.213 (1.11)		
<i>Ext. Dep.*Rule of Law</i>			0.042 (0.36)	
<i>Ext. Dep.*Trade</i>				0.004* (1.39)
<i>Country Dummies</i>	Yes	Yes	Yes	Yes
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes
Hausman Test (p-value)	2.41 (0.12)	1.46 (0.23)	2.14 (0.14)	1.76 (0.185)
R-squared	0.46	0.47	0.48	0.48
Number of Observations	877	915	895	915

Note: Ordinary Least Squares Estimation. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Private Credit is the value of loans made by deposit money banks and other financial institutions to the private sector divided by GDP. Share is the proportion of years between 1980 and 1995 in which there are no restrictions on the capital account in country *j*. External Dependence refers to the borrowing needs of the more mature firms in industry *i*. Human capital is the average for 1980 of the years of schooling attained by the population over 25 years of age. Log of per capita GDP is the logarithm of per capita income in 1980. Rule of Law is a measure of the law and order tradition of a country and ranges from 10, strong law and order tradition, to 1, weak law and order tradition, average over 1982-95. Trade is the ratio of the sum of real imports and exports to GDP, average over 1980-1995. Missing values of Human Capital and Rule of Law restrict the sample. All regressions contain industry dummies and country dummies, but I do not report their coefficient estimates. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 9. Industry-specific Effect: Heterogeneous Effect across Countries (Share)

Regressors	All Countries		Developing Countries				Industrialized countries			
	OLS	IV	OLS		IV		OLS		IV	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
<i>Fraction of Value Added</i>	-2.341*** (-3.28)	-2.325*** (-3.27)	-1.961** (-2.16)	-2.867*** (-3.25)	-1.962** (-2.16)	-2.865*** (-3.24)	-1.015 (-1.04)	-1.904* (-1.94)	-0.896 (-0.93)	-1.941** (-1.95)
<i>Ext. Dep.*Financial Depth</i>	0.451** (1.96)	0.554** (2.52)		0.591** (2.42)		0.503** (1.99)		-0.022 (-0.05)		0.384 (0.85)
<i>Ext. Dep.* Share</i>	1.384*** (3.20)	1.167** (2.46)	1.355*** (3.08)	1.448*** (3.12)	1.316** (2.07)	1.809*** (3.35)	-0.029 (-0.07)	0.189 (0.34)	-0.539 (-0.93)	-0.818 (-1.11)
<i>Ext. Dep.*Share*Developed</i>	-1.100** (-2.50)	-1.245** (-2.32)								
<i>Country Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hausman Test (p-value)	0.56 (0.45)		0.04 (0.85)	0.57 (0.44)			2.36 (0.12)		2.47 (0.12)	
R-squared	0.54	0.54	0.48	0.56	0.48	0.56	0.52	0.52	0.52	0.51
Number of Observations	784	784	573	446	573	446	387	338	387	338

Note: Ordinary Least Squares and Instrumental Variable Estimation. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Share is the proportion of years between 1980 and 1995 in which there are no restrictions on the capital account in country *j*. External Dependence refers to the borrowing needs of the more mature firms in industry *i*. Missing values of Financial Depth restrict the sample. All regressions contain industry dummies and country dummies, but I do not report their coefficient estimates. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. Instruments in column (b) are: regional dummy variables and No restriction in 1985. In column (e)-(f) and (i)-(j) the instruments is No restriction in 1985. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 10. Industry-specific Effect : Heterogeneous Effect across Countries (Quinn88)

Regressors	All Countries		Developing Countries				Industrialized countries			
	OLS	IV	OLS		IV		OLS		IV	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
<i>Fraction of Value Added</i>	-1.799** (-2.23)	-1.791** (-2.22)	-2.118** (-2.05)	-2.064** (-2.01)	-2.097** (-2.03)	-1.921* (-1.85)	-0.955 (-0.97)	-1.884* (-1.85)	-0.796 (-0.81)	-1.894* (-1.88)
<i>Ext. Dep.*Financial Depth</i>	0.381* (1.88)	0.345* (1.74)		0.556** (2.16)		0.139 (0.43)		0.084 (0.24)		0.257 (0.55)
<i>Ext. Dep.*Quinn88</i>	0.483** (2.47)	0.576** (2.37)	0.632*** (2.97)	0.541** (2.47)	0.881* (1.90)	1.355*** (3.00)	-0.217 (-0.72)	-0.124 (-0.35)	-0.576 (-0.96)	-0.75 (-1.55)
<i>Ext. Dep.*Quinn88*Developed</i>	-0.239** (-2.15)	-0.274** (-2.33)								
<i>Country Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry Dummies</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hausman Test (p-value)	0.33 (0.57)		0.58 (0.45)	3.88 (0.05)		0.78 (0.38)		2.54 (0.11)		
R-squared	0.59	0.59	0.51	0.61	0.51	0.59	0.53	0.52	0.52	0.50
Number of Observations	657	657	430	434	430	343	363	314	363	314

Note: Ordinary Least Squares and Instrumental Variable Estimation. The dependent variable in all columns is the growth rate of real value added for each industry in each country for the period 1980 to 1997. Fraction of Value Added is industry *i*'s share of manufacturing in country *j* in 1980. Financial Depth is the ratio of the sum of private credit and stock market capitalization to GDP. Quinn88 is Quinn's 0-4 measure of capital account intensity. External Dependence refers to the borrowing needs of the more mature firms in industry *i*. All regressions contain industry dummies and country dummies, but I do not report their coefficient estimates. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. Instruments in column (b) are: regional dummy variables and No restriction in 1985. In column (e)-(f) and (i)-(j) the instrument is No restriction in 1985. Standard errors are robust to unknown form of heteroskedasticity and t-statistics are reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 11. Financial Development Effect (Share)

Regressors	<i>Growth Financial Depth</i>		<i>Growth Private Credit</i>		<i>Growth Stock Market Cap.</i>		<i>Growth Liquid Liabilities</i>	
	OLS (a)	IV (b)	OLS (c)	IV (d)	OLS (e)	IV (f)	OLS (g)	IV (h)
<i>Log of initial Fin. Dev.</i>	-0.221 (-1.44)	-0.240 (-1.58)	-0.336*** (-2.78)	-0.345*** (-2.90)	-0.551*** (-3.65)	-0.553*** (-4.42)	-0.321*** (-3.53)	-0.324*** (-3.60)
<i>Share</i>	0.520** (2.02)	0.797*** (3.55)	0.694*** (3.57)	0.866*** (4.27)	0.441 (1.01)	0.836** (2.41)	0.408*** (3.53)	0.472*** (3.76)
<i>Log of per capita GDP</i>	-0.158 (-1.32)	-0.210 (-1.58)	-0.006 (-0.05)	-0.036 (-0.30)	-0.060 (-0.42)	-0.149 (-0.85)	-0.045 (-0.84)	-0.057 (-1.07)
Hausman Test (p-value)	8.66 (0.01)		2.32 (0.13)		10.34 (0.00)		0.83(0.37)	
R-squared	0.23		0.19		0.60		0.24	
Observations	41		64		41		64	

Notes: Ordinary Least Squares and Instrumental Variable Estimation. The dependent variable in all regressions is the growth in financial development over the period 1980 to 1997. Proxies for financial development are Financial Depth, Private Credit, Stock market capitalization, and Liquid liabilities. Share is the proportion of years between 1980 and 1995 in which there were no restrictions on the capital account in country j. Log of per capita GDP is the logarithm of per capita income in 1980. A constant is included in all the regressions, but I do not report the coefficient estimate. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. In the IV regression, the instruments for financial openness are regional dummies for Asia, Africa and Latin America and a dummy variable which equals one if a country had no restrictions on her capital account in 1985. Standard errors are robust to unknown form of heteroskedasticity and t-statistics reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 12. Financial Development Effect (Quinn82-88)

Regressors	<i>Growth Financial Depth</i>		<i>Growth Private Credit</i>		<i>Growth Stock Market Cap.</i>		<i>Growth Liquid Liabilities</i>	
	OLS (a)	IV (b)	OLS (c)	IV (d)	OLS (e)	IV (f)	OLS (g)	IV (h)
<i>Log of Initial Fin. Dev.</i>	-0.134 (-0.67)	-0.229 (-0.90)	-0.261* (-1.75)	-0.297* (-1.81)	-0.522*** (-3.20)	-0.486** (-2.57)	-0.315*** (-2.84)	-0.349*** (-3.29)
<i>Quinn82-88</i>	0.051 (0.31)	0.683** (2.40)	0.191* (1.65)	0.688** (2.62)	-0.019 (-0.07)	0.853** (2.12)	0.133* (1.74)	0.406*** (2.81)
<i>Log of per capita GDP</i>	-0.144 (-0.93)	-0.603** (-2.02)	-0.139 (-0.88)	-0.548* (-1.95)	0.059 (0.25)	-0.681 (-1.56)	-0.105 (-1.05)	-0.330** (-2.52)
Hausman Test (p-value)	16.50 (0.00)		8.45 (0.01)		18.04 (0.00)		5.20 (0.03)	
R-squared	0.10		0.12		0.51		0.19	
Observations	36		49		36		49	

Notes: Ordinary Least Squares and Instrumental Variable Estimation. The dependent variable in all regressions is the growth in financial development over the period 1980 to 1997. Proxies for financial development are Financial Depth, Private Credit, Stock market capitalization, and Liquid liabilities. Quinn82-88 is the average of Quinn's intensity measure for the years 1982 and 1988. Log of per capita GDP is the logarithm of per capita income in 1980. A constant is included in all the regressions, but I do not report the coefficient estimate. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. In the IV regression, the instruments for financial openness are regional dummies for Asia, Africa and Latin America and a dummy variable which equals one if a country had no restrictions on her capital account in 1985. Standard errors are robust to unknown form of heteroskedasticity and t-statistics reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Table 13. Financial Development Effect: Heterogeneous Effect across Countries

Regressors	Industrialized Countries				Developing Countries			
	<i>Growth Private Credit</i>		<i>Growth liquid Liabilities</i>		<i>Growth Private Credit</i>		<i>Growth Liquid Liabilities</i>	
	OLS (a)	IV (b)	OLS (c)	IV (d)	OLS (e)	IV (f)	OLS (g)	IV (h)
<i>Log of initial Fin. Dev.</i>	-0.589*** (-2.88)	-0.622*** (-3.43)	-0.534** (-2.66)	-0.549*** (-2.90)	-0.243 (-1.39)	-0.236 (-1.38)	-0.276** (-2.19)	-0.268** (-2.19)
<i>Share</i>	0.835*** (3.54)	1.005*** (3.87)	0.538** (2.70)	0.585*** (2.99)	0.626** (2.30)	0.885*** (3.10)	0.412*** (2.92)	0.532*** (3.60)
<i>Log of per capita GDP</i>	0.396 (0.82)	0.296 (0.58)	-0.399* (-1.75)	-0.434 (-2.00)	-0.036 (-0.23)	-0.072 (-0.45)	-0.069 (-0.80)	-0.087 (-0.95)
Hausman Test (p-value)	2.63 (0.12)		0.46 (0.50)		1.67 (0.20)		0.97 (0.33)	
R-squared	0.53		0.53		0.12		0.19	
Observations	21		21		43		43	

Notes: Ordinary Least Squares and Instrumental Variables Estimation. The dependent variable in all regressions is the growth in financial development over the period 1980 to 1997. Proxies for financial development are Financial Depth, Private Credit, Stock market capitalization, and Liquid liabilities. Share is the proportion of years between 1980 and 1995 in which there were no restrictions on the capital account in country j. Log of per capita GDP is the logarithm of per capita income in 1980. A constant is included in all the regressions, but I do not report the coefficient estimate. The Durbin-Wu-Hausman statistic tests the null that the use of instrumental variables does not change the estimation outcome. In the IV regression, the instruments for financial openness are regional dummies for Asia, Africa and Latin America and a dummy variable which equals one if a country had no restrictions on her capital account in 1985. Standard errors are robust to unknown form of heteroskedasticity and t-statistics reported in parenthesis. Three stars denote that the coefficients are statistically different from zero at the 1-percent level, two stars at the 5-percent level and one star at the 10-percent level.

Study	Countries	Financial Openness Measure	Dependent Variable and Estimation Method	Main Results
CROSS COUNTRY STUDIES				
GRILLI AND MILESI_FERRETTI (1995)	61	- Dummy variable taking the value one when capital controls are in place (IMF)	- Growth in GDP/cap for five non-overlapping periods during 1966-1989 * IV estimation	- No evidence of a robust correlation of capital account restrictions with economic growth.
QUINN (1997)	64	- Change in Quinn Index between 1988 and 1958	- Growth in GDP/cap * Data averaged over period 1960-1989 Cross Section, OLS	- Capital account liberalization is robustly and positively associated with economic growth
RODRIK (1998)	Almost 100 countries	- Share 1975-1989	- Growth in GDP/cap * Data averaged over period 1975-1989 Cross Section, OLS	- No evidence that countries without capital controls have grown faster
KRAAY (1998)		- Share 1966-1995 - Quinn Index - Flows of Capital as share of GDP	- Growth in GDP/cap - Gross domestic investment/GDP * Data averaged over period 1985-1997 Cross section, OLS and IV	- Little evidence that growth or investment is higher in more financially open economies
KLEIN AND OLIVEI (1999)	70	- Share 1986-1995	- Growth in Financial Development - Growth in GDP/cap * Data are averaged over the period 1986-1995 Cross Section, OLS and IV	- Significant effect of capital account openness on financial deepness, however the results are largely driven by the developed countries in the sample - Countries with open capital accounts enjoyed greater economic growth
LEVINE (2000)	15	- Dates at which countries liberalized restrictions on international capital flows - Foreign bank share (number)	- Stock market value traded ratio - Before tax profits / total assets - Overhead costs / total assets	- Liberalizing restrictions on international capital flows tend to enhance stock market liquidity - Greater foreign bank presence is negatively associated with bank profits and bank overhead costs

EDWARDS (2001)	59	<ul style="list-style-type: none"> - Quinn Index in 1973 and 1988 - Change in Quinn Index between 1988 and 1973 	<ul style="list-style-type: none"> - Growth in GDP/cap over the period 1980-1989 * Cross section, WLS, IV 	<ul style="list-style-type: none"> - Open capital account positively affects growth only after a country has achieved a certain degree of economic development
BEKAERT, HARVEY AND LUNDBLAD (2001)	50	<ul style="list-style-type: none"> - Official equity market liberalization dates 	<ul style="list-style-type: none"> - Growth in GDP/cap - Consumption - Size of government sector - Trade balance - Cost of capital - Efficiency of investment 	<ul style="list-style-type: none"> - Although financial liberalization furthers financial development, measures of financial development fail to fully drive out the liberalization effect.
ARTETA, EICHENGRE EN AND WYPLOSZ (2001)	61	<ul style="list-style-type: none"> - Quinn Index - Change in Quinn Index between 1988 and 1973 	<ul style="list-style-type: none"> - Growth in GDP/cap * Data averaged over period 1980-1989 Cross section, OLS, IV 	<ul style="list-style-type: none"> - Little evidence that capital account liberalization has different effects in high- and low-income countries / in high- and low-financially developed countries - Evidence that capital account liberalization has no effect in countries with weak contract and law enforcement but positive effect in those with stronger ones
EDISON, LEVINE, RICCI AND SLOK (2002)	57	<ul style="list-style-type: none"> - IMF restriction - Quinn Index - Stock of capital flows - Flow of capital - Stock of capital inflows - Inflows of capital 	<ul style="list-style-type: none"> - Growth of GDP/cap * Data averaged over the period 1980-2000 Cross-section, OLS and IV * Data averaged over 5-year non overlapping periods during 1976-2000 period GMM 	<ul style="list-style-type: none"> - International financial integration is completely irrelevant for growth, once one controls for the level of domestic financial development
KLEIN (2003)	85	<ul style="list-style-type: none"> - Share 1976-1995 - Quinn Index (average over 1973,1982 and 1988) 	<ul style="list-style-type: none"> - Growth GDP/cap * Data averaged over 1976-1995 Cross Section OLS and IV 	<ul style="list-style-type: none"> - Evidence of an inverted-U shaped relationship between the responsiveness of growth to capital account openness and income per capita - Evidence of an inverted-U shaped relationship between the responsiveness of growth to capital account openness and various indicators of government quality

Industry-level studies				
VLACHOS AND WALDENSTROM (2002)	42 (36 industries)	<ul style="list-style-type: none"> - IMF restriction - Share 1980-1990 - Quinn Index (1982) - dummy equals one if equity market is liberalized to foreign investors - capital flows/GDP - capital stocks/GDP 	<ul style="list-style-type: none"> - Growth rate of real value added - Growth rate number of firms - Growth rate real output in industry j in country k <p>* Data averaged over period 1980-1990 Cross section, OLS and IV</p>	<ul style="list-style-type: none"> - Industries highly dependent on external financing do not experience higher growth in value added in countries with liberalized financial markets - Liberalization does increase the growth rates of production and number of firms among externally dependent industries, given that the countries have reached a relatively high level of financial development
GIANNETTI, GUISSO, JAPPELLI, PADULA, PAGANO (2002)	41 and 61 (36 industries)	<p>A. Simulate the impact of raising the level of financial development in each EU country to the US level of financial development</p> <p>B. Simulate the impact of raising the institutional determinants of financial development to the highest EU standard</p>	<ul style="list-style-type: none"> - Growth rate of real value added - Growth rate of real output - Growth rate of number of firms - Investment as share of output in industry j in country k <p>* Data averaged over period 1981-1991 * Data averaged over period 1981-1995 Cross section, OLS and IV</p>	<ul style="list-style-type: none"> - Financial development matters for economic growth in the manufacturing sector, and these effects have not weakened in the early 90s - Financial integration can have potentially large effects on countries and sectors growth

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