

1 Introduction

In this paper, we explore the relation between a country's level of international financial integration, that is, its links to international capital markets, and the level of entrepreneurial activity. Researchers have stressed the roles of entrepreneurship, new firm activity, and economic dynamism in economic growth.¹ The empirical effects of international capital mobility on firm dynamism and entrepreneurial activity, however, have received little attention in the literature albeit the intense academic and policy debates. Using different measures commonly employed in the literature in a new data set of more than 24 million firms in nearly 100 countries in 1999 and 2004, we find higher entrepreneurial activity in more financially integrated countries and countries with fewer restrictions on international capital flows.

The theoretical effects of international financial integration on entrepreneurship are ambiguous. The rapid rate of global financial integration, perhaps most directly observed in the explosive growth of foreign direct investment (FDI), has raised concerns in both the public and academic communities about potential negative effects of international capital on the development of domestic entrepreneurs with negative consequences to the economy as a whole. It has been argued that foreign enterprises crowd out local efforts, and thus impart few, if any, benefits to the local economy. Grossman (1984) shows, for example, that international capital, and in particular FDI, can lead to the crowding out of the domestic entrepreneurial class.² Hausmann and Rodrik (2003) argue that *laissez-faire* and in particular openness can lead to too little investment and entrepreneurship *ex-ante*. Similar concerns were raised by an earlier development literature. Hirschman (1958), for example, warned that in the absence of linkages, foreign investments can have negative effects on an economy (the so called 'enclave economies'). More generally, researchers have argued that in the presence of pre-existing distortions and weak institutional settings, international capital mobility can increase the likelihood of financial crises; higher volatility and risk can reduce entrepreneurship and innovative efforts in a country. Some scholars have asserted that open capital markets may be detrimental to economic development (see Bhagwati (1998), Rodrik (1998), and Stiglitz

¹ Entrepreneurship and firm creation are often described as the keys to economic growth (Schumpeter 1942). See Aghion and Howitt (1998) for an exhaustive survey of Schumpeterian growth models.

² In addition, if foreign firms borrow heavily from local banks, instead of bringing scarce capital from abroad, they may exacerbate domestic firms' financing constraints by crowding them out of domestic capital markets; see Harrison, Love and McMillan (2004) and Harrison and McMillan (2003).

(2002)). As Eichengreen (2001) notes, “[C]apital account liberalization, it is fair to say, remains one of the most controversial and least understood policies of our day.”

On the other hand, access to foreign resources can enable developing countries with little domestic capital to borrow to invest, and resource constrained entrepreneurs to start new firms. Indeed, availability of funds has been shown to be an important determinant of entrepreneurship.³ International financial integration should also facilitate international risk sharing and thus lower the cost of capital for many developing countries, and, by fostering increased competition, improve the domestic financial sector with further benefits to entrepreneurship.⁴ Furthermore, researchers have stressed the potential positive role of knowledge spillovers and linkages from foreign firms to domestic firm activity and innovation.⁵

Whether international capital mobility is fostering or destroying entrepreneurship is a critical question in academic and policy circles.⁶ Yet, empirical analysis of the effects of international capital mobility on entrepreneurial activity and firm dynamism are all but absent from the literature. This is largely due to the difficulty of obtaining an international data set sufficiently comprehensive to support studies of firm dynamism in both developed and developing countries. We overcome this problem by using a new data set of private firms in 98 countries in 1999 and 2004. Our data set contains both listed and unlisted firms and contains more than 24 million firm observations across a broad range of developed and developing countries at different stages of international financial integration. Over the last decades, barriers to international capital mobility have fallen in developed countries and diminished considerably in many developing countries. But despite recent trends, restrictions on international financial transactions are still quantitatively important for many countries, and *de facto* flows remain low relative to those predicted by

³ Evans and Jovanovic (1989) show theoretically that wealth constraints negatively affect entrepreneurship. Evans and Leighton (1989) find evidence that credit constraints are a critical factor in the founding and survival of new firms.

⁴ Increased risk sharing opportunities might encourage entrepreneurs to take on more total investments or attempt new ventures; see Obstfeld (1994), Acemoglu and Zilibotti (1997).

⁵ Markusen and Venables (1999) propose a model that suggests that FDI will be associated with firm turnover. Although entry of foreign firms increases competition and, initially, forces the exit of domestic firms, in the longer run multinationals might stimulate local activity through linkages with the rest of the economy. See Rodriguez-Clare (1996) for a formalization of the linkage effects between foreign and domestic firms.

⁶ An example is the on-going debate in the Irish economy about the impact of foreign capital flows, in particular, FDI, on local entrepreneurial efforts. Given the limited size of the indigenous sector, one concern has been the potential crowding out of domestic entrepreneurship. But some contend that local entrepreneurs have benefited from foreign capital, in particular, from interacting with foreign firms as suppliers or costumers or from previous experience working in multinational firms. See Alfaro, McIntyre, and Dev (2005) for a discussion.

standard models, in particular, for developing countries.⁷ The coverage of the data enables us to study the differential effects of restrictions on capital mobility on entrepreneurial activity.

Identifying the effects of international financial integration on entrepreneurial activity is, however, not an easy task. There is no one definition of entrepreneurship or what it entitles, hence, no one variable to measure it.⁸ Hence, we analyze a variety of measures commonly used in the literature as proxies for various aspects of entrepreneurial activity.⁹ We focus on firm entry, average firm size and skewness of the firm-size as these measures better capture firm activity. We also study other measures used in the literature such as age and vintage (a size-weighted measure of the average age of the firm). The literature distinguishes between *de jure* indicators of financial integration, which are associated with capital account liberalization policies, and *de facto* indicators, which are associated with actual capital flows.¹⁰ We use both, as they capture different aspects of international capital mobility and financial integration. We also control for other determinants found in the literature to affect the level of entrepreneurship such as local development level, market size, and institutional constraints. We use industry fixed effects to control for technological determinants of entry, size and activity in an industry.

We first study the cross-section properties of our sample in 2004. We find positive correlations between the different measures of international financial integration and the different measures of entrepreneurial activity in a country. More firm activity is observed in more financially integrated countries and countries with fewer restrictions to capital mobility. Figure 1 is illustrative of this point. The figure, which plots the firm-size distribution for countries with high and low *de jure* restrictions on foreign capital, shows the countries with fewer barriers to international capital to have a higher proportion of small firms.¹¹ Specifically, in the regression analysis we find more capital controls to be associated with larger firm size

⁷ See Table 3 for stylized facts, and Alfaro, Kalemli-Ozcan, and Volosovych (2006) for a comprehensive analysis of the main trends related to international capital flows in the last thirty years.

⁸ Different views in the literature have emphasized a broad range of activities including innovation (Schumpeter, 1942), the bearing of risk (Knight 1921), and the organization of the factors of production (Say, 1803).

⁹ See Desai, Gompers, and Lerner (2003) Klapper, Laeven, and Rajan (2005), and Black and Strahan (2002).

¹⁰ See Prasad et al. (2003) for a discussion of the different indices and measures used in the literature.

¹¹ We divide the firms in our final sample into groups according to *de jure* restrictions on capital flows (proxied by the IMF index). The figure plots the firm-size distribution measured by employment for each group. The skewness values for the high and low controls distributions were 562 and 1,446, respectively. The Data Appendix provides descriptions of the variables and a list of countries.

and lower skewness of the firm size distribution and firm entry. Firms also tend to be older in less financially integrated countries. Our results are both statistically and economically significant.

As mentioned, our data set allows us to study the determinants of the business environment in a broad sample of developed and developing countries. In line with the literature, we find variables related to the regulation of entry, for example, days to start a business, to negatively affect entrepreneurial activity; while corruption, a proxy for the institutional environment, has a negative and significant effect on the dynamism of the economy. In terms of our research question, the relation between international financial integration and entrepreneurship remains positive and significant even when we control for these other determinants of entrepreneurship.

Our results are robust to different measures and specifications. We compare our results for 2004 and 1999 using a difference in differences approach obtaining similar results. In addition, we follow the methodology of Rajan and Zingales (1998) and Klapper, Laeven and Rajan (2005) and focus on cross-industry, cross-country interaction effects. Following these authors, we use the United States as a proxy of the “natural activity” in an industry. We test for whether entry and skewness of the firm size distribution are relatively higher or lower in naturally-high-activity industries when the country has relatively high international capital mobility. The results confirm our main findings.

The nature of our data allows us to explore some of the channels through which these benefits might materialize. First, international financial integration might increase the total amount of capital in the economy and improve the intermediation of capital (a capital/credit availability channel). Although small firms might not be able to borrow directly in international markets, improved financial intermediation and other firms’ (and the government’s) international borrowing might ease financing constraints until some of the additional capital finds its way to new firms. Second, local firms might benefit from spillovers and linkages from foreign firms (FDI channel). We test for the former channel by exploring whether entrepreneurial activity is higher in firms that are more dependent on external finance as defined by Rajan and Zingales (1998). The evidence does indeed suggest this to be the case. In terms of the FDI channel, our data set has the further advantage of enabling us to distinguish between foreign and local firms. We regress our entrepreneurship measures on the share of foreign owned firms in the same industry. We also test whether

our measures of domestic activity are correlated with the presence of multinational firms in downstream and upstream sectors. Given the difficulty of finding input and output matrices for all the countries in our data, we follow Acemoglu, Johnson, and Mitton (2005) in using U.S. input and output matrices (which are assumed to describe the technological possibilities of production). Our results are consistent with our previous findings.

Important concerns in our analysis are related to policy endogeneity and omitted variables biases in terms of establishing the causality between international financial integration and proxy variables of entrepreneurial activity. Capital account liberalization and entrepreneurial activity might, for example, be positively correlated with an omitted third factor. If that factor was a government policy –for example, a policy-maker anticipating improvements in external conditions liberalizes a country’s capital account– we would observe capital liberalization and intensified firm activity. We take different steps to mitigate these concerns. We control for other variables that might affect entrepreneurial activity. We believe the extensive robustness analyses we perform eases concerns about potential omitted variables. We also look at different proxies for entrepreneurial activity and capital mobility. We analyze firm/industry characteristics as opposed to country characteristics, and test effects controlling for the different sectors. Even if firm dynamism is correlated because of an omitted common factor, it is hard to argue that the latter affects the relation between capital flows and entrepreneurial activity in a systematic way for firms in sectors with different characteristics. As an imperfect control for exogenous growth opportunities, we use growth forecast from the Economist Intelligence Unit (EIU). As another imperfect attempt to account for possible endogeneity biases, we also use institution-based instruments for financial integration from La Porta et al (1998), which have been used in the literature for international financial liberalization and domestic financial development.¹² This instrumentation strategy yields similar results and confirms that our results are quite robust. The results using the difference in differences and the Rajan and Zingales (1998) methodologies further ease concerns. Finally, we feel more comfortable in interpreting our correlation as causation in as much as mechanisms consistent with such an interpretation are supported by the empirical evidence. However, even after all of these tests, our estimates should be interpreted with caution.

¹² See Imbs (2004), Kalemli-Ozcan, Sorensen, and Yosha (2003).

We noted earlier the scarcity of empirical work on the effects of international capital mobility on entrepreneurial activity. A number of papers, however, have studied how different aspects of capital account liberalization affect a firm's financing constraints and the cost of capital. Chari and Herny's (2004) examination of the effect of stock market liberalization in 11 emerging markets suggests that publicly-listed firms that become eligible for foreign ownership experience a significant average stock price revaluation and significant decline in the average cost of capital. Harrison, Love and McMillian (2004) find FDI inflows to be associated with a reduction in firms' financing constraints while restrictions on capital account transactions negatively affect their financial constraints.¹³ Our results are consistent with these findings.

Our paper also relates to the research on the effects of the external environment on entrepreneurship. Desai, Gompers, and Lerner (2003), Klapper, Laeven, and Rajan (2005), and Kumar, Rajan, and Zingales (1999) have studied different aspects of the external environment on firm creation and entrepreneurship in a cross-section of European countries. Other work on aspects of entrepreneurship include Johnson et al.'s (2002) finding that investment by entrepreneurs is lower in countries with weak property rights; Black and Strahan's (2002) and Guiso, Sapienza, and Zingales' (2004) finding that financial development fosters firm entry; Giannetti and Ongena's (2005) study of the effects of foreign bank lending on the growth of Eastern European firms; Fisman and Sarria-Allende's (2005) study of the effects of regulation of entry on the quantity and average size of firms; Beck, Demircuc-Kunt, Laeven, and Levine's (2006) finding that financial development exerts a disproportionately positive effect on small firms; and Acemoglu, Johnson and Mitton (2005) cross-country study of concentration and vertical integration. Most of these papers, with the exception of the latter two, use data from the Amadeus dataset (which has firm rather than plant level data for Western and Eastern Europe only) or the Worldscope database (which includes information for a large number of countries but covers only relatively large, publicly trade firms).¹⁴

Our paper contributes to this literature by exploring the determinants of entrepreneurship and firm

¹³ The authors use large publicly traded firm level data for 38 countries and 7079 firms from the Worldscope data base. In contrast, Harrison and McMillian (2003), find that in the Ivory Coast for the period 1974-1987 borrowing by foreign firms aggravated domestic firms' credit constraints.

¹⁴ Acemoglu, Johnson, and Mitton (2005) use data for 769,100 firms from the 2002 WorldBase file; Beck et al. (2006) use industry level data complemented by U.S. Census data; Fisman and Sarria-Allende (2005) complement industry data from UNIDO with Worldscope data for a sample of 34 countries. Publicly listed firms account for only 25 percent of jobs, even in the United States (Davis, Faberman, and Haltiwanger 2006). Although it is difficult to quantify this number for our broad sample of countries, presumably, publicly traded firms are of much greater importance in the United States than in most other countries.

dynamism in a broader sample of developed and developing countries using data for both private and public firms.¹⁵

Finally, by focusing on micro effects, our results contribute to the broader debate on the effects of international financial integration. As argued by Schumpeter, firm entry is a critical part of an economy's dynamism. Previous work has documented the important effects of new firm entry and economic dynamism on economic growth. Obstacles to this process can have severe macroeconomic consequences. To the best of our knowledge, this is the first paper to document and study the relation between firm dynamism and international financial integration.¹⁶ Our results suggest that, contrary to the fears of many, capital mobility has not hindered entrepreneurship. Instead, international financial integration has been associated with greater firm activity.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 presents the main empirical results. Section 4 discusses potential channels and presents evidence consistent with the main results. Section 5 concludes.

2 Data and Descriptive Statistics

2.1 Firm Level Data

We use data from WorldBase, a database of public and private companies in more than 213 countries and territories. For each firm, WorldBase reports the four-digit SIC-1987 code of the primary industry in which each firm operates, and for a few countries the SIC codes of up to five secondary industries, listed in descending order of importance. Dun & Bradstreet compiles the WorldBase data from a number of sources with a view of providing its clients contact details and basic operating information about potential customers, competitors, and suppliers. Sources include partner firms in dozens of countries, from telephone directory records, websites, and self-registering firms.¹⁷ All information is verified centrally via a

¹⁵ Bartelsman, Haltiwanger and Scarpetta (2004) provide evidence for the process of creative destruction across 24 countries and two-digit industries.

¹⁶ International competition is an important source of creative destruction. Researchers have documented significant productivity, firm dynamism, and reallocation effects from trade openness with positive effects for specific countries. See Caballero (2006) for an overview of empirical evidence.

¹⁷ Firms self-register to receive a widely recognized DUNS business identification number.

variety of manual and automated checks. Information from local insolvency authorities and merger and acquisition records are used to track changes in ownership and operations.

Another advantage of the WorldBase data is that its unit of record is the “establishment” rather than the firm. Establishments like firms have their own addresses, business names, and managers, but might be partly or wholly owned by other firms. Our data is thus able to capture new entrepreneurial ventures owned and capitalized by existing firms as well as by private entrepreneurs.

We use data for 2004, excluding establishments missing primary industry and year started information.¹⁸ We also excluded territories with fewer than 80 observations, establishments for which the World Bank provides no data, and government related firms (SIC 9). With these restrictions, our final data set includes more than 24 million observations in 98 countries. The criteria used to clean the sample are detailed in the Data Appendix. Table 1 lists the countries represented in the data set.

2.1.1 Sample Frame

In our final sample, the number of observations per country ranges from more than 7 million firms in the United States to fewer than 90 firms in Burkina Faso (see Table 1). This variation reflects differences in country size, but also differences in the intensity with which Dun & Bradstreet samples firms in different countries and in the number of firms in the informal sector. This raises concerns that our measures of entrepreneurship might be affected by cross-country differences in the sample frame. For example, in countries where coverage is lower or where there are a large number of firms in the informal sector (which are not captured in our data), more established enterprises –often older and larger firms– may be overrepresented in the sample. This may bias our results if the country characteristics which determine the intensity of sampling are correlated with our explanatory variables.

We address this concern in a number of ways. We compare our results for 2004 and 1999 and study how changes in our measures of entrepreneurship between these time periods relate to changes in capital restrictions and capital mobility. This gives us more confidence that our results are not driven by the sample

¹⁸ We use data for 2004. We also use information for 1999-2000 (close to 6 million observations) in the difference-in-differences section. The coverage of this sample is more limited. We performed a similar analysis with these data obtaining similar results (available upon request).

frame, although it is still possible that changes in sampling procedure are correlated with changes in financial integration over the same period.¹⁹ Second, we repeat our specifications for subsamples which include only the rich countries which are the most intensively sampled by Dun & Bradstreet. Third, we deal with the possibility that our results might be driven by a small number of observations in country/industry pairs by excluding outliers and weighting country/industry pairs by the number of observations in the industry. Fourth we include a measure of country sampling intensity in our regressions and find that our results are robust.²⁰ Fifth, in the robustness section we include a measure of the size of the informal sector.

Finally, it is worth noting that the variety of sources from which the data are collected avoids a sample selection problem presented in previous studies. Because many international databases collect firm data from national authorities, samples drawn from such sources will vary across countries with the parameters of the national statistical agency's reporting requirements. The sample of firms entered into the database from different countries is thus not random but determined by the local institutional environment. These reporting requirements may be correlated with other national characteristics, potentially biasing the results. The wide variety of sources from which Dun & Bradstreet collects data reduces the likelihood that the sample frame will be determined by national institutional characteristics. In the Data Appendix, we compare the Dun & Bradstreet data to the United States (for which there is broader coverage). The comparison illustrates that our data set seem to be well suited for our analysis.

2.2 Entrepreneurship Measurements

How to measure entrepreneurship? Given the different perspectives in the literature on the role of entrepreneurs in an economy, definitions have emphasized a broad range of activities including the introduction of innovation (Schumpeter, 1942), bearing of risk (Knight, 1921), bringing together of factors of production (Say, 1803), and pursuit of opportunity without regard to resources currently controlled

¹⁹ A comparison of the 2004 and 1999 samples and conversations with Dun & Bradstreet suggest that this is unlikely to be the case.

²⁰ We use the ratio of the number of firms in the database to GDP. We attempted to control for employment data at the industry level to get a sense of coverage, but these data were not available consistently for our cross-section of countries for 2004.

(Sahlman et al., 1999). In general, entrepreneurs are risk-bearers, coordinators and organizers, gap-fillers, leaders, and innovators or creative imitators.

If there is no one way to define entrepreneurship, there is certainly no one way to measure it. Hence, we use a variety of proxies commonly used in the literature.²¹ Following Black and Strahan (2002), Desai, Gompers, and Lerner (2003) and Klapper, Laeven, and Rajan (2005), we calculate for each industry/country pair the rate of entry, average firm size, the skewness of firm size, age, and vintage.²²

i. Firm Entry. Firm entry is defined as the number of new firms divided by the total number of firms in the country/industry pair.²³ Markets that provide an opportunity for more startup firms are said to be more dynamic and entrepreneurial. Greater access to capital and improvements in a country's financial markets associated with international financial integration should ease capital constraints and positively influence entry decisions in a country.²⁴

ii. Firm Size Distribution. Small firms play an important role in the economy as they are often portrayed as sources of innovation, regeneration, change and employment. We examine the relation between skewness of the firm-size distribution and international financial integration. If capital constraints, for example, are operative in shaping the nature of industrial activity, the firm-size distribution should be skewed.²⁵ We also calculate average firm size measured by the log of the average number of employees in each country/industry pair. Although the prediction is not unambiguous, we expect lower levels of capital rationing associated with international financial integration to result in greater numbers of small firms being able to enter and survive in the market.

iii. Age. In the robustness section, we use average age in each industry/country pair. Young firms, in particular, are said to invigorate an economy. We expect greater financial integration to be associated with more dynamic business environments and lower average firm age.

²¹ The Global Entrepreneurship Monitor (GEM) publishes indices of entrepreneurial activity. These data did not seem to be empirically consistent with other measures used in the literature and hence are not used in this paper.

²² Throughout the rest of the paper we use the terms firm and establishment interchangeably.

²³ Due to lags in reporting and collecting, we classify a firm as new if it less than two years old. See Klapper, Laeven, and Rajan (2005) for a similar treatment.

²⁴ This might depend on whether a country is exporting or importing capital, but there might still be an improvement in intermediation of capital.

²⁵ Cooley and Quadrini (2003) and Cabral and Mata (2003) argue that in the presence of capital constraints firm size distribution will be skewed.

iv. *Vintage*. We also use in the robustness section a weighted average measure of age. Following Desai, Gompers and Lerner (2003) vintage is the weighted (by numbers of employees) average age of the firms in each country/industry pair. This measure shows the importance of young firms to the productive capacity of an industry. Vintage provides a broader measure of where the mass of industrial activity is over average firm size. Low vintage indicates that young firms dominate the productive capacity. As the authors explain, if, for example, lower capital constraints make it easier to get external financing at earlier stages, the young sector would be, on average, smaller. At the same time, if firms survive to become older (that is, do not exit or fail as frequently), the fraction of actual employment in the young sector would be lower. In this case, for example, average firm size would be lower and vintage higher. The predictions with respect to vintage are not unambiguous, although we expect smaller, younger firms to benefit from greater access to international funds.

The Data Appendix explains all variables in detail.

2.3 Capital Mobility Data

How to measure international financial integration? Assessing a country's integration with international financial markets is a complicated task. The process, that is, the change in the degree to which a country's government restricts cross-border financial transactions, is complex and involves multiple phases. Markets can be liberalized gradually and the effects smoothed if the reforms can be anticipated.²⁶ The literature, as we observed earlier, differentiates between *de jure* financial integration associated with policies on capital account liberalization and *de facto* measures related to actual capital flows. *De jure* liberalization processes might not reflect *de facto* liberalization processes. If, for example, one part of the system is liberalized, investors might use it to circumvent other controls. Some reforms might not be credible, and countries, albeit officially open, might nevertheless not have access to foreign capital. Hence, we use both measures of financial integration.

²⁶ Anticipation and gradualness should bias our results away from finding an effect.

2.3.1 De Jure Measures

Most empirical analyses that require a measure of capital account restrictions use an index constructed from data in the International Monetary Fund's (IMF's) *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)*. This is a rule-based indicator in that it focuses on *de jure* restrictions imposed by the legal authorities in each country as compiled by the IMF's *AREAER*. The index is constructed from data on restrictions presented in the survey appendix. In 1997, the IMF changed the way they report the capital controls data. The new classification provides greater detail than the presented prior to 1997. We use the newer format. The index uses data from different restrictions: capital market securities; money market instruments; collective investment securities; derivatives and other instruments; commercial credits; financial credits; guarantees, securities, and financial backup facilities; direct investment; real estate transactions; and personal capital transactions. A corresponding dummy variable takes the value of 1 if each of the restrictions is present in each country, zero otherwise.²⁷ We use for each country the average of the restrictions.

2.3.2 De Facto Measures

Capital flows are usually divided into flows of foreign direct investment (FDI), portfolio equity investment, and debt inflows. FDI data include greenfield investments (construction of new factories), equity capital, reinvested earnings, other capital, and financial derivatives associated with various inter-company transactions between affiliated enterprises. Portfolio equity investment includes shares, stock participations, and similar documents that usually denote ownership of equity. Debt inflows include bonds, debentures, notes, and money market or negotiable debt instruments. We also use data on financial derivatives flows, which are relatively small for most countries.

Our analysis employs mainly the following measures of *de facto* capital mobility.

²⁷ Note that the way the IMF index is constructed results in a general indicator. The new classification is a vast improvement over the previous measure, although issues regarding circumvention of controls remain. Quinn (1997) improves the IMF restriction measure by reading through the IMF's narrative descriptions and assigning scores for the intensity of capital restrictions. This measure is not available for our sample year and coverage.

i. Capital Inflows/GDP: Capital inflows to GDP are the sum of the change in the liabilities of FDI, equity portfolio, financial derivatives, and debt from the IMF, International Financial Statistics (IFS). Data are calculated as a percentage of GDP as reported in the World Bank Development Indicators (WDI).

ii. Inflows of Foreign Direct Investment/GDP, Net: Using net inflows of FDI as a percentage of GDP emphasizes the potential benefits derived from FDI associated with technological transfers, knowledge spillovers, and linkages that go beyond the capital foreign firms might bring into a country. Data are from the World Bank, WDI.

iii. Stock of Foreign Liabilities/GDP: In our analysis, the stock of foreign liabilities proxies the thickness of banking and equity relationships (both FDI and portfolio investment) with other countries. This variable thus captures the effects of existing foreign capital relations on current entrepreneurial activity. The data are from Lane and Milesi Ferretti (2006), whose estimates of foreign assets and liabilities and their subcomponents for different countries in the 1970s, 1980s, and 1990s were recently updated to 2004. The data are calculated as a percentage of GDP.

iv. Gross Capital Flows/GDP: Gross private capital flows to GDP are the sum of the absolute values of direct, portfolio, and other investment inflows and outflows recorded in the balance of payments financial account, excluding changes in the assets and liabilities of monetary authorities and general government. The indicator is calculated as a ratio to GDP in U.S. dollars. The trade literature frequently uses the sum of exports and imports to GDP as a measure of openness. Similarly, gross capital flows to GDP capture a country's overall foreign capital activity. Data are from the World Bank, WDI.

The following measures are also used in the robustness section.

v. Equity Inflows/GDP: We use this variable to assess the relation between entrepreneurial activity and equity flows of capital (sum of foreign direct investment and portfolio inflows from IFS, IMF).

vi. Net Capital Flows/GDP: Net flows to GDP allow us to focus on the net capital available to the economy. Net flows are the sum of flows of foreign claims on domestic capital (change in liabilities) and flows of domestic claims on foreign capital (change in assets) in a given year. Coverage for this variable is more limited and is from the IMF, IFS statistics.

2.4 Other Controls

The literature has found the institutional and business environment as well as industry characteristics to affect the levels of entrepreneurial activity in a country.

In the main specification we use the (logarithm of) GDP per capita to proxy for development. The level of economic development is likely to affect the attractiveness/success of becoming an entrepreneur. We use the (logarithm of) GDP to control for scale effects that might affect entrepreneurial activity. We control for the rate of real GDP growth to capture current economic activity. These variables are from the World Bank, World Development Indicators (WB, WDI). In addition, we use various controls for institutional quality. We use data from the International Country Risk Guide (ICRG), a monthly publication of Political Risk Services. We use specifically the variables non-corruption, law and order, and bureaucratic quality, all of which we expect to be positively related to entrepreneurial activity.²⁸ We also use the number of days required to start a business from the World Bank, WDI. We expect this variable to have a negative impact on entrepreneurial activity.

In the robustness section, we use additional controls for regulation such as a business disclosure index, legal rights of borrowers and lenders index, and share of the informal sector. To control for financial development, we use domestic credit on GDP and the stock market capitalization to GDP. To capture uncertainty in the macro-economy, we use inflation. We also control for trade flows and use the sum of exports and imports over GDP. All of these variables were taken from the WB, WDI. Finally, we use growth forecasts from Economist Intelligence Unit (EIU) as an imperfect control for a country's exogenous growth opportunities. Detailed descriptions of all data are provided in the Data Appendix.

²⁸ ICRG presents information on the following variables: investment profile, government stability, internal conflict, external conflict, no-corruption, non-militarized politics, protection from religious tensions, law and order, protection from ethnic tensions, democratic accountability, and bureaucratic quality. We do not use the entire index as we do not have, a priori, a view on how some of these variables might affect entrepreneurial activity, and suspect that some might have opposite effects.

3 Empirical Analysis

3.1 Summary Statistics

Table 1 presents summary statistics by country for our main variables. We have for the United States, for example, more than 7 million firms. France follows with more than 4 million. At the other end of the spectrum, we have Zimbabwe with 99 firms and Burkina Faso with 87. There is clearly wide variation in entrepreneurial activity across countries. Countries such as Denmark, Netherlands, and South Korea exhibit high firm creation, Papua New Guinea and Yemen relatively low firm creation, in 2004. Median employment per firm was relatively high for Indonesia, Papua New Guinea, and Thailand and relatively low for Netherlands, Belgium, and Italy. Table 2 presents summary statistics by industry at the two-digit SIC code level. The service sector shows, overall, higher entry rates and lower median employment levels. Table 3 presents summary statistics on *de jure* and *de facto* capital mobility. Countries such as Costa Rica, Netherlands, and Belgium have low levels of *de jure* restrictions according to the IMF index, while Zimbabwe, Papua New Guinea and Thailand high levels of restrictions. There is also widespread variability in *de facto* flows of capital.²⁹ Table 4 reports summary statistics for our main control variables. In countries such as Australia and Canada it takes from two to three days to start a business; in Brazil and India more than 150 days. There is also great variation in terms of corruption and bureaucratic quality. Table 5 presents the correlation matrix of the main variables. Our data seem to be not only internally consistent, but also consistent with other studies of firm dynamics reported in the literature.³⁰

Figure 1, as mentioned, plots the firm-size distribution measured by the number of employees for countries with high and low *de jure* restrictions to capital mobility. The figure shows there to be higher entrepreneurial activity in countries with lower restrictions. Figure 2, presents for low and high capital controls countries histograms of firm entry by industry, each industry observation weighted by the number of firms. Similarly, the figure shows firm activity to be higher in countries with fewer controls.

²⁹ Ireland experienced particularly high flows and in particular gross flows during this period. Results are robust to excluding Ireland from the sample.

³⁰ See Bartelsman, Hatliwanger, Sarpetta (2004).

These figures, however, do not control for industry composition within countries or the level of development or activity in a country, which might be related to the level of *de jure* restrictions. We consider these issues in the following section.

3.2 Cross Sectional Analysis

The purpose of the cross-sectional analysis is to investigate whether there are variations in entrepreneurial activity across countries that are correlated with capital mobility (*de jure* or *de facto*). We run the following specification,

$$E_{ic} = \alpha K_c + \beta X_c + \delta_i + \varepsilon_{ic} \quad (1)$$

where E_{ic} corresponds to the entrepreneurial activity measure in industry i of country c , K_c corresponds to the measure of capital account integration, X_c corresponds to country level controls, δ_i is a full set of industry dummies, and ε_{ic} corresponds to the error term. Our analysis is at the two-digit industry level. The industry dummies control for cross-industry differences in technological level or other determinants of entrepreneurship.³¹ Hence, in equation (1), we look at whether, in the same industry, firms in a country with greater capital mobility exhibit more entrepreneurial activity than firms in a country with less capital mobility. In other words, cross-country comparisons are relative to the mean propensity to “generate entrepreneurial activity” in an industry. The estimation procedure uses White’s correction for heteroskedasticity in the error term. Because the capital mobility variables vary only at the country level, we present results with standard errors corrected at the country level (clustering).

In our main regressions, we run specification (1) on the different measures of entrepreneurship: entry, firm size, and skewness of the firm-size distribution, and on different measures of capital account integration, namely, the IMF index, capital inflows, FDI inflows, stock foreign liabilities, and gross flows. Appendix A presents results for the additional measure of entrepreneurship and capital mobility. Our main control variables are (log of) GDP, (log of) GDP per capita, GDP growth, days to start a business, and

³¹ Klepper and Graddy’s (1990) results point to the importance of industry characteristics in firm’s entry and exit patterns. Dunne and Roberts (1991), who describe certain industry characteristics that explain much of inter-industry variation in turnover rates, find the correlation between those industry characteristics and industry turnover pattern to be relatively stable over time.

indices of bureaucracy, non-corruption, and law and order. We use weights in the regressions to reflect the different size of each industry/country observation. We find that our results are similar when unweighted, and when weighted by either the number of firms or the total employment in the industry/country. For many industries, the rate of firm entry is zero or negligible. To account for this large number of zeros and our upper bound at 1, we use a Tobit estimation model for the firm entry regressions.³² This specification allows us to observe a regression line that is not heavily weighted by the large number of industries with a wide range of characteristics but which did not generate any observed new firms in our sample period.

Table 6a-6c presents the main results that, overall, suggest a negative and significant relation between different measures of entrepreneurial activity and restrictions on capital mobility.

Table 6a presents results for firm entry as the dependent variable. In column (1), the marginal effect of the IMF index conditional on the dependent variable (rate of firm entry) being uncensored is -5.99. This result is both economically and statistically significant. Consider a movement from the 25th percentile (Ghana, 0.77) to the 75th percentile (New Zealand, 0.15) in the distribution of the index of restrictions. Based on the results shown in column (1), we have, on average, 3.7 percent more entry in an industry in the country with less restrictive controls. This represents, in industries with average rates of entry such as textiles and apparel, an 82 percent increase in entry over average entry.³³ Columns (2)-(5) present the main results of controlling for *de facto* measures of capital account integration. A movement from the 25th percentile (Mauritius, 2.36) to the 75th percentile (Greece, 14.2) of the Capital Inflows/GDP variable is associated, based on the results in column (2), with an increase in entry of 0.31, which represents a 7 percent increase in entry over average entry. Similarly, based on the results in column (3), an inter-quartile range movement in the FDI/GDP variable is associated with an increase in FDI/GDP of 0.44, which is a 10 percent increase over the industry average.

In terms of the other control variables, our results are in line with the literature. Levels of development and growth are positively related to entrepreneurship, and we find a significant positive effect

³² Entry regressions are not clustered. Several clustered entry estimates using Tobit were not significant at standard levels. These results, however, do not contradict our main findings. We believe the loss of robustness in our estimates to be due to computational issues. Tobit is a non-linear estimator, clustering another large-sample asymptotic approximation. Together these techniques might be giving us more imprecise estimates. When we ran the regression using OLS and clustering, the results were significant.

³³ Average entry in uncensored industries is 4.5 percent.

of non-corruption and law and order. Days required to start a business has a negative and significant effect on entrepreneurship. To give some sense of the relative size of the effect of our capital mobility variable relative to our controls, if we move up from the 25th percentile (U.K) to the 75th percentile (Philippines) in the distribution of the days to start a business variable (a difference of 32 days), based on the results shown in column (2) we have, on average, 2.5 percent less entry in an industry.³⁴ This represents, in industries with average rates of entry such as textiles and apparel, a 55 percent decrease in entry over average entry, which is significantly less than the effect of a similar inter-quartile change in the IMF index.

In Table 6b, the dependent variable is the log of employment in the industry/country pair. As seen in column (1), an inter-quartile reduction in the IMF index (less restrictive controls) is associated with a decrease in average firm size by 32 percent. Similar increases in the Capital Inflows/GDP and FDI/GDP variables are associated with decreases in average firm size of 72 percent and 2 percent, respectively. The small FDI coefficient is expected as FDI is often associated with the entry of large firms.

In table 6c, the dependent variable is skewness of the firm-size distribution. We believe this variable to constitute the most complete characterization of firm activity in the economy. Column (1) of the table shows the effect of the IMF index on the skewness of the firm size distribution in each industry to be negative and significant. To get a sense of the magnitude of the effect of a reduction in the IMF index on the level of entrepreneurial activity, consider a movement from the 25th percentile to the 75th percentile in the distribution of the index of restrictions; based on the results shown in column (1), we see a 5.43 reduction in skewness, which represents 46 percent of average industry skewness. In terms of the effect of *de facto* measures of integration on the firm size distribution, a similar interquartile movement of the Capital Inflows/GDP variable is associated, based on the results in column (2), with an increase in skewness of 2.77, which represents a 24 percent increase over the industry average.

We performed additional robustness checks some of which we report on Appendix A. Table A1 shows our results to be robust to controlling for other measures of regulation and level of domestic financial development as well as other macroeconomic controls. Table A2 uses additional proxies for entrepreneurship, such as age, firm vintage, and domestic entry, as well as other measures of *de facto*

³⁴ In column 1, the marginal effect of the IMF index variable conditional on the dependent variable being uncensored is -0.0077.

financial integration such as equity inflows and net flows. Table A3 shows our results to be robust to using only the manufacturing sector, only developing countries, excluding the United States from the sample, and adding regional dummies.

Appendix B presents the results of using the Rajan and Zingales (1998) methodology and focusing on cross-industry, cross-country interaction effects. Following these authors, we use the United States as a proxy for the “natural” rate of entry and entrepreneurial activity in an industry. We test then whether entry and skewness of the firm size distribution are relatively higher or lower in a naturally-high-activity industry when the country allows for international capital mobility. As seen in the Table B1 our main results remain robust to using this methodology.

3.3 Difference in Differences

We compare our results for 2004 and 1999 using an event study based on the difference in differences (DiD) method (Card and Krueger, 1994). We measure the difference between the level of entrepreneurship in the two periods for the group of countries which experienced liberalization in the interim, and for the control group of countries which did not. The difference in differences is the difference between these two measures. This model differences out all the individual characteristics of each observation and thereby controls for more heterogeneity than the cross-sectional estimation. The model is:

$$DE_{ic} = \gamma L + \beta DX_c + d_l + v_{ic} \quad (2)$$

where L indicates whether the country experienced liberalization as measured by a reduction in the IMF index. γ is the parameter of interest and captures the difference between the change in entrepreneurship in liberalized countries and the change in control countries. The DiD estimator is given by $\hat{\gamma} = DE_{ic/L=1} - DE_{ic/L=0}$. The estimation procedure uses White’s correction for heteroskedasticity in the error term and errors are clustered at the country level. The key identifying assumption in this model is that in the absence of liberalization, both the liberalized and control observations would have experienced the same change in entrepreneurship over the period. Having only two periods of data, our ability to test this

assumption is limited. For this reason we interpret the results from this specification with some caution. We do however include differenced control variables.

In our sample, 56% per cent of countries in our sample had a lower IMF index in 2004 than in 1999.³⁵ Differences between the statistics summarizing the measures of entrepreneurship in the two samples are generally small. Tables 7a and 7b present the main DiD results for *de jure* and *de facto* restrictions on international financial integration, which suggest a positive and significant relation between different measures of entrepreneurial activity and capital mobility. Table 7a presents results for entry, Table 7b results for skewness.³⁶ In terms of economic magnitude, Table 7b, column (1), for example, indicates that industries in countries which liberalized in the period had a firm size distribution which, on average, had a higher skewness than countries which did not liberalize by 7.03 equivalent to 44 percent of the mean industry skewness. Appendix Table A4 shows the results to be robust to using only the manufacturing sector, restricting the sample to only developing countries, and excluding the United States from the sample. Overall, the results across two cross-sections of the same data give us some confidence that our results are not driven by correlations between the sampling intensity of our data provider and capital flows, generating apparent correlations between observed industry characteristics and capital mobility.

3.4 Endogeneity

Important concerns related to the previous findings include whether a potential omitted third factor explains the relation between the different measures of entrepreneurship and international financial integration and whether reverse causality might be driving our results. We take different steps to mitigate these concerns.³⁷

First, we believe the extensive robustness analysis undertaken in Appendix A shows the relation between entrepreneurship and international financial integration not to be determined by an omitted third

³⁵ Summary statistics for 1999 and 2004 are, respectively, 0.52 and 0.49 for the IMF Index, 12.91 and 11.80 for Capital Inflows/GDP, 5.19 and 2.74 for FDI Inflows/GDP, 30.84 and 29.45 for Gross Capital Flows/GDP, and 125.73 and 142.35 for Stock of Foreign Liabilities/GDP. For the entrepreneurship measures, average entry for 1999 and 2004 was, respectively, 7.56 and 4.53, skewness of employment 6.07 and 9.52.

³⁶ We obtain similar results for log size, not included due to space considerations (skewness provides a more complete characterization of the data).

³⁷ In section 2.2.1, we discuss potential sampling biases and the different ways we addressed these concerns.

factor. Second, we use in addition to *de facto* measures *de jure* measures that are less likely to be subject to reverse causality.³⁸ Third, we analyze firm/industry characteristics as opposed to country characteristics and test effects controlling for the different sectors. Fourth, we use as an imperfect proxy of forward-looking growth opportunities (growth forecasts from the EIU).³⁹ Reassuringly, as shown in Table 1, columns (8) and (9), our results are robust to including this measure.

We also run instrumental variable (IV) regressions using instruments that are not subject to reverse causality and can account for institutional variation. La Porta et al. (1998) examine the laws that govern investor protection, the enforcement of these laws, and the extent of concentration of firm ownership across countries. Most countries' legal rules, either through colonialism, conquest, or outright borrowing, can be traced to one of four distinct European legal systems: English common law, French civil law, German civil law, and Scandinavian civil law. The authors find that countries with different legal histories offer different types of legal protection to their investors. These legal origin variables have been increasingly adopted as exogenous determinants of international financial liberalization and domestic financial development. The last column in Table 2 presents IV results using the legal origin variables.⁴⁰ Criticism of these instruments notwithstanding, overall, the IV regression supports the conclusions drawn from the OLS regressions.

Finally, as explained before, in Appendix B we also follow the methodology of Rajan and Zingales (1998) and focus on cross-industry, cross-country interaction effects. This methodology allows correcting for country and industry characteristics and as the authors explain, it is less subject to criticism about omitted variable bias or model specification. Similarly, our difference in different results further ease concerns about endogeneity biases.

³⁸ In particular, it might be possible that policy makers liberalize at a time when the world economy is booming or after they observe good economic outcomes. But this does not seem to be borne out by the facts. Henry (2000), for example, shows that countries do not pursue stock market liberalization in response to investment booms, and Bekaert, Harvey, and Lundblad (2005) find, using a probit analysis, that past GDP growth cannot explain liberalization.

³⁹ One potential concern is that the data set is for a good year in the international arena (2004). As well as analyzing the differences between the two time periods, we rerun our cross-section specifications with our 1999-2000 data set (post Asia and Russia crises, during the Brazil crisis, and before Turkey and Argentina crises) obtaining similar results.

⁴⁰ First stage results indicate that the legal origin variables are, individually and jointly, significant determinants of the IMF index.

Notwithstanding the battery of robustness tests, we acknowledge the difficulties of establishing causation. At our most cautious, we can conclude that we find a robust positive correlation between capital mobility and entrepreneurship.

4 Channels

The Dun & Bradstreet data enable us to investigate possible channels through which international financial integration might affect entrepreneurial activity. That is, whether capital mobility affects entrepreneurship through a change in the activity of domestic firms in contact with foreign firms (an FDI channel) or through the availability of resources (a capital/credit availability channel).

4.1 FDI Channel

We first test for the effect of international financial integration on entrepreneurial activity through foreign firms' (FDI) influence on the creation of new domestic firms. Our data contain information on the nationality of each firm's ownership, which enables us to directly test the FDI channel through the presence of foreign-owned firms. Initially, we investigate the effects of foreign firms on new domestic firms in the same industry. Specifically, we run

$$\text{Domestic Entry}_{ic} = \alpha \text{Share of Foreign Firms}_{ic} + \beta X_c + \delta_i + \varepsilon_{ic} \quad (3)$$

where $\text{Domestic Entry}_{ic}$ refers to the percentage of new domestic firms in sector i in country c . The $\text{Share of Foreign Firms}_{ic}$ in sector i is the number of foreign firms calculated as total firms in industry i in country c . X_c represents country-level controls.⁴¹

In columns (1) and (4) of Table 8, we find the presence of foreign firms to have a positive effect on domestic activity in the same industry. An increase in the share of foreign firms equivalent to moving from an industry in the 25th percentile of the distribution of foreign presence to an industry in the 75th percentile is associated with an increase in the percentage of new domestic firms in the industry by 4.67 points, or a 102 percent increase over an industry with mean levels of foreign firms. There is a large literature examining

⁴¹ Note that in this case, both our variable of interest and the dependent variable are aggregated at the industry level. Regressions are weighted by number of firms.

horizontal spillovers from FDI. Caves (1974), Blomstrom and Persson (1983), and Haskel, Pereira, and Slaughter (2002), for instance, find a positive correlation between foreign presence and sectoral productivity, and Haddad and Harrison (1993) and Aitken and Harrison (1999) find little evidence of horizontal spillovers to domestic firms. The positive effects of FDI are often attributed to the replacement effect of productive multinationals forcing domestic firms to exit. Both the positive and negative effects of FDI are consistent with industrial restructuring and, ultimately, firm turnover. We find evidence that the existence of multinational firms increases the rate of domestic firm creation. This might reflect changes in the industry resulting from large new entrants increasing their market share at the expense of some firms and creating new opportunities for others.

We also test whether our measures of domestic activity are correlated with the presence of multinational firms in upstream and downstream sectors. Given the difficulty of finding input and output matrices for all the countries in our data, we use U.S. input and output (IO) matrices from the U.S. Bureau of Economic Analysis following Acemoglu, Johnson, and Mitton (2005). As the authors explain, IO tables from the U.S. should be informative about input flows across industries in our different sample of countries as long as they are determined by technology. For example, in all countries, car makers use tires, steel and plastic from plants specialized in the production of these intermediate inputs. We calculate the presence of downstream firms in industry i in country c as

$$Down\ Stream\ Pr\ esence_{ic} = \sum_j Z_{ji_US} \times W_{jc} \quad (4)$$

where Z_{jc} is the ratio of the inputs industry j sources from industry i in the United States to the total output of industry i in the United States according to the BEA input output table. And W_{jc} is the total number of foreign firms in industry j in country c as a percentage of the total number of firms in industry j in country c . Thus, the presence of foreign firms downstream from industry i is weighted by the volume of goods they purchase from industry i . We estimate the following relation:

$$Domestic\ Entry_{ic} = \alpha\ Downstream\ Pr\ esence_{ic} + \beta X_c + \delta_i + \varepsilon_{ic} \quad (5)$$

We estimated as well a similar regression for upstream presence.

In columns (2)-(3) and (5)-(6) of Table 8, we investigate the effect of forward and backward linkages on the creation of new domestic firms and skewness of the firm-size distribution of domestic firms. Columns (2) and (5) show the effect of foreign presence on upstream industries to be limited while columns (3) and (6) suggest the presence of foreign firms to have positive effects on entrepreneurial firm activity on downstream activities. Our results are also consistent with evidence of vertical spillovers from FDI.⁴² Firm entry (and exit) might be increased if multinational firms' demand for intermediate goods increases or their more stringent requirements for product standards and on-time delivery create opportunities for new firms with better technology or better operations. This is consistent with case study evidence from Hobday (1995), who found that foreign investments in East Asia encouraged hundreds of domestic firms to supply components or assembly services. Our results are also consistent with the findings of Harrison et al. (2004) that incoming FDI has a significant impact on investment cash flow sensitivities for domestically owned firms and firms with no foreign assets. The authors argue that their results are in line with the hypothesis that foreign investment is associated with a greater reduction of credit constraints on firms less likely to have access to international capital markets. This is plausible because incoming foreign investment provides an additional source of capital, freeing up scarce domestic credit which can then be redirected towards domestic enterprises.

Overall, although our data do not permit to correct for some of the concerns associated with cross-section analysis, our results are consistent with our previous findings.

4.2 Capital/Credit Availability Channel

In addition to an FDI channel, we also investigate the possibility that capital mobility affects entrepreneurship through the availability of resources (i.e. a capital /credit availability channel). There is considerable evidence suggesting that financing constraints are important determinants of firm dynamics. We investigate whether firm activity in industries which are more reliant on external finance are positively or negatively affected by our measures of international financial integration. We divide our sample into

⁴² Gorg and Strobl (2002) find that foreign presence encourages entry by domestic-owned firms in the high-tech sector in Ireland. Javorcik (2004) finds that FDI fosters spillovers through backward linkages in Lithuania although her work does not analyze firm entry patterns.

those industries with high dependence on external finance as defined by Rajan and Zingales (1998).⁴³ We run the following appended specification,

$$E_{ic} = \alpha K_c + \theta K_c \times High\ External\ Finance_i + \beta X_c + \delta_i + \varepsilon_{ic} \quad (6)$$

where *High External Finance* is a dummy that takes the value of 1 for high financial dependence industries. We run this specification across *de jure* (the IMF index) and three *de facto* measures of capital mobility. Table 9 reports our main results. We find entrepreneurship in industries more reliant on external finance to be more sensitive to restrictions on capital mobility and more strongly affected by increased flows of finance. This result is robust to controlling for financial development proxied by domestic credit to GDP and stock market capitalization (not shown).

5 Conclusions

Using a new data set of 24 million firms in nearly 100 countries, we found a positive relation between measures of capital account integration and entrepreneurial activity in a country. We describe a number of plausible channels through which international financial integration might affect firm dynamism.

Concerns related to the data notwithstanding, our evidence suggests, overall, a positive relation between entrepreneurial activity and capital mobility. One might argue that from a neoclassical perspective our results are to be expected. Access to foreign capital and improved risk sharing should encourage start-ups and foster opportunities in a country. But from a theoretical perspective, in light of empirical findings on capital account liberalization and growth, our results might seem surprising. We believe that more micro analysis is required to understand the effects of capital account openness in a country. It is worth emphasizing that this work is silent on growth and overall welfare effects of capital liberalization. However, at a minimum, the use of micro firm level data should enhance our general understanding of the process by which the effects of liberalization are transmitted to the real economy.

⁴³ The authors identify an industry's need for external finance (the difference between investment and cash generated from operations) under two assumptions: (a) that U.S. capital markets, especially for the large, listed firms they analyze, are relatively frictionless enabling us to identify an industry's technological demand for external finance; (b) that such technological demands carry over to other countries. Following their methodology, we constructed similar data for the period 1999-2003 as explained in the Data Appendix.

Appendix A: Robustness Checks

We performed additional robustness checks on the regressions results in (1). As Table A1 shows, our main results are robust to controlling for other measures of regulation as well as for the level of domestic financial development. In columns (1)-(3), we control for indices of borrowers' and lenders' rights and business disclosure from the World Bank as additional proxies for regulation, and domestic credit to GDP and stock market capitalization as proxies for financial development. Our results are also robust to controlling for M3/GDP as another proxy for financial development (not shown). Columns (4) and (5) control for inflation as a measure of macroeconomic instability. In columns (6) and (7) we use the EIU growth forecasts as an imperfect measure of exogenous growth opportunities. As shown in column (8), our results are robust to the inclusion of the value of the trade openness defined as the sum of exports and imports as a share of output. Column (9) controls for the share of the informal sector in the economy obtaining similar results (these data, however, were available for a wide range of countries for 2000 only). Controlling for education levels (share of primary school) yielded similar results (not shown, as we do not have strong priors on how education levels might affect entrepreneurship, in particular, in developing countries).

Columns (1)-(3) in Table A2 show our results to be robust to using as additional proxies for entrepreneurship firm age, firm vintage (a size-weighted measure of average firm age), and domestic entry, respectively. Our results are also robust to alternative measures of *de facto* financial integration such as net flows to GDP in column (4) and equity flows in column (5). Another concern is that our results are driven by different sampling intensities in different countries. It might be the case, for example, that countries with higher sampling intensity have disproportionately more small firms. Columns (6) and (7) in Table A2, which control for the number of firms sampled in each country, suggest that this is not the case. As mentioned, our results are also weighted. Column (9) presents IV results using LLSV variables.

Table A3 shows our results to be robust to using only the manufacturing sector in column (1), only rich countries in column (2), excluding the United States from the sample in column (3), and adding regional dummies in column (4).

In terms of the differences in differences approach, Table A4 shows our results to be robust to (1) using only the manufacturing sector, (2) using only rich countries, and (3) excluding the United States.

Appendix B: Rajan and Zingales' (1998) Methodology

We follow the methodology of Rajan and Zingales (1998) and Klapper, Laeven, and Rajan (2005) and focus on cross-industry, cross-country interaction effects. This methodology, as explained by the authors, enables us to address issues associated with country effects.⁴⁴ We run:

$$E_{ic} = \theta(Z_i \times K_c) + \delta_i + \gamma_c + \varepsilon_{ic} \quad (\text{A.1})$$

where E_{ic} corresponds the entrepreneurial activity measure in industry i of country c , δ_i corresponds to industry dummies, and γ_c corresponds to country level dummies. The industry indicators correct for industry-specific effects; country dummies correct for country-specific variables. The focus of analysis is on the interaction term θ between a country characteristic (K_c) and an industry characteristic, Z_i . For country characteristics, we use the capital mobility measures. For industry characteristics, we follow these authors in using the United States as a proxy for the “natural” entrepreneurial activity in an industry reflecting technological barriers in that industry like economies of scale. “Of course, there is a degree of heroism in assuming that entry in the United States does not suffer from artificial barriers,” write Klapper, Laeven, and Rajan (2005, p.17). But the methodology requires only that rank ordering in the United States correspond to the rank ordering of natural barriers across industries, and the latter rank ordering correspond to that of other countries.

Our hypothesis is that if international financial integration improves entrepreneurial activity, the coefficient on the interaction term θ will be positive as we expect industries with higher potential levels of entrepreneurship to be more negatively affected by constraints on access to foreign capital. Table B1 reports the main results. Focusing on entry and the skewness of the firm size-distribution, we find θ to be positive and significant for the different proxies of capital integration. Moreover, the magnitude of the relationship is

⁴⁴ This is equivalent to de-meaning the variables using their industry and country averages and thus removing some of the sample selection problems. The interpretation of a positive coefficient on the interaction term would be that in countries with above average capital mobility, industries with above average “country characteristics” have higher than average rates of firm entry. For a detailed description of their methodology, see Rajan and Zingales (1998).

economically significant. For example, an increase in the inflows of capital equivalent to an increase from the 25th to the 75th percentile in our sample (11.5 percent) reduces the percentage of new firms in an industry with average levels of entrepreneurship in the US (e.g. rubber products, 4.5 percent) by 0.05 points.

Data Appendix I: The Dun and Bradstreet Data Set

a. Final Sample

We use data for 2004, excluding information lacking primary industry and year started. Our original data set included 118 countries. We excluded territories with fewer than 80 observations and those for which the World Bank provides no data (most were in Africa and had fewer than 20 firms). The final dataset of 24,606,036 establishments in 98 countries covers all economic sectors (SIC) with the exception of Public Administration (Division J, group 9) and sector 43 (United States Postal Service). We also dropped all establishments for which year started preceded 1900. When we estimated mean, median, and skewness, we dropped 6 observations that were clearly outliers: a firm with sales of 648.7 trillions in Denmark, a firm with sales of 219.3 trillions in Spain, a firm with sales of 219.3 billions in Spain, a firm with sales of 32.7 trillions in Germany, a firm with sales of 5,6 trillions in Lithuania, a firm with sales of 4.9 trillions in United Arab Emirates, a firm with sales of 352 billions in Nigeria, a firm with sales of 291 billions in Chad, a firm with sales of 291 billions in Angola, a firm with sales of 121 billions in Congo, and a firm with sales of 99 billions in Haiti. We retained data with certain information (e.g., employment) but missing other information (e.g., sales), which was the case mostly in less developed countries (Africa, in particular), our objective being to maximize the number of observations for these countries. In the estimations of mean, median, and skewness using employees, we excluded establishments that reported 0 in this category. The creation rate shows the number of establishments reporting starting year in 2003-2004 over all establishments. We define foreign firms as having an uppermost parent of a corporate family located in a country different from that in which the firm operates. In terms of sample biases, we discussed with Dun & Bradstreet the possibility of over-sampling in countries with lower levels of controls or higher capital mobility (such as foreign direct investment). The firm did not seem to believe this to be a bias in its

sampling strategy. In the case of Czech Republic, a country with high sampling intensity, Dun & Bradstreet derives the bulk of its information from official registries.

b. Comparing Dun & Bradstreet Data and US Census Data

To give some sense of the coverage of the Dun & Bradstreet sample used in this study, we compare our data with that collected by the U.S. Census Bureau, Statistics of U.S. Businesses. The U.S. 2001-2002 business census recorded 24,846,832 establishments.⁴⁵ Our data include 6,185,542 establishments (from which we exclude establishments in the total sample without the year started). About three quarters of all U.S. establishments have no payroll. Most are self-employed persons operating unincorporated businesses that might or might not be the owner's principal source of income. The U.S. census records 7,200,770 employer establishments with total sales of \$22 trillion. Our data include 4,293,886 establishments with more than one employee with total sales of \$17 trillion. The U.S. census records 3.7 million small employer establishments (fewer than 10 employees). Our data include 3.2 million U.S. firms with more than one and fewer than 10 employees. This high proportion of small firms in the database could be evidence of oversampling of small firms or underreporting of firm size. In our data, 6.1 percent of establishments are new.⁴⁶ The U.S. Census reported 12.4 percent of establishments to be new in 2001-2002.^{47,48}

45 The unit of record in the Dun & Bradstreet data is the “establishment” (a single physical location where business is conducted or services or industrial operations are performed) as opposed to a “firm” (one or more domestic establishments under common ownership or control). The U.S. census collects information on establishments as well as firms.

46 We define as new an establishment having a year started date less than two years previous.

47 Establishment and Employment Changes from Births, Deaths, Expansions, and Contractions, http://www.census.gov/csd/susb/usst01_02.xls.

48 For firms with 1-4 employees this was 15.9 percent, for firms with more than 500 employees 11 percent.

Figure 1

Figure 2