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## Long-Term Finance and Entrepreneurship

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# Long-term finance and entrepreneurship

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## Abstract

This paper investigates whether long-term finance affects the firm entry across the world. We construct a new database on short-term and long-term credit provided by commercial banks to the private sector in 85 countries over the period 1995-2014. We then analyze whether differences in entrepreneurship are correlated with the provision of short-term and long-term bank credit. Data on entrepreneurship are extracted from two frequently used databases: the Global Entrepreneurship Monitoring dataset and Entrepreneurship Database, each of which captures different aspects of firm creation. Econometric results indicate that long-term credit does not stimulate the firm entry. On the contrary, we find that short-term credit exerts a positive impact at each stage of firm creation from activity birth to registration. Our findings are robust to a battery of sensitivity tests, including additional control variables, alternative dependent variables, alternative sample, and changes in econometric specification. Our findings suggest that better provision of short-term credit allows entrepreneurs to apply for a formal loan instead of relying exclusively on informal loans or internal funds, contrary to long-term loans.

*Keywords:* Long-term finance; banks; entrepreneurship; credit constraints

*JEL classification:* G21; L26; O16

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# 1 Introduction

Entrepreneurship plays a vital role in a country's growth and overall economic development by creating new jobs, supporting the emergence of new products and sectors, introducing innovation, spurring competition and productivity, and fostering knowledge diffusion (Audretsch et al., 2006; van Stel et al., 2005; Wennekers and Thurik, 1999). Understanding the institutional drivers of entrepreneurship is therefore of prime importance in designing effective policies.<sup>1</sup> Existing papers have documented that, alongside macroeconomic factors (Koellinger and Thurik, 2012; Wennekers et al., 2005), and business regulation (Djankov et al., 2002; Klapper et al., 2006; van Stel et al., 2007), the availability of external finance is one of the crucial determinants of new firm creation.

From a theoretical perspective, a deeper banking system allows lenders to mobilize and allocate more resources to greater numbers of entrepreneurs, helping businesses to overcome entry costs.<sup>2</sup> However, short-term and long-term credit may play differing roles in the development of entrepreneurship. Contrary to short-term credit, long-term loans allow entrepreneurs delay repayment and provide them time to invest funds in their business and earn profit. An entrepreneur relying exclusively on short-term credit must rapidly generate cash-flows in order to meet repayment obligations. Therefore, better access to long-term financing could help finance projects with delayed returns and therefore could spur firm creation.<sup>3</sup>

However, one might raise doubts about the unconditional positive impact of long-term finance. Banks are more reluctant to grant long-term loans than short-term ones. Loans with longer maturity exacerbate asymmetric information problems (especially moral hazard) and often imply larger loan amounts, generating higher risk for banks. Meanwhile,

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<sup>1</sup>A large body of literature has focused on personal characteristics that affect entrepreneurship decisions. Papers have focused on demographic drivers, socioeconomic factors, past experiences, education, and/or psychological drivers (e.g., a lack of risk aversion, the need for autonomy, overconfidence). In our analysis, made at the country-level, we concentrate on institutional drivers and neglect this literature.

<sup>2</sup>There are two additional theoretical channels through which financial development may spur firm creation (King and Levine, 1993). First, as the financial sector grows, ex-ante screening by lenders improves and high skilled potential entrepreneurs who lack funds can obtain financing and thus create their business. Second, entrepreneurs are able to diversify risks more easily in more financially developed countries. As a result, they invest in riskier projects yielding higher returns. However, there is no reason to believe that short-term and long-term credit differ on these points.

<sup>3</sup>An alternative way to finance long-term investment consists on relying on multiple short-term loans. However firms face a liquidity risk when they finance long-term investment with short-term debt because creditors may refuse to roll over their credits (Diamond, 1991).

entrepreneurs cannot easily provide lenders reliable information because they are unable to produce hard information (such as certified accounts) and, if such is the case, have a weak relationship with formal lenders (Demirgüç-Kunt and Maksimovic, 1999). As a result, long-term loans are oriented towards incumbents firms, at the detriment of new entrepreneurs and business ventures. Short-term credit can be more useful to entrepreneurs in alleviating credit constraints because it is more accessible for borrowers who lack an established credit history. Access to short-term loans can allow entrepreneurs to raise additional funds at lower costs. In absence of short-term loans, potential entrepreneurs have to rely on informal loans (from friends, family or moneylenders) or internal finance (savings), and are thus limited in their ability to raise sufficient funds for their entrepreneurial endeavors.

This paper empirically evaluates the impact of short-term and long-term credit on entrepreneurial activity. We firstly compile a new database on short-term and long-term credit to private sector relative to GDP. We focus exclusively on credit provided by commercial banks for two main reasons. First, data on other sources of long-term finance are rarely available and are not comparable across countries. Second, bank lending is the primary source of credit for entrepreneurs and young firms, especially in developing countries. We define short-term credit as credit with a maturity of one year or less and long-term credit as credit whose maturity exceeds one year. Our database on bank loan maturity includes all countries (both developed and developing) for which we could identify a consistent data source. The initial dataset covers 85 countries over the period 1995-2014, including 48 developing countries and 37 high-income countries.

We then investigate the relationship between long-term bank loan provision and firm entry rate. We combine our database on bank loan maturity with data on entrepreneurship at the country-year level. We consider two different datasets frequently used in the literature on entrepreneurship: the Global Entrepreneurship Monitor (GEM) dataset and the Entrepreneurship database (ED). Each database captures a different aspect of entrepreneurship. The GEM database focuses on the early stages of entrepreneurship. An entrepreneur is defined as an individual that creates business (formal or informal; part-time or full-time). The ED captures business registration and concentrates exclusively on the formation of new limited liability companies.

Our empirical approach copies recent papers that investigate cross-country differences in entrepreneurship using panel data (e.g., Klapper et al., 2010; Klapper and Love, 2011, 2014). After controlling for potential confounding variables and country unobserved time-invariant heterogeneity, we document that, contrary to short-term credit, long-term credit provision over GDP has no impact on the firm entry rate. Interestingly, while the GEM and ED databases often provide conflicting results, we find the provision of short-term credit seems beneficial to spurring the creation of a new business (GEM) and registration in the formal sector (ED). Our econometric results are robust to a battery of sensitivity tests, including additional control variables, alternative dependent variables, alternative sample consideration, and changes in econometric specification.

Our paper directly contributes to the extensive empirical literature on the impact of banking development on entrepreneurship. While the theoretical literature is rather unambiguous, the empirical literature does not provide robust proofs of the positive effect of banking development on entrepreneurial activities. Studies based on household surveys, often document a strong correlation between wealth and the propensity to start a business both in industrialized economies (Evans and Jovanovic, 1989; Evans and Leighton, 1989; Holtz-Eakin et al., 1994) and in developing countries (Demirgüç-Kunt et al., 2011; Paulson and Townsend, 2004).<sup>4</sup> A related, albeit different, question is whether better access to formal finance promotes entrepreneurial activities. Evidence from developed countries demonstrates the positive effect of banking development on firm creation.<sup>5</sup> Evidence from other parts of the world is, however, less clear-cut. For instance, while Beck et al. (2015) find a positive effect of external finance on a household's decision to set up a business in China, Elston et al. (2016) underline the role of informal finance for Chinese entrepreneurs. In another context, Demirgüç-Kunt et al. (2011) show that access to bank finance is not crucial in a decision to launch an entrepreneurship venture in Bosnia

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<sup>4</sup>However, as noted by Hurst and Lusardi (2004), the positive correlation may only reflect variation in unobserved characteristics such as ability, preference, or family background. After controlling for these aspect, they provide some pieces of evidence indicating that the relationship between wealth and entrepreneurial activities is not strong in the U.S. Recent evidence exploiting external shock on wealth (e.g., Corradin and Popov, 2015; Schmalz et al., 2017), however, gives support to the importance of wealth in entrepreneurship decision.

<sup>5</sup>These articles employ several methodologies including difference-in-difference framework (Aghion et al., 2007; Klapper et al., 2006), natural experiments such as U.S. bank branch deregulation (Black and Strahan, 2002; Kerr and Nanda, 2009), or sub-national analysis (Guiso et al., 2004). The general conclusion of these works is the positive impact of banking development for firm creation.

and Herzegovina. Put differently, entrepreneurs employ alternative sources of funding such as informal finances (from friends, family, or moneylenders) or internal finances (savings). Cross-country investigations do not really help us to provide a clear answer on this issue. Klapper et al. (2010) report a positive role of financial development on firm registration, but econometric results are weakly robust. Other papers (Klapper and Love, 2011; Klapper et al., 2015) indicate that new business creation is more sensitive to business cycles in more financially developed countries, underlining the role banking development plays in promoting entrepreneurship. Ho and Wong (2007), however, challenge this view. They show that, the availability of debt financing, contrary to that of informal financing, does not affect business creation. We try to reconcile these divergent views. In this paper, we document that total credit does not impact firm entry rate. However, this conclusion is challenged when we distinguish between short-term and long-term credit. Short-term credit tends to stimulate firm creation, contrary to long-term credit (that has a negative, albeit statistically insignificant, impact on firm creation). The most plausible explanation is that short-term credit complements informal financing and internal funding and allows entrepreneurs to raise additional resources to finance their projects.

This work is also directly linked to the body of literature focusing on real impact of long-term finance. Existing literature documents that firms with higher long-term debt ratios grow faster than their counterparts (Demirgüç-Kunt and Maksimovic, 1998), have lower growth volatility (Demirgüç-Kunt et al., 2017) and suffer less from credit contraction following a financial crisis (Duchin et al., 2010; Vermoesen et al., 2013). This micro-evidence is in line with macro-evidence underlining the positive effect of long-term credit on growth (Gbenyo and Kpodar, 2010; Valev and Tasic, 2008). To our knowledge, we are the first to study the effect of short-term and long-term bank credit provision on firm entry. By focusing on entrepreneurship, we challenge previous findings on the beneficial impact of long-term credit on firm dynamics. The provision of long-term bank credit does not help entrepreneurs.

The remainder of this paper is organized as follows. Section 2 displays the data and Section 3 presents the methodology. Section 4 discusses the main results and Section 5 runs a battery of sensitivity tests. The final section concludes.

## 2 Data

### 2.1 Bank loan maturity

This work is based on a new database that reports the maturity structure of bank credit at the country-year level. Data were hand-collected from diverse sources including central bank annual reports, supervisory department/agency annual reports, annual bulletins and statistical digests. Although alternative sources of long-term finance (such as leasing, venture capital and crowdfunding) are available for entrepreneurs, only credit provided by commercial banks was considered, for two main reasons. First, data on other sources of long-term financing are rarely available and, if so, are not comparable across countries. Second, even if a large share of long-term finance is provided by markets and institutional investors, entrepreneurs rely mainly on informal finance or bank credit to finance their business projects (La Rocca et al., 2011). The use of non-banking sources for long-term financing is rather the exception than the rule, especially in developing countries (Martinez Peria and Schmukler, 2017).

We break credit down into two categories. Short-term credit is defined as loans with a maturity of one year or less and long-term credit as loans whose maturity exceeds one year. Ideally, we wanted to employ a flexible definition of short-term and long-term credit by considering different maturity thresholds (six months, one year, two years, etc.). Unfortunately, in the majority of cases, raw data provided in annual reports or statistical digests just broke out bank credit between short-term credit (less than one year) and long-term credit (over one year). As a consequence, to facilitate comparison and increase the number of countries considered we followed this break down. The levels of short-term and long-term credit were initially reported in the current local currency amount of each country. We transform the data by dividing these figures by current GDP in local currency for each country-year. As a result, we get the ratio of short-term credit over GDP and long-term credit over GDP. The total credit over GDP is the sum of the two previous indicators and this variable is comparable to the usual ratio of credit to GDP employed in many studies.<sup>6</sup>

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<sup>6</sup>This procedure is similar to papers collecting the same type of data (Gbenyo and Kpodar, 2010; Valev and Tasic, 2008).

The database on bank loan maturity includes data on all countries (both developed and developing) for which we were able to identify a consistent data source. The initial database considers 85 countries over the period 1995-2014 (unbalanced data). The list of countries, provided in [Appendix A](#), comprises 14 low-income countries, 34 middle-income countries and 37 high-income countries. The coverage over time of the database is relatively good: there are only 12 countries for which we have less than 10 years of data, and two countries (Comoros and Croatia) with less than 5 years of data.

Before employing our new database, we verify that it provides reliable data. To do so, we compare the ratio of total credit over GDP reported in our dataset with the data published by the World Bank ([Beck et al., 2010](#)) on total credit provided by banks to private sector. Different tests confirm that our database on loan maturity provides a close picture to that depicted in the World Bank database. First, we compare the ratio of total credit to GDP computed as the sum of short-term and long-term credit with the ratio of private credit to GDP extracted from the World Bank dataset. The correlation coefficient equals 88 %. Second, we regress the total credit obtained from our database to the private credit provided by the World Bank database. The estimated coefficient is highly significant and its magnitude is around one. Finally, a simple comparison of descriptive statistics indicates that the average of total credit represents 48% of GDP in our database and 49% if we use data from the World Bank database (see the first two columns in [Table 1](#)). Break down by income level and continent provides a similar result.

Basic descriptive statistics, displayed in [Table 1](#), indicate that total credit represents 48% of GDP on average and that three fifths of loans have a maturity above one year. Average values, however, hide large variations across countries. The level and percentage of long-term credit increases with the level of a country's development, in line with previous evidence reported by [Martinez Peria and Schmukler \(2017\)](#). For instance, long term bank loans represent less than 5% of GDP and one third of total bank loans in low-income countries but exceeds 50% of GDP and two thirds of loans in high-income countries. Differences across continents, displayed in [Table 1](#), reflect differences in terms of development.



Table 1: Bank credit maturity, by country group

	Total credit		Maturity breakdown			Sample	
	WDI	Author	Short-t. to GDP	Long-t. to GDP	% of LT to total loan	Nb of Obs.	Nb of Count.
All countries	48.1	47.9	14.7	33.8	60.0	1211	85
<i>By income level</i>							
Low income	11.8	11.6	7.2	4.3	33.5	196	14
Lower middle income	22.5	22.7	10.5	12.3	47.0	171	14
Upper middle income	45.0	43.8	11.9	31.9	66.3	300	20
High income	74.2	71.2	20.2	52.2	70.2	544	37
<i>By continent</i>							
East Asia & Pacific	86.6	91.1	35.2	56.0	64.4	78	6
Latin America & Caribbean	61.0	62.2	18.4	47.7	72.1	165	11
Europe & Central Asia	64.3	57.7	13.4	44.3	71.1	539	36
Middle East & North Africa	45.9	47.9	20.1	27.8	53.2	113	9
Sub-Saharan Africa	13.0	13.0	7.8	5.2	36.2	316	23

Figures are obtained using the complete dataset (85 countries, period 2000-2014)

Table 2: Bank credit maturity, by year

	Total credit	Long-term credit		Short-term credit		Nb of countries
		% of GDP	% of TC	% of GDP	% of TC	
1995	53.7	30.9	57.6	22.7	42.4	12
1996	49.9	30.0	60.2	19.8	39.8	19
1997	38.0	22.4	58.9	15.6	41.1	29
1998	41.5	25.4	61.2	16.1	38.8	32
1999	37.7	22.6	60.1	15.0	39.9	36
2000	37.9	23.7	62.5	14.2	37.5	50
2001	37.0	23.9	64.6	13.1	35.4	55
2002	37.3	24.6	66.0	12.7	34.0	58
2003	38.2	26.1	68.3	12.1	31.7	67
2004	40.4	27.5	68.2	12.8	31.8	72
2005	43.0	29.7	69.2	13.2	30.8	75
2006	45.5	31.8	70.0	13.7	30.0	78
2007	49.6	35.0	70.6	14.6	29.4	80
2008	52.8	37.2	70.4	15.7	29.6	80
2009	55.7	40.0	71.9	15.7	28.1	82
2010	54.9	40.1	73.0	14.8	27.0	83
2011	59.0	43.1	73.1	15.9	26.9	76
2012	58.7	43.0	73.2	15.7	26.8	76
2013	57.7	42.1	73.1	15.5	26.9	77
2014	57.4	42.6	74.1	14.9	25.9	74

TC refers to total credit (sum of short-term credit and long-term credit).  
Figures are obtained using the complete dataset (85 countries)

We observe an increase of long-term bank credit in absolute and relative terms from 2000 to 2014 (Table 2). The ratio of long-term loans to GDP rose from 23 to 42 from 2000 to 2014 and its share in total credit increased from 62% to 74%. In an unreported

analysis, we scrutinize whether the increase of the ratio of long-term credit is a common feature of both developed and developing countries. We show that the percentage of long-term credit increases in high-income, middle-income and low-income countries (at least after 2005 for the latter group). In addition, this trend is occurring faster in low-income countries, suggesting a possible convergence of credit maturity. This trend appears rather similar to that observed by Léon (2018), highlighting the existence of a convergence of credit structure.

## 2.2 Entrepreneurship

There are two frequently-used datasets designed to measure entrepreneurship across the world: the Global Entrepreneurship Monitor (GEM) dataset and the Entrepreneurship Database (ED) from Doing Business. Contrary to the majority of studies on drivers of entrepreneurship, we employ both databases and exploit their differences.

The Global Entrepreneurship Monitor (GEM) is an initiative aimed at better understanding entrepreneurship around the world. The GEM defines an entrepreneur as an individual who starts a new business or manages a young firm. The entrepreneur can operate in the formal or informal sector and the entrepreneurial activity can be a full-time or a part-time business. Data are obtained using harmonized surveys across different countries. The entry rate is captured by the Total early-stage Entrepreneurial Activity (TEA) rate which is the percentage of the adult population (18-64 year-olds) who are currently starting a new business or who own or manage a young firm (less than 42 months).<sup>7</sup>

The second database is obtained from the Doing Business project. The Doing Business project measures business regulations and their enforcement across the world and also provides a dataset on entrepreneurship, called the Entrepreneurship Database (ED). This database describes entrepreneurship as "the activities of an individual or a group aimed at initiating economic enterprise in the formal sector under a legal form of business". In other words, the ED focuses on firm registration as a legal entity (and therefore exclusively on the formal sector). Data are extracted from national business registries. The business entry rate is defined as the number of newly registered firms with limited liability per

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<sup>7</sup>The GEM database is available at <http://www.gemconsortium.org/>. For a complete discussion of the GEM data, see Reynolds et al. (2005).

1,000 working-age people (ages 15-64).<sup>8</sup>

Table 3: Entrepreneurship rates from GEM and ED datasets, by country group

	TEA rate (GEM)					Business entry rate (ED)				
	Mean	25th	Median	75th	Obs	Mean	25th	Median	75th	Obs
All countries	11.02	5.83	8.98	14.11	777	2.98	0.61	1.62	3.95	1,386
<i>By income level</i>										
Low income	28.32	25.21	30.52	33.67	14	0.25	0.05	0.15	0.38	105
Lower middle income	17.55	10.23	15.55	22.47	68	0.88	0.22	0.53	1.00	315
Upper middle income	14.46	8.81	13.32	19.39	204	2.88	0.87	1.71	3.64	411
High Income	8.20	5.29	7.16	10.19	491	4.76	2.00	3.34	6.23	555
<i>By continent</i>										
East Asia & Pacific	11.03	6.05	10.59	14.68	106	4.23	0.72	2.22	6.10	166
Europe & Central Asia	6.92	5.02	6.47	8.53	370	3.67	1.17	2.78	4.68	547
Latin America & Caribbean	17.36	13.08	16.72	21.01	155	3.15	0.71	1.73	3.23	256
Middle East & North Africa	10.37	6.53	9.4	12.79	57	2.00	0.53	1.19	1.96	121
North America	11.13	9.51	11.17	12.63	26	0.98	0.86	0.94	1.07	13
South Asia	10.57	9.08	10.59	11.49	13	0.52	0.05	0.11	0.39	85
Sub-Saharan Africa	22.53	9.14	25.60	33.23	50	1.61	0.16	0.59	1.25	198

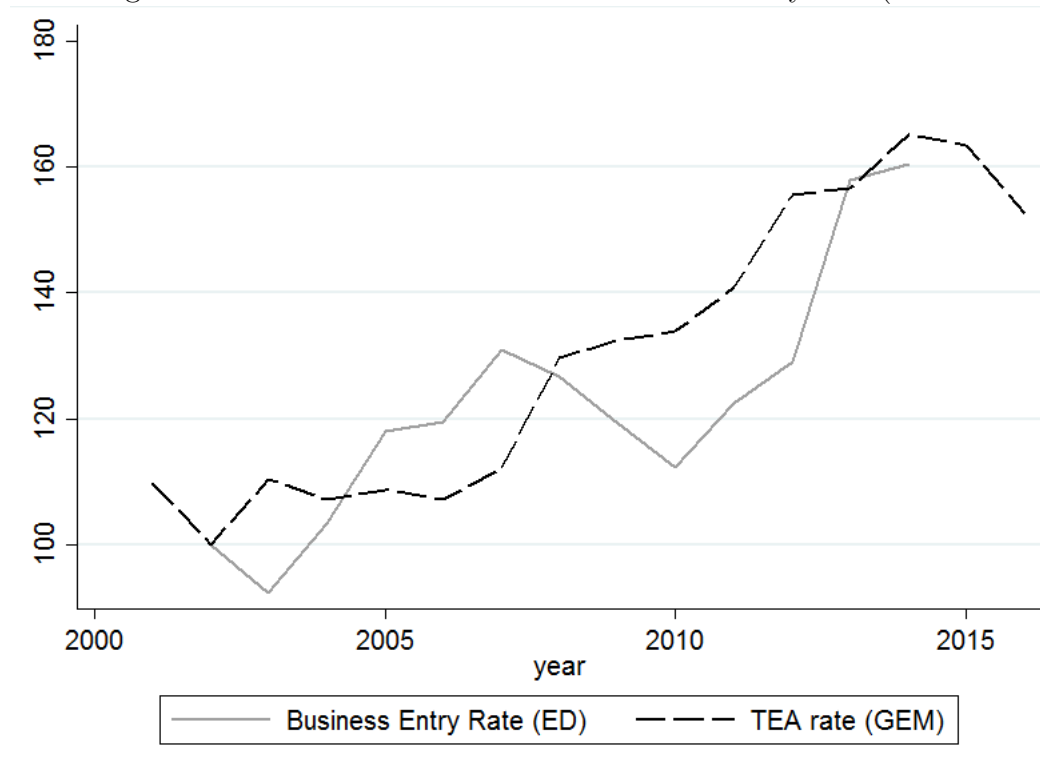
Figures are obtained using the complete datasets

Both databases capture different aspects of firm creation and often describe different realities (Acs et al., 2008). The ED focuses on firm registration and the firm entry into the formal sector, while the GEM concentrates on business creation, irrespective of legal status (i.e., formal and informal). Comparisons of the two variables of entrepreneurship, displayed in Table 3, are interesting and corroborate those made by Acs et al. (2008). First, the level of entry rate according to the TEA exceeds the rate of business registrations. This is explained by the fact that the business entry rate considers only formal registration, while the TEA rate also includes informal firms. Second, GEM data tend to report significantly higher levels of entrepreneurship in developing countries than in developed countries. The ED data present the inverse. In other words, they indicate that there is more entrepreneurial activity in developing countries but that a lesser share of firms operate under a formal status. Finally, the TEA rate and the business entry rate are not correlated ( $\rho = -0.06$ ). It is therefore not surprising that both datasets provide

<sup>8</sup>The ED is available at <http://www.doingbusiness.org/data/exploretopics/entrepreneurship>. The ED previously circulated under the name of World Bank Group Entrepreneurship Surveys (WBGES). For a complete discussion of the ED data, see Klapper et al. (2010).

conflicting results on the drivers of firm entry.<sup>9</sup> Nonetheless, we observe in Figure 1 that both the TEA rate and the business entry rate have increased over the past decade. As expected (Klapper and Love, 2011), the level of new business registrations has been impacted by the Global Financial Crisis but the Total early-stage Entrepreneurial Activity rate does not reach a similar decrease during this period.

Figure 1: Evolution of TEA rate and business entry rate (base 100 = 2002)



Studies often focus on one database because they are investigating only one aspect that is related either to firm birth or to firm registration. Financial development may *a priori* impact firm creation at each stage, from birth to registration. Credit availability may play a role in firm creation before registration because entrepreneurs face sunk costs (investment in physical capital, working capital needs, etc.). Financial constraints may also limit an entrepreneur’s ability (and/or willingness) to register with a national

<sup>9</sup>An example, also valid in this paper, is the impact of growth that could stimulate firm registration (and therefore entrepreneurial activity reported in the ED) but not necessarily entrepreneurial activity reported in the GEM (because crisis period can induce an increase in informal activity).

authority. By using both datasets, we are able to analyze whether short-term credit and long-term credit alleviate constraints faced by entrepreneurs at the different stages of entrepreneurship.

### 3 Methodology

To study whether bank credit maturity affects entrepreneurship, we follow the methodology employed in previous studies using panel data (e.g., Klapper et al., 2010, 2015; Klapper and Love, 2014). We perform a simple empirical test to investigate whether a country’s firm entry rate is related to banking development. To do so, we estimate the following model:

$$Entry_{it} = \beta F_{it-1} + \Gamma \mathbf{X}_{it} + \alpha_t + \alpha_i + \varepsilon_{it} \quad (1)$$

where  $Entry_{it}$  is a measure of entry rate in country  $i$  in year  $t$  using both indicators provided by GEM (TEA rate) and ED (Business entry rate).  $F_{it-1}$  is the ratio of private credit to GDP (defined as the sum of short-term and long-term credit) in year  $t - 1$ <sup>10</sup>,  $\mathbf{X}_{it}$  is a matrix of time-variant country characteristics (see below),  $\alpha_t$  is a matrix of time fixed effects and  $\alpha_i$  is an unobservable country-specific effect.

In a second step, we rerun the same model by splitting total credit over GDP between short-term credit to GDP and long-term credit to GDP as follows:

$$Entry_{it} = \beta_{ST} F_{it-1}^{ST} + \beta_{LT} F_{it-1}^{LT} + \Gamma \mathbf{X}_{it} + \alpha_t + \alpha_i + \varepsilon_{it} \quad (2)$$

where  $F_{it-1}^{ST}$  is the ratio of short-term credit to GDP and  $F_{it-1}^{LT}$  is the ratio of long-term credit to GDP in country  $i$  in year  $t - 1$ . Greater availability of long-term credit (resp. short-term credit) is beneficial for firms’ entry if  $\beta_{LT} > 0$  (resp.  $\beta_{ST} > 0$ ).

We run two different estimation methods to control for unobserved cross country heterogeneity: a random-effect model and a fixed-effect model. The random-effect model assumes that the unobservable individual effects ( $\alpha_i$ ) are random variables that are distributed independently of the regressors. This model allows us to exploit both within-

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<sup>10</sup>The ratio of credit to GDP is entered with one lag to limit endogeneity issue. We also run a model using contemporaneous values of credit variables. Results are unchanged.

and between-variation but is potentially biased due to the presence of any unobserved time-invariant difference between countries that affects both financial development and entry rate. Inclusion of country fixed-effects (in place of random-effect) allows us to control for this potential source of endogeneity but only exploits the within variation.

An important consideration is the need to isolate the impact of financial development from other country characteristics. The inclusion of country fixed effects allows us to control for all time-invariant country characteristics but we also control for time-variant country factors ( $\mathbf{X}_{ct}$ ). First, we control for economic development by adding GDP per capita because both long-term credit and entrepreneurship (Wennekers et al., 2005) are potentially correlated with the level of development. Second, we add the (lagged) growth rate of real GDP because both the level of financial development (due to higher demand for financial services) and firm entry (Koellinger and Thurik, 2012) can be affected by business cycles. Finally, the degree of financial deepening, especially for long-term credit, is potentially related to the business environment that a given entrepreneur is operating in a given country. We therefore include several indicators of business environment extracted from Doing Business.<sup>11</sup> Specifically, we consider the required procedures to start a business, the costs to enforce contract, procedures for registering property, and the cost of resolving insolvency. We consider additional control variables in the robustness checks. Details about variable definitions are given in Appendix A and descriptive statistics are reported in Table 4.

Data for 108 countries are available from on TEA and from ED for 137 countries. However, due to the lack of explanatory variables for many countries, our final sample includes only 43 countries (period: 2005-2015, 251 observations) when we employ the TEA rate (GEM dataset) and 57 countries (period: 2005-2014, 451 observations) when we explain the business entry rate (ED dataset). The list of countries is reported in Appendix A.

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<sup>11</sup>Data are available at: <http://www.doingbusiness.org>.

Table 4: Summary Statistics

Panel A: Models using GEM data					
Variable	Obs.	Mean	Std. Dev.	Min	Max
TEA rate	251	8.978008	6.173737	2.44	38.55
Total credit/GDP	251	68.07062	30.81505	5.915368	143.6752
Short-term credit/GDP	251	15.91691	10.56697	2.686329	57.80505
Long-term credit/GDP	251	52.71039	27.25711	1.154395	117.0423
Growth	251	1.816135	3.508607	-12.90611	12.92044
GDP per capita (in log)	251	9.802266	.9572759	6.418737	11.58387
Start a business	251	1.762163	.4993057	.6931472	2.70805
Registering property	251	1.656507	.4829481	0	2.639057
Enforcing contract	251	3.488484	.1613658	3.044523	3.850147
Resolving insolvency	251	54.31195	21.86951	0	90.2
Panel B: Models using ED data					
Variable	Obs.	Mean	Std. Dev.	Min	Max
Business entry rate	451	3.195171	2.951785	.0084	17.2608
Total credit/GDP	451	56.69467	32.3901	7.224331	143.6752
Short-term credit/GDP	451	14.03796	9.02198	2.491565	53.65152
Long-term credit/GDP	451	42.65667	28.26732	2.67105	117.0423
Growth	451	2.682963	4.359845	-14.55986	23.63913
GDP per capita (in log)	451	9.100367	1.289032	5.994983	11.62597
Start a business	451	1.891125	.4478498	.6931472	2.772589
Registering property	451	1.647574	.4767572	0	2.639057
Enforcing contract	451	3.540674	.1826104	3.044523	3.931826
Resolving insolvency	451	42.41264	22.4503	0	90.2

## 4 Baseline results

In this section, we empirically explore the relationship between financial development and firm entry rate shown in Table 5. Columns (1-3) present our results using the Total Entrepreneurial Activity (GEM dataset), and columns (4-6) present the results using the business entry rate (ED dataset). We first display results using pooled OLS in columns (1) and (4) for sake of transparency. We then consider country heterogeneity by using a random-effect model (results shown in columns (2) and (5)) and a fixed-effect model (results shown in columns (3) and (6)). Our main interest variable, namely the ratio of total credit over GDP, is not statistically significant when we control for country heterogeneity, irrespective of the measure of entrepreneurship considered or method employed (random- or fixed-effects). This finding is in line with previous studies using the GEM dataset (Ho and Wong, 2007) and the ED dataset (Klapper et al., 2010, 2015), both of which fail to show a robust impact of financial depth on entrepreneurship.

Table 5: The determinants of entrepreneurship and total credit

	TEA rate (GEM data)			Business entry rate (ED data)		
	OLS (1)	RE (2)	FE (3)	OLS (4)	RE (5)	FE (6)
Total credit/GDP (lagged)	-0.0324** (-2.07)	-0.0116 (-0.41)	0.00216 (0.07)	0.0143** (2.01)	0.00722 (1.02)	0.00377 (0.55)
Growth (lagged)	0.0323 (0.23)	0.0220 (0.20)	0.0154 (0.16)	0.126*** (2.83)	0.0570*** (2.89)	0.0514** (2.45)
GDP per capita (lagged)	-2.900*** (-4.00)	-2.742** (-2.18)	7.463 (1.29)	0.862*** (7.08)	1.192*** (3.89)	1.793 (1.23)
Start a business	1.656* (1.90)	0.879 (0.95)	1.016 (1.09)	-2.033*** (-4.60)	0.371 (0.86)	0.544 (1.24)
Registering property	-1.043 (-1.31)	-0.410 (-0.39)	-0.715 (-0.74)	-0.829*** (-3.04)	-0.486 (-1.07)	-0.486 (-0.93)
Enforcing contract	-5.414** (-2.08)	5.050 (0.77)	14.34 (1.53)	-0.630 (-0.87)	2.084 (0.95)	5.635 (1.28)
Resolving insolvency	0.00526 (0.24)	0.0198 (0.54)	-0.00921 (-0.21)	-0.0324*** (-4.00)	-0.00326 (-0.26)	-0.00240 (-0.17)
Obs.	251	251	251	451	451	451
Country	43	43	43	57	57	57
R2	0.320			0.293		

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in columns (1-3) and the business entry rate provided by the Entrepreneurship Database in columns (4-6). Dummies for each year are included but not reported in all specifications. OLS refers to pooled OLS, RE to panel random-effect model, and FE to fixed-effect model. Standard errors are clustered at the country-level. \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1%, respectively.

Next, we examine the differential impact of short-term and long-term credit on entrepreneurship. We remove total credit over GDP and include both short-term credit over GDP and long-term credit over GDP, as documented in Eq. 2. Econometric results are displayed in Table 6. Coefficients associated with long-term credit are often negative but are never statistically significant at the usual threshold. On the contrary, we find that coefficients associated with the ratio of short-term credit are statistically significant and positive. Irrespective of the econometric methods or entrepreneurship indicators considered, the rate of firm entry is higher when the provision of short-term credit increases. The economic impact of short-term credit is far from negligible. A one standard deviation increase of short-term credit raises the TEA rate by almost 1.5 points (16% of the TEA mean) and the business entry rate by 0.66 points (20% of the mean of the business entry rate).<sup>12</sup> Analysis of control variables indicates that growth has a positive impact on firm registration but not on business creation. We fail to prove a close relationship between the business environment and entrepreneurship.

In a nutshell, our findings indicate that the provision of short-term credit helps new firms to overcome sunk costs induced by the creation of a new business (such as working

<sup>12</sup>Economic significance is computed using coefficients reported in fixed-effect models (columns (3) and (6) in Table 6).



Table 6: The determinants of entrepreneurship and credit by maturity

	TEA rate (GEM data)			Business entry rate (ED data)		
	OLS (1)	RE (2)	FE (3)	OLS (4)	RE (5)	FE (6)
Short-term credit/GDP (lagged)	0.0838** (2.39)	0.130** (2.11)	0.141* (1.72)	-0.0303** (-2.27)	0.0561** (2.23)	0.0738** (2.46)
Long-term credit/GDP (lagged)	-0.0589*** (-3.41)	-0.0424 (-1.28)	-0.0220 (-0.52)	0.0131 (1.43)	-0.00421 (-0.50)	-0.00968 (-1.05)
Growth (lagged)	0.0823 (0.56)	0.0359 (0.31)	0.0302 (0.30)	0.109** (2.52)	0.0575*** (3.01)	0.0538*** (2.86)
GDP per capita (lagged)	-2.903*** (-3.98)	-2.840** (-2.30)	7.070 (1.18)	0.997*** (10.21)	1.112*** (3.59)	1.311 (0.85)
Start a business	1.815** (2.12)	0.874 (0.93)	0.908 (0.91)	-0.975*** (-2.70)	0.432 (0.99)	0.510 (1.14)
Registering property	-0.254 (-0.30)	0.0297 (0.02)	-0.514 (-0.35)	-0.826*** (-2.98)	-0.559 (-1.13)	-0.575 (-0.94)
Enforcing contract	-8.695*** (-3.15)	0.957 (0.15)	9.318 (1.14)	-0.534 (-0.67)	1.391 (0.61)	4.874 (1.04)
Resolving insolvency	0.00866 (0.40)	0.0118 (0.34)	-0.0126 (-0.31)	-0.0325*** (-4.41)	-0.00711 (-0.58)	-0.00325 (-0.22)
Obs.	251	251	251	451	451	451
Country	43	43	43	57	57	57
R2	0.361		0.856	0.230		0.906

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in columns (1-3) and the business entry rate provided by the Entrepreneurship Database in columns (4-6). Dummies for each year are included but not reported in all specifications. OLS refers to pooled OLS, RE to panel random-effect model, and FE to fixed-effect model. Standard errors are clustered at the country-level. \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1%, respectively.

capital needs, small investment, etc.). We also document that entrepreneurs are more willing to register as a limited liability company when short-term credit is more readily available. This latter result could be explained not only by the costs induced by registration procedures but also by a demand channel: firms may expect to have access to formal finance in countries where short-term credit is easily available. Unfortunately, we are unable to distinguish between these two possible explanations. However, our findings illustrate that long-term credit does not affect entry of new firms. One possible explanation for this is the inability of new firms to get access to long-term bank financing.

## 5 Robustness checks

We run several sensitivity tests to confirm our baseline findings. We start by including alternative control variables that could affect both the firm entry rate and the provision of long-term bank loans and present our results in Table 7. First, the absence of the impact of long-term credit may be explained by the negative impact of household credit on firm creation. Even if we cannot quantify it, a large share of long-term finance is dedicated to mortgage loans and therefore long-term bank credit may evolve as credit to households. Meanwhile, a recent but growing body of literature has documented that household credit is detrimental for growth, even in developing countries (Beck et al., 2012; Léon, 2016). We therefore test whether our findings are robust to the inclusion of the ratio of household credit over GDP (in columns (1-2)). The ratio of household credit to GDP is extracted from the Credit Structure Database (Léon, 2018).<sup>13</sup> Results, reported in Table 7, indicate that our conclusions are not altered by inclusion of household credit as an additional control variable. Coefficients associated with short-term credit remain positive and statistically significant, while coefficients associated with long-term credit are not statistically significant. Household credit has a positive impact on business registration (Panel B, columns (1-2)). This result is in line with Herkenhoff et al. (2016) who suggest that consumer credit access matters for entrepreneurship in the U.S and that entrepreneurs may divert household credit to alleviate their credit constraints.

We consider alternative potential omitted variables in Table 7. First, we include the level of institutional quality (assessed by the synthetic indicator of the World Governance Indicators) in columns (3-4) because entrepreneurship and long-term bank loan provision are more likely in countries with better institutions. We also control for government expenditures in columns (5-6). An increase in government expenditures may crowd-out long-term funds for private sectors. Meanwhile, a high share of government expenditures

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<sup>13</sup>The Credit Structure Database is available at <https://sites.google.com/site/florianleon/research/data>. The ratio of household credit to GDP is not available for all countries, explaining why we do not include it in our baseline model. We also test the sensitivity of this test by adding firm credit over GDP without and with household credit. Results regarding our interest variables are reinforced (coefficients associated with short-term credit is significant at the 5% level). But, surprisingly, firm credit has a negative effect on entrepreneurship (measured by both TEA rate and Business entry rate). One possible explanation is the fact that an increase in firm credit may favor incumbents at the detriment of new players.

Table 7: Robustness checks, adding control variables

Panel A: TEA rate (GEM data)								
	RE	FE	RE	FE	RE	FE	RE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Short-term credit/GDP (lagged)	0.143* (1.86)	0.160* (1.90)	0.118* (1.95)	0.165** (2.05)	0.129** (2.21)	0.132† (1.65)	0.126** (2.01)	0.130† (1.68)
Long-term credit/GDP (lagged)	0.00275 (0.04)	0.0607 (0.75)	-0.0387 (-1.17)	-0.0340 (-0.85)	-0.0382 (-1.15)	-0.0174 (-0.40)	-0.0402 (-1.21)	-0.0140 (-0.34)
Household credit/GDP (lagged)	-0.0696 (-0.76)	-0.129 (-1.24)						
Governance (lagged)			1.815 (0.84)	-4.486 (-1.32)				
Government Exp. (lagged)					-0.420* (-1.88)	-0.410 (-1.44)		
Inflation (lagged)							-0.0948 (-0.84)	-0.277** (-2.45)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	243	243	251	251	251	251	244	244
Country	40	40	43	43	43	43	42	42
R2		0.851		0.858		0.859		0.863
Panel B: Business entry rate (ED data)								
	RE	FE	RE	FE	RE	FE	RE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Short-term credit/GDP (lagged)	0.0489† (1.57)	0.0629† (1.67)	0.0548** (2.14)	0.0766** (2.57)	0.0615** (2.39)	0.0800** (2.65)	0.0570** (2.35)	0.0743** (2.60)
Long-term credit/GDP (lagged)	-0.0386** (-2.16)	-0.0465** (-2.25)	-0.00414 (-0.49)	-0.0100 (-1.11)	-0.00335 (-0.41)	-0.00885 (-0.98)	-0.00332 (-0.40)	-0.00821 (-0.92)
Household credit/GDP (lagged)	0.0545** (2.15)	0.0591** (2.02)						
Governance (lagged)			0.439 (0.84)	-0.296 (-0.44)				
Government Exp. (lagged)					-0.0690* (-1.83)	-0.0798* (-1.73)		
Inflation (lagged)							-0.0236 (-1.29)	-0.0279 (-1.51)
Obs.	409	409	449	449	450	450	445	445
Country	53	53	57	57	57	57	56	56
R2		0.903		0.906		0.907		0.906

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in Panel A and the business entry rate provided by the Entrepreneurship Database in Panel B. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, and FE to panel fixed-effects model. Standard errors are clustered at the country-level. †, \*, \*\*, and \*\*\* indicate significance at 15%, 10%, 5% and 1%, respectively.

may signal less pro-entrepreneurial policies and greater opportunity to be hired as a civil servant. Finally, we control for the inflation rate in the last two columns. Inflation proxies for macroeconomic instability, which could affect both entrepreneurship and financial

deepening. Results, reported in Table 7, show that our main findings are unaffected by the inclusion of these variables. Results also document that government expenditures and inflation rates have a detrimental effect on entrepreneurship.

In Appendix B (Tables B1 and B2), we also control for characteristics of the financial system. First, we consider the stock market development using the ratio of market capitalization to GDP. Indeed, the inclusion of stock market development proxies for direct finance and for non-banking financial intermediaries that can provide (long-term) financing for entrepreneurs such as business angels or venture capital firms. We then consider the degree of bank competition. In doing so, we include three frequently used measures of competition (Léon, 2015): the concentration ratio, the Lerner index and the Boone indicator. All of these data are extracted from the Global Financial Development Database. We also control for the share of foreign banks in the banking system, using data provided in the Bank Ownership Database (Claessens and van Horen, 2014) and reported in the GFDD. Finally, we consider the development of credit information sharing mechanisms using Doing Business data.<sup>14</sup> Econometric results confirm our baseline results. Coefficients associated with short-term credit are always positive (albeit not always statistically significant when we consider the TEA rate), while long-term credit is not correlated with firm creation. In addition, financial sector characteristics never affect entrepreneurship.

Next, we modify the dependent variable considered in Table 8. In Panel A, we employ two additional measures of entrepreneurship provided in the GEM database: (i) the percentage of the adult population (18-64 year-olds) who are currently starting a new business (nascent entrepreneurs rate); and, (ii) the percentage of the adult population (18-64 year-olds) who are owners or managers of a young firm (new entrepreneurs rate). Econometric results indicate that short-term credit mainly exerts its impact on nascent entrepreneurs. The effect on the new entrepreneurs rate is less clear-cut. However, in both cases, long-term credit has a negative effect, although not statistically significant. In Panel B, we consider the logarithms of the business entry rate and the logarithm of the total number of entry (without dividing by adult population) following papers

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<sup>14</sup>The Global Financial Development Database is available at: <https://data.worldbank.org/data-catalog/global-financial-development>. For credit information depth, we employ the old index ranging from 0 to 6.

Table 8: Robustness checks, alternative dependent variable

Panel A: TEA rate (GEM data)				
	Nascent		New	
	(1)	(2)	(3)	(4)
	RE	FE	RE	FE
Short-term credit/GDP (lagged)	0.0498** (1.98)	0.0861** (2.16)	0.0479 (1.63)	0.0231 (0.63)
Long-term credit/GDP (lagged)	-0.0388** (-2.22)	-0.0308 (-1.50)	-0.0117 (-0.92)	-0.0031 (-0.17)
Obs.	251	251	251	251
R2		0.810		0.808

Panel B: Business entry rate (ED data)				
	Log(number)		Log(entry rate+1)	
	(1)	(2)	(3)	(4)
	RE	FE	RE	FE
Short-term credit/GDP (lagged)	0.0189** (2.43)	0.0159* (1.69)	0.0091*** (2.66)	0.0159* (1.69)
Long-term credit/GDP (lagged)	-0.0078* (-1.77)	-0.0061 (-1.44)	-0.0012 (-0.79)	-0.0016 (-1.03)
Obs.	451	451	451	451
Country	57	57	57	57
R2		0.969		0.948

The dependent variable is the nascent entrepreneurs rate in Panel A, columns (1-2) and the new entrepreneurs rate in Panel A, columns (3-4) provided by the Global Entrepreneurship Monitor database. The dependent variable is the logarithm of new business and the logarithm of business entry rate provided by the Entrepreneurship Database in Panel B. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, and FE to panel fixed-effects model. Standard errors are clustered at the country-level. \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1%, respectively.

employing the same database (e.g., [Klapper et al., 2010](#)). Our results are unaffected by these changes. Coefficients associated with short-term credit are positive and statistically significant, and those associated with long-term credit are negative, although not always statistically significant.

In a third step, we test whether our findings are sensitive to the sample considered.<sup>15</sup> Results are displayed in [Appendix B](#) (Table B3). First, for both models we exclude outliers (the 5<sup>st</sup> and 95<sup>th</sup> percentile of the dependent and interest variables) in Panel

<sup>15</sup>It should be noted that we try to assess whether developed countries differ from developing countries using sub-samples and interactions specifications. However, we fail to provide a clear distinction between these groups.

A. Due to the limited number of observations, we do not exclude extreme values in our baseline regressions. Second, for models explaining business registration, results can be driven by offshore financial centers (Klapper and Love, 2011). We rerun the model investigating the determinants of the business entry rate by excluding offshore financial centers (OFCs). To select these centers, we consider the list provided by Zoromé (2007). We identify six OFCs included in our baseline model, namely Antigua and Barbuda, Ireland, Luxembourg, Malaysia, Malta and St Vincent and the Grenadines. Our results are not altered by the exclusion of these six countries. We also consider the most recent list provided by the IMF that includes only Malaysia.<sup>16</sup> Once again, our results are similar when we exclude Malaysia. In Panel C, we exclude observations during the Global Financial Crisis (GFC). Even if we control for time-dummies and lagged growth in our baseline model, our results could be driven by this specific period marked by a contraction of bank credit. However, our results are insensitive to this change.

Finally, we run a placebo test and change the econometric method (shown in Table B4 in Appendix B). To ensure that our results are not driven by spurious correlations, we apply a placebo test. To do so, we first classify all countries according to name. We then attribute to each country the level of short-term and long-term credit of the country classified just before it (in columns (1-2)) or after it (in columns (3-4)). For example, for Niger in a specific year (e.g., 2010), we employ the New-Zealand data on short-term and long-term credit in the same year in columns (1-2) and of Nigeria in the same year in columns (3-4).<sup>17</sup> Surprisingly, real values are partially correlated with placebo values (coefficient equals 0.30). We show in Table B4 that coefficients associated with short-term credit and long-term credit are not statistically significant in the placebo test, as expected. Finally, in the last column of Table B4, we consider a dynamic panel data model. As is now standard in the literature, we employ the GMM-system estimator proposed by Blundell and Bond (1998).<sup>18</sup> In Panel A, we consider the TEA rate from the GEM dataset. The model passes the usual test but suffers from too many instruments (Roodman, 2009). Nonetheless, econometric results are in line with our previous findings. In addition, the

<sup>16</sup>The list is provided at the IMF's website: <https://www.imf.org/external/NP/ofca/OFCA.aspx>.

<sup>17</sup>We employ the complete dataset on bank loan maturity, reported in Appendix A.

<sup>18</sup>All explanatory variables are considered as weakly exogenous, and available lagged values are used as internal instruments. We use the two-step procedure proposed by Blundell and Bond (1998) and obtain robust standard errors using the Windmeijer (2005) finite sample correction.

lagged value of the TEA rate is highly statistically significant. In Panel B, considering the business entry rate from the Entrepreneurship Database, econometric results are more subject to caution. First, the model fails to pass the usual tests of autocorrelation (AR(2) test). In addition, the absence of effects of all independent variables is explained by the strong inertia in the business entry rate. Put differently, the lagged value of the business entry rate captures all variation and no other variables are statistically significant.

## 6 Conclusion

This paper empirically explores whether short-term and long-term credit is beneficial for firm creation. Although a large body of literature indicates that financial constraints limit the entry of new firms, the impact of the provision of long-term financing for entrepreneurs is theoretically ambiguous. On the one hand, entrepreneurs may benefit from long-term financing to overcome entry costs. Contrary to short-term credit, long-term credit allows entrepreneurs to invest in projects with delayed returns. On the other hand, one might raise doubts about the positive impact of long-term financing if entrepreneurs are unable to get access to long-term credit. Loans with longer maturity may be oriented towards existing borrowers who have a previous relationship with a formal lender to the detriment of new borrowers. According to this view, a better provision of short-term credit would be more useful to alleviate the credit constraints of entrepreneurs because these funds are more accessible for borrowers without credit history.

This paper empirically investigates the impact of long-term and short-term bank loan provisions on entrepreneurship. In doing so, we confront a new hand-collected database on bank loan maturity with data on entrepreneurship at the country-level. Data on short-term and long-term credit granted to the private sector were collected on 85 countries, including 48 developing countries and 37 high-income countries over the period 1995-2014. Short-term credit is defined as credit with a maturity of one year or less and long-term credit as credit whose maturity exceeds one year. We combine our database on bank loan maturity with cross-country data on entrepreneurship from two different datasets: the Global Entrepreneurship Monitor (GEM) dataset and the Entrepreneurship Database (ED). Both databases capture different aspects of firm creation and describe

different realities (Acs et al., 2008). The ED focuses on firm registration and firm entry in the formal sector, while the GEM concentrates on business creation, irrespective of legal status (formal and informal). Contrary to the majority of studies on the drivers of entrepreneurship, we employ both databases and exploit their differences.

Econometric findings document that long-term credit provision over GDP has no impact on the entry rate. On the contrary, short-term credit exerts a positive impact on firm creation. These results hold for both measures of entrepreneurship considered. In other words, the provision of short-term credit is beneficial to spurring entrepreneurship at each stage, from the beginning of a new business venture (assessed by the GEM data) to registration in the formal sector (proxied by the ED). Results are robust to a battery of sensitivity tests, including additional control variables, alternative dependent variables such as household credit, alternative samples, and changes in econometric specification.

Our findings do not suggest that long-term credit is not useful for entrepreneurs. They simply signal that short-term credit is more effective than long-term credit to alleviate financial constraints faced by entrepreneurs. Better provision of short-term credit allows entrepreneurs to apply for a formal loan instead of relying exclusively on informal loans or internal funds. However, an increase in long-term loans does not help entrepreneurs in their business if they are unable to produce hard information that qualifies them for these loans. Long-term loans are certainly limited to previous (good) borrowers who have previous relationships with formal lenders and/or credit history.

From a policy perspective, our findings indicate that facilitating access to short-term finance can be of prime importance for stimulating entrepreneurship. This is crucial because new firms create more jobs both in developed countries (Haltiwanger et al., 2013) and in developing countries (Ayyagari et al., 2014; Rijkers et al., 2014).

Form a research perspective, we can suggest three ways for future works. First, it could be useful to confirm our conclusions by employing micro-evidence. Second, as underlined by King and Levine (1993), banking development can affect entrepreneurial activity not only by increasing the amount of funding dedicated to entrepreneurs but also through screening improvement and risk diversification. To our knowledge there is no paper that disentangles these three channels. Our paper's finding suggests that banking development affects entrepreneurial activities through resources allocated to entrepreneurs. Indeed,



contrary to long-term loans, short-term credit is more easily allocated for new borrowers. However, our findings just provide a simple suggestion on the channel through which finance impacts entrepreneurship. Future works should focus explicitly on disentangling the three channels through which financial development can be related to entrepreneurial activities. Finally, external funds are important because they influence not only the ability of individuals to enter into markets, but also post-entry development of firms (Aghion et al., 2007; Beck et al., 2008). In spite of a lack of impact on firm creation, long-term finance could positively impact post-entry growth and survival probability. To our knowledge, evidence is rather scarce on this subject and additional research is needed.

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# Long-term finance and entrepreneurship

## Appendix

### Appendix A Sample and variable definition

#### Sample (list of countries)

##### Bank loan maturity database (85 countries)<sup>19</sup>

Albania (2002-2014); Algeria (1997-2014); Antigua and Barbuda (2000-2014); Austria (2002-14); Azerbaijan (2005-2014); Bahamas (1998-2014); Barbados (1995-2014); Belarus (1999-2014); Belgium (2001-2014); Benin (1997-2014); Bosnia and Herzegovina (2000-2014); Botswana (2000-2014); Bulgaria (2004-2014); Burkina-Faso (1997-2014); Burundi (2003-2014); Cameroon (2000-2010); Central African Rep (2000-2010); Chad (2000-2010); Chile (1995-2014); Comoros (2013-2014); Congo (2000-2010); Côte d'Ivoire (1997-2014); Croatia (2010-2014); Czech Rep (1995-2014); Dem. Rep. of Congo (2001-2014); Denmark (2000-2014); Djibouti (2006-2014); Dominica (2000-2014); Equatorial Guinea (2000-2010); Estonia (1997-2014); Finland (2003-2014); France (1995-2014); Gabon (2000-2010); Georgia (2001-2014); Germany (1995-2014); Greece (1998-2014); Grenada (2000-2014); Guatemala (2009-2014); Guinea (2003-2010); Guinea Bissau (2001-2014); Hungary (2003-201); Ireland (2003-2014); Italy (2005-2014); Jordan (2009-2014); Kazakhstan (1996-2014); Kosovo (2001-2014); Kyrgyz Rep. (1996-2014); Latvia (2003-2014); Lithuania (2004-2014); Luxembourg (1999-2014); Macao (1995-2014); Macedonia (1995-2014); Madagascar (1996-2013); Malaysia (1996-2014); Mali (1997-2014); Malta (2003-2013); Mauritania (2004-2014); Mongolia (2007-2014); Morocco (2006-2014); Netherlands (1998-2014); New Zealand (2004-2014); Niger (1997-2014); Nigeria (2006-2014); Oman (2004-2014); Poland (1996-2014); Portugal (1996-2014); Romania (1997-2014); Russia (2007-2014); Rwanda (1999-2014); Saudi Arabia (1995-2014); Senegal (1997-2014); Serbia (1999-2014); Singapore (1995-2003); Slovak Rep. (2003-2014); Slovenia (1995-2014); St. Kitts and Nevis (2000-2014); St. Lucia (2000-2014); St Vincent (2000-2014); Sweden (1996-2014); Taiwan (2004-2014); Togo (1997-2014); Tunisia (1995-2014); Ukraine (2002-2014);

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<sup>19</sup>In parentheses, we report the period coverage

Uruguay (2003-2014); Yemen (2005-2013)

**Global Entrepreneurship Monitor (43 countries)**

Algeria, Austria, Barbados, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina-Faso, Chile, Croatia, Czech Rep., Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Guatemala, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Morocco, Netherlands, Nigeria, Poland, Portugal, Russia, Saudi Arabia, Senegal, Serbia, Slovak Rep., Slovenia, Sweden, Tunisia, Uruguay, Yemen

**Entrepreneurship Database (57 countries)**

Albania, Algeria, Antigua and Barbuda, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina-Faso, Chile, Croatia, Czech Rep., Denmark, Dominica, Estonia, Finland, France, Gabon, Georgia, Germany, Greece, Grenada, Guatemala, Hungary, Ireland, Italy, Jordan, Kazakhstan, Kyrgyz Rep., Latvia, Lithuania, Luxembourg, Macedonia, Madagascar, Malaysia, Malta, Mongolia, Morocco, Netherlands, Nigeria, Oman, Poland, Portugal, Russia, Rwanda, Senegal, Serbia, Slovak Rep., Slovenia, St. Vincent, Sweden, Togo, Tunisia, Ukraine, Uruguay

## Variables definition

Table A1: Description of variables and data source (entrepreneurship)

Variable	Description	Source <sup>a</sup>
<i>Dependent variables</i>		
TEA rate <sub>ct</sub>	Percentage of adults population (18-64 year-old) who are currently starting a new business or the owner and managers of a young firm (less than 42 months).	GEM
Business Entry Rate <sub>ct</sub>	Number of newly registered firms with limited liability per 1,000 working-age people (ages 15-64).	ED
<i>Independent variables</i>		
<i>Credit variables</i>		
Total credit/GDP	Bank credit to the private sector over GDP, sum of short-term and long-term credit	Own database
Short-term credit/GDP	Short-term bank credit over GDP defined as loans with a maturity below or equal to one year	Own database
Long-term credit/GDP	Long-term bank credit over GDP defined as loans with a maturity above one year	Own database
<i>Control variables</i>		
Growth	Growth of real GDP	WDI
GDP per capita	GDP per capita (Constant USD), in log with one lag	WDI
Start a business	Number of days to start a business (in log)	DB
Registering property	Number of days to register property (in log)	DB
Enforcing contact	Number of days to enforce a contract (in log)	DB
Resolving insolvency	Recovery rate (per USD)	DB
<i>Additional variables (robustness checks)</i>		
Household credit/GDP	Bank credit allocated to households over GDP	CSD
Firm credit/GDP	Bank credit allocated to firms over GDP	CSD
Governance	Indicator of institutional quality	WGI
Inflation	Consumer price index variation	WDI
Government Exp.	General government final consumption expenditure	WDI
Stock Market capitalization	Total value of all listed shares in a stock market as a percentage of GDP	GFDD
Concentration ratio	Assets of three largest commercial banks as a share of total banking assets	GFDD
Lerner index	Lerner index is the markup between price and marginal costs	GFDD
Boone indicator	A measure of degree of competition based on profit-efficiency in the banking market	GFDD
Foreign banks	The ratio of the number of foreign owned banks to the number of the total banks	GFDD
Information sharing depth	Depth of credit information index measures rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries	DB

<sup>a</sup>GEM: Global Entrepreneurship Monitor database; ED: Entrepreneurship Database; WDI: World Development Indicators; DB: Doing Business; CSD: Credit Structure Database; WGI: World Governance Indicators; GFDD: Global Financial Development Database



## Appendix B Robustness checks

Table B1: Robustness checks, add financial sector characteristics (TEA rate)

	RE (1)	FE (2)	RE (3)	FE (4)	RE (5)	FE (6)	RE (7)	FE (8)	RE (9)	FE (10)	RE (11)	FE (12)
Short-term credit/GDP (lagged)	0.0834 (1.23)	0.120 (1.16)	0.101* (1.87)	0.139† (1.54)	0.0596 (1.28)	0.0731 (1.11)	0.108* (1.81)	0.129† (1.48)	0.114** (2.01)	0.134† (1.48)	0.123* (1.86)	0.154 (1.27)
Long-term credit/GDP (lagged)	-0.0253 (-0.69)	-0.00123 (-0.02)	-0.0398 (-1.18)	-0.00993 (-0.19)	-0.0532* (-1.86)	-0.0607† (-1.59)	-0.0428 (-1.35)	-0.0148 (-0.30)	-0.0340 (-1.04)	-0.0150 (-0.32)	-0.0536† (-1.57)	-0.0411 (-0.80)
Stock Market capitalization	0.0234 (1.31)	0.0311 (1.39)										
Concentration ratio			0.0500 (1.00)	0.0525 (0.94)								
Lerner Index					2.376 (0.67)	2.380 (0.47)						
Boone indicator							1.732** (1.96)	1.649 (1.43)				
Foreign banks									0.0151 (0.50)	-0.0327 (-0.48)		
Information sharing depth											-0.325 (-1.03)	-0.339 (-0.84)
Obs.	216	216	237	237	201	201	243	243	221	221	237	237
Country	36	36	42	42	36	36	41	41	41	41	43	43
R2		0.825		0.838		0.820		0.836		0.842		0.861

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, and FE to panel fixed-effects model. Standard errors are clustered at the country-level. †, \*, \*\*, and \*\*\* indicate significance at 15%, 10%, 5% and 1%, respectively.

Table B2: Robustness checks, add financial sector characteristics (Business entry rate)

	RE (1)	FE (2)	RE (3)	FE (4)	RE (5)	FE (6)	RE (7)	FE (8)	RE (9)	FE (10)	RE (11)	FE (12)
Short-term credit/GDP (lagged)	0.0625** (2.10)	0.0892** (2.36)	0.0496* (1.88)	0.0702** (2.13)	0.0472** (2.05)	0.0722** (2.36)	0.0519** (2.06)	0.0700** (2.22)	0.0572** (2.29)	0.0764** (2.34)	0.0547** (2.13)	0.0821** (2.21)
Long-term credit/GDP (lagged)	0.000603 (0.06)	-0.00642 (-0.58)	-0.000325 (-0.03)	-0.00697 (-0.65)	-0.00745 (-0.81)	-0.0132 (-1.40)	-0.00330 (-0.37)	-0.00895 (-0.87)	-0.00482 (-0.59)	-0.00754 (-0.71)	-0.00859 (-0.84)	-0.0179 (-1.28)
Stock Market capitalization	0.00208 (0.64)	0.00300 (0.74)										
Concentration ratio			0.00869 (0.81)	0.00590 (0.48)								
Lerner Index			0.171 (0.38)	0.146 (0.28)								
Boone indicator					0.569 (0.91)			0.726 (0.87)				
Foreign banks									0.0106 (1.11)	0.00182 (0.11)		
Information sharing depth											0.0391 (0.42)	0.0383 (0.31)
Obs.	326	326	422	422	390	390	434	434	424	424	411	411
Country	52	52	54	54	50	50	55	55	52	52	57	57
R2		0.891		0.908		0.903		0.907		0.896		0.909

The dependent variable is the business entry rate provided by the Entrepreneurship Database. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, and FE to panel fixed-effects model. Standard errors are clustered at the country-level. \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1%, respectively.

Table B3: Robustness checks, sample

Panel A: Outliers				
	TEA rate		Business entry rate	
	(1)	(2)	(3)	(4)
	RE	FE	RE	FE
Short-term credit/GDP (lagged)	0.135*	0.181 <sup>†</sup>	0.0435	0.0696*
	(1.78)	(1.63)	(1.38)	(1.91)
Long-term credit/GDP (lagged)	-0.0591*	-0.0365	-0.0017	-0.0104
	(-1.81)	(-0.70)	(-0.18)	(-0.96)
Obs.	238	238	435	435
Country	42	42	57	57
R2		0.858		0.902

Panel B: Offshore Financial Centers				
	Malaysia		OFCs	
	(5)	(6)	(7)	(8)
	RE	FE	RE	FE
Short-term credit/GDP (lagged)	0.0546**	0.0737**	0.0223	0.0687**
	(2.10)	(2.36)	(0.82)	(2.02)
Long-term credit/GDP (lagged)	-0.0035	-0.0097	0.0128	-0.0121
	(-0.40)	(-0.99)	(1.51)	(-1.03)
Obs.	441	441	409	409
Country	56	56	51	51
R2		0.905		0.912

Panel C: Excluding Global Financial Crisis period (2007-2008)				
	TEA rate		Business entry rate	
	(5)	(6)	(7)	(8)
	RE	FE	RE	FE
Short-term credit/GDP (lagged)	0.136**	0.149	0.0497**	0.0677**
	(2.13)	(1.47)	(2.08)	(2.13)
Long-term credit/GDP (lagged)	-0.0461	-0.0215	0.0027	-0.0017
	(-1.46)	(-0.43)	(0.31)	(-0.18)
Obs.	216	216	354	354
Country	43	43	57	57
R2		0.872		0.912

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor dataset in Panel A and C (columns 1-2) and the business entry rate provided by the Entrepreneurship Database in Panel A and C (columns 3-4) and in Panel B. In Panel B, Malaysia indicates that observations for Malaysia have been dropped and OFCs that offshore financial centers identified by [Zoromé \(2007\)](#) (Antigua and Barbuda, Ireland, Luxembourg, Malaysia, Malta and St Vincent) have been removed. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, and FE to panel fixed-effects model. Standard errors are clustered at the country-level. <sup>†</sup>, \*, \*\*, and \*\*\* indicate significance at 15%, 10%, 5% and 1%, respectively.

Table B4: Robustness checks, placebo test and dynamic panel model

Panel A: TEA rate					
	Placebo test				Dyn. Panel
	(1)	(2)	(3)	(4)	(5)
	RE	FE	RE	FE	GMM-
	One lag	One lag	One forward	One forward	Syst.
Short-term credit/GDP (lagged)	0.0403 (0.48)	0.0768 (0.68)	0.0275 (0.35)	0.0396 (0.33)	0.146** (2.07)
Long-term credit/GDP (lagged)	0.0576** (2.03)	0.0595 (1.29)	-0.0551 (-1.42)	-0.0674 (-1.03)	-0.057 (-1.17)
TEA rate (t-1)					0.628*** (3.44)
Obs.	182	182	221	221	210
R2		0.909		0.884	
AR(1)					0.012
AR(2)					0.983
Hansen test					1.000
Nb. Instruments					151

Panel B: Business entry rate					
	Placebo test				Dyn. Panel
	(1)	(2)	(3)	(4)	(5)
	RE	FE	RE	FE	GMM-
	One lag	One lag	One forward	One forward	Syst.
Short-term credit/GDP (lagged)	-0.0352 (-1.56)	-0.0395 (-1.31)	0.00985 (0.28)	0.0316 (0.61)	0.010 (0.32)
Long-term credit/GDP (lagged)	0.0158 (1.31)	0.0169 (1.10)	-0.00358 (-0.44)	-0.00903 (-1.12)	0.012 (1.33)
Business entry rate (t-1)					0.985*** (12.28)
Obs.	363	363	427	427	454
R2		0.940		0.918	
AR(1)					0.003
AR(2)					0.063
Hansen test					1.000
Nb. Instruments					141

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in Panel A and the business entry rate provided by the Entrepreneurship Database in Panel B. Dummies for each year as well as the set of control variables (Growth, GDP per capita, contract enforcement cost, starting a business cost, property registration cost and insolvency procedures) are included but not reported in all specifications. RE refers to random-effects generalized least squares, FE to panel fixed-effects model, and GMM-Syst. to [Blundell and Bond \(1998\)](#)'s estimator. Standard errors are clustered at the country-level in random and fixed effect models and are computed using the [Windmeijer \(2005\)](#)'s in GMM estimations (column 6). \*, \*\*, and \*\*\* indicate significance at 10%, 5% and 1%, respectively.