Long-term finance and entrepreneurship

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ABSTRACT

This paper investigates whether long-term finance affects firm entry worldwide. We construct a new database on short- 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 related to the provision of short- and long-term bank credit. Data on entrepreneurship are extracted from two frequently used databases: the Global Entrepreneurship Monitoring dataset and the Entrepreneurship Database, each of which captures different aspects of firm creation. The econometric results indicate that long-term credit does not stimulate firm entry. By contrast, we find that short-term credit is positively related to firm creation, from birth to registration. Controlling for potential endogeneity by implementing an instrumental variables approach does not affect our conclusions. Our findings suggest that better provision of short-term credit allows entrepreneurs to apply for formal loans instead of having to rely exclusively on informal loans or internal funds. The absence of impact of long-term loans can be explained by the difficulty entrepreneurs face in getting access to long-term credit.

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; Wennekers and Thurik, 1999). Understanding the institutional drivers of entrepreneurship is therefore of prime importance in designing effective policies. 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), financial constraint is one of the crucial determinants of new firm creation (Evans and Jovanovic, 1989; King and Levine, 1993).

While better access to external finance is expected to spur entrepreneurship, short- and long-term credit may play differing roles in the development of new business ventures. We expect that some entry barriers, such as administrative fees, could be alleviated by short-term credit. The impact of the provision of long-term financing for entrepreneurs is more ambiguous. In theory, entrepreneurs may benefit from long-term financing to overcome entry costs, including those requiring long-term immobilization of capital (such as investment in projects with delayed returns). In practice, however, one might raise doubts about the positive impact of long-term financing if entrepreneurs are unable to get access to it. 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.

This paper empirically evaluates the impact of short- and long-term credit on entrepreneurial activity. We first compile a new database on short- and long-term credit extended to private sector borrowers relative to GDP. We focus exclusively on credit provided by commercial banks because data on other long-term finance sources are rarely available and not comparable across countries. Nonetheless, 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 loans 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 and includes 48 developing and 37 high-income countries (Léon, 2018b).

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 who 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.

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 (Acs et al., 2008), we find that the provision of short-term credit seems beneficial to spurring the creation of new businesses (GEM) and registration in the formal sector (ED). We apply an instrumental variable (IV) approach to control for the endogeneity issue. Our econometric results based on IV estimations confirm the positive impact of short-term credit and the absence of effect of long-term credit. Our econometric results are robust to a battery of additional sensitivity tests (additional control variables, sample sensitivity, alternative dependent variables).

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 proof of the positive effect of banking development on entrepreneurial ventures. Some papers point out that banking development spurs entrepreneurial activity, while others fail to provide a positive relationship (see Section 2). We try to reconcile these divergent views. In this paper, we document that total credit does not impact the firm entry rate. However, this conclusion is challenged when we distinguish between short- and long-term credit. Short-term credit tends to stimulate firm creation, contrary to long-term credit (which 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. The absence of impact of long-term loans can be explained by the difficulties entrepreneurs have getting access to them.

This work is also directly linked to the body of literature focusing on the real impact of long-term finance. The 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 financial crises (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 (Valev and Tasic, 2008). To our knowledge, we are the first to study the effect of short- and long-term bank credit provision on firm entry. By focusing on entrepreneurship, we challenge previous findings on the unconditional beneficial impact of long-term credit for firms. The provision of long-term bank credit does not help entrepreneurs create a firm, even if these loans may spur post-entry activity.

The remainder of this paper is organized as follows. Section 2 discusses the existing literature and raises hypotheses. Section 3 presents the data and Section 4 the methodology, while Section 5 discusses the results. The final section concludes.

2. Literature review

From a theoretical perspective, financial development can affect entrepreneurial activity by mobilizing and allocating more resources to more entrepreneurs, helping entrepreneurs to overcome entry costs.[1] However, short- and long-term credit may exert a differential impact and be more or less effective in spurring entrepreneurship.

Short- and long-term credit may help to overcome different entry costs faced by entrepreneurs in the process of firm creation. Access to short-term loans is necessary to finance pre-entry expenses such as administration fees or inventory in order for entrepreneurs to get the working capital they need. However, short-term loans are ineffective in financing long-term investments with delayed returns. Indeed, an optimal financing strategy consists of matching the maturity of assets and liabilities (Hart and Moore, 1995). Relying on multiple short-term loans to finance long-term investments induces a liquidity risk because creditors may refuse to roll over their credits (Diamond, 1991). This shortening of the investment horizon may have negative consequences on overall firm creation because some projects cannot be financed. Therefore, better access to long-term financing could help finance projects with delayed returns and therefore spur firm creation.

However, one might raise doubts about the unconditional positive impact of long-term finance. The argument exposed above is based on the assumption that new firms get access to long-term loans. Financial intermediaries 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, entrepreneurs cannot easily provide reliable information to lenders because they are unable to produce hard information (such as certified accounts) and, if this is the case, have a weak relationship with formal lenders (Demirgüç-Kunt and Maksimovic, 1999). As a result, long-term loans are oriented towards

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[1] King and Levine (1993) point out that financial development may spur entrepreneurship by two other channels. First, as the financial sector grows, ex ante screening by lenders improves and potential high-ability entrepreneurs with limited resources can access financing and create their business. In contrast, in countries with deficient capital markets, only wealthier agents are able to undertake a business venture. Second, entrepreneurs are able to diversify risk in more financially developed countries. As a result, they invest in riskier projects that yield higher returns. However, there is no reason to believe that short- and long-term credit exert a differential effect on both channels.

well-established firms, to the detriment of new entrepreneurs and business ventures (Ortiz-Molina and Penas, 2008).[2]

We therefore advance the following hypotheses.

Hypothesis 1. Short-term credit is positively related to firm creation

Hypothesis 2. The net impact of long-term credit can be positive, negative or null

To our knowledge, we are the first to investigate the differential impact of short- and long-term credit on entrepreneurship. There is a large body of literature on the effect of banking development on firm creation, with mixed results. Studies based on household surveys often document a strong correlation between wealth and the propensity to start a business in developing countries (Demirgüç-Kunt et al., 2011; Paulson and Townsend, 2004). A related, albeit different, question is whether better access to formal finance promotes entrepreneurial activities in the developing world. Empirical papers provide mixed results. 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 the decision to launch an entrepreneurial venture in Bosnia and Herzegovina. Put differently, entrepreneurs employ alternative sources of funding such as informal financing (from friends, family or moneylenders) or internal finances (savings). Cross-country investigations do not really help us provide a clear answer on this issue. Klapper et al. (2010) report a positive role of financial development on firm registration, but the 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.

3. Data

3.1. Bank loan maturity

This work is based on a new database that reports the maturity structure of bank credit at the country-year level.[3] Data were hand-collected from diverse sources, including central bank annual reports, supervisory department/agency annual reports, annual bulletins and statistical digests. Due to the lack of data on other items, only credit provided by commercial banks was considered. 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- 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 differentiate 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 breakdown. The levels of short- and long-term credit were initially reported in the 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.[4]

The database on bank loan maturity includes data on all countries 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.

A potential major shortcoming of our database is the exclusion of non-banking sources of long-term finance (such as leasing, venture capital, crowd funding and business angels). Our choice is dictated by a lack of comparable data. Nonetheless, we believe that the concentration on bank credit does not alter our conclusions. 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 the exception rather than the rule, especially in developing countries (Martinez Peria and Schmukler, 2017). Finally, although we cannot prove it, the development of non-banking long-term financial instruments is certainly correlated with the provision of long-term bank credit.

Before employing our new database, we must 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 the private sector. Different tests confirm that our database on loan maturity provides a close match to the World Bank database. First, we compare the ratio of total credit to GDP, computed as the sum of short- and long-term credit with the ratio of private credit

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[2] At the extreme, a higher level of long-term credit may therefore signal an increase of credit driven by the intensive margin (more for existing clients) rather than the extensive margin (widening the client base). Custódio et al. (2013) provide support for this view to explain changes in the use of short-term credit in the U.S.

[3] The complete database is reported in the Credit Structure Database (Léon, 2018b).

[4] This procedure is similar to papers collecting the same type of data (Valev and Tasic, 2008). Like Tasić and Valev (2010), we wanted to distinguish between medium- and long-term loans. Unfortunately, we cannot do this due to the lack of data.

Table 1
Bank credit maturity, by country group.

	Total credit WDI	Maturity breakdown Author	Short-t. to GDP	Sample 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
By income level							
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
By continent							
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).

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). Breakdown by income level and continent provides a similar result.

The 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 exceed 50% of GDP and two thirds of loans in high-income countries. The differences across continents, displayed in Table 1, reflect differences in terms of development.

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 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-, middle- and low-income countries (at least after 2005 for the latter group). In addition, this trend is stronger in low-income countries, suggesting a possible convergence of credit maturity. This trend appears rather similar to that observed by Léon (2018a), highlighting the existence of a convergence of credit structures.

Table 2
Bank credit maturity, by year.

	Total credit	Long-term credit % of GDP	% of TC	Short-term credit % of GDP	% of TC	Nb of countries
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).

3.2. 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 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) currently starting a new business or who own or manage a young firm (less than 42 months).[5]

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 in the formal sector). Data are extracted from national business registries and the business entry rate is defined as the number of newly registered firms with limited liability per 1000 working-age people (ages 15–64).[6]

Both databases capture different aspects of firm creation and often describe different realities (Acs et al., 2008). The ED focuses on firm registration and 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 rate entry, 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 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 conflicting results on the drivers of firm entry.[7] Nonetheless, we observe in Fig. 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 show a similar decrease during this period.

Studies often focus on one database because they investigate only one aspect that is related either to firm birth or to firm registration. Financial development may impact firm creation *a priori* 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 authority. By using both datasets, we are able to analyze whether short- and long-term credit alleviate constraints faced by entrepreneurs at the different stages of entrepreneurship.

3.3. Sample

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) for the business entry rate (ED dataset).[8] The list of countries is given in Appendix A.

We are able to get data on credit maturity and the entrepreneurship rate in the GEM data for 48 countries. When we restrict the sample to countries with data on credit maturity and the entrepreneurship rate from the ED, we obtain data on 61 countries. Six countries are excluded for other reasons. Five countries are excluded due to the lack of control variables (Congo, Dem. Rep., Kosovo, Romania, Singapore and Taiwan). Finally, New Zealand is dropped because it is an outlier (to avoid spurious results, we exclude outliers regarding the level of entrepreneurship and the level of financial development by excluding the extreme percentiles for each variable).[9]

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

[6] The ED is available at http://www.doingbusiness.org/data/exploretopics/entrepreneurship. It 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).

[7] 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 a crisis period can induce an increase in informal activity).

[8] We have 41 countries and 53 countries when we include household credit to GDP.

[9] The results are insensitive to the inclusion of outliers (results are available upon request).

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
By income level										
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
By continent										
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

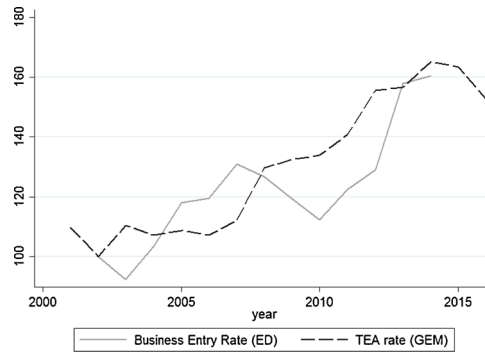Figures are obtained using the complete datasets.

Fig. 1. Evolution of the TEA rate and the business entry rate (base 100 = 2002).

4. Methodology

4.1. Baseline model

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). 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:

$$Entry_{it} = \beta F_{it-1} + \Gamma X_{it} + \alpha_t + \alpha_i + \varepsilon_{it} \tag{1}$$

where $Entry_{it}$ is a measure of the entry rate in country i in year t using both indicators provided by the GEM (TEA rate) and the ED (Business entry rate). F_{it-1} is the ratio of private credit to GDP (defined as the sum of short- and long-term credit) in year $t-1$, X_{it} is a matrix of time-variant country characteristics (see below), α_t is a matrix of time fixed effects and α_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:

$$Entry_{it} = \beta_{ST} F_{it-1}^{ST} + \beta_{LT} F_{it-1}^{LT} + \Gamma X_{it} + \alpha_t + \alpha_i + \varepsilon_{it} \tag{2}$$

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 firm 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 (α_i) are random variables that are distributed independently of the regressors. This model allows us to exploit both within- 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 effects) allows us to control for this potential source of endogeneity but only exploits the within variation.
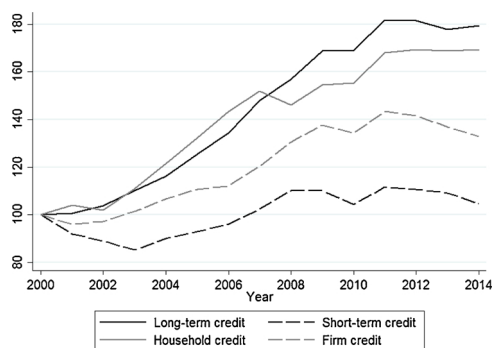
Fig. 2. Evolution of credit by maturity and by borrowers (base 100 = 2000).

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 (X_{it}). First, we control for economic development by adding (lagged) 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. Third, 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 the business environment extracted from Doing Business. Specifically, we consider the required procedures to start a business, the cost of enforcing contracts, procedures for registering property, and the cost of resolving insolvency. Finally, we consider the ratio of household credit to GDP. Even if we cannot quantify it, a large share of long-term finance is dedicated to mortgage loans and therefore long-term bank credit tends to evolve as credit to households, as documented in Fig. 2. We therefore test whether our findings are robust to the inclusion of the ratio of household credit over GDP. The ratio of household credit to GDP is extracted from the Credit Structure Database (Léon, 2018b), but it is not available for all countries. We therefore present results with and without household credit to GDP. Details of the variable definitions and the descriptive statistics are reported in Appendix A.

4.2. Endogeneity issue

A major concern is the risk of endogeneity. Our findings could be driven by reverse causality between credit and entrepreneurship or by an omitted variable. To avoid the former issue, our interest variables (as well as GDP per capita and growth) are one-year lagged. Nonetheless, this procedure cannot help us control for the omitted variable problem. Concerns might be raised about time-varying unobserved characteristics that could explain why countries with higher levels of short- or long-term credit produce more entrepreneurs. To take this issue into account, we run instrumental variables estimations.

The most important challenge is to find relevant instruments that respect the exclusion restriction and that are sufficiently correlated with endogenous variables (here short-term credit to GDP and long-term credit to GDP). We consider four different instruments: two internal and two external ones. For the internal instruments, we consider the lagged value of credit. Insofar as we employ the lagged value of credit variables, we consider credit variables with two lags as instruments. We expect that these variables are strongly correlated with contemporaneous levels of credit (relevant condition). In addition, we expect that these instruments have no direct effect on entrepreneurship (exclusion restriction).

The choice of relevant external instruments deserves more attention. We consider two, namely the degree of creditor protection and the development of information sharing mechanisms. First, we expect that both instruments are correlated with short- and/or long-term credit. Djankov et al. (2007) highlight that both creditor protection and information sharing institutions are associated with higher ratios of private credit to GDP. Subsequent works (e.g., Qian and Strahan, 2007; Tasi´c and Valev, 2010) point out that creditors' rights and information sharing affect not only the volume of total credit but also loan terms such as maturity. Second, we assume that both external instruments respect the exclusion restriction. One may argue that the protection of creditors and information sharing may capture other country characteristics, in particular business regulations and the efficiency of the legal system. For instance, a reform in creditor's protection may come hand-in-hand with other reforms affecting business activity. However, in our baseline estimation, we control for these aspects by including the required procedures to start a business, the cost of enforcing contracts, procedures for registering property, and the cost of resolving insolvency. There is therefore no evident reason to believe that both variables exert a direct impact on the entrepreneurship rate.

Data on external instruments are extracted from the Doing Business project and based on the initial methodology developed by Djankov et al. (2007). To proxy creditor protection, we employ the Strength of Legal Rights index, which measures the degree of protection based on collateral and bankruptcy laws. For the sake of comparison, we use the old version that ranges from 0 (low protection) to 10 (high protection). The development of credit information sharing is based on the coverage of private credit bureaus and public credit registries. The coverage reports the number of individuals and firms listed in a credit bureau or a credit registry relative to the adult population. The sum may therefore exceed 100% in countries with a credit bureau and a credit registry. If no

Table 4

The determinants of entrepreneurship and total credit.

	TEA rate (GEM data)				Business entry rate (ED data)			
	Random effect		Fixed effect		Random effect		Fixed effect	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total credit/GDP (lagged)	−0.0116	0.0262	0.00216	0.0703	0.00722	−0.0135	0.00377	−0.0148
	(-0.41)	(0.45)	(0.07)	(1.07)	(1.02)	(-0.89)	(0.51)	(-0.84)
Growth (lagged)	0.0220	0.0605	0.0154	0.0611	0.0570***	0.0587***	0.0514**	0.0499**
	(0.20)	(0.52)	(0.15)	(0.55)	(2.89)	(2.80)	(2.29)	(2.10)
GDP per capita (lagged)	−2.742**	−1.923	7.463	8.738	1.192***	1.199***	1.793	2.562
	(-2.18)	(-1.29)	(1.17)	(1.45)	(3.89)	(3.47)	(1.15)	(1.34)
Start a business	0.879	0.879	1.016	1.029	0.371	0.348	0.544	0.569
	(0.95)	(0.92)	(0.99)	(0.96)	(0.86)	(0.77)	(1.16)	(1.12)
Registering property	−0.410	−1.042	−0.715	−1.442*	−0.486	−0.416	−0.486	−0.360
	(-0.39)	(-1.19)	(-0.67)	(-1.83)	(-1.07)	(-0.90)	(-0.87)	(-0.62)
Enforcing contract	5.050	4.887	14.34	13.45	2.084	2.558	5.635	4.757
	(0.77)	(0.68)	(1.39)	(1.37)	(0.95)	(1.06)	(1.20)	(0.92)
Closing a business	0.0198	0.0231	−0.00921	−0.00430	−0.00326	−0.0000425	−0.00240	0.00180
	(0.54)	(0.60)	(-0.19)	(-0.09)	(-0.26)	(-0.00)	(-0.16)	(0.11)
Household credit/GDP (lagged)		−0.0719		−0.135		0.0397		0.0334
		(-0.87)		(-1.42)		(1.52)		(1.12)
Obs.	251	243	251	243	451	409	451	409
Country	43	41	43	41	57	53	57	53
R^2			0.849	0.844			0.922	0.919

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in columns (1–4) and the business entry rate provided by the Entrepreneurship Database in columns (5–8). Dummies for each year are included but not reported in all specifications. Random effect refers to the panel random effect model, and Fixed effect to the fixed effect model. Standard errors are clustered at the country-level. †, *, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

credit bureau or credit registry operates, the coverage value is 0%.

5. Results

5.1. Baseline results

For the sake of transparency, we first empirically explore the relationship between total credit (defined as the sum of short- and long-term credit) and firm entry rate. The results are displayed in Table 4. Columns (1) to (4) present our results using Total Entrepreneurial Activity (GEM dataset), and columns (5) to (8) show the results using the business entry rate (ED dataset). We first display the results using a random effect specification and then consider a fixed effect model. As explained above, we consider specifications without and with household credit to GDP. Our main variable of interest, namely the ratio of total credit over GDP, is never statistically significant, irrespective of the measure of entrepreneurship or the specification employed (random or fixed effect; inclusion or not of household credit). 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), which fail to show a robust impact of financial depth on entrepreneurship.

Next, we focus on our main analysis by examining the differential impact of short- 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. The econometric results are displayed in Table 5.[10] Coefficients associated with long-term credit are negative but often statistically insignificant at the usual threshold. The sole exception is when we consider the business entry rate and include household credit to GDP as a control variable.

By contrast, 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).[11]

Analysis of the control variables indicates that growth has a positive impact on firm registration but not on business creation. We

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[10] In an unreported analysis, short- and long-term credit are entered sequentially. Our findings are largely unchanged. Only the statistical significance of short-term credit is reduced in models explaining the TEA rate (GEM dataset). The coefficient associated with short-term credit is always positive but not statistically significant at the usual thresholds. The coefficient associated with long-term credit remains insignificant. When we consider the Business Entry Rate (ED), the empirical findings are similar (positive and significant effect of short-term credit and absence of impact of long-term credit).

[11] The economic significance is computed using coefficients reported in the fixed effect models (columns (3) and (7) in Table 5).

Table 5
The determinants of entrepreneurship and credit, by maturity.

	TEA rate (GEM data)				Business entry rate (ED data)		
	Random effect		Fixed effect		Random effect		Fixed effect
	(1)	(2)	(3)	(4)	(5)	(6)	(8)
Short-term credit/GDP (lagged)	0.130**	0.143*	0.141†	0.160*	0.0561**	0.0489†	0.0629†
	(2.11)	(1.86)	(1.56)	(1.73)	(2.23)	(1.57)	(1.56)
Long-term credit/GDP (lagged)	−0.0424	0.00275	−0.0220	0.0607	−0.00421	−0.0386**	−0.0465**
	(-1.28)	(0.04)	(-0.47)	(0.68)	(-0.50)	(-2.16)	(-2.09)
Growth (lagged)	0.0359	0.0730	0.0302	0.0755	0.0575***	0.0598***	0.0531**
	(0.31)	(0.58)	(0.27)	(0.64)	(3.01)	(3.07)	(2.60)
GDP per capita (lagged)	−2.840**	−2.287	7.070	8.898	1.112***	1.130***	2.163
	(-2.30)	(-1.62)	(1.07)	(1.41)	(3.59)	(3.09)	(1.06)
Start a business	0.874	0.970	0.908	1.042	0.432	0.393	0.496
	(0.93)	(1.00)	(0.82)	(0.92)	(0.99)	(0.85)	(0.94)
Registering property	0.0297	−0.732	−0.514	−1.416	−0.559	−0.478	−0.412
	(0.02)	(-0.67)	(-0.32)	(-1.16)	(-1.13)	(-0.95)	(-0.60)
Enforcing contract	0.957	−0.149	9.318	8.499	1.391	1.778	3.770
	(0.15)	(-0.02)	(1.03)	(0.99)	(0.61)	(0.68)	(0.68)
Closing a business	0.0118	0.0150	−0.0126	−0.00835	−0.00711	−0.00356	0.00215
	(0.34)	(0.42)	(-0.28)	(-0.18)	(-0.58)	(-0.27)	(0.13)
Household credit/GDP (lagged)		−0.0696		−0.129		0.0545**	0.0591*
		(-0.076)		(-1.12)		(2.15)	(1.88)
Obs.	251	243	251	243	451	424	424
Country	43	41	43	41	57	54	54
R^2			0.0856	0.851			0.903

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in columns (1–4) and the business entry rate provided by the Entrepreneurship Database in columns (5–8). Dummies for each year are included but not reported in all specifications. Random effect refers to the panel random effect model, and Fixed effect to the fixed effect model. Standard errors are clustered at the country-level. †,*, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

fail to prove a close relationship between the business environment and entrepreneurship. Household credit has a positive impact on business registration. 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 loans to alleviate their credit constraints.

To sum up, our findings indicate that the provision of short-term credit helps new firms overcome sunk costs induced by the creation of a new business (such as working capital needs, small investments, 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 the entry of new firms. One possible explanation for this is the inability of new firms to get access to long-term bank financing.

5.2. Endogeneity issue

As explained in Section 4, a major issue is the risk of endogeneity. To control for this, we run IV estimations. We consider two internal instruments (lagged value) and two external instruments (the creditors' rights index and the coverage of credit information mechanisms). The results of models with instrumental variables (IV) are displayed in Table 6. For both dependent variables (TEA rate and business entry rate), we present six different specifications. First, we include internal instruments and the index of creditor rights. Next, we consider internal instruments and the coverage of credit bureaus and credit registries, and finally we consider all instrumental variables. For each case, we consider two models: without and with household credit. We only report the results based on models including fixed effects that are less subject to endogeneity. At the bottom of the Table, we display the usual tests for the strength of IV (F-statistic of the excluded instruments in the first stage) and exogeneity of IV (over-identification test). The different tests confirm the relevance of our set of instrumental variables. Our instruments are not weak (except in some specifications when we investigate the determinants of the TEA rate) insofar as F-statistics are above the usual thresholds computed by Stock and Yogo (2005). In addition, we cannot reject, at least statistically, the assumption of exogeneity of our instruments.

The results indicate that the coefficients associated with short-term credit remain positive and often statistically significant at the usual thresholds. In addition, the coefficients associated with long-term finance are often negative but never statistically significant. Interestingly, beyond the statistical significance, the economic size of the short-term credit variable is not strongly different from models without IV. When we compare the results of Table 6 with those of Table 5 (columns (3/4) and (7/8)), we observe that the marginal effect of short-term credit is slightly increased for specifications explaining the TEA rate and slightly reduced for models investigating the determinants of the business entry rate. However, the deviations are somewhat limited. This finding is confirmed by

Table 6
Instrumentation.

	TEA rate (GEM data)						Business entry rate (ED data)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Short-term credit/GDP (lagged)	0.145†	0.177*	0.142	0.182*	0.143†	0.190*	0.0657**	0.0577	0.0610*	0.0437	0.0649*	0.0488
	(1.49)	(1.66)	(1.45)	(1.69)	(1.46)	(1.75)	(1.98)	(1.35)	(1.82)	(1.04)	(1.95)	(1.18)
Long-term credit/GDP (lagged)	−0.0133	0.164	−0.0170	0.169	−0.0103	0.195	−0.00891	−0.0325	−0.0109	−0.0488	−0.0105	−0.0455
	(-0.40)	(1.49)	(-0.51)	(1.61)	(-0.31)	(1.46)	(-0.79)	(-0.81)	(-0.97)	(-1.31)	(-0.94)	(-1.23)
Household credit/GDP	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
CV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	229	221	229	221	229	221	400	366	400	366	400	366
R^2	0.854	0.843	0.855	0.842	0.854	0.840	0.908	0.904	0.908	0.904	0.908	0.904
Set of instruments												
Lagged value of credit	x	x	x	x	x	x	x	x	x	x	x	x
Creditor rights	x	x			x	x	x	x			x	x
IS (coverage)			x	x	x	x			x	x	x	x
Diagnostic of instrumentation												
F-1 st (short-term credit/ GDP)	10.7	11.4	222.6	319.4	10.6	11.3	38.2	51.3	207.8	258.3	34.5	45.7
F-1 st (long-term credit/ GDP)	9.7	9.8	37.9	43.0	9.33	9.5	15.1	21.1	58.0	54.1	10.8	16.5
OIT (p-value)	0.126	0.156	0.145	0.389	0.110	0.280	0.126	0.156	0.145	0.387	0.110	0.280
Wu-Hausman test	0.638	0.611	0.596	0.391	0.417	0.259	0.808	0.742	0.569	0.403	0.608	0.452

The dependent variable is the Total Entrepreneurial Activity rate provided by the Global Entrepreneurship Monitor database in columns (1–6) and the business entry rate provided by the Entrepreneurship Database in columns (7–12). Dummies for each year are included as well as control variables, but not reported in all specifications. We only report results based on fixed effect models with instrumental variables. The list of instruments is reported in "set of variables" (see the text for more information). The usual tests are displayed at the bottom of the table. F−1st stage report the F-statistic for excluded instruments in the first stage. OIT refers to the over-identification test. Under the null hypothesis, the instruments are exogenous. Wu-Hausman test refers to the Wu-Hausman test, which evaluates whether IV results differ from OLS results. Under the null hypothesis, OLS (here FE) and IV (here IV-FE) provide similar econometric results. †, *, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

the Wu-Hausman test comparing the simple fixed effect model with the IV fixed effect model. In any case, the null hypothesis is rejected, indicating that both models provide very close results.[12]

5.3. Robustness checks

We run additional sensitivity tests to confirm our baseline findings. All tables are reported in Appendix B. We start by providing additional evidence on the absence of endogeneity. In doing so, we run a placebo test and consider a dynamic panel model in Table B1. 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- and long-term credit of the country classified just before (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- and long-term credit in the same year in columns (1–2) and of Nigeria in the same year in columns (3–4).[13] Surprisingly, real values are partially correlated with placebo values (coefficient equals 0.30). In Table B1, we show that coefficients associated with short- and long-term credit are not statistically significant in the placebo test, as expected. Finally, in the last column, 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).[14] 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, the econometric results are in line with our previous findings. In addition,

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[12] In an unreported analysis, we consider different sets of instruments. First, we employ the index of depth of credit information that measures rules and practices affecting the coverage, scope and accessibility of credit information available through a credit bureau or a credit registry. Our main results are confirmed. Nonetheless, models using the depth of credit information index suffer from a weak instrument problem. In addition, we also consider as an instrument the level of uncertainty, or at least of volatility. In doing so, we employ the sovereign credit rating as in Bae and Goyal (2009) or different indicators of output volatility as in Tasić and Valev (2010). In some cases, the instrumental strategy suffers from the problem of weak instruments. Nonetheless, in any case, our main conclusion is not confirmed.

[13] We employ the complete dataset on bank loan maturity, reported in Appendix A.

[14] All explanatory variables are considered to be weakly exogenous, and available lagged values are used as internal instruments. We also consider a model with explanatory variables considered to be endogenous without strongly changing the results.

the lagged value of the TEA rate is highly statistically significant. In Panel B, considering the business entry rate from the Entrepreneurship Database, the 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 variations and no other variables are statistically significant.

We then include 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 B2. First, we include the level of institutional quality (assessed by the synthetic indicator of the World Governance Indicators) in columns (1–2) because entrepreneurship and long-term bank loan provision are more likely in countries with stronger institutions. We also control for government expenditures in columns (3–4). An increase in government expenditures may crowd out long-term funds for private sectors. Meanwhile, a high share of government expenditures may signal less pro-entrepreneurial policies and greater opportunity to be hired as a civil servant. Finally, in the last two columns, we control for the inflation rate. Inflation proxies for macroeconomic instability, which could affect both entrepreneurship and financial deepening. The results, reported in Table B2, show that our main findings are unaffected by the inclusion of these variables. They also document that government expenditures and inflation rates have a detrimental effect on entrepreneurship.

We also control for characteristics of the financial system in Tables B.3 and B.4 . First, we consider stock market development, using the ratio of market capitalization to GDP. Indeed, the inclusion of stock market development proxies for direct finance and 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 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. The 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 B.5 . 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 a statistically significant one. 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 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 final step, we test whether our findings are sensitive to the sample considered.[15] The results are displayed in Table B.6 . First, for both models we exclude the 5th and 95th percentile of the dependent and interest variables in Panel A. 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, 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 including only Malaysia.[16] Once again, our results are similar when we exclude Malaysia. In Panel C, we exclude observations from 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.

6. Conclusion

This paper empirically explores whether short- 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 that involve 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 an established credit history.

This paper empirically investigates the impact of long- and short-term bank loan provisions on entrepreneurship. In doing so, we

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

[16] The list is provided on the IMF website: https://www.imf.org/external/NP/ofca/OFCA.aspx.

confront a new hand-collected database on bank loan maturity with data on entrepreneurship at the country level. Data on short- and long-term credit granted to the private sector were collected for 85 countries, including 48 developing 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.

The econometric findings document that long-term credit provision over GDP has no impact on the firm entry rate, while short-term credit is positively correlated with firm creation. These results hold for both measures of entrepreneurship considered. In other words, the provision of short-term credit seems 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). To control for potential endogeneity, we apply an instrumental variable approach. Our general conclusion is not altered. The econometric results are also robust to a battery of additional sensitivity tests, including additional control variables, alternative dependent variables, alternative samples, and changes in the econometric specification.

Our findings do not suggest that long-term credit is not useful for entrepreneurs but 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 forcing them to rely 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).

Our work suffers from some limitations that offer multiple directions for future research. First, as explained above, our database focuses exclusively on bank credit. Even if we believe that this limitation is not a major issue, an investigation of the impact of long-term finance including more financial instruments would be welcome. Second, due to the lack of data, we concentrate exclusively on the number of firm entries without considering the characteristics of new firms (firm size, sector, post-entry performance, etc.). The provision of long-term finance could have more of an effect on the characteristics of new firms (e.g., by favoring the entry of large firms or firms in sectors with high-entry costs), rather than the absolute number of entries. In addition, we do not investigate the post-entry performance of entrants (growth, death rate, etc.). Finally, 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 findings suggest that banking development affects entrepreneurial activities through resources allocated to entrepreneurs. Future works should focus explicitly on disentangling the three channels through which financial development can be related to entrepreneurial activities. These additional topics require more refined (micro-)data but offer promising directions for a better understanding of how financial development affects entrepreneurship and firm dynamics.

Acknowledgements

Appendix A. Sample and variable definition

Sample (list of countries)

17. Bank loan maturity database (85 countries)[17]

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

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[17] We report the period coverage in parentheses

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

Global Entrepreneurship Monitor (43 countries)

Algeria*, Austria, Barbados, Belgium, Bosnia and Herzegovina, Bostwana, 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

* indicates countries without data on household credit

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

* indicates countries without data on household credit.

Variables definition

Table A1

Description of the variables and data sources (entrepreneurship).

Variable	Description	Source [a]
Dependent variables		
TEA rate$_{ct}$	Percentage of the adult population (18-64 year-old) who are currently starting a new business or the owner and/or manager of a young firm (less than 42 months).	GEM
Business Entry Rate$_{ct}$	Number of newly registered firms with limited liability per 1,000 working-age people (ages 15-64).	ED
Independent variables		
Credit variables		
Total credit/GDP	Bank credit to the private sector over GDP, sum of short-term and long-term credit	CSD
Short-term credit/GDP	Short-term bank credit over GDP defined as loans with a maturity below or equal to one year	CSD
Long-term credit/GDP	Long-term bank credit over GDP defined as loans with a maturity above one year	CSD
Control variables		
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
Household credit/GDP	Bank credit allocated to households over GDP	CSD
Additional variables (robustness checks)		
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	The markup between price and marginal costs	GFDD
Boone indicator	A measure of the 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

[a]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.

Table A2
Summary statistics.

Panel A: Models using GEM data					
Variable	Obs.	Mean	Std. Dev.	Min	Max
TEA rate	251	8.978	6.174	2.44	38.55
Total credit/GDP	251	68.071	30.815	5.915	143.68
Short-term credit/GDP	251	15.917	10.567	2.686	57.805
Long-term credit/GDP	251	52.710	27.257	1.154	117.04
Growth	251	1.816135	3.507	−12.906	12.920
GDP per capita (in log)	251	9.802	0.957	6.419	11.584
Start a business	251	1.762	0.499	0.693	2.708
Registering property	251	1.657	0.483	0.000	2.639
Enforcing contract	251	3.488	.1613	3.045	3.850
Resolving insolvency	251	54.312	21.870	0.000	90.200
Household credit/GDP	243	34.578	18.625	2.220	78.640

Panel B: Models using ED data					
Variable	Obs.	Mean	Std. Dev.	Min	Max
Business entry rate	451	3.195	2.952	0.001	17.261
Total credit/GDP	451	56.695	32.390	7.224	143.68
Short-term credit/GDP	451	14.038	9.022	2.492	53.652
Long-term credit/GDP	451	42.657	28.267	2.671	117.04
Growth	451	2.683	4.360	−14.559	23.639
GDP per capita (in log)	451	9.100	1.289	5.995	11.626
Start a business	451	1.8911	0.448	0.693	2.773
Registering property	451	1.648	0.478	0.000	2.639
Enforcing contract	451	3.541	0.183	3.045	3.932
Resolving insolvency	451	42.413	22.450	0.000	90.200
Household Credit/GDP	409	27.836	19.212	0.480	78.640

Appendix B. Robustness checks

Table B1
Robustness checks, placebo test and dynamic panel model.

Panel A: TEA rate					
	Placebo test				Dyn. Panel
	(1) RE One lag	(2) FE One lag	(3) RE One forward	(4) FE One forward	(5) GMM-Syst.
Short-term credit/GDP (lagged)	0.0403	0.0768	0.0275	0.0396	0.146**
	(0.48)	(0.68)	(0.35)	(0.33)	(2.07)
Long-term credit/GDP (lagged)	0.0576**	0.0595	−0.0551	−0.0674	−0.057
	(2.03)	(1.29)	(-1.42)	(-1.03)	(-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) RE One lag	(2) FE One lag	(3) RE One forward	(4) FE One forward	(5) GMM-Syst.
Short-term credit/GDP (lagged)	−0.0352	−0.0395	0.00985	0.0316	0.010
	(-1.56)	(-1.31)	(0.28)	(0.61)	(0.32)

Table B1 (*continued*)

Panel B: Business entry rate

	Placebo test				Dyn. Panel
	(1) RE One lag	(2) FE One lag	(3) RE One forward	(4) FE One forward	(5) GMM-Syst.
Long-term credit/GDP (lagged)	0.0158	0.0169	−0.00358	−0.00903	0.012
	(1.31)	(1.10)	(-0.44)	(-1.12)	(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 the panel fixed effects model, and GMM-Syst. to the Blundell and Bond estimator. Standard errors are clustered at the country level in random and fixed effect models and computed using the Windmeijer correction in GMM estimations (column 6). *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table B2
Robustness checks, adding control variables.

Panel A: TEA rate (GEM data)

	RE (1)	FE (2)	RE (3)	FE (4)	RE (5)	FE (6)
Short-term credit/GDP (lagged)	0.118*	0.165**	0.129**	0.132†	0.126**	0.130†
	(1.95)	(2.05)	(2.21)	(1.65)	(2.01)	(1.68)
Long-term credit/GDP (lagged)	−0.0387	−0.0340	−0.0382	−0.0174	−0.0402	−0.0140
	(-1.17)	(-0.85)	(-1.15)	(-0.40)	(-1.21)	(-0.34)
Governance (lagged)	1.815	−4.486				
	(0.84)	(-1.32)				
Government Exp. (lagged)			−0.420*	−0.410		
			(-1.88)	(-1.44)		
Inflation (lagged)					−0.0948	−0.277**
					(-0.84)	(-2.45)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	251	251	251	251	244	244
Country	43	43	43	43	42	42
R2		0.858		0.859		0.863

Panel B: Business entry rate (ED data)

	(1) RE	(2) FE	(3) RE	(4) FE	(5) RE	(6) FE
Short-term credit/GDP (lagged)	0.0548**	0.0766**	0.0615**	0.0800**	0.0570**	0.0743**
	(2.14)	(2.57)	(2.39)	(2.65)	(2.35)	(2.60)
Long-term credit/GDP (lagged)	−0.00414	−0.0100	−0.00335	−0.00885	−0.00332	−0.00821
	(-0.49)	(-1.11)	(-0.41)	(-0.98)	(-0.40)	(-0.92)
Governance (lagged)	0.439	−0.296				
	(0.84)	(-0.44)				
Government Exp. (lagged)			−0.0690*	−0.0798*		
			(-1.83)	(-1.73)		

Table B2 (*continued*)

Panel B: Business entry rate (ED data)						
	(1) RE	(2) FE	(3) RE	(4) FE	(5) RE	(6) FE
Inflation (lagged)					−0.0236 (-1.29)	−0.0279 (-1.51)
Obs.	449	449	450	450	445	445
Country	57	57	57	57	56	56
R2		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 the panel fixed effects model. Standard errors are clustered at the country level. †, *, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

Table B3
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)
Short-term credit/GDP (lagged)	0.0834	0.120	0.101*	0.139†	0.0596	0.0731	0.108*	0.129†	0.114**	0.134†
	(1.23)	(1.16)	(1.87)	(1.54)	(1.28)	(1.11)	(1.81)	(1.48)	(2.01)	(1.48)
Long-term credit/GDP (lagged)	−0.0253	−0.00123	−0.0398	−0.00993	−0.0532*	−0.0607†	−0.0428	−0.0148	−0.0340	−0.0150
	(-0.69)	(-0.02)	(-1.18)	(-0.19)	(-1.86)	(-1.59)	(-1.35)	(-0.30)	(-1.04)	(-0.32)
Stock Market capitalization	0.0234	0.0311								
	(1.31)	(1.39)								
Concentratio ratio			0.0500	0.0525						
			(1.00)	(0.94)						
Lerner Index					2.376	2.380				
					(0.67)	(0.47)				
Boone indicator							1.732**	1.649		
							(1.96)	(1.43)		
Foreign banks									0.0151	−0.0327
									(0.50)	(-0.48)
Obs.	216	216	237	237	201	201	243	243	221	221
Country	36	36	42	42	36	36	41	41	41	41
R2		0.825		0.838		0.820		0.836		0.842

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 the panel fixed effects model. Standard errors are clustered at the country level. †, *, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

Table B4
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)
Short-term credit/GDP (lagged)	0.0625**	0.0892**	0.0496*	0.0702**	0.0472**	0.0722**	0.0519**	0.0700**	0.0572**	0.0764**
	(2.10)	(2.36)	(1.88)	(2.13)	(2.05)	(2.36)	(2.06)	(2.22)	(2.29)	(2.34)
Long-term credit/GDP (lagged)	0.000603	−0.00642	−0.000325	−0.00697	−0.00745	−0.0132	−0.00330	−0.00895	−0.00482	−0.00754
	(0.06)	(-0.58)	(-0.03)	(-0.65)	(-0.81)	(-1.40)	(-0.37)	(-0.87)	(-0.59)	(-0.71)
Stock Market capitalization	0.00208	0.00300								
	(0.64)	(0.74)								
Concentratio ratio			0.00869	0.00590						
			(0.81)	(0.48)						
Lerner Index					0.171	0.146				
					(0.38)	(0.28)				
Boone indicator							0.569	0.726		
							(0.91)	(0.87)		
Foreign banks									0.0106	0.00182

Table B4 (*continued*)

	RE (1)	FE (2)	RE (3)	FE (4)	RE (5)	FE (6)	RE (7)	FE (8)	RE (9)	FE (10)
									(1.11)	(0.11)
Obs.	326	326	422	422	390	390	434	434	424	424
Country	52	52	54	54	50	50	55	55	52	52
R2		0.891		0.908		0.903		0.907		0.896

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 the panel fixed effects model. Standard errors are clustered at the country level.*, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table B5
Robustness checks, alternative dependent variable.

Panel A: TEA rate (GEM data)

	Nascent		New	
	(1) RE	(2) FE	(3) RE	(4) 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) RE	(2) FE	(3) RE	(4) FE
Short-terPm 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 the panel fixed effects model. Standard errors are clustered at the country level. *, ** and *** indicate significance at 10%, 5% and 1%, respectively.

Table B6

Robustness checks, sample.

Panel A: Outliers

	TEA rate		Business entry rate	
	(1) RE	(2) FE	(3) RE	(4) FE
Short-term credit/GDP (lagged)	0.135*	0.181†	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) RE	(6) FE	(7) RE	(8) 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) RE	(6) FE	(7) RE	(8) 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 the panel fixed effects model. Standard errors are clustered at the country level. †, *, ** and *** indicate significance at 15%, 10%, 5% and 1%, respectively.

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