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Article

The effect of credit composition on entrepreneurship

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ABSTRACT

In this study, we aim to assess the relevance of credit composition to entrepreneurship empirically in light of the Schumpeterian perspective. The results of such an analysis can imply whether central banks should continue with the so-called neutrality principle or undertake an active credit policy. We employ a panel data model to quantify the effect of credit composition on entrepreneurship in 54 high- and middle-income economies from 2001 to 2016. To capture credit composition, we disaggregate total credit as credit to non-financial and financial businesses as well as credit to households and mortgages, and we hypothesize that the larger share of credit for non-financial businesses and households would be associated with greater entrepreneurship. The results indicate that credit composition is important for both high- and middle-income economies, but the effective composition of credit is different in the two sub-samples, which is why the effectiveness of credit allocation should not be taken for granted and active remedies are required. This paper corroborates the Schumpeterian view on the ties between credit allocation and entrepreneurship in both high- and middle-income economies.

1. Introduction

The entrepreneur plays a central role in capitalist economies (Schumpeter, 1934, 1939; Vaz-Curado and Mueller, 2019). Taking this for granted, the question regarding the factors that explain the expansion or contraction of entrepreneurship in economies is of vital importance (see, e.g., Gnyawali and Fogel, 1994; Keilbach, et al., 2008).

The role of credit and finance in enhancing entrepreneurship¹ has been ignored or underweighted in conventional wisdom (Hodgson, 2021). The conventional wisdom some economic historians (e.g., Postan, 1935; Pollard, 1964) have adopted theorizes that entrepreneurs finance their businesses with their own savings and by reinvesting their profits or borrowing from their family and friends. In this framework, financial institutions play a minor role in financing entrepreneurial activities (Heaton, 1937; Trew, 2010). In sharp contrast, many international studies violate this view and emphasize that financial institutions play a key role in economic development (e.g., Hodgson, 2021; Trew, 2010).²

[☆] We developed this paper based on Shahin Behdarvand's MA thesis at Allameh Tabataba'i University. We are also especially grateful for the helpful comments and suggestions from co-editor Matias Ossandon Busch and anonymous referees.

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¹ Such an effect has been endorsed by different scholars, including but not limited to Somoye (2013), Cumming et al. (2019), Gnyawali and Fogel (1994), He et al. (2019), Keilbach et al. (2008, p. 8), Kerr and Nanda (2009), King and Levine (1993), Lee (2019), Léon (2019), Meierrieks (2014), Shahnazi and Dehghan Shabani (2011), and Yu (2008).

² A variety of scholars, by studying different country samples and time periods, corroborate the idea that finance and financial institutions play a very important role in promoting industrialization, financing development, and establishing large-scale entrepreneurs. See, for example, Ashton (1955), Cameron (1967), Davis (1965), Rousseau and Wachtel (1998), Sylla (1969), and Rousseau (2003).

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Schumpeter, in his pioneering work, highlights the simultaneous and complementary role of credit and entrepreneurship in promoting economic growth (see Schumpeter, 1934, 1939). He emphasizes a person “can only become an entrepreneur by previously becoming a debtor.... What [the entrepreneur] first wants is credit. Before he requires any goods whatever, he requires purchasing power. He is the typical debtor in capitalist society” (Schumpeter, 1934, p.49). King and Levine (1993b), by employing data from 80 economies from 1960 to 1989, corroborate Schumpeter’s fundamental idea. Furthermore, they (1993a) conclude that a more developed financial system provides superior tools for diversification of business risks, improves productivity, and stimulates economic growth. Galindo and Méndez (2014) adopt a Schumpeterian approach and claim that monetary policy has a positive and significant effect on entrepreneurship. Beck et al. (2022) emphasize that banks’ liquidity creation enhances economic growth via increased investment based on theoretical and empirical evidence. Jha and Bhuyan (2020), by assessing 45 high- and middle-income economies, found that reforms in directed credit, credit controls, banking supervision, and international capital flow dimensions are significantly associated with early-stage entrepreneurial activity.

Notably, the positive impact of financial development on the level of entrepreneurship depends on institutional quality. Such an observation finds strong support in the “financialization debate,” which indicates mere development of financial instruments, institutions, and markets not only does not lead to real sector growth but also results in economic fragility and income inequality (Palley, 2013).

One way to reconcile these divergent findings is to consider credit’s heterogeneity. Total credit can be decomposed into its components with expected different consequences. Schumpeter emphasizes the importance of alternative uses of credit (Bezemer, 2014): “The credit machine is so designed as to serve the improvement of the apparatus and to punish any other use. However, this turn of phrase must not be interpreted to mean that design cannot be altered. Of course, it can ... the existing machine can be made to work in any one of many different ways” (Schumpeter, 1939, p.153). In fact, the distinction among the various functions of bank credit and their macro-level implications goes back to Schumpeter’s classic studies on the linkages between financial and economic development (Bezemer, 2014; Bezemer, et al., 2020).

In this line of argument, several empirical initiatives have been adopted. Léon (2019), for example, distinguishes between short- and long-term bank credit and finds that long-term credit does not stimulate firm entry, whereas short-term credit is positively related to firm creation, as short-term credit can alleviate some entry barriers.

Others differentiate types of credit based on their uses: loans to households vs. loans to businesses. In a pioneering study, Werner (1997) focuses on the impact of alternative allocations of credit in Japan. He concludes that in the case of unproductive-credit extension, intervention in credit allocation can be essential. Büyükkarabacak and Krause (2009), for example, differentiate between loan extensions to firms and consumers and conclude that the former help increase net exports and the latter lead to a decrease in net exports. Büyükkarabacak and Valev (2010) show that household-credit expansion increases debt and the probability of a banking crisis. Similarly, Beck et al. (2012) find that bank loans to enterprises drive the positive effect of financial development on economic growth, whereas loans to households do not have this effect. Xu (2000) concludes that investment is an important channel through which financial development affects growth.³

More generally, Dirk Bezemer and his co-authors, in a series of studies, promote a project entitled “debt shift,” implying that during the last several decades, the composition of credit has been shifted from “productive” to “unproductive” uses, and such a shift has significantly affected growth, stability, and income distribution. Productive credit refers to “credit that directly finances the production, sale and consumption of goods and services,” and unproductive credit “finances transactions in existing assets.” “The uses of debt by households and firms are to invest and purchase working capital on one hand, and on the other hand to buy real estate assets, to buy back their own stock, or to buy any other financial asset” (Bezemer, 2019, p.2–3).

This distinction does not imply that economies do not need credit that finances asset market transactions. Instead, the distinction emphasizes that the share of debt that finances existing assets has been growing over the last several decades, with negative consequences for production growth, stability, and distribution of income.

One may ask why significant opposite consequences are expected for different types of lending. According to Bezemer (2019, p.4–6), “If a bank issues a loan to nonfinancial firm and the debt is used to finance production, the production then results in sales revenues, from which wages are paid and a profit is realized.... Thus, the economy has expanded and, therefore, economic growth has occurred ... consumer debt also supports production in the sense that it finances output of goods and services, helping industry to realize sales, profit and wages.... [In contrast], the bulk of a mortgage loan supports transaction in a pre-existing asset, not a transaction in a good or a service ... a typical home mortgage ... generates no income at all. It generates asset price gains, ... [and] it is, in this sense, unproductive. [Finally], loans to nonbank financials, ... like pension funds, insurers, and other financial firms [are used] ... largely to conduct financial transactions

³ Explorations of the differing impact of alternative forms of credit have not been limited to growth and entrepreneurship but have been expanded to explain economic instability and distribution of income. Jordà et al. (2016) disaggregate bank credit for 17 advanced countries and conclude that financing the housing market increases financial instability risk. Nizar and Karim (2021) analyze the relationship between mortgage and consumer credit and banking stability through commercial banks in Malaysia from 2008 to 2015. They show that both forms of household credit significantly affect the banking sector’s stability. Nassiri Aghdam and Babapour (2020) show that although productive credit alleviates income inequality significantly, unproductive-credit expansion is a sign of increasing inequality. Bezemer and Samarina (2019) also deal with the debt shift’s effect on income inequality.

in assets, not to produce, sell or buy real-sector output. The result is an increase in financial asset prices, but not (or only indirectly) in income generated in the real sector. Again, this is unproductive debt.”⁴

Such an argument can be traced back to Schumpeter’s (1939, p.147) original study, which shows that neither consumer credit nor mortgages are directly related to productivity growth in the way that loans to non-financial institutions are related to innovation and productive investment (Bezemer et al., 2020).

Bezemer et al. (2016) found positive growth effects for credit flows to non-financial businesses but not for mortgage or other asset market credit flows. Bezemer (2019) emphasizes that the flow of credit to non-financial businesses typically supports private sector investment and innovation, thereby promoting extensive productivity growth.

This study is motivated by this theoretical and empirical literature and includes the hypothesis that greater shares of credit to non-financial businesses and consumers would be associated with higher entrepreneurship. Theoretically, providing credit for entrepreneurship is the underlying channel which relates the credit system to GDP growth (Bezemer, 2014).

The entrepreneurship-finance-nexus debate can be better understood based on this study’s results, as most of the literature treats total credit as credit for non-financial businesses and disregards the differing impacts of alternative uses of credit. If credit flows to finance mortgages and/or non-bank financial entities, it does not facilitate business formation or proliferation of entrepreneurship, and we cannot expect to observe a positive impact of finance on entrepreneurship. In sharp contrast, if credit is directly extended to finance entrepreneurs or to enhance the effective demand for their products, the positive impact of finance can be expected.

To investigate the effect of credit composition on entrepreneurship, we combine two datasets, one to specify credit composition and one to capture the extent of entrepreneurship. The former, which is reported in Bezemer et al. (2017, 2020), disaggregates total credit into four different subcategories: (1) credit to non-financial businesses, (2) credit to financial businesses, (3) credit to consumers, and (4) household mortgages. The latter dataset is frequently used in the literature on entrepreneurship: the Global Entrepreneurship Monitor (GEM) dataset. The GEM database focuses on the total early-stage entrepreneurial activity (TEA). According to the GEM, an entrepreneur is defined as an individual who creates business (formal or informal, part-time or full-time). It does not focus exclusively on the formation of new limited liability companies.

We employ a panel data model as our empirical strategy and include 54 high- and middle-income economies in our sample. We formed the sample based on data availability. To make sure that endogeneity does not affect the robustness of estimations, we also employed the generalized method of moments (GMM) to estimate the model. In addition, we introduced alternative control variables to test the robustness of estimations.

Interestingly, the results indicate that credit composition is important for both high- and middle-income economies. In middle-income economies, extending credit to non-financial businesses and consumers has a positive relationship with entrepreneurial activity: It funds entry cost, finances working capital, and provides relevant assets. In high-income economies, none of the credit categories indicate a significant effect on entrepreneurship, and mortgages are negatively associated with entrepreneurship, which is why the growing share of non-productive credit in high- and middle-income economies should be considered a key concern.

These findings have significant implications for central banks’ (CBs’) policies (Dikau and Volz, 2018). To protect price stability, inflation targeting framework has been the main policy framework since the 1980s. As Blanchard (2011, p.1) stated, “Before the crisis, we had convinced ourselves that there was one target, inflation. There was one instrument, the policy rate. And that was basically enough to get things done.” Based on this framework, only the price of credit matters. Banks allocate credit for different uses efficiently until the price mechanism works smoothly. Therefore, central banks should not interfere with credit allocation and refrain from distorting relative prices of different categories of credit. In other words, CBs should be neutral regarding markets when implementing monetary policy.

However, in contrast, our findings indicate that the composition of credit is of vital importance in shaping economies, especially middle-income economies, which are susceptible to credit market failure. This finding is compatible with Stiglitz’s (1994) observation regarding the existing gap between private and social returns of credit extension. To overcome such a discrepancy, Stiglitz finds justifications in directed credit, restricted lending to some activities, and the promotion of investment in others, re-emphasizing Blanchard’s observation: “The fact is that there are many targets and there are many instruments. How you map the instruments onto the targets, and how you use these instruments best is a very complicated problem. This is the problem we have to solve. Future monetary policy is likely to be much messier than the simple construction we had developed earlier” (2011, p.1).

The paper proceeds as follows: Section 2 includes data analysis and our empirical strategy. Section 3 reports the results of estimations and discusses the findings in light of the relevant empirical literature. Section 4 concludes with a discussion about the implications of this study for monetary policy.

2. Data and method

2.1. Data

The statistical sample in this study 54 economies, 37 high-income countries, and 17 middle-income countries from 2001 to 2016, based on data availability. Because the level of financial development is significantly different between high- and middle-income

⁴ This classification of credit types is organized based on data availability. In fact, it is not difficult to find examples of loans to non-financial businesses being used in an unproductive way and vice versa. Like Bezemer and his co-authors, we proceed on the assumption that “deviations are small relative to the total debt in each category, then there are reasonable approximations for productive and unproductive debt.”

Table 1
Entrepreneurship in sample economies.

Economy	Period	Average TEA	Economy	Period	Average TEA
High-income economies:					
Australia	2001–2016	11.772	Japan	2001–2014	3.372
Austria	2005–2016	7.128	Korea, Rep.	2008–2016	7.601
Belgium	2001–2015	4.118	Latvia	2010–2016	12.745
Canada	2001–2016	10.998	Lithuania	2011–2014	10.425
Chile	2002–2016	18.464	Luxembourg	2013–2016	8.802
Croatia	2002–2016	6.557	Netherlands	2001–2016	6.822
Czech Republic	2006–2013	7.607	New Zealand	2001–2015	15.060
Denmark	2001–2014	5.175	Norway	2001–2015	7.376
Estonia	2012–2016	13.22	Poland	2001–2016	8.614
Finland	2001–2016	5.732	Portugal	2001–2016	7.471
France	2001–2016	4.758	Singapore	2001–2014	7.441
Germany	2001–2016	4.858	Slovak Republic	2001–2016	10.655
Greece	2003–2016	6.934	Slovenia	2004–2016	5.274
Hong Kong	2003–2016	5.445	Spain	2001–2016	5.801
Hungary	2001–2016	7.314	Sweden	2001–2016	5.417
Iceland	2003–2010	11.264	Switzerland	2002–2016	6.902
Ireland	2003–2016	8.072	United Kingdom	2001–2016	6.862
Israel	2007–2016	7.824	Uruguay	2006–2016	13.669
Italy	2001–2016	4.523			
Middle-income economies:					
Argentina	2001–2016	14.904	Malaysia	2006–2016	5.834
Botswana	2004–2015	28.632	Morocco	2009–2016	8.580
Bulgaria	2015–2016	4.150	Philippines	2006–2015	18.612
China	2002–2016	14.913	Romania	2007–2016	7.637
Egypt	2008–2015	8.835	Russian Federation	2001–2016	4.451
Georgia	2014–2016	7.900	Thailand	2005–2016	19.244
India	2001–2016	10.54	Tunisia	2009–2015	7.615
Indonesia	2006–2016	18.150	Turkey	2006–2016	9.547
Kazakhstan	2007–2016	11.057			

Note: TEA: representing the percentage of the 18–64-year-old population who are either a nascent entrepreneur or owner-manager of a new business.

Source: GEM

economies and this difference can affect the access of new firms and entrepreneurs to finance as well as their ability to overcome establishment costs, we divided the sample based on income per capita, as reported in the Atlas of Sustainable Development Goals (2018), based on the World Development Indicators (WDI). [Table 1](#) lists the sample economies and their average values in the TEA index.

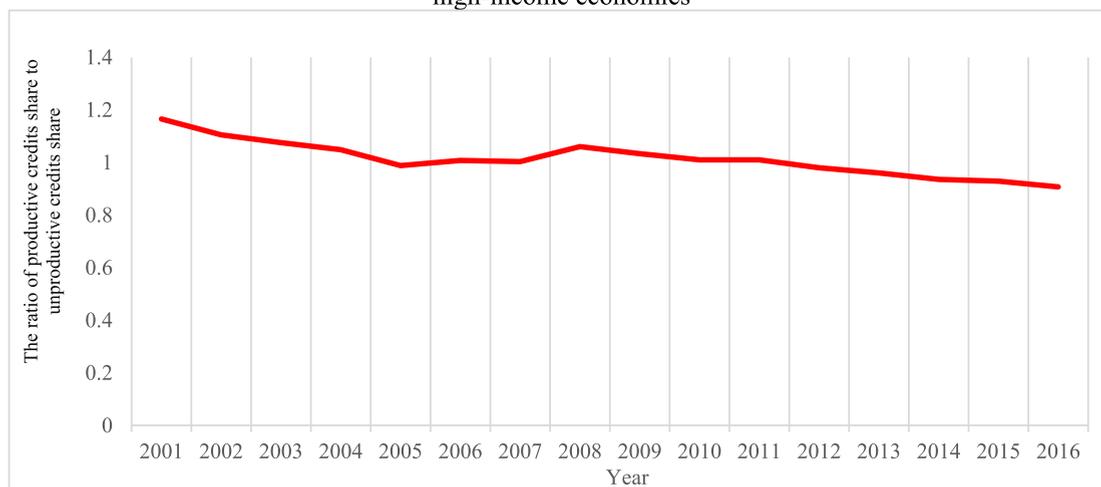
To apprehend different uses of credit, we use a new dataset provided by [Bezemer, et al. \(2020\)](#). This dataset covers all types of credit extended by deposit taking financial institutions. The data is collected from the consolidated balance sheets of those financial institutions. In this dataset, four types of credit are differentiated: credit to non-financial business, credit to financial businesses, household mortgages, and household consumption credit. In this dataset, (1) non-financial business credit includes loans to non-financial companies; (2) credit to (non-bank) financial businesses includes loans to insurance companies, pension funds, other financial intermediaries and financial auxiliaries, and other non-bank financial institutions; (3) mortgages refer to household mortgages, which are only a part of total mortgage lending; and (4) bank-issued household-consumption credit includes all types of household loans except mortgages. The last includes loans for the purchase of passenger vehicles, other consumer durable goods, student loans, and credit card advances ([Bezemer et al., 2020](#)). All values are calculated as a percentage of GDP.

As [Fig. 1](#) shows, in both high- and middle-income economies, the share of credit allocated to financial uses increased between 2001 and 2016, which can be the evidence of financialization. This pattern of change in credit composition is much more impressive and noticeable in middle-income economies. Such an evolution can result from deregulation policies, which leave credit allocation to the market and market incentives ([Palley, 2013](#)). In developing economies, not only is there a significant difference in risks and returns of financial and real activities, which leads banks to extend credit for financial purposes, but there are also loose ties between financial and real-sector activities; extending loans for financial purposes does not enhance real-sector activities instantaneously. Therefore, this pattern of change should be understood in light of the financialization literature rather than the financial development literature.

[Tables 2](#) and [3](#) present the data for both groups in high- and middle-income countries. [Table 2](#) describes the entrepreneurship index and the shares of types of credit for the 37 high-income economies from 2001 to 2016. In high-income economies, on average, the largest proportion of credit allocation belongs to mortgages and non-financial businesses. In this sample, Japan had the lowest TEA, in 2004 and Chile the highest in 2014.

[Table 3](#) presents the main features of the middle-income economies from 2001 to 2016. The first observation is that the average TEA is higher in middle-income economies than in high-income economies. It should also be noted that according to the GEM's index, among the middle-income economies, Botswana in 2015 and Russia in 2001, respectively, had the highest and lowest levels

Panel (a). The ratio of productive credit (including non-financial-business credit and household-consumption credit) to unproductive credit (including credit to financial businesses and mortgages) in high-income economies



Panel (b). The ratio of productive credit (including non-financial-business credit and household-consumption credit) to unproductive credit (including credit to financial businesses and mortgages) in middle-income economies

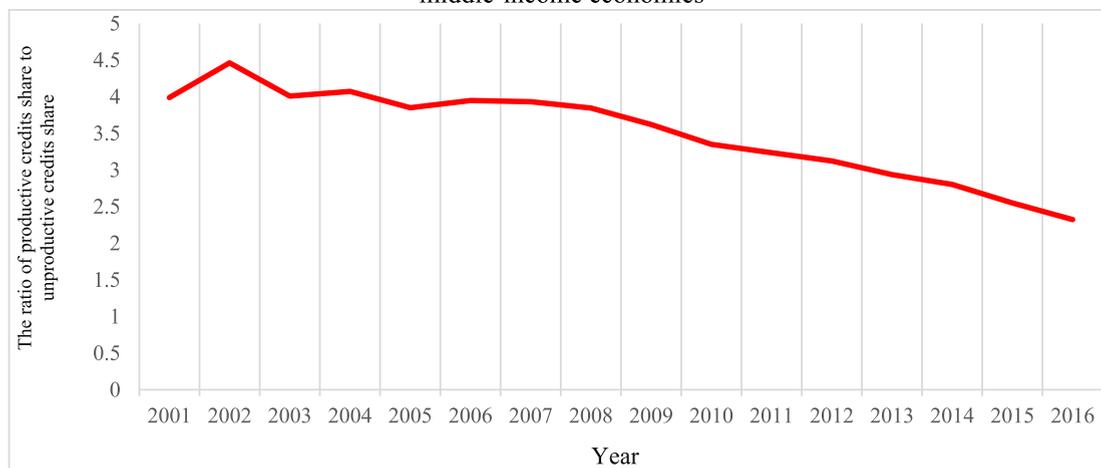


Fig. 1. The ratio of productive credit to unproductive credit.

Source: [Bezemer et al. \(2020\)](#), based on BBFCB

of entrepreneurship in our sample. Furthermore, in these economies, on average, the largest proportion of credit allocation belongs to household consumption and non-financial businesses.

Notably, in high- and middle-income economies, on average, the largest share of credit was allocated to non-financial businesses. It should be clarified that it is the evolution of credit composition that can explain the formation of new firms rather than the mere average share of credit composition.

[Fig. 1](#) reflects the evolution of the ratio of productive credit (including non-financial-business credit and household-consumption credit) to unproductive credit (including financial-business credit and household mortgages) for all income groups of economies from 2001 to 2016. The credit composition has clearly changed to the benefit of unproductive credits, especially in middle-income economies. This is a primary indicator that financial development in the sample economies does not support real-sector activities.

[Fig. 2](#) presents the correlation between TEA and different credit types for the entire sample. Whereas panels (a) and (c) do not indicate positive significant correlations between TEA and credit allocation for productive purposes, panels (b) and (d) demonstrate negative and significant correlations between TEA and measures of credit allocation for non-productive purposes (see also [Table A3](#) in Appendix). In sum, the early insight is that the data does not reject the hypothesis for all economies in the sample.

Table 2
Data description for 37 high-income economies.

Variable	Max	Min	ST. Dev.	Mean	Observations	Source*
TEA	26.83	1.48	3.823	7.6	405	GEM
Non-financial business credit to GDP	131.699	9.771	18.297	40.284	557	BBFCB
Financial business credit to GDP	92.139	0.059	14.406	11.919	544	BBFCB
Household consumption credit to GDP	35.847	0.461	6.605	10.912	553	BBFCB
Household mortgages to GDP	145.904	1.076	25.905	38.627	556	BBFCB
Growth rate	25.162	-14.814	3.266	2.293	541	WDI, WB
GDP per capita	118,823.6	3530.147	21,568.47	35,142.59	541	WDI, WB
Starting a business	15	1	2.793	6.137	454	DB, WB
Recovery rate	94.4	9.6	21.782	64.586	454	DB, WB
Registry property	11	1	2.111	4.983	424	DB, WB
Enforcing contracts	42	21	4.996	31.834	417	DB, WB
Real interest rate	14.38	-3.86	2.723	3.594	249	GFD, WB
Stock market capitalization	263.747	0.345	53.225	69.347	495	GFD, WB
Bank concentration	100	30.615	17.964	70.119	530	GFD, WB
Foreign banks	96	0	29.141	38.106	433	GFD, WB

* The GEM (Bezemer et al., 2020) based on the balance sheet of monetary and financial statistics from the central bank of each country (BBFCB), WDI, Doing Business database (DB), global financial development (GFD), and the World Bank (WB).

Table 3
Data description for 17 middle-income economies.

Variable	Max	Min	ST. Dev.	Mean	Observations	Source*
TEA	33.23	2.47	6.46	11.826	118	GEM
Non-financial business credit to GDP	125.639	4.802	22.696	30.352	255	BBFCB
Financial business credit to GDP	35.548	0.0132	4.722	3.667	240	BBFCB
Household consumption credit to GDP	48.739	0.347	9.169	8.274	251	BBFCB
Household mortgages to GDP	38.821	0.185	8.455	8.114	233	BBFCB
Growth rate	14.231	-10.894	3.707	5.012	255	WDI, WB
GDP per capita	15,974.64	748.258	3579.517	5102.924	255	WDI, WB
Starting a business	18	2	3.5	9.768	177	DB, WB
Recovery rate	81.3	1.9	15.972	35.2	177	DB, WB
Registry property	9	1	2.118	6.261	165	DB, WB
Enforcing contracts	46	28	3.749	36.311	161	DB, WB
Real interest rate	20.439	-33.597	6.539	2.582	197	GFD, WB
Stock market capitalization	148.536	0.737	34.089	42.657	238	GFD, WB
Bank concentration	100	20.846	15.492	52.513	254	GFD, WB
Foreign banks	77	6	17.908	33.985	198	GFD, WB

* The GEM based on the BBFCB, WDI, DB, GFD, and WB.

To estimate the effect of credit types on entrepreneurship, we need to control the effect of other variables that have been identified as determinant factors of entrepreneurship in the empirical literature. Following Jiang et al. (2021), Harmina (2016), Kasseeah (2016), Stel et al. (2005), and Wennekers et al. (2005), we control the effect of the stages of economic development on entrepreneurship by incorporating GDP per capita as a control variable. Economic growth rate is the next control variable, which determines the economy's potential to create new job opportunities and captures the effects of business cycles (Chambers & Munemo, 2017; Klapper et al., 2015; Léon, 2019). We collected the relevant data for these two recent variables from the WDI of the WB.

Furthermore, several studies emphasize the importance of the costs of doing business for new entrepreneurial firms (i.e., Klapper et al., 2015; Klapper and Love, 2011; Léon, 2019). Therefore, by employing the WB's DB, we capture those transaction costs by considering "the number of required procedures to start a business," "the number of procedures of enforcing contracts," "the number of procedures for registering property," and "recovery rate" (in USD).

Moreover, we estimated the regression equation by adding other control variables to check for the robustness of the estimation. First was the real interest rate (as a percentage), which we extracted from the WDI of the WB. Based on the empirical literature, this variable can affect start-up firms and entrepreneurs (Gries and Naudé, 2009; Somoye, 2013).

Second, because the impact of credit on entrepreneurship is expected to depend on the level of development of the financial sector in economies (Dutta and Meierrieks, 2021), we adopt two proxies to capture the effect of this factor: (1) stock market capitalization to GDP (as a percentage), which is a proxy for non-bank financial intermediaries that provide finance for entrepreneurs and venturesome start-up firms (Denis, 2004; Léon, 2019). We collected data from the GFD of the WB), and (2) the Financial Development Index, which the International Monetary Fund issued.

Third, we extracted the bank concentration ratio from the GFD of the WB. This measure is used to capture the degree of competition in the banking industry (Léon, 2019). Following Leon (2019), we considered the share of foreign banks in financing economies and the source of data the same as the previous one.

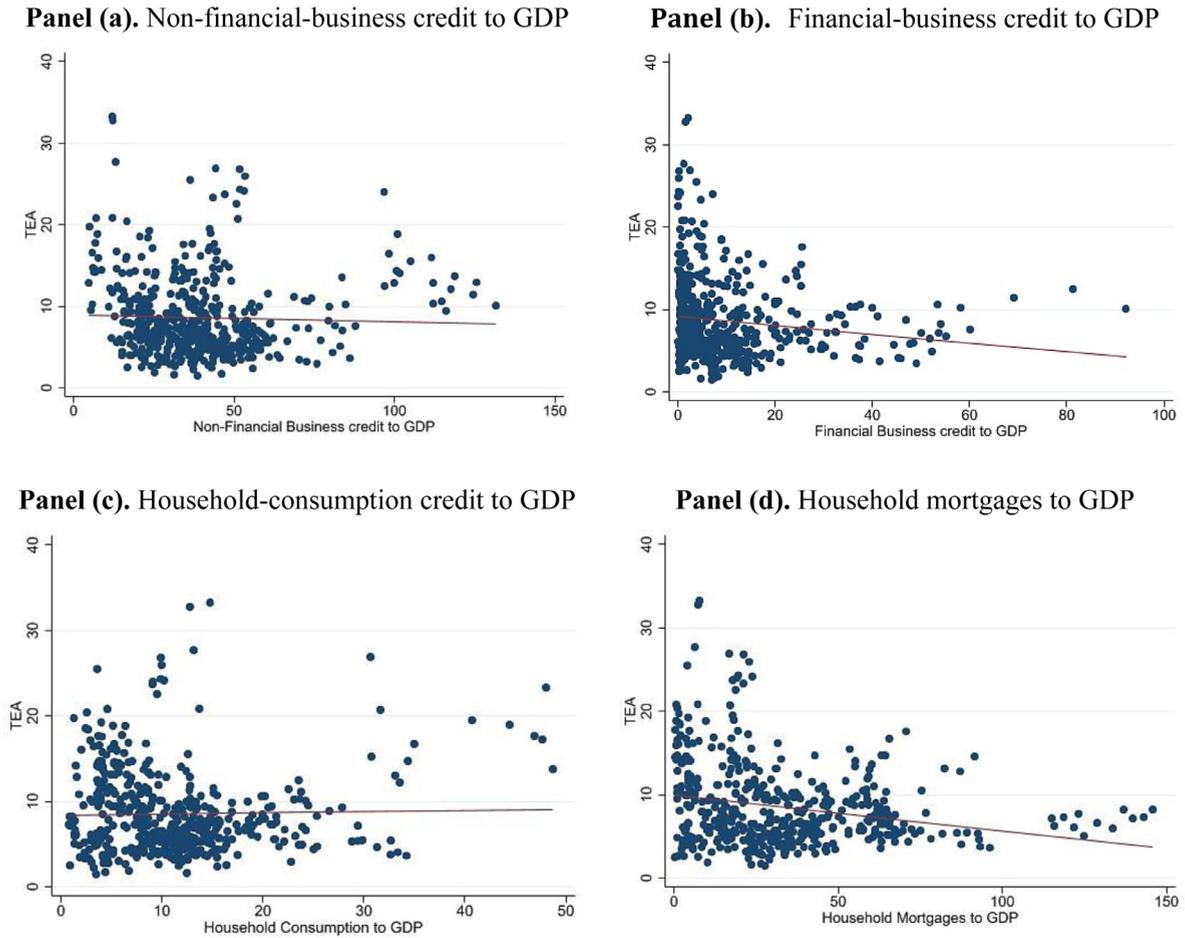


Fig. 2. The correlation between TEA and measures of credit allocation in the entire sample. Source: The GEM and Bezemer et al. (2020), based on the BBFCB.

Financial crises may also cause the loss of interest in starting new businesses. To capture their effect, we use a dummy variable that denotes the 2007–2008 financial crisis (OECD, 2009). Tables 2 and 3 present these variables for high- and middle-income economies, respectively. Table A1 provides the variables’ definitions and the descriptive statistics.

2.2. Methodology

To investigate the impact of bank credit allocation on entrepreneurship, based on Dutta and Meierrieks (2021), Léon (2019), and Klapper et al. (2015), we defined the model as follows:

$$TEA_{it} = \beta_1 NFB_{it-1} + \beta_2 FB_{it-1} + \beta_3 Con_{it-1} + \beta_4 Mor_{it-1} + \gamma X_{it} + \alpha_t + \alpha_i + \varepsilon_{it} \tag{3.1}$$

where TEA_{it} represents the TEA for economy i in year t . Because data is not balanced over the period for the entire sample, we estimated the regression in the form of an unbalanced panel data model. NFB_{it-1} represents the ratio of non-financial-business credit to GDP, FB_{it-1} represents the ratio of financial-business credit to GDP, Con_{it-1} represents the ratio of household-consumption credit to GDP, and Mor_{it-1} represents the ratio of household mortgages to GDP for country i in year $t-1$. As we have specified, it is expected that the greater the share of productive credit (i.e., credit to non-financial businesses and household-consumption credit), the larger the number of entrepreneurial activities (β_1 and $\beta_3 > 0$). In contrast, the larger share of unproductive credit is expected to lead to lower TEA (β_2 and $\beta_4 < 0$).

In this model, X denotes a matrix of control variables that includes the lag in GDP per capita in current USD (in logarithm), lag in annual GDP growth rate, number of required procedures to start a business (in logarithm), number of procedures to enforce contracts based on the DB04–15 methodology of doing business (in logarithm), number of procedures for registering property (in logarithm), and recovery rate (cents on the dollar). As mentioned in the Data sub-section, to ensure the robustness of estimations, we also employ real interest rate (as a percentage), stock market capitalization to GDP (as a percentage), the bank concentration ratio, and the proportion of foreign banks in the banking industry (as a percentage). α_t is a matrix of time-fixed effects, and α_i

Table 4
Results of estimations for 54 economies and the two sub-samples.

	All economies (1)	High-income economies (1)	Middle-income economies (1)
NFB	-0.0020 (0.0074)	0.0180** (0.0089)	0.1045** (0.0497)
FB	0.0032 (0.0116)	0.0197 (0.0124)	-0.0216 (0.2434)
Con	0.0008 (0.0242)	-0.0692*** (0.0214)	0.3440*** (0.0703)
Mor	0.0137** (0.0057)	0.0136** (0.0063)	-0.5681*** (0.1435)
Growth rate	0.1915*** (0.0375)	0.2001*** (0.0397)	0.1013 (0.1204)
GDP per capita	-6.2355*** (0.7438)	-6.6409*** (0.8398)	-4.5043* (2.5321)
Starting a business	0.6186 (0.8981)	-4.0884*** (0.9142)	28.8130*** (4.6732)
Recovery rate	-0.0172** (0.0084)	-0.0233*** (0.0086)	0.0394 (0.0334)
Registry property	-3.8041*** (0.5253)	-2.0829*** (0.5981)	-15.8017*** (4.9445)
Enforcing contracts	-10.7661*** (2.0107)	-4.8303** (2.3041)	-79.9980*** (17.7837)
Constant	53.9155*** (4.6826)	49.5199*** (4.9844)	133.7645*** (32.1765)
Observations	337	268	69
Wald χ^2	244.99	244.19	127.51
Prob. (Wald χ^2)	0.0000	0.0000	0.0000
F. test:			
F ratio	19.82	18.64	5.25
Prob. (F ratio)	0.0000	0.0000	0.0000
Breusch and Pagan's test:			
χ^2	285.05	283.06	0.73
Prob. (χ^2)	0.0000	0.0000	0.1968
Hausman's test:			
χ^2	82.57	185.88	23.96
Prob. (χ^2)	0.0000	0.0000	0.0077

Note: The table reports the estimation results based on the FGLS method for a single equation regression in which TEA, from the GEM, is the dependent variable. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01, respectively. Standard errors are reported in parentheses.

Source: Authors' findings

represents unobserved country-fixed effects. Léon (2019) employs the model (3.1) to analyze the effects of short- and long-term credit on entrepreneurship, and Dutta and Meierrieks (2021) consider credit an indicator of financial development. We employed the same model to distinguish the impacts of different types of credit.

3. Results and discussion

We implemented the unit root tests to ensure that the time series of variables was stationary (see Appendix Table A2). To determine the efficient method of estimation, we conducted various tests, including the F ratio, Breusch and Pagan's (1980) test, and Hausman's (1978) test (Greene, 2018, pp.397–415). The results (Table 4) indicate that the model should be treated as fixed effects rather than pooled data or random effects. Because of the group-wise heteroskedasticity identified using the modified Wald test (Baum, 2001; Torres-Reyna, 2007), the feasible generalized least squares (FGLS) method was used to achieve greater efficiency (Monjazebe and Mahmoodi Pati, 2017).

First, we estimated the model for the entire sample. We report the results in column 1 of Table 4 and in Tables A7 and A8. The results indicate that (1) there is no sign of a significant negative effect of credit extension for any type on entrepreneurship, (2) mortgages have a significant positive effect on entrepreneurship in all specifications, and (3) other types of credit do not reflect any significant impact on entrepreneurship. To deepen our understanding of the relationship between credit composition and entrepreneurship and because different regularities and institutions are in place in high- and middle-income economies, we separated the sample into two sub-samples, and the model was estimated again. We report these results in columns 2 and 3 of Table 4.

The results indicate that in high-income economies, extending credit to non-financial businesses has a positive impact on entrepreneurship. In case of credit extension to financial businesses, the effect is positive but with a lower level of significance. On the household side, the coefficient of household consumption credit is negative, whereas mortgages demonstrate a positive and significant association with entrepreneurship. These findings do not corroborate our initial expectations and require further scrutiny.

Except for GDP per capita, other control variables reflected initial predictions on being positive or negative. As indicated by Chambers and Munemo (2017), Léon (2019), and Klapper et al. (2015), the growth of an economy explains the proliferation of entrepreneurial activities. Furthermore, in line with Klapper and Love (2011), the greater the number of procedures in starting a business, registering property, and enforcing contact and the higher the cost of resolving insolvency, the fewer the number of entrepreneurial activities, even in high-income economies. Meanwhile, GDP per capita is inversely related to the improvement of the TEA, in line with Jiang et al. (2021) and Harmina (2016).

In middle-income economies, credit allocation to non-financial businesses has a direct and significant association with TEA, whereas extending credit to financial businesses does not promote entrepreneurship. In addition, on the demand side, providing households with consumption credit has a positive, significant impact on TEA, and in sharp contrast, financing mortgages has a negative and significant association with new innovative businesses. These results support the findings of Bezemer et al. (2020) and were obtained after controlling for the negative impact of the costs of doing business (i.e., the number of procedures for registering property and enforcing contracts) and other control variables.

As the size of the sub-sample in middle-income economies is relatively small, the issue of small sample size must be addressed. Although there is no consensus regarding the minimum number of required observations,⁵ to ensure that the results are robust to the sample size, we began by including a few of the most important control variables to retain as many observations in the regression as possible and included more variables in other regressions. Implementing this method enabled us to estimate several regressions with a range of observations varying from 69 to 105. Fortunately, results remain robust with the gradual increase of control variables and the reduction of the sample size (See Tables A7 and A9 in Appendix).

In addition, to ensure the robustness of estimations, the regression models were estimated with several control variables in both sub-samples. Again, the results confirmed the initial findings. The results of alternative estimations are reported in the Appendix (Tables A8, A10 and A11).

To address the potential endogeneity problem, the model is estimated by the GMM (Blundell and Bond, 1998; Léon, 2019; Monjazeb and Nosrati, 2017; Yamani et al., 2021). The results of employing this dynamic panel-data estimator are reported in Tables A12 through A14. For both high- and middle-income economies, estimations suffered from too many instruments, and Hansen's p-values are equal to 1 (Roodman, 2009a, 2009b). One way to reduce the number of instruments, as proposed by Roodman (2009a, 2009b), is collapsing, which reduces the number of instruments and decreases Hansen's p-values well below the unity. AR (1) p-values, however, indicate different regularities in high- and middle-income economies, which are significant for the high-income economies, and the overall output of GMM is valid. Nevertheless, the same result does not hold for the middle-income economies, and we cannot rely on the GMM's output.

Existing evidence indicates that credit composition is vitally important to both high and middle-income economies. However, categorizing credit to productive and unproductive is more indicative for middle-income economies. For high-income economies, except mortgages, other categories of credit do not show any significant relationship with entrepreneurship. However, expectedly, mortgages are associated with lower entrepreneurship, and the effect corroborates the hypothesis. This finding is in contrast to Bezemer et al. (2020), who indicate that the impact of mortgage credit expansion on business credit growth is positive in advanced economies. Such a contrast is not observed in middle-income economies.

Though the negative relationships between mortgages and entrepreneurship are observed consistently in both high- and middle-income economies, the results contrast with other types of credit. To understand the reason of such a difference between high- and middle-income economies further scrutiny is due. As discussed by Lin et al. (2022), the effect of financial institutions on innovation is conditional to the development conditions of financial markets. They specify that "*when the stock market is relatively less developed, ... banks play a significant role in financing and promoting innovation.*" (p. 143). In addition, the structure of financial systems does matter. In developing economies, financial systems are usually bank-based (Moradi et al., 2016; Schmukler and Vesperoni, 2001), and bank credit allocation critically influences the performance of these economies. A similar impact is not expected in market-based financial systems. In the former case, financial constraint is an underlying mechanism that explains why improved access to credit has sizeable positive effects on entrepreneurship, as indicated by Qin and Kong (2022). Furthermore, Howes (2022) shows that losing access to credit disproportionately hurts manufacturing firms. This finding explains why decreasing loans to non-financial businesses contributes to poor incorporation in middle-income economies.

Competition and market power is another highly discussed mechanism that affects the access of finance for small firms and entrepreneurs. Berger et al. (1998) show that the entry of new banks and an increase of lending by existing banks improve access to credit for small firms. In addition, empirical studies show that greater bank competition is associated with higher numbers of small firms (Cetorelli and Strahan, 2006), raises the rate of new business incorporations (Black and Strahan, 2002), and increases small firms' access to bank loans at lower interest rates (Rice and Strahan, 2010). These results are consistent with the finding that easier credit access lowers barriers to firm entry. In this research, our findings indicate that credit to non-financial businesses is also effective in alleviating small firms' financing constraints, especially in middle-income economies in which bank competition is relatively scant.

From an alternative perspective, a tax system plays a vital role in balancing the returns between financial and real sectors. Many developing economies suffering from a lack of such efficient tax systems. Most of them do not have a capital gain tax in place and run an inefficient personal income tax system, which normally exempts capital income.

⁵ Green (1991), for example, provides a rule of thumb for a minimum sample size. He considers 104+m (where m is the number of independent variables in the regression) as the minimum. Others propose different thresholds: 20 to 50 by Cohen (1988), 50 by Barrett and Kline (1981), more than 25 by Jenkins and Quintana-Ascencio (2020), and more than 50 by Simmons et al. (2013).

The measure we employed in this study to assess the level of entrepreneurship is GEM, which measures early-stage entrepreneurial activities, and this is somehow different from what Schumpeter implied. Future studies must develop a proper measure of entrepreneurship that evaluates the extent of prime movers' activities in economies. The world is experiencing disruptive innovations, most developed by prime movers such as Facebook (Meta), Apple, Tesla, and Google. Therefore, we expect that by developing a proper measure, the allocation of credit becomes a significant factor for entrepreneurship, even in high-income economies.

Historical studies, such as those by Monnet (2014) and Werner (2002, 2005, 2012), explain that active credit policies have been effective even in advanced economies, such as France, Germany, and Japan. However, in recent decades, those policies have been discarded, and credit allocation has been left to markets. Unfortunately, our database only covers the period of time when credit policies have not been in place, especially in high-income economies. Therefore, a deep empirical study that combines quantitative methods with qualitative data, such as Monnet's (2014) that studies France's golden age, is in demand.

4. Conclusion

Following Schumpeter (1934, 1939), Bezemer et al. (2020, 2017, 2018), Bezemer and Samarina (2019), Jordà et al. (2016), and Werner (2005, 2012), we analyzed the impact of credit composition on entrepreneurship in this paper. To understand credit composition and its evolution in our sample economies, we disaggregated credit into four categories, using the database provided by Bezemer et al. (2020). The results of our empirical research demonstrate that credit composition is of vital importance in both high- and middle-income economies, but the effective composition of credit is different in sub-samples. This means that extending credit to non-financial businesses and households can be considered as productive credit, as they are associated with higher entrepreneurial activities in middle-income economies, whereas a negative association is observed in the case of mortgages and allocation of credit to financial businesses. A similar pattern did not manifest in high-income economies, and mortgages have a negative relationship with the dependent variable, as remaining types of credit do not explain entrepreneurship in these economies.

The results of this paper indicate that the effectiveness of credit allocation should not be presumed, and active remedies are required. Credit guidance policy, depending on the capacity of the bureaucracy, is one option and has been successful in a variety of advanced and developing countries, including England (Bank of England, 1970, 2021), Germany, Japan, South Korea (Bezemer et al., 2018; Werner, 2005, 2012), China (Montes-negret, 1995), and India (Keilbach et al., 2008, p. 86–87).

Therefore, despite conventional wisdom, the results of this study inclines to support Schumpeter's view, which considers banks' money and finance as the key promoter of entrepreneurship and growth. In addition, although the orthodox view takes a neutral position with regard to the composition of credit and holds that banks as financial intermediaries allocate credit to its best uses with no need for external interventions to design and implement credit policies, this study provides empirical evidence in support of a growing literature of heterodoxy that indicates the composition of credit shapes economies.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

We implemented the Fisher-type unit-root test based on the augmented Dickey-Fuller test to examine if the series contained unit roots. In this test, the null hypothesis is that the series contains unit roots, and the alternative is that the series are stationary. As the output indicates (Table A2), these results do not allow for the possibility that variables contain unit roots because the p-value of statistics is lower than 0.05 (more than 95% confidence). So, we found significant evidence against the null hypothesis of a unit root and concluded that these series are stationary.

We employed the F test to identify if the model is pooled data or fixed effects. In this test, the null hypothesis is that the efficient estimator is pooled rather than fixed effects, the test's result indicates that the relevant method for treating data is fixed effects for both high- and middle-income economies.

Breusch and Pagan's (1980) test, their Lagrange multiplier test, uses two hypotheses: (1) the efficient estimator is pooled least squares and (2) the efficient estimator is random effects. The results of this test often reject random effects for middle-income economies (except for Table A10) but not for high-income ones. To make sure the relevant method of treating data, we employed Hausman's (1978) test. The test's results rejected random effects for high- and most middle-income economies (except for column 3 in Table A9).

The Wald test indicates strong signs of variance heteroskedasticity, which is why we employed FGLS as the final estimation method.⁶ We used Stata software (version 15) to implement all statistical tests and econometrics estimations. Tables A5-A18).

To measure the severity of multicollinearity in a regression, we used the variance inflation factors (VIF) test. Results indicated in Table A6 that the VIF values are well below 10 and therefore not likely to be a severe issue in the estimations.

⁶ According to the results of the F test and Breusch and Pagan's test, we cannot accept random effects for the third model of middle-income countries. Also, the probability of Wald χ^2 statistics was 0.2013, which signaled that random effects are not an efficient and significant way to estimate it. Thus, we used FGLS estimation (see Model 3).

Table A1

Description of the all variables and sources.

Notation	Variables	Source
<u>Dependent variable</u>		
TEA	Total early-stage entrepreneurial activity	GEM
<u>Independent variable</u>		
NFB	Non-financial business credit on GDP (lagged)	Bezemer et al. (2020)
FB	Financial business credit on GDP (lagged)	Bezemer et al. (2020)
Con	Household consumption credit on GDP (lagged)	Bezemer et al. (2020)
Mor	Household mortgages on GDP (lagged)	Bezemer et al. (2020)
<u>Independent variable (control variables)</u>		
Growth rate	GDP growth rate (annual %; lagged)	WDI, WB
GDP per capita	GDP per capita (current US\$; lagged; in logarithm)	WDI, WB
Starting a business	Number of required procedures to start a business (in logarithm)	Doing Business, WB
Recovery rate	Recovery rate (cents on the dollar)	Doing Business, WB
Registry property	Number procedures for registering property (in logarithm)	Doing Business, WB
Enforcing contact	Number of procedures of enforcing contracts (DB04–15 methodology; in logarithm)	Doing Business, WB
<u>Independent variable (additional control variables)</u>		
Real interest rate	Real interest rate (%)	WDI, WB
Stock market capitalization	Stock market capitalization to GDP (%)	GFD, WB
Bank concentration	Assets of three largest banks as a share of assets of all commercial banks	GFD, WB
Inflation	Inflation rate based on annual consumer prices	WDI, WB
Foreign banks	The ratio of the number of foreign owned banks to the number of the total banks	GFD, WB
Financial development	Financial development index	IMF
<u>Independent variable (dummy additional control variables)</u>		
Income	A dummy proxy to denote income level for each country	
Crisis	A dummy variable to denote the financial crisis during 2007–2008.	

Source: Authors' findings

Note: WDI, WB, GEM, GFD, IMF.

Table A2

Fisher's Dickey-Fuller unit root test from 2001 to 2016 for 54 high- and middle-income economies.

	37 high-income economies				17 Middle-income economies			
	p-value P	Z	L*	PM	p-value P	Z	L*	PM
TEA	0	0	0	0	0	0	0	0
NFB	0	0	0	0	0	0	0	0
FB	0	0	0	0	0	0	0.01	0
Con	0	0	0	0	0	0	0	0
Mor	0	0	0	0	0	0	0	0
Growth rate	0	0	0	0	0	0	0	0
GDP per capita	0	0	0	0	0	0	0	0
Starting a business	0	0	0	0	0	0	0	0
Recovery rate	0	0	0	0	0	0	0	0
Registry property	0	0	0	0	0	0	0	0
Enforcing contact	0	0	0	0	0	0	0	0
Real interest rate	0	0	0	0	0	0	0	0
Stock market capitalization	0	0	0	0	0	0	0	0
Bank concentration	0	0	0	0	0	0	0	0
Foreign banks	0	0	0	0	0	0	0	0
Inflation	0	0	0	0	0	0	0	0
Financial development	0	0	0	0	0	0	0	0

Source: Authors' findings

Table A3

Pairwise correlation coefficients for 54 economies.

Variables	TEA	NFB	FB	Con	Mor	Growth rate	GDP per capita	Starting a business	Recovery rate	Registry property	Enforcing contracts
TEA	1.0000										
NFB	-0.0363	1.0000									
FB	-0.1351*	0.3761*	1.0000								
Con	0.0223	0.3866*	0.1513*	1.0000							
Mor	-0.2273*	0.3867*	0.4005*	0.2185*	1.0000						
Growth rate	0.2536*	-0.1305*	-0.1262*	-0.1839*	-0.2894*	1.0000					
GDP per capita	-0.4247*	0.2809*	0.4517*	0.2657*	0.6925*	-0.3774*	1.0000				
Starting a business	0.1685*	-0.2405*	-0.3464*	-0.1610*	-0.4862*	0.1733*	0.5213*	1.0000			
Recovery rate	-0.2843*	0.4367*	0.3626*	0.3126*	0.5763*	-0.2017*	0.7154*	-0.5388*	1.0000		
Registry property	0.0259	-0.0901*	-0.1771*	-0.0140	-0.3099*	0.0890*	-0.2803*	0.4303*	-0.3537*	1.0000	
Enforcing contracts	0.1140*	-0.2331*	-0.4151*	-0.0138	-0.2883*	0.0365	-0.5425*	0.4122*	-0.5185*	0.1619*	1.0000

Note: * $p \leq 0.05$.

Source: Authors' findings

Table A4

Pairwise correlation coefficients for high-income economies.

Variables	TEA	NFB	FB	Con	Mor	Growth rate	GDP Per Capita	Starting a business	Recovery rate	Registry property	Enforcing contracts
TEA	1.0000										
NFB	-0.0485	1.0000									
FB	-0.0688	0.3214*	1.0000								
Con	-0.0691	0.3992*	0.0904*	1.0000							
Mor	-0.0855	0.2958*	0.2822*	0.1017*	1.0000						
Growth rate	0.1997*	-0.2860*	-0.0526	-0.1653*	-0.1834*	1.0000					
GDP Per Capita	-0.2982*	0.3831*	0.4776*	0.1844*	0.6336*	-0.1681*	1.0000				
Starting a business	-0.0864	-0.1568*	-0.3215*	-0.1311*	-0.3867*	-0.0012	-0.3964*	1.0000			
Recovery rate	-0.2778*	0.3429*	0.2764*	0.2535*	0.4318*	-0.0395	0.6693*	-0.4497*	1.0000		
Registry property	0.0005	-0.0339	-0.1649*	0.0474	-0.3018*	0.0087	-0.1937*	0.3062*	-0.2592*	1.0000	
Enforcing contracts	0.0698	-0.1713*	-0.3664*	0.1889*	-0.1284*	-0.1376*	-0.4255*	0.3273*	-0.3956*	0.0277	1.0000

Note: * $p \leq 0.05$.

Source: Authors' findings

Table A5

Pairwise correlation coefficients for middle-income economies.

Variables	TEA	NFB	FB	Con	Mor	Growth rate	GDP per capita	Starting a business	Recovery rate	Registry property	Enforcing contracts
TEA	1.0000										
NFB	0.0811	1.0000									
FB	-0.0613	0.6599*	1.0000								
Con	0.1714	0.3120*	0.3224*	1.0000							
Mor	-0.0771	0.5234*	0.6700*	0.6471*	1.0000						
Growth rate	0.1144	0.2343*	0.1138	-0.1100	0.0161	1.0000					
GDP per capita	-0.1779	-0.0628	-0.0042	0.3181*	0.1862*	-0.1883*	1.0000				
Starting a business	0.3551*	0.0113	0.1254	-0.1401	-0.2203*	0.2131*	-0.2073*	1.0000			
Recovery rate	0.2192*	0.2581*	0.2085*	0.4853*	0.4547*	-0.0684	0.2254*	-0.2300*	1.0000		
Registry property	-0.1747	0.0361	0.1236	-0.0663	0.0912	0.0651	-0.1144	0.6326*	-0.3862*	1.0000	
Enforcing contracts	-0.1579	0.1561*	-0.1851*	-0.3811*	-0.3021*	0.0759	-0.5051*	0.1711*	-0.4188*	0.3276*	1.0000

Note: * $p \leq 0.05$.

Source: Authors' findings

Table A6

Results of VIF test for 54 economies.

Variables	All economies	High-income economies	Middle-income economies
NFB	1.72	1.62	3.16
FB	1.56	1.61	3.71
Con	1.33	1.53	2.43
Mor	2.25	2.07	5.35
Growth rate	1.23	1.14	1.06
GDP per capita	3.26	3.30	1.61
Starting a business	1.73	1.56	3.10
Recovery rate	2.59	1.49	1.94
Registry property	1.31	1.25	3.38
Enforcing contracts	1.70	1.77	2.75
Mean VIF	1.87	1.81	2.85

Note: The table represents the values of the VIF test.

Table A7

Results of estimations for the entire sample; Robustness checks with continued observations.

	(1)	(2)	(3)
NFB	-0.0015 (0.0085)	0.0003 (0.0087)	0.0024 (0.0076)
FB	0.0180* (0.0105)	0.0192* (0.0107)	0.0356*** (0.0088)
Con	0.0348 (0.0236)	0.0293 (0.0234)	0.0943*** (0.0232)
Mor	0.0254*** (0.0049)	0.0242*** (0.0047)	0.0591*** (0.0047)
Growth rate	0.2445*** (0.0325)	0.2679*** (0.0356)	0.2566*** (0.0286)
GDP per capita	-4.5995*** (0.5361)	-4.6555*** (0.5386)	-2.6777*** (0.4859)
Crisis		-1.1244*** (0.3778)	
Financial development			-11.8154*** (0.7901)
Constant	25.6006*** (2.2535)	25.9497*** (2.2617)	22.8258*** (1.9818)
Observations	468	468	468
Wald χ^2	132.26	145.97	478.35
Prob. (Wald χ^2)	(0.0000)	(0.0000)	(0.0000)
F. test:			
F ratio	26.87	19.82	23.58
Prob. (F ratio)	0.0000	0.0000	0.0000
Breusch and Pagan's test:			
χ^2	611.54	285.05	604.52
Prob. (χ^2)	0.0000	0.0000	0.0000
Hausman's test:			
χ^2	91.15	82.57	49.99
Prob. (χ^2)	0.0000	0.0000	0.0000

Note: The table reports the results of employing the FGLS method to run the regression. TEA from the GEM is the dependent variable. Crisis and financial development are additional control variables. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A8

Results of estimations for the entire sample; Robustness checks with the additional control variables.

	(1)	(2)	(3)	(4)	(5)	(6)
NFB	0.0434* (0.0249)	0.0045 (0.0070)	0.0132* (0.0078)	0.0030 (0.0096)	-0.0035 (0.0074)	0.0024 (0.0072)
FB	-0.0213 (0.0288)	0.0218* (0.0117)	0.0102 (0.0125)	0.0228* (0.0126)	0.0019 (0.0117)	0.0254*** (0.0097)
Con	-0.1353* (0.0764)	0.0167 (0.0244)	0.0140 (0.0255)	0.0004 (0.0250)	0.0050 (0.0241)	0.0488* (0.0274)
Mor	-0.0018 (0.0296)	0.0123* (0.0075)	0.0202*** (0.0062)	0.0193*** (0.0065)	0.0132** (0.0057)	0.0480*** (0.0060)
Growth rate	0.0837* (0.0488)	0.1850*** (0.0406)	0.1854*** (0.0407)	0.1651*** (0.0414)	0.1814*** (0.0377)	0.2560*** (0.0319)
GDP per capita	10.8899*** (1.7684)	-5.9184*** (0.7129)	-6.5850*** (0.7976)	-6.5265*** (0.8964)	-5.6924*** (0.7827)	-4.3410*** (0.6912)
Starting a business	0.5112 (1.4495)	-0.0522 (0.9372)	-1.8307** (0.9279)	1.2509 (1.0828)	0.5716 (0.8930)	-0.1358 (0.8033)
Recovery rate	-0.0311 (0.0299)	-0.0250*** (0.0083)	-0.0168* (0.0087)	-0.0157* (0.0089)	-0.0158 (0.0083)	0.0065 (0.0073)
Registry property	-1.9122 (1.9989)	-3.7876*** (0.5910)	-2.9527*** (0.6196)	-3.8112*** (0.7126)	-3.5931*** (0.5287)	-1.1173* (0.5935)
Enforcing contracts	-0.9228 (16.4904)	-8.1840*** (2.4081)	-7.2265*** (2.4072)	-7.7805*** (2.5165)	-10.4251*** (2.0103)	-2.5801 (2.0617)
Crisis	-0.4187 (0.3970)					
Stock market capitalization		-0.0004 (0.0038)				
Inflation			0.0279 (0.0662)			
Foreign banks				0.0110* (0.0064)		
Income					-1.2981* (0.6796)	
Financial development						-9.7964*** (1.0033)
Constant	-34.40588 (26.2493)	49.0400*** (4.9843)	50.1615*** (5.1601)	48.9400*** (6.0808)	53.3579*** (4.6441)	34.4403*** (4.9095)
Observations	337	304	296	240	337	337
Wald χ^2	252.39	259.17	230.05	176.26	255.95	483.48
Prob. (Wald χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
F. test:						
F ratio	19.36	16.45	17.71	17.24	19.82	18.57
Prob. (F ratio)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breusch and Pagan test:						
χ^2	287.27	275.56	350.67	160.61	289.19	1.8e+05
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman test:						
χ^2	71.11	78.81	59.02	39.69	47.76	31.53
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: The table reports the results of employing the FGLS method to run the regression. TEA from the GEM is the dependent variable. Crisis, stock market capitalization, inflation, foreign banks, income, and financial development are additional control variables. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A9

Results of estimations for both sub-samples; Robustness checks with continued observations.

	High-income economies			Middle-income economies		
	(1)	(2)	(3)	(1)	(2)	(3)
NFB	0.0003 (0.0094)	0.0021 (0.0097)	0.0048 (0.0085)	0.0660*** (0.0258)	0.0570** (0.0251)	0.0991*** (0.0256)
FB	0.0186* (0.01043)	0.0209** (0.0106)	0.0352*** (0.0091)	0.1222 (0.1521)	.0797 (0.1270)	0.0715 (0.1605)
Con	-0.0112 (0.0243)	-0.0107 (0.0241)	0.0390 (0.0267)	0.3139*** (0.0553)	.2984*** (0.0623)	0.4972*** (0.0644)
Mor	0.0197*** (0.0056)	0.0187*** (0.0055)	0.0522*** (0.0054)	-0.4393*** (0.0869)	-0.4330*** (0.0743)	-0.2276** (0.0912)
Growth rate	0.2161*** (0.0355)	0.2357*** (0.0375)	0.2345*** (0.0315)	0.1738 (0.1244)	.2899** (0.11944)	0.2183* (0.1117)
GDP per capita	-3.0807*** (0.7233)	-3.0797*** (0.7401)	-1.2251** (0.6261)	-6.0455*** (1.6176)	-6.3116*** (0.1194)	-4.2113*** (1.4991)
crisis		-0.8261** (0.3967)			-4.8195*** (1.4099)	
Financial development			-11.6008*** (0.8236)			-39.0364*** (6.5207)
Constant	19.3220*** (3.0806)	19.30033*** (3.14894)	16.8390*** (2.5763)	31.5031*** (6.1499)	33.0148*** (5.4510)	37.6828*** (5.5860)
Observations	363	363	363	105	105	105
Wald χ^2	55.61	59.40	344.32	79.23	83.94	142.58
Prob. (Wald χ^2)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	0.0000	(0.0000)
F. test:						
F ratio	31.43	31.11	25.84	18.48	119.15	13.54
Prob. (F ratio)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Breusch and Pagan's test:						
χ^2	519.38	513.50	583.79	129.71	40.15	51.05
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman's test:						
χ^2	80.08	106.70	395.05	13.29	23.96	19.05
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0000	0.0077	0.0000

Note: The table reports the results of employing the FGLS method to run the regression. TEA from the GEM is the dependent variable. Crisis and financial development are additional control variables. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A10

Results of estimations for both sub-samples; Robustness checks with additional control variables (continued in Table A11).

	High-income economies			Middle-income economies		
	(1)	(2)	(3)	(1)	(2)	(3)
NFB	0.0625*** (0.0176)	0.0170* (0.0090)	0.0194** (0.0097)	0.0992*** (0.0362)	0.1255** (0.0599)	0.1091** (0.0499)
FB	0.0522** (0.0194)	0.0313*** (0.0116)	0.0165 (0.0124)	-0.1074 (0.1992)	0.1152 (0.3037)	-0.1013 (0.2536)
Con	-0.1486*** (0.0393)	-0.0358 (0.0241)	-0.0726*** (0.0211)	0.3609*** (0.0625)	0.4603*** (0.0861)	0.3285*** (0.0715)
Mor	0.0084 (0.0147)	0.0106 (0.0072)	0.0138** (0.0062)	-0.5865*** (0.1359)	-0.5946*** (0.1468)	-0.5421*** (0.1472)
Growth rate	0.2755*** (0.0637)	0.1903*** (0.0430)	0.1813*** (0.0402)	0.3449*** (0.1134)	0.1201 (0.1178)	0.0841 (0.1222)
GDP per capita	-6.2405*** (2.0799)	-6.0647*** (0.8615)	-5.7066*** (0.9207)	-1.8619 (2.1919)	-1.2314 (2.5772)	-5.5394** (2.6769)
Starting a business	-16.1038*** (1.7558)	-3.2277*** (1.0036)	-4.1416*** (0.9404)	35.7306*** (4.9025)	35.2358*** (5.2224)	27.9730*** (4.6365)
Recovery rate	-0.0535** (0.0228)	-0.0246*** (0.0089)	-0.0224** (0.0088)	-0.0109 (0.0298)	0.0812* (0.0457)	0.0405 (0.0330)
Registry property	10.7079*** (1.7504)	-2.4800*** (0.6364)	-2.7252*** (0.6607)	-21.7052*** (4.0097)	2.7879 (9.8092)	-15.0669*** (5.0285)
Enforcing contracts	6.7382 (5.0919)	-5.1615** (2.5667)	-4.4966* (2.3425)	-92.6749*** (16.0043)	-58.5555** (27.5303)	-93.0544*** (20.7179)
Real interest rate	0.0710 (0.1063)			0.0199 (0.1109)		
Stock market capitalization		0.0008 (0.0038)			-0.0328 (0.0329)	
Bank concentration			-0.0202* (0.0104)			-0.0615 (0.0454)
Constant	31.8577*** (10.6748)	46.5445*** (5.3767)	46.5879*** (5.1675)	143.5003*** (28.4133)	64.1809 (46.2509)	161.3576*** (38.9876)
Observations	118	244	268	52	60	69
Wald χ^2	143.36	185.26	210.76	506.91	107.37	131.43
Prob. (Wald χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
F. test:						
F ratio	13.32	16.80	19.69	2.77	5.29	5.11
Prob. (F ratio)	0.0000	0.0000	0.0000	0.0129	0.0000	0.0000
Breusch and Pagan test:						
χ^2	31.74	226.89	297.90	0.00	0.71	0.86
Prob. (χ^2)	0.0000	0.0000	0.0000	1.0000	0.1998	0.1771
Hausman test:						
χ^2	204.15	126.92	166.51	23.90	14.64	20.42
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0132	0.1994	0.0400

Note: The table reports the results of employing the FGLS method to run the regression. TEA from the GEM is the dependent variable. Standard errors are reported in parentheses. Real interest rate, stock market capitalization, and bank concentration are additional control variables. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A11

Results of estimations for both sub-samples; Robustness checks with additional control variables.

	High-income economies			Middle-income economies		
	(4)	(5)	(6)	(4)	(5)	(6)
NFB	0.0665*** (0.0100)	0.0214** (0.0094)	0.0268*** (0.0077)	0.1508 (0.0923)	0.0989** (0.0499)	0.1303** (0.0510)
FB	-0.00531 (0.0117)	0.0248*** (0.0125)	0.0272*** (0.0102)	-0.5939* (0.3488)	-0.0706 (-0.0706)	-0.0068 (0.2390)
Con	-0.0883*** (0.0180)	-0.0701** (0.0064)	-0.0560** (0.0246)	-0.0809 (0.2003)	0.3369*** (0.0730)	0.4544*** (0.0867)
Mor	0.0033 (0.0060)	0.0129** (0.0064)	0.0390*** (0.0065)	-0.7302*** (0.2067)	-0.5528*** (0.1359)	-0.5316*** (0.1434)
Growth rate	0.2235*** (0.0321)	0.2363*** (0.043589)	0.2203*** (0.0342)	0.0511 (0.1376)	0.1500 (0.1138)	0.12103 (0.1099)
GDP per capita	-3.1039*** (0.9294)	-6.4326*** (0.8953)	-4.4940*** (0.7779)	-4.4679 (3.0049)	-4.4871* (2.3732)	-2.6201 (2.5326)
Starting a business	-3.2191*** (0.7419)	-4.1299*** (0.9549)	-3.4941*** (0.8107)	1.3564 (11.0684)	28.6667*** (4.5886)	26.3594*** (4.7547)
Recovery rate	-0.0173*** (0.0062)	-0.0245*** (0.0088)	0.0076 (0.0078)	0.4211*** (0.1068)	0.0371 (0.0331)	0.0227 (0.0347)
Registry property	-1.8090*** (0.6039)	-2.1779*** (0.6296)	-0.1551 (0.6144)	27.0006** (13.2143)	-15.6231*** (4.7316)	-10.3625* (5.6871)
Enforcing contracts	9.0951*** (2.6900)	-3.6136*** (2.3761)	1.2134 (2.0662)	-124.7994*** (30.2537)	-80.4000*** (17.6159)	-75.6140*** (17.9861)
Foreign banks	0.0531*** (0.0064)			0.4822*** (0.1530)		
Crisis		-0.8723 (0.3708)			-2.5459** (1.2768)	
Financial development			-9.6448*** (1.0226)			-16.2260** (8.1844)
Constant	8.3984 (6.9683)	46.8214*** (5.3103)	31.7972*** (4.9088)	207.6321*** (59.6804)	134.746*** (31.4930)	123.4489*** (32.2616)
Observations	212	268	268	37	69	69
Wald χ^2	403.69	229.10	508.88	124.32	132.01	138.28
Prob. (Wald χ^2)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
F. test:						
F ratio	11.38	18.16	16.61	4.50	5.06	4.89
Prob. (F ratio)	0.0000	0.0000	0.0000	0.0044	0.0000	0.0000
Breusch and Pagan test:						
χ^2	179.42	276.96	297.15	0.00	0.47	0.53
Prob. (χ^2)	0.0000	0.0000	0.0000	1.0000	0.2467	0.2335
Hausman test:						
χ^2	46.09	158.74	83.84	36.49	25.31	26.51
Prob. (χ^2)	0.0000	0.0000	0.0000	0.0001	0.0082	0.0054

Note: The table reports the results of employing the FGLS method to run the regression. TEA from the GEM is the dependent variable. Standard errors are reported in parentheses. Foreign banks, crisis, and foreign banks, and financial development are additional control variables. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A12

Results of estimations for middle-income economies by dynamic panel-data estimation through system GMM.

	(1)	(2)	(3)
Lagged TEA	-0.4669*** (0.1801)	-0.6139*** (0.1447)	-0.5222*** (0.1839)
NFB	0.14913* (0.0804)	0.16634** (0.0800)	0.2026* (0.1178)
FB	-0.6541 (0.6546)	-1.4005 (1.0418)	-1.2380* (0.6503)
Con	0.1291 (0.2885)	0.0676 (0.3657)	-0.0878 (0.3099)
Mor	-0.2160 (0.35317)	0.1684 (0.6953)	0.3643 (0.5621)
Growth rate	0.8389 (0.6258)	0.3822 (0.7765)	-0.0820 (0.4666)
GDP per capita	33.2403* (17.7026)	30.2688 (13.7725)	42.2549** (18.9233)
Constant	-118.7479* (67.9052)	-100.2682 (52.1626)	-151.3845** (73.1288)
Lagged independent variables	Yes	Yes	No
Collapsing	Yes	Yes	Yes
Step	One-step	Two-step	Two-step
Observations	79	79	80
Prob. (Wald χ^2)	0.000	0.000	0.000
Number of instruments	20	19	19
AR (1) (P-value)	0.332	0.644	0.260
AR (2) (P-value)	0.188	0.116	0.269
Hansen (P-value)	0.924	0.988	0.959

Note: The table reports the results of employing the GMM method to run the regression. TEA from the GEM is the dependent variable. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A13

Results of estimations for high-income economies by dynamic panel-data estimation through system GMM.

	(1)	(2)	(3)
Lagged TEA	0.6187*** (0.2498)	0.6268** (0.2711)	0.7007*** (0.2194)
NFB	-0.0098 (0.0913)	-0.0077 (0.0966)	-0.0788 (0.0679)
FB	0.0236 (0.1527)	0.0485 (0.1941)	.1135 (0.1653)
Con	0.0339 (0.1128)	-0.0302 (0.1099)	.02109 (0.1244)
Mor	-0.0728* (0.0378)	-0.0948** (0.0380)	-0.0753 (0.0488)
Growth rate	0.1261 (0.1453)	0.0382 (0.1259)	-0.2006 (0.1801)
GDP per capita	10.2525* (6.1758)	12.5998** (5.2665)	7.3135 (8.4684)
Constant	-40.8257* (24.5137)	-49.8252** (21.6571)	-25.7119 (36.2210)
Lagged independent variables	Yes	Yes	NO
Collapsing	Yes	Yes	Yes
Step	Two-step	One-step	Two-step
Observations	324	324	326
Prob. (Wald χ^2)	0.000	0.000	0.000
Number of instruments	18	18	19
AR (1) (P-value)	0.004	0.003	0.006
AR (2) (P-value)	0.976	0.899	1.000
Hansen (P-value)	0.278	0.278	0.324

Note: The table reports the results of employing the GMM to run the regression. TEA from the GEM is the dependent variable. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

Table A14

Results of estimations for the entire sample by dynamic panel-data estimation through system GMM.

	(1)	(2)	(3)
Lagged TEA	0.6626*** (0.2016)	0.6246*** (0.1441)	0.3327 (0.2077)
NFB	0.0029 (0.0147)	-0.0062 (0.0159)	-0.0503 (0.0615)
FB	0.0308 (0.0379)	0.0228 (0.0373)	-0.0178 (0.1489)
Con	-0.0134 (0.0399)	0.0017 (0.0332)	0.0728 (0.1480)
Mor	0.0417 (0.0564)	0.0151 (0.0424)	0.1905 (0.1661)
Growth rate	-0.0426 (0.1193)	-0.2829 (0.2537)	-0.2689 (0.3816)
GDP per capita	-5.1733 (5.9449)	-4.0100 (4.7206)	-5.0327 (7.5807)
Constant	23.5912 (23.9187)	21.1912 (19.3913)	22.6326 (36.3150)
Lagged independent variables	Yes	Yes	No
Collapsing	Yes	Yes	Yes
Step	Two-step	One-step	Two-step
Observations	403	403	406
Prob. (Wald χ^2)	0.001	0.000	0.036
Number of instruments	21	21	20
AR (1) (P-value)	0.009	0.000	0.051
AR (2) (P-value)	0.771	0.592	0.527
Hansen (P-value)	0.110	0.110	0.358

Note: The table reports the results of employing the GMM to run the regression. TEA from the GEM is the dependent variable. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

Source: Authors' findings

References

- Ashton, T.S., 1955. *An Economic History of England: The 18th Century*. Methuen.
- Bank of England., 1970. *The Bank of England: History and Functions*.
- Bank of England., 2021. *Our History*. Bank of England.
- Barrett, P.T., Kline, P., 1981. The observation to variable ratio in factor analysis. *Personal. Study Group Behav.* 1 (1), 23–33. https://www.researchgate.net/publication/232561774_The_Observation_to_Variable_Ratio_in_Factor_Analysis.
- Baum, C., 2001. Xttest3: Stata module to compute Modified Wald statistic for groupwise heteroskedasticity. *Stata J.* 1 (1), 101–104. <https://econpapers.repec.org/RePEc:boc:bocode:s414801>.
- Beck, T., Büyükkarabacak, B., Rioja, F.K., Valev, N.T., 2012. Who gets the credit? And does it matter? Household vs. firm lending across countries. *The B.E. Journal of Macroeconomics* 12 (1), 1–46. doi:10.1515/1935-1690.2262.
- Beck, T., Döttling, R., Lambert, T., van Dijk, M., 2022. Liquidity creation, investment, and growth. *J. Econ. Growth* doi:10.1007/s10887-022-09217-1.
- Berger, A.N., Saunders, A., Scalise, J.M., Udell, G.F., 1998. The effects of bank mergers and acquisitions on small business lending. *J. Financ. Econ.* 50 (2), 187–229. doi:10.1016/S0304-405X(98)00036-1.
- Bezemer, D.J., 2019. *The Economic Consequences of The Global 'Debt Shift.'* Private Debt Project.
- Bezemer, D.J., Grydaki, M., Zhang, L., 2016. In: More Mortgages, Lower Growth? *Economic Inquiry*, 54, pp. 652–674. doi:10.1111/ecin.12254.
- Bezemer, D.J., 2014. Schumpeter might be right again: the functional differentiation of credit. *J. Evol. Econ.* 24 (5), 935–950. doi:10.1007/s00191-014-0376-2.
- Bezemer, D.J., Samarina, A., Zhang, L., 2017. The shift in bank credit allocation: new data and new findings. *De Nederlandsche Bank Working Paper* doi:10.2139/ssrn.2992621.
- Bezemer, D., Ryan-Collins, J., Zhang, L., 2018. Credit where it's due: a historical, theoretical and empirical review of credit guidance policies in the 20th century. *Working Paper IIPP*.
- Bezemer, D., Samarina, A., 2019. Debt shift, financial development and income inequality (No. 646). *De Nederlandsche Bank Working Paper* doi:10.2139/ssrn.3436782.
- Bezemer, D., Samarina, A., Zhang, L., 2020. Does mortgage lending impact business credit? Evidence from a new disaggregated bank credit data set. *J. Bank Financ.* 113 (c), 1–49. doi:10.1016/j.jbankfin.2020.105760.
- Black, S.E., Strahan, P.E., 2002. Entrepreneurship and bank credit availability. *J. Finance* 57 (6), 2807–2833. doi:10.1111/1540-6261.00513.
- Blanchard, O., 2011. *Monetary policy in the wake of the crisis*. *The IMF Macro Conference*.
- Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *J. Econometrics* 87 (1), 115–143. doi:10.1016/S0304-4076(98)00009-8.
- Breusch, T.S., Pagan, A.R., 1980. The Lagrange multiplier test and its applications to model specification in econometrics. *Rev. Econ. Stud.* 47 (1), 239–253. doi:10.2307/2297111.
- Büyükkarabacak, B., Krause, S., 2009. Studing the effects of household and firm credit on the trade balance: the composition of funds matters. *Econ. Inq.* 47 (4), 653–666. doi:10.1111/j.1465-7295.2008.00173.x.
- Büyükkarabacak, B., Valev, N.T., 2010. The role of household and business credit in banking crises. *J. Bank. Finance* 34 (6), 1247–1256. doi:10.1016/j.jbankfin.2009.11.022.
- Cameron, R.E., 1967. *Banking in the Early Stages of Industrialization; A Study in Comparative Economic History*. Oxford University Press.
- Cetorelli, N., Strahan, P.E., 2006. Finance as a barrier to entry: bank competition and industry structure in local U.S. markets. *J. Finance* 61 (1), 437–461. doi:10.1111/j.1540-6261.2006.00841.x.

- Chambers, D., Munemo, J., 2017. The impact of regulations and institutional quality on entrepreneurship (October 19). MERCATUS Working Paper doi:10.2139/ssrn.3066312.
- Cohen, J., 1988. *Statistical Power Analysis For the Behavioral Sciences*, 2nd ed. Lawrence Erlbaum Associates.
- Cumming, D., Deloof, M., Manigart, S., Wright, M., 2019. New directions in entrepreneurial finance. *J. Bank. Financ.* 100 (c), 252–260. doi:10.1016/j.jbankfin.2019.02.008.
- Davis, L.E., 1965. The investment market, 1870–1914: the evolution of a national market. *J. Econ. Hist.* 25 (3), 355–399. doi:10.1017/S0022050700057363.
- Denis, D.J., 2004. Entrepreneurial finance: an overview of the issues and evidence. *J. Corp. Finance* 10 (2), 301–326. doi:10.1016/S0929-1199(03)00059-2.
- Dikau, S., Volz, U., 2018. Central banking, climate change and green finance. *Working Paper Series (No. 867; September)*. Asian Development Bank Institute.
- Dutta, N., Meierrieks, D., 2021. Financial development and entrepreneurship. *Int. Rev. Econ.* 73, 114–126. doi:10.1016/j.iref.2021.01.002.
- Galindo, M.-Á., Méndez, M.T., 2014. Entrepreneurship, economic growth, and innovation: are feedback effects at work? *J. Bus. Res.* 67 (5), 825–829. doi:10.1016/j.jbusres.2013.11.052.
- Gnyawali, D.R., Fogel, D.S., 1994. Environments for entrepreneurship development: key dimensions and research implications. *Entrepren. Theory Pract.* 18 (4), 43–62. doi:10.1177/104225879401800403.
- Green, S.B., 1991. How many subjects does it take to do a regression analysis. *Multivar. Behav. Res.* 26 (3), 499–510. doi:10.1207/s15327906mbr2603_7.
- Greene, W.H., 2018. *Econometric Analysis (Eighth Ed.)*. The Stern School of Business New York University.
- Gries, T., Naudé, W., 2009. Entrepreneurship and regional economic growth: towards a general theory of start-ups. *Innovation* 22 (3), 309–328. doi:10.1080/13511610903354877.
- Harmina, A., 2016. The role of entrepreneurship in explaining the real Gross Domestic Product per capita: regression model selection. *Croatian Review of Economic, Bus. Soc. Stat.* 2 (1), 24–38. doi:10.1515/crebss-2016-0007.
- Hausman, J.A., 1978. Specification tests in econometrics. *Econometrica* 46 (6), 1251–1271. doi:10.2307/1913827.
- He, C., Lu, J., Qian, H., 2019. Entrepreneurship in China. *Small Bus. Econ.* 52 (3), 563–573. doi:10.1007/s11187-017-9972-5.
- Heaton, H., 1937. Financing the industrial revolution. *Bull. Bus. Historic. Soc.* 11 (1), 1–10. doi:10.2307/3111004.
- Hodgson, G.M., 2021. Financial institutions and the British Industrial Revolution: did financial underdevelopment hold back growth? *J. Inst. Econ.* 17 (3), 429–448. doi:10.1017/S174413742000065X.
- Howes, C., 2022. Why does structural change accelerate in recessions? The credit reallocation channel. *J. Financ. Econ.* 144 (3), 933–952. doi:10.1016/j.jfineco.2021.07.009.
- Jenkins, D.G., Quintana-Ascencio, P.F., 2020. A solution to minimum sample size for regressions. *PLoS One* 15 (2), e0229345. doi:10.1371/journal.pone.0229345.
- Jha, C.K., Bhuyan, R., 2020. Do financial reforms promote entrepreneurship? *Finance Res. Lett.* 34 (101272), 1–6. doi:10.1016/j.frl.2019.08.020.
- Jiang, C., Feng, A., Xiao, C., 2021. Does capital account liberalization spur entrepreneurship: the role of financial development. *Sustainability* 13 (16), 1–18. doi:10.3390/su13169238.
- Jordà, Ò., Schularick, M., Taylor, A.M., 2016. The great mortgaging: housing finance, crises and business cycles. *Econ. Policy* 31 (85), 107–152. doi:10.1093/epolic/eiv017.
- Kasseeah, H., 2016. Investigating the impact of entrepreneurship on economic development: a regional analysis. *J. Small Bus. Enterpr. Dev.* 23 (3), 896–916. doi:10.1108/JSBED-09-2015-0130.
- Keilbach, M., Tamvada, J.P., Audretsch, D.B., 2008. *Sustaining Entrepreneurship and Economic Growth: Lessons in Policy and Industry Innovations from Germany and India (First)*. Springer-Verlag New York & Business Media.
- Kerr, W., Nanda, R., 2009. Financing constraints and entrepreneurship. National Bureau of Economic Research (No. 15498; Working Paper Series) doi:10.3386/w15498.
- King, R.G., Levine, R., 1993a. Finance, entrepreneurship and growth: theory and evidence. *J. Monet. Econ.* 32 (3), 513–542. doi:10.1016/0304-3932(93)90028-E.
- King, R.G., Levine, R., 1993b. Finance and growth: schumpeter might be right*. *Q. J. Econ.* 108 (3), 717–737. doi:10.2307/2118406.
- Klapper, L., Love, I., 2011. The impact of the financial crisis on new firm registration. *Econ. Lett.* 113 (1), 1–4. doi:10.1016/j.econlet.2011.05.048.
- Klapper, L., Love, I., Randall, D., 2015. New firm registration and the business cycle. *Int. Entrepr. Manag. J.* 11 (2). doi:10.1007/s11365-014-0345-0, No. 6775; 07 November.
- Lee, H.J., 2019. What factors are necessary for sustaining entrepreneurship? *Sustainability* 11 (3022), 1–20. doi:10.3390/su11113022.
- Léon, F., 2019. Long-term finance and entrepreneurship. *Econ. Syst.* 43 (100690), 1–19. doi:10.1016/j.ecosys.2018.10.004.
- Lin, C., Liu, S., Wei, L., 2022. Banking and innovation: a review. *J. Chinese Econ. Bus. Stud.* 21 (1), 143–176. doi:10.1080/14765284.2022.2127397.
- Meierrieks, D., 2014. Financial development and innovation: Is there evidence of a Schumpeterian finance-innovation nexus? *Ann. Econ. Finance* 15 (2), 343–363. <http://www.aeconf.com/Articles/Nov2014/aef150205.pdf>.
- Monjazeb, M., Mahmoodi Pati, M., 2017. Government size and inflation in developing countries: a panel data approach. *J. Econ. Model. Res.* 7 (26), 65–87. doi:10.18869/acadpub.jemr.7.26.65.
- Monjazeb, M., Nosrati, R., 2017. *Advanced Econometrics Models: Using Eviews and Stata*. Mehraban Book Publishing Institute.
- Monnet, E., 2014. Monetary policy without interest rates: evidence from France's Golden Age (1948 to 1973) using a narrative approach. *Amer. Econ. J.* 6 (4), 137–169. <http://www.jstor.org/stable/43189942>.
- Montes-negret, F., 1995. China's credit plan: An overview. *Oxf. Rev. Econ. Policy* 11 (4), 25–42. doi:10.1093/oxrep/11.4.25.
- Moradi, Z.S., Mirzaeejad, M., Geraeejad, G., 2016. Effect of bank-based or market-based financial systems on income distribution in selected countries. *Procedia Econ. Finance* 36, 510–521. doi:10.1016/S2212-5671(16)30067-3.
- Nassiri Aghdam, A., Babapour, M., 2020. Mometry policy, credit allocation, and income inequality. In: IV International Scientific Conference “Competitiveness and the Development of Socio-Economic Systems, 105, pp. 67–80. doi:10.15405/epsbs.2021.04.8 Dedicated to the Memory of Alexander Tatarkin.
- Nizar, N., Karim, Z.A., 2021. The relationship between household credit and banking stability in Malaysia: panel evidence. *Gadjah Mada Int. J. Bus.* 23 (2), 155–172. doi:10.22146/gamaijb.64451.
- OECD, 2009. *The Impact of the Global Crisis On SME and Entrepreneurship Financing and Policy Responses*.
- Palley, T., 2013. Financialization: the Economics of Finance Capital Domination. Palgrave Macmillan, London doi:10.1057/9781137265821.
- Pollard, S., 1964. Fixed capital in the industrial revolution in Britain. *J. Econ. Hist.* 24 (3), 299–314. doi:10.1017/S0022050700060861.
- Postan, M.M., 1935. Recent trends in the accumulation of capital. *Econ. Hist. Rev.* 6 (1), 1–12. doi:10.2307/2590027.
- Qin, N., Kong, D., 2022. Access to credit and entrepreneurship: evidence from China. *Econ. Dev. Cult. Change* 71 (1), 295–331. doi:10.1086/714440.
- Rice, T., Strahan, P.E., 2010. Does credit competition affect small-firm finance? *J. Finance* 65 (3), 861–889. doi:10.1111/j.1540-6261.2010.01555.x.
- Roodman, D., 2009a. How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata J.* 9 (1), 86–136. doi:10.1177/1536867X0900900106.
- Roodman, D., 2009b. A note on the theme of too many instruments*. *Oxf. Bull. Econ. Stat.* 71 (1), 135–158. doi:10.1111/j.1468-0084.2008.00542.x.
- Rousseau, P.L., 2003. Historical perspectives on financial development and economic growth. *Fed. Reserve Bank St. Louis Rev.* 85 (4), 81–106. doi:10.20955/r.85.81-106.
- Rousseau, P.L., Wachtel, P., 1998. Financial intermediation and economic performance: historical evidence from five industrialized countries. *J. Money Credit Bank.* 30 (4), 657–678. doi:10.2307/2601123.
- Schmukler, S., Vesperoni, E., 2001. Firms' financing choices in bank-based and market-based economies. In: *Financial Structure and Economic Growth*. MIT Press, Cambridge, MA, pp. 347–375.
- Schumpeter, J.A., 1934. *The Theory of Economic Development: An Inquiry Into Profits, Capital, Credit, Interest, and the Business Cycle* (translated by Redvers Opie from German (ed.)). Harvard College (Transaction Publishers, New Brunswick, New Jersey).
- Schumpeter, J.A., 1939. *Business Cycles (Vol. 1)*. McGraw-Hill, New York.
- Shahnazi, R., Dehghan Shabani, Z., 2011. Effects of doing business on economic growth (Case Study: Selected Countries). *Econ. Res.* 11 (42), 161–185. https://joer.atu.ac.ir/article_2617.html.
- Simmons, J.P., Nelson, L.D., Simonsohn, U., 2013. Life after P-hacking. Meeting of the Society for Personality and Social Psychology doi:10.2139/ssrn.2205186.

- Somoye, R.O.C., 2013. The impact of finance on entrepreneurship growth in Nigeria: a cointegration framework. *ACRN J. Entrepr. Perspect.* 2 (2), 21–45.
- Stel, A.van, Carree, M., Thurik, R., 2005. The effect of entrepreneurial activity on national economic growth. *Small Bus. Econ.* 24 (3), 311–321. doi:10.1007/s11187-005-1996-6.
- Stiglitz, J.E., 1994. *The Role of the State in Financial Markets* (No. 14334; Vol. 1, Issue 1).
- Sylla, R., 1969. Federal policy, banking market structure, and capital mobilization in the United States, 1863–1913. *J. Econ. Hist.* 29 (4), 657–686. doi:10.1017/S002205070007193X.
- Torres-Reyna, O., 2007. *Panel Data Analysis Fixed and Random Effects Using Stata* (v. 4.2). Data & Statistical Services. Princeton University, pp. 1–40.
- Trew, A., 2010. Infrastructure finance and industrial takeoff in England. *J. Money Credit Bank.* 42 (6), 985–1010. doi:10.1111/j.1538-4616.2010.00317.x.
- Vaz-Curado, F.L.S., Mueller, A., 2019. The concept of entrepreneur of Schumpeter in comparison to Kirzner. *Interdiscip. J. Philosophy Law Econ.* 7 (3), 613–642. doi:10.30800/mises.2019.v7.1.
- Wennekers, S., van Wennekers, A., Thurik, R., Reynolds, P., 2005. Nascent entrepreneurship and the level of economic development. *Small Bus. Econ.* 24 (3), 293–309. doi:10.1007/s11187-005-1994-8.
- Werner, R.A., 1997. Towards a new monetary paradigm: A quantity theorem of disaggregated credit, with evidence from Japan. *Kredit Und Kapital* 30 (2), 276–309. <https://professorwerner.org/wp-content/uploads/2018/10/KK-97-Disaggregated-Credit.pdf>.
- Werner, R.A., 2002. A reconsideration of the rationale for bank-centered economic systems and the effectiveness of directed credit policies in the light of Japanese evidence. *Japanese Econ.* 30 (3), 3–45. doi:10.2753/JES1097-203X30033.
- Werner, R.A., 2005. New Paradigm in macroeconomics: Solving the Riddle of Japanese macroeconomic Performance. In Palgrave Macmillan, London. <https://doi.org/10.1057/9780230506077>
- Werner, R.A., 2012. The quantity theory of credit and some of its applications. In: *Presentation Slides, Centre for Banking, Finance, and Sustainable Development*, pp. 1–89.
- World Bank., 2018. Atlas of sustainable development goals 2018: from world development indicators. *World Development Indicators*. World Bank doi:10.1596/978-1-4648-1250-7.
- Xu, Z., 2000. Financial development, investment, and economic growth. *Econ. Inq.* 38 (2), 331–344. doi:10.1111/j.1465-7295.2000.tb00021.x.
- Yamani, A., Hussainey, K., Albitar, K., 2021. Does governance affect compliance with IFRS 7? *J. Risk Financ. Manag.* 14 (239), 1–23. doi:10.3390/jrfm14060239.
- Yu, C., 2008. Entrepreneurship and credit constraints: evidence from rural households in China. *Chinese Academy of Science (Working Paper)*, 26 Institute of Policy and Management.