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The Emergence of the Global Fintech Market: Economic and Technological Determinants

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Abstract

We investigate the economic and technological determinants inducing entrepreneurs to establish ventures with the purpose of reinventing financial technology (fintech). We find that countries witness more fintech startup formations when the economy is well-developed and venture capital is readily available. Furthermore, the number of secure Internet servers, mobile telephone subscriptions, and the available labor force have a positive impact on the development of this new market segment. Finally, the more difficult it is for companies to access loans, the higher is the number of fintech startups in a country. Overall, the evidence suggests that fintech startup formation need not be left to chance, but active policies can influence the emergence of this new sector.

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1. Introduction

Why do some countries have more startups intended to change the financial industry through innovative services and digitalization than others? For example, in certain economies there has been a large demand for financial technology (fintech) innovations, while other countries have made a more benevolent economic and regulatory environment available. In this article, we investigate several economic and general technological determinants that have encouraged fintech startup formations in 55 countries. We find that countries witness more fintech startup formations when the economy is well-developed and venture capital is readily available. Furthermore, the number of secure Internet servers, mobile telephone subscriptions, and the available labor force have a positive impact on the development of this new market segment. Finally, the more difficult it is for companies to access loans, the higher is the number of fintech startups in a country.

Prior research on fintech mostly focuses on specific fintech sectors. In the area of crowdlending, scholars have analyzed the geography of investor behavior (Lin and Viswanathan, 2015), the likelihood of loan defaults (Serrano-Cinca et al., 2015; Iyer et al., 2016), and investors' privacy preferences when making an investment decision (Burtch et al., 2015). In equity crowdfunding and reward-based crowdfunding, researchers have investigated the dynamics of success and failure among crowdfunded ventures (Mollick, 2014), the determinants of funding success (Ahlers et al., 2015; Hornuf and Schwienbacher, 2017a, b; Vulkan et al., 2016), and the regulation of equity crowdfunding (Hornuf and Schwienbacher, 2017c). More generally, Bernstein et al. (2016) investigate the determinants of early-stage investments on AngelList. They find that the average investor reacts to information about the founding team, but not startup traction or existing lead investors.

Recently, scholars have also investigated platform design principles and risk and regulatory issues related to virtual currencies such as Bitcoin or Ethereum (Böhme et al., 2015; Gandal and Halaburda, 2016) and the blockchain (Yermack, 2017). Others have analyzed social trading platforms (Doering et al., 2015), robo-advisors (Fein, 2015), and mobile payment and e-wallet services (Mjølsnes and Rong, 2003; Mallat et al., 2004, Mallat, 2007). To date, only a few studies have investigated the fintech market in its entirety. Dushnitsky et al. (2016) provide a comprehensive overview of the European crowdfunding market and conclude that legal and cultural traits affect crowdfunding platform formation. Cumming and Schwienbacher (2016) examine venture capitalist investments in fintech startups around the world. They attribute venture capital deals in the fintech sector to the differential enforcement of financial institution rules among startups versus large established financial institutions after the financial crisis.

In this article, we investigate the formation of fintech startups more generally, rather than focusing on one particular fintech business model. In line with recent industry reports (Ernst & Young, 2016; IMF, 2017; World Economic Forum, 2017), we categorize fintechs into nine different types of startups: those that engage in *financing*, *payment*, *asset management, insurance (insurtechs), loyalty programs*, *risk management, exchanges, regulatory technology (regtech),* and *other* business activities. Table I provides a definition for each fintech category we investigate in this article.

The remainder of the article proceeds as follows: Section 2 introduces our hypotheses. In Section 3, we describe the data and introduce the variables used in the quantitative analysis. Section 4 presents the descriptive and multivariate results. Finally, Section 5 summarizes our contribution and derives policy implications.

--- Table I About Here ---

2. Hypotheses

To derive testable hypotheses regarding the drivers of fintech startup formations, we regard fintech innovations and the resulting startups as the outcome of supply and demand for this particular type of entrepreneurship in the economy. The demand for fintech startups is the number of entrepreneurial positions that can be filled by fintech innovations in an economy (Thornton, 1999; Choi and Phan, 2006). If the business model and services provided by the traditional financial industry, for example, are essentially obsolete, there might be a larger demand for new and innovative startups. The supply of fintech startups, in contrast, consists of the entrepreneurs who are ready to undertake self-employment (Choi and Phan, 2006). Such a supply might be driven by a large number of investment bankers who lost their jobs after the financial crises and are now eager to use their finance skills in a related and promising financial sector.

First, we conjecture that the more developed the economy and traditional capital market, the higher the demand for fintech startups. This hypothesis works through two channels. As in any other startup, fintech startups need sufficient financing to develop and expand their business models. If traditional and venture capital markets are well-developed, entrepreneurs have better access to the capital required to fund their business. Although small business financing traditionally does not take place through regular capital markets, fintech startups might be eligible to receive funds from incubators or accelerators established by the traditional financial sector.[1] However, such programs have mostly been established by large players located in well-developed economies. Moreover, the more developed the economy, the more likely it is that

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[1] See, for example, the Main Incubatur from German Commerzbank AG (https://www.main-incubator.com), the Barclays Accelerator in the UK (http://www.barclaysaccelerator.com), or the US-based J.P. Morgan In-House Incubator (https://www.jpmorgan.com/country/US/en/in-residence).

individuals need services such as asset management or financial education tools. Finally, Black and Gilson (1999) note that active stock markets help venture capital and, thus, entrepreneurship to prosper, because venture capitalists can exit successful portfolio companies through initial public offerings. Active stock markets might therefore have a positive effect on fintech startup formations.

In the case of firms that aim to revolutionize the financial industry, a well-developed capital market might also prompt demand for entrepreneurship simply because a larger financial market also offers greater potential to change existing business models through innovative services and digitalization. If the financial sector is small, not much can be changed through the introduction of innovative business models. Thus, for a well-developed but technically obsolescent financial sector, there are more entrepreneurial positions that can be filled by fintech innovators. We therefore hypothesize the following:

Hypothesis 1: Fintech startup formations occur more frequently in countries with well-developed economies and capital markets.

A second driver of fintech demand is the extent to which the latest technology is available in an economy so that fintech startups can build their business models on these technologies. Technical advancements are among the most important drivers of entrepreneurship (Dosi, 1982; Arend, 1999), because technological revolutions generate opportunities that may be further developed by entrepreneurial firms (Stam and Garnsey, 2007). Technological changes enable new practices and business models to emerge and, in the case of fintech startups, disrupt the traditional financial services sector. Such technology-driven changes have in the past occurred with the move from banking branches to ATM machines and from ATM machines to telephone and online banking

(Singh and Komal, 2009; Puschmann, 2017). Moreover, modern computer-based technology has widely been used in financial markets through the implementation of trading algorithms (Government Office for Science, 2015). More generally, many technologies can be accessed through cloud servers or across multiple vendors or might even be downloadable as open source software. Geographic boundaries are increasingly teared down, and as a result access to supporting infrastructure such as broadband networks might be of crucial importance for the emergence of fintech in a country.

Furthermore, the almost inconceivable growth in mobile and smartphone usage is placing digital services in the hands of consumers who previously could not be reached, delivering richer, value-added experiences across the globe. Mobile payment services differ across regions and countries. Many users are registered in developing countries where financial institutions are difficult to access (Ernst & Young, 2014). The prime example of a fintech that delivers access to essential financial services through the usage of mobile phones is M-Pesa. M-Pesa was launched in 2007 and offers various financial services such as saving, sending, and receiving remittances, as well as the direct purchasing of products and services even when people do not possess a bank account (Jack and Suri, 2011). Today, M-Pesa has extended its market across Africa, Europe, and Asia, reaching 25.3 million active customers in March 2016 (Vodafone, 2016).

In emerging countries, mobile money has served as a replacement for formal financial institutions, and as a result mobile money penetration now outstrips bank accounts in several emerging countries (GSMA, 2015; PricewaterhouseCoopers, 2016). According to a study conducted among 36,000 online consumers, the number of Europeans regularly using a mobile phone device for payments has also tripled since 2015 (54% vs. 18%) (Visa, 2016). The study found this trend to hold for 19 European countries, revealing a big shift in customers' attitudes

toward this new technology. New technology has enabled fintech startups in developed countries to disrupt established players and accelerate change. Technologies such as near-field communication, QR codes, and Bluetooth Low Energy are being used for retail point-of-sale and mobile wallet transactions, transit payments, and retailer loyalty schemes (Ernst & Young, 2014). Fintech startups largely rely on advanced new technologies to implement faster payment services, to offer easy operations to their customers, to improve the sharing of information, and generally to cut the costs of banking transactions. We therefore argue that the better the supporting infrastructure, the higher is the supply of fintech startups, as individuals who are seeking entrepreneurial activity based on these technologies have more opportunities to succeed.

Hypothesis 2: Fintech startup formations occur more frequently in countries where the latest technology and supporting infrastructure are readily available.

A third factor on the demand side of fintech startup formations concerns the soundness of traditional financial institutions. The sudden upsurge of fintech startups, especially in the financing domain, can be partly attributed to the 2008 global financial crisis (Koetter and Blaseg, 2015). Moreover, a recent IMF study (He et al., 2017) shows that market valuations of public fintech firms have quadrupled since the global financial crisis, outperforming many other sectors. The financial crisis may have fostered the demand for fintech startups for several reasons. There is a widespread lack of trust in banks after the crisis. Guiso et al. (2013) investigate customers' trust in banks during the financial crisis and find that the lack of trust also led to strategic defaults on mortgatges, possibly initiating a vicious circle of customer distrust, defaults on morgages, even less sound banks, and again more customer distrust. Fintech startups, which largely have a clean record, might benefit from the lack of confidence in traditional banks and break the vicious circle of distrust and reduced financial soundness.

The financial crisis also increased the cost of debt for many small firms, and in some cases banks stopped lending money to businesses altogether, forcing them to contend with refusals on credit lines or bank loans (Schindele and Szczesny, 2016; Lopez de Silanes et al., 2015). Fintech startups in the area of crowdlending, crowdfunding, and factoring aim to fill this gap. Koetter and Blaseg (2015) provide convincing evidence that when bank are stressed, companies are more likely to use equity crowdfunding as an alternative source of external finance. The demand for fintech should thus be particularly high in countries that have extensively suffered from the financial crises and where the banking sector is less sound. Finally, some of the fintech business models are based on exemptions from securities regulation and would not work under the somewhat more strict securities regulation that applies to large firms (Hornuf and Schwienbacher, 2017c). Stringent financial regulation was the outcome of the spread of systemic risk to the financial system (Brunnermeier et al., 2012). Thus, economies with a more fragile banking sector and stricter regulation should see more fintech startup formations that use the existing exemptions from banking and securities laws.

Hypothesis 3: Fintech startup formations occur more frequently in countries with a more fragile financial sector.

Fourth, on the supply side we consider the role of the credit and labor market as well as business regulation in fintech startup formations. Economies that aim to promote entrepreneurship and talent generally adopt a supportive regulatory regime to attract entrepreneurs. Individuals are more likely to undertake self-employment if the extent to which credit is supplied to the private sector is larger and there are no controls on interest rates that interfere with the credit market. Moreover, for hiring talented individuals for fintech startups, a country should allow market forces to determine wages and establish the conditions that enable startups to easily hire and fire

employees. By contrast, cumbersome administrative requirements, large bureaucratic costs, and the high cost of tax compliance might hamper any entrepreneurial activity. Moreover, Armour and Cumming (2008) highlight the importance of bankruptcy laws to entrepreneurial activities and evidence that more favorable bankruptcy laws have a positive impact on self-employment. Thus, we conjecture that the quality of credit and labor market as well as business regulation should have a significant impact on fintech startup formations.

Moreover, a recent report by Ernst & Young (2016) shows that a well-functioning fintech ecosystem is built on several core ecosystem attributes, in which talent and entrepreneurial availability are essential factors. We therefore assume that a rich and varied supply of labor has a positive influence on fintech startup formations. Empirical evidence supports the argument that the population size is a source of entrepreneurial supply, in the sense that countries experiencing population growth have a larger portion of entrepreneurs in their workforce than populations not experiencing growth (International Labour Organization, 1990). To evaluate fintech startup formations, we thus account for the size of the labor force and argue that the larger and the more flexible the labor market, the higher is the potential number of entrepreneurs who are ready to undertake self-employment.

Hypothesis 4: Fintech startups are more frequent in countries with a more benevolent regulation and a larger labor market.

3. Data and Method

The data source for our dependent variable is the CrunchBase database, which contains detailed information on fintech startup formations and their financing. The database is assembled by more

than 200,000 company contributors, 2,000 venture partners, and millions of web data points[2] and has recently been used in scholarly articles (Bernstein et al., 2016; Cumming et al., 2016). We retrieved the data used in our analysis on September 9, 2017. Because CrunchBase might collect some of the information with a time lag, the observation period in our sample ends on December 31, 2015. Overall, we identified 7,353 fintech startups for the relevant sample period. To analyze the economic and technological determinants that influence fintech startup formations, we collapsed the information into a panel dataset that consists of 1,177 observations given our 11-year observation period from 2005 to 2015 covering 107 countries (see Appendix Table A1 for a list of countries in the dataset).[3]

We restrict our empirical analyses to new firm formations that focus on the nine business categories outlined in Section 1. Consequently, established firms that also provide fintech services (e.g., Amazon or Facebook providing payment or financing services) are not part of our analyses. We consider seven dependent variables: the number of fintech startup formations in a given year and country and the number of fintech startup formations in a given year and country for each of the six categories we identified previously—*financing*, *payment*, *asset management*, *insurance, loyalty programs,* and *other* business activities.[4] Because we measure the dependent variable as a count variable and because its unconditional variance suffers from overdispersion, we decided to estimate a negative binomial regression model. In particular, we estimate a random

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[2] See https://about.crunchbase.com.

[3] Because of data limitations in our explanatory variables and given that we use a lag of one year, our sample reduces to the period from 2006 to 2014 covering 55 countries and 5,588 fintechs. However, this is precisely the period when the fintech market emerged in most countries.

[4] In the regression analyses, we combine the categories risk management, exchanges, regtech, and other business activities into *others* business activities because we have too little observations to run separate regression models for each category.

effects negative binomial (RENB) model, [5] which allows us to remove time-invariant

heterogeneity from fintech startup formations, such as the existence of large financial centers or

startup ecosystems for high-tech innovation (e.g., Silicon Valley in California). In our baseline

specification, we estimate the following RENB model:

$Pr(y_{i1}, y_{i2}, ..., y_{iT}) = F$(*GDP per capita $_{i,t-1}$ + commercial bank branches $_{i,t-1}$ + VC financing $_{i,t-1}$ +*

MSCI returns $_{i,t-1}$ + latest technology $_{i,t-1}$ + mobile telephone subscriptions $_{i,t-1}$ + internet

penetration $_{i,t-1}$ + secure Internet servers $_{i,t-1}$ + fixed broadband subscriptions $_{i,t-1}$ +

soundness of banks $_{i,t-1}$ + investment profile $_{i,t-1}$ + ease of access to loans $_{i,t-1}$ + MSCI crisis

$_{i,t-1}$ + labor force $_{i,t-1}$ + regulation $_{i,t-1}$ + unemployment rate $_{i,t-1}$ + law and order $_{i,t-1}$ +

strength of legal rights $_{i,t-1}$ + cluster development $_{i,t-1}$ + freedom to trade $_{i,t-1}$ + sound money

$_{i,t-1}$ + new startup formation $_{i,t-1}$),

where y is the number of fintech startup formations in country i and year t and F(.) represents a

negative binomial distribution function as in Baltagi (2008).

For our independent variables, we employ different databases that provide country-year variables

to construct a panel. To test hypothesis 1, whether well-developed economies and capital markets

positively affect the frequency of fintech startup formations, we include the *GDP per capita*, the

number of *commercial bank branches*, the extent of *VC financing*, and *MSCI returns* at the

country-year level. Yartey (2008) suggests that income level is also a good proxy of capital

market development. We therefore include the natural logarithm of *GDP per capita*, which came

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[5] See York and Lenox (2014) or Dushnitzky et al. (2016) on the appropriateness of using the RENB model in a similar context.

from the World Development Indicators database. To capture the physical presence of banks, which traditionally allow customers to conduct various types of transactions, we employ the variable *commercial bank branches* per 100,000 adults in the population extracted from the International Monetary Fund Financial Access Survey. Furthermore, to measure the development of the venture capital market, we calculate the variable *VC financing* using the data retrieved from the CrunchBase database. We construct *VC financing* as the natural logarithm of the total amount of VC funding of all the firms available in the CrunchBase database excluding the fintech startups used in our analysis over the GDP per capita at the country level.[6] Moreover, to control for changes in market conditions over time we include MSCI returns. To construct this variable, we extracted the stock prices from the MSCI website and calculated the percentage change in the country-specific MSCI returns from the prior year to the current year.

Next, to test hypothesis 2, whether the availability of the latest technology and the respective supporting infrastructure have a positive impact on fintech startup formations, we include the variables *latest technology*, *mobile telephone subscriptions*, *Internet penetration*, *secured Internet servers*, and *fixed broadband subscriptions*. We retrieved the variable *latest technology* from the World Economic Forum Executive Opinion Survey at the country-year level. It is constructed from responses to the survey question from the Global Competitiveness Report Executive Opinion Survey: "In your country, to what extent are the latest technologies available?" (1 = *not available at all*, 7 = *widely available*). Although to our knowledge this is the only variable measuring the availability of the latest technology in a country that also covers a large sample of countries over time, survey respondents in various countries might not have fully understood

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[6] For the calculation, see Félix et al. (2013).

different types of banking technologies to be able to answer this question adequately. The variable should therefore be interpreted with caution. Next, we include *mobile telephone subscriptions* to assess the extent to which more people having access to mobile phones affects fintech startup formations. We retrieved the data from the World Telecommunication/ICT Development report and database at the country-year level. The variable measures the number of mobile telephone subscriptions per 100 adults in the population. We further account for the *Internet penetration* in the countries studied in our analyses. The data is based on surveys carried out by national statistical offices or estimates based on the number of Internet subscriptions. Internet users refer to people using the Internet from any device, including mobile phones, during the year under review. In our analyses, we use the percentage of Internet penetration at the country-year level retreived from the World Telecommunication/ICT Development report and database. We also include the variable *secure Internet servers* per one million people to account for the number of servers using encryption technology in Internet transactions. We retrieved the data from the World Telecommunication/ICT Development report and database at the country-year level. Finally, we extract the variable *fixed broadband subscriptions*, which refers to fixed subscriptions to high-speed access to the public Internet, excluding subscriptions that have access to data communications via mobile-cellular networks. We retrieved the data from the World Telecommunication/ICT Development report and database at the country-year level.

Furthermore, to test hypothesis 3, whether the soundness of the financial system affects fintech startup formations, we include the variables *soundness of banks*, *investment profile*, *ease of access to loans*, and *MSCI crisis period*. We retrieved the data measuring *soundness of banks* from the World Economic Forum Executive Opinion Survey at the country-year level. The variable is constructed from responses to the survey question from the Global Competitiveness

Report Executive Opinion Survey: "How do you assess the soundness of banks?" (1 = *extremely low – banks may require recapitalization*, 7 = *extremely high – banks are generally healthy with sound balance sheets*). We retrieved the data measuring *investment profile* from the International Country Risk Guide (ICRG) database at the country-year level. We calculate the *investment profile* variable on the basis of three subcomponents: contract viability, profits repatriation, and payment delays. Each subcomponent ranges from 0 to 4 points. A score of 4 points indicates very low country risk and a score of 0 very high country risk. To account for the availability of financing through bank loans, which might be determined by the fragility of the financial system, we retrieve the variable ease of access to loans from the World Economic Forum Executive Opinion Survey at the country-year level. It is constructed from responses to the survey question from the Global Competitiveness Report Executive Opinion Survey: "During the past year, has it become easier or more difficult to obtain credit for companies in your country?" (1 = *much more difficult*, 7 = *much easier*). Furthermore, we control for the severity of the last financial crisis and include the variable *MSCI crisis period*. The variable measures the equally weighted average of 2008–2009 period MSCI returns at the country level.

To test hypothesis 4, which investigates the extent to which market regulations and the size of the labor force affects fintech startup formations, we include the two variables *regulation* and *labor force*. We extracted the variable *regulation* from the Fraser Institute database, which assesses the extent to which regulation limits the freedom of exchange in credit, labor, and product markets in a specific country. The variable ranges from 0 to 10, with a higher rating indicating that countries have less control on interest rates, more freedom to market forces to determine wages and establish the conditions of hiring and firing, and lower administrative burdens. To control for differences in bankruptcy laws across economies, we employ the *strength of legal rights* index,

which we collected from the World Bank Doing Business database. The variable measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index ranges from 0 to 12, with higher scores indicating that laws are better designed to expand access to credit. We also include the variable labor force, which we extracted from the World Development Indicators database. The variable is the natural logarithm of the total labor force, which comprises people ages 15 and older who meet the International Labour Organization definition of the economically active population.

Finally, we include several control variables. To control for the unemployment rate in an economy, we use the variable *unemployment rate* as a percentage of the total labor force extracted from the World Development Indicators database. Furthermore, we use the variables *law and order* from the ICRG database to capture the efficiency of the legal system in a country, which might affect startup formations in general. The index of *law and order* runs from 0 to 6, with higher values indicating better legal systems. We also control for the state of business *cluster development* using the data retrieved from the World Economic Forum Executive Opinion Survey at the country-year level. The variable is constructed from responses to the survey question from the Global Competitiveness Report Executive Opinion Survey: "In your country, how widespread are well-developed and deep clusters" (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field) (1 = *nonexistent*, 7 = *widespread in many fields*).

We also control for economic freedom in an economy and consider two additional variables: *freedom to trade internationally* and *sound money*. The variable freedom to trade internationally comes from the Fraser Institute database and measures a wide variety of restraints that affect international exchange, including tariffs, quotas, hidden administrative restraints, control on

exchange rates, and the movement of capital. The variable ranges from 0 to 10, and higher ratings indicate that countries have low tariffs, easy clearance and effcient adminitration of customs, a freely convertible currency, and few controls on the movement of physical and human capital. We also consider the variable *sound money*, which contains components such as money growth, standard deviation of inflation, inflation, and freedom to own foreign currency bank accounts. The variable ranges from 0 to 10. To earn a higher rating, a country must follow policies and adopt institutions that lead to low rates of inflation and avoid regulations that limit the ability to use alternative currencies.

To control for the entrepreneurial environment in a particular economy, we also control for the total number of *new startup formations*. This variable comes from the CrunchBase database and measures the number of new startups created according to CrunchBase in a given year and country. Definitions of all variables and their sources appear in detail in Appendix Table A2.

4. Results

4.1. Summary Statistics

Table II presents statistics for the number of fintechs founded and the rounds and amounts these firms have raised through venture capital, by year, except Panel B, which provides a summary by country. Panel A considers the full sample, Panel B the top European countries, Panel C the U.S. sample only, and Panel D the EU-27 sample only. Panel E reports the number of fintech startups founded in each year that are still operating, had an IPO, were closed, or were acquired by another firm by 2017, considering the total sample, the EU-27 sample, and U.S. sample.

Panel A of Table II documents statistics of fintech startup formations for the period from 2005 to 2015. Column (1) in Panel A presents statistics on the number of fintech startup formations in a given year. There is a notable upsurge of fintech startups following the financial crisis, as the number of startups founded in 2011 was more than twice as large as in 2008. In 2014, we observe for the first time a decrease of fintech startup formations compared with the previous year. Column (2) shows the number of financing rounds fintech startup have obtained in that year, which almost reached 2,000 rounds in 2013 and 2014. In Column (3), we show the total amount fintech startups raised each year, which grew until 2011, fluctuated in the following two years, and finally steadily declined. Together with Column (2), this suggests that the average volume per funding round has recently dropped. Column (4) shows the number of fintech startups providing financing services, which constitute 54% from all categories, suggesting that the demand for innovation in financing activities was substantial. Column (5) shows statistics of fintech startups providing payment services, which constitute the second-largest group with 19% from all categories. Column (6) shows statistics of fintech startups providing asset management services, which represents 10% from all categories. Columns (7)–(11) show statistics of fintech startups providing insurance, loyalty programs, risk management, exchanges, and regulatory technology services, which represent 14% from all categories. Column (12) shows fintech startups providing other business activities, which constitutes 3% from all categories. For all categories in columns (4)–(12), we observe an increase in the number of fintech startups founded, with a slight decrease in the last year (2015), except for asset management, insurance, and regulatory technology startups, the number of which continued to grow until the end.

To investigate different dynamics in developed and developing countries, we report descriptive statistics for the 10 most relevant European countries in terms of fintech activities, the U.S.

sample, and the total EU-27 sample. Panel B of Table II presents statistics by country for the 10 most relevant European countries during the period 2005–2015. The United Kingdom is at the top of the list with regard to new fintech startup formations, followed by Germany and France (Column (1)). A recent study conducted by Deloitte (2017) ranked the United Kingdom as the number one place in the European Union to flourish as a fintech startup and third worldwide after China and the United States. With the supposedly most supportive regulatory regime, effective tax incentives, and London's position as global financial center, the country attracts more talented entrepreneurs willing to engage in fintech activity. Column (3) shows the total amount raised by new fintech startups, with firms located in the United Kingdom having raised by far the highest amount (7.3 billion USD), followed by Germany and Sweden. According to reports published in the Computer Business Review (2016) and by Deloitte (2017), the United Kingdom also had the highest number of deals outside the United States and the third-highest total VC investment after the United States and China. Columns (4)–(12) again show fintech startup formations for the nine subcategories, which remain in the same order of importance as before, except for risk management fintechs, which slightly outweigh loyalty program startups.

As the United States has the overall largest market share in our sample (see Appendix Table A1 for a ranking), Panel C of Table II presents statistics for the U.S. fintech market only by year. Column (1) shows that the number of fintech startups launched in the United States, which represent almost 53% of the entire sample. Columns (4)–(12) show that fintech startups reforming financing activities constitute 54% of all fintech startups in the United States, again followed by payment (17%), asset management (11%), insurance (5%), other business activities (4%), loyalty program (3%), risk management (3%), regulatory technology (2%), and exchanges (1%).

Panel D of Table II provides statistics for the EU-27 by year. Columns (1)–(12) are as described previously but calculated for the EU-27 sample only. Column (1) shows the number of fintech startups founded by year. Note that the EU-27 countries constitute only 20% of the total fintech startups we identified in our sample. The evidence shows that most financing rounds took place in the 10 most relevant EU countries, and the amounts these fintech startups raised there were also considerable, with the remaining 17 countries contributing only a tiny fraction. Fintech startups providing financing services again represent the largest share of all fintech startups in the EU-27 (54% of all fintechs), followed by payment services (20%), asset management (10%), insurance (5%), other business activities (4%), loyalty programs (3%), risk management (2.5%), exchanges (1.5%), and regulatory technology (0.3%). The importance of the fintech subcategories thus persists for all panels in Table II.

Panel E of Table II reports whether fintech startups were still operating, had an IPO, were closed, or were acquired by another firm until 2017 for the total sample, the EU-27 sample, and the U.S. sample. Columns (1)–(4) show descriptive statistics of the fintech startups' status for our total sample, revealing that the percentage of fintech startups still operating is substantial (79%), followed by acquired (14%), closed (4%), and IPO (3%). Columns (5)–(8) provide descriptive statistics of the fintech startups' status for the total EU-27 sample, and columns (9)–(12) show the descriptive statistics of the fintech startups' status for the U.S. sample. As would be expected, the fintech market in the United States has experienced a higher percentage of IPOs (1.9% vs. 3.2%) and acquisitions (11.9% vs. 16.5%); the percentage of firm failure is higher as well (2.5% vs. 5.6%). Appendix Tables A3 and A4 show summary statistics and a correlation table that includes the dependent variables and the main independent variables.

--- Table II About Here ---

4.2. Country-level Determinants of Fintech Startup Formations

To analyze which country-level factors drive the formation of new fintech startups, we use multivariate panel regressions to predict the annual number of fintech startup formations in 55 countries between 2006 and 2014. For the RENB model, we report incident rate ratios, which can conveniently be interpreted as multiplicative effects or semi-elasticities. Table III reports the estimates from the RENB models as outlined in Section 3. Column (1) shows the results on aggregate annual fintech startup formations, and columns (2)–(7) replicate the analyses for annual formation of fintech startups providing *financing*, *payment*, *asset management*, *insurance*, *loyalty program*, and *other* business activities.

The model in column 1 underscores the role of country-level factors in shaping the formation of new fintech startups. We find a significant, positive relationship between *GDP per capita* and fintech startup formations, with a high statistical significance ($p < 0.01$). An increase of one unit in Ln (*GDP per capita*) is associated with a 59.3% increase in fintech startup formations in the following year. Furthermore, we find a significant, positive relationship between *VC financing* and fintech startup formations, with a high statistical significance ($p < 0.01$). A one-unit increase in the variable *VC financing* is associated with a 24.1% increase in fintech startup formations in the following year. Although we find no evidence for the impact of the *number of bank branches* and *MSCI returns* on fintech startup formations, we cannot reject hypothesis 1 that fintech startup formations take place in well-developed economies, as the *GDP per capita* and *VC financing* variables are strong and robust predictors. Moreover, we find positive relationships between *mobile telephone subscriptions* and *secure Internet servers* and fintech startup formations, which are both significant at conventional levels. One more secure Internet server per one million people is associated with a 25.8% increase in fintech startup formations. We therefore cannot

reject hypothesis 2 that fintech startup formations occur more frequently in countries where the supporting infrastructure is readily available. However, we find no evidence that the *latest technology*, as perceived by the survey respondents of the Global Competitiveness Report Executive Opinion Survey, *Internet penetration*, or *fixed broadband subscriptions* have an impact on fintech startup formations.

Furthermore, our results show a negative relationship between *ease of access to loans* and fintech startup formations. A one-unit increase in the *ease of access to loans* variable is associated with an 18.8% decrease in the number of fintech startup formations in the following year. The variable MSCI crisis period is negative and statistically significant ($p < 0.05$) as well, indicating that the demand for fintech is generally higher in countries that have extensively suffered from the latest financial crises. While in Table III this holds true for the overall sample and the financing subcategory, in Table IV, which excludes the United States, we find that the effect holds for all subcategories, Although the variables *investment profile* and *soundness of banks* are not significant, we cannot reject hypothesis 3 that fintech startup formations occur more frequently in countries with a more fragile financial sector. In line with hypothesis 4, we find that our *regulation* index has a significant, positive impact on fintech startup formations, with a high statistical significance ($p < 0.05$). An increase of one unit in our *regulation* variable, which measures the extent to which regulation limits the freedom of exchange in credit, labor, and product markets, is associated with an 18.5% increase in fintech startup formations in the following year. Furthermore, the *strength of legal rights* variable, which measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders, indicates a positive relationship and is highly significant ($p < 0.01$). We also find that a larger labor market is associated with an increase in fintech startup formations, which is in line with hypothesis 4. An

increase of one unit in *Ln (labor force)* is associated with a 79.6% increase in fintech startup formations in the following year.

Stand-alone analyses of each fintech category reveal nuanced dynamics. Columns (2)–(7) of Table III highlight commonalities among the factors associated with the formation of fintech startups providing *financing*, *payment*, *asset management*, *insurance*, *loyalty program*, and *other* business activities. Consistent with Column (1) of Table III, the coefficients *Ln (labor force) is* positive and statistically significant for all subcategories, highlighting the importance of human capital for high-tech services. Moreover, the coefficients *Ln (GDP per capita)* and *ease of access to loans* are positive and significant for all subcategories except for fintechs providing insurance services. The positive coefficient of *ease of access to loans* indicates that fintech and traditional financial services might be complements in some market segments. For example, when banks are not able to extent loans to small and risky firms, fintechs can reduce transaction costs through digitalization, use big data analytics, and specialize in high-risk market segments catered small and high-risk loan projects. We also find a negative and statistically significant relationship between the number of bank branches and fintech startup formations in the realm of payment and insurance services, which indicates that fintechs might move in business areas in which traditional banks withdraw. The coefficients of the *VC financing* variable are positive and highly significant for the subcategories that most closely resemble the value chain of a traditional bank: *financing*, *payment*, and *asset management*.

Moreover, the variable *strength of legal rights* has a positive and statistically significant effect on the formation of fintech startups for all the subcategories except fintechs providing *loyalty program* services. Next, we find that the coefficient of *latest technology* is positive and statistically significant for *payment* and *loyalty program* services. We also observe a positive

effect of the variable *mobile telephone subscriptions* on the formation of fintech startups providing financing services. Finally, an increase of one unit in *fixed broadband subscriptions* is associated with a 3% increase in fintech startup formations in the financing domain the following year.

--- Table III About Here ---

In Table IV, we run the same regression excluding the U.S. fintech market, because U.S. fintechs constitute almost 53% of the total sample in our analysis. We find the results largely consistent with Table III for our main variables: *Ln (GDP per capita)*, *VC financing*, *mobile telephone subscriptions, secure Internet servers*, *ease of access to loans*, *Ln (labor force)*, and *regulation*. Moreover, we find an additional significant effect for the *availability of latest technology* variable on fintech startup formations.

--- Table IV About Here ---

5. Conclusion

In this article, we investigate economic and technological determinants that have encouraged fintech startup formations in 55 countries. We find that until 2015, the United States had the largest fintech market, followed by the United Kingdom, India, Canada, and China at a considerable distance. Categorizing fintechs in the following subcategories—*financing, asset management, payment, insurance, loyalty programs, risk management, exchanges, regulatory technology*, and *other* business activities—we show that *financing* is by far the most important segment of the emerging fintech market, followed by *payment, asset management, insurance,*

loyalty programs, risk management, exchanges, and regulatory technology. Furthermore, we derive the following recommendations for policy and practice.

Implications for Regulators

The insights of this article might guide policymakers in their decisions on how to promote this new sector. We find that countries witness more fintech startup formations when economies are well-developed, the supporting infrastructure is readily available, and flexible market regulations are applied. M-Pesa provides an example of a case in which fintechs can effectively solve the problems of people living in developing countries. Nevertheless, many of the new fintech services do not run on simple mobile phones but require users to possess a smartphone. However, people living in developing countries often cannot afford to buy smartphones. Providing affordable and sustainable technology as well as the supporting infrastructure is therefore critical to allow for financial inclusion especially with regard to fintech services. Moreover, establishing a supporting infrastructure that allows for secure transactions is essential for the digitalization of financial services in developing and developed countries.

Fintech startup formations in the *financing* category might have emerged for multiple reasons, two of which could be the traditional funding gap that small firms around the globe face (Schindele and Szczesny, 2016) and funding constraints potentially due to more stringent banking regulations in the aftermath of the latest financial crisis (Campello et al., 2010; European Central Bank, 2013; European Banking Authority, 2015). Consequently, promoting fintechs from the *financing* category through regulatory sandboxes and other policy measures could be an effective way to close the funding gap of small firms. Nevertheless, the question of whether

fintech firms provide services that are more efficient than those of incumbent financial institutions remains and is worth exploring empirically. Furthermore, an open question is whether fintechs might ultimately generate new systemic risks that need to be addressed by regulation. While market volumes in many fintech segments are still small, some fintech segments such as online factoring, marketplace lending, and payment services might soon become systemically relevant and should be carefully examined by regulators.

Implications for Incumbent Financial Organizations

Our empirical analysis shows that the available labor force has a positive impact on the supply of entrepreneurs in the fintech industry. Today, entrepreneurial activities often take place in specific geographic regions, which are referred to as startup or fintech *hubs*. Attracting a critical mass of highly specialized individuals is critical to establish a new hub or ecosystem. However, in a globalized world, this requires well-functioning and easily understandable immigration laws, the possibility to easily transfer pension claims, affordable housing, and countable other factors that make moving beyond national boarders easy. Therefore, the decision where to locate a fintech firm is crucial despite the progressive digitalization and flattening of the financial world.

Large financial firms might find it particularly difficult to hire talented individuals as they are lacking the innovative appeal and entrepreneurial spirit of fintech firms. Moreover, incumbent organizations are often more immobile than fintech startups and cannot easily relocate to newly emerging fintech hubs. Consequently, to attract the most talented individuals, incumbent financial organizations do not only face the challenge to reinvent their business models, they must also refurbish their organizational structure and work environment. Besides fintech startups,

established technology firms and modern ecosystems have recently started to provide financial services and might quickly become competitors to incumbent financial organizations. Given their size and access to customers, the threat from technology firms and large ecosystems might even be more severe than the competition that arises from fintech startups.

However, incumbent financial organizations have a competitive advantage as well. Unlike fintech startups, large financial institutions often have deep pockets and can more easily initiate large scale projects. Given that many fintech solutions are platforms services, quickly obtaining a significant market size and establishing a business standard that locks customers in is often more important than developing a high-quality product or service (David, 1985). Moreover, while reformed regulations such as the Payment Service Direction II grant fintechs access to customer data that was previously under the sole possession of banks, incumbents *de facto* maintain the market power over the standards that enable fintechs to gain access to customer information (European Banking Authority, 2017).

Finally, not only can ecosystems provide financial services, incumbent financial organizations can also create new ecosystems. For example, banks can offer their retail clients additional services that make deliberate payment processes superfluous, allow customers to engage with the bank advisor via Smart TV applications at any time without having to visit a branch, or bundle services such as the payment of utility bills and the filing of the tax declaration. For their professional clients, banks could offer additional services or software packages. For example, the investment bank UBS offers small and medium sized firms the accounting software "bexio" that connects to clients' bank accounts and allows them to manage their customers, employees, and warehouses.

Implications for Fintech Entrepreneurs

Given that many fintech solutions modify or digitize an existing financial service and do not constitute a genuine technological innovation, fintech business models can in some cases easily be copied by incumbent financial organizations. For example, many banks now offer their customers personal financial management tools that integrate checking, savings and custody accounts from various institutions. Other fintech innovations like the notification about bank wire transfers through text messaging have been adopted by many banks as well. While fintech entrepreneurs should focus on innovations and their unique selling point, they also must make sure that their ideas cannot be easily copied by incumbent financial organizations. In some cases, it might therefore make sense for fintechs to cooperate with established financial organizations, technology firms, and large ecosystems.

Finally, fintech entrepreneurs should closely monitor upcoming changes in the regulatory environment, because the core of their business models might be threatened. For example, the European General Data Protection Regulation and especially the proposed ePrivacy Regulation will limit the extent to which firms can collect data of individuals browsing their websites. Once the tracking of individuals in the Internet will only be possible with the individual's informed consent, fintech startups that build their services on this data might have to adapt their business models.

Implications for Investors in Fintechs

In this article, we find that access to venture capital is an important factor to promote fintech startup formations. Access to venture capital is, however, not equally available in every region of

the world. While the United States and Asia have recently witnessed large inflows of venture capital in fintech startups, Europe and the rest of the world have largely fallen behind (CrunchBase, 2017). Investment opportunities in fintech therefore strongly differ by geographic location. The lack of venture capital might further generate a vicious cycle, as our study also finds that *financing* fintechs are the most important categories in our sample and fintech formations more often take place if access to loans is more difficult in an economy. Thus, fintechs might improve financial intermediation when traditional banks fail to fulfill this task, but are not founded in the absence of venture capital financing.

Moreover, the case of M-Pesa evidences that investment opportunities in fintechs are available in developing and developed countries. Although customers in developed countries might have higher incomes and are therefore more likely to benefit from fintech services such as asset management, more severe problems of financial intermediation and financial inclusion are potentially solved by fintechs in developing countries. Some caution is also warranted when investing in fintechs. While investments in fintech firms are growing, returns and profits of fintech startups are in some market segments such as equity crowdfunding (Hornuf and Schmitt, 2016) still meager and might remain small for quite some time. Although many of the fintech innovations appear revolutionary, convincing mass-market customers about the quality of the service and implementing innovations on a large scale can take another decade.

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Table I. Classification of the fintech landscape

This table provides a definition for each fintech category that we empirically investigate.

Category	Definition
Asset management	We classify fintech startups as asset management companies if they offer services such as robo-advice, social trading, wealth management, personal financial management apps, or software.
Exchange services	We categorize startups as exchanges if they provide financial or stock exchange services, such as securities, derivatives and other financial instruments trading.
Financing	The category financing entails, for example, startups that provide crowdfunding, crowdlending, microcredit, and factoring solutions.
Insurance	The category insurance entails, for example, startups that broker peer-to-peer insurance, spot insurance, usage-driven insurance, insurance contract management, and brokerage services as well as claims and risk management services.
Loyalty program	We also consider startups that provide loyalty program services to customers, because they often use big data analytics and are closely linked to payment transactions. The category loyalty program involves, for example, startups providing rewards for brand loyalty or giving customers advanced access to new products, special sales coupons, or free merchandise.
Others	A bulk of fintech startups offer investor education and training, innovative background services (e.g., near-field communication systems, authorization services), white-label solutions for various business models, or other technical advancements classified under *other* business activities of fintech startups.
Payment	The category payment entails business models that provide new and innovative payment solutions, such as mobile payment systems, e-wallets, or crypto currencies.
Regulatory technology	We classify fintech startups as regulatory technology companies if they offer services based on technology in the context of regulatory monitoring, reporting, and compliance benefiting the finance industry.
Risk management	The category risk management contains startups that provide services that help companies better assess the financial reliability of their counterparties or better manage their own risk.

Table II. Development of the fintech market by year

This table presents summary statistics on the fintech market, by year, except for Panel B, which provides a summary by country. Panel A considers the full sample, Panel B the top 10 European countries, Panel C the U.S. sample, and Panel D the EU-27 sample only. Panel E reports the number of fintech startups founded in each year that are still operating, had an IPO, were closed, or were acquired by another firm by 2017 for the total sample, EU-27 sample, and U.S. sample. Values reported are based on the CrunchBase database for the period 2005–2015, covering 107 countries around the world.

Panel A: Summary statistics for the full sample, by year
Column (1) reports the number of fintech startups that started operating in a given year. Column (2) reports the number of financing rounds fintech startups have obtained in that year. Column (3) reports the overall amount raised by fintech startups in a given year in USD. Columns (4)–(12) report the number of fintech startup formations in a given year providing (4) *financing services*, (5) *payment services*, (6) *asset management services*, (7) *insurance services*, (8) *loyalty program services*, (9) *risk management services*, (10) *exchange services*, (11) *regtech services*, and (12) *other* business activities. The last row denoted "All Years" reports the sum across all years.

YEAR	TOTAL SAMPLE											
				CATEGORIES								
	1	2	3	4	5	6	7	8	9	10	11	12
	Nbr. Fintechs Started	Financing Rounds	Amount Raised (Millions $)	Financing	Payment	Asset Management	Insurance	Loyalty Programs	Risk Management	Exchanges	Regtech	Other Business Activities
2005	302	385	6,671.12	189	49	53	38	4	18	6	1	11
2006	342	426	5,286.35	224	57	57	34	5	14	10	2	10
2007	415	595	6,306.58	271	70	73	26	10	20	5	3	18
2008	402	642	6,406.67	285	75	60	25	8	9	10	3	25
2009	506	921	9,088.40	338	107	69	29	19	11	5	4	32
2010	618	1,166	10,227.48	387	142	71	36	35	24	8	9	26
2011	791	1,615	13,214.05	507	198	71	34	44	26	11	19	34
2012	915	1,781	11,434.15	604	231	108	47	44	21	11	16	39
2013	1,062	1,878	13,583.53	705	288	126	68	38	25	18	14	44
2014	1,109	1,878	8,725.04	780	331	129	56	37	32	23	9	40
2015	891	1,349	3,978.82	639	203	130	68	12	24	18	11	30
Total	7,353	12,636	94,922.20	4,929	1,751	947	461	256	224	125	91	309

Panel B: Summary statistics for the 10 most relevant European countries
Columns (1)–(12) are as described in Panel A, but calculated for each country separately.

COUNTRY	TOP 10 EUROPEAN COUNTRIES											
	CATEGORIES											
	1	2	3	4	5	6	7	8	9	10	11	12
Country Name	Nbr. Fintechs Started	Financing Rounds	Amount Raised (Millions $)	Financing	Payment	Asset Management	Insurance	Loyalty Programs	Risk Management	Exchanges	Regtech	Other Business activities
United Kingdom	695	1,223	7,398.25	518	151	85	43	23	26	15	0	34
Germany	135	289	1,735.18	93	43	19	12	2	3	0	0	7
France	132	204	840.68	75	45	15	10	5	4	0	0	6
Netherlands	75	123	555.57	49	22	12	3	4	4	3	0	2
Spain	70	132	196.04	52	13	12	2	3	0	3	1	2
Sweden	63	132	1,290.87	45	17	11	4	1	1	1	0	6
Ireland	50	92	938.84	35	15	9	3	1	5	3	1	4
Italy	44	63	147.75	30	13	8	2	2	1	2	1	0
Denmark	42	53	73.31	25	14	4	2	1	0	3	0	7
Belgium	38	44	62.5	27	5	1	2	2	1	0	0	3
Total	1,344	2,355	13,238.99	949	338	176	83	44	45	30	3	71

Panel C: Summary statistics for the U.S. sample by year

Columns (1)–(12) are as described in Panel A, but calculated for the U.S. sample only.

YEAR	U.S. SAMPLE											
				CATEGORIES								
	1	2	3	4	5	6	7	8	9	10	11	12
	Nbr. Fintechs Started	Financing Rounds	Amount Raised (Millions $)	Financing	Payment	Asset Management	Insurance	Loyalty Programs	Risk Management	Exchanges	Regtech	Other Business activities
2005	184	246	3,928.48	116	29	39	18	2	10	3	1	8
2006	200	267	2,814.22	125	34	38	17	4	7	6	2	8
2007	241	398	4,582.75	148	42	49	13	3	14	1	3	13
2008	241	443	4,792	171	40	41	15	5	6	4	3	14
2009	316	621	6,710.62	210	60	44	15	15	5	2	4	20
2010	354	707	4,268.74	219	76	37	22	24	20	1	7	14
2011	455	991	8,751.92	298	96	37	20	25	18	6	17	17
2012	481	969	6,790.05	318	101	52	31	21	15	5	15	21
2013	526	926	6,829.58	339	116	66	37	18	14	10	13	25
2014	531	863	3,986.08	362	150	57	29	14	21	7	9	17
2015	375	579	1,832.05	258	70	56	37	3	11	9	11	13
Total	3,904	7,010	55,286.49	2,564	814	516	254	134	141	54	85	170

Panel D: Summary statistics for the EU-27, by year

Columns (1)–(12) are as described in Panel A, but calculated for the EU-27 sample only.

YEAR	EU-27 SAMPLE											
				CATEGORIES								
	1	2	3	4	5	6	7	8	9	10	11	12
	Nbr. Fintechs Started	Financing Rounds	Amount Raised (Millions $)	Financing	Payment	Asset Management	Insurance	Loyalty Programs	Risk Management	Exchanges	Regtech	Other Business activities
2005	63	87	1,220.85	40	11	6	9	1	6	0	0	3
2006	56	47	662	37	10	3	6	0	4	3	0	1
2007	83	109	1,044.1	53	14	7	6	6	5	4	0	4
2008	72	96	609.62	53	16	10	6	1	1	3	0	8
2009	98	159	776.75	69	25	10	5	2	3	2	0	8
2010	119	225	2,276.92	87	22	15	6	4	1	5	0	8
2011	155	292	1,313.06	101	49	19	4	8	6	3	1	8
2012	188	365	1,426.58	122	50	20	10	10	3	4	1	6
2013	221	439	2,146.12	150	67	24	13	9	7	3	1	8
2014	256	486	1,445.83	188	63	42	13	12	8	6	0	13
2015	218	344	861.07	158	64	42	15	2	8	3	0	11
Total	1,529	2,649	13,782.90	1,058	391	198	93	55	52	36	3	78

Panel E: Summary statistics of fintech status by region in 2017

Columns (1)–(4) report the number of fintech startup formations each year that are still operating, had an IPO, were closed, or were acquired by another firm until 2017 using the total sample. Columns (5)–(12) report the respective numbers for the EU-27 sample and the U.S. sample.

YEAR	FINTECH STATUS IN 2017											
	TOTAL SAMPLE				EU-27 SAMPLE				U.S. SAMPLE			
	1	2	3	4	5	6	7	8	9	10	11	12
	Still operating in 2017	IPO until 2017	Closed until 2017	Acquired until 2017	Still operating in 2017	IPO until 2017	Closed until 2017	Acquired until 2017	Still operating in 2017	IPO until 2017	Closed until 2017	Acquired until 2017
2005	166	21	9	106	36	3	2	22	96	13	7	68
2006	178	34	19	111	32	4	3	17	95	18	12	75
2007	230	35	29	121	54	4	4	21	117	18	21	85
2008	256	27	37	82	53	4	1	14	143	15	31	52
2009	342	20	32	112	74	2	3	19	202	13	27	74
2010	462	17	33	106	98	0	4	17	243	13	28	70
2011	611	18	57	105	123	3	8	21	334	11	42	68
2012	765	16	30	104	163	5	2	18	395	7	21	58
2013	930	24	25	83	201	2	6	12	458	14	12	42
2014	1,015	5	21	68	237	1	3	15	480	2	13	36
2015	844	3	12	32	209	1	2	6	353	1	5	16
Total	5,799	220	304	1,030	1,280	29	38	182	2,916	125	219	644
Percentage	78.9%	3.0%	4.1%	14.0%	83.7%	1.9%	2.5%	11.9%	74.7%	3.2%	5.6%	16.5%

Table III. Drivers of fintech startup formations, full sample

The dependent variables in column (1) pertain to the number of new fintech startups founded in a given country and year. In columns (2)–(7), we report results for fintech startups providing *financing*, *payment*, *asset management, insurance, loyalty program*, and *other* business activities only. The data take panel structure. We report random effects negative binomial panel regressions for the columns (1)–(7) because the dependent variables are count variables. All variables are defined in Appendix Table A2. Standard errors are clustered at the country level, and the model allows dispersion to vary randomly across clusters. Columns (1)–(7) report incident rate ratios. Significance levels: * < 10%, ** < 5%, and *** < 1%.

Dependent variables	(1) Number of startups founded by year and country	(2) Financing	(3) Payment	(4) Asset Management	(5) Insurance	(6) Loyalty Programs	(7) Others
L.Ln (GDP per capita)	1.593***	1.713***	1.659***	1.486*	1.596	2.001*	2.266***
L.Commercial bank branches	0.996	0.999	0.992**	1.000	0.988*	0.988	0.994
L.VC financing	1.241***	1.284***	1.671***	1.537***	1.489*	1.540	1.330
L.MSCI returns	1.048	1.059	1.104	1.075	0.994	0.680	1.200*
L.Availability of latest technologies	1.125	0.957	1.880***	1.207	1.205	1.979**	1.130
L.Mobile telephone subscriptions	1.005**	1.006**	1.002	0.998	1.001	1.007	0.998
L.Internet penetration	0.994	0.995	0.990	0.998	0.996	0.981	0.982*
L.Secure Internet servers	1.258***	1.176	1.166	1.119	1.158	1.349	1.239
L.Fixed broadband subscriptions	1.019	1.030**	1.017	0.994	1.018	0.998	0.990
L.Soundness of banks	1.030	1.033	1.077	1.124	0.985	0.944	1.088
L.Investment Profile	0.986	0.988	0.936	0.889**	0.992	0.934	0.892*
L.Ease of access to loans	0.812**	0.828*	0.662***	0.780*	1.086	0.628**	0.665***
MSCI crisis period	0.646**	0.518***	0.951	0.900	0.847	0.690	0.650
L.Ln (labor force)	1.796***	1.985***	1.742***	1.933***	1.818***	1.795**	1.806***
L.Regulation	1.184**	1.087	1.330**	1.218	1.189	2.483***	1.478***
L.Strength of legal rights	1.181***	1.225***	1.170***	1.167***	1.127*	1.067	1.223***
L.Unemployment rate	1.011	1.008	0.986	0.992	1.007	1.025	1.016
L.Law and order	0.828**	0.781**	0.834*	1.139	0.869	0.931	1.516***
L.Cluster development	1.006	1.098	0.818	1.213	0.927	0.678	1.003
L.Freedom to trade internationally	1.002	0.935	1.130	1.546***	0.989	1.035	1.239
L.Sound money	1.111	1.186	0.955	0.968	1.111	0.856	1.080
L.New startup formation*10^{-3}	1.125***	1.108*	1.257***	1.305***	1.352***	1.090	1.287***
AdjustedR^2	-	-	-	-	-	-	-
Wald χ2	674.88***	525.74***	658.64***	2255.97***	1341.82***	780.55***	2128.83***
Log likelihood	-947.44	-818.36	-588.38	-411.19	-263.62	-231.11	-321.94
AIC	1944.88	1686.73	1226.77	872.39	577.24	512.22	693.88
BIC	2048.81	1790.66	1330.69	976.32	681.17	616.14	797.81
Observations	472	472	472	472	472	472	472

Table IV. Drivers of fintech startup formations, excluding U.S. Sample

The dependent variables in column (1) pertain to the number of new fintech startups founded in a given country and year. In columns (2)–(7), we report results for fintech startups providing *financing*, *payment*, *asset management*, *insurance*, *loyalty program*, and *other* business activities only. The data take panel structure. We report random effects negative binomial panel regressions for the columns (1)–(7) because the dependent variables are count variables. All variables are defined in Appendix Table A2. Standard errors are clustered at the country level, and the model allows dispersion to vary randomly across clusters. Columns (1)–(7) report incident rate ratios. Significance levels: * < 10%, ** < 5%, and *** < 1%.

Dependent variables	(1) Number of startups founded by year and country	(2) Financing	(3) Payment	(4) Asset Management	(5) Insurance	(6) Loyalty Programs	(7) Others
L.Ln (GDP per capita)	1.410**	1.504**	1.455*	1.703**	1.747*	1.619	2.571***
L.Commercial bank branches	0.996	0.998	0.992**	0.996	0.990	0.990	0.994
L.VC financing	1.257***	1.346***	1.724***	1.578***	1.532*	1.553	1.339
L.MSCI returns	1.082	1.079	1.158*	0.964	0.936	1.089	1.170
L.Availability of latest technologies	1.209*	1.062	1.821***	1.118	1.228	1.955*	1.154
L.Mobile telephone subscriptions	1.005**	1.006**	1.002	1.003	1.001	1.009*	1.000
L.Internet penetration	0.999	1.000	0.994	0.994	0.998	1.004	0.980
L.Secure Internet servers	1.221**	1.103	1.224*	0.833	1.026	1.185	1.145
L.Fixed broadband subscriptions	1.006	1.013	1.006	1.020	1.002	0.970	0.982
L.Soundness of banks	0.977	0.981	1.068	1.023	1.005	1.060	1.065
L.Investment Profile	1.036	1.052	0.965	1.034	1.040	0.944	0.914
L.Ease of access to loans	0.853*	0.869	0.676***	0.726**	1.251	0.647*	0.676**
MSCI crisis period	0.710*	0.577**	1.021	0.775	0.841	0.801	0.625
L.Ln (labor force)	1.710***	1.834***	1.506***	2.067***	1.726***	1.612*	1.721***
L.Regulation	1.470***	1.343**	1.485***	1.194	1.160	2.632***	1.674***
L.Strength of legal rights	1.068*	1.102**	1.055	1.113*	1.074	0.916	1.129*
L.Unemployment rate	1.019	1.024	0.980	1.014	0.997	1.011	1.019
L.Law and order	0.877	0.881	0.849	1.258	0.821	1.029	1.672***
L.Cluster development	1.017	1.073	0.819	1.071	0.868	0.643	0.955
L.Freedom to trade internationally	0.993	0.947	1.181	1.187	0.796	0.944	1.070
L.Sound money	1.033	1.067	0.877	0.928	1.307	0.857	1.001
L.New startup formation*10^{-3}	5.030***	7.629***	4.886***	10.000***	12.902***	10.238**	5.427**
AdjustedR^2	-	-	-	-	-	-	-
Wald χ2	577.09***	460.82***	454.80***	292.66***	210.32***	157.01***	343.88***
Log likelihood	-888.92	-766.97	-543.39	-370.71	-234.43	-196.51	-291.47
AIC	1827.84	1583.95	1136.78	791.42	518.69	443.02	632.95
BIC	1931.28	1687.39	1240.22	894.86	622.14	546.46	736.39
Observations	463	463	463	463	463	463	463

Appendix

Table A1. List of countries in the dataset (ranking according to number of fintech startups)

World Ranking	Country	# Fintech Started	World Ranking	Country	# Fintech Started	World Ranking	Country	# Fintech Started
1	United States	3,904	37	Malaysia	17	73	Myanmar	3
2	United Kingdom	695	38	Estonia	16	74	Zimbabwe	3
3	India	262	39	Nigeria	16	75	Azerbaijan	2
4	Canada	247	40	Bermuda	15	76	Croatia	2
5	China	160	41	Ghana	15	77	Dominica	2
6	Australia	154	42	Colombia	14	78	Gibraltar	2
7	Singapore	139	43	Luxembourg	14	79	Iran, Islamic Rep.	2
8	Germany	135	44	Egypt, Arab Rep.	13	80	Jordan	2
9	France	132	45	Norway	13	81	Malta	2
10	Brazil	79	46	Ukraine	12	82	Namibia	2
11	Netherlands	75	47	Vietnam	11	83	Slovenia	2
12	Spain	70	48	Czech Republic	10	84	Sri Lanka	2
13	Israel	66	49	Portugal	10	85	Algeria	1
14	Hong Kong SAR, China	63	50	Greece	9	86	Barbados	1
15	Sweden	63	51	Latvia	9	87	Belarus	1
16	Russian Federation	62	52	Lebanon	9	88	Belize	1
17	South Africa	60	53	Mauritius	9	89	Botswana	1
18	Mexico	56	54	Thailand	9	90	Costa Rica	1
19	Switzerland	55	55	Bulgaria	8	91	Côte d'Ivoire	1
20	Ireland	50	56	Cayman Islands	8	92	Dominican Republic	1
21	Italy	44	57	Cyprus	8	93	El Salvador	1
22	Denmark	42	58	Iceland	8	94	Guatemala	1
23	Japan	41	59	Hungary	7	95	Isle of Man	1
24	Belgium	38	60	Slovak Republic	7	96	Jersey	1
25	Indonesia	32	61	Romania	6	97	Macedonia, FYR	1
26	Chile	31	62	Bangladesh	4	98	Malawi	1
27	Argentina	30	63	Lithuania	4	99	Morocco	1
28	Finland	27	64	Pakistan	4	100	Puerto Rico	1
29	Korea, Rep.	26	65	Panama	4	101	Qatar	1
30	Poland	26	66	Peru	4	102	Seychelles	1
31	New Zealand	24	67	Rwanda	4	103	Sierra Leone	1
32	Turkey	24	68	Uganda	4	104	Togo	1
33	Austria	20	69	United Republic of Tanzania	4	105	Trinidad and Tobago	1
34	Philippines	20	70	Bahrain	3	106	Uruguay	1
35	Kenya	19	71	Chinese Taipei	3	107	Zambia	1
36	United Arab Emirates	19	72	Guernsey	3			

Table A2. List of variables

Variable Name	Definition
Dependent variables	
Number of fintech startups founded	The number of fintech startups founded in a given country and year. Source: CrunchBase.
Asset management	The number of new fintech startups providing asset management services founded in a given country and year. Source: CrunchBase.
Financing	The number of new fintech startups providing financing services founded in a given country and year. Source: CrunchBase.
Insurance	The number of new fintech startups providing insurance services founded in a given country and year. Source: CrunchBase
Loyalty program	The number of new fintech startups providing loyalty program services founded in a given country and year. Source: CrunchBase
Others	The number of new fintech startups providing risk management, exchanges, regtech, and other fintech services founded in a given country and year. Source: CrunchBase.
Payment	The number of new fintech startups providing payment services founded in a given country and year. Source: CrunchBase.
Explanatory variables	
Cluster development	Response to the survey question: "In your country, how widespread are well-developed and deep clusters" (geographic concentrations of firms, suppliers, producers of related products and services, and specialized institutions in a particular field). The variable runs from 1 = *nonexistent* to 7 = *widespread in many fields*. Source: World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.
Commercial bank branches	Is the (Number of institutions + number of bank branches) * 100,000 / adult population in the reporting country. Source: International Monetary Fund, Financial Access Survey.
Ease of access to loans	Response to the survey question: "During the past year, has it become easier or more difficult to obtain credit for companies in your country?" (1 = *much more difficult*, 7 = *much easier*). Source: World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.

Fixed broadband subscriptions	Data are collected by national statistics offices through household surveys. Fixed broadband subscriptions refers to fixed subscriptions to high-speed access to the public Internet, at downstream speeds equal to or greater than 256 Kbit/s. This include cable modem, DSL, fiber-to-the-home/building, other fixed- (wired-) broadband subscriptions, satellite broadband, and terrestrial fixed wireless broadband. The variable measures fixed broadband Internet subscribers per 100 adults in the population. Source: World Telecommunication/ICT Development report and database.
Freedom to trade internationally	Data come from third party sources, such as the International Country Risk guide, the Global Competitiveness report, and the World Bank's Doing Business project. The variables include components to measure a wide variety of restraints that affect international exchange: tariffs, quotas, hidden administrative restraints, control on exchange rates, and the movement of capital. The variable ranges from 0 to 10. A higher rating indicates that countries have low tariffs, easy clearance and effcient adminitration of customs, a freely convertible currency, and few comtrols on the movement of physical and human capital. Source: The Fraser institute database.
Internet penetration	Data are based on surveys carried out by national statistical offices or estimated on the basis of the number of Internet subscriptions. Internet users refer to people using the Internet from any device (including mobile phones) during the year under review. We use the percentage of residents using the Internet at the year and country level. Source: World Telecommunication/ICT Development report and database.
Investment profile	Assessment of factors affecting the risk of investment that are not covered by other political, economic, and financial risk components. The index is calculated on the basis of three subcomponents as follows: contract viability, profits repatriation, and payment delays. Each subcomponent ranges from 0 to 4 points; a score of 4 points indicates very low risk, and a score of 0 very high risk. Source: ICRG.
Latest technology	Response to the survey question: "In your country, to what extent are the latest technologies available?" (The variable runs from 1 = *not available* at all to 7 = *widely available.*) Source: World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.
Law and order	Law and order form a single component, but its two elements are assessed separately, with each element being scored from 0 to 3 points. The index of *law and order* runs from 0 to 6, with higher values indicating better legal systems. Source: ICRG.
Ln (GDP per capita)	GDP per capita is the gross domestic product per capita in USD. Source: World Development Indicators database.

Ln (labor force)	Total labor force comprises people ages 15 and older who meet the International Labour Organization definition of the economically active population: all people who supply labor for the production of goods and services during a specific period. Source: World Development Indicators database.
Mobile telephone subscriptions	A mobile telephone subscription refers to a subscription to a public mobile telephone service that provides access to the public switched telephone network using cellular technology, including the number of pre-paid SIM cards active during the last three months of the year under review. This includes both analog and digital cellular systems (IMT-2000, Third Generation, 3G) and 4G subscriptions, but excludes mobile broadband subscriptions via data cards or USB modems. The variable measures the number of mobile telephone subscriptions per 100 adults in the population. Source: World Telecommunication/ICT Development report and database.
MSCI crisis period	The equally weighted average of the percentage change in the country-specific MSCI Stock Market Equity Index Returns for 2008 and 2009. Source: MSCI website and own calculation
MSCI returns	The percentage change in the country-specific MSCI Stock Market Equity Index Returns from the prior year to the current year. Source: http://www.msci.com/
New startup formation	Annual number of new startups founded in a given year and country. The data were retrieved from the CrunchBase database and measure the number of new startups created according to CrunchBase in a given year and country. Source: CrunchBase and own calculations.
Regulation	Data come from third-party sources, such as the International Country Risk Guide, the Global Competitiveness Report, and the World Bank's Doing Business project. The variable measures the extent to which regulation limits the freedom of exchange in credit, labor, and product markets in a specific country. The variable ranges from 0 to 10, with higher ratings indicating that countries have less control on interest rates, have higher freedom to market forces to determine wages and establish the conditions of hiring and firing, and generally possess lower administrative burdens. Source: The Fraser institute database.
Secure Internet servers	Secure servers per one million people are servers using encryption technology in Internet transactions. Source: World Bank and https://www.netcraft.com
Sound money	Data come from third-party sources, such as the International Country Risk guide, the Global Competitiveness report, and the World Bank's Doing Business project. The variable includes the components money growth, standard deviation of inflation, inflation, and freedom to own foreign currency bank accounts. The first three are designed to measure the

consistency of the monetary policy with long-term price stability. The last component is designed to measure the ease with which other currencies can be used via domestic and foreign bank accounts. The variable ranges from 0 to 10; to earn a higher rating, a country must follow policies and adopt institutions that lead to low rates of inflation and avoid regulations that limit the ability to use alternative currencies. Source: Fraser Institute Database.

Soundness of banks	Response to the survey question: "In your country, how do you assess the soundness of banks?" (The variable runs from 1 = *extremely low – banks may require recapitalization* to 7 = *extremely high – banks are generally healthy with sound balance sheets*.) World Economic Forum, Global Competitiveness Report, Executive Opinion Survey.
Strength of legal rights	The index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending in a country. The index ranges from 0 to 12, with higher scores indicating that these laws are better designed to expand access to credit. Source: World Bank, Doing Business database.
Unemployment rate	Calculated as the percentage from the total labor force. Source: World Development Indicators database.
VC financing	The natural logarithm of the total amount of VC funding of all the startups available in the CrunchBase database excluding the fintech startups used in our analysis over the GDP per capita at the country level. The variable is constructed using available data in the CrunchBase database. Source: CrunchBase, World Development Indicators database, and own calculations.

Table A3. Summary statistics

Variable	Nbr. Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
Dependent variables						
# Fintech startups founded by year and country	472	11.84	2.00	53.82	0.00	531.00
# Financing	472	7.86	1.00	35.46	0.00	362.00
# Payment	472	2.85	0.00	12.19	0.00	150.00
# Asset Management	472	1.49	0.00	6.58	0.00	66.00
# Insurance	472	0.68	0.00	3.25	0.00	37.00
# Loyalty Programs	472	0.47	0.00	2.30	0.00	25.00
# Other business activities	472	1.24	0.00	6.20	0.00	62.00
Explanatory variables						
Ln (GDP per capita)	472	9.58	9.77	1.22	6.57	11.54
Commercial bank branches	472	26.31	19.61	23.53	0.76	256.26
VC financing	472	1.26	1.69	0.90	0.00	3.34
MSCI returns	472	0.17	0.00	0.90	-1.00	10.92
Availability of latest technologies	472	5.34	5.39	0.88	2.71	6.87
Internet penetration	472	53.76	57.89	25.97	2.81	96.30
Mobile telephone subscriptions	472	110.52	111.70	31.70	14.52	239.30
Fixed broadband subscriptions	472	16.71	17.28	12.16	0.01	42.56
Secure Internet servers	472	7.49	7.50	2.07	1.10	13.11
Soundness of banks	472	5.52	5.62	0.91	1.44	6.90
Investment Profile	472	9.80	10.00	1.81	5.08	12.00
Ease of access to loans	472	3.47	3.45	0.87	1.57	5.51
MSCI crisis period	472	0.14	0.05	0.59	-0.48	3.23
Ln (labor force)	472	16.07	16.04	1.43	13.40	20.51
Regulation	472	7.14	7.12	0.69	5.13	8.85
Strength of legal rights	472	6.69	7.00	2.20	2.00	10.00
Unemployment rate	472	7.93	7.15	4.69	0.70	27.20
Law and order	472	4.24	4.50	1.23	1.29	6.00
Cluster development	472	4.10	4.07	0.71	2.49	5.60
Freedom to trade internationally	472	7.55	7.66	0.95	3.36	9.49
Sound money	472	8.72	9.24	1.12	4.61	9.86
New startup formation	472	119.30	16.00	552.79	0.00	5254.00

Table A4. Correlation matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
# Fintech startups founded by year and country	(1)	1.0000										
# Financing	(2)	0.9988	1.0000									
# Payment	(3)	0.9829	0.9837	1.0000								
# Asset Management	(4)	0.9641	0.9620	0.9294	1.0000							
# Insurance	(5)	0.9726	0.9688	0.9465	0.9540	1.0000						
# Loyalty Programs	(6)	0.9209	0.9138	0.8931	0.8305	0.8759	1.0000					
# Others	(7)	0.9891	0.9848	0.9611	0.9486	0.9633	0.9222	1.0000				
Ln (GDP per capita)	(8)	0.1695	0.1682	0.1705	0.1598	0.1637	0.1623	0.1792	1.0000			
Commercial bank branches	(9)	0.0367	0.0356	0.0248	0.0370	0.0366	0.0377	0.0462	0.2785	1.0000		
VC financing	(10)	0.2140	0.2169	0.2206	0.2267	0.2036	0.1923	0.1925	0.2244	-0.0373	1.0000	
MSCI return	(11)	-0.0155	-0.0148	-0.0154	-0.0160	-0.0102	-0.0264	-0.0161	-0.0348	0.0552	-0.0831	1.0000
Availability of latest technologies	(12)	0.2117	0.2124	0.2189	0.2080	0.1998	0.1967	0.2035	0.7134	0.0188	0.3951	-0.1839
Mobile telephone subscriptions	(13)	-0.0754	-0.0746	-0.0636	-0.0934	-0.0794	-0.0417	-0.0729	0.5135	0.1523	0.0174	-0.0081
Internet penetration	(14)	0.1628	0.1628	0.1718	0.1516	0.1547	0.1562	0.1668	0.8832	0.2149	0.2707	-0.1277
Secure Internet servers	(15)	0.4266	0.4274	0.4255	0.4282	0.4071	0.3932	0.4170	0.6989	0.2202	0.5682	-0.1084
Fixed broadband subscriptions	(16)	0.1697	0.1703	0.1812	0.1556	0.1556	0.1681	0.1707	0.8731	0.2531	0.2885	-0.1240
Soundness of banks	(17)	-0.0339	-0.0344	-0.0325	-0.0234	-0.0137	-0.0644	-0.0365	0.2543	0.0180	0.0739	0.0794
Investment Profile	(18)	0.1673	0.1670	0.1581	0.1644	0.1715	0.1417	0.1745	0.6022	0.1187	0.0372	0.0455
Ease of access to loans	(19)	0.0846	0.0856	0.0697	0.1030	0.1030	0.0400	0.0836	0.3237	-0.0763	0.1158	0.0971
MSCI crisis period	(20)	-0.1135	-0.1143	-0.1153	-0.1127	-0.1085	-0.1023	-0.1060	-0.1774	0.0713	-0.3299	0.1286
Ln (labor force)	(21)	0.3105	0.3132	0.3052	0.3340	0.2964	0.2683	0.2842	-0.3883	-0.0659	0.3935	0.0161
Regulation	(22)	0.2157	0.2151	0.2093	0.2180	0.2058	0.1928	0.2195	0.2960	0.0676	0.1413	-0.0734
Strength of legal rights	(23)	0.1653	0.1683	0.1612	0.1609	0.1575	0.1495	0.1611	0.1356	-0.1189	0.1816	0.0091
Unemployment rate	(24)	-0.0258	-0.0271	-0.0349	-0.0412	-0.0263	-0.0026	-0.0186	-0.0967	0.1665	-0.0500	-0.0633
Law and order	(25)	0.1161	0.1170	0.1184	0.1124	0.1081	0.1057	0.1259	0.7478	0.1089	0.2006	-0.0258
Cluster development	(26)	0.2737	0.2770	0.2772	0.2831	0.2600	0.2427	0.2580	0.5015	-0.0514	0.4471	-0.0983
Freedom to trade internationally	(27)	0.0782	0.0797	0.0763	0.0794	0.0710	0.0622	0.0827	0.6338	0.1564	0.1795	-0.0340
Sound money	(28)	0.1137	0.1129	0.1098	0.1102	0.1123	0.1043	0.1234	0.7051	0.3827	0.1416	-0.0913
New startup formation*10^{-3}	(29)	0.9967	0.9941	0.9709	0.9685	0.9730	0.9218	0.9897	0.1715	0.0445	0.2137	-0.0177

Table A4. Continued

		(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Availability of latest technologies	(12)	1.0000										
Mobile telephone subscriptions	(13)	0.3507	1.0000									
Internet penetration	(14)	0.7706	0.5035	1.0000								
Secure Internet servers	(15)	0.6642	0.2230	0.7173	1.0000							
Fixed broadband subscriptions	(16)	0.7394	0.4254	0.9064	0.7386	1.0000						
Soundness of banks	(17)	0.2746	0.0652	0.1684	0.1025	0.1130	1.0000					
Investment Profile	(18)	0.4456	0.2590	0.4702	0.2967	0.4444	0.6333	1.0000				
Ease of access to loans	(19)	0.3837	0.0616	0.2702	0.1692	0.2092	0.7008	0.6411	1.0000			
MSCI crisis period	(20)	-0.3359	0.0204	-0.2363	-0.3442	-0.2240	-0.1993	-0.1285	-0.1923	1.0000		
Ln (labor force)	(21)	-0.1825	-0.4687	-0.3512	0.2834	-0.3016	-0.1294	-0.3535	-0.1226	-0.1372	1.0000	
Regulation	(22)	0.3392	0.2042	0.3733	0.2594	0.3600	0.3439	0.4029	0.3935	-0.1483	-0.2002	1.0000
Strength of legal rights	(23)	0.1645	0.1056	0.2301	0.2090	0.2155	0.1209	0.2215	0.2473	-0.0571	-0.0692	0.5539
Unemployment rate	(24)	-0.1039	-0.0236	-0.1436	-0.1093	-0.1019	-0.2836	-0.2061	-0.4031	0.2221	-0.1167	-0.1778
Law and order	(25)	0.6702	0.2627	0.7307	0.5671	0.7479	0.1997	0.5335	0.4055	-0.0782	-0.2913	0.2698
Cluster development	(26)	0.6572	0.1731	0.5047	0.6021	0.4827	0.2828	0.3827	0.4734	-0.3455	0.1911	0.3430
Freedom to trade internationally	(27)	0.5480	0.3662	0.5518	0.3837	0.5624	0.3013	0.5754	0.4287	-0.1908	-0.3852	0.4409
Sound money	(28)	0.5064	0.3127	0.6418	0.4864	0.6817	0.2352	0.5309	0.2096	-0.0425	-0.3805	0.3215
New startup formation*10^{-3}	(29)	0.2134	-0.0834	0.1624	0.4313	0.1702	-0.0331	0.1698	0.0863	-0.1107	0.3144	0.2088

		(23)	(24)	(25)	(26)	(27)	(28)	(29)
Strength of legal rights	(23)	1.0000						
Unemployment rate	(24)	-0.2214	1.0000					
Law and order	(25)	0.1473	-0.1095	1.0000				
Cluster development	(26)	0.1473	-0.3128	0.4554	1.0000			
Freedom to trade internationally	(27)	0.2620	-0.1557	0.5164	0.3789	1.0000		
Sound money	(28)	0.0660	0.1322	0.5621	0.2688	0.7165	1.0000	
New startup formation*10^{-3}	(29)	0.1612	-0.0223	0.1221	0.2739	0.0782	0.1187	1.0000