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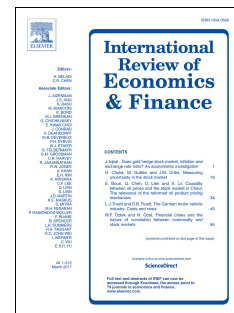
Financial Inclusion, Financial Innovation, and

Firms' Sales Growth

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Financial Inclusion, Financial Innovation, and Firms' Sales Growth

Abstract

This paper examines the effect of financial inclusion on firms' sales growth in developing countries and also investigates how this effect varies depending on different subsamples (such as during a crisis versus a non-crisis, Asia versus non-Asia, manufacturing versus non-manufacturing, and small- and medium-sized firms versus large- and medium-sized firms). Our first finding is that financial inclusion helps firms increase their sales growth during normal times and in non-Asia regions. After using interaction terms between financial inclusion and financial innovation, our second finding is that financial innovation has a negative impact on the sales growth rate of firms engaging in financial inclusion. Our results provide insights and implications for policy makers and regulators.

Keywords: Financial innovation; Financial inclusion; Developing countries; Firm's sales growth; Access to finance.

JEL Classifications: G21, G01, G30, O16.

1. Introduction

The existing literature has stressed the importance of collateral and good relations with banks as factors that help increase firms' access to credit from traditional financial institutions (Gopalan, Udell, & Yerramilli, 2011; Calcagnini, Farabullini, & Giombini, 2014; Naegels, D'Espallier, & Mori, 2020). As Donati (2016) points out, small businesses without access to affordable credits have a hard time expanding and creating jobs. Therefore, promoting financial inclusion enables small businesses, which had previously been excluded from traditional financial channels, to obtain credit, generate productivity, and increase sales growth. The aim of this paper is thus to investigate the effect of financial inclusion on sales growth for firms in developing countries by specifically examining different subsamples on this effect. Additionally, we focus on whether financial innovation is likely to strengthen or weaken the relationship between financial inclusion and firms' sales growth.

The consequences of the financial inclusion-sales growth nexus have been a hot issue in academia, and whether the effect varies with subsample characteristics remains unknown. First, we target the occurrence of crises on impeding the effect of financial inclusion on firms' sales growth. As much literature has documented the effect of crises on firm growth, we believe that firms in developing countries participating in financial inclusion might also be affected as well by having to tighten credit constraints during a crisis. We thus help fill the gap in the literature and provide evidence to regulators and policymakers on whether a financial crisis influences financial inclusion's effect on firms' sales growth. Second, we perform our study on Asia and non-Asia regions by comparing the results of both less developed Asia countries and developed non-Asia countries in order to understand whether developed countries with higher financial inclusion provide more growth opportunities on firms' sales. To our knowledge, this remains an under-researched area. Third, we consider manufacturing and non-manufacturing industries and investigate whether manufacturing firms with income stability and regular repayment ability have higher credit availability from banks, which enhances sales growth. Fourth, we focus on firm size and whether size affects the relationship between financial inclusion and firms' sales growth since large firms have better access to financial services than small ones. No study has yet to focus on whether

the effect of financial inclusion on large enterprises' sales growth is greater than that on small enterprises'.

Financial innovation in recent years has become a hot concern of both scholars and policy makers. Some researchers attribute the impact of financial innovation to a number of outcomes, including financial crisis and more credit dynamics (Beck, 2014; Kim, Koo, & Park, 2013; Grydaki & Bezemer, 2013). The role of financial innovation on firms' sales growth remains ambiguous. In our extended estimates, we therefore include the interaction of financial innovation and financial inclusion in order to understand whether the impact of financial inclusion on sales growth correlates with financial innovation.

Our paper differs from the existing literature. Using data from India firms, Sethi and Sethy (2019) investigate the long-term relationship between financial inclusion and economic growth and find that financial inclusion has a positive impact on economic growth. Kim, Yu, and Hassan (2018) also find a positive relationship between financial inclusion and economic growth in Organization of Islamic Cooperation (OIC) countries. While they focus on the financial inclusion-economic growth nexus in a single country or Muslim-majority countries, our paper uses the World Bank Enterprise Survey (WBES) on a sample of 47 developing countries over the period 2006-2016 and examines the role of financial inclusion in explaining firms' sales growth. Chauvet and Jocolin (2017) use 55,596 firms from developing and emerging countries to show that financial inclusion enhances firms' sales growth, but this effect is less likely in a more concentrated banking system. Different from their work, we use financial innovation to replace bank concentration and expect that financial innovation may affect the inclusion-sales growth nexus differently since financial innovation can affect sales growth by enabling firms to obtain efficient loan services.

Our paper has two contributions. First, it enhances the finance and sales growth literature by investigating various approaches to raise sales growth. Brown, Earle, and Lup (2005) employ panel data from Romania firms and find that access to external credit substantially increases sales growth. Chauvet and Ehrhart (2018) suggest that financial aid enhances firms' sales growth. Ayyagari, Demirgüç-Kunt, and Maksimovic (2014) argue that firms' sales growth is higher when it comes to small firms. We focus on country-and firm-level measures of financial inclusion and examine their effects on

firms' sales growth. Second, our paper focuses on two emerging issues in recent years: financial inclusion and financial innovation. We find that the positive relationship between financial inclusion and sales growth disappears when we include financial innovation, suggesting that policies that enhance financial inclusion may be instrumental alone in spurring firms' sales growth.

The remainder of the paper is structured by the following sections. Section 2 discusses the theoretical background and literature review. Section 3 explains the data, variable definitions, and model specifications. Section 4 provides empirical results. Robustness checks are in Section 5. The conclusion is in Section 6.

2. Literature review and theoretical background

2.1 Financial inclusion and firms' sales growth

Sales growth remains an important representation of corporate financial performance, while financial inclusion is related to obtaining access to financial services, especially access to credit. Since firms of developing countries are unable to obtain access to credit availability from traditional financial systems, the impact of financial inclusion has led to significant value added to financially constrained firms. In particular, the benefit from accessibility and usability is that raising funds is not restricted by time or space. The reason why researchers are eager to investigate how to increase access to finance is that they believe this behavior fosters firms' sales growth. This conviction clearly reflects the promotion of developing countries on the recent development of financial inclusion.

There are two aspects concerning access to credit as a crucial determinant for firms' sales growth. First, Brown et al. (2005) employ panel data from Romania firms and find that access to external credit will substantially increase sales growth. Second, Gopalan et al. (2011) point out that firms need to maintain good relations with banks in order to obtain large bank credit amounts, especially for small-sized firms. Based on the above arguments, firms determine their external financing needs relevant to their sales amount; small firms cannot resist the risk of insufficient repayment sources, so they maintain close relations with banks to improve their financing conditions.

Credit constraints are found to lower a firm's ability to obtain external funds, thus decreasing sales growth. In accordance with the function of credit constraints, Dimitrov

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and Tice (2006) uncover that credit constraints, due to either non-performing loans or recessions, could induce firms to experience lower sales growth rates. As documented in extant studies, the main obstacle to the development in developing economies is that financial services are not accessible and not usable to firms - when firms are financially constrained or in remote areas where financial services are unavailable. In addition, Calcagnini et al. (2014) analyze the role of collateral guarantees on Italian firms' lending rate. Their findings present that guarantees easily allow firms' access to credit especially for reducing repayment costs. The lack of collateral guarantees appears to be an unfavorable characteristic to firms of developing countries. Therefore, financial inclusion not only addresses the problems of credit-constrained firms and those with a lack of collateral guarantees, but also in turn boosts firms' growth in sales.

Taken all together, prior studies tend to serve as the logic for linking financial inclusion indicators with sales growth. We therefore assume that financial inclusion used by developing economies will enable their firms to access more financial services at affordable and lower costs, thus increasing sales growth. We propose the first hypothesis.

Hypothesis 1: *The introduction of financial inclusion increases firms' sales growth in developing countries.*

2.2 Financial innovation affects the relation between financial inclusion and firms' sales growth

Financial innovation is the activity of creating new financial technologies or financial institutions. The three types of financial innovation are institutional, product, and process.[1] Financial innovation not only enhances the provision of services, but also improves access to financial services. However, financial innovation hinders the two financial services most closely related to financial inclusion - credit loans and mobile payment systems - which are also the most relevant to the institutional and process innovations within financial innovation. Institutional and process innovations can expand the coverage and penetration of financial services, but we argue that those types

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[1] Examples of institutional innovation include specialist credit card companies, electronic trading platforms, and direct banks. Examples of product innovation are foreign currency mortgage loans, securitization, and derivatives. Examples of process innovation are telephone and online banking (see Davis, 2013; Federico, Langus, & Valletti, 2018).

of financial innovations are not market-driven governance, but rather are easily manipulated by government. From the view of credit loans, Zhang and Guo (2019) use a dataset of Chinese private firms and show that firms access bank financing through a government-controlled business association. In addition, although institutional and process innovations can provide firms with more convenient, efficient, and high-quality modern financial services through new payment tools (such as Internet banking and mobile banking), firms in developing countries cannot afford the high cost of setting up mobile payment systems. Moreover, for firms in developing countries where financing costs are high, the practice of payment after delivery is used in order to mitigate the risks of international trade. As to mobile payment systems, Hoefele, Schmidt-Eisenlohr, and Yu (2016) showcase cross-country and firm-level data in developing countries and confirm that international transactions are more likely to use post-delivery payment contracts in countries where financing costs are high. Based on the above findings, we believe that the applications of financial innovation in developing countries discussed above fail to broaden the financial channels for financial inclusion.

Many studies confirm that financial innovation positively influences national economic growth, but whether it significantly drives firms' sales growth remains uncertain (Laeven, Levine, & Michalopoulos, 2015; Beck, Chen, Lin, & Song, 2016). Chauvet and Jocolin (2017) emphasize that the use of financial inclusion and bank concentration, namely in the context of the volume and the price of credit, negatively affects firms' sales growth. We use financial innovation to replace bank concentration, implying that financial innovation provides low-cost and efficient loan services for firms with financing needs. This paper identifies financial innovation and financial inclusion - that is, the use of new financial instruments to access financial services - as interacting effects under the financial infrastructure of firms in developing countries that moderate firms' sales growth. Based on the above discussions, we propose the next hypothesis.

Hypothesis 2: *Financial innovation is likely to hinder the effect of financial inclusion on firms' sales growth in developing countries.*

3. Data, variable definitions, and model specifications

3.1 Data and variable definitions

To gauge the relation between firms' sales growth and financial inclusion in developing countries, we construct our variables from several sources (see Appendix A). All variables, which exclude financial innovation and country-level variables, are collected from World Bank Enterprise Surveys (WBES).[2] We use financial innovation (FI) defined by Beck et al. (2016) and Lozano-Vivas and Pasiouras (2014) and calculate the data from Fitch/Bureau Van Dijk of Bankscope CD. We compile country variables from World Development Indicators (WDI) and Worldwide Governance Indicator (WGI).

From the WBES database, we construct a dependent variable (firms' sales growth) and three measures of independent variables (financial inclusion).[3] We use the data on sales three years before the establishment of the company and calculate the logarithm for the sales growth of the company. Moreover, we use the data on access to finance for firms that have bank loans, have overdraft facilities, or finance parts of their working capital. Following Chauvet and Jacolin (2017), we thus create three alternative aggregate variables of financial inclusion from the firm-year data using frequency weights in a country with the percentage of firms having bank loans (I-loan), have overdraft facilities (I-overdraft), or finance part of their working capital (I-wcbank). The WBES database does not contain the ratio of the population with bank accounts or their use of financial services, but is instead limited to the allocation of credits between companies at the national and industrial levels. Nevertheless, we regard this as an advantage for two reasons. First, it presents different characteristics of the country's financial development. Second, it contains information on the characteristics of the

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[2] We thank Joshua Wimpey, a private sector development specialist, for providing us with the available data sources from the Enterprise Surveys (ES). Using the WBES database like in other literature (Beck, Demirgüç-Kunt, & Singer, 2013; Chauvet & Jacolin, 2017; Fowowe, 2017), we collect firm level-data.

[3] Many definitions and understandings of financial inclusion are discussed. The United Nations identify financial inclusion to be "a financial system that provides effective and comprehensive access to financial services for all social groups, especially the poor and low-income population." Compared with other financial services, financial inclusion has three characteristics. First, it serves a wider range of people, including middle- and low-income groups, small private enterprises, and poor and remote areas. Second, there are more service providers, including banking financial institutions, non-bank financial institutions, internet financial enterprises, social non-governmental organizations, and other institutions. Third, the overall customer volume is large, but the single business scale is small. Much of the research on the features of financial inclusion has focused on individuals' access to finance, rather than companies' access to finance (Grohmann, Klühs, & Menkhoff, 2018).

financing needs of different sectors in each country (Rajan & Zingales, 1998).[4] In addition, we collect data on SIZE, FOREIGN, STATE, EXPORT, and LOAN from the WEBS database to control for financial constraints to inhibit firm growth.[5] A lot of evidence suggests that FOREIGN, EXPORT, STATE, LOAN, and SIZE are positively associated with sales growth (Beck, Demirgüç-Kunt, & Maksimovic, 2005; Gopalan et al., 2011; Harrison, Lin, & Xu, 2014). Those variables are explained in Appendix A.

Data on financial innovation come from Fitch/Bureau Van Dijk of Bankscope CD. Financial innovation (FI) is defined as the ratio of the total value of off-balance-sheet items to total assets in our country-level regressions, because off-balance sheet items (weighted by total assets) in a country portray some forms of financial innovative activity. We expect FI to positively correlate with sales growth (Filatotchev & Piesse, 2009; Ang, Cheng, & Wu, 2014) in accordance with previous literature.

From World Development Indicators (WDI), we include several country-level control variables (LP or LINCOME). LINCOME is used to control for differences in economic conditions, while LP is to control the development of the financial system and diffusion of financial services (García-Teruel & Martínez-Solano, 2010; Akileng, Lawino, & Nzibonera, 2018). We also use CORRUPTION as a country variable from Worldwide Governance Indicator (WGI). LP and LINCOME are positively related to sales growth, while corruption is negatively correlated with sales growth (Harrison et al., 2014; Head, Lloyd-Ellis, & Sun, 2014).

As shown in Table 1, our dataset covers 47 countries over the period 2006-2016.[6] Out of 47 countries, we form various subsamples that include a sample of Asia countries, non-Asia countries, manufacturing and non-manufacturing samples

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[4] The WBES data cover 23 sectors and can be separated into two categories according to ISIC Revision 3.0. The manufacturing (MANUF) category has 17 sectors, including tobacco, textile, food, leather, wood, paper, garments, publishing, chemicals and refined petroleum, rubber and plastics, metallic and non-metallic mineral products, fabricated metal products, electronics, motor vehicles, furniture, machinery and equipment, and other manufacturing. The non-manufacturing (NONMANUF) category covers sectors of retail trade, wholesale trade, IT, transport and construction, hotel, and other services. Please see Appendix B for the list of sectors.

[5] SIZE consists of three size dummies (equal to 1 if there are less than 20 employees; equal to 2 if there are between 20 and 100 employees; equal to 3 if there are more than 100 employees).

[6] Table 1 lists country names and provides the number of firms in each country in the dataset based on our study. The list of sectors and the number of firms are provided in Appendix B. The number of firms in other subsamples is available upon request.

distinguished by industrial structure, crisis samples and non-crisis samples distinguished from the financial crisis of 2007-2009, large firm (MLEs) sample and small firm (SMEs) sample by firm size.[7] Overall, there are eight subsamples. It is important to study the effects of the factors above separately, as one could draw biased inferences when those factors are pooled together.

This paper does not explore each of the descriptive statistics for all data series, but rather attempts to provide a brief view of the dataset by considering only the mean and the standard deviation of our main variables - namely, firms' sales growth (LSG), three measures of financial inclusion (I-loan, I-overdraft, and I-wcbank), and financial innovation (FI). First, in terms of firms' sales growth, we find that the highest mean is in the sample of larger enterprises (MLEs) and the lowest mean is in the sample of smaller enterprises (SMEs) (see Table 2). Further analysis shows that, on average, ASIA is higher than NONASIA when comparing the two samples. Similarly, the results show that CRISIS is higher than NONCRISIS, manufacturing (MANUF) is higher than non-manufacturing (NONMANUF), and larger firms (MLEs) are higher than smaller firms (SMEs). Here, the average sales growth of these subsample companies appears to vary significantly.

We next compare the mean of three measures of financial inclusion for the eight subsamples. We find that the highest is the NONASIA subsample, and the lowest is the ASIA subsample. We consider the standard deviation of the three indicators of financial inclusion as a measure of the dispersion of financial inclusion. The standard deviations of the three indicators of financial inclusion suggest that the highest dispersion is in the subsamples of NONASIA and NONCRISIS and the lowest dispersion is in the subsamples of ASIA and CRISIS.

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[7] We divide our sample into Asia and non-Asian regions according to geographical concepts. There are 13 developing countries in the Asia region (Armenia, Azerbaijan, Bangladesh, Georgia, Indonesia, Kazakhstan, Kyrgyz Republic, Lao PDR, Mongolia, Pakistan, Philippines, Tajikistan, and Turkey). The rest of the developing countries are located in the non-Asia region (Albania, Argentina, Bosnia and Herzegovina, Belarus, Benin, Bolivia, Botswana, Cameroon, Colombia, Dominican Republic, Egypt, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Lesotho, Macedonia, Madagascar, Malawi, Mali, Mexico, Moldova, Montenegro, Nicaragua, Niger, Panama, Peru, Senegal, Serbia, Swaziland, Tanzania, and Togo). There are 19,429 firms (36%) in the Asia region and 35,214 firms (64%) in the non-Asia region. We categorize the entire sample into small (SME) and large (MLE) firms. SMEs consist of two size dummies (1 and 2; 1 if the firm has less than 20 employees; 2 if the firm employs between 20 and 100 employees.) MLEs also cover two dummies (2 and 3; 3 if the firm has more than 100 employees).

We now consider mean and standard deviation of financial innovation. The results, shown in Table 2, are similar to the previous analysis of the two subsamples of firms' sales growth. Financial innovation is higher in Asia, during the crisis, in the manufacturing sector, and in large businesses. Unlike the standard deviation of financial inclusion, the standard deviation of financial innovation suggests that the highest dispersion is in the CRISIS subsample and the lowest dispersion is in the NONASIA subsample.

[Insert Table 1 Here]

[Insert Table 2 Here]

In Table 3, the signs of the correlation between LSG and financial inclusion (I-loan, I-overdraft, and I-wcbank) are positive and significant at the 5% level, which in general comply with our Hypothesis 1. FI is negatively related to LSG, which is inconsistent with our expectation. Financial innovation may cause reduced sales growth, especially in the presence of information asymmetry (Mason, 2008). As to control variables, CORRUPTION is negatively related to LSG, whereas STATE, EXPORT, LOAN, SIZE, FOREIGN, LINCOME, and LP are positively related to LSG in Table 3. The directions between control variables and firms' sales growth are consistent with our expectations. We also confirm that firm and country characteristics are not highly correlated with each other, thus ensuring that our regression results are not subject to multicollinearity problems.

[Insert Table 3 Here]

3.2 Model specification

Under the above theoretical and empirical studies, we adopt the following empirical model to investigate the effect of financial inclusion on sales growth:

$$LSG_{i,j,k,(t,t-3)} =$$
$$\beta_0 + \beta_1 X_{i,j,k,t} + \beta_2 Y_{j,(t,t-3)} + \beta_3 Inclusion_{j,k,t} + Country\ fixed\ effects +$$
$$+industry\ fixed\ effects + year\ fixed\ effects + \varepsilon_{i,j,k,t},$$

(1)

where $i, k, j,$ and t refer to firm, industry, country, and time, respectively. The dependent variable, $LSG_{i,j,k,(t-3)}$, is firms' sales growth over the time between t and t-3. The independent variable is financial inclusion indictors ($Inclusion_{j,k,t}$). Following Chauvet and Jacolin (2017), we measure financial inclusion (I-loan, I-overdraft, and I-wcbank) at the country-industry level. Our intention is to capture the various sectors of enterprises and their characteristics of different development stages and different financing needs. In addition, by using the original firm-level data on bank loans, overdraft facility, and working capital, we find our results are robust to account for endogeneity and reverse causality problems. The control variables are a set of firm-level characteristics ($X_{i,j,k,t}$) and a set of country-level variables over three years ($Y_{j,(t-3)}$) (Allen, Demirgüç-Kunt, Klapper, & Martínez Pería, 2016; Allen, Carletti, Cull, Qian, Senbet, & Valenzuela, 2014; Fowowe, 2017).[8] Here, $X_{i,j,k,t}$ includes SIZE, STATE, FOREIGN, LOAN, and EXPORT; $Y_{j,(t-3)}$ consists of LINCOME, LP, and CORRUPTION. [9] We include the country-time fixed effect to control for macroeconomic fluctuations that can impact firms' sales growth and to avoid omitted variables regarding changing country characteristics. To avoid the influence of aggregate trends, we control the year-fixed effects. In addition, we take into account industry-fixed effect to control for cross-industry heterogeneity in financing needs. The error term is $\varepsilon_{i,j,k,t}$. In Eq. (1), the positive (negative) coefficient of β_3 suggests financial inclusion exerts a positive (negative) effect on sales growth.

We now examine different subsamples that may determine the likelihood of different results. Our whole sample is stratified by the subsamples including CRISIS/NONCRISIS, ASIA/NONASIA, MANUF/NONMANUF, and SMEs/MLEs. It is important to study the effects of the factors above separately, as one could draw biased inferences when those factors are pooled together. By using Eq. (1), the effect of a country's financial inclusion on sales growth is further examined.

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[8] To measure sales growth, we use firm characteristics, which include type of ownership, size, and access to credit and exporting activity. Knack and Xu (2017) use these variables to measure worldwide firm performance.

[9] Beck et al. (2013) regards corruption as the key indicator that affects a firm's ease at utilizing financial products. See also Beck et al. (2005) and Harrison et al. (2014).

Since Beck (2016) shows that financial innovation improves financial inclusion dramatically in some countries, we also consider the effect of financial innovation. We look at the interaction effect of financial innovation and financial inclusion on firm sales' growth in developing economies. Consequently, our extended model is:

$$LSG_{i,j,k,(t,t-3)} = \gamma_0 + \gamma_1 X_{i,j,k,t} + \gamma_2 Y_{j,(t-3)} + \gamma_3 Inclusion_{j,k,t} + \gamma_4 \big(Inclusion_{j,k,t} \times$$
$$FI_{j,t-3}\big) + \gamma_5 FI_{j,t-3} + Country\ fixed\ effects + industry\ fixed\ effects +$$
$$year\ fixed\ effects + \varepsilon_{i,j,k,t}, \tag{2}$$

where $FI_{j,t-3}$ represents the level of financial innovation for country j. We calculate financial innovation over three years between t and t-3. Other variables are already defined above. If $\gamma_3 > 0$ and $\gamma_4 > 0$, then financial inclusion positively affects firms' sales growth, and financial innovation favorably has a positive effect on this relationship; otherwise, if $\gamma_3 > 0$ and $\gamma_4 < 0$, then financial inclusion positively affects firms' sales growth, and financial innovation adversely has a negative impact on this relationship.

4. Empirical results

We regard Eq. (1) as the baseline model and Eq. (2) as the extended model. To examine Eq. (1), we use a sample set of 47 countries over the period 2006-2016. However, in Eq. (2) when we include financial innovation data from Bankscope database, our sample is restricted to the time period of 2006-2014.

4.1 The baseline model: Financial inclusion and firms' sales growth

As to the relation between financial inclusion and firms' sales growth, the results for the baseline model appear in Table 4. Column (1) shows that the estimated coefficients of I-loan are positive and significant at the 1% level. As a robustness check, we also use the alternative proxies of I-overderdraft and I-wcbank in Columns (2) and (3). We observe that I-loan and I-overdraft are positive, ranging from 1.299 to 4.226, and statistically significant at the 1% level. We consistently find that financial inclusion has a positive effect on firms' sales growth - that is, financial inclusion can be seen as a tool to help firms to obtain loans or credit from lending institutions, which in turn boosts sales growth. Our findings are in line with those of Chauvet and Jacolin (2017).

Hence, the above results in the three indicators of financial inclusion are consistent with Hypothesis 1. Regarding control variables, the results show that EXPORT, LOAN, SIZE, and FOREIGN are all positive and statistically significant and thus consistent with the findings in the extant literature (Filatotchev & Piesse, 2009; Amiti & Weinstein, 2011; Gopalan et al., 2011; Ayyagari et al., 2014; Chauvet & Ehrhart, 2018). STATE has a positive effect as well, but the effect is insignificant. The coefficient on LINCOME is significantly positive, implying that more developed financial markets in high-income countries are associated with increased sales growth by firms (Wang, Wen, & Xu, 2018). The negative sign on CORRUPTION as expected in the literature denotes a negative relation between corruption and firms' sales growth. Prior studies support their findings with possible explanations, suggesting that corruption reduces a firm's competitiveness and therefore lower its sales growth (Gaviria, 2002; Şeker & Yang, 2014). The coefficient on LP has a positive correlation with firms' sales growth, suggesting that an increasing population brings opportunities for firms that are seeking market expansion (Simeon, 2013).

[Insert Table 4 Here]

4.2 The role of different subsamples

Findings in the financial inclusion-sales growth nexus are consistent, but we believe that the results will change due to different subsamples. Using WBES data, we are able to distinguish the inclusion-sales growth relation with various subsamples, such as during a crisis (CRISIS) versus during a non-crisis (NONCRISIS), Asia (ASIA) versus non-Asia (NONASIA), manufacturing (MANUF) versus non-manufacturing (NONMANUF), and SMEs versus MLEs. We separately estimate the inclusion-sales growth nexus with three financial inclusion measures (I-loan, I-overdraft, and I-wcbank) as shown in Tables 5, 6, and 7.

The first section examines whether CRIRIS or NONCRISIS influences the relationship between financial inclusion and firms' sales growth. In the first two columns of Table 5, we find a sign change for *I-loan* after the subsample CRISIS is added, indicating that the financial crisis may impede the effect of financial inclusion on firms' sales growth. We confirm the previous findings and reveal that developing firms are more financially constrained during financial crises than in normal times, making it

harder to access financial services and expand their sales growth (Dimitrov & Tice, 2006; Campello, Graham, & Harvey, 2010; Shikimi & Yamada, 2019). The directions between control variables and firms' sales growth are the same as shown in Table 4, except CORRUPTION and LINCOME.[10]

The second section presents the results concerning about whether ASIA or NONASIA has an effect on the inclusion-sales growth nexus. In the following two columns of Table 5, the coefficient of I-loan on firms' sales growth is significantly negative in the subsample of ASIA, whereas in the other subsample of NONASIA the coefficient remains positive and significant at the 1% significance level. The results point out that the positive inclusion-sales growth nexus is more pronounced for non-Asian regions that are associated with a relatively high level of financial development (Fafchamps & Schüendeln, 2013). Among the control variables shown in the subsample of ASIA, only the coefficients of CORRUPTION and LINCOME on firms' sales growth differ from those in Table 4. Some evidence implies that Asia countries with low incomes and high levels of corruption tend to have higher sales growth rate (Colombage, Maslyuk, & Taha, 2015).

Turning to the subsamples of MANUF and NONMANUF, Table 5 reports that both have the same-direction coefficients at a higher significance of the 1% level, implying that the inclusion-sales growth nexus is not driven by industry. Except for the coefficients of LINCOME in the subsample of NONMANUF, all control variables are estimated in the same direction as in Table 4. We offer a possible explanation. Non-manufacturing firms often replace people with technological innovation, causing national incomes to fall and sales growth to rise. Finally, as shown in the last subsamples (SMEs and MLEs), we analyze the differences in the relationship between financial inclusion and sales growth for two groups of firms of different sizes, but again the results in the direction of the inclusion-sales growth nexus are unaltered whether SMEs (small- and medium-sized enterprises) or MLEs (medium- and large-sized enterprises) are used. To sum up, the findings suggest that industry and size are not important factors in the relationship between financial inclusion and firms' sales growth.

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[10] Shimpalee and Breuer (2007) conclude that financial institutions perform worse before and after the crisis than in normal times. Moreover, Amendola, Gaffard, and Patriarca (2017) point out that crises affect income inequality, thus reducing firms' sales growth. Other evidence suggests that CORRUPTION is mostly uncorrelated with sales growth (Brown et al., 2005).

[Insert Table 5 Here]

In the following we provide further robustness checks of estimations on the subsamples presented in Tables 6 and 7 along two measures of financial inclusion: (1) I-overdraft and (2) I-wcbank. Our findings remain unchanged when using two proxies for financial inclusion, suggesting that financial inclusion is not favorable to firms' sales growth when the firms are situated in Asia or in countries in the direct aftermath of the financial crisis.

[Insert Table 6 Here]

[Insert Table 7 Here]

4.3 The extended model: Financial inclusion, financial innovation, and firms' sales growth

Table 8 lists the results from the impact of financial inclusion on firms' sales growth after taking financial innovation into consideration. The coefficients on the three alternatives of financial inclusion are significantly positive, while the coefficients of the interaction term between the three alternatives of financial inclusion and financial innovation are significantly negative at the 1% significant level, which in general supports Hypothesis 2. We find that financial inclusion is positively associated with firms' sales growth, but the positive effect is mitigated by financial innovation. Table 8 reports that either financial innovation or financial inclusion has a positive effect on the firms' sales growth, but if the two variables are combined together, then the positive effect will diminish. Hence, we use two proxies of financial inclusion (I-overdraft and I-wcbank) as robustness checks.

[Insert Table 8 Here]

5. Robustness checks

Robustness checks using the firm-level measures of financial inclusion and the system GMM estimations confirm our main results for the baseline model. First, we use bank loans (loan), overdraft facility (overdraft), and working capital (wcbank) as alternative proxies for financial inclusion. As shown in Table 9, our OLS estimation results are robust to using different firm-level measures of financial inclusion.

As a further robustness check, we use the system generalized method of moments (GMM) estimation of Mohn and Misund (2011) that we apply to our panel data, in order to control for unobserved heterogeneity and for possible endogeneity. We follow many researchers in the international finance field to estimate the relevant parameters of our model using instruments (i.e. lagged one period of endogenous firm- and country-level characteristics). [11] We also implement Hansen's *J* test for the over-identifying restrictions. [12] Table 10 shows that Hansen's *J* test only rejects the null of the over-identifying restrictions for I-overdraft, as a proxy for financial inclusion. In sum, the system GMM estimates are robust to using three financial inclusion indicators, and Hansen's *J* test supports the baseline model. Therefore, we conclude that our results are basically consistent with our baseline analysis, thus confirming the bright side of financial inclusion on sales growth.

[Insert Table 9 Here]

[Insert Table 10 Here]

6. Conclusion

This paper provides empirical cross-country evidence for the impact of financial inclusion on sales growth for firms of developing countries, with the main aim of finding out if the effect of the financial inclusion-sales growth nexus follows some clear patterns. Using a large dataset that includes 47 developing countries, we examine the financial inclusion-sales growth nexus through subsample analysis. We show that financial inclusion is favorable to firms' sales growth when the firms are situated in non-Asia regions and during normal times. We conduct a number of robustness checks and confirm that our main results are robust to alternative proxies for country- and firm-level data of financial inclusion as well as under two-step system GMM estimation.

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[11] The system GMM estimation is widely used in international finance by researchers (bank profit efficiency, Han, Kim, & Kim, 2012; investors' portfolios, Farag, 2014; deposits in monetary transmission, Hamza & Saadaoui, 2018).

[12] The Sargan-Hasen test is a test for the validation of instrument variables. The null hypothesis is that the instruments are valid instruments; in other words, the error terms are serially uncorrelated, and there is no autocorrelation. We expect not to reject the null hypothesis; only one proxy does not meet our expectations.

This paper also examines the influences of financial innovation on the financial inclusion-sales growth nexus using the WBES and Bankscope databases and a set of 47 developing economies for the period 2006 to 2014. Our results show that the positive financial inclusion-sales growth nexus disappears when adding financial innovation. This indicates that policies that enhance financial inclusion may alone be instrumental at spurring firms' sales growth. The implication of this result is that policy makers should establish guidelines and procedures to pursue financial innovation that helps increase firms' access to financial services and to boost their sales growth.

This paper can be extended to other comparative research avenues. First, other financial issues, like financial aid and financial literacy, can be investigated. Second, the use of firm-level data on financial innovation can provide further insights, although the availability of relevant data is a major obstacle to this study. Third, the relationship between financial inclusion and firms' sales growth shows different effects in different regions, and thus more research on regional characteristics or developments can be conducted in the future.

APPENDIX

Appendix A. Definitions of Variables and Data Sources

Variable	Definition	Source
LSG	Natural logarithm of firms' sales growth rates over three years. Sales are deflated and converted into US dollars.	WBES (Download 2017/9/11)
I-loan	Share of firms that have a bank loan at the country-industry level.	
I-overdraft	Share of firms that have an overdraft facility at the country-industry level.	
I-wcbank	Share of firms that use bank credits to finance working capital at the country-industry level.	
SIZE	Three values: listed as 1 if employees are less than 20; 2 if employees are between 20 and 100 employees; 3 if employees are over 100 employees.	
FOREIGN	A dummy variable indicating the firm being owned by foreign individuals, companies, and organizations.	
STATE	A dummy variable indicating the firm being owned by government/state individuals, companies, and organizations.	
EXPORT	A dummy variable indicating the firm exports part of its production either directly or indirectly.	
LOAN	A dummy variable indicating the firm has a credit or loan from a financial institution.	
FI_{t-3}	Total value of off-balance-sheet items as a percentage of total assets, lagged by a three-year period. The value is calculated at the aggregated country level. Included from the sample are commercial banks, savings banks, cooperative banks, real estate & mortgage banks, investment banks, Islamic banks, central banks, and multi-lateral governmental banks over our sixteen-year sample period, 1999-2014.	Bankscope CD

18

Appendix A (cont'd). Definitions of Variables and Data Sources

Variable	Definition	Source
LP_{t-3}	Log (total population at a three-year lag)	World Development Indicators (downloaded 2017/09/18)
$LINCOME_{t-3}$	Log (adjusted net national income per capita at a three-year lag)	
$CORRUPTION_{t-3}$	The country's rank among all countries covered by the aggregate index, with 0 referring to lowest rank and 100 to highest rank (at a three-year lag)	Worldwide Governance Indicators (downloaded 2017/09/18)

Notes:
1. GDP per capita and adjusted net national income per capita: annual growth rate.
2. Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates.

Appendix B. List of Sectors and Number of Firms

No.	Sector	Freq.	Percent
1	Food	6,095	11.15
2	Tobacco	10	0.02
3	Textile	1,303	2.38
4	Garments	1,839	3.37
5	Leather	360	0.66
6	Wood	229	0.42
7	Paper	91	0.17
8	Publishing	167	0.31
9	Chemicals and refined petroleum	1,296	2.37
10	Rubber and plastics	724	1.32
11	Metallic and non-metallic mineral products	1,203	2.20
12	Fabricated metal products	740	1.35
13	Machinery and equipment	417	0.76
14	Electronics	468	0.86
15	Motor vehicles	171	0.31
16	Furniture	545	1.00
17	Other manufacturing	20,093	36.77
18	Retail trade	7,750	14.18
19	Wholesale trade	1,395	2.55
20	IT	222	0.41
21	Transport and construction	1,618	2.96
22	Hotel	1,204	2.20
23	Other services	6,703	12.27
	Total	54,643	100

Notes: This table includes 23 sectors and is classified into two broad categories of manufacturing and non-manufacturing based on ISIC Revision 3.0. The manufacturing category refers to sectors from 1 to 17, and the non-manufacturing category refers to sectors from 18 to 23.

Disclosure statement

No potential conflict of interest is reported by the authors.

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Table 1. List of developing countries.

Country Name	No. of firms	Percent of Total
1 Albania	828	1.52 %
2 Argentina	2,117	3.87 %
3 Armenia	720	1.32 %
4 Azerbaijan	770	1.41 %
5 Bosnia and Herzegovina	721	1.32 %
6 Bangladesh	2,884	5.28 %
7 Belarus	633	1.16 %
8 Benin	300	0.55 %
9 Bolivia	975	1.78 %
10 Botswana	500	0.92 %
11 Cameroon	609	1.11 %
12 Colombia	1,942	3.55 %
13 Dominican Republic	719	1.32 %
14 Egypt	4,697	8.6 %
15 El Salvador	1,079	1.97 %
16 Ethiopia	1,492	2.73 %
17 Georgia	718	1.31 %
18 Ghana	1,148	2.1 %
19 Guatemala	1,112	2.04 %
20 Honduras	796	1.46 %
21 Indonesia	2,764	5.06 %
22 Kazakhstan	1,116	2.04 %
23 Kenya	1,382	2.53 %
24 Kyrgyz Republic	505	0.92 %
25 Lao PDR	1,107	2.03 %
26 Lesotho	301	0.55 %
27 Macedonia, FYR	1,162	2.13 %
28 Madagascar	505	0.92 %
29 Malawi	326	0.6 %
30 Mali	1,035	1.89 %
31 Mexico	2,960	5.42 %
32 Moldova	723	1.32 %
33 Mongolia	714	1.31 %
34 Montenegro	260	0.48 %
35 Nicaragua	669	1.22 %
36 Niger	150	0.27 %
37 Pakistan	2,267	4.15 %
38 Panama	969	1.77 %
39 Peru	1,632	2.99 %

25

Table 1(cont'd). List of developing countries.

Country Name	No. of firms	Percent of Total
40 Philippines	2,661	4.87 %
41 Senegal	939	1.72 %
42 Serbia	735	1.35 %
43 Swaziland	338	0.62 %
44 Tajikistan	707	1.29 %
45 Tanzania	1,155	2.11 %
46 Togo	305	0.56 %
47 Turkey	2,496	4.57 %
Total	54,643	100 %

Notes: The table lists the 47 countries with 54,643 firms in the sample and reports the number of firms in each country and their proportion in the total sample.

Table 2. Mean and standard deviation for the main variables of the 8 subsamples.

	WHOLE SAMPLE		ASIA		NONAISIA	
Dependent variable	Mean	S. D.	Mean	S. D.	Mean	S. D.
LSG	16.693	3.289	17.379	3.547	16.306	3.066
Independent variables						
I-loan	0.343	0.160	0.327	0.127	0.351	0.175
I-overdraft	0.355	0.207	0.268	0.175	0.402	0.208
I-wcbank	0.271	0.140	0.250	0.089	0.282	0.160
FI(-3)	0.241	0.257	0.341	0.373	0.194	0.156
			CRISIS		NON- CRISIS	
Dependent variable			Mean	S. D.	Mean	S. D.
LSG			17.151	3.171	16.498	3.319
Independent variables						
I-loan			0.333	0.140	0.346	0.167
I-overdraft			0.320	0.182	0.368	0.215
I-wcbank			0.257	0.089	0.276	0.155
FI(-3)			0.298	0.378	0.220	0.189
			MANUF		NONMANUF	
Dependent variable			Mean	S. D.	Mean	S. D.
LSG			16.742	3.342	16.616	3.201
Independent variables						
I-loan			0.339	0.163	0.348	0.155
I-overdraft			0.356	0.213	0.352	0.198
I-wcbank			0.272	0.144	0.269	0.134
FI(-3)			0.268	0.270	0.202	0.229
			SMEs		MLEs	
Dependent variable			Mean	S. D.	Mean	S. D.
LSG			16.119	3.058	17.626	3.258
Independent variables						
I-loan			0.341	0.161	0.348	0.159
I-overdraft			0.357	0.207	0.352	0.210
I-wcbank			0.270	0.139	0.277	0.143
FI(-3)			0.234	0.251	0.258	0.275

Notes: This table reports means and standard deviations for the main variables namely, firms' sales growth (LSG), and three measures of financial inclusion (I-loan, I-overdraft, and I-wcbank). This table lists the results for 1 whole sample and 8 subsamples (ASIA, NONASIA, CRISIS, NONCRISIS, MANUF, NONMANUF, SMEs, and MLEs). CRISIS refers to sample surveys during 2007-2009. NONCRISIS refers to sample surveys not during 2007-2009 (normal time). ASIA refers to sample firms located in Asia countries (Armenia, Azerbaijan, Bangladesh, Georgia, Indonesia, Kazakhstan, Kyrgyz Republic, Lao PDR, Mongolia, Pakistan, Philippines, Tajikistan, and Turkey). NONASIA refers to sample firms not located in Asia (Albania, Argentina, Bosnia and Herzegovina, Belarus, Benin, Bolivia, Botswana, Cameroon, Colombia, Dominican Republic, Egypt, El Salvador, Ethiopia, Ghana, Guatemala, Honduras, Kenya, Lesotho, Macedonia, Madagascar, Malawi, Mali, Mexico, Moldova, Montenegro, Nicaragua, Niger, Panama, Peru, Senegal, Serbia, Swaziland, Tanzania, and Togo). The sectors in manufacturing (MANUF) consist of food, tobacco, textile, garments, leather, wood, paper, publishing, chemicals and refined petroleum, rubber and plastics, metallic and non-metallic mineral products, fabricated metal products, machinery and equipment, electronics, motor vehicles, furniture, and other manufacturing. The sectors in non-manufacturing (NONMANUF) consist of retail trade, wholesale trade, IT, transport and construction, hotel, and other services. SMEs refer to sample firms with less than 100 employees. MLEs refer to sample firms with more than 100 employees.

Table 3. Pair-wise correlation matrix.

	LSG	I-loan	I-overdraft	I-wcbank	FI(-3)	STATE	EXPORT	LOAN	SIZE	FOREIGN	LINCOME(-3)	CORRUPTION (-3)	lP(-3)
LSG	1												
I-loan	0.0656*	1											
I-overdraft	0.0302*	0.7259*	1										
I-wcbank	0.1214*	0.8447*	0.6554*	1									
FI(-3)	-0.0193*	0.0371*	-0.1024*	0.0283*	1								
STATE	0.0329*	-0.0211*	-0.0187*	-0.0449*	-0.0267*	1							
EXPORT	0.1708*	0.1052*	0.1355*	0.1022*	0.0500*	0.0393*	1						
LOAN	0.1666*	0.3366*	0.2450*	0.2848*	0.0401*	-0.0004	0.1424*	1					
SIZE	0.3755*	0.0342*	-0.0216*	0.0389*	0.0722*	0.0769*	0.2701*	0.1695*	1				
FOREIGN	0.1612*	-0.0138*	0.0125*	-0.0122*	0.0118*	0.1920*	0.2147*	0.0035	0.1885*	1			
LINCOME(-3)	0.1013*	0.2467*	0.0168*	0.1716*	0.1064*	0.0092	-0.0055	0.1181*	-0.0089	0.0086	1		
CORRUPTION(-3)	-0.0965*	0.3851*	0.4139*	0.2632*	0.0007	-0.0289*	0.0886*	0.1280*	-0.0182*	0.0492*	0.0325*	1	
LP(-3)	0.1690*	-0.2400*	-0.2725*	-0.1400*	0.3051*	-0.0306*	0.0343*	-0.0828*	0.0941*	-0.0768*	0.0655*	-0.1165*	1

Notes: The table provides information on the correlation of all the variables in our model specification. The pairwise correlations' coefficients are denoted as star signs that indicate statistical significance at the 5% level or better. See Appendix A for variable definitions.

Table 4. Baseline regression.

Dependent variable: LSG	(1)	(2)	(3)
Main independent variables			
I-loan	3.753 ***		
	[27.08]		
I-overdraft		1.299 ***	
		[11.97]	
I-wcbank			4.226 ***
			[30.82]
Control variables			
STATE	0.213	0.184	0.353 **
	[1.26]	[1.08]	[2.07]
EXPORT	0.149 ***	0.160 ***	0.176 ***
	[3.85]	[4.09]	[4.58]
LOAN	0.622 ***	0.809 ***	0.668 ***
	[16.61]	[21.70]	[18.21]
SIZE	1.422 ***	1.443 ***	1.406 ***
	[62.71]	[62.82]	[62.33]
FOREIGN	0.961 ***	0.907 ***	0.957 ***
	[16.58]	[15.49]	[16.56]
LINCOME(-3)	0.059 ***	0.163 ***	0.090 ***
	[4.60]	[12.74]	[7.31]
CORRUPTION(-3)	-0.020 ***	-0.014 ***	-0.017 ***
	[-16.92]	[-11.37]	[-15.34]
LP(-3)	0.402 ***	0.366 ***	0.355 ***
	[32.21]	[28.94]	[30.21]
Constant	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
R^2	0.254	0.238	0.2581
Obs.	31,533	31,533	31,533

Notes: The table contains the estimated results for the baseline specification. Our total sample covers 47 countries over the period 2006-2016. The dependent variable, LSG, is our proxy for firms' sales growth. The dependent variable is regressed on financial inclusion measures (I-loan, I-overdraft, and I-wcbank) and a group of firm-level and country-level variables. Furthermore, we control for the country, year, and industry fixed effects. T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

Table 5. Results for the impact of financial inclusion (I-loan) on firms' sales growth.

	CRISIS	NONCRISIS	ASIA	NONASIA	MANUF	NONMANUF	SMEs	MLEs
I-loan	-3.347 ***	5.902 ***	-4.655 ***	4.983 ***	3.437 ***	4.719 ***	3.718 ***	3.994 ***
	[-15.68]	[37.15]	[-13.46]	[30.42]	[19.04]	[21.49]	[24.76]	[19.74]
STATE	-0.030	0.508 **	-1.800 ***	1.147 ***	0.068	0.466 *	0.034	0.341 *
	[-0.13]	[2.08]	[-6.03]	[5.99]	[0.32]	[1.69]	[0.14]	[1.74]
EXPORT	0.157 **	0.188 ***	-0.187 ***	0.347 ***	0.254 ***	-0.015	0.129 ***	0.156 ***
	[2.53]	[4.01]	[-2.79]	[7.62]	[5.79]	[-0.17]	[2.92]	[3.18]
LOAN	0.467 ***	0.725 ***	0.608 ***	0.724 ***	0.637 ***	0.584 ***	0.586 ***	0.667 ***
	[8.03]	[15.70]	[10.97]	[15.07]	[14.29]	[8.60]	[13.92]	[13.52]
SIZE	1.470 ***	1.504 ***	1.594 ***	1.298 ***	1.500 ***	1.273 ***	1.242 ***	1.624 ***
	[38.62]	[54.93]	[45.29]	[46.11]	[56.07]	[29.86]	[34.46]	[33.68]
FOREIGN	1.330 ***	0.977 ***	1.547 ***	0.736 ***	0.967 ***	0.795 ***	0.824 ***	1.036 ***
	[14.16]	[13.88]	[15.26]	[11.07]	[13.82]	[7.83]	[11.77]	[15.06]
LINCOME(-3)	-0.797 ***	0.115 ***	-0.609 ***	0.014	0.134 ***	-0.073 ***	0.056 ***	0.087 ***
	[-17.59]	[9.03]	[-9.75]	[1.17]	[7.72]	[-3.81]	[3.97]	[5.07]
CORRUPTION(-3)	0.066 ***	-0.045 ***	0.049 ***	-0.031 ***	-0.026 ***	-0.010 ***	-0.020 ***	-0.019 ***
	[25.56]	[-29.06]	[15.37]	[-19.77]	[-17.98]	[-5.06]	[-15.22]	[-11.32]
LP(-3)	0.487 ***	0.560 ***	0.406 ***	0.290 ***	0.463 ***	0.356 ***	0.353 ***	0.475 ***
	[21.90]	[35.76]	[17.31]	[18.00]	[27.47]	[17.30]	[26.55]	[26.34]
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.306	0.299	0.317	0.276	0.282	0.196	0.147	0.2253
Obs.	10,078	21,455	13,254	18,279	22,201	9,332	24,968	17,485

Notes: The table reports results based on Eq. (1) for different sub-samples. T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

Table 6. Results for the impact of financial inclusion (I-overdraft) on firms' sales growth.

	CRISIS	NONCRISIS	ASIA	NONASIA	MANUF	NONMANUF	SMEs	MLEs
I-overdraft	-8.044 ***	2.187 ***	-13.881 ***	5.507 ***	0.898 ***	2.536 ***	1.524 ***	1.004 ***
	[-35.2]	[18.31]	[-56.20]	[42.94]	[6.56]	[13.90]	[12.73]	[6.72]
STATE	0.022	0.432 *	-1.154 ***	1.477 ***	0.004	0.534 *	0.028	0.296
	[0.10]	[1.76]	[-4.62]	[7.36]	[0.02]	[1.91]	[0.12]	[1.51]
EXPORT	0.673 ***	0.177 ***	0.473 ***	0.359 ***	0.290 ***	-0.055	0.121 ***	0.188 ***
	[10.73]	[3.69]	[7.85]	[8.05]	[6.52]	[-0.65]	[2.71]	[3.79]
LOAN	0.513 ***	0.968 ***	0.622 ***	0.615 ***	0.822 ***	0.781 ***	0.773 ***	0.859 ***
	[9.63]	[20.75]	[12.69]	[13.06]	[18.55]	[11.51]	[18.56]	[17.40]
SIZE	1.409 ***	1.523 ***	1.461 ***	1.351 ***	1.520 ***	1.288 ***	1.270 ***	1.636 ***
	[39.72]	[54.27]	[46.81]	[48.83]	[56.15]	[29.66]	[34.83]	[33.48]
FOREIGN	1.073 ***	0.881 ***	0.685 ***	0.718 ***	0.917 ***	0.704 ***	0.778 ***	0.966 ***
	[11.79]	[12.27]	[7.27]	[10.87]	[12.96]	[6.90]	[10.99]	[13.88]
LINCOME(-3)	-1.304 ***	0.276 ***	-1.520 ***	0.056 ***	0.256 ***	0.032	0.159 ***	0.202 ***
	[-29.21]	[20.64]	[-22.07]	[4.74]	[15.32]	[1.58]	[11.13]	[11.94]
CORRUPTION(-3)	0.111 ***	-0.035 ***	0.136 ***	-0.032 ***	-0.018 ***	-0.010 ***	-0.016 ***	-0.009 ***
	[41.58]	[-23.64]	[49.77]	[-21.73]	[-11.75]	[-4.81]	[-11.66]	[-4.89]
LP(-3)	0.451 ***	0.496 ***	0.305 ***	0.314 ***	0.420 ***	0.334 ***	0.325 ***	0.426 ***
	[22.09]	[31.32]	[13.74]	[20.52]	[24.60]	[15.84]	[24.06]	[23.51]
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.3887	0.2629	0.4566	0.315	0.2684	0.1731	0.129	0.207
Obs.	10,078	21,455	13,254	18,279	22,201	9,332	24,968	17,485

Notes: The table reports results based on Eq. (1) for different sub-samples. T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

31

Table 7. Results for the impact of financial inclusion (I-wcbank) on firms' sales growth.

	CRISIS	NONCRISIS	ASIA	NONASIA	MANUF	NONMANUF	SMEs	MLEs
I-wcbank	-6.712 ***	4.388 ***	-3.195 ***	3.304 ***	4.046 ***	5.226 ***	3.956 ***	4.611 ***
	[-17.48]	[29.51	[-4.96]	[19.50]	[24.11]	[22.24]	[26.21]	[24.16]
STATE	-0.094	0.628 ***	-1.648 ***	1.359 ***	0.201	0.661 **	0.149	0.532 ***
	[-0.41]	[2.58]	[-5.58]	[7.16]	[0.93]	[2.36]	[0.62]	[2.70]
EXPORT	0.246 ***	0.224 ***	-0.237 ***	0.394 ***	0.276 ***	0.046	0.173 ***	0.169 ***
	[3.90]	[4.74]	[-3.50]	[8.52]	[6.35]	[0.55]	[3.91]	[3.48]
LOAN	0.454 ***	0.880 ***	0.513 ***	0.943 ***	0.658 ***	0.663 ***	0.655 ***	0.706 ***
	[7.93]	[19.19]	[9.19]	[19.72]	[15.11]	[9.94]	[15.94]	[14.69]
SIZE	1.468 ***	1.469 ***	1.595 ***	1.282 ***	1.485 ***	1.251 ***	1.206 ***	1.632 ***
	[38.63]	[53.44]	[44.99]	[44.58]	[55.91]	[29.44]	[33.44]	[34.10]
FOREIGN	1.287 ***	0.913 ***	1.503 ***	0.641 ***	0.985 ***	0.743 ***	0.820 ***	1.040 ***
	[13.67]	[12.92]	[14.70]	[9.60]	[14.15]	[7.32]	[11.74]	[15.17]
LINCOME(-3)	-1.036 ***	0.205 ***	-0.614 ***	0.100 ***	0.155 ***	-0.035 *	0.091 ***	0.128 ***
	[-23.99]	[15.87]	[-9.37]	[7.97]	[9.56]	[-1.83]	[6.53]	[7.88]
CORRUPTION(-3)	0.073 ***	-0.033 ***	0.031 ***	-0.022 ***	-0.023 ***	-0.007 ***	-0.016 ***	-0.016 ***
	[27.26]	[-23.04]	[8.95]	[-14.04]	[-17.29]	[-3.79]	[-13.38]	[-10.19]
LP(-3)	0.682 ***	0.499 ***	0.560 ***	0.239 ***	0.433 ***	0.280 ***	0.301 ***	0.446 ***
	[27.76]	[32.77]	[19.86]	[15.01]	[27.11]	[14.39]	[23.99]	[26.06]
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	No	No	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.310	0.281	0.305	0.250	0.288	0.196	0.148	0.232
Obs.	10,078	21,455	13,254	18,279	22,201	9,332	24,968	17,485

Notes: The table reports results based on Eq. (1) for different sub-samples. T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

Table 8. Extended regression.

Dependent variable: LSG	(1)	(2)	(3)
I-loan	7.827 ***		
	[40.95]		
I-loan×FI(-3)	-13.067 ***		
	[-23.75]		
I-overdraft		6.003 ***	
		[43.73]	
I-overdraft×FI(-3)		-10.046 ***	
		[-33.32]	
I-wcbank			5.996 ***
			[34.39]
I-wcbank×FI(-3)			-7.234 ***
			[-27.58]
FI(-3)	3.863 ***	2.114 ***	1.311 ***
	[18.43]	[23.60]	[13.53]
STATE	0.225	0.317 *	0.337 *
	[1.32]	[1.83]	[1.92]
EXPORT	0.206 ***	0.185 ***	0.212 ***
	[5.28]	[4.72]	[5.37]
LOAN	0.605 ***	0.704 ***	0.757 ***
	[16.42]	[19.10]	[20.48]
SIZE	1.348 ***	1.382 ***	1.364 ***
	[59.53]	[60.41]	[59.21]
FOREIGN	0.834 ***	0.749 ***	0.788 ***
	[14.93]	[13.35]	[13.91]
LINCOME(-3)	-0.065 ***	0.081 ***	-0.014
	[-5.32]	[6.72]	[-1.08]
CORRUPTION(-3)	-0.023 ***	-0.027 ***	-0.017 ***
	[-19.51]	[-22.78]	[-15.36]
LP(-3)	0.179 ***	0.156 ***	0.097 ***
	[14.00]	[12.20]	[7.87]
Constant	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
R^2	0.286	0.285	0.263
Obs.	26,496	26,496	26,496

Notes: The interaction term is between financial inclusion indicators and financial innovation. The table reports results based on Eq. (2). T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

Table 9. Robustness check. Alternative firm-level measures for financial inclusion.

Dependent variable: LSG	(1)	(2)	(3)
Main independent variables			
Loan	0.910 ***		
	[24.83]		
Overdraft		0.764 ***	
		[20.72]	
Wcbank			0.893 ***
			[23.37]
STATE	0.171	0.195	0.247
	[1.01]	[1.15]	[1.44]
EXPORT	0.216 ***	0.214 ***	0.224 ***
	[5.59]	[5.48]	[5.78]
SIZE	1.437 ***	1.451 ***	1.454 ***
	[62.51]	[63.02]	[63.35]
FOREIGN	0.847 ***	0.793 ***	0.828 ***
	[14.45]	[13.49]	[14.09]
LINCOME(-3)	0.163 ***	0.199 ***	0.186 ***
	[12.47]	[15.39]	[14.4]
CORRUPTION(-3)	-0.005 ***	-0.006 ***	-0.003 ***
	[-3.93]	[-5.43]	[-2.91]
LP(-3)	0.332 ***	0.332 ***	0.321 ***
	[27.55]	[27.46]	[26.89]
Constant	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
R^2	0.234	0.2286	0.2323
Obs.	31,533	31,533	31,533

Notes: The table contains the estimated results for the robust test. The table reports results based on Eq. (1). We conduct the robustness test by employing different measures for dependent variables to assess the robustness of our findings. We use bank loans (loan), overdraft facility (overdraft), and working capital (wcbank) as alternative proxies for financial inclusion. T-statistics and robust standard errors are reported in square brackets, with ***, **, and * representing 1%, 5%, and 10% significance levels, respectively.

Table 10. The two-step system GMM estimation.

	LSG	LSG	LSG
I-loan	9.194 ***		
	[4.79]		
I-overdraft		-0.977	
		[-0.83]	
I-wcbank			5.144 ***
			[4.86]
Constants	Yes	Yes	Yes
Firm-level characteristics	Yes	Yes	Yes
Country-level characteristics	Yes	Yes	Yes
Hansen *J*-test	0.993	0.999	0.999

Notes: The table contains the estimated results of the system GMM estimation for the robustness test. We regard lags of firm- and country-level characteristics as instruments. *, **, and *** denote that the coefficient is statistically significant at the 10%, 5%, and 1% levels, respectively. Z-values are reported in square brackets. Hansen *J*-test reports the p-values for the null that instruments are valid.

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