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Financing Singapore's SMEs and the crowdfunding industry in Singapore

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Chapter 2: Financing Singapore's SMEs and the Crowdfunding Industry in Singapore

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Abstract

As new digital technologies emerge that make the provision of financial services more efficient, they hold the potential to address barriers that SMEs face in accessing credit. This paper finds empirical evidence that crowdfunding for SMEs improved SMEs' timeliness to pay debt in Singapore. Anecdotal evidence from growing SMEs suggests that getting crowdfunding loans also induced financing from banks, leading to more efficient allocation of credit. In just four years, Singapore's crowdfunding volume has grown rapidly making it one of the top crowdfunding hubs in Southeast Asia in 2018. The rapid development of Singapore's crowdfunding industry can be attributed to its higher GDP per capita, higher level of financial sector development and greater availability of venture capital. Our results suggest that policies do matter to the development of the crowdfunding industry and we identify some policy considerations at national level. The paper concludes with a discussion on implications of crowdfunding on banks' business models and analysis of policy makers' regulatory approach to crowdfunding.

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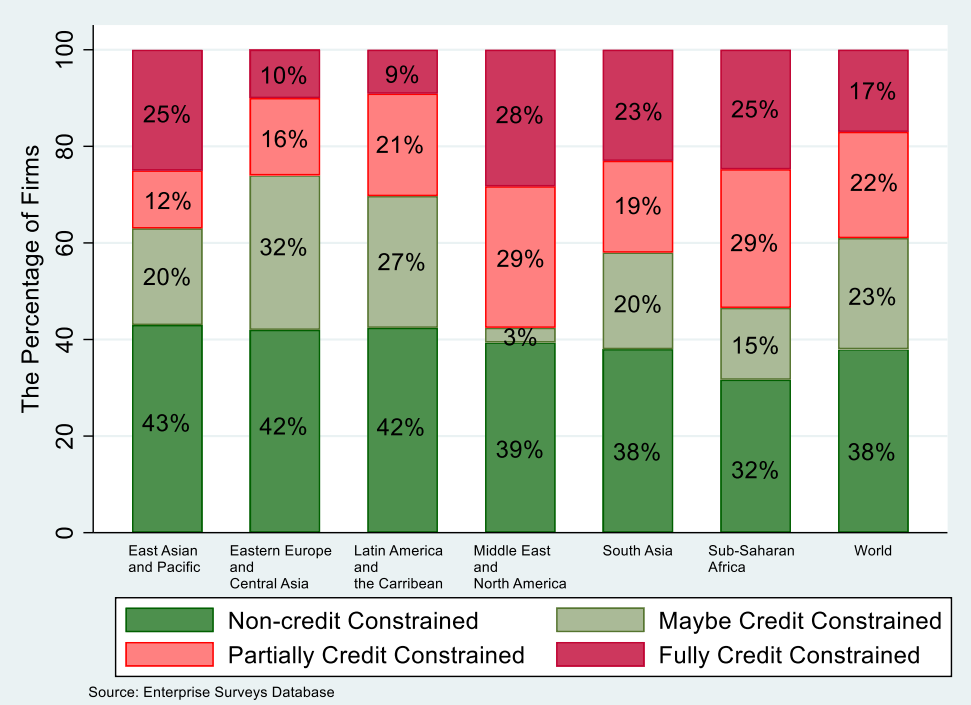
2.1 Introduction

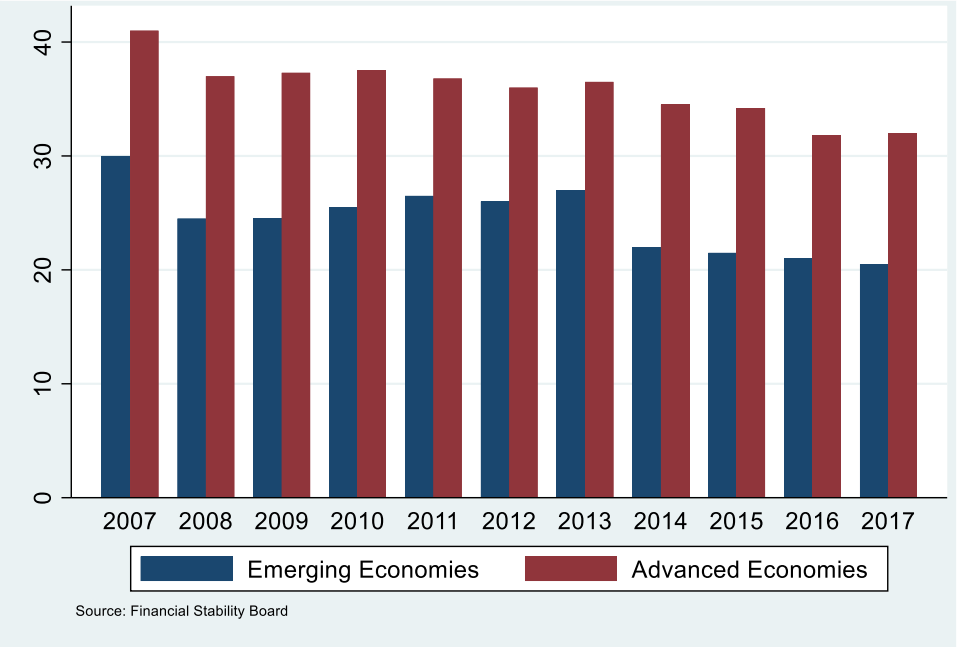
In many countries, SMEs represent an important share of firms and employment. SMEs play an important role in a healthy and dynamic economy. Recent research has shown SMEs faced greater financing barriers than large firms,[1] and in turn, financial constraint affected the average firm size (Kumar, Rajan, & Zingales, 1999). In the Asia Pacific region, 37% of firms were either fully or partially credit constrained,[2] compared to the world average of 39% (Figure 1).

Figure 1: Percentage of Credit Constrained Firms, by Region



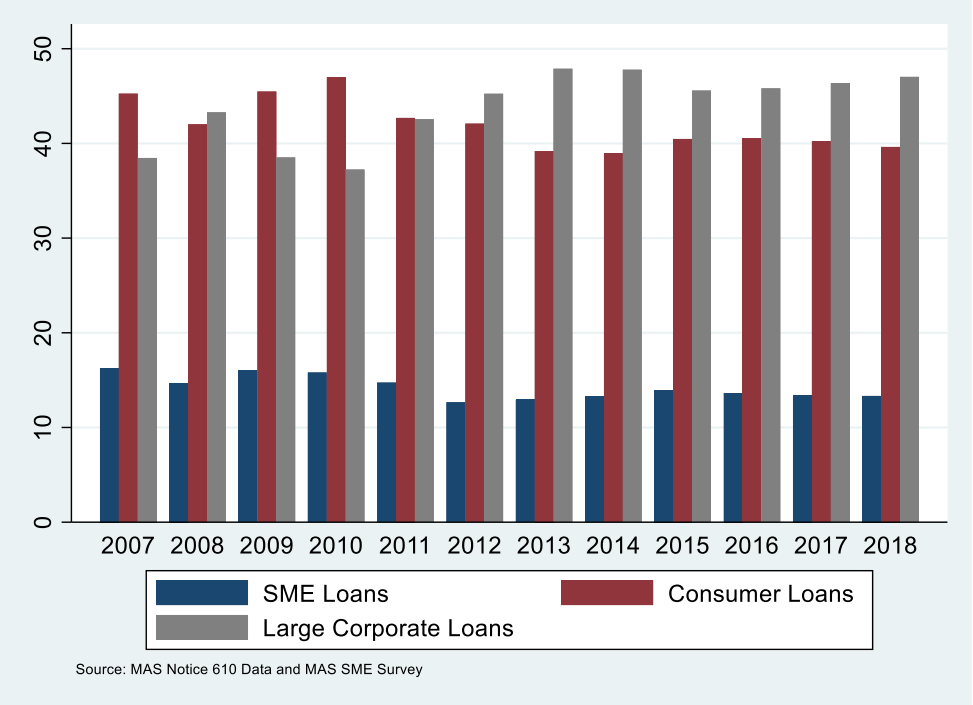
Many factors account for the credit constraint including information asymmetries, collateral shortage and lack of credit information. Particularly during and after the 2008 Global Financial Crisis when banks suffered heavy losses, banks turned cautious and lending to SMEs fell further. The share of lending to SMEs (as total of bank lending) declined both in advanced economies and emerging markets (Figure 2). In emerging markets, its share of lending fell from a peak of 30% in 2007 to 21% in 2009. It resumed in recent years, but the volume remained below pre-crisis levels in some jurisdictions (e.g. Singapore, Hong Kong, South Korea and Italy). According to the Financial Stability Board (FSB),[3] empirical evidence found that the more stringent risk-based capital requirement under Basel III had slowed the pace of lending to SMEs relative to other sectors. However, this effect was found to be temporary and differed across jurisdictions.

Figure 2: SME Loans (% of Total Bank Loans) in Emerging and Advanced Economies (2007 – 2017)



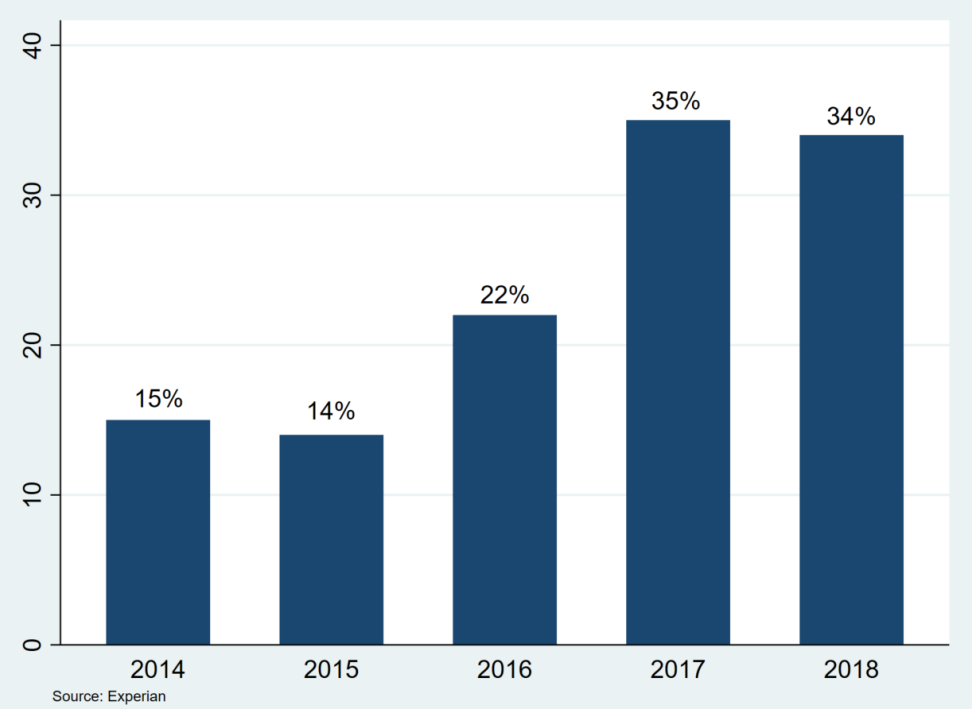
In Singapore, SMEs made up 99% of all the companies, employing about 65% of its workforce and contributing to nearly half of the country's nominal. Yet, the share of total bank credit to SMEs was disproportionately low at 13.4% in 2017[4] (in comparison, the share to large corporates was about three times higher at 47.0%, and the remaining 39.6% to consumer loans; see Figure 3).

Figure 3: Share of Loans by Type in Singapore (2007 – 2018)



Access to finance is not a problem in Singapore, yet for small and micro enterprises who lack collateral and credit information, they would still find it difficult to get a bank loan. *SME Development Surveys* in recent years showed much higher percentages of SMEs with finance-related issues compared to 22% in 2016 and 14% in 2015 (Figure 4) (Experian, 2017). According to the Monetary Authority of Singapore (MAS) Internal Survey,[5] micro and small enterprises account for 57% of banks' outstanding SME loan portfolio. SMEs with lower credit ratings faced more difficulties getting uncollateralized loans, and wider spreads due to risks.

Figure 4: Percentage of Singapore SMEs with Finance-Related Issues

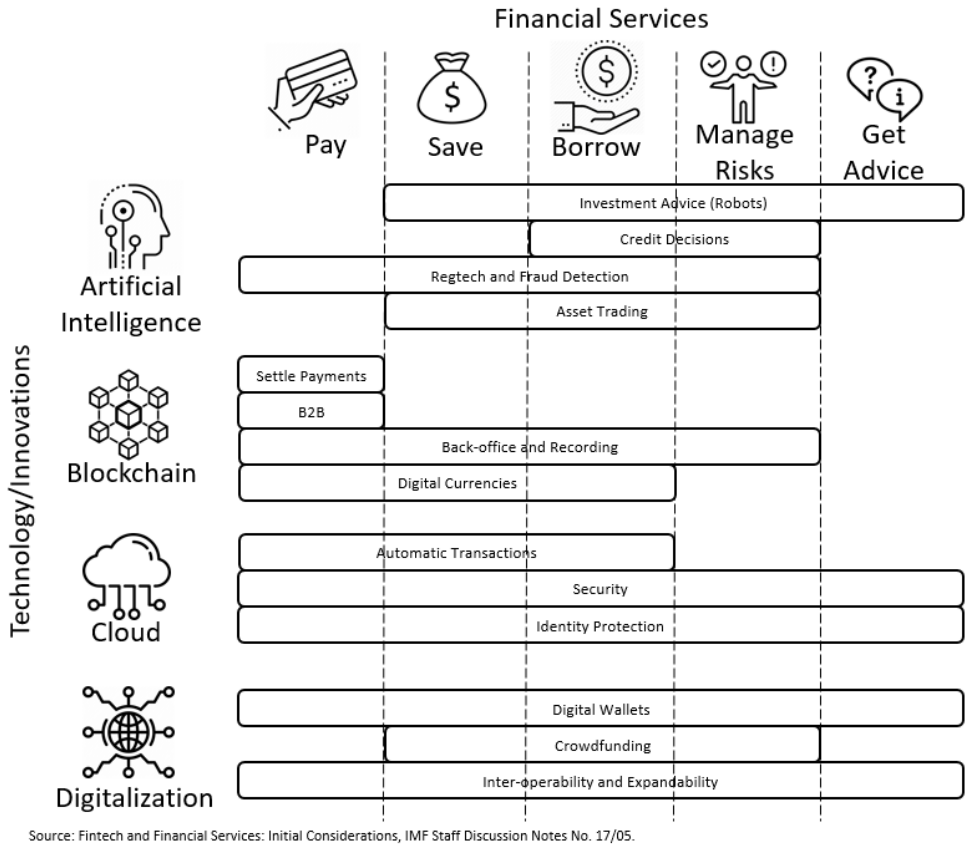


Section 2.2 explains crowdfunding, and its development in Singapore using our survey and interviews of Singapore-based crowdfunders. Section 2.3 examines key drivers of crowdfunding for nine major fintech countries in the world, with a focus on Singapore's fintech sector, using panel data regression. Section 2.4 examines whether crowdfunding has improved SMEs' cashflows using time-series regression. Section 2.5 analyses the implications of fintech on banks. Section 2.6 describes the risks of crowdfunding and Singapore's regulatory approach to crowdfunding. Section 2.7 concludes, with post-script of Covid-19 impact on crowdfunders' business.

2.2 Crowdfunding Development in Singapore

Fintech (shortened from financial technology) is about combining the latest technological developments such as artificial intelligence (AI), distributed computing, cryptography, mobile access internet with financial services and applications in areas of payment, savings, borrowing, managing risks and seeking financial advice (Figure 5). One example of fintech comes from the use of the mobile phone - for payments, lending and borrowing - to enable "unbanked" consumers to access financial services for the first time, hence promoting financial inclusion. Another example of fintech is the use of blockchain technology - a distributed decentralized ledger that transfers authority to a decentralized virtual network - in cryptocurrencies for lending, online payments, and areas beyond financial services (e.g. sports betting). Our paper is related to the use of big data and machine learning that enables individuals and businesses to borrow and lend money to each other (commonly known as peer-to-peer or P2P lending or crowdfunding)[6] and as mentioned earlier, show how it can improve access to finance for underbanked SMEs.

Figure 5: Technology Transformations to Financial Services



Source: Fintech and Financial Services: Initial Considerations, IMF Staff Discussion Notes No. 17/05.

Crowdfunding[7] is about raising small amount of money (funding) from a large number of people (crowd, not necessarily family or friends), typically via the internet or social media. The matching

of lenders to borrowers is conducted directly through the crowdfunders' platforms on the internet, where details of a borrower's loan request are listed for viewing by lenders who may choose to participate by funding all, or part of the loan. The crowdfunder earned revenue from fees levied on the transacting parties (e.g. *loan origination fee* payable by the borrower to the crowdfunder upon disbursement of the loan; and *service fee* payable by lender to the crowdfunder of ongoing loan repayments). What makes crowdfunding attractive for the SMEs compared to bank loans is that the loans are usually not collateralized, of a smaller quantum, shorter loan duration, and has faster approval time.

Studies shown that crowdfunders enhanced the efficiency of intermediation using digital technologies and granular customer data. Such data include utility payments, rent payment history, insurance claims, mobile phone usage, social media, and sales data. Crowdfunders provided faster and better credit risk assessments, shorter loan approval time through automatic matching. They provided lower transaction costs by using big data analytics and fraud detection based on alternative sources of data that traditional banks may not typically use.

Crowdfunders in the U.S. processed mortgages about 20 percent faster than traditional lenders, without having higher default rates (Fuster, Plosser, Schnabl, & Vickery, 2018). Using digital footprints of customers' registration behaviours on the websites, crowdfunders' credit assessment models predicted default rates better than using credit bureau data alone (Berg, Gombovic, Burg, & Puri, 2018). For example, the U.S. crowdfunding platform Lending Club, used non-traditional data for grading loan ratings which predicted the performance of the loans over the two years after origination (Jagtiani & Lemieux, 2018). These studies suggested that crowdfunders were able to price their loans according to the risk of their customers. Lower-risk customers were charged at lower interest rates due to the use of alternative data that traditional banks do not usually use.

Our survey of crowdfunders in Singapore yielded a similar story. The average loan processing time ranged between two hours to five days, compared to 45 to 60 days that of the banks. Many of them including Validus were able to charge lower interest rates to consumers with better credit ratings as suggested by their in-house credit assessment algorithm. Based on our data collected, there was a wide variation in their non-performing loan (NPL) ratios. See Appendix 1 for a list of crowdfunders in Singapore. Excluding the outliers, the crowdfunders' NPL ratios were lower than banks' (1.3%[8] vs 1.5%[9] in 2018). Notwithstanding these encouraging data, the fintech industry had yet to experience a full credit cycle where default risks rise during economic downturns (see Post-Script).

Singapore's crowdfunding market is small by international standards but growing rapidly. The Singapore market, which started a decade later than U.S. and U.K., is small compared to the global market measured by total funds raised, number of platforms, or share of outstanding bank loans. Nevertheless, it has grown rapidly to become the sixteenth largest in terms of total crowdfunding volume raised (US$499.7 million, Figure 6) in 2018 and sixth largest in terms of crowdfunding volume per capita (US$88.6 per capita, Figure 7) in 2018 (Cambridge Centre for Alternative Finance, 2020). China has by far the largest crowdfunding market in the world, at US$215.4 billion in 2018. These figures and rankings can change vastly every year, given the dynamic nature of the industry.

Figure 6: Crowdfunding Volume in 2018 (US$ Million)

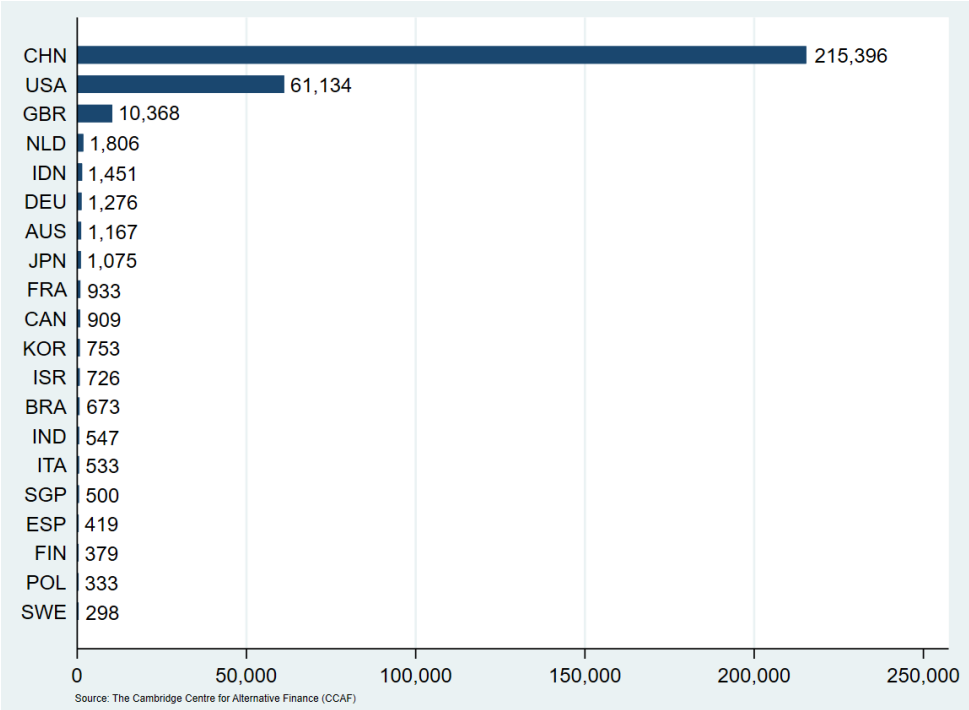
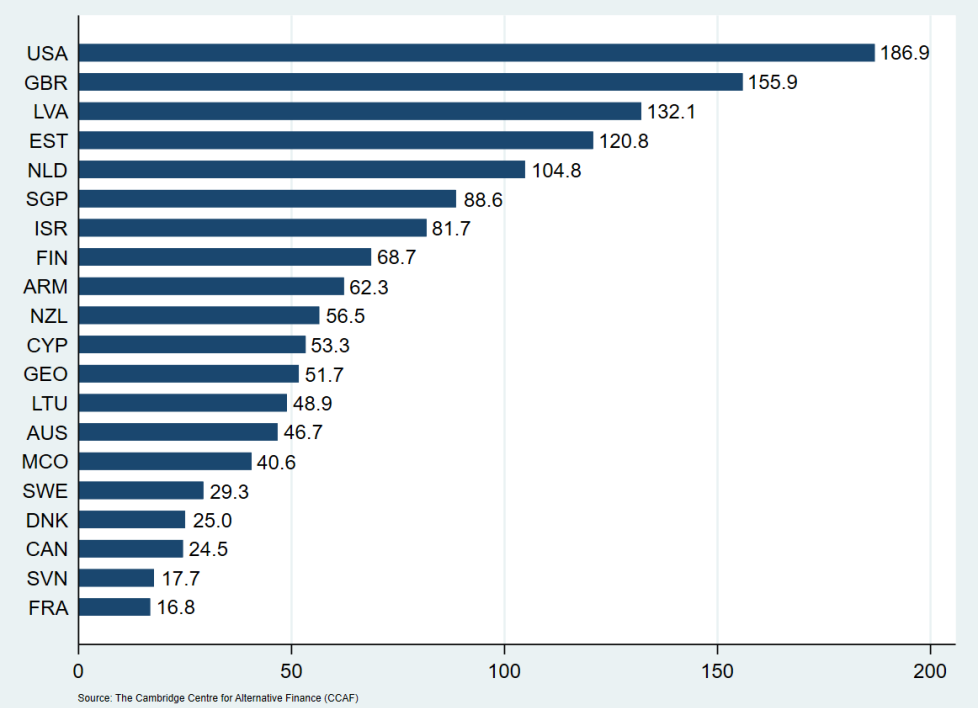


Figure 7: Crowdfunding Volume per Capita in 2018 (US$)



In Singapore, there were 19 crowdfunding platforms as of 2018. Our survey of crowdfunders showed that 100% of them expected their businesses and the industry to grow rapidly in the next 24 months.[10] Loans amounting to US$191 million were raised via crowdfunding, amounting to 0.29% of banks' lending to SMEs. In other countries, the shares of crowdfunding to bank credit were also small. For example, in the U.K., crowdfunding was estimated to be 1.4% of the outstanding stock of bank lending to consumers and small businesses at end-2016.[11] Despite its small size, crowdfunding has drawn the attention of bankers and regulators because of its capacity to enhance, and disrupt, financial services (Bank for International Settlements (BIS), 2018).

Globally, the total crowdfunding market is dominated by consumer lending as in the case of U.S. and U.K. However, in Asia and Singapore, corporate lending dominates. Recently, some crowdfunders in Singapore (e.g. Minterest) were issued licenses to lend to consumers. See Box 1 for various types of crowdfunding models in Singapore. See Appendix 2 for case studies of two Singapore-based crowdfunders; Funding Societies and Validus.

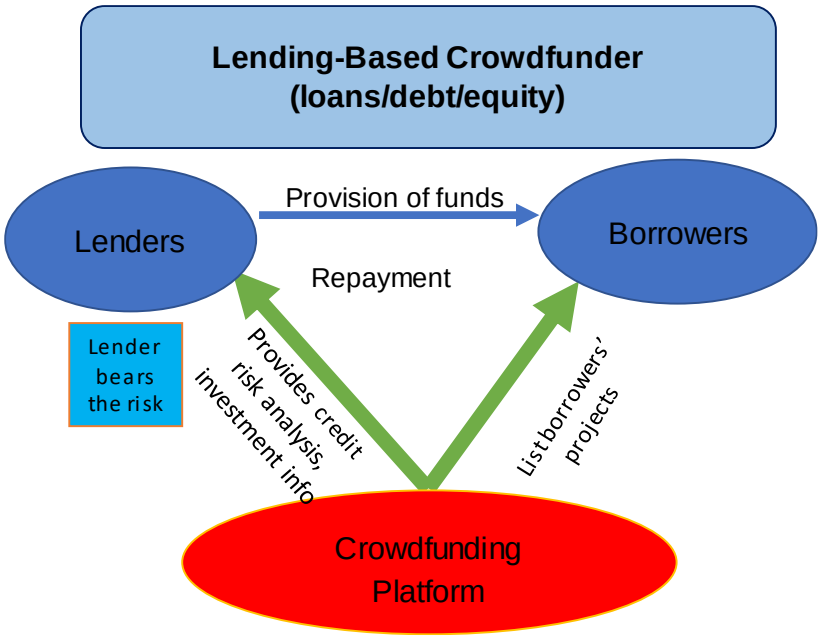
Box 1 – Types of Crowdfunding Models

Box 1: Crowdfunding Models Crowdfunding is about matching lenders to borrowers via an online platform. The first crowdfunding started in 1997 to raise funds for a British rock band, Marillion's reunion tour. Since then, different types of crowdfunding have emerged. We briefly describe three major types of crowdfunding models, all of which pose risks mainly to the lenders.
(ii) Donation-Based Crowdfunding

It is used to raise funds for charitable causes and does not provide any prospect of financial returns.
Examples: U.S.: Kiva (2005) and GoFundMe (2010)
Singapore: Giving Asia, Giving.sg and Simply Giving
Who bears the risk: Lenders

(ii) Rewards-Based Crowdfunding
It is used to raise funds for companies launching new products such as a 3D printer. Lenders are usually rewarded with the products produced by the companies.
Examples: U.S.: Kickstarter (2009) and Indiegogo (2008)
Singapore: MoolahSense and Minterest
Who bears the risk: Lenders

(iii) Lending-Based Crowdfunding
It takes on different forms, depending on the type of financing: One, a lender is matched to a borrower or a company that requires loans and will make interest payments on the loan at pre-determined intervals and at the transacted interest rate *(known as **pure lending-based**)*. Two, a lender purchases a debenture, or a bond issued by a company and is paid pre-determined coupon payments during the term of the loan *(known as **debt-based crowdfunding**)*. Three, a lender purchases equity issued by a company and is paid dividends on the company's shares *(known as **equity-based crowdfunding).*** In addition, platforms can also offer invoice-financing, which is a way for companies to borrow cash against the value of the funds owed to them by their customers. It is structured as a security with the invoices as collaterals



Examples: U.S.: Lending Club and Beehive
Singapore:
Lending-based crowdfunding: Funding Societies and Validus
Debt-based crowdfunding: Fundnel and FundedHere
Equity-based crowdfunding: CapBridge

CapBridge recently partnered with the Singapore Stock Exchange (SGX) to launch Singapore's first private equity stock exchange InvestaCrowd (real estate crowdfunder).

Who bears the risk: Lenders

For the lending-based crowdfunding model, the platform matches the lender and the borrower. Funds and loan repayments are segregated from the platform's own account. The crowdfunder is not involved in the loan contract between the borrower and the lender and hence does not bear the risks of the borrowers.

2.3 Key Drivers of Crowdfunding

What accounts for the variation in crowdfunding volume around the world? Studies found the level of economic and financial development, economic growth, as well as the quality of legal and other institutions to be significant drivers of overall credit (Demirgüç-Kunt & Levine, 2018). Extending this to crowdfunding volume per capita, studies showed a positive, non-linear relationship with GDP per capita; and a negative relationship with the degree of competition of the banking system and banking regulation stringency (Claessens, Frost, Turner, & Zhu, 2018). Barriers to entry and prevailing financial depth (e.g. credit to GDP) also helped to drive crowdfunding volume, as do the rule of law, control of corruption, and quality of regulation in general (Rau, 2017).

In this paper, we modified Claessens et al.'s approach,[12] using a strongly balanced panel data of nine countries – Australia, India, Indonesia, Japan, Korea, Malaysia, U.K., U.S. and Singapore – from 2013 to 2017. Ideally, China should be included given its importance. However, we dropped it from the sample because China is the biggest market in both volume and per capita terms, and it is driven by a unique set of factors. As such, including China might affect the fit of the regression, distorting the results.

We estimated various models with different variables that could explain crowdfunding volume in different jurisdictions. These variables are the level of economic development in the country, its financial sector development, availability of venture capital, the ease of doing business, its country risk, and strength of legal rights. For the purpose of discussion, we consider the following panel data regression:

$$ln\_CF_{it} = \alpha + \beta_1\, ln\_GDP_{it} + \beta_2\, ln\_GDP_{it}^2 + \beta_3\, ln\_VA_{it} + \beta_4\, ln\_DB_{it} + \beta_5\, ln\_ICRG_{it} + \beta_6\, ln\_FA_{it} + \beta_7\, ln\_FD_{it} + d_1C_{1i} + d_2C_{2i} + d_{n-1}C_{n-1,\,i} + \varepsilon_{it}$$

where the dependant variable $\boldsymbol{CF_{it}}$ is *crowdfunding per capita* for country *i*, at time *t*, in US$. The explanatory variables are; $\boldsymbol{GDP_{it}}$, – *GDP per capita* as a proxy for economic development; $\boldsymbol{GDP_{it}^2}$ to capture possible non-linear effect of GDP per capita on crowdfunding volume per capita; $\boldsymbol{VA_{it}}$

– *venture capital availability* to measure the ease of raising venture capital (its values lie between 1 to 7, from extremely difficult to extremely easy); $\boldsymbol{FA_{it}}$ ***and*** $\boldsymbol{FD_{it}}$ – *financial institutions access and depth* which are the two sub-indices of the overall *IMF Financial Development Index*. We did not use the overall index because it is too broad an index and would not reveal the nuances. Instead, we used financial access to test the effects of crowdfunding rising to serve the needs of the unbanked; and the financial institutions depth to show the positive effects of the virtuous cycle of financial development spurring investment and growth of fintech and vice-versa; $\boldsymbol{DB_{it}}$ – World Bank's *Ease of Doing Business Score* with higher score indicating that it is more conducive to do business in the country;[13] and $\boldsymbol{ICRG_{it}}$ – *International Country Risk Guide* with three subcategories and their respective weights, namely political (50%), financial (25%), and economic (25%). The scores range from 0 to 100 with higher score indicating less risk. We investigated if countries with better institutions (e.g. regulations that enhance business activities, as opposed to those that constrain them) grow faster, enable SMEs to grow and drive demand for crowdfunding measured by crowdfunding volume. Lastly, the country dummies C_i capture country-specific characteristics that are fixed or invariant over time (e.g. these could be geographical location, market size, entrepreneurship level, society's acceptance to risk-taking, or characteristics that do not vary over a long period of time). Singapore's country dummy was dropped to avoid multicollinearity and used as a country reference group for comparison with other countries.[14] See Appendix 3 for a glossary of the variables used.

By construction, a higher value of *DB* score signifies greater ease in doing business, and a higher value of *ICRG* signifies lower risk. As expected, the coefficients for *DB* and *ICRG* are positive, but not statistically significant in explaining crowdfunding volume (see Appendix 4). Hence, we dropped these two variables from the main regression model (see Table 1).

Table 1: Panel Data Regression Result for Crowdfunding per Capita using Fixed Effect Model

VARIABLES	(1) Main Model
GDP per Capita	31.03***
	(11.91)
Square of GDP per Capita	-1.722***
	(0.546)
Availability of Venture Capital	9.975***
	(1.194)
Financial Institutions Access	-6.236*
	(3.266)
Financial Institutions Depth	18.65***
	(5.022)
AUS	6.982**
	(2.793)

IND	12.55
	(7.756)
IDN	26.48***
	(7.853)
JPN	5.500
	(3.351)
KOR	4.934
	(3.425)
MYS	-10.19**
	(4.799)
GBR	3.834
	(3.087)
USA	8.411***
	(2.715)
Constant	-149.8**
	(72.59)
Observations	45
R-squared	0.933
Number of Countries	9
Robust	Yes
RMSE	0.978
Dependent Variable	Crowdfunding per Capita

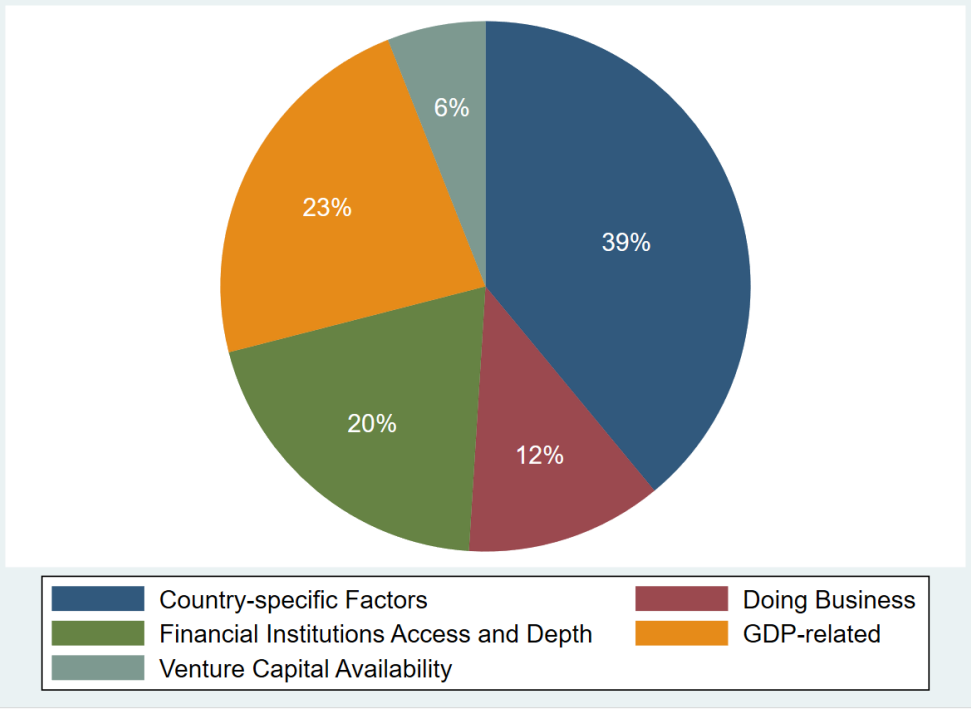
The coefficients of *GDP per capita* and its square are as expected. Higher *GDP per capita* has a positive effect on crowdfunding volume but this effect is diminishing at higher levels of GDP, shown by the negative coefficient of the squared term. Since these crowdfunding platforms are start-ups and dependent on venture capital funding, greater availability of venture capital also helps to drive crowdfunding volume. While the coefficient on *Financial Institutions Depth (FD)* is positive, implying that a more developed financial sector is an important driver of crowdfunding volume, the coefficient on *Financial Institutions Access (FA)* is negative, implying that the low level of financial access in less developed countries spurs crowdfunding to grow and serve the unbanked.

The results are intuitive for Singapore – its higher level of GDP per capita, more developed financial market, and greater availability of venture capital, are key factors behind the growth of crowdfunding volume in Singapore. For Singapore, which already has a high level of financial development and access, further lowering the cost of financial services (through fintech) might not increase the demand for financial services and this is where the government can play a role to encourage technology adoption and fintech development. Indeed, the Singapore government's push towards digitalisation and growing the fintech market have played a significant role in growing fintech activities, although these are difficult to capture in the regression. The dummy variables for Indonesia and U.S. are significant and positive (at the 1% significance level) and similarly for Japan (at the 10% significance level), suggesting that there are country-specific factors that contributed to the higher crowdfunding per capita (relative to

Singapore, after controlling for other explanatory variables). The country-specific factors for Indonesia could be attributed to its relatively younger population, with high mobile phone penetration, high demand and adoption of fintech services. For the U.S., Silicon Valley is the global technology hub with a huge global talent pool and venture capital funding which drive fintech activities.[15]

See Figure 8 for decomposition of the goodness-of-fit (R^2) for regression result in Table 1. *Country dummies* accounted for 39% of the total R^2, *GDP per capita* contributed 23%, *Financial Institutions Access and Depth* contributed 20%, *Venture Capital Availability* contributed 6% while the remaining 12% is due to the *ease of doing business* index. Our results suggest that policies do matter to the development of the crowdfunding industry. Governments can make a difference in ensuring greater depth in financial institutions, and ease in venture capital availability. These are policy considerations at the national level that countries can undertake to promote crowdfunding development.

Figure 8: Decomposition of Goodness of Fit



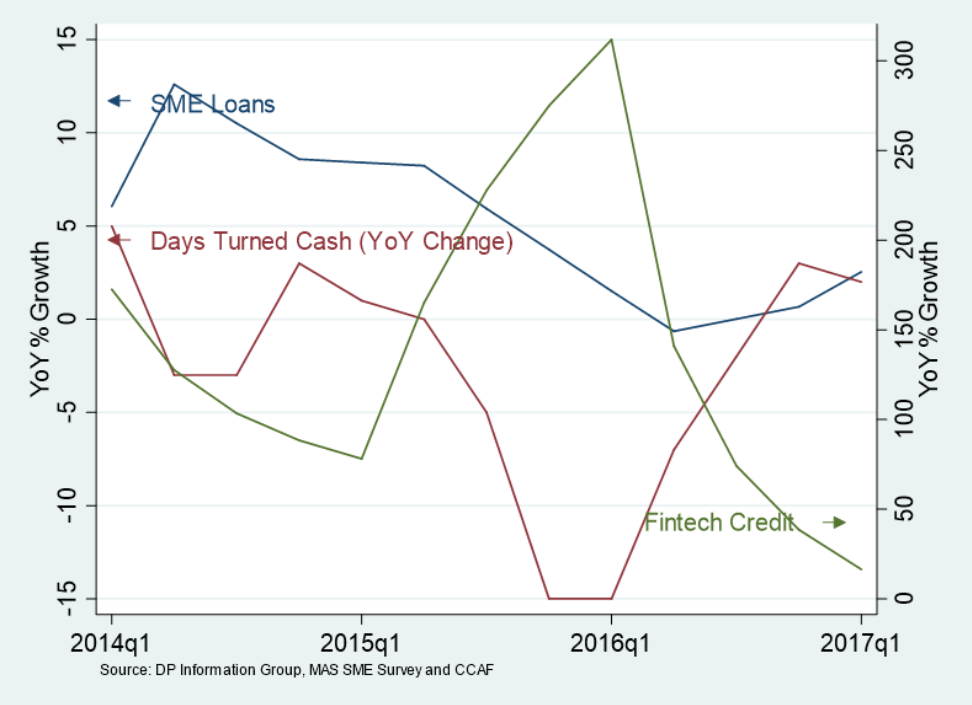
2.4 Impact of Crowdfunding on SMEs' Cashflows

As discussed earlier, SMEs especially the smaller ones, faced financing constraints as they lack collateral and solid financial statements. In the last five years, the rapid rise in new digital technologies in the financial services sector has helped SMEs overcome some barriers to financial access (Organisation for Economic Co-operation and Development (OECD), 2018).

While banks in Singapore have been supportive of lending to SMEs, their share of loans to SMEs have remained steady at around 13%. In addition, there are various government financing schemes to help SMEs such as the Micro Loan Program (MLP) and the SME Working Capital Loan but take-up rates have been low. With the advent of crowdfunding, SMEs now have an alternative source of finance to tap into.

From our survey and interviews with crowdfunders, their business models are well-suited to solving SMEs' liquidity problems by providing low quantum, short-term loans at competitive rates. While the growth of SME bank loans has moderated from 12.6% in 2014Q2 to just 2.5% in 2017Q1, crowdfunding volume has increased by 311.8% in just a year (Figure 9). The surge in crowdfunding is due to the entry of more crowdfunding platforms into the market since 2016, coupled with the low base effect. It also partly reflected MAS's move to ease the entry requirements for securities-based crowdfunding[16] in 2016, followed by efforts to improve the conduct of crowdfunding business and disclosure in August 2018 (see Section 2.6).

Figure 9 – SME Bank Loans, Days Turned Cash and Crowdfunding (Y-o-Y)



We analyse whether crowdfunding has improved SMEs' cashflows. We expect an increase in crowdfunding volume to lead to quicker settlement of debt, and therefore ease SMEs' cashflows. We use the average *Days Turned Cash (DTC)*[17] as a measure of how quickly SMEs pay their debts. A lower number means that SMEs on average settle their debts more quickly across all industries.

DTC is sometimes referred to as Days Payable Outstanding. It is tricky to interpret the DTC number. On the one hand, a higher DTC does not necessarily mean that the company has a bad credit as it could be using the excess cash for other purposes such as investing or expanding. On the other hand, a lower DTC may indicate that the company is not fully utilising its cash and may be operating inefficiently. There is no optimal level of DTC as it varies significantly by industry, competitive positioning and bargaining power. For the purpose of discussion, we consider the following time-series regression:

$$\Delta DTC_t = \alpha + \beta_1 * AFE_t \text{ (Y-o-Y)} + \beta_2 * CF_t \text{ (Y-o-Y)} + \beta_3 \, GDP \text{ (Y-o-Y)} + \varepsilon_t$$

where the dependent variable *ΔDTC* is the year-on-year change in *days turned cash*. The explanatory variables are; *access to financing expectations (AFE)*; *crowdfunding (CF)*; and *GDP* (all year-on-year growth rates) from 2013 to 2017.[18]

Table 2 below summarises our regression result. Both coefficients on *CF* and *AFE* are negative and significant, implying that higher crowdfunding volume and improved expectations of access to financing indeed improve the timeliness of debt payment by SMEs (indicated by lower DTC). GDP growth, which captures the overall macroeconomic environment for SMEs, is weakly positive (at the 10% significance level). This is because stronger economic growth could induce SMEs to use their excess cash for efficiently for investments (in expectation of higher returns) and stretch out their payment to suppliers. Thus, a higher DTC in this case may not necessarily be an indication of cashflow problems.

Table 2: Time-Series Regression Result for *Days Turned Cash* Model

VARIABLES	(1) OLS	(2) OLS
Access to Financing Expectations Y-o-Y Growth	-0.324**	-0.320*
	(0.140)	(0.154)
Crowdfunding Credit Y-o-Y Growth	-0.0674***	-0.0660***
	(0.00522)	(0.00525)
GDP Y-o-Y Growth		1.179*
		(0.603)
Constant	2.902**	-0.551
	(1.073)	(2.194)
Observations	15	15
R-squared	0.812	0.863
Robust	Yes	Yes
RMSE	3.206	2.855
Dependent Variable	Y-o-Y Change in Days Turned Cash	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

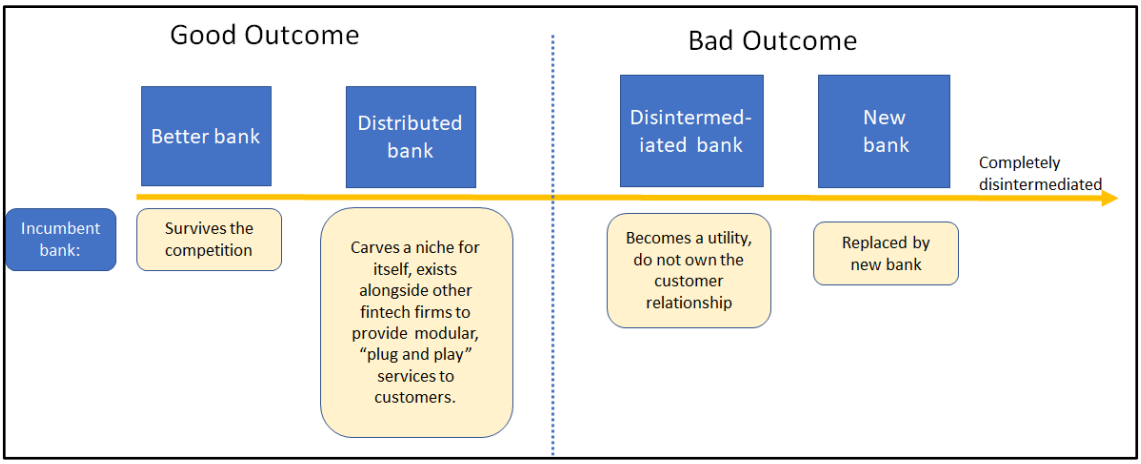
The above suggests that crowdfunding has a positive effect on SMEs' timeliness to pay their debt. This is consistent with the finding from our survey of crowdfunders in Singapore that SMEs such as small restaurant owners have benefited from crowdfunding as they not only improved their cashflows but also induced financing from banks. This shows that crowdfunding plays a catalytic role to spur bank lending to SMEs. While we do not have the figures for Singapore, survey data from the U.K.[19] showed that 79% of borrowers had attempted to get a bank loan before turning to crowdfunding. 33% of borrowers thought it was unlikely or very unlikely that they would have been able to secure funding elsewhere had they not been successful in getting a crowdfunding loan.

2.5 Implications of Fintech on Banks - Possible Scenarios

The rapid growth of fintech and digital banks have raised concerns that incumbent banks would be disrupted in some jurisdictions more than others. Digital banks in the U.K. are seen to be in a stronger position to challenge incumbent banks, while digital (neo) banks in the U.S. are seen to have to partner incumbent banks in the background in order to thrive.

While it is too early to predict the eventual outcome, various scenarios about how the future would look like have been postulated (Hatami, 2015). The following is adapted from Hatami's four scenarios ranging from minimum to complete disintermediation (Figure 10). We categorise the four scenarios into a "good" or "bad" outcome from the perspective of the incumbent bank.

Figure 10: Possible Scenarios for Bank Business Models



Good Outcome: Under the **"Better Bank"** scenario, the incumbent banks are swiftly digitizing and modernizing themselves (e.g. using biometry, chatbots, and robo-advisor services) to retain its core banking services and customer relationships. In the **"Distributed Bank"** scenario, financial services become increasingly fragmented and incumbent banks carve out enough of a niche to survive and exist alongside fintech firms. Each of them focused on providing specific products extremely well, offering services from payments, loans, savings products, forex, investments, and mortgages. A new type of online business could also emerge to aggregate these providers to enable consumers to access multiple providers using a single interface with one login.

Bad Outcome: At the other extreme, under the **"New Bank"** scenario, the incumbent banks cannot survive the technology disruption and are replaced by a challenger bank (e.g. a digital or virtual bank). The **"New Bank"** provides a full suite of banking services on "built-for-digital"

banking platforms, in a cost effective and innovative way. These new players obtain banking licenses from regulators and own the customer relationship. For example, Atom and Monzo, are digital banks in the U.K. that aim at simplifying the banking experience using mobile application technology and avoiding paperwork and physical branches. Users can open an account for free within minutes.

In the **"Disintermediated Bank"** scenario, fintech companies use front-end customer platforms to offer a variety of financial services from a diverse group of providers. The incumbent bank is relegated to simply providing commoditised services such as deposit taking. Customers perform banking services with mobile phone companies or social network providers (e.g. Apple Pay, Samsung Pay, Google Wallet and Facebook for payment). For loans, customers possibly bypass the banks and approach their preferred P2P lenders instead.

These scenarios are extremes and in practice, a combination of them could play out. The rapid pace at which technologies and innovation are happening mean that new products and channels could be created quickly. Regulatory changes such as the issuance of digital bank licenses in Singapore (see below) could also allow the entry of new players and create more disruption.

How would the new digital banking initiatives in Singapore affect incumbent banks?

New regulations would play a key role in shaping the future outcome for the banking sector. The MAS announced in June 2019 that it will issue up to two Digital Full Bank (DFB) licenses and three Digital Wholesale Bank (DWB) licenses. A digital bank offers banking services such as deposits, loans, debit and credit cards like a traditional bank, except that transactions are performed online, and the bank does not have a physical branch. A DFB will be allowed to take deposits from and provide banking services to both retail and non-retail customer segments. A DWB, on the other hand, will be allowed to take deposits from and provide banking services to only SMEs and other non-retail clients. One criterion the MAS has made clear is that digital banks must target niche, untapped segments, to serve a social purpose, and not to erode the share of the incumbents. The regulator's conviction is that *"the local banks will be able to withstand the competition and actually become even stronger and more innovative".*[20]

As at the close of application on 31 December 2019, MAS announced it received 21 applications for digital bank licenses. This comprised seven applications for the two DFB licenses, and 14 applications for the three DWB licenses. The new digital bank licenses have attracted strong interest from a diverse group of applicants including e-commerce companies, technology and telecommunications companies, Fintechs (e.g. crowd-funding platforms and payment services

providers) and financial institutions. Most applications were from consortiums, with entities seeking to combine their individual strengths to enhance the digital bank's value proposition. For example, the consortium led by Hong Kong financial services provider *AMTD Group*, included Singapore's power grid operator *SP Group* that provides crucial information on SMEs, Chinese tech company *Xiaomi*'s finance arm and crowdfunding platform *Funding Societies*, applied for the DWB licenses.[21] Many of the applicants for the digital bank licenses in Singapore applied as consortiums, similar to the experience of Hong Kong which issued eight virtual bank licenses in March 2019. This is unlike the Europe and U.S. experience, where the applicants are mainly individual start-ups.

Since 2016, the MAS has partnered with industry players to bring together global financial and technology players for the week-long Singapore Fintech Festivals. How have incumbent banks been responding to this development, and now leading to the digital bank licenses? Under the existing internet banking framework, the incumbent banks could already set up digital banks as they operate within the same prudential framework as traditional banking. For example, *DBS* is transforming from within to become fully digital. *DBS* is also building digital banks in overseas market to reduce operating costs – it set up *Digibank* in India in 2017 – the country's first mobile-only bank that is branchless and fully-digital. The model is replicated in Indonesia. Other incumbent banks responded to the competition through seeking partnerships with fintech players and adopting new technologies. For example, *UOB* invested and partnered with Israel-based fintech AI firm *Personetics* to use data analytics that allows bank to identify patterns from transactional data so that they can provide customers with real-time and personalised guidance on their financial decisions.[22] *UOB* has also invested S$10 million in Israeli equity crowdfunding platform, *OurCrowd* in 2016. Another incumbent *OCBC bank* partnered with local fintech firm *WeInvest* to provide clients investment services using *RoboInvest* platform, which has algorithm to optimise each portfolio by regular rebalancing in response to economic and market movements.

Some incumbents have turned to fintech companies rather than in-house solutions to accelerate their own digital transformations, to achieve a **"Better Bank"** outcome. We expect the trend of bank partnerships with fintech firms to continue in the near future,[23] reinforced from our crowdfunding survey's respondents who likewise indicated a preference for partnerships with traditional banks, insurance, and brokerage companies. For example, *Visa* in Singapore has partnered with *Validus* to offer a virtual credit card payment facility to SMEs for faster payment.

Should incumbent banks and new digital banks each focus on providing specific products extremely well, offering services from payments, loans, savings products, forex, investments and mortgages, we can expect financial services to become increasingly fragmented. With this, we

can expect a **"Distributed Bank"** outcome where the incumbent banks would have carved out enough of a niche to survive and exist alongside fintech firms.

2.6 Singapore Regulator's Response to Crowdfunding

Does crowdfunding pose any financial stability risks in Singapore?

Given the presently small size of crowdfunding volume relative to bank credit, it does not *yet* pose any systemic risks in Singapore. Nevertheless, the modalities and risks of the crowdfunding market can change rapidly, and regulators should be vigilant of any changes in size and interconnectedness.

At a macro-level, increased competition from new entrants could weaken lending standards, resulting in higher default rates and financial instability. Collaborations between banks and crowdfunders and their interconnectedness could lead to contagion risk. A rising share of crowdfunding volume could increase procyclicality; that is, a weakening of lending criteria during an economic upswing, and a tightening of credit during an economic downswing can amplify economic shocks.

At the micro-level, the risks from crowdfunding are mainly in the area of investor protection. This could arise from fraud, improper handling of investor funds, inadequate or misleading disclosure and cyber risk (operational risk). Improving disclosures by crowdfunding platforms and ensuring quality data can bridge the information asymmetry for investors.

Is there an internationally agreed standard on regulatory approaches to crowdfunding?

There is currently no internationally agreed standard on regulatory approaches to crowdfunding. The Financial Stability Board (FSB), and Committee of the Global Financial System (CGFS) in 2017 have reviewed the crowdfunding market globally and concluded that due to its small size, crowdfunding does not pose systemic risk to the global financial system (Bank for International Settlements (BIS), 2017). The risks posed by crowdfunding is mainly related to investors. Hence, most regulators have adopted a *proportionate approach* to regulating crowdfunding. This means regulating in a risk-focused manner, according to the activity of the crowdfunders (e.g. equity-based or lending-based crowdfunding), so as to strike a balance between the benefits and risks of crowdfunding. Given the rapid pace of innovation and changes in the crowdfunding sector, regulators are monitoring the crowdfunding sector closely to keep pace with the changing nature and risks.

Singapore Regulator's Response to Crowdfunding

The Singapore regulator's view is that crowdfunding could provide an alternative source of financing for start-ups and SMEs. To this end, it has made some policy moves to improve crowdfunding access. First, in June 2016, the MAS made the entry requirements easier for securities-based crowdfunding (SCF) operators. For SCF from non-retail investors (accredited and institutional investors),[24] the MAS reduced the base capital requirement from S$250,000 to S$50,000, as well as the minimum operational risk requirement from S$100,000 to $50,000. It has also removed $100,000 security deposit requirement (Monetary Authority of Singapore (MAS), 2016). This is on the basis that the platforms do not hold customers' monies or assets, and hence have limited risks. For SCF from retail investors, there is a $500,000 base capital requirement. Second, the MAS made it easier for SMEs to secure investors by simplifying pre-qualification checks on investors. Crowdfunders now only need to determine that investors have either the financial competence or are suitable to invest in SCF given their investment objectives and risk tolerance. Previously, the requirement was that they needed to satisfy all criteria of financial competence, suitability and financial means before they can invest.

At the same time, the MAS acknowledged that SCF has investment risks (namely, loss of capital if start-ups or SMEs without track record perform badly, liquidity risk due to absence of secondary market for securities trading, fraud, or platform risk in which investors lose monies if there is no proper segregation of customer monies). To ensure there are sufficient safeguards for investors, the MAS put in the place the following requirements in June 2016:

First, crowdfunding platforms that deal with debt and equity are required to obtain a Capital Market Services (CMS) license to operate. This will lend credibility to the sector and protect investors. Second, crowdfunders are subjected to the prospectus requirements under the Securities and Futures Act (SFA) because an invitation to lend money to a corporation in Singapore is considered as an offer of debentures under the law. Equity-based crowdfunding will similarly attract prospectus requirements. The prospectus requirements aim to ensure timely and accurate disclosure of information so that investors can make informed decisions about their investments. However, there are exemptions to the prospectus requirements for small offerings, private placements, and offers to institutional and accredited investors.[25] Third, crowdfunders are required to document and disclose key risks of investments, as well as obtain investor's acknowledgement that he/she has read and understood these risks, before investing on the platform. Forth, the MAS required in 2018 that crowdfunders enhance their practices and controls in relation to due diligence conducted on issuers, management of defaults, cessation of business and disclosures to investors. Specifically, crowdfunders are required to disclose interest rates and non-performing loan rates in a consistent manner.

In addition to the CMS license, any person (or in our case, crowdfunders) engaged in the business of moneylending, be it as a principal or as an agent, is legally required to hold a moneylender's license from Singapore's Registrar of Moneylenders under the Ministry of Law. A relevant exception applies, however, if the lending goes exclusively to business entities or accredited investors. This lending is then executed by "excluded moneylenders".

The Moneylenders Act comes under the purview of the Ministry of Law, while the SFA is administered by the MAS. These differences could give rise to opportunities for regulatory arbitrage. So far, none of the 19 crowdfunders (except Minterest) that are CMS licensees, have registered as moneylenders. It is important that the authorities monitor the industry closely for regulatory arbitrage. Improving transparency and availability of data for this sector is critical for market discipline to work. In December 2018, the Ministry of Law lifted its moratorium on issuance of new licenses. It issued six new moneylending licenses to businesses that are able to make better credit assessments using AI and non-traditional data sources to assess credit worthiness, thus lowering credit cost.

In sum, the MAS approach is to balance improving access to capital for businesses, with mitigating the financial stability risks arising from crowdfunding. It does so by adopting a *proportionate approach* to regulating crowdfunding, by applying *risk-appropriate regulations* to the specific activities that are conducted, be it lending to SMEs or individuals. Regulation will have to adapt to the rapidly evolving financial landscape, notably, policy issues beyond the scope of prudential supervision (e.g. safeguarding data privacy, cyber-security, consumer protection, fostering competition and compliance with anti-money laundering AML and combating the financing of terrorism CFT).

2.7 Conclusion

In Singapore, crowdfunding volume has grown rapidly to make the country one of the top crowdfunding hubs in Southeast Asia in 2018. Our empirical results showed that the key drivers of crowdfunding for Singapore are its high GDP per capita, developed financial market and greater availability of venture capital. We found evidence that crowdfunding has helped improve SMEs' cashflows. This is consistent with the finding from our survey of crowdfunders in Singapore that SMEs have benefited from crowdfund financing as they not only improved their cashflows but also induced financing from banks.

We suggest that a combination of the *Better Bank* and *Distributed Bank* scenarios is likely to happen in Singapore. Regulatory changes such as the issuance of new digital bank licenses could

shape the future fintech landscape. Regulators have to strike the right balance between developing the fintech industry while safeguarding financial stability. While the systemic risk from crowdfunding is currently low given its small size and limited interconnections, this could change quickly over time and it is important for regulators to monitor the industry closely and require greater disclosure from the crowdfunders.

As new digital technologies emerge that make the provision of financial services more efficient, they hold the potential to address barriers that SMEs face in accessing credit. We hope our findings in the paper will inspire more research on crowdfunders' effect on SMEs, and both their roles in building a dynamic and inclusive society in Singapore.

Post-script:

Cashflow has always been a challenge for SMEs and this paper is about how SMEs have benefited from crowdfunding as an alternative source of financing**.** Although the paper was written in 2019 before the Covid-19 crisis, it is important to provide an account of the crowdfunders' challenges during the crisis given its unprecedented nature.

Related to the earlier point on how crowdfunders have yet to experience the full credit cycle where default risks rise during downturn, the Covid-19 crisis is one such example of an economic downturn where businesses are severely affected due to the lockdown and social distancing measures. Crowdfunders themselves are not spared as they are squeezed from both borrowers and investors (e.g. rising default rates from borrowers and reduced funding from investors during a downturn).

Moreover, the Covid-19 crisis poses an existential threat for many small businesses including crowdfunders who are start-ups themselves and dependent on Venture Capital (VC) funding. Given the deep economic contraction, VC funding to crowdfunders will be squeezed given that their returns are badly affected. Indeed, the amount of funding raised for fintech investments have declined significantly in South East Asia and globally. Massive monetary stimulus has brought down the cost of funding and central banks have made available massive amount of funding, at low costs to SMEs,[26] but these are being channelled through the banks, bypassing crowdfunders.

Anecdotal examples in the U.S. showed that banks would not consider applications from some new SMEs, while for the others the bank lending process was tedious and lengthy with manual-filling of data. Crowdfunders have the capabilities and information about their clients to fill in the data automatically and distribute the cash into the hands of entrepreneurs quickly. However, while the crowdfunding business model is most-suited for lending during the Covid-19 pandemic as it

is contactless and efficient, unfortunately, they are not being tapped to perform the intermediation function. Going forward, crowdfunders are facing an increasingly challenging environment not only because investor funding is drying up and fresh VC funding is harder to come by, but default rates are also on the rise. Only the fittest will survive.

References

Bank for International Settlements (BIS). (2017). *Fintech Credit: Market structure, business models and financial stability implications.* Bank for International Settlements.

Bank for International Settlements (BIS). (2018). Sound Practices: Implications of fintech developments for banks and bank supervisors. *Basel Committee on Banking Supervision*.

Beck, T., & Demirgüç-Kunt, A. (2006). Small and Medium-Size Enterprises. *Journal of Banking and Finance Volume 30*, 2931-43.

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). Financial and Legal Constraints to Firm Growth: Does Firm Size Matter? *Journal of Finance Volume 60*, 137-177.

Beck, T., Demirgüç-Kunt, A., Laeven, L., & Maksimovic, V. (2006). The Determinants of Financing Obstacles. *Journal of International Money and Finance Volume 25*, 932-952.

Berg, T., Gombovic, A., Burg, V., & Puri, M. (2018). On the Rise of the FinTechs—Credit Scoring using Digital Footprints. *Federal Deposit Insurance Corporation Center for Financial Research Working Paper Series*.

Cambridge Centre for Alternative Finance (CCAF). (2014). *The UK Alternative Finance Industry Report.* CCAF.

Cambridge Centre for Alternative Finance (CCAF). (2018). *Third Asia-Pacific Alternative Finance Industry Report.* CCAF.

Cambridge Centre for Alternative Finance (CCAF). (2018). *The Future of Finance is Emerging: New Hubs, New Landscapes.* Zhejiang Association of Internet Finance. Retrieved from www.jbs.cam.ac.uk: https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2018-ccaf-global-fintech-hub-report-eng.pdf

Cambridge Centre for Alternative Finance (CCAF). (2020). *The Global Alternative Finance Market Benchmarking Report.* CCAF.

Claessens, S., Frost, J., Turner, G., & Zhu, F. (2018). Fintech credit markets around the world: size, drivers and policy issues. *Bank for International Settlements Quarterly Review*.

Demirgüç-Kunt, A., & Levine, R. (2018). *Finance and Growth.* The International Library of Critical Writings in Economics Volume 1.

Experian. (2017, November). *SME Development Survey 2017: Manpower concerns drop as SMEs focus on growth*. Retrieved from www.experian.com.sg: https://www.experian.com.sg/sme-development-survey-2017-manpower-concerns-drop-as-smes-focus-on-growth

Financial Stability Board (FSB). (2019). Evaluation of the effects of financial regulatory reforms on small and medium-sized enterprise (SME) financing.

Fuster, A., Plosser, M., Schnabl, P., & Vickery, J. (2018). *The Role of Technology in Mortgage Lending.* Federal Reserve Bank of New York Staff Reports No. 836.

Hatami, A. (2015, October 6). *The future of banking: four scenarios*. Retrieved from www.banknxt.com: https://banknxt.com/53478/future-banking-scenarios/

Huettner, F., & Sunder, M. (2011). Axiomatic arguments for decomposing goodness of fit according to Shapley and Owen Values. *Electronic Journal of Statistics*.

Jagtiani, J., & Lemieux, C. (2018). The Roles of Alternative Data and Machine Learning in Fintech Lending: Evidence from the LendingClub Consumer Platform. *Federal Reserve Bank of Philadelphia Working Papers 18-15*.

Kumar, K. B., Rajan, R. G., & Zingales, L. (1999). What Determines Firm Size? *National Bureau of Economic Research Working Paper 7208*.

Lee, J. (2019, November 11). Singapore digs deep to bring true financial liberalisation. Retrieved from The Business Times: https://www.businesstimes.com.sg/hub/sff-x-switch-2019/singapore-digs-deep-to-bring-true-financial-liberalisation

Monetary Authority of Singapore (MAS). (2016, June 8). *MAS to Improve Access to Crowd-funding for Start-ups and SMEs*. Retrieved from www.mas.gov.sg: https://www.mas.gov.sg/news/media-releases/2016/mas-to-improve-access-to-crowdfunding-for-startups-and-smes

Monetary Authority of Singapore (MAS). (2018). *Financial Stability Review.* MAS.

Navaretti, G. B., Calzolari, G., & Alberto, P. F. (2017). *Fintech and Banking: Friends or Foes?* European Economy: Banks, Regulation and the Real Sector.

Organisation for Economic Co-operation and Development (OECD). (2018). *Financing SMEs and Entrepreneurs.* OECD.

Rau, R. P. (2017). Law, trust, and the development of crowdfunding. *University of Cambridge*.

Smischenko-Mironova, A., & Fedorova, A. (2017). *Partnership in Fintech*. Retrieved from www.pwc.ru: https://www.pwc.ru/en/press-releases/2017/partnership-in-fintech.html

Appendix 1: Crowdfunders in Singapore

Name/ Total Loan Book Size*	Type of Investors and Minimum Investment Amount	Duration and Loan Size	Borrower Fees	Weighted average returns to Investors***	Non-performing loan rate***
Funding Societies; S$628.88 m**	Anyone. S$20 per project (initial deposit S$1,000).	Invoice financing; 3-12 months, up to 80% of invoice value. Secured business loan; 3-12 months, up to S$3,000,000. Unsecured business loan; 3-12 months, up to S$1,500,000. FS Bolt; quick loans of up to S$50,000, approval within 2 hours.	2%-5% on the amount crowdfunded.	Weighted average 9.32% p.a. (2018)	1.81% (2018)
SeedIn Technology; S$166 m (excluding China)	Anyone. S$1,000 per project.	Unsecured or secured business loan against invoices/collateral; 1-12 months, S$1,000-S$5,000,000	3%-5% on the amount crowdfunded.	Weighted average 8.33% p.a. (2018)	0%
Validus; S$230.24 m	Only accredited and institutional investors. Minimum investment of 1000 per faculty (via Auto Invest)	Purchase order financing; 1-3 months, up to 60% of purchase order value. Invoice financing; 1-4 months, up to 80% of invoice amount.	0.75%-3% per month.	4.42-24% p.a. (2018)	2.5% (2018)

	Minimum portfolio size of S$50,000).	Unsecured business loan; 3-12 months, up to S$250,000.			
Capital Match; S$143.86 m	Anyone. S$1,000 per project.	Invoice financing; 1 week-4 months, S$5,000-S$2,000,000 or up to 85% of invoice value. Business loan; 3-12 months, S$50,000-S$200,000.	15%-20% on the amount crowdfunded.	15-20% p.a. (2018)	0.2% (2018)
MoolahSense; S$74.38 m (Feb 2019)	Anyone. S$100 per project.	Invoice financing; 15-90 days, from S$15,000 up to 80% of invoice value. Unsecured business loan; 3-24 months, S$50,000-S$5,000,000 under Small Offers Exemption and above S$5,000,000 under Private Placement Exemption. Secured business loan; 6-24 months, S$50,000-S$5,000,000 under Small Offers Exemption and above S$5,000,000 under Private Placement Exemption.	Invoice financing; 1% per month and S$1,000 for annual application fees. Business loan; 3%-5% on the amount crowdfunded and S$500-S$750 for annual application fees.	9.9% p.a. (2018)	14.82%
Co-Assets; S$60 m	Anyone. S$1,000 per project.	Business loan; S$100,000-S$5,000,000	3%-5% on the amount crowdfunded.	9.9% p.a. (2018)	0%
Minterest; S$35 m	Anyone. S$500 per project (initial deposit S$1,000).	Invoice financing and business loan; up to 12 months, minimum S$50,000.	Invoice financing; minimum 0.5% per month. Business loan; minimum 2% on	12.95% p.a. (2018)	0.59%.

			the amount crowdfunded.		
FundTier; S$9.7 m	Anyone. S$1,000 per project (initial deposit of S$50,000)	Business loan; average deal size S$31,000	na	Weighted average: 9.18% p.a. (2018)	6.55% (as at Dec 2018)
Aces Crowdfund	Only accredited and institutional investors.	Business loan; 12-24 months. Equity investment; typically longer duration.	na	na	na
Arcor Capital	Only accredited and institutional investors.	Targeting start-ups who needs early stage financing or mid-market SMEs, financing though mezzanine or private equity structure	na	na	na
Crowd Genie	Only accredited and institutional investors. S$1,000 per project.	Unsecured business loan; S$50,000-S$500,000	2%-5% on the amount crowdfunded.	8.2% p.a. (2018)	na
Crowdo	Only accredited and institutional investors.	Invoice financing; Business loan; 3-9 months, backed by gold or jewellery collaterals Equity investment;	na	5% p.a. (2018)	0%
Fund Singapore	Anyone. S$1,000 per project.	Business loan and equity investment; real estate, average deal size S$1,500,000	na	na	na

SmartFunding	Anyone. S$100 per project (Initial deposit of S$1,000).	Invoice financing; Business loan;		na	na
Fundnel; S$800 m	Only accredited and institutional investors.	Allows investors to invest in a set of start-ups, early to late stage, via equity convertible bonds, revenue sharing or bond/debt structure. S$1,000,000-S$100,000,000, average deal size S$3,200,000	5% on the amount crowdfunded.	na	na
CapBridge; S$900 m (2018)	Only accredited and institutional investors.	Business loan and equity investment in mid-to-late stage growth companies; S$5,000,000-S$50,000,000	na	na	na
FundedHere; >S$100 m	Only accredited and institutional investors. S$50,000 per Listco bond project. S$5,000 per equity project.	Singapore-listed corporate bonds (Listco bonds); 24 months, S$1,000,000-S$5,000,000 Equity investment in early stage start-ups; S$100,000-S$1,000,000	Listco bonds; 1.5% on the amount crowdfunded. Equity; 6% (in cash) and 2% (in equity) of the amount crowdfunded.	12.14% p.a. (2018)	na
InvestaCrowd; S$ 1 bn	Only accredited and institutional investors. S$100,000 per project (S$25,000 for first-time investor).	Real estate crowdfunder using blockchain technology Debt real estate investment (senior debt); 3-12 months Debt real estate investment (junior debt); 12-18 months Preferred equity real estate investment; 18-36 months		Senior debt; 8%-12% p.a. Junior debt; 12%-18% p.a.	

		Common equity real estate investment; >36 months Note: all projects are securities-backed with borrowers' pledged assets		Preferred equity; >20% p.a. Common equity; >40% p.a.	

Note: Most platforms engage escrow agencies such as Vistra and Watiga to hold investor funds.

*Information is correct as at May 2019.

**Total loan book size includes funds raised across all geographical regions that the crowdfunder operates (e.g. Funding Societies).

***Since March 2019, the MAS requires holders of CMS license to publish the following statistics amongst other disclosure requirements;

Weighted Average (Per Annum): Weighted Average Rate of Return is the percentage of the sum of all interests (per annum) less fees and charges for all loans (excluding interest payments for defaulted loans) divided by the total amount of loans disbursed during the year. This excludes the amounts disbursed for defaulted loans during the applicable year.

Non-Performing Loan Rate is computed as the ratio of loans (principal + interest) that are at least 30 days past due over the total outstanding loans facilitated on the platform during the year (including outstanding amounts of defaulted loans) as at the applicable year end.

Appendix 2: Case Studies of Crowdfunders

Case Study of Funding Societies

Funding Societies was founded in 2015 by two former Harvard Business School students, Mr. Reynold Wijaya and Mr. Kelvin Teo. It operates in Singapore, Indonesia and Malaysia, and it has received funding from SoftBank Ventures Asia amongst other investors.

According to Mr. Teo, *"We launched our Indonesia business in January 2016, six months after the launch in Singapore. The choice of Indonesia is primarily driven by our understanding and passion for the market (Reynold is Indonesian, while I have worked there for a year). Its large market size and our realistic chance of becoming No. 1 there are other driving factors. We are fortunate to have an excellent local country head to drive the business."*

He added, *"SME digital financing is a low margin, high volume business, and Singapore in itself is simply insufficient to build a sustainable business."*

Currently, Funding Societies has more than 200 employees and financed over 100,000 business loans, totalling over S$600 million in funds. The company serves mainly SMEs who need small, short-term and unsecured (uncollateralized) loans, and the average loan size is S$500,000. Its top lending segment is in the Information and Communication sector (32%), followed by the Commerce and Wholesales sector (21%), as well as the Hospitality and Food and Beverages sector (16%). Interest rates vary from 9% for secured loans, to as high as 16% for unsecured loans. In 2018, its weighted average returns to investors was 9.32%.

Funding Societies' default rate in 2018 is 1.5%, down from 2% to 3% two years ago, due to improvements in its underwriting model. Its proprietary credit-scoring model uses risk-based pricing, which significantly reduces the average time to process a loan with some degree of automation. It is the first crowdfunder in Singapore to integrate its system with MyInfo[xxvii] for a quicker and more accurate access to its borrowers' business information. In addition, the model incorporates alternative data to help in their credit assessment, such as CEO's credit card payment history and other qualitative information.

Funding projects are loaded on the platform, after the borrowers have accepted a set of terms and conditions relating to quantum, tenor and interest rate. Lenders such as retail, institutional and accredited investors can invest in Funding Societies' projects from as low as S$20 per project. Its financial services include auto-invest, quick loan, invoice financing, and unsecured business loan up to S$1,500,000. For instance, auto-invest is an automated algorithm-driven investment model that matches investors on the platform according to their desired investment criteria. With quick

loan, the SME can expect a loan from US$500 to US$40,000 to be approved and disbursed within two business hours. For larger loan quantum, it would require a waiting period of two to seven days.

Funding Societies shared a case of a client, Mr. Prasad Raja who was the owner of Home Raj Pte Ltd, a Food and Beverage F&B Indian restaurant chain with a ten-year history in Singapore. Mr. Raja needed some funds to set up a new shop in Changi Business Park and renovate an existing restaurant. However, his loan applications to the banks were rejected, due to several factors. One was because of his age, and the other was because his company was facing declining profit margins at his existing restaurant due to 50% decline in footfall from on-going roadworks that would last for three years. Mr. Raja was introduced to the concept of alternative financing and eventually secured funds from Funding Societies. Since then, he has opened two more outlets in the vicinity of Changi Business Park and Buona Vista in Singapore.

According to Mr. Raja, *"In this business, cashflow is king. You need cashflow. Getting the finances on time was a big help".*

Case Study of Validus

Validus was founded in 2015 and has three co-founders, namely Mr. Ajit Raikar, Mr. Vikas Nahata and Mr. Nikhilesh Goel. It has grown from a firm of 4 to 80 people in 2019. Amongst its investors are Vertex Ventures (a unit of Singapore's sovereign wealth fund Temasek Holdings) and FMO (the Netherland's Development Finance Company, the Dutch entrepreneurial development bank).

Validus matches accredited individual and institutional investors (retail investors are excluded) to growing SMEs, with a total amount funded of S$300 million. It earns a fee of 0.75% to 3% on the amount crowdfunded.

To diversify risk for its investors, Validus encourages its investors to lend across all products. In addition, Validus is able to price their loans at competitive rates, charging interest rates as low as 6-12% on an annualized basis. The rates can often be similar to what banks offer to the SMEs. It is able to charge bank-like rates largely due to its partnership strategies with accredited and institutional lenders which include family offices.

Validus' default rate is less than 2%, which is lower than the banks' NPL for SMEs of 5.1% in H12018.[xxviii] Several factors may have contributed to the low default rate. First, its use of a fraud detection algorithm developed in-house has helped detect irregularity in data if financial statements are doctored. Second, its business approach to collaborate with large stable corporates

in Singapore has enabled it to reach out to vendors that have successfully secured contracts with the large corporates. For example, once a vendor has secured a contract, Validus offers short-term, collateral-free loans at competitive interest rates. During our interview, a security services firm had won a $3 million project and required a 10% financing upfront (or S$300,000) to hire more security guards. Validus provided the working capital required upfront which helped ensure the project was completed.

Validus also collaborates with industry-leading partners such as Visa to offer innovative SME financing solutions using a virtual commercial card to facilitate immediate cashflow to SMEs with unpaid invoices in their payment cycle.

Appendix 3: Glossary of Variables and Data Sources

Crowdfunding Volume: the amount of crowdfunding raised in U.S. dollars, based on the data collected from the 'Global Alternative Finance Benchmarking Survey'. It comprises marketplace/P2P consumer lending, marketplace/P2P business lending, marketplace/P2P property lending, balance sheet business lending, revenue sharing/profit sharing crowdfunding, real estate crowdfunding, equity-based crowdfunding, invoice trading, reward-based crowdfunding, donation-based crowdfunding, debt-based securities, and balance sheet consumer lending.
Source: Cambridge Centre for Alternative Finance

Population: country population data used to derive crowdfunding per capita.
Source: World Bank data from CEIC

World Bank's Ease of Doing Business Index: the index ranks economies from 1 to 190, with first place being the best. On a scale of 0 to 100, a higher value (a low numerical rank) means that the regulatory environment is more conducive to business operations. The index averages the country's percentile rankings on 10 topics covered in the World Bank's Doing Business Survey; they are 1. Starting a business; 2. Dealing with construction permits; 3. Paying taxes; 4. Trading across borders; 5. Registering property; 6. Getting electricity; 7. Enforcing contracts; 8. Protecting minority investors; 9. Getting Credit; 10. Resolving insolvency. The ranking on each topic is the simple average of the percentile ranking on its component indicators.
Source: World Bank, Doing Business project (http://www.doingbusiness.org/)

ICRG Composite Risk Rating: this is a composite risk indicator that summarises risks across three subcategories and their respective weights, namely political (50%), financial (25%), and economic (25%). The political indicators are derived from surveys of risk perceptions related to each of the following 12 variables; government stability; internal conflict; external conflict; military in politics; law and order; ethnic tensions; bureaucracy quality; socioeconomic conditions; investment profile; corruption; religious tensions; and democratic accountability. The financial risk ratings are derived from the assessment of a country's ability to pay its official, commercial, and trade debt obligations based on the following five variables: foreign debt as a percentage of GDP, foreign debt service as a percentage of exports of goods and services, current account as a percentage of exports of goods and services, net international liquidity as months of import cover and exchange rate stability. The economic risk components are derived from the assessment of a country's current economic strengths and weaknesses related to each of the five variables: GDP per capita, real GDP growth, annual inflation rate, budget balance as a percentage of GDP, and current account as a percentage of GDP. The composite scores range from 0 to 100

with higher values signifying lesser risk.
Source: World Bank World Development Indicators database archive and the PRS Group

Availability of Venture Capital: this is a sub-index from the World Competitiveness Index of the World Economic Forum (WEF). This is based on a survey response to the question: *"In your country, how easy is it for start-up entrepreneurs with innovative but risky projects to obtain equity funding?"* Its values lie between 1=extremely difficult and 7= extremely easy).
Source: World Economic Forum and Executive Opinion Survey

Financial Institutions Depth and Financial Institutions Access: these are two of the six sub-indices from the IMF's Financial Development Index. The index is a relative ranking of countries on the depth, access and efficiency of their financial institutions and financial markets.

The Financial Institutions Depth Index includes the following indicators: bank credit to the private sector as a percent of GDP, the assets of the mutual and pension fund industries, and the size of life and non-life insurance premiums.
Source: International Monetary Fund

The Financial institutions Access is proxied by the number of bank branches and ATMs per 100,000 adults, number of bank accounts per 1,000 adults, percentage of firms with line of credit, and usage of mobile phones to send and receive money.
Source: International Monetary Fund

Days Turned Cash (DTC): it measures the timeliness of SMEs paying their debt. The lower the number, the timelier their payment. It is collected from quarterly payment records of more than 120,000 companies in Singapore, across eight major sectors in the economy (retail, wholesale, construction, hospitality/food and beverage, information and communications, manufacturing, services, and transport/storage).
Source: Experian previously DP Information Group

Access to Financing Expectations: this is a sub-index from the SME Index compiled by the Singapore Business Federation (SBF) and Experian. The SME Survey collects input from 3,600 SMEs on their expectations in seven key areas: Turnover, Profitability, Business Expansion, Capital Investment, Hiring, Capacity Utilisation, and Access to Financing Expectations. A higher number means better access to financing expectations.
Source: Experian

Appendix 4: Alternative Models with World Bank's Ease of Doing Business Index and ICRG Composite Risk Rating.

VARIABLES	(1) DB Index	(2) ICRG
GDP per Capita	40.84**	27.11**
	(19.12)	(11.47)
Square of GDP per Capita	-2.246**	-1.579***
	(0.913)	(0.540)
Availability of Venture Capital	9.166***	9.661***
	(1.026)	(1.105)
Ease of Doing Business Index	6.754	
	(6.750)	
ICRG Composite Risk Rating		10.04
		(9.832)
Financial Institutions Access	-18.62***	-7.521**
	(7.173)	(3.608)
Financial Institutions Depth	22.23***	18.47***
	(5.377)	(4.607)
AUS	16.66***	8.903**
	(5.622)	(3.582)
IND	15.31	9.409
	(10.15)	(5.724)
IDN	36.93***	25.67***
	(11.07)	(6.858)
JPN	16.06**	6.730*
	(6.683)	(3.834)
KOR	11.46**	5.410
	(5.110)	(3.485)
MYS	-11.66**	-10.82**
	(5.365)	(4.243)
GBR	12.09**	5.529
	(5.420)	(3.839)
USA	19.60***	10.57***
	(6.189)	(3.757)
Constant	-234.8**	-169.6**
	(112.6)	(76.07)
Observations	41	45
R-squared	0.945	0.936
Number of Countries	9	9
Robust	Yes	Yes
RMSE	0.888	0.978
Dependent Variable	Crowdfunding per Capita	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

End of Paper

[1] (Beck & Demirgüç-Kunt, Small and Medium-Size Enterprises, 2006), (Beck, Demirgüç-Kunt, & Maksimovic, Financial and Legal Constraints to Firm Growth: Does Firm Size Matter?, 2005), (Beck, Demirgüç-Kunt, Laeven, & Maksimovic, 2006).

[2] Here are definitions of credit-constrained firms according to the World Bank's Enterprise Survey;
(i) Fully Credit Constrained (FCC) firms have no external loans because loan applications were rejected, or the firm did not apply even though they needed additional capital;
(ii) Partially Credit Constrained (PCC) firms used external sources of finance for working capital and/or investments and/or have a loan outstanding but did not apply for a new loan;
(iii) Marginally Credit Constrained (MCC) firms are those that used external sources of finance for working capital and/or investments during the previous fiscal year and/or have a loan outstanding at the time of the survey and;
(iv) Non-Credit Constrained (NCC) firms are those that did not apply for financing because they have enough capital.

[3] Financial Stability Report "Evaluation of the effects of financial regulatory reforms on small and medium-sized enterprise (SME) financing", 2019.

[4] In 2017, the Monetary Authority of Singapore's outstanding SME loan data was S$87.54 billion while total banking credit to both businesses and consumers was S$651.93 billion, making SME share to total banking credit at 13.4%.

[5] MAS Financial Stability Review, November 2018, Box F.

[6] Different terminologies have been used to refer to crowdfunding and to avoid confusion, it is important to note that crowdfunding, P2P lending and marketplace lending are commonly used terms. They refer to all types of crowdfunding including equity-based, consumer, and business lending. The Bank for International Settlements (BIS) uses the term *fintech credit* to refer to all credit activities facilitated by electronic platforms that are not operated by banks. The Cambridge Centre for Alternative Finance classifies crowdfunding models into 11 categories: P2P consumer lending, P2P business lending, equity-based crowdfunding, reward-based crowdfunding, invoice trading, real estate crowdfunding, debt-based securities, mini-bonds, balance sheet business lending and profit-sharing crowdfunding.

[7] The term "crowdfunding" was coined by Michael Sullivan, an entrepreneur who was trying to fund a video-blog project in 2006.

[8] Data is based on the average NPLs of four crowdfunders in 2018, namely Funding Societies, Validus, Capital Match and Minterest. Crowdfunders such as MoolahSense and Fundtier have higher NPLs.

[9] MAS Financial Stability Review, November 2018, Chart 2D3.

[10] We surveyed nine crowdfunders and received five fully completed responses.

[11] (BIS, 2017).

[12] Claessens et al. (2018) conducted multivariate cross-country regression analysis for a sample of 63 economies in 2016 using $c_i = a_i + b_1 y_i + b_2 y_i^2 + b_3 LI_i + b_4 RS_i \ (i=1,...\ 63)$ where y_i is the log of GDP per capita in economy i, as a measure of economic development, and the variable y_i^2 captures possible nonlinearity in the relationship, LI_i is the Lerner Index of banking sector mark-ups (an indicator of market power) in economy i, and RS is the regulatory stringency index constructed by (Navaretti, Calzolari, & Alberto, 2017).

[13] We use the World Bank's Ease of Doing Business *score* (the higher, the better), instead of the Ease of Doing Business *ranking* (the lower, the better).

[14] Data on crowdfunding volume are from the Cambridge Centre for Alternative Finance. Data on population, GDP, regulatory quality, and venture capital availability are from the World Bank. Data on financial access and financial depth are from the IMF.

[15] See CCAF Global Fintech Hub Report 2018.

[16] Securities-based crowdfunding refers to crowdfunding model that involves the offer of securities in the form of debentures or shares. This is subject to securities regulation in most jurisdictions, including Singapore.

[17] The DTC data from Experian (previously known as DP information Group) is collected based on quarterly payment records of more than 120,000 companies in Singapore, across eight major sectors in the economy (e.g. retail, wholesale, construction, hospitality/food and beverage, information and communications, manufacturing, services, and transport and storage).

[18] The data on crowdfunding volume and access to financing expectations are from the Cambridge Centre for Alternative Finance *Third Asia-Pacific Alternative Finance Industry Report* and Experian, respectively.

[19] See CCAF U.K. Alternative Finance Industry Report, 2014.

[20] (Lee, 2019)

[21] The consortium is targeting small and medium enterprises and entrepreneurs in South-east Asia and Greater China.

[22] Personetics' services include setting up triggers when a customer needs to top up the account balance to cover upcoming payments. Its services also allow the bank to nudge customers to save more or to spend wisely, creating a stickier relationship for the bank.

[23] PricewaterhouseCoopers' survey showed 82% of financial services companies globally plan to increase Fintech partnerships in the next 3-5 years (Smischenko-Mironova & Fedorova, 2017). CEOs at financial services firms around the world are allocating 15.4% of their annual turnover to develop fintech projects (e.g. investing in fintech companies, launching IT projects, or dedicating additional resources to existing fintech projects).

[24] Definition of Accredited Investors (AI): They include wealthy individuals with net personal assets exceeding SG$2 million in value (or the equivalent in a foreign currency) or with an income in the past 12 months of not less than SG$300,000 (or the equivalent in a foreign currency). Corporations with net assets exceeding SG$10 million in value (or the equivalent in a foreign currency) are also considered as accredited investors.

Definition of Institutional Investors (II): Under Section 4A of the Securities and Futures Act (SFA), they include inter alia: a holder of a capital market license, an approved exchange, a designated clearing house, a pension fund, or collective investment scheme, a person (other than an individual) who carries on the business of dealing in bonds with accredited investors or expert investors.

[25] Crowdfunders seeking to raise a maximum of S$5 million within a 12-month period can already do without having to issue a prospectus. For small offers: under Section 272A of the SFA, offerors may make personal offers of securities, up to $5 million within any 12-month period, without a prospectus subject to certain conditions. Further details on the criteria for a "personal" offer can be found in the Guidelines on Personal Offers made pursuant to the Exemption for Small Offers. For private placements: under Section 272B of the SFA, offers of securities to no more than 50 persons within a 12-month period may be exempted from the Prospectus Requirement subject to certain condition.

[26] Governments around the world see the urgent need to support SMEs given their GDP and employment contributions. In Singapore. SMEs facing Covid-19 cashflow disruptions could apply for low-cost funding from participating financial institutions through the Temporary Bridging Loan Programme, the SME Working Capital Loan and the SME trade loan schemes that are 90% risk-shared by the Government. Banks and finance companies apply for low-cost funding through a new MAS Singapore Dollar Facility for loans granted under these schemes until end December 2020, provided they commit to pass on the savings in funding cost to their SME borrowers. All applications must go through banks and subject to the usual bank approval process. The new MAS facility enables financial institutions to borrow at an annual rate of only 0.1% for a two-year tenor, thus ensuring ample liquidity for these schemes.

In the U.S., the largest federal fiscal stimulus to date of US$2 trillion Coronavirus Aid, Relief and Economic Security (CARES) Act was signed into law on 27 Mar 2020. Roughly $377 billion was distributed to small businesses as loans under the Paycheck Protection Program. Small businesses applied through lenders (which can be banks or non-banks) and the decision on whether to extend credit, and management of the loan, remained with the lenders. The loans were used to cover eight weeks of payroll and other expenses, to discourage layoffs.

[xxvii] Designed by the Government, MyInfo is a service that enables citizens and residents to manage the use of their personal data for simpler online transactions. Users control and consent to the sharing of their data and can view a record of past usage.

[xxviii] See MAS Financial Stability Report 2018, page 72.