FSB FINANCIAL STABILITY BOARD

Evaluation of the effects of financial regulatory reforms on small and medium-sized enterprise (SME) financing

29 November 2019

The Financial Stability Board (FSB) is established to coordinate at the international level the work of national financial authorities and international standard-setting bodies in order to develop and promote the implementation of effective regulatory, supervisory and other financial sector policies. Its mandate is set out in the FSB Charter, which governs the policymaking and related activities of the FSB. These activities, including any decisions reached in their context, shall not be binding or give rise to any legal rights or obligations under the FSB's Articles of Association.

Contacting the Financial Stability Board
Sign up for e-mail alerts: www.fsb.org/emailalert
Follow the FSB on Twitter: @FinStbBoard
E-mail the FSB at: fsb@fsb.org

Table of Contents

Page

Abbreviations

ABS	Asset-backed security
AEs	Advanced Economies
A-IRB	Advanced internal ratings-based approach (Basel III)
ASF	Available stable funding
ASU	Accounting standards update
AT1	Additional tier 1 (capital)
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlements
CCAR	Comprehensive Capital Analysis and Review (US stress test)
CCB	Capital conservation buffer
CCF	Credit conversion factor
CDP	Cassa Depositi e Prestiti (Italian bank)
CECL	Current expected credit loss model
CET1	Common equity tier 1 (capital)
CGFS	Committee on the Global Financial System
CHF	Swiss franc
CMU	Capital Markets Union
CoCo	Contingent convertible bond
CRD	Capital Requirements Directive
CRR	Capital Requirements Regulation
DFA	Dodd-Frank Act
DiD	Difference-in-difference (statistical technique)
D-SIB	Domestic systemically important bank
EAD	Exposure at default
EBA	European Banking Authority
ECB	European Central Bank
ECL	Expected credit loss
EMDEs	Emerging Market and Developing Economies
ESRB	European Systemic Risk Board
EU	European Union
EUR	Euro
FASB	Financial Accounting Standards Board (US)
FinTech	Financial technology
F-IRB	Foundation internal ratings-based approach (Basel III)
FLS	Funding for Lending Scheme (UK)
FSB	Financial Stability Board
G20	Group of 20
GBP	Great British pound
GDP	Gross Domestic Product
GFC	Global financial crisis
G-SIB	Global systemically important bank
HLA	Higher loss absorbency
HQLA	High quality liquid assets
IASB	International Accounting Standards Board
ICO	Initial coin offering
IFI	International Financial Institution
IFRS	International Financial Reporting Standard

IOSCO	International Organization of Securities Commissions
IRB	Internal ratings-based approach (Basel III)
KfW	Kreditanstalt für Wiederaufbau
KRW	Korean won
LCR	Liquidity Coverage Ratio
LGD	Loss given default
Libor	London interbank offered rate
LIQ	Liquidity ratio
LR	Leverage Ratio
LTRO	Long-term refinancing operations
MAG	Macroeconomic Assessment Group
MSE	Micro and small-sized enterprise
MSME	Micro, small and medium-sized enterprise
NPL	Non-performing loan
NSFR	Net Stable Funding Ratio
OECD	Organisation for Economic Co-operation and Development
OMT	Outright Monetary Transactions (ECB)
OTC	Over-the-counter (derivatives)
P2P	Peer-to-peer
PD	Probability of default
QIS	Quantitative impact studies
RBC	Risk-based Tier 1 capital ratio
RMB	Chinese renminbi
RSF	Required stable funding (NSFR)
RW	Risk weight
RWAs	Risk-weighted assets
SA	Standardised approach (Basel III)
SAFE	Survey on access to finance of enterprises (EU)
SEC	(US) Securities and Exchange Commission
SF	Supporting Factor (as in SME Supporting Factor)
SIB	Systemically important bank
SIFI	Systemically important financial institution
SME	Small and medium-sized enterprise
USD	US dollar
WACC	Weighted Average Cost of Capital

Evaluation of the effects of financial regulatory reforms on small and medium-sized enterprises (SME) financing

Executive summary

This report presents the results of the evaluation of the effects of financial regulatory reforms on the financing of small and medium-sized enterprises (SMEs). It is carried out under the FSB framework for the post-implementation evaluation of the effects of the G20 financial regulatory reforms, and is part of a broader evaluation on financial intermediation.

Given that banks are the primary providers of external SME financing, the reforms that are most relevant and have been implemented to date are the initial Basel III capital and liquidity requirements agreed in 2010. These reforms were evaluated by means of both qualitative and quantitative analysis. Other G20 reforms that may be relevant for SME financing but are at an earlier implementation stage (e.g. Basel III reforms finalised in December 2017, accounting standards) are only reviewed qualitatively, given the lack of data required for a quantitative assessment. In addition to the G20 reforms, national and regional regulations (e.g. stress tests) may affect SME financing. Consistent with the FSB evaluation framework, these reforms have also been analysed qualitatively.

The main conclusion of the evaluation is that, for the reforms in scope, the analysis does not identify material and persistent negative effects on SME financing in general, although there is some differentiation across jurisdictions. There is some evidence that the more stringent risk-based capital (RBC) requirements under Basel III slowed the pace and in some jurisdictions tightened the conditions of SME lending at the most "affected" banks (i.e. those least capitalised ex ante) relative to other banks. These effects are not homogeneous across jurisdictions and they are generally found to be temporary. This conclusion is consistent with the literature on the effects of bank capital regulations and with stakeholder feedback that SME financing is largely driven by factors other than financial regulation. The evaluation also provides some evidence for a reallocation of bank lending towards more creditworthy firms after the reforms, but this effect is not specific to SMEs.

The evaluation draws on a broad range of information sources and is based on various types of analyses and extensive stakeholder feedback. These include responses to a questionnaire by FSB jurisdictions; a review of the literature; empirical analysis using data from commercial providers and FSB member authorities; and input from stakeholders (SMEs, market participants, trade associations, think-tanks and academics) through a roundtable, a call for public feedback, interviews with market participants, and responses to the consultation report. These sources taken together form the basis for the conclusions presented in the report.

SME financing sources are diverse across jurisdictions, due in part to differences in financial systems and macroeconomic conditions as well as firm structures and characteristics. Internal financing typically plays an important role, particularly for micro and small firms, while bank lending remains the prevalent form of external SME financing in almost all jurisdictions. There is significant heterogeneity across jurisdictions in the types of banks that provide SME financing, largely reflecting the structure of the banking sector. Access to public capital markets for SMEs is not common, partly reflecting the higher cost of tapping those markets and informational opacity relative to large firms.

SME lending growth has resumed in recent years after falling during the financial crisis for a number of jurisdictions. Notwithstanding this positive trend, the volume of bank lending to SMEs remains below the pre-crisis-level in some of these jurisdictions. SME lending rates have followed the overall decline in interest rates in most jurisdictions, although they remain consistently higher than the rates for larger firms. The ratio of long-term (i.e. with a tenor above one year) to total SME loans has generally increased since the crisis, reflecting in part firms' incentives to borrow longer-term and the search for higher yield by banks in a low interest rate environment. There are significant differences among jurisdictions in the use and type of collateral for SME loans, with a prevalence of immovable assets such as real estate. There is also some evidence that the share of collateralised loans in SMEs has increased since the crisis.

A number of surveys suggest that access to external finance for SMEs has improved in recent years, particularly in advanced economies. A larger share of firms in these economies report no major constraints to accessing finance, or that they no longer seek external financing because they make greater recourse to internal sources. Such improvements are less obvious for emerging economies as well as for micro firms and start-ups with less tangible collateral.

Alternative, non-traditional forms of financing such as financial technology (FinTech) credit have seen their importance increase in recent years, albeit from a low base. There are several drivers for this trend, including technological innovation, official sector initiatives to promote alternative sources of finance, and potentially a lower regulatory burden for non-bank providers. The long-term sustainability of many alternative financing providers has not been tested over a full economic cycle and is not yet clear.

Various public sector policies are in place across FSB jurisdictions to support SME financing. These include co-financing or risk-mitigation facilities, direct lending schemes, programmes that allow the pledging of SME loans as collateral against refinancing operations with the central bank, tax subsidies and interest rate caps. The focus of SME support policies has largely shifted from broad-based countercyclical support in the aftermath of the crisis to more targeted policies in recent years, particularly aimed at promoting innovation and start-ups.

Feedback from stakeholders suggests that SME financing trends are largely driven by macroeconomic conditions and factors other than financial regulation. These factors include the public policies put in place to address SME financing constraints as well as benign financial conditions (in particular, the low interest rate environment), which may have mitigated some of the negative effects of financial reforms.

The analysis of the effects of reforms considered important data and methodological challenges. These include: (i) heterogeneity across jurisdictions and over time in terms of SME definitions (which tend to vary for statistical, regulatory and other purposes, even within the same jurisdiction) and characteristics; (ii) a segmented SME financing market with diverse providers and instruments, driven by differences in domestic institutional frameworks; (iii) isolating reform effects from other drivers like macroeconomic and financial conditions; (iv) separating SME demand and bank supply effects; and (v) the lack of a comprehensive and globally consistent SME financing transactions database, as well as differences in the granularity of information collected by authorities. These challenges suggest that caution is needed when identifying trends and drivers, in particular for cross-country comparisons, as well as interpreting the results of empirical analyses.

The evaluation adopted a multipronged approach to address these challenges and arrive at comprehensive and more robust results. Different data sources were used to disentangle the effects of the reforms from demand-side factors and macro-financial conditions in different jurisdictions. These sources include cross-country datasets on firm and bank balance sheets, survey data and SME lending aggregates, as well as national supervisory datasets on bank lending and bank-firm relationship from a number of FSB jurisdictions. Ten jurisdictions participated in this type of analysis using a common empirical methodology, while considering country specificities to the extent possible.

Overall, the empirical analyses find that there is no one-size-fits-all pattern for all jurisdictions. In particular, the type of impact and its relative strength may also depend on the stage of the economic cycle during the reform implementation and may have been relatively stronger for jurisdictions affected by an economic crisis. It may also depend on the way that the G20 reforms were implemented across jurisdictions, although this was not formally tested.

The empirical analysis for individual jurisdictions provides some evidence that the introduction of RBC reforms temporarily slowed the pace of SME lending at the most "exposed" banks (ex ante least capitalised) relative to other banks. As noted, this effect is often found to be temporary and not statistically significant across all empirical specifications. The reduction in the pace of lending seems to have affected SMEs relatively more than other corporates, resulting in some cases in a portfolio re-composition away from SMEs. On the other hand, there is no evidence that Basel III reforms on systemically important banks, the Leverage Ratio or new liquidity standards had a significant effect for the most exposed banks.

In some jurisdictions, RBC reforms have also slightly tightened the conditions of SME lending by the most constrained banks. In these jurisdictions, banks most affected by the reforms ex ante have kept relatively higher loan rates charged to SMEs, although this took place in a general context of low interest rates. Loan collateralisation has also increased at the most affected banks, but this was not a consistent outcome across the various empirical analyses. Capital reforms may have incentivised longer-tenor borrowing by SMEs, a finding that is consistent with the observed change in the maturity composition of banks' SME loan portfolio in the post-reform period. However, these effects differ across jurisdictions and cannot easily be disentangled from the low interest rate environment or from banks adjusting to lower profit margins. In general, these findings confirm stakeholders' feedback that banks have become more selective and generally apply tighter risk management to lending policies.

The empirical analysis based on firm and bank firm-level data finds some reallocation of credit towards more creditworthy SMEs and improved access to finance for financially stronger SMEs. After the reforms were introduced, better capitalised and more profitable firms increased their long-term borrowing more than other firms. This is consistent with preliminary evidence of a credit reallocation by banks towards more creditworthy borrowers, although this is not specific to SMEs.

Any potential costs found in this evaluation should be framed against the wider financial stability benefits of the G20 reforms estimated in previous ex ante impact assessments. These studies generally found significant net overall benefits in terms of reducing the likelihood and severity (lost output) of financial crises. The costs on SME financing assessed in this evaluation, which appear limited and transitory, should be weighed against the wider benefits of enhanced resilience from the reforms.

1. Introduction

1.1 Motivation and objectives

In the aftermath of the financial crisis, the G20 launched a comprehensive programme of financial reforms to increase the resilience of the global financial system, while preserving its open and integrated structure. With the main elements of the reforms agreed and implementation underway, an analysis of the effects of these reforms is becoming possible. To that end, the FSB, in close collaboration with the standard-setting bodies, and informed by work carried out by its members and other stakeholders, has developed a framework for the post-implementation evaluation of the effects of the G20 financial regulatory reforms (Framework).[1] The Framework guides the analyses of whether these reforms are achieving their intended outcomes, and helps to identify any material unintended consequences that may have to be addressed, without compromising on the objectives of the reforms.

One of the first two evaluations under the Framework is an examination of the effects of the G20 regulatory reforms on financial intermediation.[2] The evaluation consists of two parts: the first part involved an evaluation of the effects of reforms on the financing of infrastructure investment (delivered to the Argentine G20 Summit in November 2018);[3] and the second part involves an evaluation of the effects of reforms on the financing of small and medium-sized enterprises (for delivery to the Japanese G20 Presidency in 2019). This report describes the results of the second part of the financial intermediation evaluation, focusing on the effects of reforms on the financing of small and medium-sized enterprises (SMEs).

The motivation for this evaluation stems from the need to better understand the effects of the post-crisis reforms on the financing of real economic activity and their contribution to the G20 objective of strong, sustainable, balanced and inclusive economic growth. The annual FSB reports to the G20 on the implementation and effects of reforms have focused mainly on general trends in financial intermediation. The November 2018 report,[4] published a decade since the global financial crisis, reported that higher financial system resilience is being achieved without impeding the supply of credit to the real economy, while recognising the need for continued rigorous assessments to identify areas of unintended consequences of reforms. A more granular and systematic examination of financial intermediation trends and their drivers would validate whether this conclusion also applies for particular asset classes, such as SME financing.

1.2 Approach

A team drawn from FSB member institutions (including standard-setting bodies and international organisations) has conducted the evaluation, supported by FSB Secretariat staff and research assistants from the Bank for International Settlements (BIS) (see Annex G). The FSB engaged two academic subject matter experts to provide feedback on the methodological

---

1 *Framework for Post-implementation Evaluation of the Effects of the G20 Financial Reforms* (July 2017).

2 The other initial evaluation under the Framework examined the effects of post-crisis reforms on *incentives to centrally clear OTC derivatives* (November 2018).

3 *Evaluation of the effects of financial regulatory reforms on infrastructure finance* (November 2018).

4 *Implementation and Effects of the G20 Financial Regulatory Reforms: Fourth Annual Report* (November 2018).

approaches, empirical analysis and preliminary results of the evaluation.[5] The working group collected and analysed information from a variety of sources, including:

- responses to a stocktake questionnaire by FSB member jurisdictions;
- feedback from stakeholders through a roundtable in December 2018 as well as a call for public feedback and interviews with market participants in February/March 2019;
- a review of the relevant literature in this area;
- empirical analysis on the effects of reforms using data procured from commercial data providers, FSB member authorities, the OECD and other sources; and
- responses to a public consultation.[6]

Data availability (e.g. in terms of comprehensive and globally consistent SME definitions and information on SME financing sources etc.) and methodological questions (e.g. how to evaluate the effects of reforms aimed at a large and diverse group of entities (demand side) and financial institutions (supply side) within the context of many idiosyncratic confounding factors), presented important challenges in carrying out this evaluation. Notwithstanding these challenges, which are further described in section 4, the aforementioned information sources taken together form the basis for the conclusions presented in the report.

1.3 Structure of the report

The rest of the report is structured as follows:

- Section 2 provides an overview of SME definitions, importance and characteristics, as well as the overall structure, trends and drivers in SME financing;
- Section 3 outlines relevant reforms potentially affecting SME finance, their implementation timelines and possible transmission channels;
- Section 4 presents the results of the qualitative and empirical analysis on effects; and
- Section 5 concludes with an overall assessment of the effects on SME financing.

The report also includes annexes with additional information on: SME definitions and financing trends (Annex A); public policies to support SMEs after the crisis (Annex B); financial regulations potentially affecting SME financing (Annex C); a stylised example of the impact of changes in regulatory capital to the cost of bank financing for SME lending (Annex D); stakeholder feedback (Annex E); literature review and bibliography (Annex F); and the composition of the evaluation working group (Annex G). A Technical Appendix published together with this report provides a detailed description of the analytical approaches, data sources and results of the empirical analysis.[7]

---

[5] The academic experts were selected on the basis of nominations received through a public call in August 2018. Each academic signed the BIS Code of Conduct for Contractors; a disclosure and affirmation form about any possible conflicts of interest; and a confidentiality agreement. The role of the academics was limited to the provision of technical feedback for consideration by the working group, and did not involve the identification of conclusions or the write-up of this report.

[6] See the public responses to the consultation report and a note that provides an overview of those responses and sets out the main changes that have been made to the final report in order to address them.

[7] The Technical Appendix is available on the FSB website.

2. Market structure, trends and drivers of SME financing

2.1 SME definitions and characteristics

There is significant heterogeneity across jurisdictions in terms of SME definitions. While the number of employees is used widely as a criterion in defining SME, jurisdictions also apply (separately or concurrently) other criteria such as annual sales, size of assets or amount of loan (see the table in Annex A). Even within the same jurisdiction, there are a number of definitions depending on the purpose, such as for financial regulation, taxation and statistics. In addition, some jurisdictions also have more granular definitions that further distinguish micro, small, and medium-sized enterprises.

Use of different criteria in defining SMEs (see Annex A)[8]

Number of employees	Annual revenue	Assets
AR, AU, BR, CA, CH, DE, ES, FR, HK, IT, MX, NL, RU, SA, TR, UK, US	AR, AU, BR, DE, ES, FR, HK, ID, IT, JP, MX, NL, RU, SA, SG, TR, UK, US, ZA	AR, BR. DE. ES. FR. ID, IT, JP, NL, TR, UK, US

For the purpose of financial regulation, the SME definition is reported to be mostly in line with the one used for credit risk exposures under Basel III (i.e. annual sales less than €50 million). Some jurisdictions, mostly emerging market economies, apply a lower threshold. Many jurisdictions also reference the number of employees as one of the determinants (and in some cases the main one), often using a threshold of lower than 250 employees. However, the overlap between the definitions used in official statistics and for regulatory purposes is limited.

Notwithstanding the definitions used, SMEs form the backbone of the economy and account for a large share of employment and value-added (Graphs 1 and 2 in Annex A). A survey of firms in 99 countries for the period from 2006 to 2010 estimated that 66% of total workers are employed by SMEs.[9] SME also account for a smaller but still sizable share in terms of value-added to the economy, particularly in the services sector.[10] SMEs, although a very diverse group of enterprises, are considered important drivers of job creation, entrepreneurship and inclusive economic growth worldwide.

The availability of data on SME financing varies across jurisdictions. While data on bank loan volumes is relatively common across jurisdictions, access to data on loan prices and tenors is much more limited. Not all jurisdictions have public credit bureaus/registries with granular loan-level and other types of data (e.g. non-performing loan rates, credit scores, number of loans). Information on non-bank sources of financing to SMEs is much more limited.

---

[8] Throughout the report, for brevity, the following abbreviations are used to identify jurisdictions: AR=Argentina, AU=Australia, BR=Brazil; CA=Canada; CH=Switzerland; CN=China; DE=Germany; ES=Spain; EU=European Union; FR=France; HK=Hong Kong; IN=India; ID=Indonesia; IT=Italy; JP=Japan; KR=Korea; MX=Mexico; NL=Netherlands; RU=Russia; SA=Saudi Arabia; SG=Singapore; TR=Turkey; UK=United Kingdom; US=United States; ZA=South Africa.

[9] *Small vs. Young Firms Across The World – Contribution to Employment, Job Creation, and Growth* by Ayyagari et al. (World Bank Policy Research Working Paper No. 5631, April 2011).

[10] OECD's *Entrepreneurship at a Glance 2017* (September 2017) and the European Commission's *Annual Report on European SMEs 2017/2018* (November 2018).

The diversity of SME definitions, combined with the limited availability of granular data on SME financing, reduces comparability across jurisdictions. It suggests that caution is needed when identifying trends and drivers, in particular for cross-country comparisons, as well as interpreting the results of empirical analyses.

Many SMEs were affected by the global financial crisis (GFC). The effect, which stemmed mainly through the deterioration of macroeconomic conditions, varied significantly across jurisdictions and types of firms (Graphs 3-5 in Annex A).[11] In response, various public sector policies to promote SME financing were introduced or enhanced after the crisis (see below).

2.2 SME financing needs, sources, trends and drivers

The sources of financing for SMEs are diverse. Internal financing includes own capital and retained earnings, while external financing includes bank lending, capital markets and other types of financing by non-bank financial institutions. The choice between internal and external financing can partly be explained by prevailing macroeconomic, institutional and financial conditions, as well as by differences in the SME structure across jurisdictions (see table below).

Jurisdictions where internal financing is relatively more important	Jurisdictions where external financing is relatively more important but internal financing is growing in importance	Jurisdictions where external financing is relatively more important
AR, AU, CH, ES, HK, IN, MX, RU, SG, US	BR, IT, JP, NL, UK	DE, FR, TR

Source: Responses to the FSB questionnaire and OECD Financing SMEs and Entrepreneurs 2019: An OECD Scoreboard (April 2019).

Internal financing plays an important role in most jurisdictions. This is particularly the case for micro and small (including high growth) firms, in part due to the limited availability of structured information and collateral that may prevent them from accessing credit.[12]

Although access to finance for SMEs has improved in recent years in several jurisdictions, it is still seen as a major issue in some emerging market and developing economies (EMDEs) and for micro and young firms. A large share of SMEs across several advanced economies state in surveys[13] that they face no major constraints to accessing finance. This includes firms that do not seek external financing because it is not needed ("happy non-seekers") as well as firms that are discouraged from seeking such financing. Improvements are less noticeable for emerging economies, where access to finance continues to feature among

[11] According to the OECD's *Financing SMEs and Entrepreneurs 2019: An OECD Scoreboard* (April 2019), "Data analysis shows that new lending activities appear to be strongly and significantly correlated with GDP growth. For every additional 1% of GDP growth, new lending to SMEs could be expected to rise by close to 2% on average".

[12] According to the OECD's *Financing SMEs and Entrepreneurs 2019: An OECD Scoreboard* (April 2019), "Survey data indicate that the share of SMEs citing sufficient internal funds as a reason for not applying for loans has been consistently increasing, from 35% in 2014 to 44% in 2018. These developments have also played a role in moderating demand for credit in recent years". See also the British Business Bank report on *Small business finance markets report (2018/2019)*.

[13] ECB's 2018 *Survey on the access to finance of enterprises (SAFE)* mentions that access to finance is cited as the most important concern for 7% of EU SMEs, down from 14% in 2009. A similar trend applies in the case of the US – see, for example, the December 2018 National Federation of Independent Business *Small Business Economic Trends* as well as the 2019 US Federal Reserve Banks' *Small Business Credit Survey Report on Employer Firms*.

the main concerns cited by SMEs.[14] This can also be due to the fact that SMEs in these economies – and even more so in developing economies – operate in less developed institutional frameworks that lead to higher informality, which limits their financing sources and is a significant financial inclusion challenge.[15] Smaller firms and start-ups with no credit history or less tangible collateral also report greater difficulties in obtaining access to finance (see below).

Bank lending to SMEs

Bank lending – whether to the firm itself or to its business owner – remains the prevalent form of external SME financing in all FSB jurisdictions. The literature (see Annex F) indicates that access to finance can be particularly challenging for SMEs because: i) default risk is negatively associated with size and age; and ii) the costs of screening, monitoring and liquidation (in case of default) for small/informationally opaque firms are higher. Banks play a special role in overcoming informational obstacles, mainly through the gathering of "soft" information throughout the lending relationship. In the case of smaller borrowers with limited history, these asymmetries remain prevalent and banks often provide loans only when they are secured by collateral. The use of collateral in SME loans widely varies across jurisdictions (see below). SME loans denoted in foreign currencies play a relevant role only in a few jurisdictions.

There is significant heterogeneity across jurisdictions in the type of banks that typically provide SME financing (Graph 1). In many jurisdictions, larger banks – both G-SIB/D-SIBs and others – are the main providers of SME lending (AU, BR, FR, HK, IT, KR, MX, NL, SA, SG, TR, US), although small lenders often have an important market share. In some advanced economies, relatively smaller banks are the leading providers of such lending (DE, JP), while in other jurisdictions (CH, CN, UK) the picture is more mixed. State-owned and development banks are major providers of financing to SMEs, particularly in some emerging market and developing economies (BR, IN), but can play a role also in advanced economies (e.g. JP).

Jurisdictions where G-SIBs, D-SIBs and other large banks are the main providers of SME financing (group 1)	Jurisdictions where large banks are the main providers of SME lending, but smaller banks also participate (group 2)	Jurisdictions where bank financing to SMEs is more diversified (group 3)	Jurisdictions where smaller and regional/local banks are the main providers of SME financing (group 4)
FR, HK, ID, MX, NL, RU, SG, ZA	AU, BR, ES, IT, KR, SA, TR, US	CH, CN, UK	DE, JP

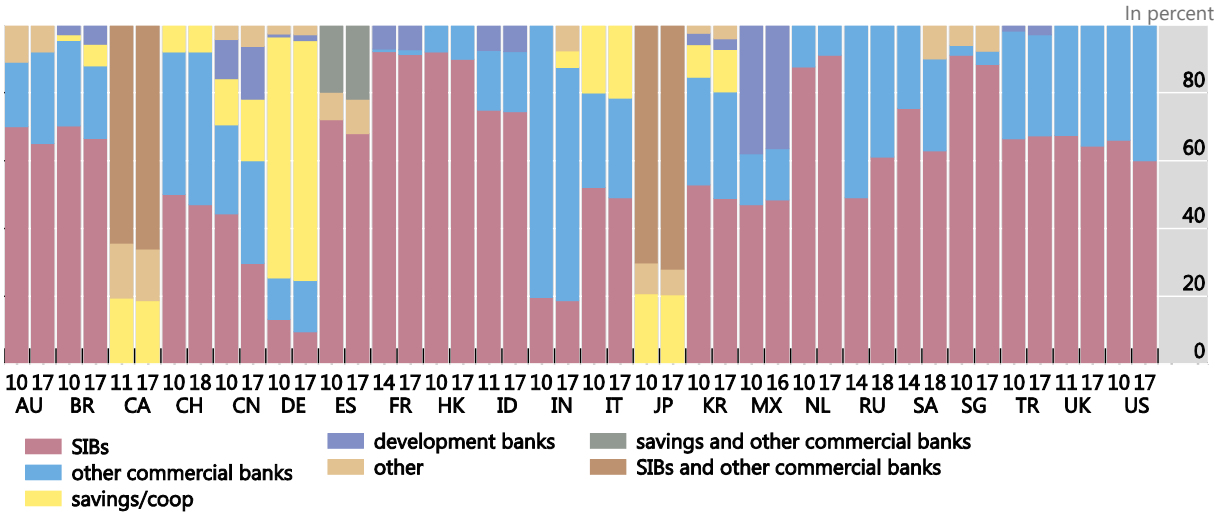
This difference in the provision of SME lending largely reflects the structure of the banking sector across jurisdictions (Graphs 1 and 2). SMEs tend to rely on relationship lending, which requires soft information and a thorough understanding of local markets. Because of their geographical proximity to borrowers, smaller banks can have a comparative advantage in establishing these relationships. However, larger banks may be able to use other means to overcome informational obstacles (e.g. contract design, and other assessment mechanisms). The development of wide regional networks as well as historical or legal reasons may also have allowed for large banks to engage in relationship lending in certain jurisdictions.

[14] The World Bank Enterprise Surveys indicate that SMEs are more likely to be credit constrained than large firms. 25% of respondents identify access to finance as a major constraint (the correspondent result in the EU SAFE Survey is 4%, although there are significant difference in the methodology).

[15] The SME Finance Forum provides detailed information on the extent of this financing gap.

Generally speaking, while SIBs tend to be the primary providers of SME lending in most jurisdictions given their importance in the banking sector, they tend to account for a relatively smaller proportion of such lending compared to total lending. In 6 jurisdictions (CA, CN, DE, IT, JP and MX), the share of SME lending by development banks, savings/cooperatives and other credit institutions was in excess of 20%. With a few exceptions (CN, RU), the market share of SME lending by type of bank has not changed significantly in recent years.

Market share of SME lending by type of bank — Graph 1

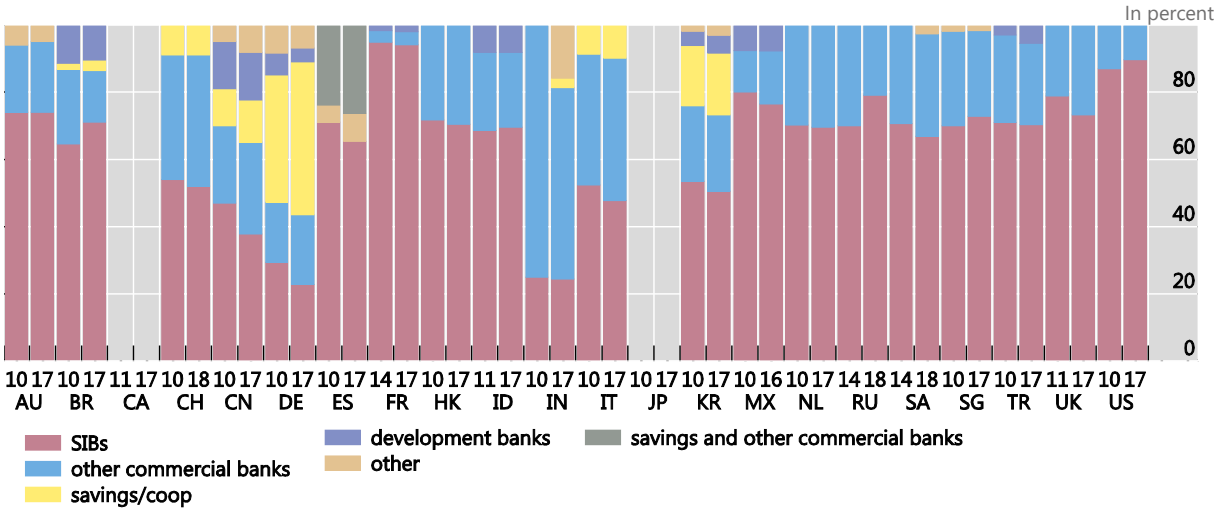


Note: SIBs refers to both G-SIBs (only for their home jurisdictions) and D-SIBs. For China and US, SIB figures refer only to G-SIBs. For Brazil, figures for 2010 are calculated based on D-SIBs identified as of end-2018. For Hong Kong (HK), figures refer to loans provided by all locally incorporated licensed banks; figures for 2010 are calculated based on D-SIBs identified as of end-2017. For Italy, SIBs refer to the five largest banking groups.

Source: FSB questionnaire on SME financing.

Market share of total lending by type of bank

Graph 2



Note: SIBs refers to both G-SIBs (only for their home jurisdictions) and D-SIBs. For China and US, SIB figures refer only to G-SIBs. For Brazil figures for 2010 are calculated based on D-SIBs identified as of end-2018. Figures for Hong Kong (HK) refer to loans by all locally incorporated licensed banks; figures for 2010 are calculated based on D-SIBs identified as of end-2017. For FR, total loans do not include loans to the public sector. For Italy, SIBs refer to the five largest banking groups. For UK, total loans do not include loans to non-residents.

Source: FSB questionnaire on SME financing.

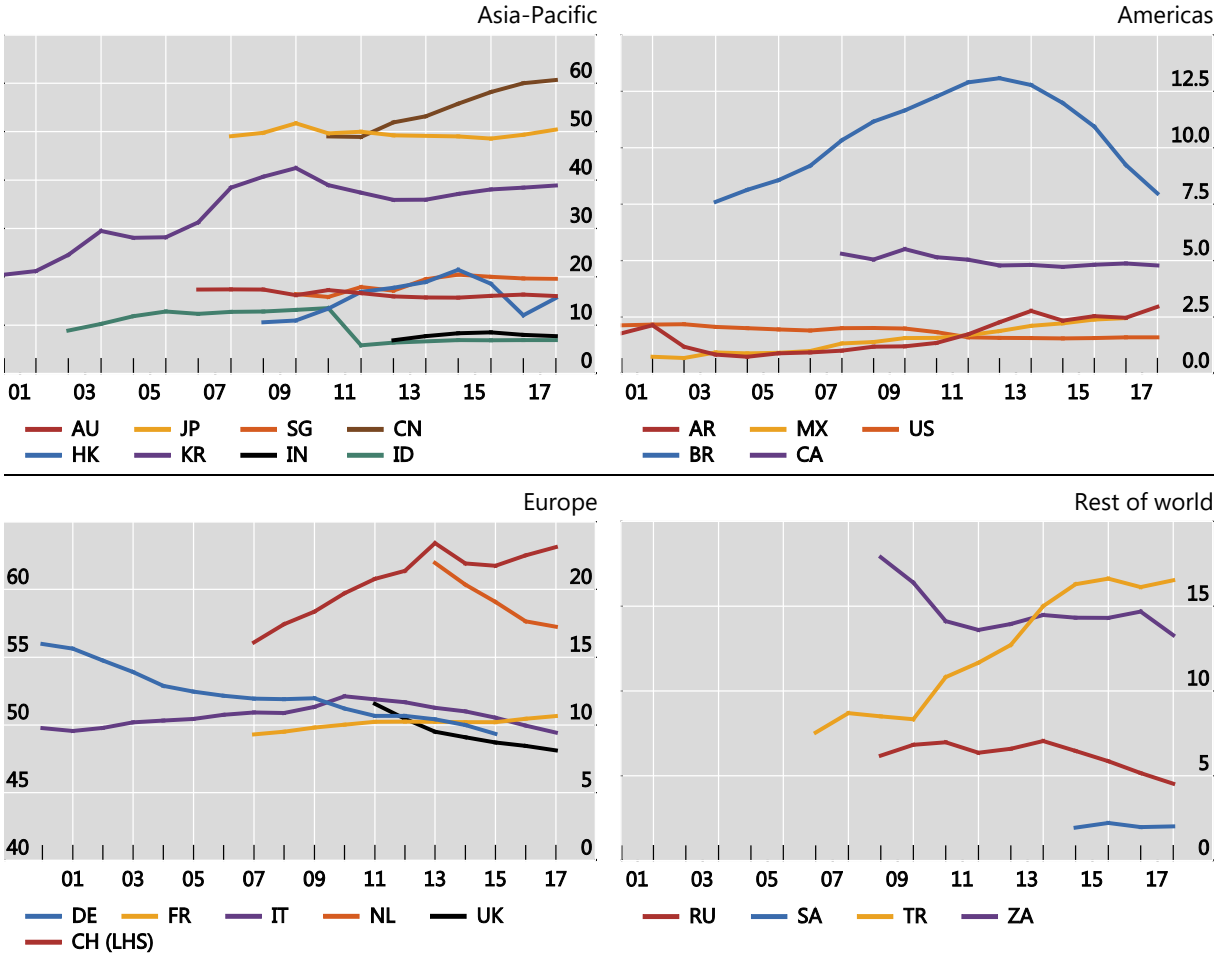
SME lending growth has resumed in recent years, after falling during the GFC for a number of jurisdictions (Graph 3 below and Graphs 6 and 8 in Annex A). Notwithstanding this positive trend, the absolute volume of bank lending to SMEs remains below the pre-crisis-level in some of these jurisdictions (AU, DE, IT, KR, ID, RU, ZA). According to the OECD, SME loan growth has been strong in most emerging markets, more sluggish in advanced economies, and negative in particular in countries recently hit by a macroeconomic crisis.[16] SME to total bank business lending has remained stable in most jurisdictions (Graphs 7 and 8 in Annex A).

[16] In some cases, the sluggish growth of SME lending in advanced economies may be part of broader changes in financing patterns – for example, the OECD's *Financing SMEs and Entrepreneurs 2019: An OECD Scoreboard* (April 2019) notes that "loan growth has been particularly weak in the UK and the US, with increased access of other sources of finance than straight debt playing a role." See also the *KfW SME Panel 2018* (October 2018), the European Commission's *Annual Report on European SMEs* (November 2018), and the US Center for Capital Markets Competitiveness study on *Financing Main Street: The State of Business Financing in America* (Spring 2019). For the US, the volume of commercial and industrial loans under USD 1 million is above pre-crisis levels, but the volume of commercial real estate loans under USD 1 million remains below pre-crisis levels. The share of small business loans as a proportion of total loans is at 19% and has dropped since the crisis, although this is a continuation of a steady decline since 1995 when it peaked at 40%.

Outstanding bank loans to SMEs/GDP

By region, in percent

Graph 3



Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees.

Source: FSB questionnaire on SME financing.

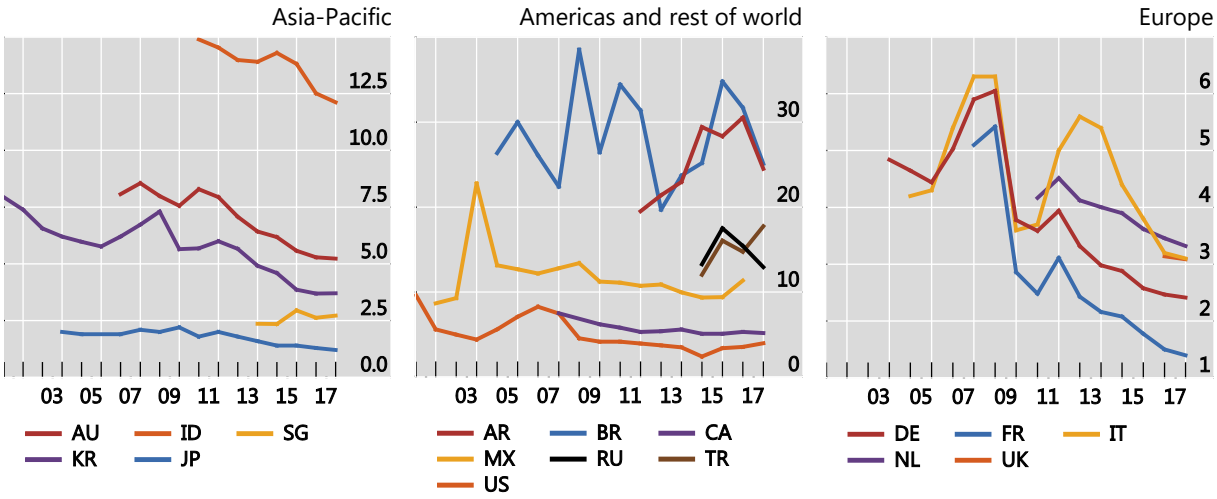
SME lending rates have followed the overall decline in interest rates in most jurisdictions (CN, ID, IT, JP, KR, DE, NL, RU, US, FR), although they remain consistently above the corresponding rates for larger firms (Graphs 4 and 5).[17] In a few EMDEs (IN, MX, TR), SME lending rates increased in recent years partly due to the tightening of monetary policy and economic conditions. The interest rate spread between loans to SMEs and loans to large corporates is generally in the range of 0-5% and has remained relatively flat for most jurisdictions in recent years, although it has been affected in some cases by a generalised compression of corporate risk premia.

[17] The comparison does not reflect, however, adjustments based on risk characteristics or on the maturity of the loans.

Interest rates for SME loans

By region, in percent

Graph 4



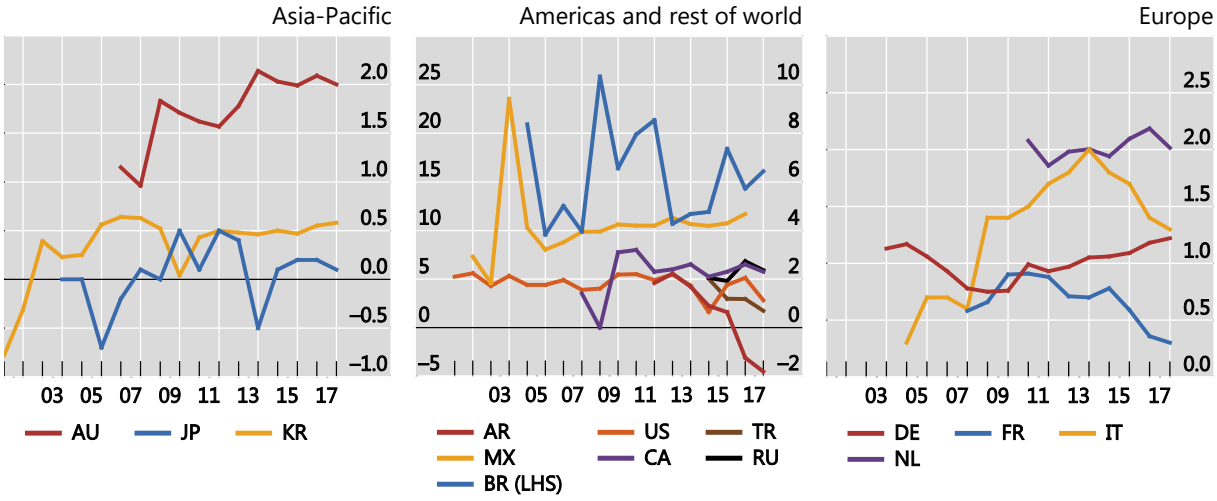
Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees.

Source: FSB questionnaire on SME financing.

Interest rate spread between loans to SMEs and loans to large corporates

By region, in percent

Graph 5



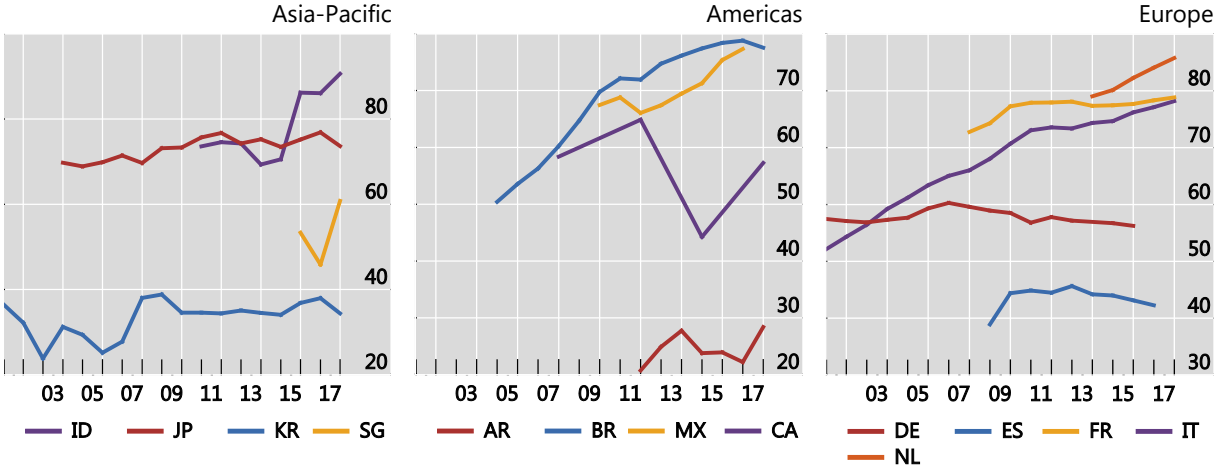
Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees.

Source: FSB questionnaire on SME financing.

The share of medium-to-long term lending in total bank lending to SMEs has increased recently in some jurisdictions (BR, IT, JP, MX) (Graph 6). OECD data also suggest that there has been a shift towards longer-term SME lending.[18] Such developments are consistent with the general pick-up in the overall improvement of business conditions for SMEs, which has probably led to a reduced need for short-term working capital or for external financing as a whole. It may also be the result of firms seeking to secure relatively favourable funding costs in a low interest rate environment or of some (particularly smaller) SMEs seeking short-term financing from other, non-bank sources (see below).

Long-term loans to SMEs as a percentage of total SME loans

By region, in percent — Graph 6



Long-term loans are defined as loans above one year in maturity. For ES, IT, JP and SG, the figures include loans by non-bank lenders. For IT, SME loans refers to bank loans to firms with <20 employees. For ES, the data comes from the Spanish Mercantile Registers, which covers around 45% of the total population of SMEs (in terms of the number of firms and number of employees).

Source: FSB questionnaire on SME financing.

There seem to be significant differences among jurisdictions in the use of collateral in SME loans (Graph 7 below and Graph 11 in Annex A). There has been a slight increase in recent years of collateralised SME loans in some jurisdictions (BR, CH, IT, KR, SG, TR, US), with notable exceptions among advanced economies (DE, FR and NL). Immovable assets such as real estate are widely used (AU, CH, CN, HK, ID, IN, JP, KR, MX, RU, SA, SG), while banks in a number of jurisdictions also accept moveable assets (BR, ID, IN, JP) and financial assets (ID, IN, KR) as collateral.[19] Intangible assets such as patents and copyrights are less used due to challenges such as the difficulty in valuation. In a few jurisdictions, there may be a gradual shift from secured to unsecured lending, although this is limited to medium-sized firms.

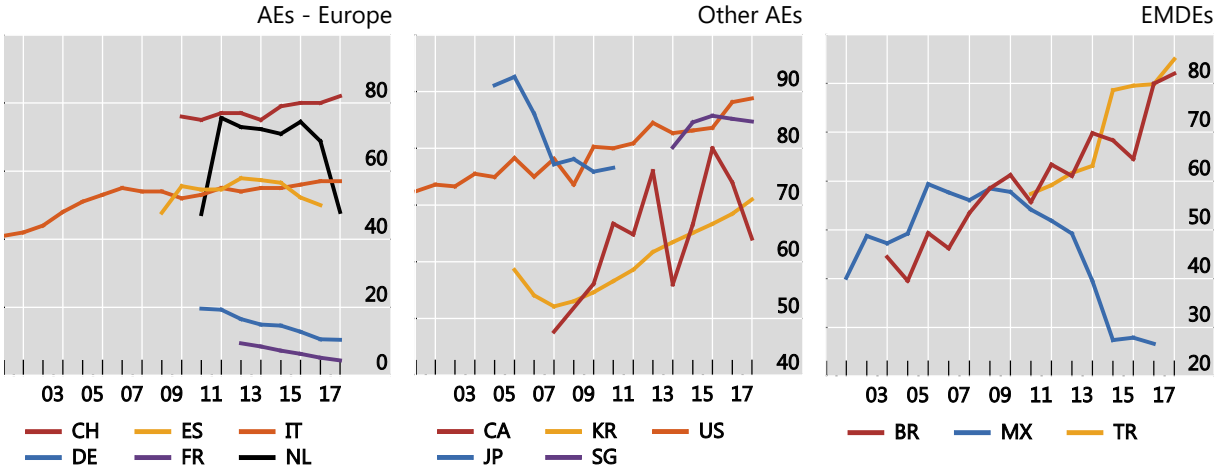
[18] *Financing SMEs and Entrepreneurs 2019: An OECD scoreboard by the OECD* (April 2019).

[19] The use of personal/corporate guarantees is also observed in some jurisdictions (AU, IT, MX, TR).

Percentage of bank loans to SMEs that are collateralised

By region, in percent

Graph 7



Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees. For ES, the data comes from Spanish Mercantile Registers, which covers around 45% of the total population of SMEs (in terms of number of firms and number of employees).

Source: FSB questionnaire on SME financing.

Several factors are cited by both banks and SMEs as impediments to bank provision of SME financing. These include the lack of real collateral, difficulty in pledging personal and public guarantees, and absence of verified financial statements and bank credit histories. Other factors, such as various financial and other non-financial regulations or limited competition in the banking sector and macro-economic conditions, are also cited in some cases.

Other forms of financing to SMEs

External sources of financing other than bank loans are also relevant for SMEs. These include, for example, leasing and hire purchase,[20] factoring, as well as trade/supplier credit. Trade finance is an important form of financing for working capital purposes, in particular for SMEs in developing economies. Recent studies have concluded that SMEs face the greatest hurdles in accessing affordable trade finance.[21]

Access to public capital markets for SMEs is not common, partly reflecting the higher cost of tapping those markets and informational opacity relative to large firms. Specialised stock exchanges have been set up in several jurisdictions to provide public equity financing to SMEs, although they remain relatively small in market capitalisation and trading volumes.[22] SME financing through private debt placements has gained traction recently but from a low base, while SME loan securitisation is limited and present only in a small number of

[20] According to the ECB 2018 *Survey on the access to finance of enterprises (SAFE)*, 24% of SMEs report using this source of financing.

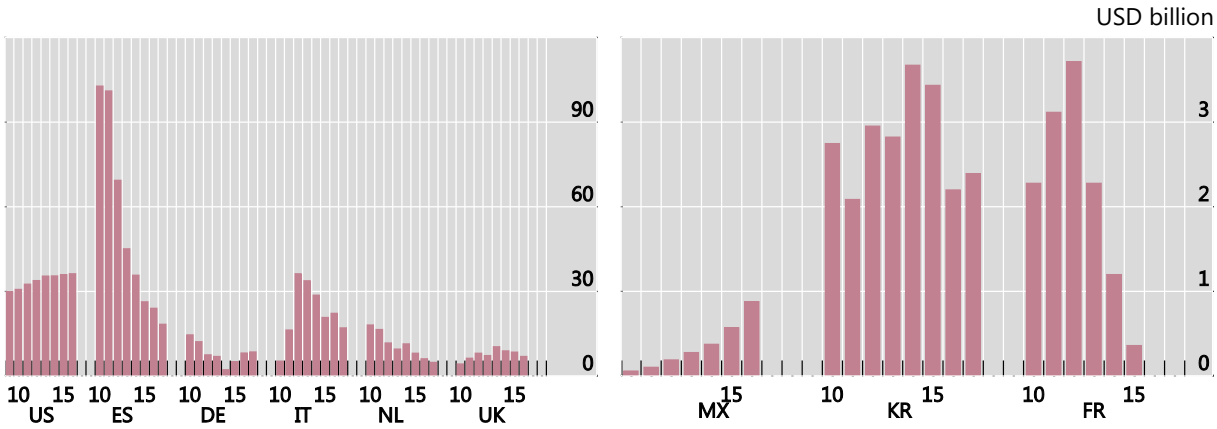
[21] See, for example, the report by the International Finance Corporation and World Trade Organization on *Trade finance and the compliance challenge* (2019) and the Asian Development Bank's brief on *2019 Trade Finance Gaps, Growth, and Jobs Survey* (September 2019).

[22] Table 1.3 of the OECD report on *Financing SMEs and Entrepreneurs 2019: An OECD scoreboard* (April 2019).

jurisdictions (Graph 8). For start-ups, venture and angel capital and financing from families and friends are often important financing sources. However, in comparison to bank lending, these forms of external financing are still limited at present.

Securitisations of SME loans in selected FSB jurisdictions

2000-17 Graph 8



Source: AFME, SIFMA, and FSB questionnaire data.

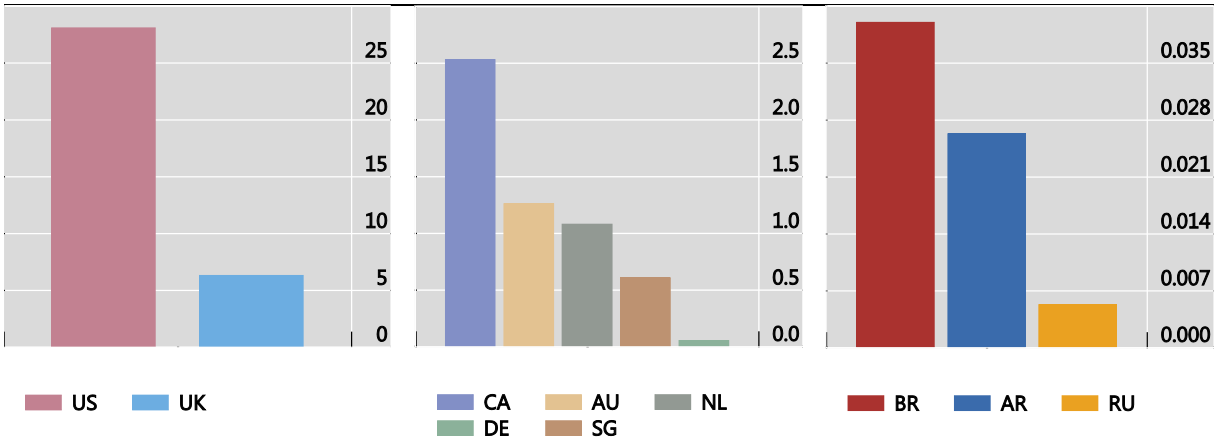
Alternative forms of financing, such as financial technology (FinTech), have seen their importance increase in recent years, albeit from a low base (Graph 9 and Box 1).[23] In some jurisdictions, most notably China, the expansive growth of these forms of financing by non-banks may be related to the relatively less developed state of traditional financial intermediation channels, and the ability to reach a wider part of the population through online-based platforms. There are several drivers for this trend, including technological innovation,[24] official sector initiatives to promote alternative sources of finance, and potentially a lower regulatory burden for non-bank providers. The long-term sustainability of many non-bank financing providers and channels is not yet clear since they have not been tested in a downturn.

[23] FSB's *Global monitoring report on non-bank financial intermediation 2018* (February 2019).

[24] For example, some of these firms may be able to *harden* the 'soft' information needed for SME lending by compiling and exploiting a diverse set of qualitative data including on habits and behaviours. These firms may therefore be able to gain a competitive advantage with respect to traditional lenders thanks to their ability to process information rapidly, which is a key aspect of the SME lending business.

FinTech credit volumes as a proportion of bank loan volumes to SMEs (2017)

In percent Graph 9



Note: US total bank loan volume data is based on 2016 figures.

Sources: Cambridge Centre for Alternative Finance; national data; FSB calculations.

Box 1: The role of FinTech credit platforms and other innovations in SME financing

FinTech credit platforms, including peer-to-peer (P2P) and marketplace lending, have grown since the financial crisis by catering to pent-up demand for unsecured borrowing from individuals and SMEs, in particular micro SMEs and new firms without a credit history. More than a decade after the creation of FinTech credit platforms, the question is whether they can start to penetrate more mainstream lending markets and thus challenge bank lenders head-on. For example, in the UK P2P platforms contributed an equivalent of around 6% of total new loans issued by UK banks to SMEs in 2017, corresponding to almost 30% with respect to those SMEs (micro firms) with an annual turnover of less than £2 million.[25] In China, FinTech credit accounted for 13% of all new lending in the first half of 2018.[26]

FinTech lenders have two comparative advantages over traditional banks: (i) an absence of legacy operating costs, typically linked to banks' extensive branch networks and IT systems that are more difficult to update; and (ii) limited or no prudential (e.g. capital) requirements and no mandatory contributions to the public deposit guarantee scheme.[27] For example, the UK Financial Conduct Authority introduced minimum capital standards for P2P platforms with volume-based decreasing rates, where the highest rate is 0.2% over the first GBP 50 million of total value of loaned funds outstanding. This compares to a 3% minimum leverage ratio (i.e. a capital floor based on gross non-risk weighted exposure) for banks, notwithstanding the differences in business models and risk-taking.

In order to grow market share, FinTech lenders have sought to raise funds from institutional investors such as pension funds, asset managers and other financial institutions, including banks. For example, 40% of the funding raised by FinTech credit platforms in the UK for new business lending in 2017 was provided by institutional lenders.[28] Some platforms are seeking a full banking license, suggesting that deposit guarantee scheme eligibility may be an important factor to raise funds from retail investors.

[25] Zhang et al., *The 5th UK Alternative Finance Industry Report* by the Cambridge Centre for Alternative Finance (November 2018).

[26] Claessens et al., *FinTech credit markets around the world: size, drivers and policy issues* in the BIS Quarterly Review (September 2018).

[27] FSB and CGFS, *FinTech credit: market structure, business models and financial stability implications* (May 2017).

[28] Zhang et al. (ibid).

These constraints may not be as applicable to so-called BigTech firms – large companies whose primary business is carried out on digital platforms. For example, Amazon offers selected sellers on its electronic marketplace platform loans for up to 12 months. Ant Financial offers credit to merchants on the Taobao platform in China and Mercado Libre offers credit to its merchants in Brazil, Argentina and Mexico.[29] Some have therefore argued that these non-bank lenders may be able to grow whilst staying outside the regulatory perimeter, and without having to rely on funds from institutional investors, thanks to their large customer footprint, richness of proprietary data, and extensive opportunities of cross-selling over several market segments and availability of internal funds.[30]

Equity crowdfunding and initial coin offerings (ICOs) are recent innovative sources of SME finance. Equity crowdfunding allows investors to take an equity stake in small firms. This form of finance has grown in the UK, and to a lesser extent the United States and China, but from a very low base. ICOs involve the sale of a "coin" or a digital representation of value. The potential of ICOs as a mainstream financing option for SMEs is considered to be very limited at this time, particularly given the risks for issuers and investors from the crypto-asset market.[31]

Public policies to support SMEs

A wide range of public sector policies are in place across FSB jurisdictions to support SME financing (see Annex B), and some of these were introduced or enhanced after the GFC.[32] These policies are generally considered by market participants and authorities as particularly important support factors for SME access to finance. These policies include:

- co-financing/risk-mitigation facilities by publicly-sponsored entities, such as loan or securitisation guarantees schemes (CA, CH, DE, ES, EU, FR, HK, IT, JP, KR, MX, NL, RU, SA, SG, TR, UK);
- direct or indirect lending by government entities (AR, BR, CN, DE, ES, FR, IN, JP, KR, MX, NL, RU, TR, US);
- schemes that allow banks to pledge SME loans as collateral to obtain central bank funding (FR, IT, JP, UK); and
- interest rate caps on SME loans (RU).

In addition, a few jurisdictions cite preferential tax policies for certain types of SMEs. These included tax concessions for early stage investors in innovative start-ups (AU, ES, IT); tax concession for unincorporated business (HK); administrative relief for the issuance of the so-called mini-bonds (IT); and allowance for corporate equity regulation (TR, IT) as policies that affect SME financing. Other policies cited by jurisdictions aim at developing financial infrastructure, such as a crowd-sourced equity funding framework (AU, ES) and a framework to support SME bond securitisation (KR).

---

[29] FSB, *FinTech and market structure in finance: Market developments and potential financial stability implications* (February 2019).

[30] Speech by Agustin Carstens on *Big tech in finance and new challenges for public policy* (5 December 2018).

[31] OECD, *Initial Coin Offerings (ICOs) for SME Financing* (January 2019).

[32] Table 1.4 of the OECD report on *Financing SMEs and Entrepreneurs 2019: An OECD scoreboard* (April 2019).

3. Relevant reforms

3.1 Overview

The G20 financial reforms aim to create a safer, sounder and more resilient global financial system. They are intended to rebuild confidence in the ability of financial institutions to discharge their functions and in the financial system's capacity to intermediate financial flows through the cycle and for different investment horizons.

Given that bank lending remains the prevalent form of external SME financing, the G20 reforms considered most relevant are those associated with banks, particularly Basel III (see Table 1). The feedback from stakeholders (see Annex E) and the literature review (see Annex F) confirm the importance of these reforms for SME financing. Basel III reforms aim to strengthen the resilience of banks by increasing the level and quality of capital, enhancing risk capture, constraining leverage, improving liquidity and limiting procyclicality. In particular, the initial Basel III package agreed in 2010 left the underlying credit risk weights (RWs) for different exposure types unchanged, while increasing the amount and quality of regulatory capital required and introducing liquidity requirements for banks and additional loss absorbency requirements for G-SIBs. These may affect both the asset and liability side of banks' balance sheets, and thereby the provision of lending to SMEs (see below).

Other financial regulations have also been identified as relevant for SME financing, but their implementation is at an earlier stage (e.g. finalised Basel III reforms, accounting standards) or they are national or regional in nature (e.g. stress testing frameworks). The finalised Basel III reforms agreed in December 2017 will change the credit RWs for specific asset classes, including for SME lending. The use of internal ratings-based (IRB) approaches for credit risk was also constrained (e.g. by introducing input floors for Loss Given Default (LGD) estimates and changes to the recognition of eligible collateral), and an 'output floor' was introduced such that modelled outputs could not diverge too far in aggregate from Standardised Approaches. These changes are due to be implemented in 2022, while jurisdictions have the option of phasing-in the output floor over a five year period. The implementation of new accounting standards based on expected credit loss provisioning (such as IFRS 9, which became effective as of January 2018) might affect the maturity, collateralisation and cyclicality of lending in general, including credit to SMEs.

The rest of this section presents the implementation status and possible transmission channels for these reforms, while a more detailed description can be found in Annex C.

3.2 Implementation status

The implementation status of reforms differs across reform areas and, in some cases, relevant jurisdictions. The initial Basel III reforms agreed in 2010 have been implemented by most jurisdictions, with the exception of the Net Stable Funding Ratio and the securitisation framework.[33]

[33] See Graph 8 of the FSB *evaluation report on infrastructure finance* (November 2018) and the BCBS *Report to G20 Leaders on implementation of the Basel III regulatory reforms* (November 2018).

The implementation status of these reforms, in combination with data availability, determines the scope of analysis for this evaluation. Reforms that are fully or largely implemented by year-end 2018 are included in quantitative and qualitative analyses, while other reforms are only considered qualitatively. Several of these reforms were implemented at around the same time across jurisdictions, which hinders the exploitation of cross-country heterogeneity in implementation for the purpose of the empirical analysis (see next section).

Table 1: Regulations or standards identified as potentially relevant to SME financing

Reform area or sector	Element of regulation or standard	Agreed phase-in (completed) date for G20 reforms	Implementation status of FSB/BCBS members[34]
G20 reforms			
Banks (Basel III)	Risk-based capital	2013 (2019)	Fully implemented
		2022 (2027)	N/A at this stage
	Securitisation framework	2018	Partly implemented
	Leverage ratio	2018	Largely implemented
		2022	N/A at this stage
	Liquidity Coverage Ratio (LCR)	2015 (2019)	Fully implemented
	Net Stable Funding Ratio (NSFR)	2018	Partly implemented
	Framework for G-SIBs	2016 (2018)	Fully implemented
Accounting standards	IFRS 9 / CECL (US)	Effective from 2018-2023	N/A at this stage
Non-G20 regulations			
Banks	National / regional regulations (e.g. EU SME supporting factor, stress tests)	N/A	N/A

Note: Only those regulation or standard elements that are most relevant for SME financing are included, so the list is not comprehensive. Green cells refer to reform areas that have been subject to quantitative (regression) as well as qualitative analysis; other areas have been analysed qualitatively. Grey cells refer to reform areas where implementation is at an early stage or has not yet begun. See Annex C for details.

3.3 Transmission channels

The analysis of the effects of reforms involves the identification of transmission channels through which those reforms may affect financial institutions, and thereby influence financial intermediation and economic activity more broadly. This forms the basis for comparing the realised outcomes with the reforms' intended objectives. Financial reforms may influence both the level and structure of SME lending by changing the costs of different transactions and the incentives of different types of financial institutions. Most transmission channels described below tend to be similar across different types of lending, although the effect on SMEs may be amplified given their limited access to alternative (market-based) sources of finance due to their smaller scale and informational opacity relative to larger firms.

[34] Based on the FSB's *Fourth Annual Report on the Implementation and Effects of the G20 Financial Regulatory Reforms* (November 2018) and the BCBS *Fifteenth progress report on adoption of the Basel regulatory framework* (October 2018).

Higher liquidity and capital requirements under Basel III[35] may affect both the asset and liability sides of banks' balance sheets. Graph 10 shows potential stylised transmission channels from selected reforms through balance sheets and behaviour of finance providers, and ultimately to levels of aggregate lending and gross domestic product (GDP). The "force" of the transmission might also depend on the composition of the SME population – for example, a competitive, efficient and stable banking system might be better placed to promote lending over the cycle and refrain from supporting non-viable firms.

On the asset side, banks may adjust downwards both the volume and the tenor of lending to SMEs. Banks might also change the type or collateralisation required when lending to SMEs.[36] This can be the case at least over the short term, that is, until banks adjust the structure of their liability side in order to meet higher prudential requirements. Banks' funding mix and costs may also change, and these changes in funding structure could be passed on to borrowers via higher lending rates in order to maintain profitability. The impact on SMEs might be more severe to the extent that they have less recourse to alternative funding sources (e.g. capital markets or private placements) compared to larger firms. However, the net impact is not clear: since SME lending can be more risky than other corporate loans, banks subject to a fixed risk weight under the standardised approach could potentially increase such lending to obtain greater returns in a tighter regulatory environment.

Financial regulations may affect SME financing via bank-intermediated securitisation. After the crisis, there was a significant pull back in all types of securitisation, including for SMEs. On the one hand, securitisation can enhance a bank's balance sheet capacity so that it can be used for more lending. On the other hand, when retained on a bank's balance sheet, securitised assets can require more capital than a non-securitised loan. However, as noted in section 2, SME loan securitisation is limited and present only in a small number of jurisdictions.

Financial regulations may also entail a higher overall compliance burden that in turn may affect SME lending. SMEs are considered to be more reliant on "relationship lending", whereby lending decisions are based on soft information collected by loan officers at the local bank branch. Smaller banks may be better suited at collecting soft information by virtue of their more flat or decentralised organisational structure. Higher, regulatory-induced compliance burdens, if they are at least in part unrelated to loan size, may make smaller loans less attractive for every lender. This might affect smaller banks relatively more and incentivise them to focus on larger loans, which may in turn affect the availability of "relationship lending", particularly in those jurisdictions where SMEs rely predominantly on those banks. On the other hand, large banks are the main providers of SME lending in most jurisdictions (see section 2), and some "relationship lending" could be carried out by their local branches. The impact on SME lending may ultimately depend on the structure of the local banking market and any structural changes that may affect the competitiveness of different providers.

---

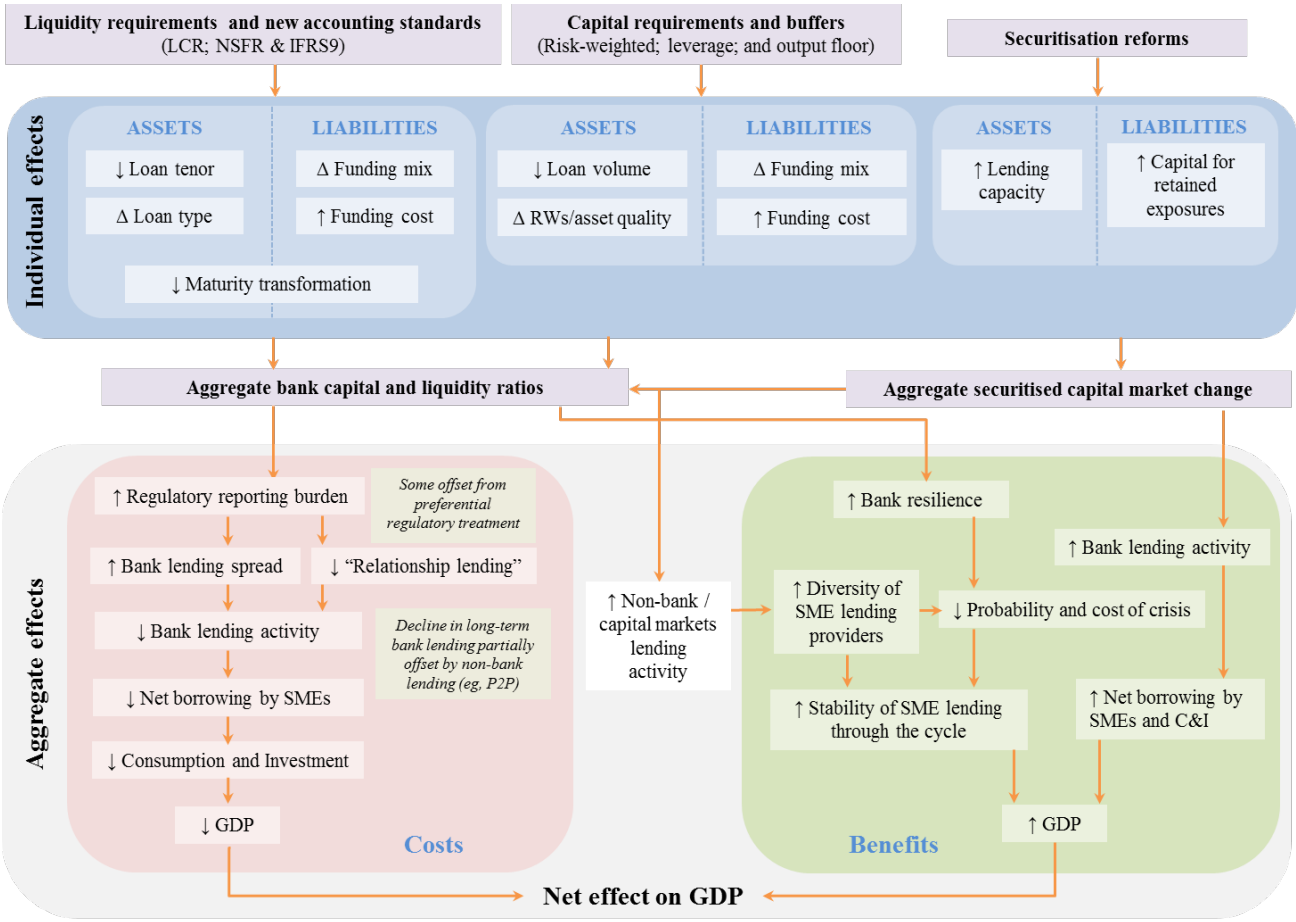
[35] Table C-1 in Annex C describes the risk weights for the different SME exposures under Basel III.

[36] For example, under the internal ratings-based (IRB) approach for credit risk in Basel III, the haircut applied to the valuation of non-financial collateral has increased. Should SMEs be required to pledge further collateral in order for the bank to maintain the same amount of risk weighted assets, it could negatively affect SME financing. At the same time, the LGD used for exposures with non-financial collateral was decreased, which may negate this effect. Banks must continue to meet a number of conditions to recognise the credit risk mitigation of such collateral. BCBS members have agreed to implement these changes by 2022.

The effects of financial reforms on the provision of SME financing may also depend on the degree of substitution between bank and non-bank financing sources. Although there is some anecdotal evidence about substitution effects (e.g. SMEs borrowing from online platforms rather than banks), there is not enough data to shed a conclusive light on this issue.

At an aggregate level, these reforms are expected to reduce the probability of a crisis and, should a crisis occur, soften its impact by stabilising the provision of lending. While there is limited evidence that explores the specific effect on SME lending, there is no reason to expect that SMEs too would not also benefit from a more stable economy and in particular from more resilient banks (see section 4). In particular, SMEs are less likely to be able to access alternative sources of financing than larger companies, making it more important that banks can continue to provide lending even in a severe downturn.

Graph 10: Stylised representation of possible transmission mechanisms of regulatory requirements to SME lending and economic activity



Source: Adapted from Graph 1 of the *Literature review on integration of regulatory capital and liquidity instruments* by the BCBS Research Task Force (March 2016).

4. Effects of reforms on SME financing

4.1 Qualitative analysis

This section presents a qualitative analysis of the effects of reforms on SME financing, based on feedback from stakeholders (see Annex E), the literature review (see Annex F), and the responses to a stocktake questionnaire by FSB jurisdictions.

4.1.1 Basel III capital and liquidity reforms

Ex ante impact assessments of Basel III reforms generally found positive net benefits of higher capital and liquidity requirements. As described in section 5.1 and Annex F, these studies estimated the expected benefits of reforms in terms of reducing the likelihood and severity of financial crises. To estimate ex ante social costs, these studies assumed that more stringent regulatory requirements increase the funding costs of financial institutions, which they, in turn, pass on to borrowers through higher lending spreads. This reduces overall lending and investment in the economy and thereby economic output. On balance, most of these studies have found that the benefits outweigh the costs.

The literature has mostly focused on the impact of capital and liquidity reforms on bank lending in general, with only a few papers discussing the impact on SMEs more specifically. The effects of these reforms on loan supply differ between the short/medium and long term and depend on different factors. There is an emerging consensus in terms of: i) negative impact on loan supply in the short/medium term as banks adjust their balance sheets to reduce their risk-weighted assets;[37] and ii) positive impact in the longer term, since better-capitalised banks are able to lend/maintain lending in a downturn.[38] Further, the adjustment behaviour of banks to capital or liquidity requirements depends on a number of factors, including initial conditions (e.g. bindingness of the reform across jurisdictions and banks), banks' business model and economic conditions.[39] The effects of liquidity requirements have not been extensively studied yet, with one recent exception not finding a negative effect on loan supply.[40] Studies analysing specifically the impact on SME lending have mainly focused on domestic rather than cross-country implementation of reforms, including local specificities (see

---

[37] See, for instance, Francis and Osborne, *Bank regulation, capital and credit supply: measuring the impact of prudential standards* (FSA Occasional paper 36, September 2009); Aiyar et al., *Does macro-pru leak? Evidence from a UK policy experiment* (Journal of Money Credit and Banking, 46(1), February 2014); Bridges et al., *The impact of capital requirements on bank lending* (Bank of England Working Paper No. 486, January 2014); Fraisse et al., *The real effects of bank capital requirements* (ESRB Working Paper Series No 47, June 2017) (2017); Behn et al., *Procyclical capital regulation and lending*. (Journal of Finance, 71(2), 2016); Gropp et al., *Banks Response to Higher Capital Requirements: Evidence from a Quasi-Natural Experiment*. (Review of Financial Studies, January 2019); Jiménez et al., *Macroprudential policy, countercyclical bank capital buffers, and credit supply: evidence from the Spanish dynamic provisioning experiments* (Journal of Political Economy, 125(6), 2017).

[38] See, for example, Gambacorta and Shin, *Why bank capital matters for monetary policy* (Journal of Financial Intermediation, July 2018) and Cohen, *How Have Banks Adjusted to Higher Capital Requirements?* (BIS Quarterly Review, 2013).

[39] Papers using a more structural approach to study these determinants include, for example, Bahaj and Malherbe, *The Forced Safety Effect: How Higher Capital Requirements Can Increase Bank Lending* (London Business School working paper July 2018); Mankart et al., *Bank Capital Buffers in a Dynamic Model* (Deutsche Bundesbank Discussion Paper No 51, 2018); Goel et al., *Bank capital allocation under multiple constraints* (BIS Working Papers No. 666, October 2017); and Behn et al., *A dynamic model of bank behaviour under multiple regulatory constraints* (ECB Working Paper No. 2233, January 2019).

[40] See Banerjee and Mio, *The impact of liquidity regulation on banks*. (Journal of Financial Intermediation 35, 2018).

section 4.1.2). Generally, there are no empirical studies that suggest that the combination of negative short term impact and positive long term effects would not also apply to SME lending.

Banks can respond to the multiple regulatory constraints in different ways, depending on which constraints are most binding for them and on their particular risk preferences. For SME financing, banks can choose to modify the pricing, extent, geographical location or risk profile (e.g. maturity, risk mitigation) of the finance they are willing to provide. The overall effect will vary depending on a number of factors such as the specific risk characteristics of the transaction and the existence of alternative financing sources. Box 2 provides an illustration of how changes in the Basel III risk weights for SME exposures may translate into higher cost of funding for borrowers (see Annex D for the assumptions underpinning this analysis).

Identifying the effects of Basel III reforms is challenging because of the many confounding factors, which are difficult to disentangle. Macroeconomic conditions have an important effect on total lending within the economy and also on SME lending. After the global financial crisis, many countries entered a recession which led to a lower demand for credit and reduced asset quality and investment opportunities. Crisis-hit countries have observed strong effects on total lending, including lending to SMEs. In addition, recent years have been characterised by accommodative monetary policy in advanced economies, which has significantly eased credit conditions in a number of jurisdictions. Evidence on the effects of SME lending is mixed, with some studies finding that monetary policy actions led to a lower likelihood of SMEs being credit constrained, whereas others finding such actions to be benefiting lending to larger firms instead of SMEs.[41] Likewise, following the crisis, several jurisdictions introduced public policies that had the objective to support SME financing. These policies may also have influenced the extent to which the reforms impact SME financing.

Stakeholders identified Basel III as the most relevant reform impacting the provision of SME lending, although there were mixed views about its importance. Some stakeholders noted that banks may have increased the pricing and the proportion of secured SME lending – as well as reduced credit to riskier firms – including as a result of the reduced eligibility of collateral for regulatory capital purposes. A few of them also expressed concern that: i) Basel III imposed a disproportionate capital charge on equity investment in SMEs, thereby discouraging such exposures vis-à-vis debt finance; ii) changes in the treatment of the credit conversion factor (CCF) would penalise undrawn credit lines commonly used by SMEs; and iii) the leverage ratio would adversely impact trade finance, which is a preferred means of external financing for SMEs.[42] In addition, some stakeholders commented that the cumulative costs of complying with financial regulations may be disproportionately higher for smaller credit institutions and incentivise them to focus on bigger loans, while others expressed concern

---

[41] See Ferrando et al., *Sovereign stress, unconventional monetary policy, and SME access to finance* (2015), for positive effects on SMEs from the ECB's Outright Monetary Transactions; Cahn et al., *Unconventional monetary policy and bank lending relationships* (2017) for the additional credit claims framework; Andrade et al., *Can the Provision of Long-term Liquidity Help to Avoid a Credit Crunch? Evidence from the Eurosystem's LTRO* (Journal of the European Economic Association, June 2018) for larger benefits for large firms from the ECB's Long Term Refinancing Operations; and Rodnyansky and Darmouni, *The effects of quantitative easing on bank lending behaviour* (The Review of Financial Studies 2017), for the effects of the US Federal Reserve's asset purchases.

[42] More details on the potential impact of these Basel III elements on SME financing are provided in Annex C. The BCBS has not found any empirical evidence that the introduction of the leverage ratio has had an impact on the supply of trade finance or in lending rates to trade finance in general. The BCBS quantitative impact assessments also suggest that the vast majority of banks are not bound by the minimum leverage ratio. See, for example, BCBS (2011) *Treatment of trade finance under the Basel capital framework* and section 2.4 of BCBS (2018) *Basel III Monitoring Report*.

about the apparent convergence in business models across large banks that may reduce diversity and build up systemic risks. However, other stakeholders noted that Basel III reforms were not the major constraint to SME financing; that loan maturities have lengthened in recent years (due, at least in part, to lower interest rates); and that capital regulations have impacted countries differently depending on how they were implemented by the authorities (e.g. in terms of their application to banks of different size), and how successful banks have been at raising capital.

Box 2: Illustrative examples of changes to the RWAs and WACC for SME lending under Basel III

The first phase of Basel III ('phase 1') increased the amount and quality of regulatory capital, while leaving most underlying credit risk weights (RWs) broadly unchanged. The December 2017 finalisation of Basel III ('phase 2') will change the credit RWs for some exposures when fully implemented in 2022. The typical funding costs and funding mix for banks will also have changed over time.

By considering the credit RW changes for different assets, and making assumptions about typical SME exposures, funding mix and funding costs for bank portfolios, a weighted average cost of capital (WACC) can be computed for credit risk before and after the Basel III changes. The spread of the WACC to a risk-free rate is one of the underlying factors that may have affected loan pricing and volumes for SMEs. The table below shows the RW changes for stylised samples of SME exposures.

Exposure class	Regulatory approach	Credit quality/rating	Basel II / Basel III phase 1 RW (%)	Basel III phase 2 RW (%)*
Retail SME	Standardised	N/A	75	75
Retail SME	AIRB	N/A	45	42
Corporate SME	Standardised	BBB	100	75
Corporate SME	Standardised	unrated	100	85
Corporate	AIRB	N/A	69	65

* Several elements of the standardised approach RWs have been revised between phases 1 and 2. The Advanced IRB approaches are unchanged between phase 1 and 2, except for the deletion of the 1.06 IRB multiplier, the increase in PD floors, and the introduction of LGD parameter floors. The impact from introducing an output floor in phase 2 on IRB risk weights is not captured by the analysis, since the floor applies at the aggregate level and not to individual exposures. The changes to PD and LGD floors are also not incorporated into the analysis due to the lack of granular data required for such analysis.

The Basel III reforms result in an increase in the spread of the WACC over the risk-free rate of 19-36 basis points (bps) for the retail SME and the corporate SME exposures (detailed assumptions underlying these calculations are included in Annex 3). All of the increase in WACC is driven by phase 1 of the reforms (which raised the amount and quality of capital required for all asset classes), while the decreased credit RWs (particularly for unrated and BBB rated corporate SMEs under standardised approach) and the removal of the 1.06 multiplier for IRB in Phase 2 offset parts of the increase resulted from the phase 1 reforms. However, the changes to the PD parameter floors and the introduced LGD floors under the IRB in phase 2 will also increase the WACC to some degree. This is not analysed herein due to the lack of data required for such analysis, specifically portfolio data by buckets of LGD, in particular of given floors.

An increase in the WACC for credit risk capital would be expected to impact loan pricing, assuming that at least some of this is passed through to borrowers. There are, of course, other relevant factors influencing pricing, such as temporal and structural changes in risk premia, and other macroeconomic and idiosyncratic microeconomic conditions.

4.1.2 Other reforms

Other G20 reforms

Changes to accounting standards for expected credit loss (ECL) were also cited by stakeholders as potentially affecting SME financing, although a comprehensive assessment of their impact is not possible at this stage. Accounting standards aim to provide accurate information to investors and do not seek to change asset allocation choices, but may have a bearing on the investment decisions of banks and other institutions as they seek to optimise their reported positions. In this context, concerns have been expressed by some stakeholders about the effects of the new standards – the International Accounting Standards Board's (IASB) IFRS 9 and the US Financial Accounting Standards Board's (FASB) current expected credit loss (CECL) model. These stem from worries about a sudden increase in loan loss provisions and higher volatility of earnings in general, which may incentivise banks to reduce the maturity of SME loans, request higher collateralisation, and reduce credit availability in a downturn. The presence and magnitude of any potential effects on SME financing will be substantially determined by the way banks implement the standard, as well as by factors such as the composition and quality of their credit assets.[43] The overall impact on banks' financial positions will also be affected by the regulatory capital treatment of loan loss provisions resulting from the move to these new accounting standards. Given that the bulk of these changes will only come into effect in the coming years – IFRS 9 was only effective as of 1 January 2018, and CECL is not effective until 2020 (2023 for non-SEC filers) – a meaningful analysis of their effects on SME financing is not possible at present.

Other financial regulations

Several jurisdictions that have implemented the G20 post-crisis reforms have also adopted additional regulatory requirements that may impact SME financing. Such examples cited by stakeholders and found in the literature include the capital reduction for SME lending introduced by the CRR/CRD IV in the EU (so-called "SME Supporting Factor" or SF, see Box 3); the stress testing frameworks in the US and other jurisdictions; and Anti-Money Laundering and Combating the Financing of Terrorism as well as know-your-customer requirements.

Some studies and stakeholders note that stress testing requirements may have affected SME lending for the banks subject to the requirements vis-à-vis other banks, but the evidence on overall lending to SMEs is mixed. This stems from a perception that stress testing frameworks are particularly punitive for SME lending because of the variables stressed most severely, which typically include unemployment, house prices (a common source of collateral for SMEs) and unsecured lending (which is how many SMEs finance themselves). The implicit risk weight assumptions may lead to relatively higher SME loan portfolio losses in stress scenario calculations. Two studies for the US indicate that stress-tested banks reduce SME lending,[44] however one of them also finds that smaller banks not subject to the stress tests were more willing to lend to SME borrowers so that the aggregate credit supply was not reduced.

---

[43] A comparison of the EU and US accounting rule can be found in the ESRB's *Expected credit loss approaches in Europe and the United States: differences from a financial stability perspective* (January 2019).

[44] See the articles by Cortés et al. on *Stress tests and small business lending* (Journal of Financial Economics, September 2019) and Doerr on *Unintended Side Effects: Stress Tests, Entrepreneurship, and Innovation* (August 2019).

Box 3: SME Supporting Factor in the EU

Article 501 of the Capital Requirements Regulation (CRR) introduced a capital reduction factor ("SME Supporting Factor, SME SF") for exposures to SMEs under both the standardised and IRB approach. Capital requirements for exposure to SME are reduced by applying a discount factor of 0.7619 to these exposures. The SME SF came into effect in January 2014 as a permanent discount factor with the purpose of supporting SME lending (Recital 44 of the CRR).

The application of the SME SF is limited to exposures that satisfy all of the following eligibility criteria:

- The loan is allocated to corporate exposures, retail exposures or exposures secured by immovable property. Exposures in default are excluded from the application of the SME SF.
- The borrower is an SME, according to the definition of the 2003 European Commission Recommendation. Its turnover must be below EUR 50 Million.
- The total amount owed to the lending institution, its parent and subsidiary undertakings (including exposures in default, but excluding the claims secured on residential property) shall not exceed EUR 1.5 million.

Given its focus on the G20 (rather than regional) financial regulatory reforms, this evaluation has not sought to assess the effects of the SF but it has taken the policy into account as a control variable in quantitative analyses when applicable.

Studies on the effectiveness of the SF do not find clear significant results. The European Banking Authority (EBA)[45] analysed the effects of the SF from 2009 until the second quarter of 2015. SMEs subject to the SF represent 4% of the aggregate corporate portfolios, 11% of the aggregate retail portfolios and, in case of Standardised Approach banks only, 6% of the aggregate exposures secured by immovable property at the EU level. The EBA study finds no evidence that the SME SF has provided additional stimulus for lending to SMEs compared to large corporates (comparison group). The EBA noted, however, that the length of the period examined by the study might have been insufficient to assess the full potential impact of the measure with regard to stimulating lending, and that it would be necessary to assess its impact over a longer period.

More recent studies, based on longer time series of post-reform data, find more positive results. One study shows that the size dependency of asset correlations is only adequately reflected in the relative calibration of capital requirements for SME after accounting for the relief of the SME SF as compared to large corporates.[46] Another study finds that the SME SF alleviates credit rationing for medium-sized firms, but not for micro/small firms or if all SMEs of different sizes were analysed together.[47] A third working paper finds positive and significant effects of the SF on credit volumes.[48]

The EBA conducted an impact study on the finalised Basel III reforms in 2019 and recommended that the SF be removed because a more favourable treatment has already been introduced in the final Basel III framework (i.e. 85% RWs for unrated corporate SMEs and 75% RWs for retail SMEs under the standardised approach).[49]

---

45 *EBA Report on SMEs and SME Supporting Factor* (March 2016).

46 See Dietsch et al., *Support for SME supporting factor – multi-country empirical evidence on systematic risk factor for SME loans* (Deutsche Bundesbank, Discussion Paper No 45/2016).

47 See Mayordomo and Rodríguez-Moreno, *Did the bank capital relief induced by the Supporting Factor enhance SME lending?* (Journal of Financial Intermediation, Vol. 36(C), October 2018).

48 See Lecarpentier et al., *Lower bank capital requirements as a policy tool to support credit to SMEs: evidence from a policy experiment* (EconomiX Working Papers 2019-12, University of Paris Nanterre, June 2019).

49 *EBA advises the European Commission on the implementation of the final Basel III framework* (August 2019).

FSB jurisdictions have also adopted a range of public sector policies to support SME lending. Several of these measures were introduced or enhanced after the financial crisis (see Chapter 2 and Annex B), and are considered by both authorities and market participants as enhancing SMEs' access to finance. The impact of these programmes depends on the design, economic circumstances and initial conditions within the jurisdiction. The evaluation has not sought to assess the effects of these policies, but rather to take them into account as control variables in the empirical analysis.

These policies have coincided with the implementation of reforms. The interaction between the different measures and how the regulations are implemented, as well as the macro-economic situation in a jurisdiction and the market structure, ultimately determine the extent to which SME financing is affected. Several stakeholders noted that identifying the relative importance of different factors is not easy given the confounding events taking place at the same time.

4.2 Empirical analysis and findings

This section describes the empirical analysis and its findings on how capital and liquidity reforms in the Basel III framework may have affected banks' SME financing. It addresses the main features of the analysis, in terms of challenges, methodology, data availability and results. More details are provided in a Technical Appendix, published separately.

The analysis was designed to answer four broad questions about how the Basel III capital and liquidity reforms might have affected bank lending to SMEs. First, did the SME lending of those banks more affected by the reforms slow in the aftermath of the reforms? Second, did SME lending decline more than lending to non-SMEs? Third, did banks more affected by the reforms tighten the terms of SME lending – maturity, collateral requirements and costs (interest rates) – relatively more after the reforms? Fourth, did the allocation of SME credit change after the reforms?

The rest of the section is organised as follows. The first two sub-sections describe the empirical strategy to answer these questions, and address methodological and data-related limitations. The third sub-section describes the reforms included in the analysis and the outcomes studied, while the final sub-section discusses high-level findings.

4.2.1 Empirical strategy

The bank regulatory reforms to be evaluated were launched shortly after or amidst financial and economic upheaval, including the global financial crisis in 2007-08 and its repercussions in several jurisdictions, and unprecedented policy responses. The reforms coincided therefore with a host of other potentially confounding macro-economic events (e.g. the repercussion effects of the global financial and the European sovereign debt crisis) and policy responses, such as the unconventional monetary policy as well as national or regional policies, including those supporting SME financing (e.g. reinforced public guarantee schemes, or the SME Supporting Factor in the European Union, see Chapter 2 and Box 3). Both almost certainly induced economic spill-overs affecting firm credit demand, from SMEs and firms more generally. Further, unfavourable macroeconomic conditions might have amplified the impact of reforms on bank credit supply.

The empirical challenge for this evaluation is therefore to identify the effects of the reforms through their differential impact on banks, by also disentangling supply from demand effects.

This evaluation exploits most granular data available for some jurisdictions in order to disentangle credit supply and demand effects. With bank-level data, control variables and fixed effects are used to control for potentially confounding demand-side variables and macroeconomic conditions. With the most granular *bank-firm level data*, the analysis can credibly control for loan demand by using control variables and fixed effects while also comparing lending behaviour of banks more or less exposed to the reforms to the same or highly comparable firms.[50] The Technical Appendix describes the empirical models in more detail.

However, not all confounding factors can be controlled for through fixed effects or other controls. Therefore, the identification of the effects also relies on the comparison of banks with different exposures to the reforms.

In particular, to identify the reform effects and minimise the risk of misattribution, the evaluation exploits heterogeneity across banks in their exposure to the reforms. Specifically, lending growth is compared before and after the reforms. Thereby, post-reform effects are compared between banks identified as potentially constrained by the reforms (more exposed ex ante) and less exposed banks. Comparing the change across differently affected banks strengthens the identification considerably, that is, as long as the effects of potentially confounding events did not differ systematically with banks' exposure to reforms, reform effects can be said to be plausibly identified.[51]

Banks' exposure to capital or liquidity reforms was identified by their relative capital or liquidity strength before the reform. Intuitively, credit supply from less capitalised banks or less liquid banks is more likely to be constrained by the reforms than the credit supply by better capitalised or more liquid banks. This intuition underlies the empirical strategy in this evaluation. Banks with capital or liquidity ratios in the bottom decile or quartile of the distribution for all banks within the relevant jurisdiction before reforms were announced nationally have been identified as "more exposed." Following the strategy outlined above, the change in SME lending growth and other outcomes after reforms at the more exposed banks was compared to the change at other, less exposed banks.[52] Alternative exposure measures (e.g. the capital shortfall at a given point in time relative to the final requirement), while potentially more precise, would have necessitated a common set of assumptions and additional data that were not available to all participating jurisdictions. Notwithstanding these limitations, capital shortfall was used in one of the analyses as a measure of banks' constrainedness (see Box 6).

---

[50] For countries where SMEs mostly have one relationship only, the analysis compares firms subject to similar demand conditions but with relationships to differentially affected banks.

[51] This approach largely borrows from the "difference-in-difference" strategy, as it is technically known, which is standard in the policy evaluation literature.

[52] The identification of the reform effect crucially depends on how the most exposed (treated) and less exposed (comparison) group of banks is constructed. In the baseline setup, the group compositions of most and less exposed groups was held constant over the entire observation period. As a robustness check, the composition was allowed to vary period-by-period. This time-varying exposure measure captures the fact that individual banks might adjust over time and rotate in and out of the group of most affected banks. The results of this robustness check, not shown here, generally confirm the main findings.

Importantly, this empirical strategy can only assess the relative and not the absolute effects, thereby limiting the conclusions that can be drawn about the overall effects of the reforms. For example, a finding that lending at more exposed banks (less capitalised or less liquid banks) is more affected than at other banks does not imply that lending by the other banks was entirely unaffected. Since the analysis relies on bank credit data, it is not possible to gauge an absolute effect, because in most jurisdictions all banks had to comply with the reforms and therefore there is no natural control group for totally unaffected (i.e. obviously unexposed) banks. For the same reason, the absence of any relative effect for the ex ante more exposed banks precludes drawing any inference about the rest of the bank population.[53]

4.2.2 Data

Fifteen different datasets have been used to examine the effects of the reforms while addressing the identification challenges mentioned above. Table 2 summarises key differences across the datasets and how the individual studies address identification issues based on their coverage, data structure and granularity.

The four cross-country data sets provide different measures of SME financing, ranging from outstanding SME loans to SMEs' own perception of access to bank financing. Each of the cross-country data sets has unique advantages and disadvantages. The FSB data collected for this evaluation has the widest coverage across countries, but is also the least granular. The Basel Committee on Banking Supervision (BCBS) data has a very precise measure of banks' exposure to the reforms across a number of jurisdictions, but is limited to very large banks. The European Central Bank (ECB) financing conditions survey provides granular bank-firm level information also across a (more limited) number of jurisdictions, but it relies on self-reported information on whether firms demand credit or not and on the perception of firms of being credit constrained. Capital IQ data includes SMEs' borrowing and investment spending, and thus provides information on potential *real* effects of reforms, but without information on the supplying banks, potentially differently exposed to the reforms.

The 17 within-country exercises (with bank or bank-firm level data) span 10 individual jurisdictions. [54] SME outcomes in these datasets were observed at the bank level or at the bank-firm level. The bank-firm level data, apart from greater granularity, also feature richer information on SME lending terms, including interest rates, maturity, and collateralisation in some jurisdictions.

---

[53] Under the maintained assumption that any capital or liquidity reform effects should be stronger for lower capitalised or less liquid banks, the absence of any relative effect is consistent with a null effect for all banks.

[54] Some jurisdictions conducted twofold satellite analyses, on two different datasets (one based on bank-level data and one on bank-firm level data from the same jurisdiction).

Table 2: Key dimensions and identification tools of the empirical analyses

	Coverage in Estimation Sample	Unit of observation	SME Outcome variable of interest	Demand absorbed by	Heterogeneity to proxy reform exposure
Cross-country analyses					
FSB survey	13 AEs+ 8 EMDEs 2010-2017	Country-time	Aggregate bank lending to SMEs	Macro control variables at the country-time level Separate country and time fixed effects.	Banking system characteristics at the country-time level
Capital IQ	9 AEs+EMDEs 2010-2017	Firm-time	SME debt (total, short term, long term) and investment	Country-by-time fixed effects and firm fixed effects.	Time-varying firm characteristics – More exposed firms within each country.
ECB SAFE survey	8 euro area members 2010-2016	Firm-time Bank-firm time	SMEs reply being "credit-constrained"	Firm-level control variables and fixed effects (country-by-time or separate country and time).	Time-invariant bank characteristics – More exposed banks (at euro area and at country level).
BCBS	18 AEs+EMDEs 2011-2018	Bank-time	Individual banks' SME loan portfolio	Macroeconomic control variables	Individual bank's exposure to the reforms – More exposed banks.
Within-country analyses					
Supervisory bank reports[55]	10 jurisdictions, AEs+EMDEs	Bank-time	Individual banks' SME loan portfolio (total, long term, short term)	Macroeconomic control variables, bank and time fixed effects, or bank and region-by-time fixed effects	Individual bank's exposure to the reforms
Of which, also on credit registries data	6 jurisdictions AEs+EMDEs	Bank-firm-time	Bank-firm loan relationships (total, short term, long term, collateralised, indicative or charged interest rates)	bank-by-firm fixed effects, and sector-by-time fixed effects	Individual bank's exposure to the reforms.

[55] One within-country analysis used commercial data.

All the cross-country and within-country "satellite"[56] analyses used a common empirical framework (with some adaptations to jurisdiction-specific aspects) to evaluate the effects of the reforms. Striking the balance between comparability and the need to reflect country specificities, the analyses faced a number of data and methodological challenges (Box 4).

Box 4: Empirical analysis – data and methodological challenges

SME definition(s)

Official definitions of "small" and "medium"-sized firms can vary substantially both across jurisdictions and even across banks of the same jurisdiction. The issue is particularly relevant for cross-country estimations, limiting the comparability of the underlying information. This issue of different definitions might potentially affect reliability of the estimates, which are supposed to apply equally for the different jurisdictions considered in the analysis. Different SME definitions also restrict comparability of outcomes of jurisdiction-specific exercises.

Identifying relevant reforms and their potentially effect on more exposed banks

Isolating specific reforms effects. Several regulatory reforms were introduced in a sequence of relatively short, partly overlapping periods. Absent sufficient data and a sufficiently long pre- and post-reform period, it is difficult to robustly parse the specific effects of each reform. By the same token, the effects noted for the first reform announced might also capture the effects of other reforms that were announced shortly thereafter.

Announcement, legal implementation framework, or both. Banks may adjust to reforms at different implementation stages of the reforms, for instance, when reforms are nationally announced, or when details on the legal framework are published, or after the phase-in period expires. The econometric analysis draws on the national announcement as the first implementation stage, and the adoption of a legal framework as the second, and uses these stages separately or jointly in the single estimation.

Estimating the effects

The "baseline approach" for estimating the effects of the reforms is the following.

SME Outcome =

*a * D(Pre/post-regulation variable) * D(Exposure variable) +*

*b * D(Post-regulation) +*

*c * D(Bank exposure variable) +*

*d * controls (country, bank, firm, bank-firm level) +*

error term

The effect of regulation is estimated by interacting a dummy variable separating the pre and post-regulation period with a dummy variable highlighting more exposed banks. The analysis distinguishes between "persistent" effects, i.e. an average impact over the entire post-reform period in the sample, and "transitory" effects that vary over time. For more details across the various specifications, please refer to the Technical Appendix.

The exposure variables of interest. For each reform, reform-specific balance sheet measures have been used to identify more exposed banks. For instance, to analyse the effects of the RBC reform, the analysis resorts to the ratio of Tier 1 capital over risk-weighted assets. A bank is considered as more "exposed to

[56] The term "satellite" analysis also points to the confidential nature of the granular data that could be used. As a consequence, only the results from the satellite estimations following a common protocol were shared with the evaluation group. As a general rule, also for the multi-country exercises, bank- or firm-specific information was treated as confidential and never shared within the evaluation group.

the regulatory change", if the relevant variable of interest is below a chosen threshold level, mostly the bottom quartile (25%).

Reform	Exposure variable based on
RBC	Tier1 capital (or CET1)/RWA
LCR	(Cash+Central bank accounts+Liquid securities)/TA
G-SIB/D-SIB	Bank identified as D-SIB or G-SIB
LR	Tier1 capital/Total Assets

Controlling for confounding factors. Depending on the data analysed, the empirical analysis accounts for important bank or firm characteristics and other confounding macro, monetary, and financial factors over time. For instance, at the most aggregate level, the FSB survey analysis combines macroeconomic control variables with separate country and time fixed effects to control for demand effects. At the most granular bank-firm relationship level, fixed effects at the sector-by-time level absorb sector-specific demand effects that vary over time, while bank-firm fixed effects absorb any time-invariant aspects that are unique to a particular bank-customer relationship. If two banks are differently affected by the reforms, the absorption of demand effects for a customer (or for a category of customers) allow a more proper identification of the impact on lending outcomes that can be attributed to the reforms. Importantly, the within-country level analyses for EU jurisdictions controlled for the eligibility of the SME loans to the SME SF. While the introduction of the SF as a control variable in the econometric analysis allows to disentangle the effect of the reforms from a potential confounding factor, the SF was not in itself a primary focus of the analysis and conclusions on its effectiveness cannot be drawn.

Main caveats of the empirical analyses

Several caveats limit the comparability of results across jurisdictions. First, in some cases local regulations similar to Basel III were already in force, or policies were implemented around the same years to foster SME access to finance. Second, there are substantial differences in the banking systems across jurisdictions. This relates to the relative importance of banks as a source of SME funding (see below), the average size and concentration of banks, as well as the heterogeneity with respect to the importance of banking groups. Third, the coverage of bank-level data varies widely across jurisdictions, but also within jurisdictions when different data sets are taken into consideration.

Other caveats

Bank-centric SME focus. The evaluation focusses specifically on *bank* SME credit for two reasons. First, the set of considered regulatory reforms, namely Basel III, specifically targets banks as financial intermediaries. Second, as pointed out in other parts of this report, banks remain the dominant source of SME financing in most jurisdictions, before and after the reform implementation. Given the lack of data on non-bank SME finance, possible substitution away from bank towards non-bank finance cannot be explored.

Timing of the evaluation. Finally, it must be noted that this evaluation has been carried out before some of reforms were fully implemented in most of the jurisdictions. Accordingly, the results are subject to revisions as new post-reform data become available.

4.2.3 Reforms and outcomes studied

The effects of both capital (RBC, G-SIB/D-SIB higher loss absorbency requirements, leverage ratio (LR)) and liquidity reforms (Liquidity Coverage Ratio (LCR))[57] were investigated. For each reform, SME outcomes were compared before and after the date the reform was announced and/or implemented via an established legal framework. RBC was the first reform to be announced and implemented, and thus, may serve as a proxy for the entire set of Basel III reforms that followed.

The effects on both the quantity and terms of bank SME credit were studied, while allowing the effects to have either a temporary or a persistent (over the observed post-reform period) impact. The growth rate of bank lending to SMEs is the primary outcome variable of the analysis. As noted above, the granularity of this measure ranged from relatively coarse, national aggregates to very fine bank-firm level measures (i.e. growth in lending to the same SME by different banks).[58] The SME lending terms (when available) included interest rates, maturity (short-term versus long-term and their relative share in the SME loans portfolio), and the degree of collateralisation (at the bank or bank-firm level). For the ECB survey using qualitative data, the outcome variable captures whether a SMEs reported being "credit constrained" (i.e. if the SME was rejected a credit application or granted less credit than demanded (see Box 5).

The analysis also compared changes in SME outcomes to changes for larger firms, thereby analysing whether the reforms' effects were unique to SMEs, or in fact part of a broader pattern shared by other types of firms.

The empirical analysis examines several dimensions of how the capital and liquidity reforms have affected banks' SMEs lending. The analysis addressed the following main questions:

Q1. **Basic SME effect (quantities).** Did the introduction of bank capital and liquidity reforms impact lending to SMEs by those banks that had been ex ante more exposed to the reforms, i.e. with lower capitalisation or liquidity ratios in the period before reform announcement? Was the effect transitory or persistent over the entire post reform period?

Q2. **Differential SME effect.** Were the effects of the reforms, where detected, relatively stronger for SMEs than for larger firms? Did the share of SME lending go down on average over the period after reforms became effective?

Q3. **SME terms and conditions**. Did G20 regulatory reforms impact SME credit in terms of maturity, collateralisation or cost (interest rates)?

Q4. **Reallocation effect.** Were some types of SME relatively more affected than others by the reforms? Did the composition of borrowing SMEs change over time, e.g. in that relatively more credit was extended to more creditworthy borrowers?

---

[57] The evaluation could not obtain results on the effects of the NSFR, given that implementation in many jurisdictions happened too recently and there isn't enough heterogeneity in the data to estimate the effects.

[58] In particular, the evaluation looked at aggregate SME credit (for the FSB survey data), SMEs' borrowing (for firm-level datasets), total on balance sheet SME lending by a specific bank (for bank level datasets), or the outstanding amount that a specific SME has borrowed from a specific bank (for bank-firm level datasets).

4.2.4 Findings

Across the full range of analysed datasets, the general finding is that the evaluation does not identify material and persistent negative effects on SME financing for the reforms in scope. However, this finding is not homogeneous across jurisdictions. There is some evidence that more stringent risk-based capital requirements under Basel III slowed the pace of SME lending at the ex ante most exposed banks, but this effect is generally found to be temporary and does not hold across all empirical specifications and jurisdictions. The findings also suggest that the effects were amplified in jurisdictions undergoing a macroeconomic downturn in the reform implementation period. There is also evidence in some jurisdictions of a tightening in credit conditions, in terms of higher interest rates charged and higher collateral required by the most affected banks.

The main insights of each analysis based on the different datasets are described below.

Analysis of the country-level FSB data reveals only weak evidence of a relative negative impact of RBC reforms on SME lending growth rates in countries with relatively less capitalised banking systems before the reforms. For the full sample of 22 FSB jurisdictions,[59] the RBC reforms are not found to have had either temporary or persistent effects on the pace of SME or total corporate lending in jurisdictions with relatively less capitalised banking systems relative to other jurisdictions. However, for a subset of jurisdictions that provided information on tenors, short term and long term credit were negatively affected in jurisdictions with less capitalised banking systems relative to other jurisdictions. Robustness analyses indicate that the effects might have been stronger in countries hit by a macroeconomic crisis. In these jurisdictions, lending to both SMEs and all firms declined in the post-reform period, irrespective of the level of capitalisation of their banking systems.[60] Other reforms are not found to have significantly impacted aggregate SME lending. It should be noted that this analysis uses the least granular data. Hence, exposure to the reforms can only be proxied by the average characteristics of a jurisdiction's banking system.[61] Further, demand and other confounding factors that may be impacting the level of SME financing cannot be fully controlled for with such aggregated data.

Analysis of the granular ECB survey on access to finance of enterprises (SAFE) does not identify any significant effect of the reforms on SME access to finance at more exposed banks for the regulatory reforms studied (RBC, LR, G-SIB higher loss absorbency requirements, LCR). In a few cases, there is a temporary negative effect for firms borrowing from the most affected banks, which is however not robust (Box 5).

---

[59] Two jurisdictions are not included because of lack of information on bank control variables.

[60] For more details on the estimation procedure and the empirical results, see the Technical Appendix document.

[61] This aggregate capitalisation level masks heterogeneous capital conditions in banks within any given jurisdictions. Thus, the proxy used to identify the most exposed banks (or banking systems) in this setting may be less informative.

Box 5: The ECB analysis on the SAFE survey

This cross-country analysis on the euro area is based on the *Survey on the Access to Finance of Enterprises (SAFE)* conducted on a bi-annual basis since 2009 by the ECB and the European Commission. The survey covers developments in the financial situation of enterprises and trends in the need for, and availability of, external financing, asking enterprises a standardised set of questions on their funding needs and financial constraints during the six months under study. The sample is broken down by firm size in the countries under consideration. Most of the firms are interviewed only once, but there is a small subsample of firms present in several waves.

The confidential non-anonymised ECB SAFE dataset at the firm-level is complemented with quantitative information on firm balance sheets and income statements, and bank-level information on the firm's main lender.[62] The final sample for the empirical analysis contains information on around 7,000 matched firm-bank observations, covering SMEs in eight euro area countries (Austria, France, Germany, Greece, Ireland, Netherlands, Portugal, and Spain).[63]

The main dependent variable in the empirical analysis, "Credit Constrained", is a binary variable equal to 1 if any of the following four conditions applies: 1) the firm's application for a bank loan or a credit line in the past 6 months was denied; 2) the firm received less than 75% of the amount it requested; 3) the firm refused the loan offer because the rate was too high; 4) the firm did not apply for a loan or credit line because it feared a rejection. The variable is equal to zero if none of the above conditions applies for the firm. Using this definition of constrainedness, responses from the survey show that overall access to finance for SMEs has significantly improved in the past few years, following a significant deterioration during the global financial crisis.

The identification strategy employed for the analysis of the SAFE data is similar to the other cross-country and satellite analyses in the report, apart from the difference in the dependent variable. The analysis looks at whether the reform exposure of each firm's main lender has an impact on the individual firm's survey reply. In particular, banks are grouped into those that were more and those that were less affected by a specific reform (based on their initial balance sheet characteristics), and the analysis tests whether access to finance for firms borrowing from either group was differentially affected by the reform. For example, for the RBC reforms, relatively less capitalised banks are assumed to be more affected by the reform. To identify these, banks were sorted by their pre-reform capital positions relative to their peers in the euro area, and those belonging to the lower end of the distribution were considered as being most affected.

The analysis does not identify any significant negative impact of the regulations studied (RBC, LR, G-SIB capital surcharge, LCR) on SME access to finance. In a few cases, there is a significant temporary effect for firms borrowing from the most affected banks, which is however not robust. In particular, for RBC, SMEs borrowing from banks in the bottom decile of the initial capital ratio distribution, report becoming more constrained in the first two years after the reforms, relative to firms borrowing from better capitalised banks. This effect vanishes, however, when looking at the bottom quartile or bottom half of the capital ratio distribution. It also vanishes when excluding certain crisis-hit jurisdictions from the regression, or when defining constrained banks relative to their peers within the same country, rather than at euro area level. For the other reforms under consideration, the analysis does not reveal any significant difference in the impact on the access to finance for firms borrowing from banks that were more or less affected by the reforms.

---

[62] The firm level information is taken from the Amadeus data set, which is a proprietary database maintained by Bureau van Dijk (BvD). The bank-level information on the firm's main lender, obtained from three datasets: (1) confidential supervisory reporting data; (2) public data available from the EBA Transparency Exercises and Stress Tests; and (3) balance sheet and income statement information from Bank Focus.

[63] Data from other euro area jurisdictions participating in the SAFE survey have not been used due to the unavailability of information about the lender banks.

The BCBS analysis is based on data collected from the Basel Committee's quantitative impact studies covering the largest banks in 18 jurisdictions. The results do not provide any evidence that the capital reforms examined (RBC, G-SIB higher loss absorbency requirements, LR) affected SME lending of more exposed banks in comparison to less exposed ones (Box 6).

Box 6: Impact of Basel III (first phase) on SME lending by large banks

The BCBS analysed the impact of the reforms on SME lending based on data collected from its quantitative impact studies (QIS).

The dataset used for the analysis includes information from 94 banks in 18 jurisdictions, and covers the period 2011-2018. The banks are representative of the largest banks in each jurisdiction. Data on SME exposures were not readily available before 2011. The simple average across jurisdictions of the share of SME exposures (retail exposures plus corporate exposures) in total credit exposures as defined by the Basel definition is around 10% (5% for corporate SME exposures only; see the Technical Appendix section for jurisdictional averages of corporate and retail SME shares). SME data are provided on a voluntary basis. In comparison to retail SME exposures, corporate SME data were collected from a larger sample of banks and appears of higher quality. Consequently, the econometric analysis focused on corporate SME lending.

Similar to the other analyses in the FSB evaluation, the empirical analysis examines the determinants of SME lending growth and the share of SME credit to total credit. The analysis focuses on a measure of the constrainedness of regulatory reforms based on the QIS data on capital shortfalls and surpluses. This measure includes changes in how risk-weighted assets are calculated, new definitions of eligible capital, increases in minimum capital requirements, G-SIB capital buffers, targeted capital conservation buffers, the leverage ratio minimum requirements, the output floor and any other reforms that have been agreed to. As such, the definition for this variable changes over time as additional regulations are introduced.

Banks were ranked based on the constrainedness measure immediately prior to the regulatory change of consideration. Following the empirical approach for the other analyses in the FSB report, the most exposed banks were defined as those with a constrainedness measure in the lowest quarter prior to the implementation of the reforms (23 banks were in this group). The analysis then compared the growth rates of SME lending and its share in total corporate lending of the most exposed banks to that of other banks in the sample.

The analysis found no evidence of a differential impact on lending by banks with relatively lower capital levels. That is, there is no statistically significant effect, either permanent or transitory, of changes in regulation on SME corporate credit growth or the share of SME corporate lending to total credit for banks in the lowest quarter compared to other banks in the sample.

While the analyses based on cross country data do not show material and persistent effects on SME lending at the most affected banks, within-country satellite analyses provide more granularity to the results and paint a more nuanced picture, showing some differentiation across jurisdictions (Box 7 and Table 3) The analysis identifies some effects of the RBC regulation in slowing the pace of SME lending. In some cases affected banks reduced the share of SME loans to total corporate loans relative to other banks and (in few jurisdictions with this data) tightened the conditions of credit to SMEs. These effects show however some differentiation between regions, and apply predominantly to jurisdictions most affected by a macroeconomic crisis or adverse macroeconomic developments in the post-reform years.

For the remaining regulations (LR, G-SIB/D-SIB higher loss absorbency requirements, LCR), no robust evidence was found for an impact on bank lending to SMEs. Some regulations, such as LR, were implemented very recently and it may take time for their effect to show up on banks' balance sheets. But it is also plausible that the higher regulatory costs simply did not affect the supply of credit to SMEs in those cases.

The fact that RBC exhibits more significant effects than other reforms might be related to it being the first reform that was announced and implemented. After raising capital ratios to meet higher RBC requirements, little further adjustment may have been necessary to comply with other reforms. In fact, the LR and G-SIB/D-SIB higher loss absorbency reforms also aimed at increasing capital ratios. In addition, in a number of jurisdictions, the LCR requirement was preceded by similar liquidity management regulations and therefore the marginal effect from the introduction of the LCR may have been negligible.

Box 7: Within-country satellite analyses on bank and bank-firm level data

On the basis of a common protocol, a sample of 10 jurisdictions from both advanced and emerging economies conducted an evaluation of the impact of Basel III reforms on bank lending to SMEs, for a total of 12 exercises. The main outcomes examined include the growth rates of total SME lending, and, if possible, splits into growth rates of short- and long-term SME lending, the share of SME loans in total loans to the corporate sector, interest rates and the degree of collateralisation.

Twelve studies use central credit registry bank-level reports or commercial data[64] on balance sheets and income statements to study regulatory reform effects. Of these, studies for six jurisdictions rely on confidential bank-firm level data from the central credit registers (CCR). These registers are maintained by the national regulatory authority and provide confidential data on credit granted by single banks to single firms in each jurisdiction. The CCR data are matched to firms' and banks' balance sheets and income statements, as available, to account for idiosyncratic structural or time-varying features of the borrowers and the lenders within each bank-firm relationship. Banks' balance sheets are retrieved from supervisory reports, firms' balance sheets from databases provided by data vendors or by the relevant central banks. In some jurisdictions granular bank-firm databases also provide information on credit conditions, namely the loan maturity, the degree of loan collateralisation and the applied interest rates. This allows to analyse, in selected jurisdictions, the impact of regulation on SME credit terms. All satellite analyses use data for the period from 2010 to 2016 or later.

To complement the analyses at the bank level, the six jurisdictions with granular bank-firm level data have also conducted analyses at the bank level by collapsing the firm level dimension in their datasets. This allows a comparison across all satellites of the coefficient estimates for the baseline regression analysis on the persistent effects of RBC on SME lending growth (see the Technical Appendix).

The identification strategy employed for the bank-firm exercises mirrors the other cross-country analyses in the report, but can achieve/provide the most proper identification by effectively controlling for demand effects. Heterogeneous exposures to the reforms denote that banks are differentially affected and thereby identify the effects on banks' SME lending business. The effect of the regulations is estimated by interacting indicators for the post-regulation period (either in terms of announcement or legal framework) with indicators for the most exposed banks,

[64] One jurisdiction conducted two studies using commercial data.

as reported in section 4.2.1 and Box 4. Two different approaches allow distinguishing between average effects over the entire post-implementation period (so called "persistent" effects) and year-specific "transitory" effects.

The findings vary across jurisdictions. The analysis identifies some effects of the RBC rule in slowing the pace and worsening the conditions of credit to SMEs extended by the more exposed (less capitalised) banks. After the announcement of the rule, the growth of SME lending was lower for more exposed banks relative to the less exposed ones, but the effect is often transitory. When looking at the full set of 11 satellites[65] based on bank-level data only, four jurisdictions find temporary negative effects mostly fading out over time. The negative effects remain persistent for only for two jurisdictions over the observed implementation period (Table 3).

These results do not appear to be driven by specific regions or by the distinction between advanced and emerging economies. Yet, macroeconomic conditions play a role. The bank-firm level analyses that allow to better control for demand show more significant impacts on the pace of SME lending of more affected banks relative to other banks, with four out of six jurisdictions showing negative effects that are also persistent. It should be noted that among these jurisdictions there are some of those hit by an economic downturn during the reforms' implementation time period. Given that given these analyses control effectively for demand effects, this may corroborate the cross-country findings discussed above that macroeconomic conditions play a non-secondary role in how the reforms have impacted lending at the most exposed banks.

In some jurisdictions, the results also suggest an increase in collateral requirements and in the interest rates charged on short-term loans by the more exposed banks. In terms of credit reallocation towards more creditworthy firms, for the few jurisdictions that have this information there does not appear any significant shift from the most to the least risky SMEs. In turn, the evidence suggests that there was some reallocation of credit towards larger firms and away from SMEs as a result of the RBC reform. In six out of 12 cases (based on bank level data, see Table 4), less capitalised banks reduced the share of SME lending in total corporate lending, although in some cases, this was due to total corporate lending growing faster than SME lending rather than an outright decline in SME lending. Lending to non-SMEs seems in fact less affected, with mainly insignificant results for non-SMEs both transitory and persistent (Table 3). In a few jurisdictions, there is some evidence of positive credit growth for non-SMEs. Bank-firm level data allow more insights on the differential effect for SMEs, showing a marginally stronger effect for SMEs than non-SMEs for the same affected banks, although in almost all cases this effect is only transitory.

[65] For one study, data limitations only allowed to consistently estimate the SME share (shown in table 4).

Table 3: Effects of Risk-based capital (RBC) reforms – SME and non SME lending growth

Results of within-country satellite analyses - By type of data, region, advanced versus emerging markets, average 2010-2017 GDP growth
Results indicated with: ● positive (at the 10% level); ■ negative (at the 10% level); △ not significant

	Credit growth to SMEs		Credit growth to corporates			
			Total corporates		Non-SME	
	Transitory	Persistent[1]	Transitory	Persistent[1]	Transitory	Persistent[1]
Cross-country						
FSB questionnaire data	■	△	△	△		
Satellites by type of data						
Bank Level	■ ■ ■ ■ △ △ △ △ △ ● ●	■ ■ △ △ △ △ △ △ △ △ △	■ ■ △ △ △ △ △ △ ● ● ●	■ ■ △ △ △ △ △ △ △ △ ●	■ ■ △ △ △ △ △ △ △ ●	■ ■ ■ △ △ △ △ △ △ △ △
Bank Firm level (*based on balanced sample****)***	■ ■ ■ ■ △ △	■ ■ ■ ■ △ △	■ ■ ■ △ △	△ △ △ △ ●	■ ■ ■ △ ●	■ △ △ △ ●
Satellites by region *(based on bank-firm level data where applicable)*						
Americas	■ △ ●	■ △ △	■ △ △	△ △ △	△ △ ●	△ △ ●
Asia	■ △ △	■ △ △	■ ■ ●	■ △ △	■ ■ △	■ ■ △
Europe	■ ■ ■ ■ △	■ ■ ■ △ △ △	■ ■ ■ △ △	△ △ △ ●	■ ■ ■ △	■ △ △ △

	Credit growth to SMEs		Credit growth to corporates			
			Total corporates		Non-SME	
	Transitory	Persistent[1]	Transitory	Persistent[1]	Transitory	Persistent[1]
Satellites by Advanced versus Emerging Markets *(based on bank-firm level data where applicable)*						
Advanced economies	■ ■ ■ ■ ■ △△△ ●	■ ■ ■ ■ △△△△△	■ ■ ■ ■ ■ △△△ ●	■ △△△△△△ ●	■ ■ ■ ■ ■ △△△	■ ■ ■ ■ △△△△
Emerging markets	■ △	■ △	■ △	△△	△ ●	△ ●
Above versus below the median real growth rate *(based on bank-firm level data where applicable)*						
Above the median	■ ■ △△ ●	■ △△△△	■ ■ △△ ●	△△△△△	■ △△△ ●	△△△△ ●
Below the median	■ ■ ■ ■ △△	■ ■ ■ ■ △△	■ ■ ■ ■ △△	■ △△△ ●	■ ■ ■ ■ △	■ ■ ■ ■ △

Table 4: SME lending shares

Results of within-country satellite analyses - By type of data, region, advanced versus emerging markets, average 2010-2017 GDP growth
Results indicated with: ● positive (at the 10% level); ■ negative (at the 10% level); △ not significant

	Share of SME Credit "Persistent"	**Share of long term "Persistent"**	**Share of collateralised "Persistent"**	**Interest rates to SMEs "Persistent"**
Cross-country				
FSB questionnaire data	△	△		△
Satellite by type of data				
Bank-level				
	■ ■ ■ ■ ■ ■	■ ■	● ●	■
	△ △ △ △ △ △	△ △	△	●
		● ●		
Economic region				
Americas				
	■	■		
	△ △	△		■
Asia				
	■ ■ ■			
	△			
Europe				
	■ ■	■	△	●
	△ △ △	△	● ●	
		● ●		
Advanced vs emerging markets				
Advanced economies				
	■ ■ ■ ■ ■	■		●
	△ △ △ △ △	△	△	
		● ●	● ●	
Emerging markets				
	■	■		■
	△	△		

	Share of SME Credit "Persistent"	Share of long term "Persistent"	Share of collateralised "Persistent"	Interest rates to SMEs "Persistent"
Above and below median GDP growth rate				
Above the median				
	■ ■ ■ △ △ △	■ △	●	■
Below the median				
	■ ■ ■ △ △ △	■ △ ● ●	△ ●	●

The cross-country analysis on firm-level data suggests that more creditworthy SME borrowers obtain more credit and increase investment after the RBC reforms (Box 8).[66] After the implementation of the reforms better capitalised and more profitable firms raised their long-term borrowing and thus total debt, while also exhibiting higher investment rates in total fixed assets relative to other firms. These findings seem to be driven mostly by firms located in EU countries.

Box 8: Do SMEs borrow and invest less after Basel III implementation?

Evidence from a cross-country study based on commercial data

This study focuses on real sector outcomes to complement other pieces of the empirical analysis from a cross-country perspective. It exploits data on nine jurisdictions[67] for the 2010-2017 period from the commercial provider Capital IQ. In this database, the coverage of firms, in particular SMEs, varies considerably across jurisdictions. Hence, constructing the sample implies trading off the benefits from a larger overall sample with more observations against the representativeness of the national firm-level data. The analysis followed a weighted regression approach to tone down well-covered countries and give more prominence to firms in less well-covered countries. Further, the sample was restricted to those firms that provide breakdowns of their debt into a long-term and a short-term component, and which reveal information on their total fixed assets to capture investment. The analysis focuses on four Basel III reforms: RBC, G-SIB/D-SIB higher loss absorbency requirements, and LCR. To the extent possible, the analysis examines permanent effects of both national announcement and legal framework.

The identification of reform effects rests on two pillars. First, by looking at firm-level heterogeneity and cross-country differences in the reform implementation stages. Heterogeneity across firm characteristics helps to disentangle the effects of individual reforms, if it is assumed that, for instance, the reforms play out differently for more or less creditworthy borrowers. Second, country-by-time fixed effects absorb national macroeconomic developments that are unrelated to the introduction of regulatory reforms.

The growth rates of the firm-level debt, the share of long-term debt to in total borrowing and investment growth feature as the key outcome variables of interest. As proxies for firm-level heterogeneity the analysis draws on firm size, capitalisation, liquidity, and profitability. To highlight particular firms which stand out among their country-level peers in terms of their characteristics, balance sheet indicator variables are interacted with a post-regulation dummy. These interaction terms serve as the key identification device.

The findings suggest that Basel III regulatory reforms are associated with a reinforced impact of specific SME borrower characteristics that had proven beneficial to obtain bank funding before reforms entered into force (see Technical Appendix for a more detailed description of the results). In particular, better capitalised and more profitable firms find it easier to obtain long-term loans after the legal framework of the RBC reform had been implemented. The focus is hence on the RBC effects, implicitly acting as a placeholder for the full set of Basel III reforms. Further, the comparison of SMEs with larger companies shows similar effects. In fact EU-member countries clearly drive the results as evidence from JP and the US is inconclusive.

---

[66] An assessment of reform effects on SME performance (such as firm productivity or employment) might have enriched the interpretation of the analysis with regard to the potential benefits of the reforms at the firm level. Due to data limitations, however, such an analysis could not be implemented in this setting.

[67] Countries in the estimation sample are CA, DE, ES, FR, IT, JP, KR, UK and US.

5. Conclusions

5.1 Cost-benefit considerations

Evaluating the overall effects of the G20 financial regulatory reforms involves an assessment of their social benefits and costs. Ex ante impact assessment studies on the effects of those reforms have found significant net overall benefits.[68] These studies estimate the expected benefits of reforms in terms of reducing the likelihood and severity (output costs) of financial crises. Higher resilience enhances the financial system's ability to intermediate financial flows through the cycle and reduces the macroeconomic costs of financial crises, in particular in the form of output and employment losses. To estimate ex ante social costs, these studies assume that more stringent regulatory requirements increase the funding costs of financial institutions, which they in turn pass on to borrowers through higher lending spreads. This reduces overall lending and investment in the economy and thereby economic output.

Much of the preceding analysis has focused on the potential costs of the reforms for financing (particularly bank lending) to SMEs in terms of lower volumes or higher spreads and shorter maturities. The findings from the empirical analysis (see above) indicate that the introduction of higher risk-based capital requirements temporarily slowed the pace and slightly tightened (at least in some cases) the conditions of SME lending by the ex ante most "affected" banks relative to other banks. This is consistent with the relationship between resilience and lending assumed by the ex ante impact assessments and found in other more recent studies.

The long-term economic benefits of reforms, which ex ante studies estimate to be substantial, are more difficult to quantify since they are often less evident and take longer to unfold. This is even more the case when considering how benefits may manifest for one specific asset class like SME financing, which only makes up a fraction of total finance provided by the financial system. The evaluation has neither analysed the ex post effects of financial reforms on resilience in general, nor on the resilience of SME financing in particular. A complete empirical analysis of the benefits would only be possible after a full financial cycle, when data would show how regulated institutions and lending have performed during both stressed and normal market conditions. Even then, the counterfactual in the absence of regulation would not be known.

Notwithstanding these considerations, an indication of benefits of the reforms on SME financing can be inferred from the effects on the firms involved. The results from the empirical analysis based on firm and bank firm-level data finds some evidence of reallocation of credit towards more creditworthy SMEs and improved access to finance for financially stronger SMEs. More specifically, after the reforms were introduced, better capitalised and more profitable firms increased their long-term borrowing more than other firms, and they

---

[68] See *An assessment of the long-term economic impact of stronger capital and liquidity requirements* by the BCBS (August 2010); *Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements* by the Macroeconomic Assessment Group (December 2010); *Assessment of the macroeconomic impact of higher loss absorbency for global systemically important banks* by the Macroeconomic Assessment Group (October 2011); *Macroeconomic impact assessment of OTC derivatives regulatory reforms* by the Macroeconomic Assessment Group on Derivatives (August 2013); and *Adding it all up: the macroeconomic impact of Basel III and outstanding reform issues* by Fender and Lewrick (2016, BIS Working Papers, No. 591). For a summary, see Box 1 of the FSB report to the G20 on the *Implementation and effects of the G20 financial regulatory reforms* (November 2015).

invested more. This is consistent with preliminary evidence of a credit reallocation by banks towards more creditworthy borrowers, although this effect is not specific to SMEs.

5.2 Overall assessment

For the most ex ante exposed banks, the evidence suggests a slower (often transitory) pace of SME bank lending growth, and in some jurisdictions a persistent tightening in the cost of credit and collateral requirements. Risk-based capital reforms were found to slow SME lending growth at the most exposed (least capitalised) banks relative to other banks. In most empirical analyses, these effects are found to be temporary. By contrast, the Leverage Ratio and liquidity reforms (and in particular the LCR, whose implementation is more advanced than for the NFSR) were found not to exert significant effects.

Overall, the multi-pronged empirical analysis finds that there is no one-size-fits-all pattern for all jurisdictions. Findings suggest that the presence and strength of the effects of the reforms may depend on country-specific factors, such as local economic circumstances. In particular, there is some evidence that in countries hit by an economic downturn during the reform implementation period, the pace of lending was reduced for both SMEs and other firms. Conversely, the reform effects could have been milder in jurisdictions where the financial system started from a stronger basis and favourable economic conditions.

The main conclusion of the evaluation is that, for the financial reforms in scope, the analysis does not identify material and persistent negative effects on SME financing in general, although there is some differentiation across jurisdictions. This conclusion is consistent with the literature on the effects of bank capital regulations and with stakeholder feedback that SME financing is largely driven by factors other than financial regulation. Moreover, any potential costs should be weighed against the wider benefits of enhanced resilience from these reforms, which have been estimated by ex ante studies to be significant.

Annex A: SME definitions and financing trends

Abbreviations of jurisdictions presented in the tables and charts

AR	Argentina
AU	Australia
BR	Brazil
CA	Canada
CH	Switzerland
CN	China
DE	Germany
EU	European Union
ES	Spain
FR	France
HK	Hong Kong
ID	Indonesia
IN	India
IT	Italy
JP	Japan
KR	Korea
MX	Mexico
NL	Netherlands
RU	Russia
SA	Saudi Arabia
SG	Singapore
TR	Turkey
UK	United Kingdom
US	United States
ZA	South Africa
AEs	Advanced economies
EMDEs	Emerging market and developing economies
LatAm	Latin America

Criteria used for the definition of SMEs in FSB jurisdictions

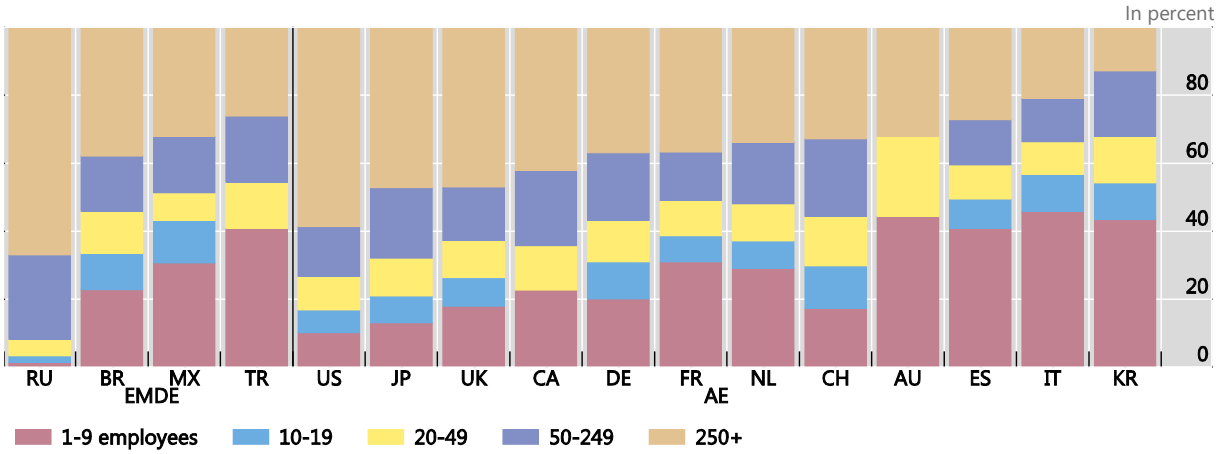
Jurisdiction	Criteria used for the definition of SMEs				Regulatory definition generally in line with Basel III?
	Annual revenue	Employees	Assets	Other	
AR					
AU				[69]	
BR				[70]	[71]
CA					[72]
CH					[73]
CN					[74]
EU					
FR					
HK					
ID					[75]
IN				[76]	[77]
JP					
MX					
RU					
SA					
SG					
TR					
UK				[78]	
US				[79]	[80]
ZA				[81]	[82]

Note: Grey=Yes, White=No. FSB jurisdictions that are EU member states are shown separately only when they have SME definitions that differ from the one in the Annex of Recommendation 96/280/EC.[83]

[69] RBA uses loan size under AUD $2 million as a proxy for small business lending.
[70] The Central Bank of Brazil uses liabilities (debt) for monitoring the credit risk in relation to SME's. Entities with debt below a threshold of BRL 100 million, are classified as SME.
[71] These definition threshold limits are lower than those used in Basel III of relative firm sizes (including SMEs) are smaller than in the jurisdictions which the discussions in BCBS considered as a basis for the standard.
[72] CA currently uses Basel II definitions for regulatory purposes, which includes a SME threshold for the internal ratings-based approach of sales of EUR 50 million or lower, which is the same as that used for Basel III. Unlike under the forthcoming Basel III reforms, CA does not currently apply lower risk weights for SME exposures for the standardised approach to credit risk.
[73] The definition according to the criteria of the National Bureau of Statistics in Switzerland.
[74] The definition according to the criteria of the National Bureau of Statistics in China.
[75] The definition is based on the MSME Act No. 20 year 2008.
[76] IN defines SMEs in terms of investment thresholds in plant and machinery (including sector threshold) and equipment.
[77] MSMEs are defined in India as per MSMED Act 2006.
[78] Annual debit account turnover on the main business account of up to £25 million (BoE).
[79] C&I loans < 1 million.
[80] The Small Business Administration provides small business size standards methodology.
[81] Businesses with a turnover above a threshold of gross exposure (Gross loans and advances which includes both on- and off-balance sheet exposures).
[82] In South Africa the EUR 50 million BCBS threshold has been converted to R400 million.
[83] European Commission definitions for SME.

Employment by size of firm

Graph 1

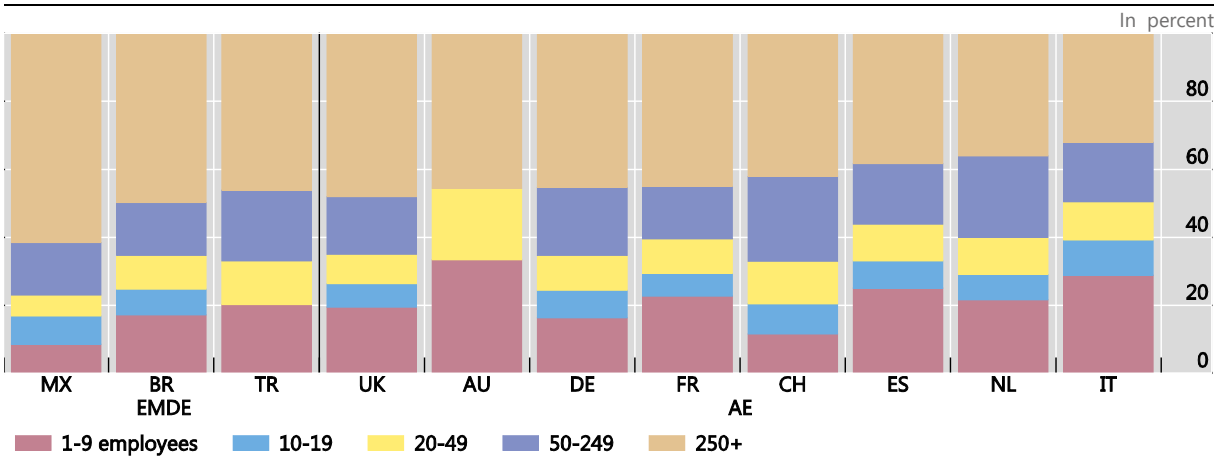


Note: EMDE = Emerging Market and Developing Economy. AE = Advanced Economy. SMEs are defined by the OECD as firms with less than 250 employees.

Source: OECD.

Value-added by size of firm

Graph 2

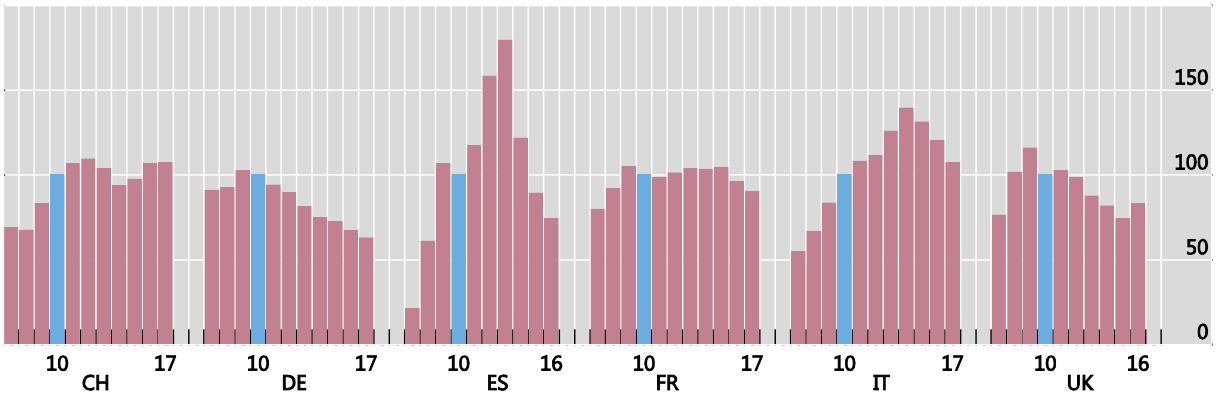


Source: OECD.

SME bankruptcies (2010=100 (blue)) 2007-17

Europe

Graph 3



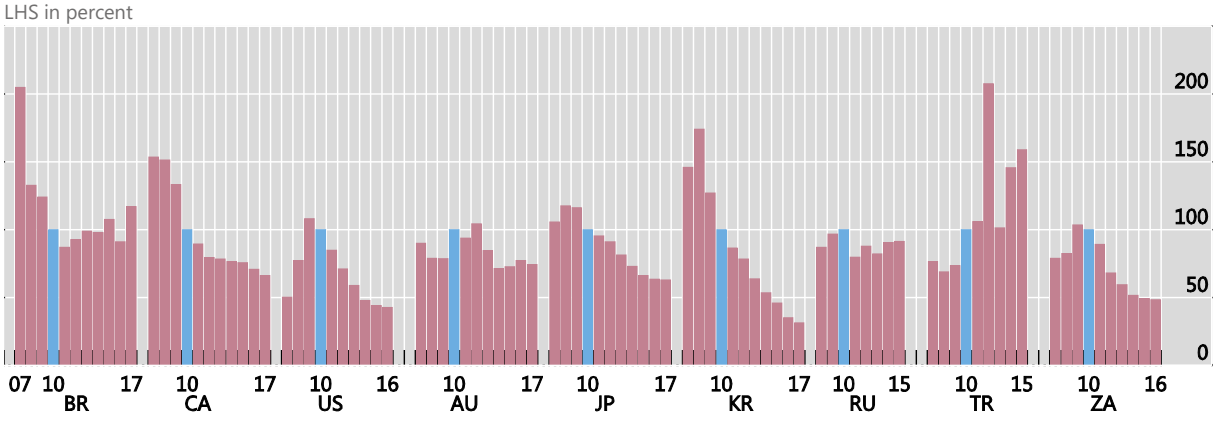
Source: OECD and FSB questionnaire on SME financing.

SME bankruptcies (2010=100 (blue)) 2007-17

Rest of the world

Graph 4

LHS in percent

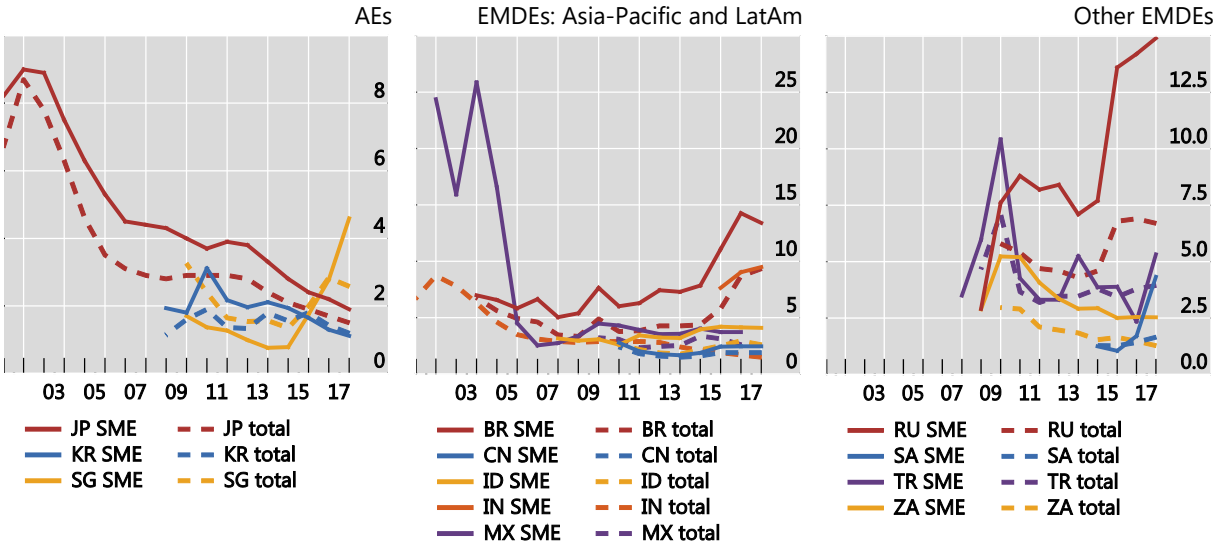


Source: OECD and FSB questionnaire on SME financing.

Non-performing loan (NPL) rates for SME loans vs total business loans

By region, in percent

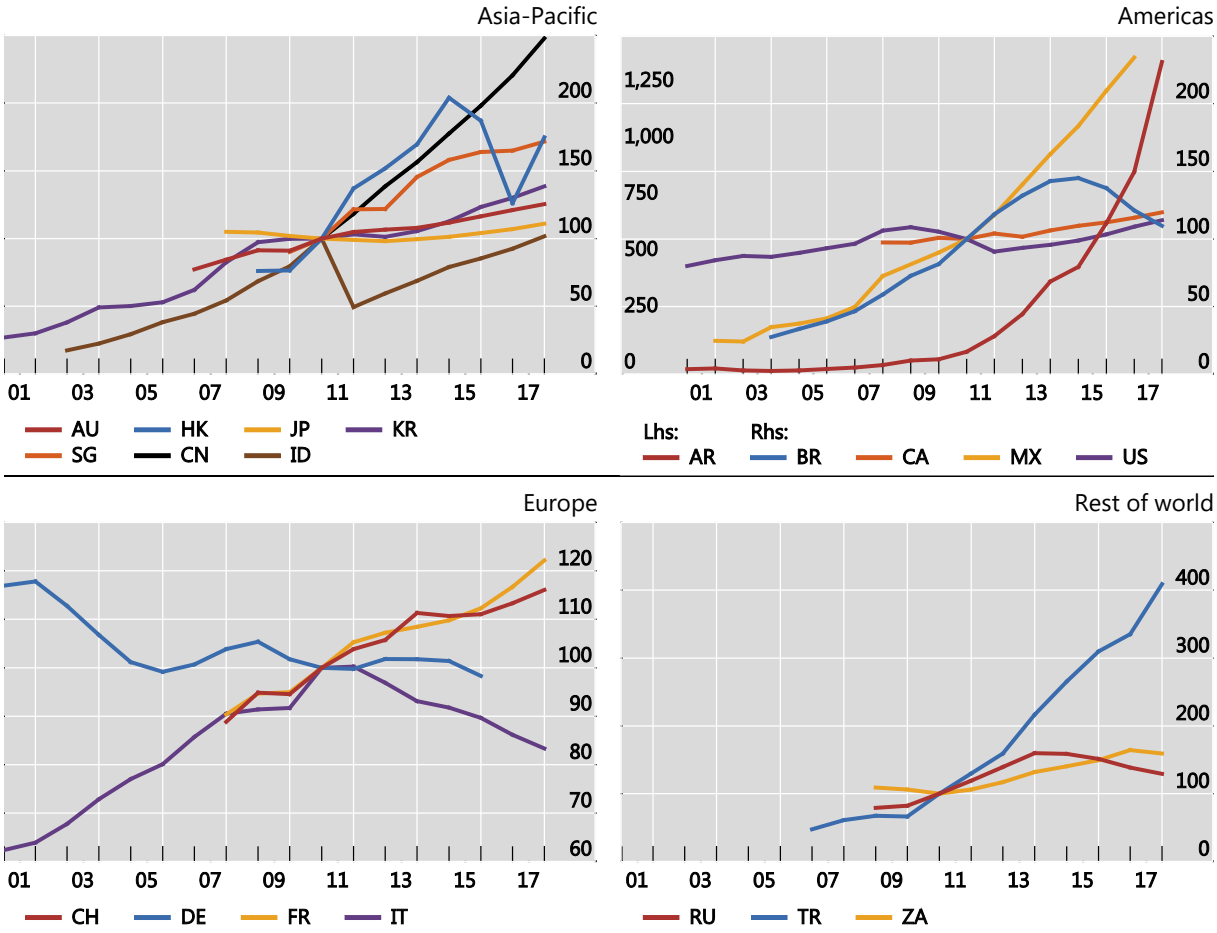
Graph 5



Source: FSB questionnaire on SME financing.

Outstanding bank loans to SMEs

By region, index 2010=100 Graph 6

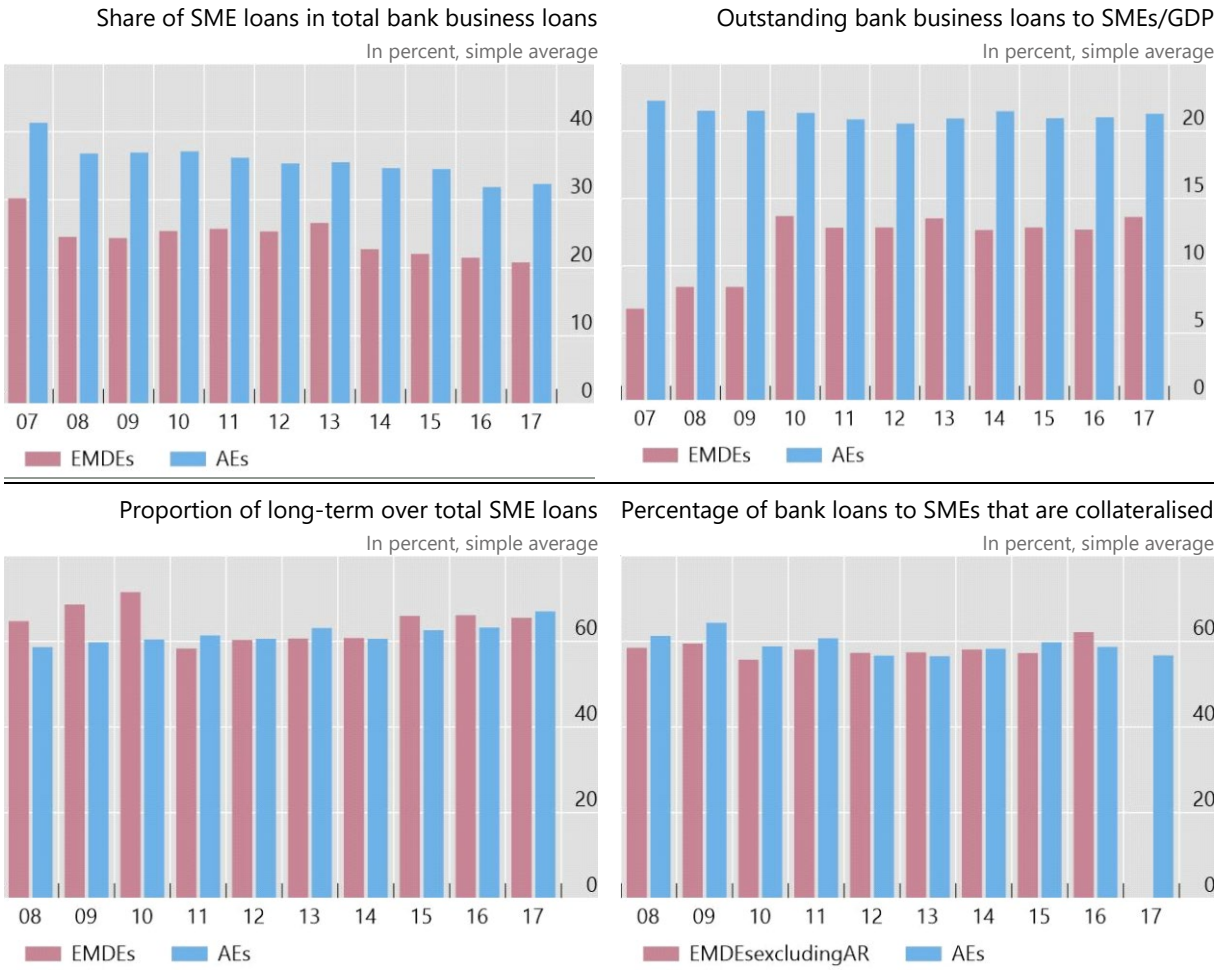


Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees.

Source: FSB questionnaire on SME financing.

Trends on SME lending in Advanced Economies (AEs) and Emerging Market and Developing Economies (EMDEs)

Graph 7



Note: The jurisdictions covered in each panel are shown below, while the figures in parentheses represent the full time series that the jurisdiction provided and that have been used in these panels. For IT, the SME aggregate refers to bank loans to firms with <20 employees. For ES, the data comes from Spanish Mercantile Registers, which covers around 45% of the total population of SMEs (in terms of number of firms and number of employees).

Top left panel: EMDEs include AR (2000-17), BR (2003-17), IN (2012-17), MX (2001-16), RU (2008-17), SA (2014-17), TR (2006-17) and ZA (2008-17). AEs include AU (2006-17), CA (2007-17), CH (2007-17), DE (2000-15), ES (2008-16), FR (2007-17), HK (2008-17), IT (2000-17), JP (2007-17), KR (2000-17), NL (2013-17), SG (2009-17), UK (2011-17) and US (2000-17).

Top right panel: EMDEs include AR (2000-17), BR (2003-17), CN (2010-17), ID (2002-17), IN (2012-17), MX (2001-16), RU (2008-17), SA (2014-17), TR (2006-17) and ZA (2008-17). AEs include AU (2006-17), CA (2007-17), CH (2007-17), DE (2000-15), ES (2014-16), FR (2007-17), HK (2008-17), IT (2000-17), JP (2007-17), KR (2000-17), NL (2013-17), SG (2009-17), UK (2011-17) and US (2000-17).

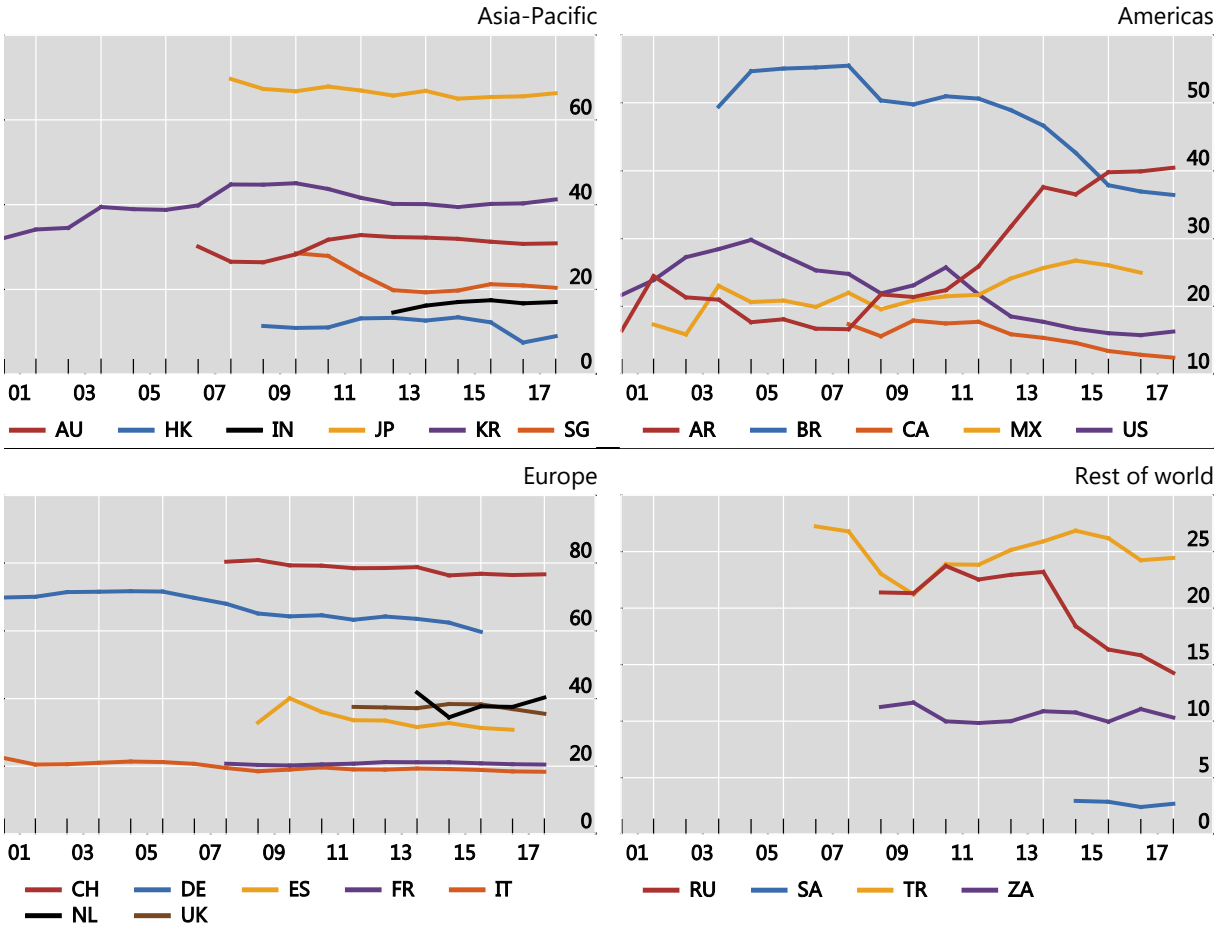
Bottom left panel: EMDEs include AR (2011-17), BR (2004-17), ID (2010-17) and MX (2009-16). AEs include CA (2007, 11, 14, 17), DE (2000-15), ES (2008-16), FR (2007-17), IT (2000-17), JP (2003-17), KR (2000-17), NL (2013-17) and SG (2015-17).

Bottom right panel: EMDEs include BR (2003-17), MX (2001-16) and TR (2010-17). AEs include CA (2007; 2009-17), CH (2009-17), DE (2010-17), ES (2008-16), FR (2012-17), IT (2000-17), JP (2004-10), KR (2005-17), NL (2010-17), SG (2013-17) and US (2000-17).

Source: FSB questionnaire on SME financing.

Total bank business loans SME/total bank business loans by region

By region, in percent — Graph 8

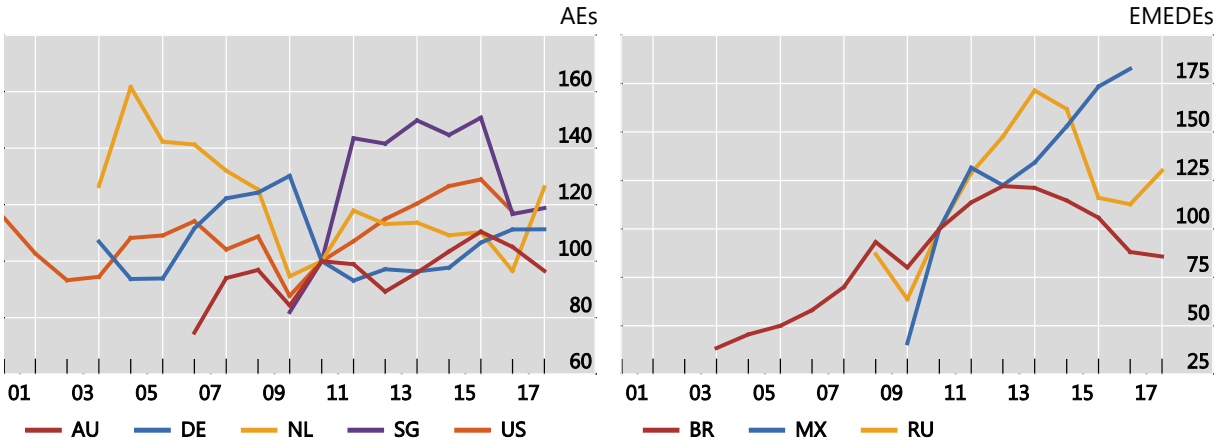


Note: For IT, the SME aggregate refers to bank loans to firms with <20 employees. For ES, the data comes from Spanish Mercantile Registers, which covers around 45% of the total population of SMEs (in terms of number of firms and number of employees).

Source: FSB questionnaire on SME financing.

New bank loans to SMEs

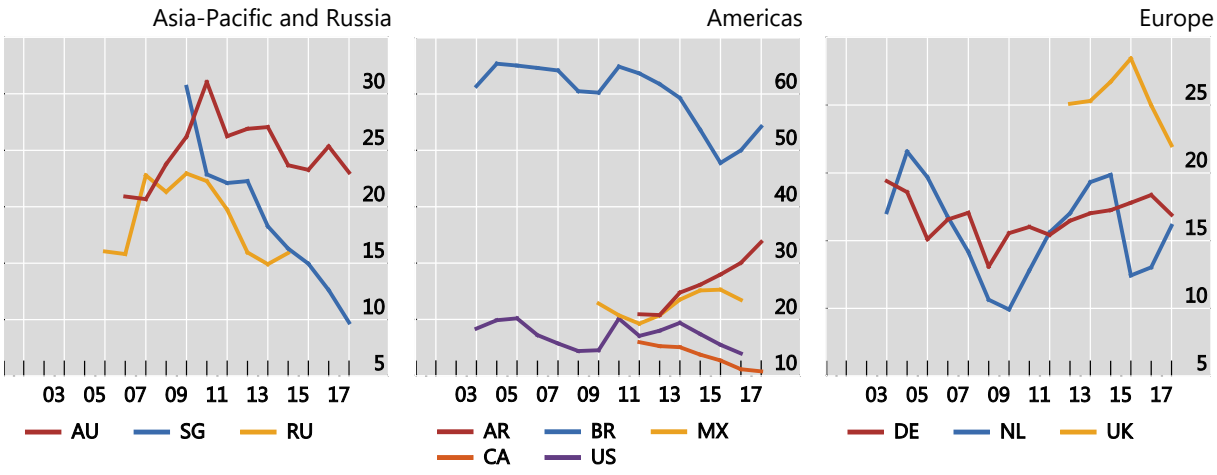
By region, index 2010=100 Graph 9



Source: FSB questionnaire on SME financing.

New SME loans as a percentage of total new bank business loans

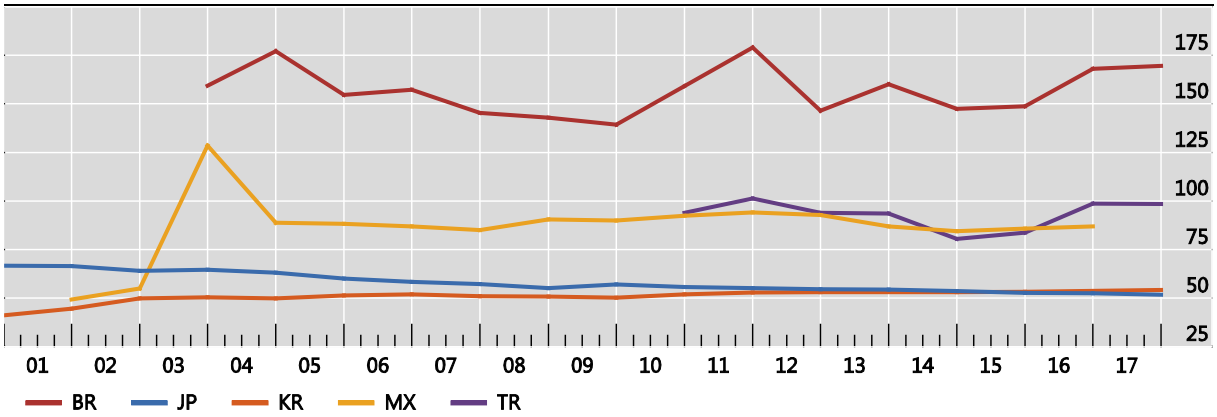
By region, in percent Graph 10



Source: FSB questionnaire on SME financing.

Collateralisation rate (value of collateral as a percentage of the loan)

Average rate, in percent | Graph 11



Source: FSB questionnaire on SME financing.

Annex B: Public policies implemented across jurisdictions

Type of policies	Jurisdiction (year of introduction and policies introduced after the GFC)
Direct lending	**AR (Ongoing).** Banco de Inversión y Comercio Exterior (BICE) finances SMEs and promotes foreign trade. The Argentine Fund for the Development of Micro, Small and Medium Enterprises program provides direct financing to SMEs that cannot access the banking system through a financial trust. Among other programs, Ministerio de la Producción y Trabajo has specific programs to finance new SMEs such as the "Fondo Semilla", the "Primer crédito Pyme" programme that provides financing through the BICE or the programme "Banca de garantías" to facilitate the obtaining of guarantees of Sociedades de Garantia Reciproca (SGRs). **CN (2015).** China set up a special fund of RMB60 billion (US$9.4 billion) under a public-private partnership structure to support small and medium-size enterprises (SMEs) in the country by providing early-stage and growth capital. **FR (2013).** Bpifrance – a public national development bank – complements medium-term bank loans (co-financing) financing tangible and (mostly) intangible investments (from €10 thousand to €5 million for SMEs). **ES (Ongoing).** Empresa Nacional de Innovación provides financial support to small and medium companies. ENISA finances SMEs through participatory loans (loans made by multiple lender to a single borrower). **DE (2009).** KfW increased volume of commitments, implementing the new "KfW Special Programme", which was launched under the German Government's economic stimulus package. **IN (Ongoing).** 40% of Adjusted Net Bank Credit (ANBC), or Credit Equivalent Amount of Off-Balance Sheet Exposure, whichever is higher, is targeted to be directed to specified priority sectors, including 7.5% of ANBC to micro enterprises. No specific target has been prescribed for SMEs. For the quarter ended December 2018, loans to micro enterprises were 7.7% of total ANBC. All Scheduled Commercial Banks have been advised to achieve 20% year-on-year growth in outstanding credit to micro and small enterprises (MSEs). As on September 2018, Scheduled Commercial Banks registered Y-o-Y growth of 15.2% in MSE loans. **IT (2017).** In 2017 the Cassa Depositi e Prestiti, 83% state owned bank (CDP, the National Promotion Institute), made available €1 billion in order to grow the volume of credit to SMEs. To give effect to this, CDP implemented a securities purchase programme in May 2016, to provide bank and financial intermediaries with resources to be used for SMEs financing. The programme is rounded out by instruments to facilitate access to medium-/long-term credit made available by CDP as from 2009 (total value of €31 billion) that have benefited more than 110,000 businesses operating in all economic sectors. In 2017, the SME Guarantee Fund and the CDP entered into an agreement covering the issuance of a CDP counter-guarantee against a €3 billion portfolio of guarantees issued by the fund.

	JP (2008, 2011). Direct lending introduced in response to the GFC and earthquake. Direct loans from state-affiliated financial institutions totalled 20.4 trillion yen (10% of the total outstanding loans to SMEs). Of the 3.8 million SMEs, 1.3 million have received credit guarantees and the number of SMEs receiving direct loans was 1 million. **KR (2009).** Small Business Corporation increased its direct lending by 83% in 2009. **MX (2016).** Development banks and publicly sponsored entities provided around a third of SME credit in 2016. About 2/3 of this credit was direct lending. **NL (2009).** Microcredit institution credits launched in 2009, supported by the government and national banks. Expanded in 2014. **RU (2017).** JSC Russian Bank for Small and Medium Enterprises Support provides financial assistance for SMEs in Russia. It offers financial support for manufacturing businesses, microloans businesses, business incubators, leasing and factoring companies, regional SME support funds, technological parks, multifunctional SME business centres, etc.; and enterprises implementing innovative and high-technology projects. **TR (Ongoing).** Development banks account for around 3% of the total banking sector SME lending. **US (2017).** USD 1.1 billion in Small Business Administration-backed loans were approved.
Co-financing/ risk mitigation schemes (e.g. loan guarantees)	**CA (Ongoing).** Canada Small Business Financing Programme. This programme, which started in 2012, makes it easier for small businesses to get loans from financial institutions by sharing the risk with lenders. Over the past 10 years, small businesses have received over CAD 9.5 billion in asset-based financing representing over 63,000 loans made. **CH (Ongoing).** The federal government assists efficient and viable SMEs in obtaining bank loans by funding loan guarantee cooperatives. The total amount guaranteed is about CHF 255 million (0.05% of the total amount of bank loans to SMEs). **DE (Ongoing).** Extended eligible firms in co-financing scheme. **ES (Ongoing).** Compañía Española de Refinanzamiento is a public institution that provides refinancing to the "sociedades de garantia reciproca", which guarantee SME loans. **EU (Ongoing).** Various loan guarantee schemes, e.g. through European Investment Fund. **FR (2013).** Bpifrance – a public national development bank – complements medium-term bank loans (co-financing), financing tangible and (mostly) intangible investments (from €10,000 to €5 million for SMEs). **HK (Ongoing).** Various loan guarantee schemes are provided by the government and the Hong Kong Mortgage Corporation Limited (a government-owned company) with loan guarantee ratio ranging from 50-

	70%. Special enhancements were introduced according to the business environment to allow a maximum loan guarantee ratio of 80%. **IT (Ongoing).** The SME Guarantee Fund, managed by the Ministry of Economic Development and partially financed by the EU, activates guarantees for SME financing from banks and other financial intermediaries. **JP (Ongoing).** Credit guarantee corporations in each region of Japan provide guarantees to SME borrowings from private-sector financial institutions in which they pay for the obligation on behalf of the SME in case of default (payment in subrogation). In fiscal year 2018, these guarantees amounted to 8.5 trillion yen. **KR (2007/9).** Public guarantee institutions such as the Korea Credit Guarantee Fund, the Korea Technology Finance Corporation, the Korea Federation of Credit Guarantee Foundations, provide guarantees and Primary Collateralised Bond Obligations[84] to SMEs. As of end-2017, the outstanding balance of guarantees amounts to KRW 89.7 trillion. **MX (2011).** Around 11% of bank loans to SMEs are linked to co-financing/risk-mitigation programs provided by publicly sponsored entities. The Mexican Government incentivises commercial banks to extend credit to entrepreneurs with feasible projects by covering 100% of the credit risk during the first two years of the credit term, and then 75% for the third and fourth years for enterprises eligible for the Financing Programme for Entrepreneurs. **NL (Ongoing, expanded 2018).** The Guarantee Scheme for SMEs assists SMEs that have a shortage of collateral to obtain credit from banks (expanded 2018), while the Growth Facility offers banks and private equity enterprises a 50% guarantee on newly issued equity or subordinated loans, while the Guarantee for Entrepreneurial Finance guarantees new bank loans. **RU (Ongoing).** Joint stock company Corporation issues SME guarantees (contingent liabilities) – RUB 119 billion of guarantees in 2017. **SA (Ongoing).** Kafalah guarantee programme provided by the Saudi Industrial Development Fund to promote lending in this sector. **SG (Ongoing).** Enterprise Financing Scheme covers six different areas of financing (working capital, fixed assets, venture debts, trade, projects and mergers & acquisitions), with the Government co-sharing default risk with the banks. There are also loan, political risk and trade credit insurance schemes, with the Government supporting part of the insurance premium. **TR (2017).** Introduced a credit guarantee fund in 2017. **UK (2009).** The British Business Bank (100% government owned) supports bank lending through its Enterprise Finance Guarantee scheme as

[84] P-CBOs are an extension of securitising circulated corporate bonds as underlying assets. KR policymakers do this as it is difficult for small and medium-sized enterprises to issue bonds only by issuer's creditworthiness. The Korea Credit Guarantee Fund (KODIT) provides credit enhancement to P-CBOs so that triple A rating may be afforded to the issuer.

	well as two wholesale products (ENABLE Funding and ENABLE Guarantee) launched in 2014 and 2019 respectively. ENABLE Funding warehouses newly-originated finance receivables from different originators, bringing them together into a new structure; while ENABLE Guarantee, incentivised by a government-backed portfolio guarantee, covers a portion of a designated lending portfolio's net credit losses in excess of an agreed 'first loss' threshold. Since its launch in 2009 to 2017, total supported value is £3.1 billion.
SME loans as collateral to central bank funding	**FR (Ongoing).** Starting in 2011 the threshold for the quality of SME loans to be posted as collateral was loosened. Banks can pledge SME loans as collateral to obtain central bank funding if the quality of the loan is satisfactory (rated 4 or above in the rating scale of Banque de France, based on their default probability). The same rules apply for loans to other firms. **IT (2012/4).** Since 2012, the Additional Credit Claims programme sets specific eligibility criteria for Italy beyond Eurosystem's general criteria. In 2014, Italian program rules were extended to allow pledging portfolios of mostly corporate credit claims, with a level of granularity that fosters the usage of small loans (and SME-related loans therein). At end-March 2019, over 110,000 loans to (small) corporates were pledged to the Bank of Italy under these rules, with a collateral value of about €23 billion after the application of risk control measures, which are on average, around 40% of nominal value. **JP (2008).** The Bank of Japan extended eligibility criteria in 2008. Corporate bonds issued by SMEs and claims against SMEs can be considered eligible collateral for operations with the central bank. **UK (2012).** The Funding for Lending Scheme (FLS) is designed to encourage banks and building societies to lend more to households and businesses. It does this by providing funding to these firms for an extended period, with the quantity of funding we provide linked to their lending performance. The FLS allows firms taking part to borrow UK Treasury bills in exchange for eligible collateral.
Interest rate caps and subsidies	**BR (2011).** Earmarked credit was 49% of total credit in 2015, up from 32% in 2008. SMEs received 25% of business earmarked credit in 2017. **RU (2017).** The SME Corporation, jointly with the Ministry of Economic Development of Russia and the Bank of Russia, sets interest rates on loans to SMEs up to 9.6% per annum for medium-sized businesses and up to 10.6% per annum for small business. In July 2017, the limit for this program has been increased to 175 billion roubles.
Banking regulation	**CN (2015).** The China Banking Regulatory Commission put forward three "not-lower-than" operating principles for micro and small enterprise (MSE) lending by banks: • the growth rate of SME loans should not be lower than that of total business loans; • the number of credited SMEs should not be lower than that of last year;

	• the granted ratio of SME loan applications should not be lower than that of last year.
Loan support schemes by central banks	**KR (2008).** The Bank of Korea Intermediated Lending Support Facility. The Bank of Korea runs facilitation programs that provide funds with lower interest rates than base rates for banks to be more engaged in SME financing. The limit is set at KRW 25 trillion and lending rates ranging from 0.5% to 0.75% per programme.
Tax incentives	**AU (2015).** Tax concession for early stage investors in start-ups. **CN (2008).** MSE tax at a 20% tax rate (as opposed to 25% for general business). **(2010).** The government introduced a programme whereby the tax base for MSEs whose payable tax is lower than 30,000 RMB is reduced by one-half. **FR (1994).** Tax credit for individuals (who are tax domiciled in France) investing in equity for SMEs at the developmental (seed, start-up or expansion) stages. **(2015).** Tax credit on R&D expenses for SMEs. **HK (2018).** Profit tax rate reduction for a certain amount of assessable profit for unincorporated business. **IT (2017).** Tax exemption on capital gains requiring an investment in SMEs. **TR (2015).** Measure allowing returns on equity to be deducted from tax liability.
Developing financial infrastructure	**AU (2017).** Crowd-sourced equity funding framework and open banking framework announced in 2016; regulatory sandbox for FinTech providers). **KR (2009).** Framework to support SME bond securitisation. **MX (2015).** Crowdfunding Ecosystem Acceleration to promote entrepreneurship, innovation and economic inclusion and the Crowdfunding Pilot Programme. This includes a framework and law: *Act to Regulate Financial Technology Institutions (2018)*, aimed at providing a favourable predictable regulatory environment.

Annex C: Financial regulations potentially affecting SME financing

Basel III[85]

Basel III is a comprehensive set of policy measures designed to strengthen the regulation, supervision and risk management of the banking sector in response to the lessons from the global financial crisis. The Basel III standards are minimum requirements that apply to internationally active banks. BCBS member jurisdictions[86] commit to implementing them within the timeframe established by the Basel Committee, while non-member jurisdictions implement them on a voluntary basis.[87]

Jurisdictions may choose to supplement the Basel framework with their own additional prudential requirements on banks. Some examples of these are stress testing requirements and stricter capital and liquidity requirements. While these local requirements are relevant to the evaluation work, there is generally no straightforward way to separate out their impacts when evaluating the effects of reforms on SME financing.

The capital and liquidity requirements introduced since the crisis have increased the potential number of binding regulatory constraints for banks.[88] Some banks may focus only on their most binding resource constraint, while others may seek to concurrently manage across multiple constraints at different levels of the organisation.[89] As such, the effects may differ depending on the approach used by the bank to determine its regulatory capital requirements (e.g. standardised vs model-based approaches) and on whether they arise from domestic implementation or from cross-border spillovers (i.e. adoption of reforms by the home jurisdiction of the foreign bank). Also given different starting points and risk preferences, banks are not expected to have homogeneous reactions to these regulatory changes.

The definition of a SME in the Basel framework may affect firms that are near the definitional threshold. The Basel definition for SMEs are firms that have annual sales less than or equal to €50 million. Under the Standardised Approach for credit risk, to be considered a "regulatory retail" SME, firms further must meet product, aggregate counterparty exposure, and granularity requirements. The product criteria specify what types of loans could be included in the retail SME category. Retail SME exposures can include credit cards, charge cards and overdrafts, personal term loans and leases, instalment loans, auto loans and leases, student and educational loans, personal finance and small business facilities and commitments. Mortgage loans, derivatives and other securities (such as bonds and equities), whether listed or not, are specifically excluded from the retail SME category. The next criterion is that a bank cannot have an aggregated exposure larger than €1 million to a specific retail SME firm. Lastly, the

---

85 More information on the Basel III reforms are available here (summary table) and implementation status is available here.

86 The Basel Committee comprises 45 members from 28 jurisdictions, consisting of central banks and authorities with formal responsibility for the supervision of banking business. Additionally, the Committee has nine observers including central banks, supervisory groups, international organisations and other bodies (https://www.bis.org/bcbs/membership.htm).

87 *FSI Survey on Basel II, 2.5 and III Implementation* (July 2015).

88 For example, *Literature review on integration of regulatory capital and liquidity instruments* by the BCBS Research Task Force, BCBS Working Paper No. 30 (March 2016).

89 For example, *Financial Resource Management: Balancing complex and competing constraints on capital, liquidity and funding* by Oliver Wyman and the International Association of Credit Portfolio Managers (2017).

aggregate exposure to one firm cannot exceed 0.2% of the overall regulatory retail portfolio of the bank. These criteria are similar for exposures to be treated as retail SME exposures under the Internal Ratings Based (IRB) approach.[90]

Under the Basel framework, SME lending can be classified as either "regulatory retail" or "corporate" lending, with the former subject to comparatively lower capital requirements. There may also be SME lending that is not captured under these two categories (including, for example, credit card lending or consumer mortgages undertaken to finance a small business).

Under the Basel framework there are specific national discretions. For example, with respect to the granularity criterion under the Standardised Approach for credit risk, national supervisors can adopt another method to ensure satisfactory diversification of the regulatory retail portfolio. Another area of national discretion is the calculation of the size threshold that separates corporate SMEs from other corporates under the IRB approach. Subject to national discretion, supervisors may allow banks to substitute total assets of the consolidated group for total sales in calculating the SME threshold and the firm-size adjustment under the IRB approach; however, total assets should be used only when total sales are not a meaningful indicator of firm size. As is the case for all Basel requirements, jurisdictions (e.g. EMDEs) might deem it appropriate to define SMEs in a more conservative manner (i.e. with a lower level of sales).

The treatment of SMEs in credit card lending can also be a relevant factor. Retail lending, in particular revolving credit facilities, is often a channel for SME financing.[91] The Standardised Approach for credit risk under the Basel framework for retail SMEs includes a reduced risk weight compared to non-retail SME lending. This is an incentive for banks to provide these type of loans to SMEs. Revolving accounts, however, may have other requirements at the jurisdictional level.

SME financing may take other forms that are not necessarily classified or recorded as an SME loan. For example, real estate lending, which is excluded from the Basel retail SME category, may also be a source of SME financing. Small businesses may use the collateral in their home or other assets to fund parts of their business. In these cases, requirements on loan purpose and cash-out refinancing may be important factors.

A brief description of Basel III elements potentially affecting SME financing is provided below.

---

[90] There are some differences under the IRB. For example, the IRB approach does not include the 0.2% threshold under the granularity criterion.

[91] Personal and business credit cards account for about 20% of new start-up capital for small businesses in the US (see US Small Business Administration, *Annual Report of the Office of Economic Research, Fiscal Year 2017* (2017).

Risk-based capital

Quality of capital, minimum capital requirements and capital buffers: The first phase of the Basel III reforms, agreed in 2010, sought to improve the quality of capital and raise the level of minimum required capital. Capital conservation and countercyclical capital buffers were also introduced. These reforms have now been implemented across all BCBS member jurisdictions.

Aside from the reductions in some SME risk weights, the overall changes do not specifically target a bank's SME lending as distinct from its other exposures, since they affect the multipliers that are applied to a bank's total risk-weighted assets (RWAs). However, they may have an indirect effect on SME financing if banks respond by altering their mix of activities. For example, a bank constrained by risk-based capital requirements may choose to pull back from *riskier* lending before exiting lower-risk business lines. If the bank is a Standard Approach bank with favourable risk weights for SMEs, the bank could potentially pull back on non-SME lending relative to SME lending.

Capital Conversion Factor (CCF): One way that the 2017 Basel III reforms may affect SME lending is through the credit conversion factor, which may result in higher risk weights applied to undrawn credit lines commonly used by SMEs – in particular:

1. The CCF on unconditionally cancellable commitments (UCC) increased from 0% to 10%. This increase reflected practical experience during the crisis where banks, for reputational reasons, fulfilled draw-downs on lines of credits irrespective of whether they were cancellable or not.
2. The CCFs for commitments other than UCC were also adjusted. In Basel II, the granularity depended on the original maturity of a commitment: a 20% CCF applied for commitments up to one year, while a 50% CCF applied for commitments with a maturity greater than one year. Basel III removed this distinction based on maturity and applied a single CCF of 40%.

The new treatment of CCFs is not SME-specific, and is not expected to have any impact to the supply of SME lending or in the SME lending rates relative to other non-financial corporates. SME-specific factors that can influence how a particular SME may be impacted include for example how heavily an SME relies on lines of credit relative to other types of funding; how often an SME draws available lines of credit; the duration of (non-UCC) commitments.

*Credit risk weights for SME lending***:** The first phase of the Basel III reforms revised some risk weights (for example market risk, counterparty credit risk and securitisation) but left credit risk weights broadly unchanged. The finalisation of Basel III in December 2017 amended the credit risk framework, as part of efforts to restore credibility in the calculation of RWAs and improve the comparability of banks' capital ratios.[92] The use of IRB approaches for credit risk was constrained (e.g. by introducing input floors for LGD[93] estimates, in addition to changes to the recognition of eligible collateral), and an 'output floor' was introduced so that modelled outputs could not diverge too far in aggregate from standardised approaches (see Box C-1 below).

---

92 BCBS, *High-level summary of Basel III reforms* (December 2017).

93 The rationale for the introduction of such floor was to enhance the reliability of model estimates and to reduce excessive variability in RWAs.

These changes will be implemented by 2022 with jurisdictions having the option of phasing-in the output floor over a five year period.

Box C-1: Output floor[94]

The Basel II framework introduced an output floor based on Basel I capital requirements. That floor was calibrated at 80% of the relevant Basel I capital requirements. Implementation of the Basel II floor has been inconsistent across countries, partly because of differing interpretations of the requirement and also because it is based on the Basel I standards, which many banks and jurisdictions no longer apply. The Basel III reforms replace the existing Basel II floor with a floor based on the revised Basel III standardised approaches.

Consistent with the original floor, the revised floor places a limit on regulatory capital benefits that a bank using internal models can derive relative to the standardised approaches. In effect, the output floor provides a risk-based backstop that limits the extent to which banks can lower their capital requirements relative to the standardised approaches. This helps to maintain a level playing field between banks using internal models and those on the standardised approaches. It also supports the credibility of banks' risk-weighted calculations and improves comparability via related disclosures.

Under the revised output floor, banks' RWAs must be calculated as the higher of: (i) total RWAs calculated using the approaches that the bank has supervisory approval to use in accordance with the Basel capital framework (including both standardised and internal model-based approaches); and (ii) 72.5% of the total RWAs calculated using only the standardised approaches.

The effect of these changes for SME lending depends on the financing instrument used (see Table C-1 below). The changes to risk weights in isolation may have an effect on banks' behaviour:

- the changes to the Standardised Approach for SMEs may be impactful for some banks (in particular small and new ones); and
- all of the IRB approaches that were permissible under Basel II, including Advanced IRB and slotting, will remain available under the finalised Basel III agreement with some additional constraints.

Under the Standardised Approach for credit risk in Basel II, the risk weight for retail SMEs that qualify for the regulatory retail asset class is 75%; the risk weight for all other retail is 100%. This includes both revolving and non-revolving retail SME. With the finalised Standardised Approach under Basel III, the risk weight for revolving transactors is further lowered to 45%. Transactors are obligors in relation to credit card or credit-card-like instruments that must be paid off in full each month.

Retail exposures excluding real estate				
	Regulatory retail (non-revolving)	**Regulatory retail (revolving)**		**Other retail**
		Transactors	**Revolvers**	
Risk weight	75%	45%	75%	100%

Source: BCBS, *High-level summary of Basel III reforms* (December 2017).

[94] BCBS, *High-level summary of Basel III reforms* (December 2017).

For corporate SMEs, i.e., loans that meet the definition of a SME but not as a retail SME, the risk weights are generally the same as other corporates. Under Basel III, risk weights decrease to 85% for unrated SME exposures and for SME exposures where a rating approach is not permitted. For firms that use an IRB approach, there is firm-sized adjustment that reduces the final risk weights.

Exposures to general corporates						
Risk weights in jurisdictions where the ratings approach is permitted						
External rating of counterparty	**AAA to AA–**	**A+ to A–**	**BBB+ to BBB–**	**BB+ to BB–**	**Below BB–**	**Unrated**
Risk weight	20%	50%	75%	100%	150%	100% or 85% if corporate SME

Risk weights where rating approach is not permitted		
SCRA grades	**Investment grade**	**All other**
General corporate (non-SME)	65%	100%
SME general corporate	85%	

Source: BCBS *High-level summary of Basel III reforms* (December 2017).

Other changes to the Basel III risk-weighting framework include updating floors and removing the multiplier. In the Basel II IRB risk weighting formula, there is a 1.06 multiplier or scalar; in Basel III this has been removed. An overall output floor and separate PD, LGD and EAD floors have also been specified.

Table C-1: SME risk weights for selected exposures under different approaches[95]

	Retail SME[96]	**Corporate SME rated**	**Corporate SME unrated**
Basel II Standardised Approach	(Same as regulatory retail) **75%**	(Same as corporate)[97] AAA to AA-, 20%; A+ to A-, 50% BBB+ to BB-, 100%; Below BB-, 150%	(Same as corporate) 100%[98]

[95] Bold font identifies areas were the treatment is different for SMEs. Different treatment for retail is identified as regulatory retail SME. Unless specifically noted, SMEs follow the respective requirements for retail and corporate loans or bonds.

[96] This received the same treatment as regulatory retail, which excludes mortgages.

[97] At national discretion, supervisory authorities may permit banks to risk weight all corporate claims at 100% without regard to external ratings. Where this discretion is exercised by the supervisor, it must ensure that banks apply a single consistent approach, i.e. either to use ratings wherever available or not at all. To prevent "cherry-picking" of external ratings, banks should obtain supervisory approval before utilising this option to risk weight all corporate claims at 100% (*International Convergence of Capital Measurement and Capital Standards: A Revised Framework, Comprehensive Version* (June 2006), "B2", paragraph 68).

[98] Supervisory authorities should increase the standard risk weight for unrated claims where they judge that a higher risk weight is warranted by the overall default experience in their jurisdiction. As part of the supervisory review process, supervisors may also consider whether the credit quality of corporate claims held by individual banks should warrant a standard risk weight higher than 100% (B2, paragraph 67).

	Retail SME[96]	Corporate SME rated	Corporate SME unrated
Basel II IRB[99]	A-IRB; depends on estimated parameters.	Slotting, F-IRB, or A-IRB; depends on estimated parameters.	
	PD floor: 0.03% (all retail)	For corporate SME (both rated and unrated) banks are permitted to make a firm-size adjustment to the corporate correlation risk weight formula for exposures to SME borrowers, thereby reducing the risk weights.[100] PD floor: 0.03 (all corporate and bank)	
Final Basel III Standardised Approach (from 2022)	(Same as regulatory retail) **75%** If transactors, 45% (change from Basel II)	Rating approach (same as corporate): AAA to AA-, 20%; A+ to A-, 50% BBB+ to BBB-, 75%; BB+ to BB-, 100%; Below BB-, 150% W/o rating approach: **85%**	**85%**[101] Same risk weight for ratings approach and non-ratings approach
Basel III IRB	Same approaches remain available in final Basel III framework (from 2022). The 1.06 multiplier for IRB has been removed. Output floor for the IRB approach (72.5%).		
	(Same as retail) PD floor: 0.05% LGD floor: see other retail	(Same as Corporate) PD floor: 0.05% LGD floor: 25% (unsecured); 0% (financial); 10% (receivables); 10% (commercial or residential real estate); 15% (other physical)	

Source: BCBS, *International Convergence of Capital Measurement and Capital Standards: A Revised Framework, Comprehensive Version* (Basel II) and *Basel III: Finalising post-crisis reforms*.

The treatment of equity exposures in described in Box C-2 below.

Box C-2: Equity investment and lending to SMEs

Some SMEs have no tangible assets, so it is not possible to provide loan collateral. For these types of SMEs, some may turn to equity financing from banks.[102]

The finalised Basel III reforms include a number of changes to bank equity exposure risk weights. Most prominent is that equity exposures can only be risk weighted through the standardised approach; the internal ratings based approach is not available.[103] The risk weights for equity exposures include some degree of granularity within the standardised approach.

---

[99] For retail exposures, banks must provide their own estimates of PD, LGD and EAD. There is no distinction between a foundation and advanced approach for this asset class (B2, paragraph 252).

[100] Annex 5 in the Basel II consolidated framework to see how the risk weights change.

[101] *Basel III: Finalising post-crisis reforms* (December 2017), ("B3"), SA Approach, paragraph 43.

[102] The Basel standard for equity exposures does not separately distinguish between SMEs and non-SMEs.

[103] BCBS *High-level summary of Basel III reforms* (December 2017), and *Basel III: finalising post crisis reforms* (December 2017).

Prior to the finalised Basel III banks could use the IRB approach to risk weight equity financing.[104] This approach included a simple risk weight method, an internal models method and a PD/LGD approach. The simple risk weight method applied a 300% risk weight to publicly traded equity holdings and a 400% risk weight to all other equity exposures. Both the internal models method and the PD/LGD approach were floored at 200% and 300% risk weights for publicly and non-publicly traded holdings respectively.

Prior to the finalised Basel III, equity exposures were not a separate asset class under the standardised approach. As such, banks applying the standardised approach typically either included equity exposures in the "other assets" asset class, where they receive a 100% risk weight, or national discretion was used to apply a higher risk weight (the Basel II text suggests that such discretion could be used to apply a 150% risk weight to venture capital and private equity investments).

In the finalised Basel III reforms, equity exposures are codified in the standardised approach taxonomy. The risk weights applied are close to the IRB simple risk weight levels: speculative unlisted equity holdings receive a 400% risk weight, equity exposures to certain legislated programmes receive a 100% risk weight, and all other equity exposures receive a 250% risk weight. The changes generally reduce the number of options for risk weighting equity exposures, as the IRB approach is not available, but provide for some additional differentiation in the standardised framework.

Another change in the initial Basel III package was the introduction of specific requirements for equity investments in funds.[105] The revised policy framework took effect from 1 January 2017 and applies to investments in all types of funds (e.g. hedge funds, managed funds, investment funds). The framework is also applicable to all banks, irrespective of whether they apply the Basel framework's Standardised Approach or an IRB approach for credit risk.

The revised standard improves upon the framework by: 1) taking account of a fund's leverage when determining risk-based capital requirements associated with banks' investments in a fund; 2) clarifying the application of the IRB approaches for credit risk; and 3) more appropriately reflecting the risk of a fund's underlying investments, including the use of a 1,250% risk weight for situations in which there is not sufficient transparency regarding a fund's investment activities.

The revised framework is based on the general principle that banks should apply a look-through approach to identify the underlying assets whenever investing in funds. When a full look-through approach is not feasible, a staged approach based on different degrees of granularity of the look-through is provided. Following this principle, the framework includes three approaches for setting capital requirements for banks' equity investments in funds, which have varying degrees of risk sensitivity: the "look-through approach", the "mandate-based approach", and the "fall-back approach". To ensure that banks have appropriate incentives to enhance their risk management of their investments, the degree of conservatism increases with each successive approach (as risk sensitivity decreases).

The revised BCBS policy framework helps to address risks associated with banks' interactions with shadow banking entities, which is part of the broader effort by the FSB to strengthen the oversight and regulation of non-bank financial intermediation.

Leverage ratio

A minimum leverage ratio was introduced to constrain excess leverage in the banking system and complement risk-weighted capital requirements. It requires a bank to have high-quality capital resources equivalent to 3% of its total on- and off-balance sheet exposures (its 'leverage exposure measure'). Proposals for a leverage ratio were agreed in 2010 and then revised in

[104] Comprehensive Version of the Basel II framework (June 2006).

[105] BCBS Capital requirements for banks' equity investments in funds.

2014. Banks were expected to report their leverage ratios from 2015 onwards, and to comply with a minimum requirement from 2018 onwards. Nearly all BCBS members have implemented the initial leverage ratio.

The finalisation of Basel III in December 2017 amended the definition of the exposure measure and introduced a G-SIB 'surcharge' (taking the form of a capital buffer) equivalent to 50% of a G-SIB's risk-weighted higher-loss absorbency requirements. The implementation date for both measures is 1 January 2022.

For banks that consider the leverage ratio as a constraint when making lending decisions, low-risk-weight exposures may appear relatively less attractive. This is because such exposures will tend to offer lower returns versus the relevant hurdle rate, despite generating the same capital requirement (due to the leverage ratio) as a riskier, higher-return asset with the same exposure value.

SME assets may have particularly low or zero risk weights where they have been guaranteed by a special facility (e.g. a guarantee from an export credit agency). However, since it is a non-risk-based measure, the leverage ratio does not allow risk mitigants such as guarantees to reduce the leverage exposure measure. Such guarantees may therefore be less attractive to banks that are leverage-constrained, or that place weight on leverage requirements (in addition to risk-weighted requirements) when making lending decisions.

G-SIB framework

Systemically important financial institutions (SIFIs) are financial institutions whose distress or disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity. As part of the policy framework for addressing the negative externalities of SIFIs and to protect the system from wider spillover risks, the BCBS adopted in 2011 (and revised in 2013 and 2017) an assessment methodology to identify G-SIBs and introduced higher loss absorbency requirements (HLA) for them. G-SIBs are scored against published criteria (based on size, interconnectedness, lack of substitutability, global activity and complexity) and placed into buckets of systemic importance that require them to have an additional capital buffer, which will be phased in from 2016 to 2019.[106] Final rules on HLA requirements are now in force in all jurisdictions that have G-SIBs headquarters.

The potential effects of this reform are similar in nature to those of the new minimum capital requirements introduced by Basel III. In particular, the higher capital buffer does not specifically target a bank's SME loans as distinct from its other exposures, but it may have an indirect effect on SME lending if the bank responds by altering its mix of activities.

Liquidity standards

Basel III introduced two minimum standards for funding liquidity: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).

LCR: The LCR seeks to ensure that a bank has sufficient unencumbered High Quality Liquid Assets (HQLA) to survive an acute stress scenario of cash outflows lasting for 30 days. The

[106] BCBS, *Global systemically important banks: updated assessment methodology and the higher loss absorbency requirement* (July 2013). G-SIBs are also subject to a total loss-absorbing capacity requirement and a leverage ratio buffer requirement.

LCR was published as a standard in 2010 and revised in 2013, with implementation being phased in between 2015 and 2019. All BCBS members have implemented the LCR standard.

In the LCR stress scenario, undrawn credit and liquidity facilities[107] provided to special purpose vehicles are assumed to be fully drawn down, whereas the same facilities provided to other types of entity (including corporates) have much lower drawdown rates.

NSFR: The NSFR incentivises banks to use more stable sources of funding on an ongoing basis. It was introduced in the December 2010 Basel III agreement and was revised in 2014 to focus on the riskier types of funding profile employed by banks while improving alignment with the LCR and reducing cliff effects. It became a minimum standard in 2018. As of September 2019 most BCBS member jurisdictions had implemented the NSFR.

The NSFR categorises a bank's assets into buckets to determine a total amount of Required Stable Funding (RSF). Banks' sources of funding are also bucketed to determine total Available Stable Funding (ASF). A bank must have ASF greater than RSF over a time horizon of one year to comply with the NSFR.

It has been argued[108] that relative to the pre-crisis framework, the NSFR creates a disincentive to undertake longer-term lending because it increases the cost of the funding required to support that lending. It is true that the NSFR would make it more expensive for a bank to fund a long-term (over 1 year) loan (100% RSF) with short-term (less than one year) funding (50% ASF). However, this is an intended effect of the reform, which seeks to reduce overreliance on short-term funding for maturity transformation purposes. Moreover, the NSFR does not differentiate by term for assets or liabilities with maturities of 1 year or greater – so it does not, for example, make a 15 year loan less attractive than a 10 year loan. Given this, the NSFR still permits a significant degree of maturity transformation.

While these additional liquidity requirements do not specifically target a bank's SME loans as distinct from its other exposures, but it may have an indirect effect on SME lending if the bank responds by altering its mix of activities.

Accounting standards for banks

The objective of general purpose financial reporting is "to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity." General purpose financial reporting standards do not seek to influence investors' capital allocation decisions or actions taken by management; rather, they aim to provide better information to inform those decisions and actions. Since the financial crisis, both the IASB and FASB have issued new and amended accounting standards to improve general purpose financial reporting.

The relevance of these new standards to SME financing mainly relates to the revised accounting treatment of expected credit losses, given their impact on the reported financial position of banks. While these additional requirements do not specifically target a bank's SME loans as

[107] These facilities are defined as explicit contractual agreements or obligations to extend funds at a future date to retail or wholesale counterparties. They only include agreements that are contractually irrevocable or conditionally revocable.

[108] For example, *Interaction, coherence and overall calibration of post crisis Basel reforms* by Oliver Wyman (August 2016).

distinct from its other exposures, they may have an indirect effect on SME lending if the bank responds by altering its mix of activities.

Expected credit loss (ECL) accounting

During the crisis, credit losses were only recognised upon an observable 'triggering event'. As a result, even in the face of clearly deteriorating credit quality, banks did not generally recognise losses until the obligor's default or delinquency were evidenced, or until data indicated a measurable decrease in estimated future cash flows. This reduced transparency and delayed the identification and management of problem assets. As a result, the G20 Leaders directed accounting standard setters in April 2009 to "strengthen accounting recognition of loan-loss provisions by incorporating a broader range of credit information".[109]

The ECL model in IFRS 9 and FASB's current expected credit loss (CECL) model (ASU 2016-13) respond to this by changing the timing of credit loss recognition. The ECL estimate needs to consider forward-looking information (instead of simply information about past events and current conditions), and is based on the probability of future credit events and the estimated cash shortfalls at a particular point in time.

Concerns have been expressed by some market participants about the new accounting standard potentially having cliff effects due to a sudden increase in loan loss provisions[110] and cyclical effects stemming from higher volatility of earnings in general.[111] However, IFRS 9 was only effective as of 1 January 2018, and CECL is not effective until 1 January 2020 for SEC filers (1 January 2023 for all other entities). Accordingly, it is too early to conclusively analyse any potential effects on SME financing.[112]

---

[109] G20 Declaration and IASB response (April 2009).

[110] For example, under IFRS 9 the ECL provision for a loan will move from a 12-month horizon to a 'lifetime loss' horizon if there is a significant deterioration in credit quality. Some concerns have been expressed about this leading to a cliff effect due to a sudden large increase in provisions.

[111] A report on *Financial stability implications of IFRS 9* by the European Systemic Risk Board (July 2017) noted that banks may react by shortening the maturity of loans and rolling them over more frequently, although this would need to be balanced against increased operational costs and increased refinancing risks for the borrower.

[112] For example, *The interplay of accounting and regulation and its impact on bank behaviour* by the BCBS Research Task Force (BCBS Working Paper No. 31, July 2017).

Annex D: Stylised example of the impact of changes in regulatory capital

Objective

Analyse the change in a typical bank's funding costs for SME credit exposures as a result of the Basel III risk-based capital reforms. The focus is only on credit risk from direct lending to SMEs.[113] This is intended to produce results that help to qualitatively describe the likely direction of the reform effects and proxy their rough order of magnitude.

Scope

The particular funding structure of the bank granting the SME loan determines its weighted average cost of capital (WACC). The relevant reforms are:

- Changes in quality and quantity of capital (first phase of Basel III).
- Changes in risk weights attributed to specific asset classes for the SME loans in the calculation of the risk-weighted assets (RWA) measure (final Basel III agreement).

This analysis only considers the RWA/WACC of direct lending without any credit enhancement. It examines the impact of the Basel III risk-based capital reforms on retail and corporate SME loan exposure types, making assumptions about credit quality, maturity and regulatory capital approach used.

Analysis

The analysis is conducted in two steps.

Step 1: Changes to the composition and cost of funding (Basel III phase 1 and 2)

A bank's WACC can be expressed as:

$$WACC = \sum_i \%\ of\ funding\ source\_i * cost\ of\ funding\ source\_i$$

$$i = CET1, AT1, Tier\ 2, other\ liabilities\ (deposits, other\ debt, etc)$$

Banks fund a credit exposure with some amount of regulatory capital (usually in excess of the minimum), with the rest coming from other sources (deposits, other non-eligible debt, wholesale funding etc.). The initial phase of the Basel III reforms (2010) will have directly affected the WACC by changing the composition of funding sources. In addition, the cost of funding has changed over time, both in absolute terms and with reference to the risk-free rate.

For changes to the composition of *regulatory capital*, we look at the actual changes in risk-based capital ratios (as a % of RWAs) based on the regular BCBS Quantitative Impact Study (QIS) monitoring reports for Group 1 banks:[114]

---

[113] Several other factors are relevant to the hurdle rate assessment, but the focus here is solely on the assessment of credit risk.

[114] Source for 2009 Capital ratios, Table 2 in https://www.bis.org/publ/bcbs186.pdf and for 2018 Capital ratios (both phase 1 and phase2), Table 2 in https://www.bis.org/bcbs/publ/d461.pdf.

	Pre-reform (2009)	Post-reform (2018)[115]	
		Phase 1	Phase 2
CET1	5.7%	12.7% (+7.0p.p)	11.7% (+6.0p.p.)
AT1	0.6%	1.2% (+0.7p.p.)	1.2% (+0.7p.p.)
Tier 2	2.1%	2.1% (no change)	1.9% (-0.2p.p.)

For changes in the costs of various forms of funding, we look at the changes relative to the *spread* to a risk-free rate:

Funding source	**Pre-crisis cost[116]**	**Updated cost[117]**
CET1	15%	11.8%
AT1	10%	6.84%
Tier 2	7%	3.81%
Other funding (deposits, wholesale funding etc.)	5%	2.8%
Risk-free rate proxy: 3m US Libor	*5% (end 2007)*	*2.8% (end 2018)*

Step 2: Changes to risk weights (RWs) (Basel III phase 2)

Changes in RWs generate changes in the absolute amount of regulatory capital that each exposure consumes, and hence its marginal cost of capital for that exposure. This feeds directly into the WACC calculation.

The December 2017 Basel III agreement contains changes to the credit RWAs framework. In summary, the changes relevant to the exposure classes differ by the type of approach. Under the standardised approach, the decrease of risk weights from 100% to 85% for unrated corporate SME exposure and the reduction of BBB rated exposure from 100% to 75% provide the relevant framework. Under the IRB approach, changes to the calibration of the input parameters (i.e. the PD and LGD parameter floors)[118] and the removal of the 1.06 scalar are key. The detailed assumptions and procedures can be found in the addendum below.

---

[115] The changes in the composition of regulatory capital from pre-reform (2009) to post-reforms (2018) for the two phases are in parentheses.

[116] The cost of pre-crisis CET1 is based on the 2010 BIS study (August 2010). We assume a 5% pre-crisis cost for the 'catch all' other funding category (including deposits and other wholesale borrowing) to be equivalent to 3m US Libor. The assumptions on non-CET1 funding spreads are based in part on the BIS primer (2013) on CoCos, which cited a rough 5pp spread to senior unsecured debt and 3pp spread to other subordinated debt.

[117] The updated cost of AT1 is based on the effective yield of the ICE BoAML CoCo index as of 31 December 2018 (6.8%). The cost of CET1 and Tier 2 is then derived by applying +5pp and -3pp spreads respectively (as above). The updated costs are the same for both phases, since we don't have data for the finalised Basel III before implementation of it.

[118] For retail SME exposures, the PD floor increases from 0.03% to 0.05%, while a 30% LGD floor (same as for other retail exposure) is introduced. Regarding corporate SME exposures, the PD floor also increases from 0.03% to 0.05%, while the newly introduced LGD floor is 25% for unsecured exposures. The analysis does not consider any impact on IRB risk

Results

We look at the two types of SME exposures under both regulatory approaches. For credit subject to the AIRB, we use hypothetical exposures with median PDs and LGDs properties[119] and an effective maturity of 2.5 years.[120]

Exposure class	**Regulatory approach**	**Credit quality**[121]	**Basel II/Basel III phase I**[122] **RW**	**Basel III phase 2 RW**
Retail SME	Standardised	N/A	75%	75%
Retail SME	AIRB	Median PD and median LGD	45%	42%
Corporate SME rated	Standardised	BBB	100%	75%
Corporate SME unrated	Standardised	N/A	100%	85%
Corporate SME	AIRB	Median PD and median LGD	69%	65%

We plot the spread of the Basel II and Basel III WACCs relative to the relevant risk-free rate (i.e. at the same point in time) for the SME exposures below. Based on the underlying assumptions, the WACC spread to the risk-free rate is expected to have risen by 19-36 basis points (bps) for retail SME credit after implementation of the final Basel III package depending on the regulatory approaches, while it is expected to have risen by 20-31 bps for corporate SME exposures. As can be seen in the chart below, all of the increase in WACC is driven by the first phase of the reforms on quantity and quality of capital. The effect is partly mitigated by the recently agreed reforms (i.e. reduced risk weights under the standardised approach, and removal of 1.06 multiplier for IRB). However, this mitigation effect of the Basel III Phase 2 will be dampened due to changes to PD floors and LGD parameter floors which are not accounted for in this analysis.

weights from the output floor, 72.5% of standardised RWAs. The output floor will phase in from 50% in 2022 to 72.5% in 2027.

[119] PDs and LGDs (for non-defaulted corporate and retail SME exposures) represent median values across the banks surveyed by EBA (See Table 5 in EBA, Results from the 2018 Low and High Default Portfolio Exercise). The median PD (LGD) for retail SME exposure (among 74 institutions using AIRB) is 2.60% (31%), while the equivalent metrics for corporate SME exposures (for AIRB 55 institutions) is also 2.60% (31%).

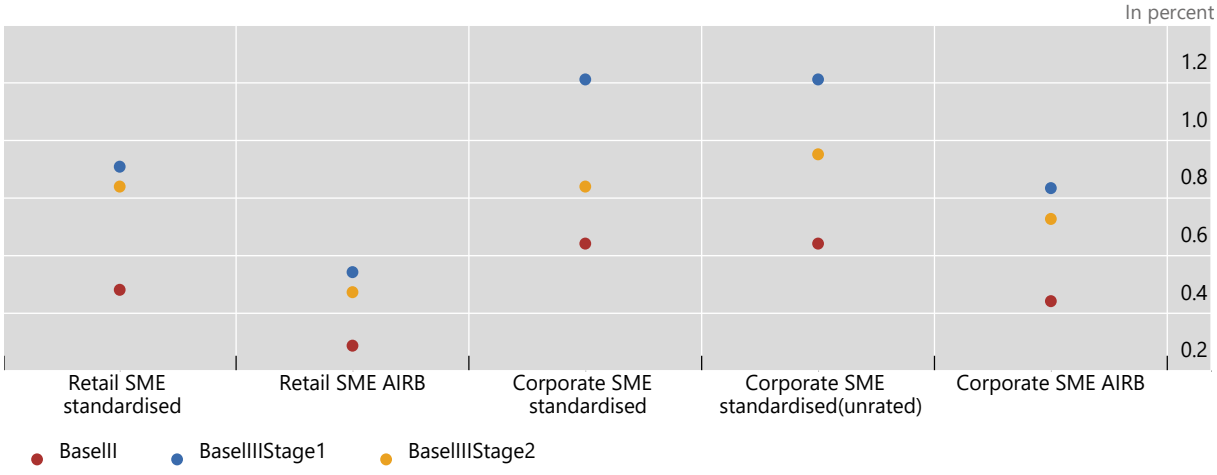
[120] This is the median maturity for the corporate SME portfolios. See Figure 62 in EBA, Results from the 2018 Low and High Default Portfolio Exercise.

[121] The impacts of an increase in PD floors from 0.03% to 0.05% and newly introduced LGD floors in Basel III Phase 2 are not considered in this analysis.

[122] There was no change to most RWs for credit exposures in Basel III phase 1.

WACC spreads under Basel II vs Basel III for SME exposures

WACC spread | Graph 1



Source

Addendum: detailed assumptions and procedures to estimate change in WACC for an unrated corporate SME exposure under the standardised approach

Pre-crisis framework

- RW = 100%
- Regulatory capital stack: 5.7% CET1, 0.6% AT1, 2.1% Tier 2
- Cost of funds: 15% CET1, 10% AT1, 7% Tier 2, 5% other funding
- Risk-free rate assumed: 5%

For an unrated corporate SME exposure with a 100% RW, need the following proportion of funding:

- CET 1: 100%*5.7% = 5.7%
- AT 1: 100%*0.6% = 0.6%
- Tier 2: 100%*2.1% = 2.1%
- Other funding: 100%-(5.7%+0.6%+2.1%) = 91.6%

Since

$$WACC = \sum_i \%\ of\ funding\ source\_i * cost\ of\ funding\ source\_i$$

The pre-crisis WACC for this exposure would be given by:

$$5.7\% * 15\% + 0.6\% * 10\% + 2.1\% * 7\% + 91.6\% * 5\% = \mathbf{5.64}\%$$

And the pre-crisis WACC spread over the risk-free rate would be given by

5.64% - 5% = **0.64%**

Post-crisis – Basel III phase 1

If we assume that under Basel III phase 1 the funding mix, funding costs and risk-free rate changed to:

- Regulatory capital stack: 12.7% CET1, 1.2% AT1, 2.1% Tier 2

- Cost of funds: 11.8% CET1, 6.8% AT1, 3.8% Tier 2, 2.8% other funding
- Risk-free rate assumed: 2.8%

the new proportion of funding for a 100% RW exposure would be:

- CET 1: 100%*12.7% = 12.7%
- AT 1: 100%*1.2% = 1.2%
- Tier 2: 100%*2.1% = 2.1%
- Other funding: 100%-(12.7%+1.2%+2.1%) = 84.0%

With the new WACC given by:

$$12.7\% * 11.8\% + 1.2\% * 6.8\% + 2.1\% * 3.8\% + 84.0\% * 2.8\% = \mathbf{4.01}\%$$

And the new WACC spread over the risk-free rate given by:

4.01% - 2.8% = **1.21%**

Post-crisis – Basel III phase 2

Layering on phase 1, Basel III phase 2 changes the RW under the standardised approach for unrated corporate SME exposures to 85%. Keeping the regulatory capital stack and funding costs the same as under phase 1, the new proportion of funding for this would be:

- CET 1: 85%*11.7% = 9.95%
- AT 1: 85%*1.2% = 1.02%
- Tier 2: 85%*1.9% = 1.62%
- Other funding: 100%-(9.95%+1.02%+1.62%) = 87.42%

With the new WACC given by:

$$9.95\% * 11.8\% + 1.02\% * 6.8\% + 1.62\% * 3.8\% + 87.42\% * 2.8\% = \mathbf{3.75}\%$$

And the new WACC spread over the risk-free rate given by:

3.75% - 2.8% = **0.95%**

Annex E: Summary of stakeholder feedback

I. Introduction

The FSB evaluation team organised a series of outreach engagements with external stakeholders on SME financing and the effects of financial reforms. The outreach included a roundtable (held in Amsterdam on 13 December 2018); a call for public feedback (which took place in February and March 2019); as well as targeted interviews of stakeholders undertaken by team members in their jurisdiction (held in February and March 2019).

The objective of the roundtable and call for public feedback was to solicit the views of industry participants and other relevant stakeholders on recent trends and drivers in SME financing across FSB jurisdictions, including the possible effects that G20 financial reforms may have had on this market. The objective of the interviews with domestic stakeholders was to gather more targeted information on trends and drivers that affect SME financing in each jurisdiction. The information collected through the interviews provided insights into specific domestic factors that may affect the nature and importance of effects of G20 reforms on SME financing.

A summary of the main takeaways from these outreach engagements can be found below.

II. Key takeaways from the roundtable[123]

Around 35 external participants from financial institutions, trade associations, credit rating agencies, think tanks, academia and civil society attended the roundtable. Each session included short presentations by selected invitees followed by open discussion. The roundtable followed the Chatham House Rule and remarks were not for attribution. Participants welcomed the opportunity for such an exchange of views, and were invited to continue their engagement through submissions of relevant information that could inform the evaluation.

The main takeaways are the following:

SME financing trends

This session sought to establish the characteristics, prevailing trends and main drivers in SME financing. The presenters noted that access to finance and credit conditions have generally improved in recent years; that banks remain the key providers of SME financing; and that new innovative forms of financing (e.g. peer-to-peer platforms, crowdfunding) are growing rapidly, albeit from a low base in most countries. SME loan growth has been strong in most emerging markets, more sluggish in advanced economies, and negative in countries most hit by the global financial crisis. Data gathered by the Organisation for Economic Co-operation and Development (OECD)[124] show a marked shift toward longer-term bank loans, while asset-based SME lending has been growing steadily in numerous countries.

Several participants noted that the resumption in SME lending growth and the fact that access to finance is not perceived in many cases as the main problem for SMEs anymore, especially

[123] This summary does not represent the views of the FSB and its member authorities, or reflect consensus views expressed by stakeholders at the roundtable.

[124] OECD *Financing SMEs and Entrepreneurs 2019 - An OECD Scoreboard* (April 2019).

in advanced economies, should not be a cause for complacency. The fact that SMEs are not tapping external financing sources more could indicate demand-driven constraints and limitations in their ability to create investment and growth opportunities, which may merit further investigation. In that regard, a relevant question would be whether the financial system delivers the type and amount of financing that SMEs need to grow. Disentangling demand factors (e.g. changes in the structure of SME sector from capital-intensive to more service-oriented SMEs, replacement of external finance by internal sources or supplier credit) and supply factors (deleveraging and disintermediation trends, also due to financial and other regulations) was an important consideration.

Participants highlighted the significant heterogeneity across jurisdictions in terms of SME definitions and characteristics (size, sector, age), as well as in terms of needs for financing and support services, including in particular access to knowledge. Access to finance is still seen as a major issue in developing economies and for micro and young firms.

Participants agreed that an in-depth examination of trends and effects at the domestic (individual jurisdiction) level is important given this heterogeneity. This includes the structure and competition of the banking sector and the availability of non-bank financing providers as important variables. Participants noted that small banks, or those banks that have a strong local presence, can lever on longer term relationships and may be better able to provide funding when it is needed. This relationship advantage may lead to a different assessment of riskiness than that based on hard information and statistical models. At least in some jurisdictions, cooperative credit institutions have supported SME financing and gained market share.

Participants also discussed the role of public policies (e.g. credit guarantees, tax incentives, directed lending) in fostering SME access to finance. Consistent with a shrinking of the macroeconomic public support in normal times, these policies have largely shifted from broad-based countercyclical support in the aftermath of the crisis to more targeted policies in recent years aimed at promoting innovation and start-ups. A few participants noted that while guarantees can represent an effective means to facilitate access to finance for SMEs, the treatment of guarantees for prudential purposes may pose challenges especially if a loan-by-loan modelling approach is required.

Participants highlighted an important distinction between the timing and the nature of implementation on the effects of financial reforms. In many jurisdictions the transmission channels on SME financing depend on how these reforms have been implemented by regulatory and, most importantly in the view of some participants, supervisory authorities. In the European Union (EU), for example, this includes the introduction of an SME Supporting Factor in the regulatory capital framework, while in some other jurisdictions the effects may have been influenced by accompanying supervisory activities and expectations.

Many participants also highlighted the need for additional efforts to collect data in order to effectively monitor trends and better understand the drivers of SME financing. Several noted that it is striking how little is known given that SMEs are the backbone of economies, and that a common database would lower the cost of credit assessment and make it (almost) transferable. More generally, views varied in terms of data access versus data protection issues, and on whether open banking initiatives could advantage some players while not necessarily improving SMEs' access to finance.

Effects of reforms on bank financing to SMEs

In this session, participants discussed the effects of G20 financial reforms on bank financing to SMEs. The research in this area finds that some regulatory reforms (e.g. capital and liquidity requirements) and the introduction of macroprudential policies seem to generate credit supply effects, particularly if borrowers cannot easily find substitutes. However, identifying those effects is not easy given the many confounding events taking place at the same time (e.g. multiple reforms, accommodative monetary policies). According to the empirical literature, the effects seem to vary depending on initial conditions and on banks' lending techniques. The intensity of the effects depends largely on the "bindingness" of the reform across jurisdictions and banks. Banks that were capital constrained at the time of the implementation of new regulations seemed to be more heavily affected, while less constrained banks less so.

Basel III was identified by participants as the most relevant reform. Some participants expressed concern that banks may have increased the pricing and the proportion of secured SME lending – as well as reduced credit to riskier firms – including as a result of the reduced eligibility of collateral (both intangibles and physical collateral) for regulatory capital purposes. In that context, some participants raised the question of whether regulation strikes the right balance in terms of overall financing structure needs of SMEs.

Some participants identified other potentially relevant reforms. These included accounting rules (IFRS 9),[125] which may incentivise banks to reduce the maturity of SME loans, to request higher collateralisation, and to reduce credit availability in a downturn; insurance regulation such as Solvency II,[126] preventing insurance companies from investing in securitisations of SME loans; and domestic stress test frameworks, which may disproportionally affect SME finance because of the penalising implicit risk weight assumptions embedded in some of these tests. It was noted that while internationally agreed reforms play a role, the interaction of the reforms with other domestic regulation and public policies, as well as how the regulation is implemented and interpreted by relevant authorities, ultimately determines the extent to which various economic actors, including SMEs, are affected.

Finally, a few participants noted that the cumulative impact of regulations on SME lending may be driven also by the increased complexity and compliance costs, which may affect differently various types of banks. Small banks can be particularly affected by higher (fixed) compliance costs, while large banks may be incentivised to focus on bigger loans, this making it harder for smaller SMEs to obtain financing overall. Some participants expressed concern about the apparent convergence in business models across large banks, which may reduce diversity and build up systemic risks.

Some participants noted that the role played by small (and cooperative) banks during the financial crisis seemingly calls for providing some more proportionality in regulation, although views were mixed about how to strike a balance between ensuring proportionality and safeguarding a level playing field across lenders.

---

[125] IFRS 9 is an International Financial Reporting Standard promulgated by the International Accounting Standards Board. It addresses the accounting for financial instruments. Details.

[126] The Solvency II Directive is a Directive in European Union law that codifies and harmonises the EU insurance regulation. Details.

A few participants noted that while public policies such as SME credit guarantees can partly offset the effects of higher prudential requirements, such instruments can be introduced to support different public policy purposes and different types of firms. Consistency and more broadly neutrality across different policy instruments cannot be taken for granted.

It was also pointed out that, while several of the concerns expressed by participants can be tested empirically, the financial system is still in a state of transition towards full-fledged new regulatory regimes (so the effects to date may not be conclusive) and that there may not be sufficiently granular data to allow strong conclusions to be reached.

Effects of reforms on non-bank financing to SMEs

This session examined the possible impact of post-crisis financial reforms on the provision of SME financing by non-bank financial institutions and capital markets. It was noted that the growth in alternative financing is particularly evident in a few jurisdictions (e.g. China, UK, US). Participants commented that there may have been some substitution effects (disintermediation) between banks and other financing providers, with the latter increasingly attracting institutional funds in search for yield. While this fostered the emergence of a more diversified pool of SME finance providers, some banks are adjusting their business models in response to this competition (e.g. by channelling SME loans to online platforms), while big techs are beginning to become active by leveraging their access to behavioural data and technology. Bank and non-bank finance, however, should not only be seen as alternative, as joint projects to exploit complementarities among new and traditional intermediaries are gaining pace.

Several demand and supply side factors drive this trend, one of which may be a lower regulatory burden for non-bank providers coupled with initiatives to promote alternative sources of finance (e.g. open banking, official support for venture capital/private equity funding, EU regulatory capital framework for simple, transparent and standardised securitisations). Other drivers include crisis-induced bank retrenchment from lending as well as technological innovation that enables access to customers whose creditworthiness is more difficult to assess, such as self-employed borrowers. Lending platforms can also provide an enhanced customer experience (and potentially lower pricing) due to the speed and simplicity of online interactions and more tech-based and automated decisions, while allowing access to a variety of investors. Some participants noted that the target business model provides investors with a commoditised, scalable and efficient way to access SME finance as an asset class, while allowing for similar scrutiny to the one provided by a traditional lender.

Participants noted that SME loan securitisation is concentrated in Europe and, while it performed well after the crisis, it has not represented a significant source of financing. Banks remain the principal issuers, with the majority of securitisations retained for funding purposes (used as collateral for refinancing with the European Central Bank). One participant also noted that regulatory frameworks that impose high capital charges on securitisation or rely on net asset value reporting for illiquid assets, may prevent institutional investors from providing investment capital to SMEs thereby reducing the universe of potential funding providers.

Some participants noted that the long-term sustainability of some alternative, non-bank financing providers is not yet clear since they have not been tested in a downturn, and expressed concern that they may create amplification mechanisms in the crisis through flight to quality reactions. Participants also noted that the growth of alternative finance may at present lever on

regulatory arbitrage opportunities that might disappear in the future should the regulatory perimeter be adjusted or regulation be more activity-based.

III. Public feedback

The FSB published the note on the key takeaways from the roundtable and invited feedback from stakeholders on a number of related issues. Twenty firms and individuals provided feedback that was published on the FSB's website, with a majority of respondents from Europe.[127] The key takeaways are described below.

Trends and drivers in SME financing since the financial crisis

Most respondents noted the improved credit conditions for SMEs across jurisdictions, with some exceptions: SME lending in Italy and other southern European countries have declined in recent years and not recovered to their pre-crisis levels. Respondents also noted that access to finance has improved overall for most SMEs, although one respondent commented that younger high-tech firms and SMEs looking to scale up their business do not necessarily get sufficient funding from banks.

Respondents in many jurisdictions noted that SME loan prices (interest rates) have declined and tenors have generally increased. They also noted an increase in government-sponsored credit risk mitigation programmes (e.g. public guarantee programmes) to encourage SME lending. Whilst this was seen overall as a positive development, a few respondents stated that it is important to examine the role of such public sector programmes for their efficacy, the impact they may have on private sector lending and possible reallocation effects.

Several respondents commented on the increase in new forms of SME financing – securitisations, FinTech, and market-based finance – while acknowledging that banks still play a key role. There were mixed views on the potential growth of such alternative sources of financing, particularly with respect to capital markets for smaller and micro firms, also depending on the region.

Most respondents commented that financial regulations (particularly capital requirements) have led to an increase the cost of lending. However, regional initiatives (such as the SME Supporting Factor in the EU), public support programmes (such as the Funding for Lending Scheme in the UK) and accommodative monetary policy have contributed to reducing the cost of SME financing. The current prolonged low interest rate environment may have offset the potential effect, and thereby disguised the true impact, of such reforms. A few respondents stressed the importance and positive impact of credit guarantee programmes offered in some countries. Several respondents stressed the need and importance of separating out these confounding factors but acknowledged that it could be difficult to do so.

Effects of financial reforms on bank financing to SMEs

Almost all respondents commented that increased regulatory burdens (Basel III capital requirements, but also regulations on NPLs and loan loss provisions, stress testing, microprudential and reporting requirements) have increased the cost of SME loans. At the same time, respondents noted that loan maturities have lengthened (due, in part, to lower interest

[127] Public feedback available here.

rates). Some respondents noted an increase in collateral requirements, which might create a hurdle for SMEs that do not have such collateral and thereby lead to lower access to finance.

Several market participants commented that Basel III and other regulations that impose capital charges (such as Solvency II) put a disproportionate capital charge on equity exposures and on alternative providers of finance relative to traditional debt-based finance. Several respondents also mentioned IFRS as adversely impacting SME financing.

One respondent noted that capital regulations have impacted countries differently, depending on how successful banks have been at raising capital. That respondent noted that European banks have had relatively more difficulties raising capital and thus have seen reductions in their SME lending compared to banks in Australia, Canada and the US.

Several small banks and credit union industry associations commented that the costs of complying with financial regulations are disproportionately higher for smaller banks.

Several respondents, particularly from bank trade associations, commented that new regulations such as Basel III create a non-level playing field since non-banks and FinTech providers are not as stringently regulated.

In the EU, several commenters (mostly trade associations representing exchanges, private equity and other non-bank market participants) mentioned the Capital Markets Union (CMU) as helping to increase market-based financing for SMEs (particularly for start-ups and non-listed companies), while other respondents noted the limitation of such types of financing for small firms. These associations also mentioned that the Markets in Financial Instruments Directive (MiFID) II's research rules may potentially lower SME financing if they result in less-informed investors.

One respondent noted that the Comprehensive Capital Analysis and Review (CCAR) in the US has adversely affected SME lending, pointing out that the origination of small business loans by banks subject to CCAR has slowed after 2011 compared to non-CCAR banks.

Other issues or relevant factors

Several respondents stressed the need to clearly define and identify SMEs in order to avoid inconsistent credit decisions. One industry organisation stated that having a clear legal framework makes it less costly for banks to identify and track SMEs.

One respondent stated that financial reforms in the Nordic region have restored investor confidence, which in turn has allowed investors to make better-informed decisions about investing in SME markets.

Trade associations representing financial industry participants all cited the need for tax reforms that encourage savings and investment for SMEs. Some also mentioned that reforms that make it easier to get publicly listed, through lowered costs and reduced requirements, along with education (to both firms and the investor public) would unlock equity financing for SMEs.

IV. Interviews of stakeholders in FSB jurisdictions

Members of the FSB evaluation team undertook interviews of stakeholders in their respective jurisdictions in February and March 2019. Interviewed stakeholders included SME associations and chambers of commerce; domestic bankers' or other financial industry associations; and a

few private or public institutions mandated to facilitate access to finance by SMEs. Table E-1 provides a summary of the main takeaways by jurisdiction from those interviews.

Trends in demand and supply for SME financing

Stakeholders in most jurisdictions (DE, FR, HK, IN, IT, JP, NL, SA, SG) indicated that bank financing represents the principal source of external financing for SMEs. There are some exceptions: in Mexico, for example, while bank lending increased significantly, supplier credit remains the most important source of external financing. In some jurisdictions (HK, IN, SG), stakeholders highlighted that SMEs are often primarily financed through internal resources.

Stakeholders in some jurisdictions (DE, IT, JP, MX) highlighted some compositional change in terms of the type of banks (regional, depositor-funded etc.) providing SME financing. In Mexico, these structural changes were perceived to be driven by dynamics at the group level of foreign banks in the country and not as a result of domestic developments. In Italy, smaller local banks were seen to provide credit to local SMEs during the first phase of the credit crunch (2009-2010), thus partly offsetting the reduced supply from large banks. SMEs represent an important business segment for banks in many jurisdictions (DE, FR, JP, MX, NL, US).

In most jurisdictions (DE, FR, JP, NL, MX, SG, US)[128] SMEs do not report significant problems accessing finance; however, in some jurisdictions, stakeholders highlight that smaller and newer firms tend to struggle more relative to larger and more established ones. Other factors (e.g. competition, market structures and payment periods) are seen as more significant in constraining SMEs' growth prospects (DE, FR, IT, JP, MX).

A number of interviewees in advanced economies (DE, FR, JP, and NL) reported that accommodative monetary policies after the global financial crisis have helped maintain or expand SME financing. One jurisdiction (IT) where SMEs have been significantly affected by the crisis indicated that accommodative monetary policy has benefited larger and more creditworthy SMEs. Public policies are also highlighted as a major positive factor in the supply of credit to SMEs (HK, IN, JP, MX, NL, SA, SG), although the type, persistence and breadth of use of public policies varies significantly across jurisdictions.

Effects of reforms on bank financing of SMEs

Stakeholders in most jurisdictions did not identify Basel III reforms as the major constraint to SME financing (DE, FR, HK, IN, MX, NL, JP, SA, US), though some of them highlighted the effects of other reforms. Stakeholders in one jurisdiction (IT) highlighted that Basel III has had an effect on credit supply more broadly including – but not limited to – SMEs, but acknowledged that it was difficult to disentangle this effect from broader macroeconomic factors. IFRS 9 was most commonly cited (DE, FR, IN, SA). A few stakeholders also mentioned the impact of domestic stress testing frameworks (NL, SA, US) and noted that some of these frameworks are particularly punitive for SME lending because of the variables stressed most severely (home prices, a common source of collateral for SMEs) and unsecured lending (which is how many SMEs are granted credit). Some jurisdictions also mentioned the impact of higher administrative costs associated with anti-money laundering rules (IT, NL). Stakeholders in one

[128] In the US, stakeholders indicated that immediately following the crisis, SMEs demanded less finance. Banks also tightened lending standards limiting their lending to less-than-prime borrowers. However, since the crisis, lending to SMEs has increased as businesses have expanded.

jurisdiction (FR) also mentioned Solvency II because of its perceived impact on investment activities of insurers.

Effects of reform on non-bank financing of SMEs

Most interviewees noted a low use of non-bank external finance including new innovative FinTech credit (DE, FR, HK, IN, IT, JP, NL). Stakeholders in one jurisdiction (US) noted that with low interest rates, non-bank lenders have cheaper access to funding than in the past and can successfully compete against (cheap deposit-funded) banks. Since non-bank lenders do not have the same cost structures as banks (including capital requirements and other regulatory costs), they are able to offer cheaper financing to SMEs.

Table E-1: SME financing factors identified by stakeholders in FSB jurisdictions

Factor	Jurisdiction	
SMEs identify idiosyncratic factors (e.g. competition, market structure, and payment periods), as most significant factors constraining SME access to finance.	DE, FR, IT, JP, MX	
SMEs reporting struggling to get finance.	Do not report problem	Report problem
	DE, FR, JP, MX, NL, SG, US	IT
Dominant SME financing source.	Internal	External
	HK, IN, SG	NL
Bank finance dominates external financing.	DE, FR, HK, IN, IT, JP, MX, NL, SA, SG	
SMEs remain an important business segment for banks.	DE, FR, JP, MX, NL, US	
SMEs have decreased, maintained or expanded number of banks they have relationships with.	Increase	Decrease
	DE, FR, JP, SA	IT
Some compositional change in type of banks providing SME finance (regional, depositor-funded etc.).	DE, IT, JP, MX	
Low use of non-bank external finance (including Fintech), with bank finance as the major external financing source.	DE, FR, HK, IN, IT, JP, NL	
Jurisdictions identifying reforms (incl. Basel III) as a major constraint.	Not a major constraint	A major constraint
	DE, FR, HK, IN, JP, MX, NL, SA, US	IT
Potential reduction of SME credit due to IFRS 9.	DE, FR, IN, SA	

Annex F: Literature review and bibliography

SME financing patterns

Financing constraints and general trends

Small and medium-sized enterprises (SMEs) form the backbone of the economy in many countries and play an important role for overall economic growth and employment. For example, using a large sample of 99 countries for the period from 2006 to 2010, Ayyagari et al. (2011) estimate that 66% of total workers are being employed by SMEs. Taking into account the importance of SMEs for the economy as a whole, potential financing constraints for these firms are a crucial issue both for policy makers and academics, and empirical evidence suggests that access to finance is disproportionately more important and credit constraints are usually more detrimental for small firms (e.g., Cetorelli & Strahan, 2006, Beck et al., 2008A).

Despite its importance, a large body of literature has expressed concerns that having access to finance can be particularly difficult for SMEs. Beck & Demirgüç-Kunt (2006) study the impact of a number of obstacles to growth such as macroeconomic instability, corruption, institutional development and access to finance and report that the latter is typically the most important one for SMEs. Similarly, Arráiz et al. (2014) argue that SMEs face bigger financial constraints relative to larger firms. A number of studies confirm these results, suggesting that a firm's age and size are valid predictors of financing obstacles, with smaller and younger firms being more constrained (see: Beck et al., 2006; Ferrando et al., 2011).[129] The reasons for these results could be that (1) default risks are negatively associated with size and age, (2) there is a higher cost of monitoring for smaller firms that tend to be informationally opaque and (3) there are higher costs of liquidation in case of a default.

In general, the literature finds that SMEs are financially constrained, across countries, industries and throughout time. The real effects of these constraints are also a subject of extensive research, with many papers arguing that limited access to capital constrains productivity growth, especially in emerging economies (EMEs) (see Beck et al., 2008B; Beck & Demirgüç-Kunt, 2006; Beck et al., 2008A; Hsieh & Klenow, 2014; Bloom et al., 2010).

Banks as financing providers – lending techniques

The financing constraints that SMEs face are directly related to certain characteristics they have as a group, such as informational opacity and higher relative risk. Banks can help overcome informational obstacles and reduce the asymmetric information costs associated with lending to SMEs, and are hence of particular importance for the SME sector (see Stiglitz & Weiss, 1981; Fama 1985; Rajan, 1992; Petersen & Rajan, 1994; Boot 2000).

In particular, SMEs often rely on relationship lending, or in other words, a type of financing that is based on the accumulation of "soft" information gathered by the loan officer through personalised contacts with SMEs (Rajan & Petersen, 1994). Indeed, Degryse et al. (2017) find that SMEs with a close relationship with their banks have better access to credit. Similarly, Bartoli et al. (2013) find that when "soft" information is used, the probability of a firm being

[129] SMEs are not a homogeneous group, as micro, small and medium-sized enterprises are different in various ways. The paper by Masiak, C. et al. (2017) is one of the few studies that explore the heterogeneity among SMEs, illustrating that micro firms seem to be using primarily internal financing instruments or short-term debt (such as credit lines, overdrafts etc.), while, small and medium-sized firms use bank loans and grants more frequently.

rationed decreases, and Ferri & Murro (2015) argue that when an opaque borrowing firm is matched with a bank that does not collect "soft" information, the probability of credit rationing increases. Moreover, bank-firm relations may affect not only the probability of credit rationing, but also interest rates, although the direction of this effect is theoretically ambiguous. On the one hand, interest rates may decrease since informational asymmetries between borrowers and lenders are reduced (Bris & Welch, 2005). On the other hand relationship lenders have an informational advantage compared to outside investors, which enables them to hold-up their borrowers and enforce higher lending rates (Rajan, 1992; Bolton et al., 2016).

Given the importance of relationship lending, the organisational structure and the business model of a bank seem to play a role in SME lending, as the conventional wisdom argues that large or foreign banks - because of their centralised and hierarchical approach - tend to engage less in relationship lending. For instance, Uchida et al. (2012) study the Japanese SME loan market and find that not only loan officers are important in producing borrower information, but also that more soft information is produced in smaller banks, as loan officers exert more effort there. Using Argentinian data, Berger et al. (2001) show that large and foreign owned banks supply less credit to small and opaque firms. Moreover, Berger et al. (2005) provide evidence that small banks are more willing to act on soft information compared to larger ones and Mian (2006) concludes that foreign banks shy away from lending to soft information firms because of the agency and informational costs that are associated with geographical differences. Beck et al. (2018) find that if more "relationship" focused banks exist in the vicinity of firms, these firms are less credit constrained during "busts" and that the main beneficiaries are small, young and more opaque firms, that are often unable to provide collateral (see also Cotugno et al., 2013, DeYoung et al., 2015).

While smaller banks seem to have a competitive advantage in relationship lending, Beck et al. (2011) find that SMEs do not depend entirely on relationship lending, showing that the pricing and type of SME loans is not closely associated with the bank type. A possible explanation for this is that large foreign banks may use other ways to overcome their informational disadvantage (such as contract design and other assessment mechanisms), which can be quite effective in reaching out to SMEs (Beck et al., 2017A).[130] In a similar spirit, Cull et al. (2002) find that although small foreign banks lend less to SMEs than small domestic banks, the difference between large foreign and domestic banks is considerably smaller. Moreover, de la Torre et al. (2010) use data from bank surveys for a total of 48 banks in 12 countries and find that large and international banks have several comparative advantages (some of the technologies applied to SME lending benefit from the effects of economies of scale) and are more aggressive in SME lending. They also find that dealing with large corporations may help banks to reach out and offer loans to economically viable SMEs that have long-term relations with those corporations and note that these trends were not thwarted during the financial crisis.

Overall, the general consensus is that bank lending is particularly important for SMEs, as a means to overcome informational obstacles. Moreover, certain types of banks such as small

[130] Moreover, Canales & Nanda (2012) argue that the fact that loan officers of local/decentralised banks can be more responsive to soft information could work in two ways: while it is likely to be beneficial for small businesses in competitive banking markets, it may allow decentralised banks to better exploit their market power in more concentrated markets, resulting in credit restrictions or higher interest rates for small firms.

banks and local banks may be better able to lend to SMEs, as they have a comparative advantage in gathering soft information and engaging in relationship lending.

Other factors affecting bank lending to SMEs – competition and securitisation

There are competing hypotheses about how competition in the banking sector affects SME lending. On the one hand, some studies claim that low levels of competition could decrease the willingness of banks to take risks for a given return, which would hamper access to finance for SMEs (Beck et al., 2010). Empirical evidence supports this hypothesis, showing that higher levels of bank competition are associated with more firms in operation and a decrease in average firm size (Cetorelli & Strahan, 2006) as well as an increase in innovation by small firms (Cornaggia et al., 2015). However, the effect of higher competition may only work until a certain level is reached, as Aghion et al. (2018) suggest an inverted-u-shaped relationship between credit access (which may be better with higher levels of competition) and productivity growth, due to two opposing effects: while better access to credit makes it easier for entrepreneurs to innovate, it also allows less efficient incumbent firms to remain longer in the market, thereby discouraging entry of new and potentially more efficient small firm innovators.

The extent of competition in credit markets may also affect the extent to which banks focus on relationship lending. Peterson and Rajan (1994) argue that banks operating in less competitive markets can conduct more relationship lending than banks in competitive markets, as they can smooth profits over the course of such lending. By contrast, other studies have found benefits from greater competition: For instance, Boot & Thakor (2000) show in a theoretical model that competition increases relationship lending, which is consistent with empirical findings by Degryse & Ongena (2007) and Presbitero & Zazzaro (2011). Similarly, Cetorelli and Strahan (2006) argue that, in markets with concentrated banking, potential entrants face greater difficulty gaining access to credit than in markets in which banking is more competitive. Bertrand et al (2007) found evidence that greater competition in the banking sector may improve the efficiency of bank lending. Rice and Strahan (2010) found that, in U.S. States with more restrictions on inter-state branching (and therefore less competition), firms pay higher rates for loans than similar firms operating in U.S. States where restrictions are loose.

Finally, there is some evidence that the involvement of banks in different securitisation activities can affect loan supply to small firms. Carbo-Valverde et al. (2015) study this effect and find that, before the crisis, the impact of securitisation (both for asset-backed securities (ABS) and covered bonds) on credit supply was stronger for SMEs compared to larger firms. However, during the crisis, even though SMEs benefited more from covered bond issuances of their banks, they suffered larger credit constraints from ABS issuers.

The role of trade credit

An alternative to bank loans is trade credit, which has been found to be the second most important source of SME external financing in nearly every economy (Demirgüç-Kunt & Maksimovic, 2001). Trade credit can be useful for firms that are unable to secure funding from the "traditional channels" (Petersen & Rajan, 1997). Casey & O'Toole (2014) study the use of alternative financing instruments by credit constrained SMEs and find that these firms are more likely to apply for and use trade credit. Using Spanish firm-level data, Carbo-Valverde et al. (2016) find that credit constrained SMEs turned to trade credit much more compared to unconstrained SMEs and that this dependence got stronger during the crisis. However, there is also literature arguing that trade credit has an information content for banks and can help them

to provide loans. One of the most recent papers is that of Agostino & Trivieri (2013), who find that the availability of trade credit for a firm is important in fostering access to bank lending for new and opaque firms. This effect is even stronger for banks that do not rely much on "soft" information. These results are congruent with the theoretical contributions of Biais & Gollier (1997) and Burkart & Ellingsen (2004), who argue that having access to trade credit as a firm could be a positive signal for banks.

The impact of regulation on SME access to finance

Ex ante impact assessment of the Basel III reforms

The Basel III reforms aim to improve banks' risk management capabilities and liquidity management by specifying new requirements on capital ratios and setting new standards for short and long term funding that are meant to improve banks' resilience and ability to absorb losses (BCBS, 2010, 2013). The global and ambitious nature of the reforms makes cost/benefit analyses complicated for a number of reasons. First, the reforms are ongoing and many have not yet been fully implemented. Second, banks will have to decide how they adjust their activities and these behavioural changes are hard to predict or to quantify. Finally and perhaps most importantly, while potential short-term adjustment costs in response to a reform are relatively easy to assess, the benefits of reforms in terms of financial stability are much more difficult to quantify and often materialise only in the long term.

Despite these challenges, several papers assess the potential costs and benefits of the reforms. According to the Macroeconomic Assessment Group (MAG, 2010), the benefits of the Basel reforms far outweigh any transitional costs as higher capital and liquidity requirements reduce the frequency and severity of financial crises and the corresponding loss of output. In a country specific setting, Wong et al. (2010) perform a cost-benefit analysis of the proposed regulatory reform by the BCBS for Hong-Kong and argue that the reform would bring a positive long-term effect for the economy. Miles et al. (2013) also conclude that higher loss-absorbing capital reduces the probability of banking crises and estimate that the optimal level of bank capital is around 20% of RWA, which is much higher than what is introduced with the Basel reforms. In contrast, Angelini et al. (2015) assess the long-term impact of the new regulatory standards (of the Basel III reforms) and estimate that there will be a loss both in the steady state output and welfare (measured in terms of consumption). However, they also find that tighter liquidity regulation induces a decline in output volatility.

Generally, there is consensus in the literature that better capitalised banks are better able to absorb shocks and maintain lending in a downturn, and there is no evidence suggesting that these benefits would not also apply to SME lending.

The impact of regulation on bank lending

There is an extensive literature studying the relationship between bank capital regulation and lending, while the evidence for liquidity regulation or other forms of regulation is rather scarce (see BCBS 2016 for a recent overview of the literature). Many studies on the impact of higher capital requirements on bank lending start from the perception (or embedded model assumption) that raising equity is somehow expensive for banks, e.g. due to debt overhang problems (Myers 1977; Admati et al., 2012), signalling issues (Myers & Majluf, 1984), or other types of frictions. Others have argued that the Modigliani and Miller (1958) theorem on the irrelevance of capital structure can be extended to banks, so that overall funding costs of a bank

would not materially increase in response to higher capital requirements (e.g., Miller, 1995; Admati et al., 2013; Admati & Hellwig, 2014). Following this argument, higher capital ratios would reduce the probability of default for banks individually and also for the banking system as a whole, and the resulting downward pressure on the cost of equity and debt would weigh strong enough to prevent any increase in lending rates or decrease in loan growth.

Empirically, several papers indicate that changes in capital requirements can be associated with reductions in loan supply, at least in the short to medium term (see, for instance, Peek & Rosengren 1995; Thakor, 1996; Francis & Osborne 2009; Aiyar et al., 2014; Bridges et al., 2014; Fraisse et al. 2017; Behn et al., 2016; Gropp et al. 2019; Jiménez et al., 2017). In contrast, over a longer-term horizon better capitalised banks seem to be better able to lend (e.g. Gambacorta & Shin, 2018). Cohen (2013) provides an interesting overview of how 82 large global banks have moved to higher capital ratios in the aftermath of the financial crisis. He illustrates that the bulk of the increase in risk-weighted capital ratios between 2009 and 2012 can be attributed to additional retained earnings, rather than external equity issuances or asset side deleveraging. While many of the previously cited papers use reduced-form models to gauge the impact of changes in capital requirements, a number of recent papers adopt a more structural approach in order to study the determinants of bank adjustment behaviour (e.g. Bahaj & Malherbe, 2018; Mankart et al., 2018; Goel et al., 2017; Behn et al., 2019). These papers also study the interaction between different types of capital and liquidity requirements and show that banks' adjustment behaviour is likely to depend on a number of factors, including e.g. initial tightness of the regulatory constraints, banks' business model, or economic conditions. Apart from this, the empirical literature on the effects of liquidity regulation is still in its infancy. A notable exception on this is a recent paper by Banerjee & Mio (2018), who estimate the effects of liquidity regulation in the UK and find that tighter liquidity standards did not have a negative effect on loan supply.

The impact of regulatory reforms on SME lending

The literature has mostly focused on the effects of regulation on bank lending in general, with few papers discussing the impact on SME lending more specifically. Concerning Basel III, Allen et al. (2012) acknowledge the long-term benefits of the reforms on financial stability, but also argue that they would necessitate major changes to banks' business models and assert that the availability of credit to smaller customers could deteriorate as the new liquidity requirements force banks to reduce non-liquid assets and restrict credit.

Empirical literature assessing the effect of globally agreed reforms on SME lending in a multi-country setup is very scarce at this stage. However, a number of studies examine the effects of local implementation, including local specificities of the global reforms or of national regulations. For example, following the introduction of the stricter capital rules introduced by the CRR and CRD IV, a capital reduction factor called "SME Supporting Factor" was introduced in the EU, according to which, "capital requirements for credit risk on exposures to SMEs shall be multiplied by the factor 0.7619".

One of the studies that examine the effects of this SME-specific regulation is the one by Mayordomo & Rodríguez-Moreno (2018), who try to identify supply effects related to the introduction of the SME SF by making use of microdata obtained from the Survey on the Access to Finance (SAFE). Even though they find that the SME SF did not have a significant impact on credit constraints faced by SMEs, when they differentiate between micro, small and

medium-sized enterprises they conclude that medium-sized firms were significantly less constrained than before the introduction of the regulation. Results from the EBA (2016) are similar: not distinguishing different types of SMEs, the report does not identify any significant change in access to finance for SMEs relative to large firms after the introduction of the SME SF. Somewhat in contrast to these studies, Humblot (2014) uses data on French SMEs and shows that these firms appear to be negatively impacted by the Basel III implementation.

In the US, the Dodd-Frank Act (DFA) increased the fixed regulatory compliance requirements for making business loans, which raised concerns about access to finance for SMEs. Indeed, Bordo & Duca (2018) find that right after 2010 (when the DFA was implemented), not only the share of small businesses in commercial and industrial loans had fallen by 9%, but also bank credit standards had become relatively tighter for small businesses. In contrast, a recent report of the U.S. Government Accountability Office[131] (GAO, 2018) documents that, while many community banks changed their lending processes and increased documentation requirements, processing time, fees and minimum credit criteria, these changes did not have a significant effect on SME lending. Furthermore, Cortés et al. (2018) study whether stress testing had an impact on the slow recovery in small business lending in the US in the aftermath of the crisis. They find that banks that were most affected by stress tests were less willing to supply loans to small and risky businesses (see also Doerr, 2018), while smaller banks that were not subject to the stress tests took up the slack and were more willing to lend to such borrowers, so that aggregate credit supply was not affected.

Besides the effects of reforms themselves, there is also a literature studying the impact of specific tools that became available in the aftermath of the crisis. For example, Ayyagari et al. (2017) combine data on 1.3 million firms from 2002 to 2011, across 59 countries and find that borrower targeted macroprudential policies have a negative effect on lending, including long-term lending, especially for small firms.

This overview highlights some gaps in the literature studying the effect of regulation on SME lending. So far, no study has attempted to disentangle the particular effects of the globally agreed reforms specifically on SME lending, instead mainly focusing on local regulations. Furthermore, the few studies mentioned have focused only on the EU or certain European countries and the US, but no studies have looked at the impact of reforms either on a global scale comparing the impact for different countries or for other regions of the world (e.g. Asia or South America). Lastly, there are no studies focusing specifically on the effects of regulation on SME financing in emerging economies, which face significantly different jurisdictional context and operating environments, and on whether the transmission channels of these effects may differ from those in advanced economies.

Other factors affecting SME finance

The period after 2009 poses many challenges for evaluating the impact of regulatory reforms on SME lending, as other coetaneous events also impacted SME lending.

The sovereign debt crisis that unfolded after 2009 is one of these events. Several papers have shown that banks reduced lending to the private sector in response to sovereign shocks (Correa

[131] US Government Accountability Office, *Community Banks: Effect of Regulations on Small Business Lending and Institutions Appears Modest, but Lending Data Could Be Improved* (August 2018).

et al., 2012; Ivashina, et al., 2015; Bofondi et al., 2013; De Marco, 2014; Bedendo & Colla, 2014; Popov & Van Horen, 2015). In contrast, evidence for SMEs more specifically is mixed: while Ferrando et al. (2015) find that large firms are more likely to be credit constrained than SMEs in stressed countries after the crisis, Kremp & Sevestre (2012) use a sample of 60,000 French SMEs and argue that even though banks followed stricter lending standards after 2009, credit rationing remained limited.

Monetary policy and in particular the unconventional monetary policy measures implemented in the aftermath of the crisis are another possible confounding factor. Ferrando et al. (2015) focus on the effects of the ECB's Outright Monetary Transactions (OMT) programme on SMEs and conclude that after the OMT programme announcement smaller firms were less likely to be credit constrained. These results are congruent with previous studies (e.g. Gertler & Gilchrist, 1994; Jimenez et al., 2012) according to which smaller firms are more sensitive to monetary policy shocks. Moreover, Cahn et al. (2017) exploit an unexpected drop in the cost of funding loans to a subset of firms in France for banks in 2012 and conclude that this drop in funding costs was quickly translated into an increase in bank credit to SMEs. [132] Moreover, they also find that the increase in bank credit was associated with ex post credit rating upgrades, which indicates that the additional credit was not "zombie lending", and that the effect was mainly driven by firms with which the bank already had a close relationship. In contrast, other studies find that central-bank-supplied liquidity has been largely ineffective at expanding lending to small firms. Andrade et al. (2018) find that large firms benefited disproportionally from the Long Term Refinancing Operations (LTROs) of the ECB in 2011-12 and that banks did not increase their lending to riskier firms. Rodnyansky & Darmouni (2017) assessed the effects of the Fed's asset purchases and obtain similar results.

There is also a literature that illustrates possible spillover effects on SME lending from other sectors of the economy, most notably the housing sector. For example, Chakraborty et al. (2017) study the role of the bank lending channel in the presence of an asset price boom and find negative real effects for firms: during a housing boom, banks increase mortgage lending and if capital constraints are sufficiently binding, this increase crowds out commercial lending. The firms that are crowded out reduce their investment levels more than their peers, and these effects are stronger for smaller firms. Similar mechanics may occur also in a downturn: Bord et al. (2018) find that large banks that were impacted by the collapse of the real estate market in 2007 in the US very strongly reduced credit supply to small firms. While this effect was partially mitigated by less impacted banks, the net effect on lending remained negative. In a similar vein, Iyer et al. (2014) study the credit supply effects of the unexpected freeze of the European interbank market in the crisis of 2007-09. Using Portuguese loan-level data, they find that banks that relied more on interbank borrowing before the crisis decreased their credit supply more during the crisis. They also document that smaller firms suffered more from this reduction in credit supply.

Finally, bank failures and bail-ins could also have an effect on SMEs. Beck et al. (2017B) study the failure and bail-in of a Portuguese bank and find that credit lines to SMEs that were more exposed to the resolution through their bank relationship were significantly reduced. Moreover,

[132] As a response to the liquidity crisis in the interbank funding market in 2011, the ECB announced in Dec 2011 that National Central Banks would be able to accept additional credit claims (assets with lower credit ratings) as collateral from banks that want to borrow (so called Additional Credit Claims framework, see Bignon et al., 2016).

the bail-in caused an increase in interest rates, a relative decrease in the maturity of new credit and had real economic implications as affected firms and especially illiquid SMEs reduced investment and employment significantly.

Bibliography

Admati, A. R., DeMarzo, P. M., Hellwig, M. F., & Pfleiderer, P. C. (2013). Fallacies, irrelevant facts, and myths in the discussion of capital regulation: Why bank equity is not socially expensive. Max Planck Institute Preprint, http://coll-files.iwww.mpg.de/pdf_dat/2013_23online.pdf.

Admati, A., DeMarzo, P., Hellwig, M., & Pfleiderer, P. (2012). Debt overhang and capital regulation, https://www.gsb.stanford.edu/faculty-research/working-papers/debt-overhang-capital-regulation.

Admati, A., & Hellwig, M. (2014). The Banker's New Clothes: What's Wrong with Banking and What to Do about It, Princeton University Press.

Aghion, P., Bergeaud, A., Cette, G., Lecat, R., & Maghin, H. (2018). The Inverted-U Relationship Between Credit Access and Productivity Growth (No. 696). https://scholar.harvard.edu/files/aghion/files/inverted-u_relationship.pdf.

Agostino, M., & Trivieri, F. (2014). Does trade credit play a signalling role? Some evidence from SMEs microdata. *Small Business Economics*, 42(1), 131-151, January.

Aiyar, S., Calomiris, C. W., Hooley, J., Korniyenko, Y., & Wieladek, T. (2014). Does macro-pru leak? Evidence from a UK policy experiment. *Journal of Money Credit and Banking*, 46(1) 181-214, February, https://onlinelibrary.wiley.com/doi/epdf/10.1111/jmcb.12086.

Allen, B., Chan, K. K., Milne, A., & Thomas, S. (2012). Basel III: Is the cure worse than the disease? *International Review of Financial Analysis*, 25, 159-166, December.

Andrade, P., Cahn, C., Fraisse, H., & Mésonnier, J. S. (2018). Can the Provision of Long-term Liquidity Help to Avoid a Credit Crunch? Evidence from the Eurosystem's LTRO. *Journal of the European Economic Association*, June, https://academic.oup.com/jeea/advance-article/doi/10.1093/jeea/jvy020/5035663.

Angelini, P., Clerc, L., Cúrdia, V., Gambacorta, L., Gerali, A., Locarno, A., & Vlček, J. (2015). Basel III: Long-term Impact on Economic Performance and Fluctuations. The Manchester School, 83(2), 217-251.

Arráiz, I., Meléndez, M., & Stucchi, R. (2014). Partial credit guarantees and firm performance: evidence from Colombia. *Small Business Economics*, 43(3), 711-724.

Ayyagari, M., Beck, T., & Martinez Peria, M. S. (2017). Credit growth and macroprudential policies: preliminary evidence on the firm level, *BIS Papers no 91,* https://www.bis.org/publ/bppdf/bispap91a.pdf.

Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2011). Small vs. young firms across the world: contribution to employment, job creation, and growth. The World Bank, April, http://documents.worldbank.org/curated/en/478851468161354807/pdf/WPS5631.pdf.

Bahaj, S., & Malherbe, F. (2018). The Forced Safety Effect: How Higher Capital Requirements Can Increase Bank Lending, July, http://faculty.london.edu/fmalherbe/BM.pdf.

Banerjee, R. N., & Mio, H. (2018). The impact of liquidity regulation on banks. *Journal of Financial Intermediation*, *35*, 30-44.

Bartoli, F., Ferri, G., Murro, P., & Rotondi, Z. (2013). SME financing and the choice of lending technology in Italy: Complementarity or substitutability? *Journal of Banking & Finance*, 37(12), 5476-5485.

Basel Committee on Banking Supervision (2010). Basel III: A global regulatory framework for more resilient banks and banking systems. Bank for International Settlements, December, https://www.bis.org/publ/bcbs189.pdf.

Basel Committee on Banking Supervision (2013). Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools. Bank for International Settlements, January, https://www.bis.org/publ/bcbs238.pdf.

Basel Committee on Banking Supervision (2016). Literature review on integration of regulatory capital and liquidity instruments. Working Paper No. 30, Bank for International Settlements, March, https://www.bis.org/bcbs/publ/wp30.pdf.

Beck, T., Da-Rocha-Lopes, S., & Silva, A. F. (2017B). Sharing the pain? Credit supply and real effects of bank bail-ins, https://sbfc.sydney.edu.au/2017/docs/Beck,-Da-Rocha-Lopes-and-Silva-WP-2017.pdf.

Beck, T., Degryse, H., De Haas, R., & Van Horen, N. (2018). When arm's length is too far: Relationship banking over the credit cycle. *Journal of Financial Economics*, 127(1), 174-196.

Beck, T., & Demirgüç-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, 30(11), 2931-2943, November.

Beck, T., Demirgüç-Kunt, A., Laeven, L., & Levine, R. (2008B). Finance, firm size, and growth. *Journal of Money, Credit and Banking*, 40 (7), https://research.tilburguniversity.edu/en/publications/finance-firm-size-and-growth.

Beck, T., Demirgüç-Kunt, A., Laeven, L., & Maksimovic, V. (2006). The determinants of financing obstacles. *Journal of International Money and Finance*, 25(6), 932-952.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2010). Financial institutions and markets across countries and over time: The updated financial development and structure database. *The World Bank Economic Review*, 24(1), 77-92, http://documents.worldbank.org/curated/en/916561468331178510/pdf/776350JRN020100itutions0and0Markets.pdf

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: does firm size matter? *The Journal of Finance*, 60(1), 137-177.

Beck, T., Demirgüç-Kunt, A., & Maksimovic, V. (2008A). Financing patterns around the world: Are small firms different? *Journal of Financial Economics*, 89(3), 467-487.

Beck, T., Demirgüç-Kunt, A., & Pería, M. S. M. (2011). Bank financing for SMEs: Evidence across countries and bank ownership types. *Journal of Financial Services Research*, 39(1-2), 35-54.

Beck, T., Ioannidou, V., & Schäfer, L. (2017A). Foreigners vs. natives: Bank lending technologies and loan pricing. *Management Science*, September, http://openaccess.city.ac.uk/15667/1/Beck-Ioannidou-Schaefer_20160902.pdf.

Bedendo, M., & Colla, P. (2015). Sovereign and corporate credit risk: Evidence from the Eurozone. *Journal of Corporate Finance*, 33, 34-52.

Behn, M., Daminato, C., and Salleo, C. (2019). A dynamic model of bank behaviour under multiple regulatory constraints, ECB Working Paper No. 2233, January, https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2233~f03ecad4e8.en.pdf.

Behn, M., Haselmann, R., & Wachtel, P. (2016). Procyclical capital regulation and lending. *The Journal of Finance*, 71(2): 919-956.

Berger, A. N., Klapper, L. F., & Udell, G. F. (2001). The ability of banks to lend to informationally opaque small businesses. The World Bank, August, https://openknowledge.worldbank.org/handle/10986/19567.

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., & Stein, J. C. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics*, 76(2), 237-269.

Bertrand, M., Schoar, A., & Thesmar D., "Banking deregulation and industry structure: Evidence from the French banking reforms of 1985," *The Journal of Finance*, 2007, 62 (2), 597–628.

Biais, B., & Gollier, C. (1997). Trade credit and credit rationing. *The Review of Financial Studies*, 10(4), 903-937.

Bignon, V., Boissay F., Cahn C. & Harpedanne de Belleville, L. (2016), "Extended eligibility of credit claims for Eurosystem refinancing", Quarterly Selection Banque de France No. 43, Autumn, https://publications.banque-france.fr/sites/default/files/medias/documents/quarterly-selection-of-articles_43_2016-autumn.pdf.

Bloom, N., Mahajan, A., McKenzie, D., & Roberts, J. (2010). Why do firms in developing countries have low productivity? *American Economic Review*, 100(2), 619-23.

Bofondi, M., Carpinelli, L., & Sette, E. (2013). Credit supply during a sovereign debt crisis. Temi di discussione (Economic Working Papers) 909, Bank of Italy. Economic Research and International Relations Area, https://www.bancaditalia.it/pubblicazioni/altri-atti-convegni/2013-2-sovereign-debt-crisis/carpinelli.pdf.

Bolton, P., Freixas, X., Gambacorta, L., & Mistrulli, P. (2016). Relationship and Transaction Lending in a Crisis, *The Review of Financial Studies*, 29 (10), 2643–2676, October.

Boot, A. W. (2000). Relationship banking: What do we know? *Journal of Financial Intermediation*, 9(1), 7-25.

Boot, A. W., & Thakor, A. V. (2000). Can relationship banking survive competition? *The Journal of Finance*, 55(2), 679-713.

Bord, V. M., Ivashina, V., & Taliaferro, R. D. (2018). Large banks and small firm lending (No. w25184). National Bureau of Economic Research.

Bordo, M. D., & Duca, J. V. (2018). The Impact of the Dodd-Frank Act on Small Business (No. w24501). National Bureau of Economic Research, https://www.nber.org/papers/w24501.

Bridges, J., Gregory, D., Nielsen, M., Pezzini, S., Radia, A., & Spaltro, M. (2014). The impact of capital requirements on bank lending. Bank of England Working Paper No. 486, January, https://www.bankofengland.co.uk/working-paper/2014/the-impact-of-capital-requirements-on-bank-lending.

Bris, A., & Welch, I. (2005). The optimal concentration of creditors. *The Journal of Finance*, 60(5), 2193-2212.

Burkart, M., & Ellingsen, T. (2004). In-kind finance: A theory of trade credit. *American Economic Review*, 94(3), 569-590.

Cahn, C., Duquerroy, A., & Mullins, W. (2017). Unconventional monetary policy and bank lending relationships, Banque de France Working Paper No. 659, December, https://www.banque-france.fr/sites/default/files/medias/documents/wp659_0.pdf.

Canales, R., & Nanda, R. (2012). A darker side to decentralized banks: Market power and credit rationing in SME lending. *Journal of Financial Economics,* 105(2), 353-366.

Carbo-Valverde, S., Degryse, H., & Rodríguez-Fernández, F. (2015). The impact of securitization on credit rationing: Empirical evidence. *Journal of Financial Stability*, 20, 36-50.

Carbó-Valverde, S., Rodríguez-Fernández, F., & Udell, G. F. (2016). Trade credit, the financial crisis, and SME access to finance. *Journal of Money, Credit and Banking*, 48(1), 113-143.

Casey, E., & O'Toole, C. M. (2014). Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *Journal of Corporate Finance*, 27, 173-193.

Cetorelli, N., & Strahan, P. E. (2006). Finance as a barrier to entry: Bank competition and industry structure in local US markets. *The Journal of Finance*, 61(1), 437-461.

Chakraborty, I., Goldstein, I., & MacKinlay, A. (2017). Monetary Stimulus and Bank Lending. Finance Down Under 2017 Building on the Best from the Cellars of Finance.

Clarke, G, Cull, R., Peria, M., & Sánchez, S. (2002). Bank lending to small businesses in Latin America: Does bank origin matter? The World Bank, http://web.worldbank.org/archive/website00955A/WEB/PDF/BANK_ORI.PDF.

Cohen, B. H. (2013). How Have Banks Adjusted to Higher Capital Requirements? *BIS Quarterly Review*, https://www.bis.org/publ/qtrpdf/r_qt1309e.htm.

Cornaggia, J., Mao, Y., Tian, X., & Wolfe, B. (2015). Does banking competition affect innovation? *Journal of Financial Economics*, 115(1), 189-209.

Correa, R., Sapriza, H., & Andrei Zlate, N. (2012). Liquidity Shocks. Dollar Funding Costs, and the Bank Lending Channel During the European Sovereign Crisis, Board of Governors of the Federal Reserve System International Finance Discussion Papers, (1059), https://www.federalreserve.gov/pubs/ifdp/2012/1059/ifdp1059.pdf.

Cortés, K., Demyanyk, Y., Li, L., Loutskina, E., & Strahan, P. E. (2019). Stress tests and small business lending (No. w24365). *Journal of Financial Economics.*

Cotugno, M., Monferrà, S., & Sampagnaro, G. (2013). Relationship lending, hierarchical distance and credit tightening: Evidence from the financial crisis. *Journal of Banking & Finance*, 37(5), 1372-1385.

De la Torre, A., Pería, M. S. M., & Schmukler, S. L. (2010). Bank involvement with SMEs: Beyond relationship lending. *Journal of Banking and Finance*, *9*(34), 2280-2293.

De Marco, F. (2014). Bank lending and the sovereign debt crisis. Manuscript, Boston College.

Degryse, H., & Ongena, S. (2007). The impact of competition on bank orientation. *Journal of Financial Intermediation*, 16(3), 399-424.

Degryse, H., Matthews, K. and Zhao, T. (2017) 'Relationship banking and regional SME financing: the case of Wales', *International Journal of Banking, Accounting and Finance*, Vol. 8, No. 1, pp.93–118

Demirgüç-Kunt, A., & Maksimovic, V. (2001). Firms as financial intermediaries: Evidence from trade credit data, http://documents.worldbank.org/curated/en/973231468767093690/pdf/multi0page.pdf.

DeYoung, R., Gron, A., Torna, G., & Winton, A. (2015). Risk overhang and loan portfolio decisions: small business loan supply before and during the financial crisis. *The Journal of Finance*, 70(6), 2451-2488.

Dietsch, M., Düllmann, K., Fraisse, H., Koziol, P., Ott, C. (2016): Support for the SME supporting factor – multi-country empirical evidence on systematic risk factor for SME loans, Deutsche Bundesbank – Discussion Paper 45/2016, https://www.bundesbank.de/resource/blob/704058/4b9ab175da611d1d49eceacee3571c6e/mL/2016-11-21-dkp-45-data.pdf.

Doerr, S. (2018). No Risk, No Growth: The effects of Stress Testing on Entrepreneurship and Innovation.

Fama, E. F. (1985). What's different about banks? *Journal of Monetary Economics*, 15(1), 29-39.

Ferrando, A., & Griesshaber, N. (2011). Financing obstacles among euro area firms: Who suffers the most? European Central Bank Working Paper Series No. 1293, February, https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1293.pdf.

Ferrando, A., Popov, A. A., & Udell, G. F. (2015). Sovereign stress, unconventional monetary policy, and SME access to finance, ECB Working Paper Series, No. 1820, June, https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1820.en.pdf.

Ferri, G., & Murro, P. (2015). Do firm–bank 'odd couples' exacerbate credit rationing? *Journal of Financial Intermediation*, 24(2), 231-251.

Fraisse, H., Lé, M., & Thesmar, D. (2017). The real effects of bank capital requirements. ESRB Working Paper Series No. 47, June, https://www.esrb.europa.eu/pub/pdf/wp/esrbwp47.en.pdf.

Francis, W., & Osborne, M. (2009). Bank regulation, capital and credit supply: measuring the impact of prudential standards. FSA Occasional paper, 36, September, http://www.fsa.gov.uk/pubs/occpapers/op36.pdf.

Gambacorta, L., & Shin, H. S. (2018). Why bank capital matters for monetary policy. *Journal of Financial Intermediation*, July.

Gertler, M., & Gilchrist, S. (1994). Monetary policy, business cycles, and the behavior of small manufacturing firms. *The Quarterly Journal of Economics*, 109(2), 309-340.

Goel, T., Lewrick, U., & Tarashev, N. (2017). Bank capital allocation under multiple constraints, BIS Working Papers, No. 666, October, https://www.bis.org/publ/work666.pdf.

Gropp, R., Mosk, T., Ongena, S., & Wix, C. (2019). Banks Response to Higher Capital Requirements: Evidence from a Quasi-Natural Experiment. *The Review of Financial Studies*, January.

Hsieh, C. T., & Klenow, P. J. (2014). Misallocation and manufacturing TFP in China and India. *The Quarterly Journal of Economics*, 124(4), 1403-1448, August, http://klenow.com/HsiehKlenow_LifeCycle.pdf.

Humblot, T. (2014). Basel III effects on SMEs access to bank credit: an empirical assessment. CR14-EFI06.

Ivashina, V., Scharfstein, D. S., & Stein, J. (2015). Dollar Funding and the Lending Behavior of Global Banks. *The Quarterly Journal of Economics*, April, https://scholar.harvard.edu/files/stein/files/ivashina-scharfstein-qje-2015.pdf.

Iyer, R., Peydró, J. L., da-Rocha-Lopes, S., & Schoar, A. (2014). Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis. *The Review of Financial Studies*, 27(1), 347-372, January, https://academic.oup.com/rfs/article/27/1/347/1573768.

Jiménez, G., Ongena, S., Peydró, J. L., & Saurina, J. (2012). Credit supply and monetary policy: Identifying the bank balance-sheet channel with loan applications. *American Economic Review*, 102(5), 2301-26, August, https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.102.5.2301.

Jiménez, G., Ongena, S., Peydró, J. L., & Saurina, J. (2017). Macroprudential policy, countercyclical bank capital buffers, and credit supply: evidence from the Spanish dynamic provisioning experiments. *Journal of Political Economy*, 125(6), 2126-2177.

Kremp, E., & Sevestre, P. (2013). Did the crisis induce credit rationing for French SMEs? *Journal of Banking & Finance*, 37(10), 3757-3772.

Macroeconomic Assessment Group. (2010). Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements. Final Report, Bank for International Settlements, December, https://www.bis.org/publ/othp12.pdf.

Mankart, J., Michaelides, A., & Pagratis, S. (2018). Bank Capital Buffers in a Dynamic Model. Financial Management. Deutsche Bundesbank Discussion Paper No 51/2018 https://www.bundesbank.de/resource/blob/773124/ce20bf7b832693ee41357cc7bd9c1248/mL/2019-01-15-dkp-51-data.pdf.

Masiak, C., Block, J. H., Moritz, A., Lang, F., & Kraemer-Eis, H. (2017). Financing Micro Firms in Europe: An Empirical Analysis. EIF Working Paper No. 2017/44, September, https://www.eif.org/news_centre/publications/eif_wp_44.pdf.

Mayordomo, S., & Rodríguez-Moreno, M. (2018). Did the bank capital relief induced by the Supporting Factor enhance SME lending? *Journal of Financial Intermediation*.

Mian, A. (2006). Distance constraints: The limits of foreign lending in poor economies. *The Journal of Finance*, 61(3), 1465-1505, https://scholar.princeton.edu/sites/default/files/SSRN-id631705_0.pdf.

Miles, D., Yang, J., & Marcheggiano, G. (2013). Optimal bank capital. *The Economic Journal*, 123(567), 1-37.

Miller, M. H. (1995). Do the M & M propositions apply to banks? *Journal of Banking & Finance*, 19(3-4), 483-489.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48(3), 261-297.

Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147-175.

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.

Peek, J., & Rosengren, E. (1995). The Capital Crunch: Neither a borrower nor a lender be. *Journal of Money, Credit and Banking*, 27, 625-638.

Peek, J., & Rosengren, E. S. (2000). Collateral damage: Effects of the Japanese bank crisis on real activity in the United States. *American Economic Review*, 90(1), 30-45, March, https://pubs.aeaweb.org/doi/pdfplus/10.1257/aer.90.1.30.

Petersen, M. A., & Rajan, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *The Journal of Finance*, 49(1), 3-37.

Petersen, M. A., & Rajan, R. G. (1997). Trade credit: theories and evidence. *The Review of Financial Studies*, 10(3), 661-691.

Popov, A., & Van Horen, N. (2015). Exporting sovereign stress: Evidence from syndicated bank lending during the euro area sovereign debt crisis. *Review of Finance*, 19(5), 1825-1866.

Presbitero, A. F., & Zazzaro, A. (2011). Competition and relationship lending: Friends or foes? *Journal of Financial Intermediation*, 20(3), 387-413.

Rajan, R. G. (1992). Insiders and outsiders: The choice between informed and arm's-length debt. *The Journal of Finance*, 47(4), 1367-1400.

Rice, Tara and Philip E. Strahan, "Does Credit Competition Affect Small-Firm Finance?" *The Journal of Finance*, June 2010, 65 (3), 861–889.

Rodnyansky, A., & Darmouni, O. M. (2017). The effects of quantitative easing on bank lending behavior. *The Review of Financial Studies*, 30(11), 3858-3887, November.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), 393-410.

Thakor, A. V. (1996). Capital requirements, monetary policy, and aggregate bank lending: theory and empirical evidence. *The Journal of Finance*, 51(1), 279-324.

Uchida, H., Udell, G. F., & Yamori, N. (2012). Loan officers and relationship lending to SMEs. *Journal of Financial Intermediation*, 21(1), 97-122.

United States Government Accountability Office (2018). Community Banks: Effect of Regulations on Small Business Lending and Institutions Appears Modest, but Lending Data Could Be Improved, August.

Vig, V. (2013). Access to collateral and corporate debt structure: Evidence from a natural experiment. *The Journal of Finance*, 68(3), 881-928, June, https://onlinelibrary.wiley.com/doi/epdf/10.1111/jofi.12020.

Wong, T. C., Fong, T., Li, K. F., & Choi, H. (2010). An assessment of the long-term economic impact of the new regulatory reform on Hong Kong.

Annex G: Composition of the evaluation working group

Chair	**Klaas Knot** President De Nederlandsche Bank
Argentina	**Daniela Bossio** Advisor to the Chief of Cabinet Ministry of Finance
Brazil	**André Barbosa Costa** Head of Division Banco Central do Brasil
France	**Anne-Sophie Cavallo (until January 2019)** Financial Regulation Expert, Financial Stability Division Banque de France
	Clément Martin (from December 2018) Economist, Financial Stability Division Banque de France
Germany	**Philipp Marek** Economist, Financial Stability Division Deutsche Bundesbank
	Ingrid Stein Principal Economist, Financial Stability Division Deutsche Bundesbank
Hong Kong	**Eric Wong** Senior Economist, Market Research Division Hong Kong Monetary Authority
Italy	**Vincenzo Meola** Directorate for Banking and Financial System Ministry of Economy and Finance
	Valerio Vacca Manager, Financial Stability Directorate Banca d'Italia
	Maddalena Galardo Advisor Banca d'Italia
Indonesia	**Kurniawan Agung** Deputy Director, Macroprudential Policy Department Bank Indonesia
Japan	**Ryozo Himino** Vice Minister for International Affairs Japan Financial Services Agency

	Chizuko Takai Deputy Director Japan Financial Services Agency
	Makoto Minegishi Deputy Director-General Financial System and Bank Examination Department, Bank of Japan
Mexico	**Juan Cardenas** Manager, Financial Stability Directorate Banco de México
	Mariela Dal Borgo Research Economist Banco de México
Netherlands	**Paul Hilbers** Director De Nederlandsche Bank
Saudi Arabia	**Saud M. Albarrak** G20 Program Officer Saudi Arabian Monetary Authority
Singapore	**Lily Chan** Principal Economist & Specialist Leader, MacroFin Modelling Monetary Authority of Singapore
Spain	**Mikel Bedayo** Global Prudential Policy and Impact Analysis Division Banco de Espana
Turkey	**İzzet Yerdeş** Senior Expert Turkish Treasury
UK	**Paolo Siciliani** Senior Technical Specialist, Prudential Policy Directorate Bank of England
	Kyoungsoo Yoon Bank of England (seconded from Bank of Korea)
US	**Donald Morgan** Assistant Vice President, Research Department Federal Reserve Bank of New York
	Sharon Yang Deputy Assistant Secretary U.S. Department of the Treasury
	Michael Carlson International Economist U.S. Department of the Treasury

BIS	**Catherine Koch** Economist, Monetary and Economic Department
European Commission	**Andreas Strohm** Economic Advisor
ECB	**Markus Behn** Principal Financial Stability Expert, Financial Regulation and Policy Division
	Alexandra Born Financial Stability Expert, Financial Regulation and Policy Division
ECB Banking Supervision	**Karen Braun-Munzinger** Head of Division, Financial Regulation and Policy Division
OECD	**Naima Smaini** Policy Analyst Centre for Entrepreneurship, SMEs, Regions and Cities
World Bank	**Martin Melecky** Lead Economist Finance, Competitiveness and Innovation Global Practice
BCBS	**Mark Pocock (until July 2019)** **Edson Bastos e Santos** Members of Secretariat
IAIS	**Conor Donaldson** Head of Implementation
IOSCO	**Shane Worner** Senior Economist and Head of the Market Intelligence and Data Analysis Team
FSB Secretariat	**Vukile Davidson (from October 2018)** **Simonetta Iannotti** **Kyoko Oishi** **Costas Stephanou** Members of Secretariat
Chair support	**Jeroen Hessel** De Nederlandsche Bank
	Marco van Hengel De Nederlandsche Bank
Academic advisors	**Thorsten Beck** Professor of Banking and Finance, Cass Business School
	Hans Degryse Professor of Finance, Department of Accountancy, Finance and Insurance, KU Leuven