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Boot, A.; Hoffmann, P.; Laeven, L.; Ratnovski, L.

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## The old and the new of fintech

Arnoud Boot, Peter Hoffmann, Luc Laeven, Lev Ratnovski 21 July 2020

*Technological change in the financial industry is accelerating. Recent developments include new innovations and improvements on past trends. This column distinguishes between the information and communication channels of financial innovation and analyses their implications for financial intermediation. It suggests that innovations in these two dimensions may lead to big changes in the traditional bank business model. New policy priorities should focus on accurately assessing the operational risks and ensuring the robustness of these technologies.*



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Technological change in the financial industry is accelerating. Incumbents face disruption from innovative start-ups and large technology firms (Philippon 2020). The ongoing COVID-19 crisis, which has increased demand for digital services, will if anything speed-up this process. This raises some important issues. What are the key dimensions of innovation in the provision of financial services? Are they genuinely new developments, or rather the continuation of past trends?

In a recent paper (Boot et al. 2020), we develop a simple conceptual framework that distinguishes between two key dimensions of financial innovation: information (data collection and processing) and communication (relationships and distribution). Superior information and communication are key ingredients of the financial intermediation process because they allow intermediaries to overcome frictions related to adverse selection and 'match-making', which helps to ensure an efficient transformation of savings into investment. Moreover, they enable banks to generate market power, and the resulting 'charter value' makes the financial system more stable and forward-looking. When discussing the implications of innovations in information and communication for financial intermediation, we distinguish between the continuation of established trends and genuinely new developments. Table 1 provides an overview.

**Table 1** Technological progress and financial intermediation

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**Arnoud Boot**

Professor of Corporate Finance and Financial Markets, University of Amsterdam; CEPR Research Fellow



**Peter Hoffmann**

Senior Economist, DG- Research, European Central Bank



**Luc Laeven**

Director-General of the Directorate General Research, European Central Bank and CEPR Research Fellow

	Information	Communication
Role in financial intermediation	Collect and process data for screening and monitoring	Establish relationships and distribution networks
Established trends	Codification of soft information	Move from in-person to distant (telephone and online) interactions
New developments	New types of (non-financial) data; Data abundance enables AI and machine learning	Low-cost search, matching, and distribution through internet-based and smartphone-based digital platforms



**Lev Ratnovski**

Lead Economist, DG-Research,  
ECB

## What's old?

Technological progress in finance is nothing new. In particular, the proliferation of hard information and the shift away from in-person interactions are prime examples of technological progress in information and communication that predate the current wave of digitalisation. The existing literature offers useful insights on the effects of these trends:

- Hard information mostly improves credit conditions (Jappelli and Pagano 1993, Berger and Udell 2007, Loutskina and Strahan 2009). However, such information may be difficult to generate for SMEs or innovative firms, leading to worse credit terms for some borrowers (Petersen and Rajan 1994, Dell'Ariccia et al. 2017). At the aggregate level, an increasing reliance on hard information can increase the cyclicity of credit supply (Allen and Gale 1997, Bolton et al. 2016, Boot and Ratnovski 2016).
- A shift from in-person to remote communication (e.g. online banking) creates convenience for customers. With more efficient communication, the reach of financial intermediaries widens, which creates competitive pressure and increases incentives for consolidation as response to rising overcapacity in physical branch networks. Moreover, it also fosters an increase in institutional complexity as banks boost their product range to remain the 'first point of contact' for financial services customers (Houston et al. 2001).

## What's new?

These past trends stand in sharp contrast to novel developments:

- Key innovations in information are the rise of machine learning and artificial intelligence, enabled by an abundance of data. Notably, this includes non-financial data such as the 'digital footprint' or customer information gathered by digital platforms, which is valuable for financial decision making (Berg et al. 2019, Frost et al. 2019).
- On the communication side, the ability to establish efficient distribution channels at low cost through online portals and social media marketing campaigns has lowered barriers to entry. This enables the rise of specialised standalone financial intermediaries. Moreover, the internet has given rise to digital platforms that have penetrated much of consumers' everyday lives. Financial services fit well into such ecosystems because they complement the consumption of non-financial goods and services. Accordingly, digital platforms have a natural interest to include financial services into their offerings. Their communication advantage may enable them to take over the role of 'first point of contact' with customers from banks.

The figures below illustrate the effects of technological progress in information and communication for the financial industry. Financial intermediation relies most heavily on the use of computers among all industry sectors in the economy, and the trend towards automation has led to a consistent decline in employment (Figure 1). At the same time, the share of customers who use online banking has increased from under 20% to over 50% over the past two decades, whereas the number of bank branches has almost halved over the same time (Figure 2).

**Figure 1** Computer use and employment in financial intermediation

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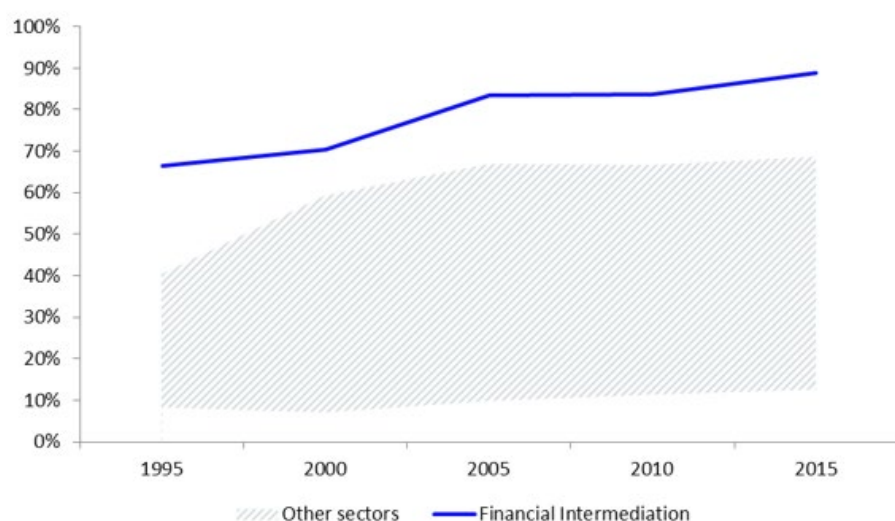
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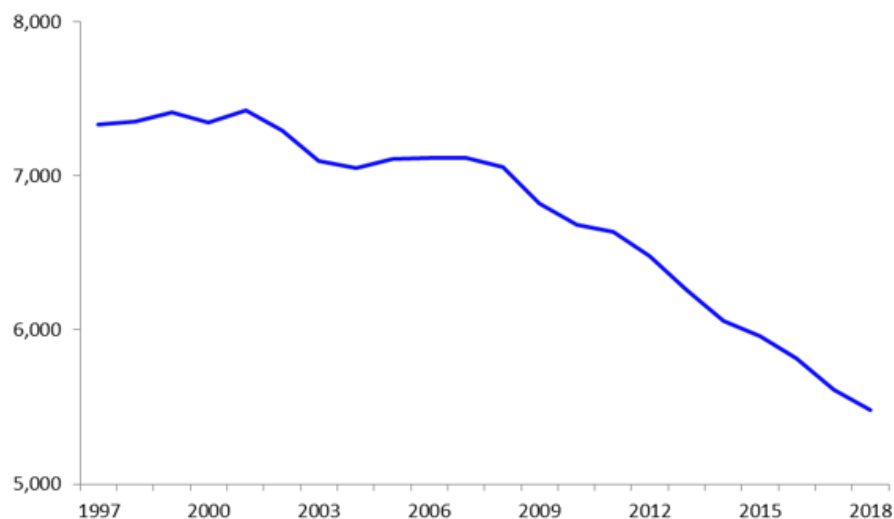
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**a) Computer use across sectors (EU15)**



**b) Bank employees per million inhabitants (EU15)**



*Note:* The top panel shows the share of employees that report using computer at work, across NACE-1 sectors. The blue line shows the share for Financial Intermediation, while the shaded grey area indicates the range for other sectors. The bottom panel shows the number of bank employees per million inhabitants.

*Source:* European Working Conditions Survey (top) and ECB Statistical Data Warehouse (bottom). Source: . All data cover EU15 countries

**Figure 2** Use of online banking and the number of bank branches in Europe

**a) Use of online banking services (EU15)**

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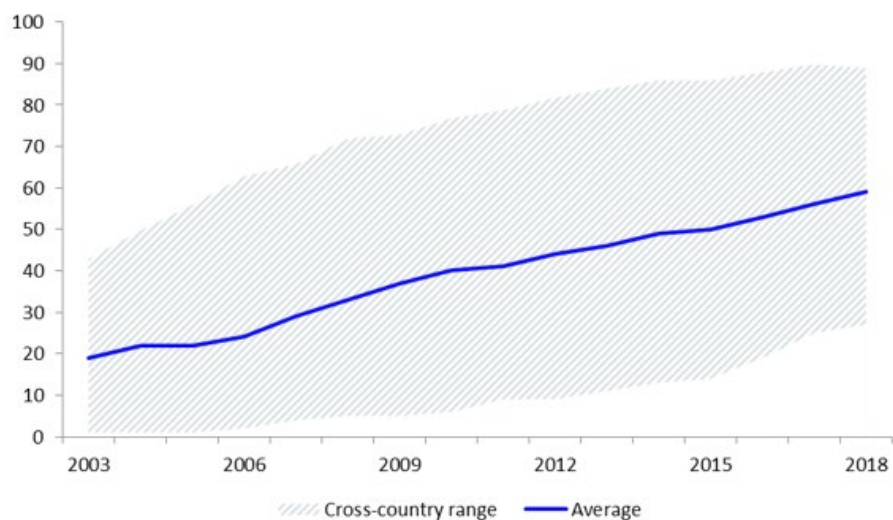
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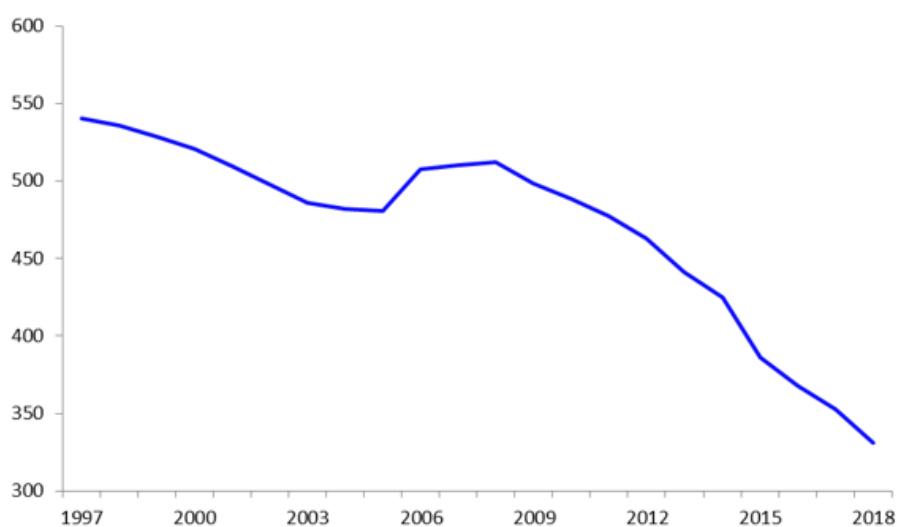
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## b) Bank branches per million inhabitants (EU15)



*Notes:* The left panel shows the share of survey respondents that report regular use of online banking services. The blue line indicates the average, while the shaded grey area shows the cross-country range. The right panel graphs the number of bank branches per million inhabitants.

*Source:* Eurostat (top) and ECB Statistical Data Warehouse (bottom). All data cover EU 15 countries.

Another novelty is the change in the relative importance of information and communication in driving competitive advantages in financial services provision. The literature has historically focused on informational frictions in financial intermediation, viewing the effects of communication as mechanical and similar to those in non-financial industries. However, it is the recent communication innovation that gives digital platforms unrivalled market power. Similarly, the competitive challenge from specialised providers is largely driven by innovations in communication rather than information.

## Disintegration of bank business models

Going forward, recent innovations in information and communication technologies may lead to the vertical and horizontal disintegration of the traditional bank business model. At present, there are some limiting factors to this extreme outcome, but these may decline over time:

- Specialised providers compete on convenience, efficiency, and speed. Since new communication channels enable them to side-step banks' distribution networks, they can attempt to chip away horizontally integrated banking services (e.g. payments, asset management, etc.) that do not require access to a deep balance sheet (which they do not

have). They may, however, be constrained by their narrow business models.

- Digital platforms can interject themselves between banks and their customers, introducing another layer of intermediation that captures most rents and data. So far, the reach of digital platforms is constrained by their focus on retail consumers. This may change with the rise of cloud computing, which allows large technology firms to create business-to-business (B2B) ecosystems that include large corporate customers and is able to generate information and communication advantages that can be used for the provision of financial services to these clients as well.

In the extreme, competitive forces created by technological progress can relegate banks to upstream (i.e. non customer-facing) providers of maturity transformation services. They can attempt to stave off the competitive pressures from platforms and specialised entrants by investing in the digitalisation of their own business processes. However, besides the associated costs, such transformation is often impeded by entrenched organisational cultures, reputational risks, and regulatory factors.

## Policy challenges

Technological innovations in information and communication give rise to new policy priorities:

- Prudential regulation needs to address a financial system that is more cyclical and crisis-prone due to its reliance on hard information. In addition, the robustness of new lending technologies (such as peer-to-peer (P2P) or those based on digital footprint data) is untested in downturns. Operational risks from new business models and cybersecurity issues are hard to assess. Increased complexity of financial supply chains increases regulatory arbitrage concerns, as risks become 'hidden' in complex network structures, less regulated entities, or more lenient jurisdictions. Digital platforms and large providers of cloud services may need to be designated as systemically important infrastructures. Critically, regulatory agencies need to ensure that their expertise matches that of the industry (Hakenes and Schnabel 2014) – something that has historically been hard to achieve and may become even harder as innovation accelerates and more talent enters the financial technology sphere.
- The transmission of monetary policy will change. Technological innovations render deposit and loan markets more contestable, which is likely to amplify the pass-through of policy rates (e.g. Drechsler et al. 2017). A better pass-through might be welcome, as a more cyclical financial system may require more countercyclical monetary policy. The introduction of central bank digital currencies (CBDCs) – also in response to payment innovations – can remove the effective lower bound on interest rates (Griffoli et al. 2018). In monetary policy implementation, the increased use of collateral (rather than soft information) in lending will further weaken the relevance of the unsecured lending rates as operational targets (English 2002). Finally, the decreasing number and importance of banks will spark further debate on allowing non-banks to access central bank operations.
- Additional priorities include those in data and competition policy (see also Carrière-Swallow and Haksar 2019, and Vives 2019).

The question of whether other entities can efficiently fulfil the economic role of banks remains open. However, even if this were the case, the transition would be complex and require fundamental policy adjustments because banks are currently at the core of the financial system.

*Authors' Note: The views are our own and not those of the ECB or the Eurosystem.*

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