FinTech and Banks: Friends or Foes?

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1. Introduction

FinTech hypes abound. In the news, FinTech is "disruptive", "revolutionary" and armed with "digital weapons", that will "tear down" barriers and traditional financial institutions (World Economic Forum, 2017).

Although FinTech (see the Box below for a definition) has been expanding very rapidly in financial markets, as documented in the Numbers section of this Journal, the jury is still out, and their potential impact on banks and financial institutions, as we know them today, is far from clear yet. The tension between stability and competition underlies the whole debate on FinTech and on how to regulate it. The crucial question is whether and how far FinTechs are replacing banks and other incumbent financial institutions. And whether, in doing so, they will induce a healthy competitive process, enhancing efficiency in a market with high entry barriers, or rather cause disruption and financial instability. This issue of European Economy deals especially with the relationship between FinTechs and banks.

Our bottom line is that *FinTechs enhance competition in financial markets, provide services that traditional financial institutions do less efficiently or do not do at all, and widen the pool of users of such services. But they will not replace banks in most of their key functions.* In most cases, FinTechs provide a more efficient way to do the same old things. Yet *banks are well placed to adopt technological innovations, and do the old things in the new way themselves.*

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FinTechs provide indeed the same services as banks, possibly more efficiently because of technologies, but in a different and unbundled way. For example, like banks, crowdfunding platforms transform savings into loans and investments. Yet, differently from banks, the information they use is based on big data not on long term relationships; access to services is only decentralized through internet platforms; risk and maturity transformation is not carried out; lenders and borrowers or investors and investment opportunities are matched directly. There is disintermediation in this case. These are pure FinTech activities. *However, these pure FinTech unbundled activities have limited scope.* For example, it is difficult for platforms to offer to their clients diversified investment opportunities without keeping part of the risk on their books, or otherwise securitizing loan portfolios.

Other functions carried out through FinTechs instead of banks, like payment systems (e.g. Apple pay instead of credit cards) are still supported by banks. Banks loose part of their margins, but still keep the final interface with their clients, and because of the efficiency of these new systems, they expand their range of activities. Hence, in this case, *there may be strong complementarities between banks and FinTechs.*

The value chain of banks includes many bundled services and activities. FinTech generally carry out one or few of these activities in an unbundled way. Yet, bundling provides powerful economies of scope. The economics of banking is precisely based on, and has a strong rationale in the ability of banks to bundle services like deposits, payments, lending etc. For this reason, FinTechs will also have to bundle several services if they wish to expand their activities (as for the crowdfunding example above) or integrate their services with those of banks (as for the payment systems above).

The business model of FinTechs, therefore, is highly likely to gradually converge towards that of banks, as we will discuss in this editorial. As this happens, it is no longer clear that FinTechs have a neat competitive advantage on banks, besides for the legacy costs that banks face in reorganizing their business. Moreover, as FinTechs expand their range of activities, the scope for regulatory arbitrage will decline. We share Ferrarini's view in this issue (see also the section on regulation of this editorial below), *that a case by case regulatory approach should be implemented, essentially applying existing regulations on FinTechs, on the basis of the service they carry out.* Regulation

should be applied when services are carried out (of course with an element of proportionality), independently from which institution is carrying them out.

For example, if we consider again loan based crowdfundig, different regulatory frameworks could be relevant, depending on what these platforms actually do. Banking regulation could be unnecessary, if platforms do not have the opaqueness of banks in transforming risks and maturities and do not keep such risks on their balance sheets, for example by collecting deposits and lending outside a peer-to-peer (P2P) framework. But it should be enforced if platforms carry out such activities.

Once regulatory arbitrage is ruled out, and the same regulatory framework is imposed on all institutions on the basis of the functions they perform, the playing field is levelled. Then the only competitive advantage is the one granted by technology and the organization of activities. The framework becomes one of pure competition with technological innovation. Vives in this issue discusses several competitive options banks and FinTechs face. We also discuss this at length in section 3 of this editorial.

Cases of entrants with digital innovations and their disruptive effects abound in sectors affected by digital technologies. Netflix caused the "bust" of Blockbuster and Amazon that of many retailers and booksellers. Skype took 40% of the international calls markets in less than ten years. For the incumbents the deadly mix of the newcomers was lower-costs higher-efficiency with better or new products and services, "sprinkled" with incumbents' inability to swiftly account and adapt to the changing landscape.

Although evocative, these examples do not fit precisely the financial industry. This is significantly different because banking is multiproduct, with largely heterogeneous customers, intrinsically plagued by asymmetric information and heavily regulated.

Competition will enhance efficiency, bring in new players, but also strengthen the resilient incumbents, able to play the new game. Intermediation will keep being a crucial function of financial markets. Intermediation will partly be carried out in a different way than today: much more internet and internet platforms; much more processing of hard information through big data. *But banks will note disappear. If some do, they will be replaced by other, more efficient ones. The real casualties will not be banking activities, but mostly small banks and banking jobs.*

We will develop further our arguments in the rest of this editorial. In the next section, we will first discuss the key economic ingredients characterizing banking activities, and how they might be affected by FinTech, in particular with respect to maturity and risk transformation, payment systems and the management of information. In the following section, we will compare the revenue models and the incentive frameworks characterizing the activities of banks and FinTechs and how these may affect their competitive prospects. We will finally conclude with a discussion on regulation.

Box 1: What is FinTech

Fintech refers to the novel processes and products that become available for financial services thanks to digital technological advancements. More precisely, the Financial Stability Board defines fintech as "*technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services*".[2]

The areas of actual and potential expansion of Fintech are: a) transactions execution (payments, clearing and settlement); b) funds management (deposit, lending, capital raising and investment management); and c) insurance.

The ability to impact on essentially all the services typically offered by traditional financial institutions, such as banks, comes from cost reductions implied by digital technology advancements, improved and novel products for consumers and limited regulatory burden. More specifically, with technological advancements Fintech operators benefit from: i) lower costs of search that enable matching in financial markets more effectively, ii) economies of scale in collecting and manipulating large bunches of data, iii) cheaper and more secure transmission of information, iv) lower costs of verification.

2. The economics of FinTech and banks

A bank is an institution whose current operations consist in granting loans and receiving deposits from the public (Freixas and Rochet, 2008). This entails

2. See http://www.fsb.org/what-we-do/policy-development/additional-policy-areas/monitoring-of-fintech/

performing simultaneously three sets of activities: transmuting the characteristics of financial assets and liabilities, providing payment services, collecting and processing information (see Dermine, in this issue, for a thorough analysis of the impact of Fintech on many different financial services).

Transmuting the characteristics of financial assets and liabilities is mainly realized through *maturity transformation*, that is the use of short-term funding to grant long-term loans. This function is crucial to any economic system, since it allows to fund long-term investments, and therefore foster productivity, while at the same time insuring depositors from idiosyncratic liquidity shocks. Because of their function in providing liquidity to their customers, banks are also well placed in offering *payment services*.

Information processing includes all the activities related with the ex-ante screening of potential borrowers, with the ex-post monitoring of their behavior, and with the construction and management of a diversified portfolio that maximizes the return to risk ratio.

Economies of scope justify the internalization and bundling of all these key services within the boundaries of one institutions. They provide a core rationale for banks' existence.[3]

We therefore need the perspective of each of these three key services to understand the impact of FinTech on the banking industry. We will discuss them in turns.

a) Credit and liquidity risk

The first key task of banks is to transmute the characteristics of financial assets and liabilities, in particular through maturity transformation. Banks can exploit diversified large pools of small size depositors to cope with the impact of idiosyncratic liquidity shocks. Since it is unlikely that depositors unexpectedly need to withdraw their funds all at the same time, banks can set aside a limited buffer of liquid assets to grant longer-term loans. In synthesis, they can transform short-term sight deposits into long-term loans. This is the essence of banks' ability to provide liquidity services (Bryant, 1980, and

3. Banks also perform a host of other services, such as portfolio management, financial advice, security underwriting and brokerage, but although these may also benefit from economies of scope and are relevant from a revenue perspective, they are not crucial to their specificity as financial intermediaries.

Diamond and Dybvig, 1983). Unless technological innovation will change significantly the way in which maturity transformation is performed, which seems to be unlikely, the interesting question from our perspective is whether FinTech companies can also provide liquidity management services.

The answer is yes and no. Yes, because any FinTech company can raise funds and put them in a pool, from which its clients can make withdrawals when needed. No, because if they use these funds to grant illiquid loans or acquire less liquid assets, they would need a specific authorization. In particular, if FinTech companies raise deposit-like funds to grant illiquid loans, they would be acting by definition as banks, and as such they would be under a bank charter.

Therefore, as long as banks are subject to fractional reserve requirements, they have an advantage in providing liquidity services to their depositors, because they can perform maturity transformation and earn the interest margin.

In a way, FinTech companies providing liquidity services are like 100% reserve or "narrow" banks, with the possible additional weakness that their accounts are not as trustable as those of banks, since the latter are subject to much stricter regulations.[4] Moreover, bank depositors are also partly shielded by credit risk by capital buffers and deposit insurance. Also, the structure of bank liabilities gives a priority to the holders of some asset classes, such as depositors and bondholders.

Clearly, all this is not the case with FinTech companies, that typically act as brokers, leaving on investors the credit risk of the loans that they grant (unless it is covered externally by an insurance company). While the new discipline on bank resolution increased significantly the share of credit risk on banks' depositors and other creditors, this has been partly matched by the surge in capital requirements.

Because of maturity transformation, banks also disentangle any loan that they grant from the funding of each single depositor, *obtaining in this way a much better portfolio diversification than what a single depositor could achieve.*

In principle, any financial intermediary could perform these same activities. But while venture capital and private equity firms are typically much better than banks in screening and monitoring opaque entrepreneurs,

4. For a recent survey on fractional reserve banking see Pennacchi (2012).

they normally do not obtain the same degree of portfolio diversification. And while investment funds have very diversified portfolios, they typically invest only in listed shares. If they are based on a pure peer-to-peer (P2P) principle, crowdfunding lending and investment platforms cannot offer any diversification to investors. If they do, then platforms will have to take up part of their risk on their books (hence falling under banking regulation) or act as issuers of securities (then falling under security regulation).

In fact, most of the match-makers currently adopt the so called "agency model", where they do not retain the risk of the loan that they originate, do not interfere with its price, and receive compensation through commission fees, that may be paid by both sides of the transaction. It is therefore very likely that, for a given portfolio of assets, the riskiness of FinTech liabilities is higher than that of bank deposits and plain bonds. And that, due to their different incentives, FinTech companies are likely to have riskier asset portfolios than banks.

Hence, as far as banks also adopt new information management technologies and regulatory arbitrage is ruled out, the threat to their business coming from this channel of credit and liquidity risk seems limited.

b) Payment systems

Banks' ability to provide instruments for liquidity and risk management is very much related to their ability to supply payment services. There are obvious and strong economies of scope in providing at the same time liquidity and payment services: customers facing a liquidity need are much better off if they can make payments directly from their deposit account. This is the very reason why checks were originally introduced, and why ATMs and POS followed.

Many payments can be made by transferring value across accounts, with no need of recurring to cash (or other central-bank liabilities, such as bank reserves). In most of cases the transfer is among banks. In fact, even many services that appear to be extremely innovative (e.g. Apple pay) are in fact technological devices that make it easier to transfer value across bank accounts.

But a number of non-bank financial intermediaries are indeed emerging, from payment institutions to electronic money providers. In some countries,

also non-financial corporation, such as telecommunication companies, are entering the market of payment services, exploiting their large base of customers.

In China, for example, telecommunication companies have been offering for years payment services linked to deposit-like accounts, that often paid higher interest rates than deposits at commercial banks. However, to a large extent, this expansion was possible and profitable because of the limited diffusion of bank accounts in China (as in all other emerging economies, see Vives in this issue) and because bank deposits were subject to interest rate ceilings. In most countries, non-financial corporations are not allowed to pay interest rates on their accounts, and there are no interest rate ceilings on bank deposits.

In general, if non-financial corporations or non-bank financial corporations can afford to compete with banks in payment services by paying higher interest rates on their accounts, there must be some kind of benefit that compensates for their inability to exploit the fractional reserve requirements and earn the interest margin granted by maturity transformation. We can think of at least three reasons. First, *lighter regulatory requirements* than banks. The role of telecommunication companies in China is the case in point. Second, *better technologies*, allowing non-banks to provide similar payment services at lower costs. Third, different and more effective *economies of scope* than those available to banks.

The case of regulatory arbitrage is not particularly interesting, since it depends on the decisions of the authorities. As we argue below, the more FinTechs carry out activities similar to banks, and the more they become systemically relevant, the lower there should be room left to regulatory arbitrage.

Technological advantage is relevant in the short-run, when new players can enter the market and exploit their better technologies. But there are no clear reasons why in the long-run banks should not be able to adopt the same technology as non-banks. Of course, banks face huge legacy costs that slow down their transition to new technologies. But as far as technological adoption is fast enough for banks not to lose their network economies, we should expect technological convergence.

The presence of economies of scope between payment services and other business activities that banks cannot replicate is no doubt the most interesting

issue. These economies of scope arise especially between providers of payment services and of other services typically affected by network externalities, like Amazon and Apple in consumption and Google in internet services. To generate these transactions not only the matching must be efficient, but it is necessary that both sides of the market, sellers and buyers, lenders and borrowers, are willing to be "on board". In particular, there must be a sufficiently large pool of lenders ready to offer funding to borrowers. This is partly the reason why these IT giants are starting to offer payments and other banking services like (indirectly) consumer credit, where economies of scope are huge in information processing: purchases, payments and internet searches alike allow these companies to evaluate the credit risk of their clients possibly better than banks.

Other economies of scope relate to the possibility of extending consumer credit to customers, thereby using interlinked pricing strategies. This is an old game, think for example at the consumer-credit banks owned by the sellers of durable goods like cars. With a customer base such that of Amazon, the potential of this activity expands immensely. Yet this connection is strictly restricted to consumer credit. And if companies start to do consumer credit, they will also face standard regulatory restrictions. Interestingly, Amazon's store cards, that provide consumer credit, are issued by a consumer financial service bank, Synchrony, which also manages credit scoring and payments.

There might be technological economies of scope to be exploited by linking electronic purchase platforms with electronic payment platforms. Paypal, the largest world supplier of electronic payment services, started its business as a linked service to E-bay, the electronic auction and sale site. However, Paypal offers today services far and above payments on E-bay, most of which are linked to bank or to credit card accounts (also linked to bank accounts). On top of that, Paypal has nowadays a bank charter.

Finally, the digital ledger or blockchain technology would require a separate discussion, beyond the scope of this editorial. Yet we should at least mention digital payments with virtual currencies such as the Bitcoin. Blockchain technologies record any type of digitalized information permanently and virtually with no possibility of manipulation by anyone. This helps in building trust with no need for the State or notaries guaranteeing the actual legitimacy of the transaction and the ownership of the assets

transferred. This certainty and certification of property rights greatly facilitates the commerce and exchanges, building on "automatic, machine based trust". This is of course an option also to banks, not necessarily only to new comers.

c) Information

The entire financial sector builds on information and information management. Recent developments in ICT have radically changed the way information is processed by financial institutions. As discussed by Bofondi and Gobbi in this issue, these developments have impacts in three different dimensions. First, data storage and processing, because cloud computing allows for the implementation of on demand high level computational capacity at fairly low cost. Second, data transfer through the internet at low cost. Third, data availability, because of the increasing digitalization of society and the economy.

The type of information that financial institutions have and the way they use it to take their decisions is a crucial element to consider in discussing the potential impact of FinTech on banks. FinTechs function on big data and on the standardization of information. Banks, most of the time, on soft and relationship based information. It is also clear that any advancement on information technology profoundly affects the financial sector: FinTech operators are modifying both production and distribution of financial services.

As for the *production of financial services*, a huge mass of personal information is collected and analyzed nowadays. Large client bases and their past behavior allow to predict preferences, needs and trends and to offer the right financial product at the right moment and with the right price. Big data and machine learning are two key ingredients that are dramatically changing the landscape of financial services. Applications and effects on the industry are growing and will be pervasive, from screening potential borrowers to pricing risk at the individual level. Amazon Store Cards boast that they can take instant credit decisions in 15 seconds, something unthinkable through standard means of credit processing.

Distribution of financial services is deeply affected as well, with new channels, personalization, flexibility and better matching. Here, the driver of change is the possibility to match different sides of the market easily and

effectively. Online platforms allow sellers and buyers to screen for the best deals in a process that is more efficient the more populated is the other side of the market, a network externality. At the same time, large information bases allow FinTech provider to assess the characteristics of their customer to implement price discrimination policies.

What matters most for financial applications of tools such as machine learning, big data and matching is the ability to recognize patterns quickly by digging in vast data set, an activity that would be virtually impossible for humans. The idea is not new as even standard regression econometric models can be seen as tools for pattern recognition. The novelty lies in the possibility to rely on extremely large set of data that are explored with more and more powerful computers and algorithms that explore, learn and identify patterns.

There are however *four key questions* concerning the transition to hard information and big data.

A first question is who owns and has access to the information. The screening capacity is based on hard information derived from huge data sets. As stated, the gist of digital innovations is the large amount of data for pattern recognition and the network externalities that are needed for matching and that non-linearly increase with the size of the network, for example in peer-to-peer platforms. If the information is private, only platforms with large client base have a sufficient scale to have such data. And certainly, giant internet companies like Amazon have huge amount of data on which to base their analyses.

Incumbent large traditional operators, such as banks, will also have an informational advantage. It is not clear how far these institutions make use of this information, how far the information itself is already digitalized and how far their ICT facilities allow banks to process this information. Whatever the case, incumbent banks can certainly build up large data bases at a lower cost than new entrants.

Hence, new FinTech entrants will initially suffer from small scale. Naturally, also publicly available information can be used. And regulation may force private owner of information to disclose it to entrants. For example, the new Payments System Directive (PSD2) imposes to banks to release information on their clients' accounts to other financial institutions, on request of clients themselves. Even though these prospects presently refer to

deposits and current account conditions, they might be extended to credit performances and the assessment of borrowers.

However, second question, the processing of hard information has huge legal and social implications, in terms of privacy, in terms of the mechanisms of reciprocal assessment in society, and of cyber risk. The more information and data on the financial behavior of individuals become public, the lower barriers to entry, but also the more we move away from a society where screening occurs through direct economic and social interactions. Understanding the implications of this pattern is beyond the scope of this editorial, but it is very likely that regularly restraints will be set up, specifying to what extent private information may become public and shared. In this respect, who has legitimate channels to be the holder of large volumes of private data (banks on their clients), will also keep being in an advantageous competitive position.

A third question is how far hard data can fully replace soft information. It is clear, for example, that relationship lending is hard to replace in granting credit to small-medium-enterprises (SMEs), with still fairly high degrees of opacity in their accounts and future business prospects. Or in evaluating large investments or loans, involving a large concentration of risk.

This claim could partly be mitigated by the fact that one of the interesting applications of machine learning is the area of natural language recognition and interpretation. For example, the huge amount of lines of texts in social networks could be investigated to identify preferences, desires and attitudes. In the future, this may have very deep consequences in the banking sector as well. Relationship banking is built on human interactions between a loan officer and a prospective borrower. The former is meant to be able to interpret the behavior of the latter and give a meaning and a judgment to the borrower's trustworthiness and other subjective matters. Improving pattern recognition with machine learning, for example in text and verbal communication, could complement (or perhaps replace) this human activity.

Finally, the fourth question concerns the different incentives that banks and FinTechs have in processing information. Banks act as *delegated monitors* for their clients: they screen ex-ante the applications, by evaluating in detail the prospects of the potential borrowers and the value of the collateral that they may be posting; they monitor ex-post their performance along the whole duration of the lending relationship, possibly enforcing covenants capable of

limiting losses in case of default (Diamond, 1984). Thus, they manage the credit risk of the investors, partly holding a share of it in their balance sheets. Moreover, the risk and maturity transformation function carried out by banks, and the inherent structural instability of their balance sheets (risk of bank-runs), provide very strong incentives for better information collection and management than for non-bank institutions, that do not carry out such functions (Diamond and Rajan, 2001). Directly managing credit risk and incentives to collect information seem less strong for many FinTechs, where platforms have an originate and distribute function and do not keep risks on their balance sheet. This different structure may well involve high moral hazard and lower incentives for actively screen investments and monitor ex post performances.

3. FinTech and banks: incentives, competition and regulation

For the reasons discussed above, we believe it is unlikely that FinTech will supplant banks in the long-run: they will probably live together, possibly becoming more and more similar. Here we further explore the competitive context that will likely emerge and how their different business model will coexist, and how far new entrants and incumbents will behave like complements or substitutes, i.e., like friend or foes. To answer these questions, we can consider three major aspects: the funding and revenue structure of FinTechs compared to banks; the sustainability of the unbundling of the banks' product mix and the potential competitive reaction of banks; the role of regulation.

a) Funding and revenue structure

Some of the disintermediated activities of FinTech operators are based on matching supply and demand, as in the digital platforms. As seen, most of FinTech operators have adopted the "agency model" where they do not retain the risk of the loan they originate. Differently, in the traditional "wholesale model" of banking, banks purchase funds from lenders and resell them to borrowers, but keep the credit risk on their books. The difference between these two business models is not only in who bears the risk of the loan, but also in the revenues structure. Banks act on both prices/interest rates paid to

the lender and received by the borrowers and make most of the money from interest rate margins. Digital platforms, instead, make money on fees.

How sustainable is this pure "agency model"? There are two crucial issues here. The first one relates to scale. The second one to the quality of the selection of borrowers.

Scale. To generate disintermediated transactions, matching must be efficient and both sides of the market (borrowers and lenders) must be willing to be "on board". The ability to match the two sides of the market, the probability of finding a good partner, grows more than proportionally with the size of the two sides. This property is the driver of the dramatic concentration trends experienced in online markets, where companies like Google and Amazon are essentially *winners take all*. Also, lending platforms have high fixed costs and low marginal costs. Thus, they need to operate on a large scale, because fees are paid on each transaction and this is what generates the bulk of revenues (in the US fees accounted to ninety percent of revenues of Lending Clubs in 2017).

Selection of borrowers. Platforms are multi or two-sided markets. Since match-makers need both sides on board, profit maximizing fees must factor in the potential reaction of each side. This requires charging comparatively more on the less elastic side of the market and even subsidizing the most elastic side. This has important implications for the quality of the lending process.

The combination of fee-based profitability, the need for a stable and possibly increasing source of lending and network externalities to cut out small players push lending platforms to broker as many deals as possible, "no matter what". But, as it is well known form the literature on information asymmetries, this is the perfect receipt for adverse selection on both sides of the market, lenders and borrowers. Moreover, as platforms will charge comparatively higher fees to the borrowers, which are typically less elastic than lenders, the problem of adverse selection will be especially serious for this side of the market.

One sensible solution to avoid this risk is the one recently adopted by the UK platform Zopa, that has announced it will open its own bank. This will allow to rely both on funds originated directly by online deposits, as well as on other traditional banking sources of funding.

But we are back to square one. This strategy brings convergence of FinTechs towards traditional banking.

b) Reacting to Fintechs' competition

Resisting the unbundling of the financial product mix. Many Fintech firms are entering in specific segments of the multi-product financial industry with a business model that, to some extent, is the opposite of universal banking. They operate in single and almost unregulated segments of the industry, and try to stay at latitude from the cost and burdens of banking regulation and compliance (see Figure 12 in the Numbers section, showing that FinTech is more common in countries where banking regulation is more severe).

The risk for traditional banks is that these segments may also be the most profitable ones, such as lending to borrowers with limited market power, and providing payment services and financial advice. This unbundling may be a nightmare for traditional banks, if it leads to a banking industry where the (already) competitive segment of retail banking remains the only realm of banks. They will then be limited to offering an essential, basic facility, very much like the utility industries of water supply, gas and electricity, while the more profitable segments and customers would instead go to FinTechs with few or no layers of intermediation. Figures 9 to 11 of the Numbers section show that indeed investment in FinTechs are higher the lower the level of competition in the banking market.

There are however several hints suggesting that this scenario will hardly emerge, besides for the large economies of scope in bundled activities discussed in the previous section.

First, although retail banking is competitive, it is also an enormous source of cheap funds, explicitly or implicitly protected by public guarantees. This fat part of the market will always provide cheap funds that can be leveraged on other activities.

Second, regulators and supervisors are starting to have Fintech firms under their radar, and for good reasons. Figures from 4 to 7 in the Numbers section show that there is much heterogeneity in the degree of regulatory stringency across services provided by Fintechs and across countries where such services are provided. Consumers' enthusiasm with Fintech may not be coupled with a knowledgeable understanding of the riskiness of Fintech products. Furthermore, the larger the FinTech industry will grow, the more important effects it will have on the stability of the entire financial sector. Despite all the attentions of regulators to avoid chilling the growing of Fintech operators

(see Ferrarini in this issue), we can still reasonably foresee that they will face an increase of their regulatory burden.

Third, traditional banks, at least the largest ones, are not indifferent nor stay put, and already started to incorporate digital innovations in their business models. This is a significant difference with respect to the mentioned cases of digitally-affected industries where incumbents were passive and often incredulous about the risk they were facing. The largest banks seem to have realized that FinTech is not a momentary detail in the history of financial industry, and are therefore reacting. Also, as argued, they have the considerable advantages of large network economies themselves, and the economies of scope of bundled activities.

Small and unspecialized banks will probably be unable to cope with digital innovation with the required intensity and scale (and, in passing, this may lead to another wave of acquisition in the banking industry spurred by FinTech pressure). Large banks will likely be able to absorb and digest the digital innovations and converge towards a new type of operator where many financial services, FinTech and not, are offered together. Buchak et al. (2017), one of the first studies on the impact of FinTech in the banking industry, show that *"(rural) commercial banks lose lending volume and take on riskier borrowers in response to peer-to-peer lending encroachment. Large (urban) bank loan volumes appear to be unaffected by the increase in competition."* Moreover, a substantial fraction (26.7%) of the peer-to-peer loan volume substitutes for small commercial bank personal loans.

This convergence is not new in the digital industries. Amazon, Apple, Facebook, Google and even Microsoft, they all started in different types of businesses (retail, computers and phones, social network, and search), but they are now converging to a similar set of activities that mix all the initial areas of specialization. Interestingly, most of these conglomerates have already experimented entry in the financial services sector, although with not great success so far. The attitudes of younger customers towards traditional banks suggests that it's a matter of time that these companies will be more successful at offering financial services.[5] But most likely, they will either focus

5. A multi-year survey by Scratch (an in-house unit of Viacom) shows that 75% of Millennials say they would prefer financial services from Google, Amazon, and PayPal than traditional banks that are also considered more painful that a visit to a dentist. See Baker et al. (2017).

only on targeted products, or they will set up a bank chartered subsidiary.

Resisting the cherry picking of the best customers. Some FinTech firms are entering with low-costs services, often targeting "unbanked" customers, both in developed and developing countries. However, other Fintech firms will target customers with high value for quality of services granting extreme attention to their customers' needs in terms of accessibility, customization, and speed and with the ability to collect and exploit large amount of personal data. Indeed, Figure 8 in the Numbers section shows that there is a positive relationship at the country level between bank sector development and FinTech.

Also, cherry picking in the banking sector is not new. The effects of entry of foreign banks in the recent history of the banking industry provides some useful insights. Several theoretical and empirical papers have shown that foreign banks tend to "cherry pick" and mainly lend to larger and more transparent firms.[6] This strategy is the consequence of foreign banks being comparatively better than local banks at monitoring "hard" information (e.g. accounting statements and collaterals), but not so in the case of "soft" information, (e.g. a borrower's trustworthiness and skills). Notably, this may be the case also for FinTech firms, that very much rely on codified and digitized information, at least as long as the type of digital innovations currently prevailing will continue to shape FinTech firms and their technologies.

What could be the effects of customers' segmentation in financial markets is difficult to say. Back to foreign banks, evidence is mixed. Some previous works identified an overall increase in lending due to the competitive pressure on domestic banks and the increased risk of takeovers that forced efficiency gains and an expansion of lending to previously unbanked borrowers. Other works instead showed a reduction in lending because the pool of borrowers after the "cream had been skimmed" is riskier, thus facing increased interest rates and reduced demand of loans.[7]

Reacting to the management of digital information. So far, active FinTech firms are mainly exploiting better abilities to match needs. Their impact on the type of collected information and on information management has not

6. Dell'Ariccia and Marquez (2004); Detragiache et al. (2008); Giannetti and Ongena (2012); Gormley (2010).
7. This negative effect is similar to the negative effects of limiting cross-subsidization between different classes of risks in insurance markets.

been dramatic (yet). However, as discussed above, one can envision drastic improvements in FinTech operators' ability to deal with information coming from multiple sources, such as social networks, different media and informal ratings. Will FinTech firms prove effective also dealing with soft information? Will they be able to transform soft into hard information? The consequences on the banking industry may be deep and drastic.

Consider the first stage of development of FinTech. We know that, generally, safer assets are also those that rely less on soft information and tend to be more liquid. Riskier assets, such as credits towards opaque SMEs, are instead based more on soft information and continued monitoring. Currently, FinTech operators are more efficient at managing hard information that can be digitalized, and thus focus more on safer and more standardized assets, such as consumer credit loans and mortgages. They will also leave to traditional operators, like banks, riskier assets that are better managed with soft information, which is difficult to "quantify, store and transmit impersonally" (Liberti and Petersen, 2017). Indeed, Boot and Thakor (2000) show that banks respond to more intense competition with relationship banking, and this is confirmed empirically by Degryse and Ongena (2007). SMEs may thus benefit not only directly from peer-to-peer lending, as discussed above, but also thanks to the competitive pressure the FinTech exert on traditional banks.

If FinTech operators also became better able to manage soft information effectively, this may open the door to the possibility for customers to rely on multiple relationship banking. The typical hold-up and rent extraction of relationship banking (Sharpe, 1990, and Rajan, 1992) will thus be mitigated, and margins from traditional banking business would be further eroded.

But traditional banks have several options to cope this competitive pressure that substantiate with unbundling, cherry-picking and improved information processing. They can renovate their existing IT infrastructure to the new FinTech approaches of information management, to avoid being cornered to the more and more competitive retail banking sector, where FinTech firms and larger digital operators will sooner or later exploit their competitive advantages. They can acquire start-up FinTech firms, to access and learn about the new technologies and to expand the offer to customers and to limit their competitive pressure (although competition authorities will

begin investigating soon such strategies). Alternatively, some large banks can keep relying on their scale and develop internally Fintech-like activities.

While these two different models will very likely coexist for some time, it is our opinion that the future of the financial industry will be shaped by the convergence of surviving incumbent banks and more "organic" FinTech operators.

c) Regulation

Regulation had and is still having a first order effects on the patterns of evolution of FinTech, likely as important as that of technological innovation itself.

The key question from the perspective of regulation is the trade-off between competition and financial stability. The aim of fostering competition in financial markets should lead, in principle, to a lighter regulatory approach than for traditional financial services. Yet, the expansion of FinTech poses implicit concerns in terms of financial stability, that cannot be disregarded.

Bofondi and Gobbi in this issue tackle this question by exploring the evolution of the regulatory framework in the Eighties, when IT and innovation like money market funds were already challenging traditional banking. In those years, the gradual pattern of deregulation, precisely aiming at enhancing competition and efficiency in the financial market, led to the expansion of shadow banking, the undertaking of risky off-balance sheet activities by banks, and finally to the financial crisis of 2008.

Both Bofondi and Gobbi and Vives, also in this issue, argue that an excessively light approach to the regulation of FinTech today may lead to similar consequences. The reason is not only the riskiness of FinTech per se, but also the fact that banks, because of the competitive pressure from FinTechs, might exploit opportunities of regulatory arbitrage and increase the riskiness of their activities. Xiang et al. in this issue explicitly state that "*reviewing and modifying existing regulatory concepts, framework, standards, and tools to adapt to FinTech innovations have become a crucial part [of China's efforts] to build a modern framework for financial regulation.*"

Especially because of the trend towards convergence between banks and FinTech identified in this editorial, the regulatory framework should level the playing field for overlapping services between FinTechs and traditional

providers. Regulation should then be concerned with the service provided, rather than with whom is providing it. Activities such as innovative payment services are partly unchartered territories, and pose new questions in terms of their regulatory requirements. Other new products, such as P2P lending, should be made at least fully transparent to their users.

The article of Guido Ferrarini in this issue convincingly illustrates that a case by case regulatory approach should be implemented, essentially applying existing regulations on Fintechs, depending on the type of services they carry out. For example, if we consider loan based crowdfunding, different regulatory frameworks could be relevant, depending on what these platforms do. Banking regulation could be irrelevant, if platforms do not have the opaqueness of banks in transforming risks and maturities and do not keep such risks on their balance sheets, for example by collecting deposits and lending outside a P2P framework. But it should be applied if platforms carry out such activities. Equally, if the platform has discretion in selecting potential borrowers or portfolios of borrowers for their clients, then they should be regulated as portfolio managers. And when the platform collects money without resorting to a third-party payment service provider, it should be subject to payment service regulation. Finally, if platforms develop secondary markets for their products, and issue tradable and non-tradable securities, they should be subject to security regulation.

This regulatory approach is not inconsistent with the regulatory framework that most countries are granting to Fintech companies, considered as new types of intermediaries, that should be subject to light regulation. "Sandbox régimes" and FinTech innovation hubs, i.e. periods of targeted light regulation, should be considered as temporary explorative tools to understand the implications of new products and services. The idea is to finalise the appropriate regulatory regime, without "throwing the baby away with the water".

Whatever the approach, what is crucial is the levelling out of the playing field, avoiding regulatory arbitrage that might lead to serious events of financial instability.

Summing up, the game is still open and the jury is still out. We see FinTech as a crucial healthy evolution of financial markets. Disruption can be avoided. But, as in all times of broad technological transition, a lot of work lies ahead. In the meanwhile, we hope you will enjoy reading this issue of European Economy.

References

Baker, H.K., Filbeck, G., and Ricciardi, V. (Eds.) (2017). Financial behavior: Players, services, products, and markets. Oxford University Press, USA.

Bofondi, M., and Gobbi, G. (2017). The big promise of FinTech. European Economy – Banks, Regulation, and the Real Sector, this issue.

Boot, A.W.A. (2017). The future of banking: From scale & scope economies to FinTech. European Economy – Banks, Regulation, and the Real Sector, this issue.

Boot, A.W.A., and Thakor, A.V. (2000). Can relationship banking survive competition? Journal of Finance, 55, 679–713.

Boyd, J. H., Prescott, E. C. (1986). Financial intermediary-coalitions. Journal of Economic Theory, 38, 211-232.

Bryant, J. (1980). A model of reserves, bank runs, and deposit insurance. Journal of Banking and Finance, 4, 335-344.

Buchak, G., Matvos, G., Pikorski, T., and Seru, A. (2017). FinTech, regulatory arbitrage, and the rise of shadow banking. NBER Working Paper, No. 23288.

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

Dell'Ariccia, G., and Marquez, R. (2004). Information and bank credit allocation. Journal of Financial Economics, 72, 185-214.

Dermine, J. (2017). Digital disruption and bank lending. European Economy – Banks, Regulation, and the Real Sector, this issue.

Detragiache, E., Tressel, T., and Gupta, P. (2008). Foreign Banks in Poor Countries: Theory and Evidence. Journal of Finance, 63, 2123–2160.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. The Review of Economic Studies, 51, 393-414.

Diamond, D. W., and Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. Journal of Political Economy, 91, 401-419.

Diamond, D. W., and Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: A theory of banking. Journal of political Economy, 109, 287-327.

Ferrarini, G. (2017). Regulating FinTech: Crowdfunding and beyond. European Economy – Banks, Regulation, and the Real Sector, this issue.

Freixas, X., and Rochet, J. C. (2008). Microeconomics of banking. MIT press.

Giannetti, M., and Ongena, S. (2012). "Lending by example": Direct and indirect effects of foreign banks in emerging markets. Journal of International Economics, 86, 167-180.

Gormley, T.A. (2010). The impact of foreign bank entry in emerging markets: Evidence from India. Journal of Financial Intermediation, 19, 26-51.

Liberti, J.M., and Petersen, M.A. (2017). Information: Hard and Soft. Mimeo. Available at: http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/hard%20and%20soft%20information.pdf

Liberti, J.M., Seru, A. and Vig, V. (2016). Information, credit, and organization. Available at SSRN: https://ssrn.com/abstract=2798608 or http://dx.doi.org/10.2139/ssrn.2798608.

Mocetti, S., Pagnini, M., and Sette, E. (2017). Information technology and banking organization. Journal of Financial Services Research, 51, 313-338.

Pennacchi, P. (2012). Narrow Banking. Annual Review of Financial Economics, 4, 141-159.

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

Sharpe, S.A. (1990). Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships. Journal of Finance, 45, 1069–1087.

Vives, X. (2017). The impact of FinTech on banking. European Economy – Banks, Regulation, and the Real Sector, this issue.

World Economic Forum (2017). Beyond FinTech: A pragmatic assessment of disruptive potential in financial service. Available at https://www2.deloitte.com/global/en/pages/financial-services/articles/beyond-FinTech-pragmatic-assessment-disruptive-potential-financial-services.html (accessed 10/12/2017).

Xiang, X., Lina, Z., Yun, W., and Chengxuan, H. (2017). China's path to FinTech development. European Economy – Banks, Regulation, and the Real Sector, this issue.