Digital banking and market disruption: a sense of *déjà vu*?

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The paper assesses the threat posed by digital banking as seen in the context of a long series of innovations in the banking sector that includes telephone banking, payment cards, the development of capital markets, internet, smartphones, and cloud computing. It focuses on the economics of banking services and banks' two main functions – as providers of liquidity and loans – and analyses whether these could be displaced by peer-to-peer and marketplace lending.

Digital banking is currently one of the main strategic issues faced by banks in terms of threats and opportunities. It raises also public policy issues: its impact on the profitability and solvency of banks, the protection of borrowers and investors, and the systemic importance of the new players, the fintechs starts-up specialised in financial services.

Even a casual reader of the press regularly comes across the impending death of banking. Fintechs – start-ups specialised in financial services – are disrupting banking markets. New payments systems have proliferated such as PayPal, Venmo, M-Pesa, Apple Pay, Android Pay, Alipay and Samsung Pay. Even social media platforms such as Facebook offer payment facilities. TransferWise and WorldRemit are competing with the incumbent Western Union for international transfers and remittances. On the credit side, Lending Club and Prosper, both in the United States, the British Zopa and Funding Circle, and the French Prêt d'Union are competing with established banks in the unsecured consumer loan market. The scale of the threat to the banking industry is summed up in the following:

"*They all want to eat our lunch. I mean every single one of them, and they are going to try*" (Jamie Dimon, Chairman and CEO of JP Morgan Chase, *Financial Times*, 26 February 2014). "*The aim is to inflict death by a thousand cuts. Fintech start-ups are nimble piranhas, each focusing on a small part of a bank's business model to attack*" (*Financial Times*, 14 October 2015).

The cataclysmic predictions of the slow death of banking reminds me of similar gloomy forecasts made over the past 35 years. When telephone banking was introduced in the 1980s, there were fears that telephone companies would enter the banking industry and displace the incumbent players. But that did not happen – the banks themselves started to offer telephone based services.

At that time, I was consulted by a major British petroleum company, whose clients were using a credit card issued by the company to buy gasoline, about adding other financial services to the card for its millions of customers. It did not happen. Similarly, the Standard Chartered Bank in Hong Kong was nervous about potential competition from the "Octopus" card, a payment card used by millions travelers on the Hong Kong subway, particularly if other financial services were added to the card. Again, the threat of market disruption did not materialise.

When in the 1990s, capital markets – bonds and equity markets – were deregulated, it was predicted that direct finance would replace costly and inefficient indirect finance and financial intermediation. But the prediction turned out to be wrong: banking assets-to-GDP ratios grew in both developed and emerging economies.

At the turn of the millennium, as the internet bubble went up, bankers were terrified that Microsoft would enter their industry and enable customers to navigate online from one bank to another – such transparency of prices and product offers seemed set to undermine revenues. According to forecasters at the time, the end of "branch banking" was imminent, with severe bank restructuring and massive layoffs (as had happened in the coal and steel industries). Again, the threat failed to materialise. Indeed in several countries, banks opened more street branches, in response to customer preference for physical proximity.

More recently, the same has been said of the smartphone, essentially a computer with internet access in your pocket – purportedly poised to revolutionise the world of banking.

After 35 years of impending doom, it seems appropriate to ask whether digital banking will bring market disruption, or is it simply a fad and another case of *déjà vu*? Will banks adapt to control the technology or "will tomorrow be really different" with the supply chain of banking services dismantled by new players?

The objective of this paper is to analyse the sources of market disruption brought by digital technology and to identify public policy issues that need to be addressed. It is divided into four sections. In the first section, I review six fundamental services offered by banks. In the second, I attempt to identify the major changes in technology, and in the third, how they may disrupt the offering of banking services. In the final section, public policy issues related to marketplace lending are identified.

1| Economics of banking services: six main functions

In financial markets, economic units holding surplus funds, be they households or firms (or more rarely, governments), can finance directly economic units that are short of funds, such as other firms, households, or governments. Savers can buy bonds or shares issued by deficit units directly on the financial markets. This is referred to as *direct finance*. Where there is an intermediary between the units with surplus and those with a deficit, we refer to *indirect finance*. A bank

is one example of a financial intermediary, collecting deposits and granting loans. Others include insurance companies, pension funds, and investment funds, such as mutual funds or hedge funds.

Although the services provided by banks in financial markets are interrelated, we can distinguish six categories of increasing complexity (Dermine, 2015): underwriting and placement, portfolio management, payment (transmission) services, monitoring or information-related services, risk sharing, and advisory services.

Underwriting and placement: a first service provided by banks is to bring together savers and borrowers. Underwriting and placement of securities – bonds or shares – help borrowers (corporate firms or public institutions) to meet surplus units, and structure or customise the type of securities that meet the risk/return requirements of borrowers and lenders. In this function, the underwriter is involved not only in designing the security, but also in the valuation of assets and the pricing of securities to ensure that the terms of the issue are competitive. As investors may wish in the future to transform these claims into cash, consumption or other securities, they need to be exchanged. Brokers/dealers or market makers provide these services to ensure secondary trading and liquidity. In a pure underwriting and placement service, it is assumed that the return and risk of the securities can be properly defined, so that there is no major problem of asymmetric information (agency problem) between lenders and borrowers. In this case, monitoring is not an issue. With the underwriting and placement service, the end-investor holds directly the claims on deficit units.

Portfolio management: investors can acquire at a low cost a diversified portfolio of securities issued by deficit spending units. Mutual funds and UCITS (Undertakings for the Collective Investment In Transferable Securities) supply a diversified portfolio to the holders of its shares. The income derived from the financial assets is paid to shareholders less a fee paid to the fund manager. These funds exist for three reasons: to reduce the divisional costs incurred in issuing many securities, to provide a diversified portfolio to investors, and to delegate asset management to specialists who can assess economic prospects.

Payment mechanism: a third function of financial markets is the management of the payment system, i.e. to facilitate and keep track of transfers of wealth among individuals. This is the bookkeeping activity of banks realised by debiting and crediting accounts. Although the retail payment system is limited by regulation to a specific type of deposits (demand deposits), it could be achieved by debiting or crediting any type of liquid assets.

Monitoring and information-related services: private information held by borrowers leads to contracting problems, because it is costly to assess the solvency of a borrower or to monitor his/her actions after lending has taken place (Stiglitz and Weiss, 1981). Sometimes, it is useful to package these claims in a portfolio, and banks perform a useful function in reducing the costs of screening and monitoring borrowers. The delegation of screening and monitoring to banks has been shown to be an efficient mechanism (Diamond, 1984). This fourth category is linked to the first (underwriting and placement) but listed here as a separate service as it corresponds to those cases where significant information asymmetries make it difficult to issue financial claims traded on securities markets. While the second service (portfolio management) refers to the management of liquid assets, this fourth function refers to the management of an illiquid loan portfolio, often the largest part of a bank's balance sheet.

Risk-sharing service: an increasingly important function of banks is to make the market more complete, i.e. to provide some form of insurance against multiple sources of risk. First, banks not only supply diversified assets, but also organise efficiently the distribution of risky income earned on the asset pool. The debt holders receive a fixed payment while the shareholders receive the residual income. Other insurance services include interest rate insurance (floating rate lending with various ceilings on interest rates called *caps or floors*), inflation insurance with real contract, and liquidity insurance, i.e. option for a deposit holder or the holder of a line of credit to withdraw cash quickly at its face value (Diamond and Dybvig, 1983).

Advisory services: advisory services to corporations and individuals are a significant source of fee income. Advices on mergers & acquisitions or risk management to corporations, as well as on asset management, tax or succession planning to individuals are all services offered by banks.

In the next two sections, we identify technological innovations and evaluate how digital technology could disrupt the offering of bank services.

2| Disruptive technology in banking, a historical perspective

The following sections review the technological innovations (by a non-specialist) and their impact on the banking industry: electronic processing of data, telephone banking, internet, smartphones and cloud computing.

Electronic processing of data. According to Ali *et al.* (2014a), a major breakthrough that affected the payment system was the move from manual entry of debit/credit in a book ledger, to machine-readers of checks, and subsequently electronic payments. The payment business relies on the mastering of electronic data processing with debit and credit of accounts. In this area, banks have no source of competitive advantage vis-à-vis tech firms such as telephone or internet companies, as illustrated by the proliferation of new entrants/payments systems, including the mentioned M-Pesa, PayPal, Apple Pay, Samsung Pay, and Alipay developed by the Chinese retailer Alibaba.

Telephone (minitel) banking: a major benefit of telephone (minitel) banking was that access to bank information (such as to the account balance) and transactions could be initiated from any location outside the bank's branch and processed automatically with electronic data processing.

Internet: compared to telephone banking, the Internet allowed millions of users to access data more easily from distant locations and facilitated the entry of transactions. Coupled with the development of mathematical algorithms, it allowed the clearing and settlement of securities trade at low cost. This facilitated the entry of online brokerage and asset management firms such as Boursorama and Cortal in France, Banco BIC in Portugal or Binckbank in the Netherlands, Belgium and France. More recently, the Internet and mathematical algorithms combination has allowed the matching of investors and borrowers.

This is best illustrated by America's Lending Club, which has attracted a significant attention due in part to a successful IPO in December 2014 and the presence of well-known individuals on its board, such as Larry Summers, former US Treasury Secretary, and John Mack, former president of Morgan Stanley. Founded in 2006 in San Francisco by the French entrepreneur Renaud Laplanche, the current CEO, it is essentially a brokerage platform matching investors to individual borrowers. On the first day of trading (12 December 2014) the price of its shares issued at USD 15 jumped to USD 24.75, a 65 per cent gain.

Initially dubbed peer-to-peer (P2P) lending with individuals financing individuals, it has evolved into "marketplace funding" with large institutional investors such as pensions funds or hedge funds making these loans. According to Credit Suisse analysts (CS, 2015), the USD 4 billion loan volume issued by Lending Club in 2014 can be compared to a total addressable market (TAM) of USD 873 billion of unsecured consumer loans, reaching USD 1,171 billion if one includes unsecured loans to small and medium size enterprises (SMEs). The claim of Lending Club is that, unencumbered by an expensive set of physical branches and outdated IT, it can operate with a much lower cost base, offering better returns to investors and cheaper loans to individuals. On 11 January 2016 it was trading with a price-to-book of 3.5 but a share price of USD 9.24, significantly below the December 2014 issue price of USD 15. Available FICO credit scores on the credit worthiness of individuals in the United States allows to classify credit risk and investors can diversify by investing pieces of USD 25 into several loans. Lending Club relies on digital technology to solve the asymmetric information and divisibility issues mentioned earlier.

Smartphone with sensors: smartphones that combine computer power and internet access allow banking at any time, any place. In addition, sensors collect data on customer habits which allows big data analytics.

Cloud computing: progress in storage and transmission of data allows the aggregation of data and softwares in specialised places on the "cloud". This has an important impact on the bank value chain. Data and softwares no longer need to be stored in house but can be stored with a third party. Smaller firms can benefit from lower cost generated by economies of scale of the cloud company specialists.

3| Banking services and disruptive digital technology

To understand the impact of digital technology on banking markets, it is useful to group some of the banking services discussed in Section 1 into three categories: those related to data processing, to data analysis, and to the bank's unique balance sheet structure, as in Table 1.

The first column lists banking services that involve mostly electronic data processing. They include payment with debit and credit of accounts, the development of digital currencies such as bitcoins,[1] brokerage of securities including trading with algorithms, and the distribution of passively managed funds. It includes consumer loans for which credit risk can be quantified with external discriminatory factors. Easy access to external data and statistical packages to evaluate credit risk implies that the risk is commoditised. As this first set of services requires expertise in data processing and not in banking, they are attractive to new competitors. Entrants into the payment business – PayPal, Apple Pay, etc., and in international money transfers (TransferWise) illustrate the significance of the threat.

In many cases, banks have been able to respond. In France, they joined forces to introduce Paylib for online payment. In the online securities brokerage industry, Boursorama and Cortal have fought off competition, but have seen a significant reduction of the fee per transaction. Other industry responses have been cooperation with telephone companies (such as Apple), but again with a reduction of bank revenue due to sharing. Finally, when credit risk is quantifiable with external data and commoditised, it becomes a data processing game. This explains the success of Lending Club in penetrating the US unsecured consumer loan market. Section 4 offers a specific analysis of credit market disruption.

An open and significant issue for banks is whether the loss of the payment business implies the loss of the client relationship and cross-selling opportunities (World Economic Forum, 2015). It is not clear whether data-processing specialists want to enter banking services related to data analysis and balance sheet structure. This would require the acquisition of banks' expertise at great cost. This would only happen if clients valued a single point of entry for the purchase of financial services (payment and other banking services). So far, the growth of the online payment PayPal does not seem to have affected yet the banking businesses.

The second column includes services that require data analysis and specific banking expertise. Lending involves not only a supply of funds, but also the control of risk via assessment of collateral and, when the economy dives, loan restructuring and recovery. This requires specific banking expertise that cannot be easily copied by data processing specialists.

The third column includes banking services that rely on the unique balance sheet of banks and their ability to mismatch maturities. As stated above, banks provide liquidity insurance services in both deposit and credit markets by relying on a large pool of depositors and borrowers. This service cannot be easily imitated by pure data processors. Lending Club, it should be observed, does not engage in maturity mismatch but offers matched-maturity medium-term investment.

From this we can conclude that data-processing activities are under threat from specialist companies

Table 1
Banking services

Data processing	Data analysis	Bank's balance sheet
Payment, crypto-currencies (bitcoin)	Lending to SMEs (with evaluation of risk, collateral, monitoring of risk, restructuring, recovery)	Deposits: safe (as backed by deposit insurance and diversified loan portfolio) and liquid (withdrawable on demand)
Brokerage of securities (shares and bonds), passively managed investment funds	Advisory (corporate finance and risk management)	Credit lines (borrowers can access liquidity on demand)
Consumer loans (credit risk is quantifiable, commoditised)	Asset management (advisory on estate planning, actively managed funds, structured products)	

Source: Jean Dermine.

1 *The case of crypto-currencies is not discussed in this essay (Ali* et al. *2014b).*

such as telephone or internet companies. India, for example, has recently granted banking licenses to telephone operators to stir competition. And the announcement on 6 January 2016 by the French telephone operator Orange of its intention to buy the insurer Groupama's bank to launch a mobile bank in 2017 will be closely monitored. Banking services that are quantifiable with external data and commoditised are also subject to competition, such as Lending Club in the consumer credit market. A fundamental question arises as to whether banks will be affected by the loss of payment business and client relations. Agile banks can adjust by offering alone or in partnership the omni-channel distribution to meet the needs of the clients, but often with a reduction of bank revenue, which in turn implies pressures to reduce operating costs.

As bank lending is fundamental for the economy, a specific analysis of digital disruption in the lending market follows.

4| Digital disruption, bank lending, and public policy

We have seen how P2P and marketplace funding could disrupt two banking services: the resolution of asymmetric information and the division of investment into small amounts to allow diversification. While it is too early to know whether the potential will become reality, two observations must be made about the benign economic circumstances which favor the growth of that industry: an ultra-low interest rate environment and an economic recovery in the United States.

The very low interest rate environment has created an appetite for riskier assets and credit risk spreads, with institutional investors searching for yield. The US economic recovery has shifted attention away from the downside risk of a recession and loan losses. It is obvious that lending is not just about matching investors and borrowers, it is also the business of controlling risk and managing non-performing assets From that perspective, a remote internet-based company from San Francisco will be at a competitive disadvantage vis-à-vis banks with branches that are closer to its non-performing clients. The case of marketplace funding suggests that we classify lending into different types of credit risk and funding vehicles, as in Table 2.

Table 2
Digital disruption and lending

Data Processing	Data Analysis
High risk ("information sensitive": collateral valuation, risk monitoring, restructuring, recovery)	Insured deposits, unsecured deposits or bonds, subordinated debt and equity Banks keep "skin in the game"
⬇	Securitised loans with several tranches – Shadow banking Under current international regulations, banks keep "skin in the game"
Low risk ("information insensitive", such as a mortgage with a low loan-to-value ratio)	P2P, Marketplace funding Brokers do not keep skin in the game

Source: Jean Dermine.

Digital technology allows direct finance with the matching of borrowers and investors. It is a low cost competitor to the banking industry. However, as discussed above, lending is more than the matching of investors and borrowers. It involves the control of risk after lending has taken place, the trading of claims if investors need to access liquidity, and the management of non-performing assets. Given the complexity of these lending services, it is useful to rank assets according to the degree of credit riskiness (from high risk to very low risk) as shown in the first column of Table 2.

Higher credit risk implies a need for risk monitoring and a higher probability of having to deal with non-performing assets. Moreover, the presence of credit risk with asymmetric information between the holder of an asset and a potential buyer may lead to a market breakdown due to the classical fear of buying a "lemon". Such "information sensitive" assets become illiquid in a recession, just when liquidity is most needed (Dang *et al.* 2013). For such assets, funding on the bank's balance sheet with a maturity mismatch allows the creation of liquidity and is something that cannot be replicated by a broker such as Lending Club that does not engage in maturity transformation.

At the other extreme are very safe assets, such as a mortgage with a very low loan-to-value ratio. These assets which are not affected by credit risk are "information insensitive" and therefore liquid. A broker is well placed to offer financing vehicules at a low cost. Classifying loans from risky to very safe, one can argue that higher risk transactions will remain on the balance sheet of banks, that lower risk can be securitised and that very safe assets can be handled with marketplace funding. This does not

necessarily imply market disruption as banks could replicate by offering similar products to investors.

Securitisation of loans and shadow banking were the source of the global financial crisis in 2007. Three issues were at stake: excessive borrowing, poor information available to investors in securitised vehicles and a severe maturity mismatch when loans were funded in structured investment vehicles (SIVs). Short-term commercial paper could not be rolled over in summer 2007 (Dermine, 2013).

P2P and marketplace funding are developing in a special situation of ultra-low interest rates and an economic recovery, at least in the United States. It remains to be seen how risk and losses will materialise during a recession or a period of rising interest rates. Marketplace brokers do not seem to perform maturity transformation, but it remains to be seen if institutional investors buying these loans do not perform maturity transformation. Protection of borrowers and investors and the identification and control of maturity mismatch in shadow banking must be addressed by regulators if we are to avoid history repeating itself (Kelly, 2014).

Conclusion

The disruption caused by digital technology is seen as sounding the death knell of banking, just as in the past with the birth of telephone (minitel) banking, the development of bonds and equity markets, the advent of internet and the smartphones, with a certain sense of *"déjà vu"*.

Two main sources of market disruption are analysed. The move of payment services to new players could break the banks' customer relation and cross-selling of products. However, it is far from clear how new players with expertise in data-processing could acquire at a reasonable price banking expertise in fields such as asset management or corporate advisory. Just as banks have adapted to new technology in the past with the development of omni-channel distribution, there is no reason why this would not be the case again.

With regards to the funding of credit risk, internet has facilitated P2P and marketplace funding. Furthermore, the environment for P2P has been extremely favorable, thanks to low interest rates and the expansion of economic activity. Such a benign environment for marketplace funding may not last. Moreover, nothing stops a bank from offering a similar loan brokerage facility.

As was the case with securitisation, public policy should ensure a minimum level of transparency for borrowers and investors. It must identify and control shadow banking with maturity mismatch, a major cause of a liquidity crisis. Banks have a unique role to play in providing liquidity and funding higher credit risk assets, which are often characterised by opacity. Digital technology, in my opinion, does not represent a fundamental disruption to these two banking services.

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