Do banks experience value creation from Fintech M&As in United States?

Master Thesis

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Disclaimer

The author declares that the text and work presented in this master thesis are original and no sources other than those mentioned in the text and its references have been used in creating this master thesis.

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Finally, I would like to declare my gratitude to my parents for their constant support which made it possible for me to study abroad.

Abstract

This study examines the value creation in banks from mergers and acquisitions (M&As) with financial technology startups (defined as Fintech) and whether these M&As outperformed the deals where non-fintech target firms were involved during the period from 2010 to 2018. From a sample of 759 deals, only in 37 of them are detected fintechs as targets. The cumulative abnormal returns of M&As are studied through the event study methodology using 21-day, 7-day and 3-day event windows. Furthermore, several regression analyses study the deal and firm characteristics that drive the impact of deals on acquirers' value. The results indicate an overall 0.56% statistically significant abnormal return for banks when involving in M&As but no evidence of higher value creation in the case of fintech target firms. In addition, this research evidences that public target firms have a negative impact on the cumulative abnormal returns of acquirers, with a stronger effect by public fintech targets. Furthermore, the results indicate that multiple acquisitions have negative effect on banks, however no evidence was found in favour of the higher relative size.

Keywords: Financial Technology Startups, M&As, Banks' Value Creation, Event Study Methodology, Cumulative Abnormal Returns.

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1. Introduction

Since the financial crisis of 2008, the landscape of the financial services' sector has changed (context of banking, the nature of financial markets, services, and institutions) due to new entrants' disruptive and innovating technological practices. The rapid rise of Financial Technology (also known as Fintech) over this past decade has reshaped the financial industry in relation to both the contents and delivering methods of financial services. The global investments in fintech have increased. In 2016, the total amount of global investments in fintechs was $24.7 billion and concerned 1,076 deals related to activities such as payment, lending, wealth management and insurance. This increasing pervasiveness of financial innovation firms which offer banking services has put traditional banks on pressure to modernize or reshape their business activities and models. A possible option for the banks to cope with this uncertain future is to merge with or acquire a fintech firm. This thesis examines the productivity and efficiency effects of fintech mergers and acquisitions in banks during the period 2010-2018. The main research question of this thesis is:

"Do banks experience value creation from Fintech M&As in United States?"

So, this research investigates whether these M&As are value-enhancing, value-neutral, or value-reducing.

The impact of fintech on traditional banks is a burning issue in recent years. Therefore, a reliable answer to the main question, will contribute to envisage the future and what direction the fintech wave of change will take especially when that direction depends to a great extent on whether banks consider fintech as an opportunity or a threat. This research will also contribute in understanding the strategy that banks follow to offer, by using new digital technologies, greater convenience, lower transaction costs and better credit risk assessments.

The answer of the question is of great importance not only for the bank's shareholders but for customers as well. Financial technology firms provide indeed the same services as banks but more efficiently due to the use of technology. Shareholders are concerned about the future of fintech companies since an increase in their popularity probably will consist a threat of replacing

banks. This will have as a result losing money or even their entire investments. Additionally, other functions that used to be carried out through fintech are still supported by banks. For example, banks introduced changes in payment system (e.g., ApplePay instead of credit cards) which led them to lose part of their margins, to keep the final interface of their clients. Furthermore, it is of interest to shareholders due to legacy costs that banks face in reorganizing their business.

As concern customers, they want to combine convenient payment services (digital payments, internet banking etc.) with security and trustiness of transactions. Customers use banks due to security reason and trust but prefer fintech companies for payment services. Fintech companies must build trust and prove their reliability compared with traditional banks. In accordance with the foregoing reasons, the study of the relationship between traditional banks and fintech firms is considered to be crucial.

In order to answer the research question, this thesis studies mergers and acquisitions in United States between banks and fintech firms. Investigating the value creation that these mergers and acquisitions had on the banks, through the stock price of banks, it will try to reach a conclusion of whether these mergers and acquisitions had a positive or negative impact on bank valuation. The impact of M&As is calculated through the abnormal returns of the acquiring firm upon the announcement of an M&A. More specifically, an event study with different event windows is used to calculate the cumulative abnormal returns. These returns will determine the impact of M&As on stock price movements. Assuming that the market is efficient, positive cumulative abnormal returns mean positive impact of the event on the stock value, therefore better firm valuation. So, this will contribute to investigate the impact on the value of banks. The sample is going to have a time frame of nine years, from January 1, 2010 to December 31, 2018 eliminating the effects of the 2008 financial crisis. This research will focus on post financial crisis mergers and acquisitions between banks and fintechs in the United States and this data is collected from Thomson One. As concerns stock prices and financial details of acquiring firms, the availability of this kind of data has been provided by CRSP/Compustat Database.

The regression analysis is used to identify the impact of deal and firm characteristics to the value of banks which have the role of acquirer. The analysis shows that banks are creating value

when involving in M&As. Overall, the findings imply that, within 7-day event window, these deals experience an average 0.56% statistically significant abnormal return and 0.54% when target firms are not fintech. Despite their non-statistical significance, the cumulative average abnormal returns of fintech acquirers are higher than those of non-fintech acquirers. Moreover, the results indicate that the status of target firms matters. The public target firms affect negatively the value creation of M&As. Furthermore, this research finds some evidence that multiple acquisitions have a statistically significant negative impact on the abnormal returns of acquirers. This implies that banks who engage in multiple M&As experience less value creation. As to answer whether higher relative size have positive impact on the abnormal returns of acquirers, no evidence and statistically significant results were found.

As concern the contribution of this study to the existing academic research, it adds new insights. One contribution is to detect the characteristics of the acquirers and the target firms that create or destroy the most value. In addition, it will enrich the existing literature because only a little research has been done before. Kohers and Kohers (2000) found that M&As with target firms which belong to high-tech sector, have a positive impact on acquirers' abnormal returns. This thesis adds knowledge because it gets more specialised and focus on the target firms which belong to financial technology sector. Furthermore, most of the previous literature has focused on M&As between banks and not so much on studying M&As between banks and fintech. So, it will provide more knowledge at a scarce academic literature as concern the relationship of banks with fintech firms. Another contribution of this research is the investigation of the short-run effects of the acquirer's stock performance upon the announcement day which could be useful knowledge for bank's shareholders. This research could constitute a great guidance for bank's shareholders to be careful with their M&As as well as avoiding several acquisitions. In addition, this study could make banks entities to prefer developing digital technology internal instead of acquiring or merging a fintech firm.

The remainder of this paper is structured as follows. In the next section, this thesis includes the theoretical background, followed by hypotheses in Section 3. In Section 4, it is presented the method and data of how the research is designed. Section 5 provides the results. Finally, Section 6 lists the conclusions.

2. Theoretical background

This section will include three perspectives. Firstly, it will present the competitive behaviour of firms and the mergers and acquisitions that this behaviour leads to. Secondly, it will describe the history of fintechs and their development as well as its implications for traditional banking. Third, it will present the performance of mergers and acquisitions with fintech firms.

2.1 Competitive behaviour and M&As

Mergers and acquisitions can be defined as the transactions where the ownership of a company is transferred or consolidated with another entity. Although the reasons for making an M&A may vary, the main motives are synergies (higher market power), economies of scale (by achieving a combined output that is more profitable than before), diversification, complimentary goods, and industry shocks. The most frequent reason seems to be economies of scale which are achieved through decreasing average unit costs of production. Studies such as Bena and Li (2014) have found that the synergies obtained from combining innovation capabilities are important drivers of acquisitions. Nguyen, Yung and Sun (2012) found in their research that 73% of M&As are related to market timing, 59% are related to agency motives and/or hubris and 3% are due to economics and industry shocks. Moreover, the competitive behaviour in combination with the eagerness of firms to obtain competitive advantage are drivers of mergers and acquisitions. This aggressiveness is fostered by the willingness of firms to survive. They must become more aggressive, creative, and competitive to avoid bankruptcy. Besides that, many companies intend to acquire a fintech company because they believe that they can improve business processes, solve complex information technology (IT) problems, and reduce cybersecurity risks.

As concern banks, some models of engagement with fintech firms are Investment, Collaboration, In-house development of products and M&As. According to EY analysis[1], the method of M&A is the least preferred strategy but due to important advantages and the superior interest in a specific area of technology, many banks choose to merge or acquire their competitors. Through this model, banks obtain access to new markets and new clients (modernize their core business activities), become more tech oriented, introduce innovative

[1] EY, 2019: "Global FinTech Adoption Index".

banking products, and obtain sole possession of the knowledge that target firm is using (Teece, 1986)[2].

Mergers and acquisitions come in waves and a characteristic of M&A market is the existence of cycles in M&A activity. The M&A life cycle includes five major phases: Strategic selection, Negotiations, Due diligence, Completion, and Integration. The M&A market is quite volatile, and its transactions could be divided into three basic categories:

1. Asset Acquisitions
2. Mergers
3. Stock Acquisitions

There are differences between the three categories as concern legal obligations, acquisition procedures, and tax liabilities (Marren, 1993). In the case of asset acquisition, the acquirer obtains all or part of the target. This means that the target legally continues to exist. In a merger transaction the target does not continue to exist as a separate entity anymore but is dissolved into acquiring firm. In the case of stock acquisition, the acquirer obtains the target firm by buying shares from the target individual shareholders. During an M&A there are three main methods of payment: by cash, stock or a mix of cash and stock (varying funding methods between cash, equity, and debt). Comparing these three methods, stock payment is considered to be easier to execute and quicker to accomplish (Marren, 1993).

During a nine-year period from 2010 to 2018 the record of the number of M&As that happened in United States was in 2017 with 15,100 deals whereas the highest value of deals took place in 2015 with 2,417 bn.USD. In Fig. 1[3], the trend illustrates that probably there will be a decrease in the number of M&As but an increase in the value. Indeed in 2019 there was a drop in the number of M&As but the value of transactions decreased as well. Comparing the M&A market worldwide, major differences exist between advanced and emerging countries, but United States remain the most active market.

[2] EY, 2017: "Unleashing the potential of Fintech in banking".
[3] Imaa-Institute. Announced M&A in the United States by numbers and value by years. Available at: https://imaa-institute.org/m-and-a-us-united-states/

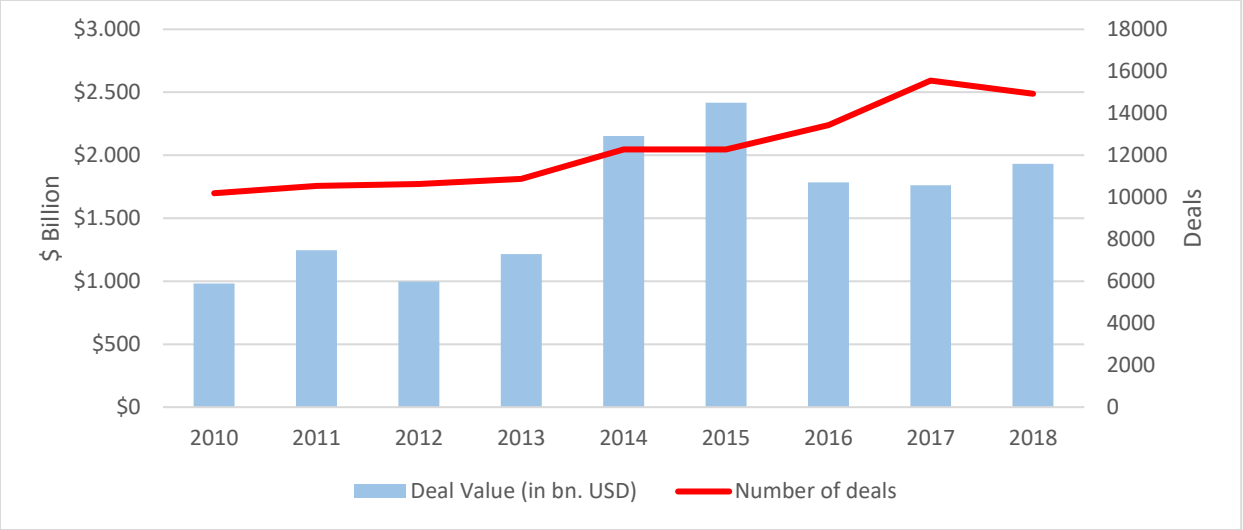

Fig. 1. *This figure illustrates the value and the number of M&As in United States during the period 2010-2018.*

On the other hand, there are several theories about when a firm becomes a target for M&A. The corporate control theory (e.g., Jensen, 1988; Shleifer and Vishny, 1988) predicts that poorly performing firms are more likely to participate in an M&A as a target. According to the literature the empirical evidence from previous studies is that acquirers have low or negative abnormal announcement returns, while target firms have positive abnormal announcement returns around the merger announcement date. Furthermore, M&As have a mixed short-term impact on company stock returns (Agrawal et al., 1992) but in general the investors of target companies received high return (Loughran and Vijh, 1997) and this because the effective transfer of knowledge gives the capability to companies to grow (Kogut and Zander, 1992).

2.2 The Fintech phenomenon

The definition of fintech is prone to differentiation as not one universal definition exists. Fintech is a new sector in the finance industry that incorporates all the kinds of technology that are used in finance to facilitate trades, corporate business or interaction and services provided to the retail consumer. Fintech constitutes an integration of finance and technology in financial services. Several definitions have been given for fintech. One of them is:

"*Fin-tech, is a combined word of 'financial' and 'technology' referring to the financial services where various technologies have been newly introduced such as bank transfer, personal financial asset management, mobile payment etc." (Kang et al., 2016).*

The fintech evolution could be divided in three main eras. The first one is from 1866 to 1967, without major changes in the financial services. The period from 1987 to 2008 constitutes the second era with great development of digital technology both in communication and processing of transactions. Since 2008, the third era has started by providing direct financial services to customers. Nowadays, a fourth era is arising through computerization of manufacturing and the main reason for that are the fintech companies.

The financial crisis in 2008 played a crucial role for financial technology firms to emerge. The main reasons were digital transformation, tighter regulation of traditional player like banks and customer mistrust (especially by younger generations) toward these financial institutions. Big data, blockchain, robo-advisors, internet of everything, use of mobile devices and digital channels constitute examples of the new fintech era. Imagine that in 2009, Paul Volcker, former chairperson of the US Federal Reserve, said: "The most important financial innovation that I have seen in the past 20 years is the automatic teller machine (ATM), that really helps people and prevents visits to the bank and it is a real convenience"[4]. The shift from analog to digital technologies took place in the 1990s by Well Fargo in USA and ING in Europe through the development of World Wide Web. The financial industry is characterized by high rate of innovation and as experts support, it will continue to grow in the future.

Houman Shadab, a law professor at New York Law School, states: "Fintech is different from many other startup sectors because the financial world is heavily regulated and mostly consists of a relatively few numbers of large, well-established companies" (Desai, 2015)[5]. Annika Falkengren, the CEO of Skandinaviska Enskilda Banken, said: "They look like banks, they talk like

[4] Volcker, P. (2009), The only thing useful banks have invented in 20 years is the ATM, *The New York Post*. Available at https://nypost.com/2009/12/13/the-only-thing-useful-banks-have-invented-in-20-years-is-the-atm/

[5] Desai, F. (2015), The fintech boom and bank innovation, Forbes. Available at https://www.forbes.com/sites/sap/2020/03/05/intelligent-buildings-climate-change/#7e9362195276

banks, but are not regulated like banks". The regulatory restrictions that exist, could be proven to have a bad effect on the size and nature of banks that get involved into an M&A. Gavin Weir mentioned that there is an irony in the relationship between banks and regulations. He said: "The irony is that banks want to be in the fintech space, and the regulators are encouraging it, but some cannot make direct investments because of regulatory restrictions" (Meager, 2017). In order to decrease the generation of systemic risk by banks, the Basel Committee on Banking Supervision (BCBS) increased their regulatory reserve requirement.

There has been a lot of prior research and literature on fintech since their inception. They have attracted the interest of various researchers. Stijn Claessens, Jon Frost, Grant Turner and Feng Zhu (2018) found that fintech credit has grown rapidly around the world in recent years, but its size still varies greatly across economies. The main driving force for the significant growth of fintech companies is the mobility. The use of smartphones and tablets has increased dramatically. Furthermore, the number of fintech increased since they offer a combination of fast and flexible customer-centric services, as well as user-friendly digital applications. This increase as Haddad and Hornuf (2018), through their investigation in 55 countries found, is detected more in well-developed economies where the venture capital is easily accessible. Similarly, Beck et al. (2016) presented that the financial innovation is higher in countries and industries with better growth opportunities. Fintech investments in US increased remarkably and especially in 2014 it got tripled.

Fintechs try to exploit inefficiencies within the banking processes. They focus on a customer-oriented approach. According to a report of EY[6], the percentage of consumers adoption to fintech services has increased significantly, from 16% in 2015, to 33% in 2017, to 64% in 2019. Regarding the EY report the US consumer fintech adoption rate is equal to 46%. Specifically, it has increased from 17% in 2015 to 46% in 2019. They have disrupted banking sector, but they have provided new opportunities for other businesses to emerge and enter banking. Payments is the most open area to fintech. Additionally, the Google, Apple, PayPal are trying to obtain a central role in payments but thus far, banks have continued to be the leader. The changes that have occurred

[6] EY, 2019:" Global Fintech Adoption Index".

in payment technologies for the last four decades, have created the evolution of banking services. Examples of these technological changes are credit and debit cards, electronic payments and in more recent years the e-payments, emerged the sector of online banking and mobile money (e.g., ApplePay). P2P-crediting, E-wallets, Bitcoins, mPOS-acquiring, T-commerce, mobile banks are part of the financial technologies which are changing our life. People are not obliged to visit the bank for credit arrangements, currency exchange etc. Fintech firms have introduced the payment not only with the local currencies but with digital ones as well (e.g., Bitcoin). Despite the advantages of the fintech era it also hides threats. One of these threats is its cyber vulnerability. Also, the weakness of fintech in comparison with their competitor banks is that they do not have large and broad customer base as well as they do not have the experience in cases like anti-money laundering and cybersecurity.

In contrast to other industries and apart from changes in payments, the banking sector presented slower ability to adopt innovation. Banks are characterized by their risk-averse culture since they are heavily regulated and must protect customer deposits. Fintech generation has increased the client's expectations from the bank. According to the EY report, almost the 46% of the fintech adopters share or are willing to share their bank data. This means that banks are losing their competitive advantage. On the other hand, banks and insurance companies, more traditional than fintech, are trying to invest in innovative solutions to narrow this technological gap that exists between them and fintech.

The new needs and expectations of customers have affected their trust to financial institutions like banks. Banks should not stay static, contrariwise, should try to anticipate their own competitors. As Mayer Brown said: "Banks are traditionally quite conservative and hierarchical, and it can be a struggle for them to move. This makes it more difficult and rarer the phenomenon of M&A between banks and fintech. Digitalization is one of the main drivers of financial sector nowadays and banks try to obtain access to this vital knowledge through M&A of fintech firms. Moreover, banks followed cost-cutting policies to achieve a sustainable growth. Taking into consideration the growing importance of data, an interesting future for fintech is expected. Whereas, the future for banks seems to be difficult. Citibank estimates that over the next ten years 30% of banking jobs will disappear.

Many benefits are gained from financial institutions that transform themselves into platform-based, digital banking ecosystem. Some of these benefits are the easier access to personalized products and services, better security system etc. According to previous trends, major banks used to obtain more than one fintech start-up in 2018 but in lots of cases the fintech instead of choosing to merge a bank, they obtain a banking license.

On the other hand, there is also the possibility of a controversial relationship between banks and fintechs. Baker Botts partner David Ramm said: "Some of the most attractive fintech firms are, effectively, new banks". One example of firm which is trying to provide banking services is Facebook. Facebook has currently around 50 different regulatory licenses in US, allowing its users to transfer money through messenger application. Also, Amazon has recently been experimented with offering student loans. There are lots of new start-ups which are offering products that used to be offered previously by traditional banks. The advantage of this kind of firm is that they can choose in which part of banking they want to involve and obviously they get involved in most profitable parts. Some really successful fintech companies have tried to obtain banking license or even acquire a bank. As Jumbahoy said: "The next logical step, if you want a banking license and you can afford it, is to buy an existing bank". Because as Sarch supports: "It is actually quicker to buy an existing bank than applying for a banking license afresh and going through the full ordeal with markets and banking regulators".

2.3 M&A performance with fintech

This thesis will investigate the bank's value creation from fintech based mergers and acquisitions and whether these transactions outperform deals with non-fintech companies. According to previous literature, M&As have a mixed short-term effect on the performance of the acquirer (Agrawal et al., 1992). Focusing on general M&As where banks are involved as acquirers, Neely (1987) argues that there is evidence of positive cumulative abnormal returns of banks for the two weeks following the announcement date. Furthermore, in more recent studies, Al-Sharkas, Hassan and Lawrence (2008) have found that banks' mergers and acquisitions lead to profit efficiency and to greater productivity growth than banks which did not engage in any transaction. So, M&As affect positively the bidder companies.

On the other hand, as concerns M&As of fintech, the financial technology revolution changed the way the investing was done. KPMG (2018)[7] reported that M&A activity of fintech companies in United States was ramping up till 2015.

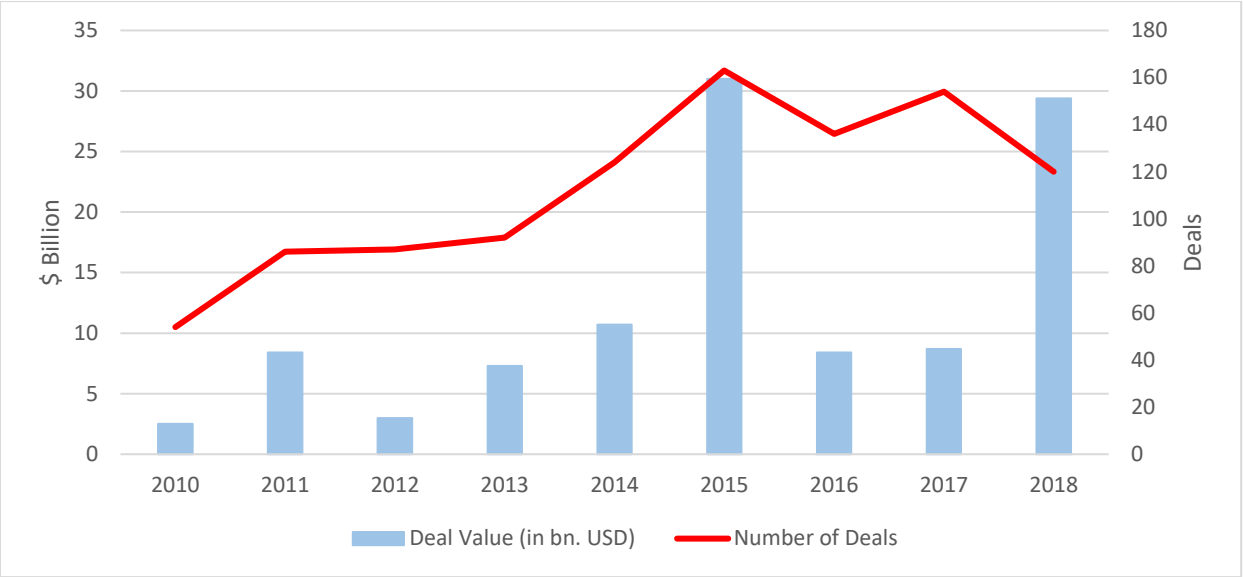

Fig. 2. *Fintech M&A activity in the US, during the period 2010-2018.*

As can be seen in Fig. 2, since 2015 there are fluctuations in the value and the number of transactions with fintech, with a significant increase as concern the deal value in 2018. This increase was driven by the massive investment of $17 billion by Blackstone Group into Refinitiv. White&Case research predicts not only M&As for the next years, but it seems that new deals like joint ventures and minority stake acquisitions would be very popular in the future. Regarding existing research, Dranev, Frolova, and Ochirova (2019), found a positive average abnormal return in the short run, and negative average abnormal return in the long run. Therefore, firms which acquire companies related to financial technology sector obtain positive abnormal returns in the short-term.

Nonetheless, the focus of this thesis is on the M&As between banks and fintechs. Banks try to develop ideas more quickly with tens of millions euros expenses in development teams.

[7] KPMG, 2018: "The pulse of fintech 2018. Biannual global analysis of investment in fintech".

Characteristically, Derek White, Barclays' chief design officer mentioned: "We needed to change the way we worked. We needed to act like a startup"[8]. Some banks have realized that the only way to be alive and compete the fintech firms which have acquired an important percentage of information and clients, is to collaborate with them. The banks are trying to get ahead of digital innovation through mergers and acquisitions with fintech startups. Mergers and acquisitions of fintech are considered to be the means of strategic competitive response to the threat emerging from fintech. Banks, through mergers with fintech companies, are creating lots of new opportunities by the improvement of the technology. As it has been mentioned in previous research, lots of M&As occurred by banks to improve their efficiency (Al-Sharkas, Kabir Hassan and Lawrence, 2008). In addition, studies which focused in the profit efficiency, detected a more favourable picture for M&A which was linked to a better diversification of risk and an improved risk-expected return trade-off (Akhavein, Berger and Humphrey, 1997; and Berger, 1998). Also, Hornuf, Klus, Lohwasser and Schwienbacher (2018) argue that the banks are more likely to participate in fintech based M&As when they want to obtain a digital strategy or when they want to employ a Chief Digital Officer. So, banks through mergers and acquisitions of fintechs could secure their distribution channels but it is difficult for these financial institutions to grow in the same pace as fintechs do. In accordance with the foregoing, this research is expected to detect value-enhancing M&As between banks and fintechs.

3 Hypotheses development

Through an M&A, the merger company can increase its market power, achieves economies of scale as well as lower cost of capital etc. (Adnan and Hossain, 2016). Based on these expectations, investors can be positive and optimistic about an M&A. More precisely, studies such as Kohers and Kohers (2000) have found significantly positive abnormal returns in the short term of acquirers upon an M&A announcement when the target firms belong to the high-tech sector. These results are independent of the method of payment (either cash or stock). Fintech companies constitute the digital revolution in the financial sector. They offer great developed

[8] Slater, S. (2015), Money, scouts and speed dating: Banks fight for technology edge, Reuters, available at https://uk.reuters.com/article/uk-banking-tech-investment-idUKKBN0MD1EZ20150317

digital platforms and modern internet banking services. Therefore, fintech firms indicate the appearance of an innovative and a brand-new type of high-tech providers of financial services. The tighter regulation of banks provides fintech companies with the advantage of presenting faster ability to adopt innovation as well as to offer flexible customer-centric services. A fintech based M&A, could help banks to provide direct digital financial services to customers and to become more efficient. Merging or acquiring a fintech, banks could obtain access to new markets and introduce innovative banking products which would constitute a great complement for their old-technology core business.

Financial innovation is higher in countries with better growth opportunities. Moreover, in developed economies such as the market of this research, venture capital is easily accessible (Haddad and Hornuf, 2018). So, the market of United States, helps fintech companies to emerge and grow in size. Fintechs have high growth opportunities which constitutes a factor that could lead their acquirers to create value through an M&A. Furthermore, Capron and Shen (2007) argue that the acquisitions of public targets, on average, destroy value for acquirer's shareholders. On the other hand, the evaluation of private target it is difficult and increase the risk of not appraising its assets properly. This lack of information could lead through exploitation of private information to more value-creating opportunities. In addition, they found that the acquisitions of private targets had a better performance than public ones because their announcement elicit a more positive response from the stock market. The majority of fintech population consists of startups. So, fintech firms are mainly private firms. Hence, based on the above discussion, the hypothesis can be presented as follows:

H1: The fintech M&As will positively affect the cumulative abnormal returns of the acquiring company in a short term (CAR>0).

Based on previous literature, single acquirers have higher returns than acquirers who participated in multiple mergers and acquisitions (Ismail, 2008). Higher experience in mergers and acquisitions, especially when it is successful, leads managers to overestimate their abilities to manage new possible acquisitions and make them obtain a hubris behaviour. This has as a result to overrate the value of target firm and to pay higher premiums. Consequently, being

involved in multiple M&As does not convince investors that these acquirers can create value through the acquisition. Moreover, fintech is a new industry trend that makes it difficult for the acquirers to value target firms that belong to this sector. Besides that, Ismail (2008) argues that the acquisitions of non-public targets lead to higher stock market reaction. It is interesting to check whether this theory is applicable when the merger company is a bank and target firm is a fintech. All these arguments lead to assume that this would happen in higher level when the target firm is a fintech company because of their possible misevaluation. Fintech industry is really new and scarce experience exists in their valuation which in combination with the hubris behaviour of serial acquirers can lead to even higher value-reducing deals. In addition, the shareholder protection standards are another important factor which affects the announcement returns (Karolyi, Liao, and Loureiro, 2015). The serial acquirers from countries with poor shareholder protection, have lower returns. This factor cannot affect our sample since all the acquiring firms of our study are in the United States. So, the next hypothesis can be stated as follows:

H2: Multiple acquisitions have negative impact on cumulative abnormal returns of acquiring firm, with a stronger multiple acquisition effect for fintech target firm.

As concerns the investigation of mergers and acquisitions, the size of the acquirer is an important factor on how the stock market reacts. Studies such as Moller, Schlingemann and Stulz (2003), have found that small bidder-company shareholders have better announcement returns than large ones. It is important not only the absolute size of the merger company but the size of the target firm as well. Therefore, studying an M&A should focus also on the relative size. Nevertheless, Mateev (2017) and Danbolt and Maciver (2012), found a non-significant relationship between bidders' abnormal returns and relative size. It is expected the M&As of banks would be value-enhancing and the relative size would affect positively the bidder-company shareholder returns. I assume that deals where fintech firms are involved as target firms will have positive and stronger effect. Nowadays, a new era of computerization is arising, and fintech companies have developed innovating technological practices which constitute a competitive advantage. Relatively larger fintech firms offer more cut costing and synergy opportunities. These firms have grown and have gain the access and the trustiness of clients. Furthermore, the M&As

of relatively larger fintech firms could lead to value creation deals for banks through the decrease in competition. On the other hand, the fintech sector is a relatively new sector, the majority of the fintech firms would be startups, privately and small. Nevertheless, the hypothesis could be presented as follows:

H3: Higher relative size will have positive impact on the abnormal returns of the banks engaging in M&A activity with a stronger effect when fintech target firms are involved in deals.

4. Research design

4.1 Methodology

This section motivates and explains the different methods of testing hypotheses.

4.1.1 Event study

In order to calculate and measure the impact that these M&As had on the efficiency of the United States Banking Industry, an event study is used. According to Fama, Fisher, Jensen & Roll (1969) and MacKinlay (1997) the value creation of a merger and acquisition, for a publicly traded firm, is calculated through the stock price. To avoid calculations of stock returns that are affected by other events, it is preferable to choose a short time study (Kothari and Warner, 2007). Similarly, studies such as MacKinlay (1997), suggest using the short event windows for event study in M&As because long windows may be affected by variety of factors. In addition, short windows are preferred over longer windows because longer windows could increase the probability of potential leakage and pre-takeover informed trade. This research is using different event windows: (-10,10), (-3,3) and (-1,1) and the day 'zero' event constitutes the announcement date of the merger or acquisition. These event windows could be useful for robustness checks for the findings.

This thesis adopts the market model. The market model (following Brown and Warner, 1980, 1985) contributes into calculating abnormal returns. It is preferred more than constant-mean-return model and market-adjusted-return model because it takes into consideration the correlation and the market dynamics of the firm with the stock market. Investigating a market like United States which is very liquid, means that there is a low probability the estimated betas

by using the market model to be biased which could happen in markets that suffer from thin trading (Dimson, 1979; Dimson and Marsh, 1983). In this case there would be lower expected returns and higher abnormal returns.

The first step of this methodology is to calculate Abnormal Return (AR), that is the forecast error of a specific normal return-generating mode. The abnormal returns are calculated through the Eq. (1) and are equal to the difference between actual stock returns and expected ones.

$$AR_{it} = R_{it} - E[R_{it}|I_{it}] \qquad (1)$$

The expected returns are based on the historical return of benchmark index such as S&P 500 Bank Index. The estimation period begins 170 days prior to the event date, the announcement date of the M&A, and finishes 20 days before the event date. Using the market model method, the return for a security "i" at time "t" is:

$$R_{it} = a_i + b_i R_{mt} + e_{it} \qquad (2)$$

Where R_{mt} is the market (portfolio) return and e_{it} is the residual. The procedure of estimating the parameters of the model (Alpha and Beta) in MacKinley (1997) is through the least squares regressions (OLS) method by using the returns during the estimation window. So, the abnormal return can be measured by the following formula:

$$AR_{it} = R_{it} - (\hat{a}_t + \hat{b} R_{mt}) \qquad (3)$$

Where R_{it} is the actual return subtracted by the expected return. Beta reflects the return of the stock in relation to the market return. Alpha and beta are estimated from the returns during the estimation window.

The Abnormal Returns which derive from the Eq. (3), represent the single day abnormal returns. The Cumulative Abnormal Returns (CARs) are defined as the summation of the individual abnormal returns of each day during the event window. Therefore, the CARs are obtained as follows:

$$CAR_{it}(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \qquad (4)$$

Where t_1 and t_2 are the start and the end date of the event window. The CAR gives the abnormal return per deal. Hence, to aggregate the abnormal return for the whole sample, the Cumulative Average Abnormal Returns (CAARs) are calculated as:

$$CAAR(t_1, t_2) = \frac{1}{N} \sum_{i=1}^{N} CAR_i\,(t_1, t_2) \qquad (5)$$

The statistical significance of the cumulative abnormal returns will be tested by t-test as:

$$t_{CAR_t} = \frac{\overline{CAR}\,(T_1, T_2)}{\sqrt{var\,(\overline{CAR}\,(T_1, T_2))}} \qquad (6)$$

If the test statistic significantly deviates from zero, the results are statistically significant.

4.1.2 Variable description

This research is using as dependent variable the abnormal stock return and as independent variables the dummy fintech variable, the dummy serial acquirer, and relative size. Moreover, additional control variables are used such as dummy public target firm, dummy target banking

industry, dummy paying only with cash, acquirer market capitalization and market-to-book ratio.

Dependent variable

Abnormal stock return: In order to decide whether an M&A is creating value or not for the acquirer, the abnormal stock returns of the acquirer are calculated. Benchmark S&P 500 Bank Index is used as benchmark index during the event window so as to obtain the abnormal stock returns.

Independent variables

Fintech: As concerns the first hypothesis, the sample is split into two groups. One of them contains M&As where the target firm is fintech and the next one all the other firms that are not fintechs. So, a variable which declares whether the target is a fintech firm is needed. This variable represents a dummy variable which is equal to "1" when the target firm is labelled as a fintech firm, and "0" when the target belongs to a different sector and it does not constitute a fintech.

Serial vs single acquirer: According to the second hypothesis, the cumulative abnormal returns of banks with multiple acquisitions have a worse performance than banks which participated only in one M&A. To check this hypothesis, a dummy variable is used. This variable takes the value of "1" if the acquirer did two or more mergers and acquisitions, regardless of whether the target firm is a fintech or non-fintech firm, otherwise it takes the value "0".

Relative size: Studies such as Moller, Schlingemann and Stulz (2003), calculate relative size variable by dividing the transaction value with the market capitalization of the acquiring firm. Using the transaction value instead of the market capitalization of the target firms leads to less accurate estimation of its value because the transaction value could incorporate also the premium paid by the acquirer. On the other hand, it is impossible to calculate the market capitalization for every target since the majority of fintech firms are private. Hence, in this thesis the relative size variable is estimated by dividing the transaction value with the market capitalization of the acquirer prior to the announcement.

Control variables

This model includes more variables that affect the abnormal returns of the acquiring company. More specifically, some of these control variables are the following:

Public target firm: An important control variable that is used in this research is the status of the target firm. A public target firm has not the same impact on the returns of bidder firm as a private target firm would have. More specifically, according to Fuller, Netter, and Stegemoller (2002), it is expected the acquirers of public firms to lose value.

Target industry: In order an M&A to be considered as successful transaction, it should lead to synergy success. Target industry could affect the match between the acquirer and the target firm, which affects in turn the performance of the M&A. I assume that when the target firm belongs to the same sector as acquirer, then, M&A are associated with higher synergy, efficiency and higher market power. Palich, Cardinal, and Miller (2000) found a negative relationship between the performance and the level of diversification. In their research, they argued that changing from related diversification to unrelated diversification, the performance deteriorates. Moreover, acquirers that intend to purchase firms that are not core-related, it is more possible to pay high premium (Flanagan and O'Shaughnessy, 2001). The higher is the level of relatedness, the easier is to transfer knowledge between the two firms.

Payment in cash: In an M&A, the method of payment pays a significant role as concern the transaction value and the premium that acquirer will pay. Martynova and Renneboog (2006) argue that paying with only cash has a positive impact on the acquirer's abnormal returns. On the other hand, studies such as Travlos (1987) has found that stakeholders of bidding firms which use only stock as a method of payment, experience significant losses at the announcement of the acquisition. The variable is used as a dummy variable which takes the value of "1" if the payment is only with cash and "0" if a different method of payment is used.

Acquirer market capitalization: Market capitalization is one of the different measurements of the absolute size of a firm. The value creation of an M&A is affected by the absolute size of the acquiring firm. As discussed in other studies (Humphery-Jenner and Powell, 2014; Moeller, Schlingemann and Stulz, 2004), there is a negative relationship between firm size and the

acquirer's shareholder wealth. This happens because large firms do not have lots of space for internal growth instead, they have cash which leads them to offer higher premiums and make them get involved in value-destroying M&As.

Market-to-book ratio: According to previous studies, the market valuation of the merger company affects its abnormal returns. Market-to-book ratio is measured by dividing market capitalization with the total book value of the firm in the fiscal year preceding the bid announcement. This research includes market-to-book-ratio because it captures whether the acquirer is overvalued or undervalued. Rau and Vermaelen (1998) argues that the highly valued acquirers (glamour bidders) have lower performance than value bidders. As a consequence, it is expected that the bidders with high market-to-book ratio will engage in value destroying M&As and will perform worse.

4.1.3 Regression model

In order to test the hypotheses a regression model is used. So, the effects of the described variables on cumulative abnormal returns of banks are checked through the following regression model:

$$CAR_i = a + b_1 FT_i + b_2 SA_i + b_3 RS_i + b_4 PT_i + b_5 BI_i + b_6 CP_i + b_7 AMC_i + b_8 MTB_i \qquad (7)$$

This regression model has as a dependent variable the Cumulative Abnormal Returns (CARs), as independent variables the Relative Size (RS), the dummy Fintech (FT) and the dummy Serial Acquirer (SA). Moreover, in the model are included Market to Book Ratio (MTB), Acquirer Market Capitalization (AMC), Dummy Public Target (PT), Dummy Target Banking Industry (BI) and Dummy Payment Only Cash (CP) as control variables. A quick description of the model variables is presented in the Table 1.

As first step of this study is to detect and download from Center for Research in Security Prices (CRSP) the daily stock returns of all companies for the period 2010-2018. The next step is to identify which of them belong to banks. In order to obtain the list with all the banks during the period 2010 to 2018, the CRSP/Compustat Merged database has been used by downloading the "Bank Annual" data. Through the merge of daily stock returns with the list of banks which was

retrieved from CRSP/Compustat, the created file includes the daily stock returns of all banks in the United States during the time horizon between 2010 and 2018. Then, this file is merged with annual financial variables which are obtained from the database of CRSP/Compustat Merged Fundamentals Annual for the period 2009 to 2017. The created file includes all the daily stock returns of all banks with financials. To end up with the final sample, this file must be merged with transactions of M&As.

Table 1

This table depicts the list and the description of independent and control variables. It illustrates their possible values and how these variables are calculated.

Independent Variable	**Description**
Dummy Fintech (FT)	1 - Target is a fintech firm 0 - Otherwise
Dummy Serial Acquirer (SA)	1 - Acquirer did two or more acquisitions in the database 0 - Otherwise
Relative Size (RS)	Estimated by dividing the transaction value with the market capitalization of the acquiror prior to the announcement.
Control Variable	**Description**
Dummy Public Target (PT)	1 - Target firm is public 0 - Otherwise
Dummy Target Banking Industry (BI)	1 - Target's sector is banking 0 - Otherwise
Dummy Payment Only Cash (CP)	1 - Pay only with cash 0 - Otherwise
Acquirer Market Capitalization (AMC)	Market value of the acquirer before the announcement of the deal
Market to Book Ratio Acquirer (MTB)	Market value to book ratio of the acquirer

The information about the M&A deals in this research was retrieved from the Thomson One database. The following list represents the first requirements for a deal to be included in the sample:

- Announced between 01/01/2010 and 31/12/2018.
- The acquirer is based in United States of America and is listed on the stock exchange.
- The acquirer operates in the financial industry.
- The deal has been completed and the acquirer owns 100% of shares after the transaction.
- The target firm is in United States

According to these requirements the initial sample consists of 1,183 deals. Afterwards, the identification of the target which operates in both the financial and IT sector constitutes the most difficult part of this research. There is not a specific SIC or NAICS code. Therefore, in order to

detect which deal is between banks and fintech, I investigated manually every deal separately. As concern acquirers, “Acquiror Industry”, “Acquiror Short Business Description” and “Acquiror Full Business Description” information is used to detect the acquirers who operate in the banking industry so as to obtain a restricted sample to banks.

On the other hand, the variables which are used to detect the target company that constitutes a fintech company are the “Target Industry”, “Target Short Business Description”, “Target Full Business Description” as well as its own internet address. Screening and reducing the data set by excluding deals from the sample if the target company is not related directly to the fintech sector, the final list with the 37 M&As between banks and fintech firms is obtained.

The most relevant index to calculate abnormal returns since all the acquirers are from United States is the S&P500 Bank Index.

4.2.2 Data set composition

After using different criteria on Thomson One database and searching in sites like CrunchBase and Factiva for M&As of banks, 759 final deals are collected. These deals represent the mergers and acquisitions that took place in United States where the acquirer was a bank regardless of the industry of the target firm. As can be seen in Fig. 3, the number of M&As showed an upward trend during the period 2010-2015. In the next three years there was a fluctuation in the total number of M&As. A decrease in 2016 was followed by a slight increase in 2017 and a reduction in 2018 which is concise with the M&A activity in fintech in the US (KPMG, 2018)[9]. On the other hand, as concern the mergers and acquisitions between banks and fintech, there are small fluctuations during the period from 2010 to 2018 with a peak of eight deals in 2016.

[9] KPMG, 2018: “The pulse of fintech 2018. Biannual global analysis of investment in fintech”.

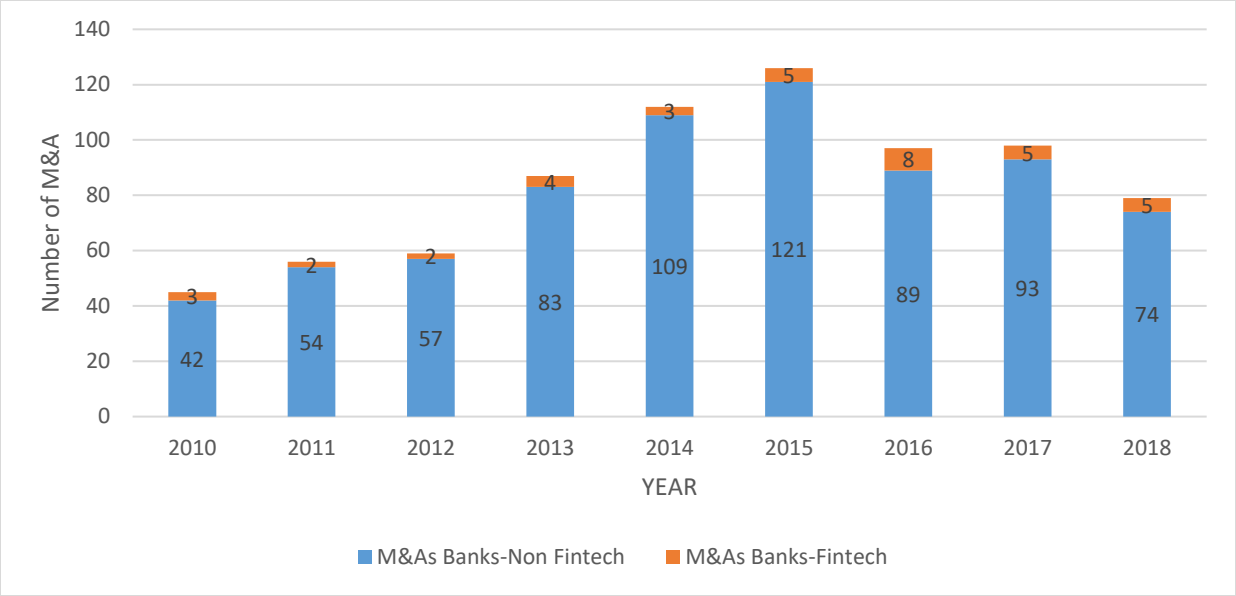

Fig. 3. *This figure presents the number of mergers and acquisitions in United States during the period 2010-2018. The sample includes 722 deals of banks with targets that operates in any industry sector except fintechs, as well as 37 deals which occurred between banks and fintech firms.*

The target firms that took place in these deals can be split in five main categories (Asset Management, Banking, Other Financial, Other and IT).

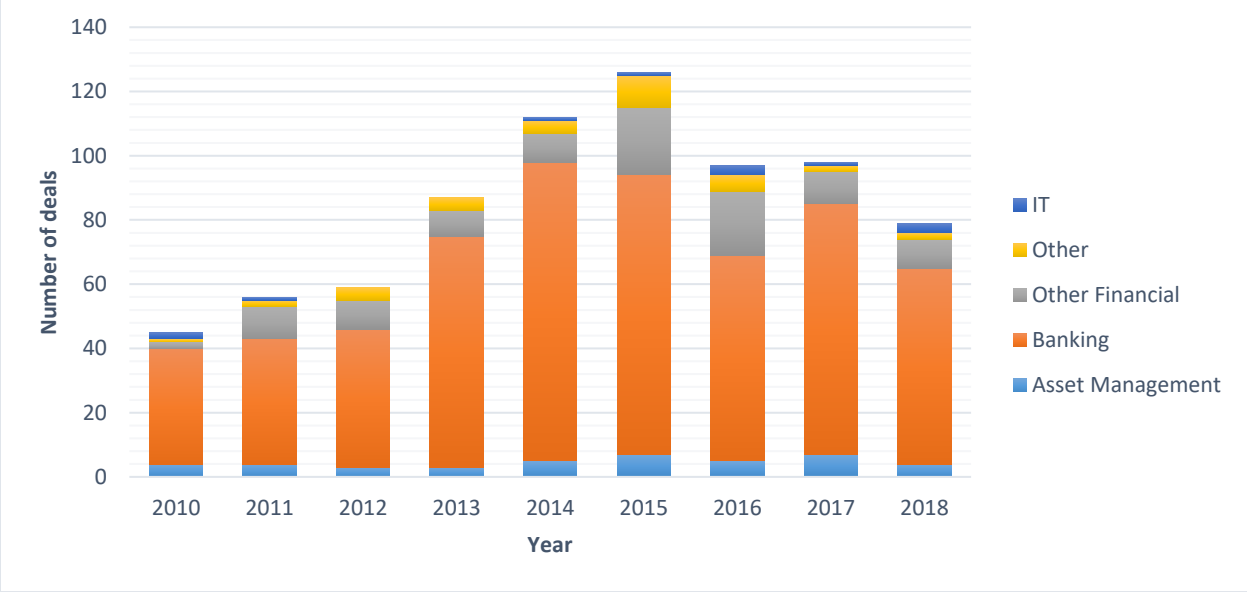

Fig. 4. *This figure presents the industry group that target firm belongs to. The sample includes 759 M&As by banks in United States during the period from 2010 to 2018.*

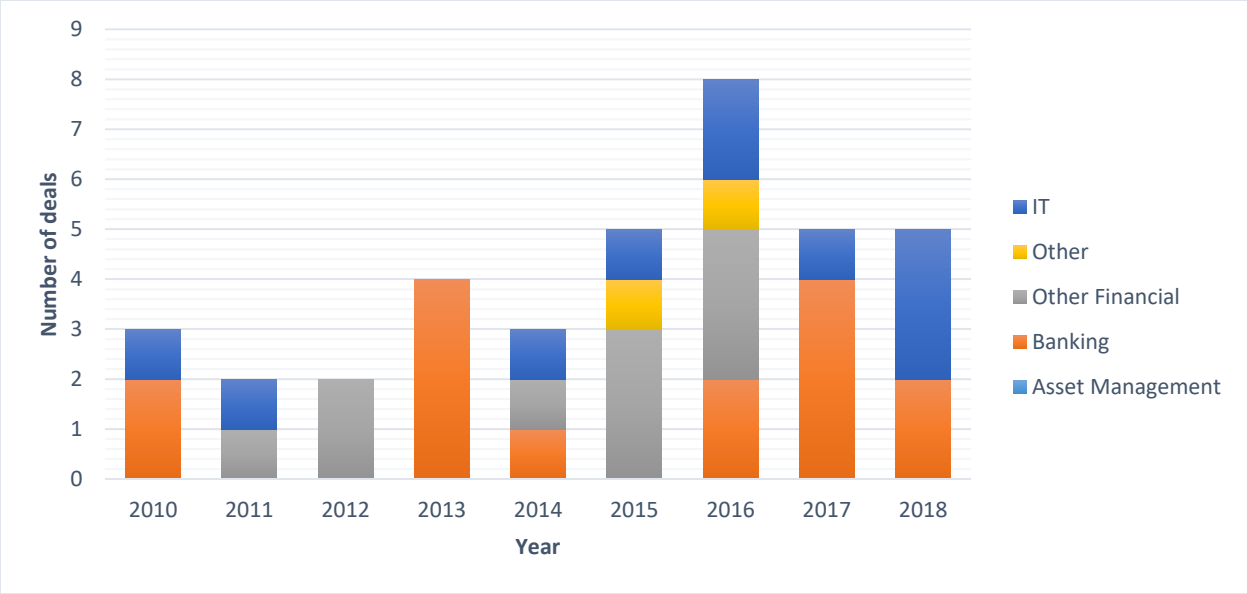

Fig. 5. *This figure presents the industry group that target firm belongs to. The sample includes 37 M&As between banks and fintech from 2010 to 2018.*

The Fig. 4 and the Fig. 5 display how many target firms belong in each category every year. The "Banking" industry is the main category for both samples. It is interesting that even though many target firms that were merged or acquired by banks in the time horizon between 2010 and 2018 operated in "Asset Management", none of them was a fintech company. A significant percentage of fintech firms which were acquired and merged by banks were detected either in "IT" industry or in "Other Financial" industry like brokerage and credit institution.

This thesis focuses on the value creation in deals between banks and fintech firms. So, this research investigates the difference between deals where non-fintech firms are involved like target firm and the deals where banks acquire fintech firms. Therefore, the sample is split into two subsamples, the first one includes 722 deals between banks and non-fintech target firms and the second one consists of 37 bank acquisitions of fintech firms (Table 2).

Table 2

This table depicts the sample composition. It illustrates various characteristics of deals and their distribution in the subsamples of Fintech and Non-Fintech target firms.

		Target Firm		
		Non-Fintech	Fintech	Total
Number of Observations		722	37	759
Public Target Firm:	Yes	271	8	279/759
	No	451	29	480/759
Fully paid in cash:	Yes	602	2	604/759
	No	120	35	155/759
Serial Acquirer:	Yes	647	34	681/759
	No	75	3	78/759
Target IT Industry:	Yes	2	10	12/759
	No	720	27	747/759
Target Bank Industry:	Yes	558	15	573/759
	No	164	22	186/759
International Acquirer:	Yes	-	5	
	No	-	32	

The number of deals between banks and fintechs represents only 4.8% of the whole number of acquisitions that occurred by banks during the period from 2010 to 2018. As concerns the status of target firm, the majority of target firms, both for fintech and non-fintech group, are private. Moreover, banks prefer to pay with cash when the target is not a fintech firm. In a percentage of almost 90% of transactions, the acquirer participated in multiple acquisitions. Most of target firms (77%) belong to banking industry and a very small proportion of them operate in IT industry. On the other hand, 27% of fintech target firms are in IT and 40% in banking sector. Besides that, banks which acquired fintech firms are by a majority, domestic. These banks operate locally, only in United States.

5. Empirical results and analysis

After describing how the data set is constructed, the presentation of descriptive statistics and outliers follows. In addition, this chapter introduces and discusses the results of the event study and regression analysis.

5.1 Descriptive statistics and outliers

In order to run a regression, it is necessary to check the existence of outliers and how they influence the results of a regression. Characteristics like skewness and non-normal distribution could lead to estimations that are not accurate. As a consequence, many researchers to ensure normality in their sample distribution, they use the logarithm or square root transformation. Transforming the variables by taking the natural logarithm, reduces the influence of the outliers (Leydesdorff and Bensman, 2006). Therefore, the natural logarithm is one way to deal with the outliers before running a regression. Moreover, as an additional method to cope with skewness and non-normality is winsorizing. Winsorization is the modification of one or more data points at the end of the tails of the distribution to the next highest/lowest values within the distribution that are not suspected to be the outliers. It improves statistical efficiency and increases the robustness of statistical inferences which is important for estimating statistics such as mean and variance that are very vulnerable to outliers. The program that is used in this thesis for regressions is Stata. It provides the option of winsorization. So, data has been also winsorized to 1% and 99% to eliminate the influence of the extreme observations. More specifically, these methods have been used for the variables: Acquirer Market Capitalization, Market-to-Book, and Relative Size.

Before discussing the results, the descriptive statistics are presented. Through the descriptive analysis, the validity of the data is checked. The Table 3 below, shows the descriptive statistics of the main variables which are going to be used in our tests. It produces the descriptive statistics on the dependent, independent and control variables for the whole sample. It illustrates the mean, median, standard deviation, skewness and kurtosis. The descriptive statistics for the two subsamples are presented in the Appendix A.

Table 3

This table reports the descriptive statistics of the whole sample with 759 M&As. The variables: Acquirer Market Capitalization (AMC), Market-to-Book (MTB), and Relative Size (RS) are transformed by taking the natural logarithm and winsorizing.

	Mean	Median	St.Dev.	Skewness	Kurtosis	Obs.
CAAR (-3,3)	0.561	0.227	4.563	1.183	9.968	759
Fintech Target (FT)	0.048	0	0.215	4.191	18.564	759
Public Target (PT)	0.367	0	0.482	0.549	1.301	759
Serial Acquirer (SA)	0.897	1	0.303	-2.616	7.845	759
Payment Cash (PC)	0.161	0	0.367	1.847	4.412	759
Target Industry IT (T_IT)	0.015	0	0.124	7.763	61.266	759
Acquirer Market Capitalization (AMC)	13.623	13.467	1.631	0.754	3.765	759
Market-to-Book (MTB)	2.335	2.312	0.356	0.445	3.215	728
Relative Size (RS)	0.309	0.382	0.180	-0.857	2.192	749

As concern skewness, if it is less than -1 or greater than 1, the distribution is highly skewed. In our sample highly skewed are the dummy variables of Target Fintech, Payment Cash, Serial Acquirer and Target Industry IT. Specifically, dummy Fintech Target and Serial Acquirer are skewed since the proportions of the non-fintech target firms and serial acquirer in our sample are high with 95.2% and 89.7% respectively. Furthermore, there is a large difference between the two subsamples as concern the dummy Payment Cash and dummy Target Industry IT which causes the phenomenon of skewness. The 16.6% of deals in the non-fintech subsample is paid with cash whereas the percentage of cash payment deals in fintech subsample is only 5.4%. Similarly, only 0.2% of non-fintech target firms which engaged in M&As with banks belong to the IT sector while this percentage is 27% for the fintech subsample.

5.2 Abnormal returns

As shown in Table 4, there are positive cumulative average abnormal returns for every sample. As concerns the 7-days event window, the cumulative average abnormal returns for the whole and non-fintech samples show significant positive results (0.56% and 0.54% respectively) at 1% significance level. Finding positive and significant results for the whole sample is in line with the research of Neely (1987) on banking acquisitions who finds positive cumulative abnormal returns of 1.92% for the first week following the announcement date. A possible explanation for this difference in cumulative abnormal returns could be the different event window and different period of investigation. As regards the fintech sample, it has higher cumulative average abnormal

returns (0.93%) but not statistically significant. The results of Table 4 are in line with our expectations and our first hypothesis that deals with fintech target firms achieve positive cumulative abnormal returns and outperform the acquisitions of non-fintech target firms. Previous literature (Draven, Frolova and Ochirova, 2019) demonstrates positive average abnormal returns of 0.87% in the short run after the acquisition of fintech. The higher positive cumulative abnormal returns of 0.93% in this thesis could be associated with the fact that the sample consists only banks as acquirers. A possible logic explanation for higher abnormal returns to fintech sample could be the status of target firms. The majority of fintech firms are private firms so more is paid in equity compared to the non-fintech subsample. Studies such as Alexandridis and Petmezas (2010), support that acquirers who get involved in private deals pay lower premium due to lower competition. Hence, this could lead the acquirers of fintech firms to have higher returns than acquirers of non-fintech firms.

However, due to insufficient evidence, these results cannot conclude that acquirers of fintech firms create more value than acquirers who involved in non-fintech target deals because the coefficient is insignificant. As concerns some other different event windows, an extended study can be found in the Appendix B.

Table 4

*Cumulative Average Abnormal Returns (CAARs) for the Whole, Non-Fintech Target, and Fintech Target Sample. This table reports CAARs and t-statistic for 7-day event window. The Abnormal Returns are calculated through the market model, having as estimation period 151-trading days, ending 20 days before the event day. * significance at the 10% level, ** at the 5% level, and *** at 1% level.*

Event Window		Whole Sample	Non-Fintech	Fintech
[-3 to 3]	CAAR (%)	0.560*** P<0.01	0.542*** P<0.01	0.933
	t-stat	3.48	3.34	0.95

Additionally, it is worth observing and noting how the cumulative average abnormal returns change from the event day -10 to event day +20. The Fig. 6 illustrates the plot of these returns. Each day CAAR consists of the average abnormal return of that day and the sum of average abnormal returns before that day.

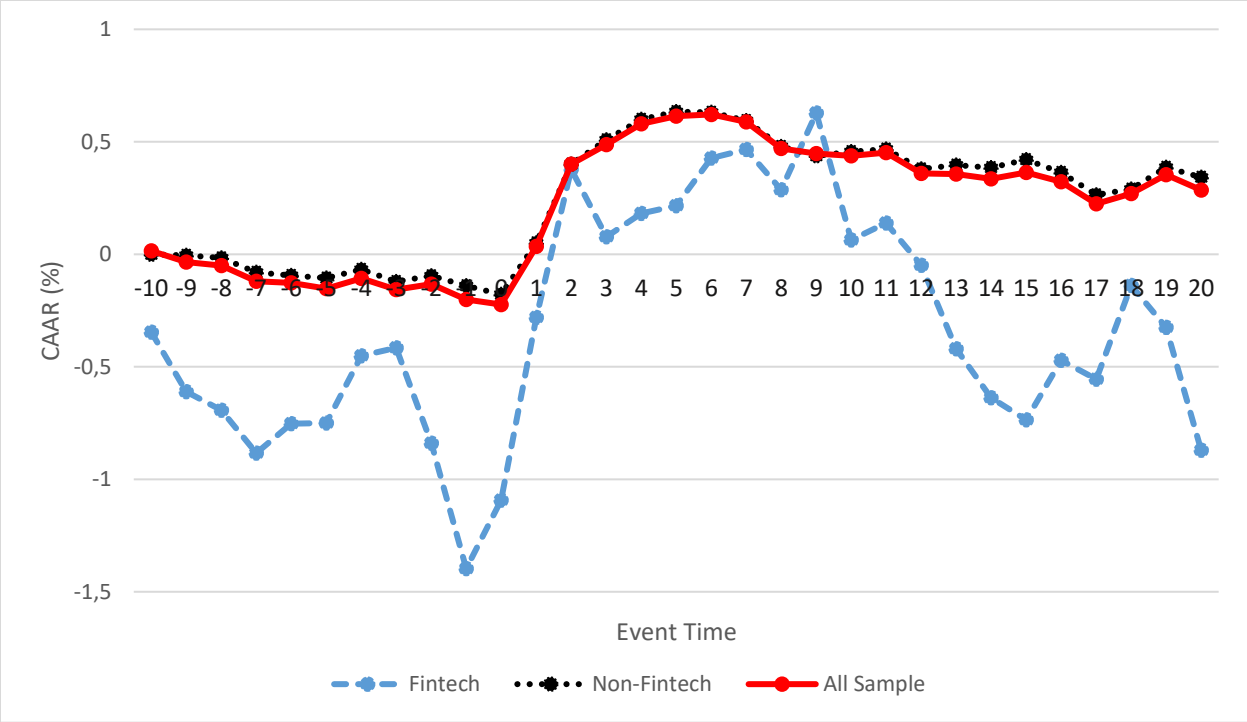

Fig. 6. *This figure depicts the plot of cumulative average abnormal returns from event day -10 to event day +20.*

Giving a quick overview of Fig. 6, it is obvious that the line which represents the fintech subsample is more volatile. The CAARs of the other two samples continue to drift downwards till the announcement day (event day 0). It is noticeable that the abnormal returns become more negative when the event window moves towards the announcement day. The announcement of the M&A results in positive effect to the abnormal returns. All the samples show an upward trend for the following days. Thus, this could indicate that the market is efficient since the news have affected the returns immediately after the announcement. Perhaps the positive reaction is a sign that investors expect future growth and immediately react to announcements of M&As. The cumulative average abnormal returns of non-fintech and whole sample post the event day 6, are sloping slightly downwards while fintech sample shows fluctuations with a downward trend. Focusing on the two or three days prior and after the event, the average abnormal returns are negative till the announcement day when these returns change to positive ones. This leads the cumulative abnormal returns to decrease and after the event to increase which could interpret the positive results of Table 4. Therefore, the positive results and the highest returns of fintech subsample in the Table 4 are driven by the initial stock decrease which is followed by a significant

increase after the announcement day. Fintech subsample experienced the highest increase as concerns the first few days after the deal announcement. Probably, investors are more optimistic in the case of fintech target firm because they believe that banks with these acquisitions will obtain access to advance technologies which will accelerate their growth. However, interpretations for the fintech line should be approached with caution because of the small number of observations. The sample size is extremely low (n=37) which could constitute an issue and affect the obtained results. A larger number of observations could give a better explanation of the correlation between variables and decrease the probability of wrong estimations. The fintech line is too volatile with large and intensive fluctuations. The lower is the sample size, the higher is the sampling noise which in turn distorts the overall trend. As concerns the whole and the non-fintech sample, the most significant changes in the CAARs take place after the deals are announced (after event day 0). Consequently, no phenomenon of information leakage is detected prior to the event.

5.3 Regression analysis

In order to check the hypotheses, this study runs different regressions which are presented in this section. These regressions analyse the influence that deal and firm characteristics have on the abnormal returns of the acquirer. The 7-day event window is used as the main model. To begin with, the first column of Table 5 presents the results of the following regression:

$$CAR_i = a + b_1 FT_i + b_2 PT_i + b_3 BI_i + b_4 CP_i + b_5 AMC_i \qquad (8)$$

It regresses the cumulative abnormal returns of banks with the dummy variable of fintech (FT) and with some additional control variables to increase the R-squared coefficient. The model (Model 1) has 759 observations and presents a R-squared value of 0.056. Out of all tested variables, only Public Target (PT) and Acquirer Market Capitalization (AMC) appear to be statistically significant at the level 1% with coefficients of -1.769 and -0.439 respectively. Afterwards, three other variables which are related to the Hypothesis 2, are added to the regression formula (Table 5, Column 2). These variables are: Dummy Serial Acquirer (SA), the interacted variable of Serial Acquirer and Fintech Target (FT * SA) and lastly the Market-to-Book ratio (MTB). The formula of the regression is the following:

$$CAR_i = a + b_1 FT_i + b_2 SA_i + b_3 FT_i * SA_i + b_4 PT_i + b_5 BI_i + b_6 CP_i + b_7 AMC_i + b_8 MTB_i \quad (9)$$

Adding these three variables to the original model, the value of the R-squared increased from 0.056 to 0.084. Therefore, the model (Model 2) improves its explanatory power after extending its variable list. However, the R-squared continues to be very low. Dummy Public Target and Acquirer Market Capitalization continue to have negative and statistically significant coefficient at 1% and 5% level respectively. Finally, the impact of relative size on the cumulative abnormal returns is checked through the following regression:

$$CAR_i = a + b_1 FT_i + b_2 SA_i + b_3 RS_i + b_4 RS_i * FT_i + b_5 PT_i + b_6 BI_i + b_7 CP_i + b_8 AMC_i + b_9 MTB_i \quad (10)$$

The output of this regression is presented in the third column (Model 3) of Table 5. In this regression the independent variable Relative Size (RS) and its interaction variable with dummy Fintech Target are added. Instead of an increase in the R-squared, at this time the R-squared is decreased from 0.084 to 0.072. Moreover, Model 3 has a lower significance of determinants in comparison with the previous models. A possible explanation could be the lowered number of observations which decreased to 580 due to the lack of sufficient data for the added variables used for estimation of Model 3. What is more, only one of the nine independent and control variables is statistically significant. This variable continues to be the dummy Public Target.

Table 5 reports that in Model 1 and 2 the coefficients of dummy Fintech Target are positive but negative in Model 3. It has a positive insignificant coefficient of 0.936 percentage points in the first model and a statistically significant coefficient of 13.933 at one percent level in the second model. These results indicate that fintech M&As have positive impact upon CAR. According to the theory developed previously, it is expected that the M&As with high-tech target firms to create positive abnormal returns in the short run of acquirers (Kohers and Kohers, 2000). This means that M&As of fintech firms are value-enhancing for the bank which achieves to get access to new markets and to create value for itself. However, the coefficient is not statistically significant due to a high p-value level in Model 1. In addition, there is a very large increase and a change in the significance of the variable between the two models. The coefficient of dummy Fintech Target in Model 2 depicts a very large and significant effect which generates concerns

about the results. This enormous difference can be attributed to the dummy Serial Acquirer that has been used, for deviating the results from their true value. Almost 90% of the sample includes acquirers who got involved in multiple M&As both with fintech and non-fintech firms during the period from 2010 to 2018. As a consequence, there is insufficient evidence to bolster the first hypothesis.

Table 5

*This table provides the results of the regressions, where the dependent variables are the Cumulative Abnormal Returns (CARs) for the event window (-3, 3). The sample consists of all M&As. Coefficients of variables are expressed in percentage points (%) and standard errors are shown in parentheses. As concern the significance level: * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level.*

	Model 1	Model 2	Model 3
VARIABLES	CAR (-3,3)	CAR (-3,3)	CAR (-3,3)
Fintech (d)	0.936	13.933***	-2.033
	(0.772)	(3.186)	(2.337)
Serial Acquirer (d)		-0.621	-0.945
		(0.553)	(0.594)
Fintech x Serial Acquirer		-13.61***	
		(3.330)	
Relative Size			0.200
			(2.633)
Fintech x Relative Size			9.376
			(5.993)
Public Target (d)	-1.769***	-1.900***	-1.791***
	(0.354)	(0.357)	(0.397)
Target Banking Industry (d)	0.354	0.437	-0.0611
	(0.413)	(0.425)	(0.537)
Cash Only Payment (d)	0.194	0.148	0.129
	(0.450)	(0.455)	(0.490)
Acquirer Market Capitalization	-0.439***	-0.314**	-0.220
	(0.106)	(0.151)	(0.186)
Market-to-Book ratio		0.386	0.973
		(0.640)	(0.715)
Constant	6.872***	4.784	2.696
	(1.571)	(3.297)	(4.126)
Observations	759	728	580
R-squared	0.056	0.084	0.072

The results show that the coefficients behind the dummy Serial Acquirer are negative and insignificant (-0.62 and -0.94 percentage points). This indicate that the acquirers who involved in more than one M&A, are more negatively affected than the single acquirers. This is consistent with prior study on the negative impact of multiple acquisitions on the value creation of merger company (Ismail, 2008). Besides that, as concerns the interaction of dummy Serial Acquirer with the dummy Fintech Target, Model 2 shows a negative and significant interacted coefficient of -13.61%. This indicates that serial acquirers get 13.61 percentage points less than non-serial acquirers in the group of fintech target firms. Additionally, regarding the 7-day event window, in Table 5b in Appendix C the results depict a very large significant coefficient of -20.49 percentage points in the fintech subsample and an insignificant coefficient of -0.55 percentage points for the non-fintech subsample. These results are consistent with the second hypothesis of stronger multiple acquisition effect for fintech than non-fintech firms. This effect may be due to the hubris behaviour of acquirers in combination with the scarce experience that exists in fintech valuation. Acquirers with higher experience in M&As, especially in successful ones, tend to overrate the value of target firm and to overpay for their acquisition. It seems that this research finds some evidence but there are important reservations. The fact that there are only three observations with fintech not acquired by a serial acquirer, the small size of the fintech subsample and the high number of serial acquirers could lead to deviations from the true value and therefore to get very high estimations of interacted variable.

As concerns the third hypothesis, the coefficient for relative size in Model 3 (Table 5, Column 3) presents an insignificant positive impact of 0.20 percentage points on the cumulative abnormal returns of merger company. This coefficient indicates that the higher is the size of target firm relatively to the size of the acquirer, the higher is the positive impact on the cumulative abnormal returns of the merger company. This could be associated with synergy opportunities and decrease in competition. The result is in line with previous studies such as Mateev (2017) and Danbolt and Maciver (2012) who find a non-significant relationship between bidders' abnormal returns and relative size. Regarding the coefficient of its interaction with the dummy Fintech Target, the results present a positive but not statistically significant coefficient and equal to 9.37 percentage points. This indicates that deals with higher relative size get 9.37 percentage points

more than deal with low relative size in the fintech mass. Furthermore, as expected in Hypothesis 3, the influence of relative size on the abnormal returns is higher when the target firm is a fintech. Surprisingly, in Table 5b in Appendix C, the relative size of the fintech subsample (-16.29 percentage points) does not exhibit positive and higher coefficient of the non-fintech subsample (0.55 percentage points). Although its statistical non-significance coefficient is consistent with the previous studies, the negative coefficient contradicts the theory. So, no evidence is found to confirm the null hypothesis. A possible explanation for this unexpected very high coefficient of -16.29% could be the small number of the observations that are available for this regression (21 observations) or the fact that the banks which inject fund to a fintech firm take long time to become profitable. What is more, it is possible that larger fintech firms are more difficult to become a target because they have grown enough and have reached a certain maturity level, making it more difficult to achieve synergies with the acquirer banks. Another possible reason could be the usage of transaction value instead of the market capitalization of the target firms which leads to less accurate estimation of its value because the transaction value could incorporate also the premium paid by the acquirer. On the other hand, this does not happen in the case of larger non-fintech target firms because in this subsample the target firms that operate on the banking sector are almost the 77%, which makes banks more effective in creating synergies and integrate these companies into their own business.

The coefficient of dummy Public Target has a negative significant impact on the CARs at one percent level of significance (Table 5). This indicates that the acquirers of public target firms are more negatively affected than companies which acquire private target firms which bolster the results of Fuller, Netter and Stegemoller (2002). A logic explanation for this could be that public targets tend to be larger than private targets, so they have stronger negotiating power and could require higher premium. Moreover, it is more difficult for the acquirer to integrate large firms into their business.

The factor market capitalization (Acquirer Market Capitalization) has negative and significant coefficients in Model 1 and Model 2 of -0.43 and -0.31 percentage points respectively. More specifically, an M&A with high acquirer market capitalization is associated with a negative impact on the acquirers' cumulative abnormal returns. It can be said that this outcome agrees with the

results of previous studies (Humphery-Jenner and Powell, 2014; Moeller, Schlingemann and Stulz, 2004). This is not surprising given that the larger the acquirer is, the higher is the premium that bidder pays leading to value-destroying M&As.

The variable Market-to-book has a positive insignificant impact on CAR (0.386 and 0.973 percentage points), while it was expected to show a negative effect. This result indicates that the higher the market-to-book ratio (glamour acquirer), the greater its impact on CAR after an M&A. This fact partially contradicts the findings of Rau and Vermaelen (1998) of long run underperformance of glamour acquirers. However, this thesis investigates the short-term performance of acquiring firms. Hence, this could constitute a reason for different results in this study. Additionally, the positive impact could indicate that the past growth in cash flow of glamour acquirers, potentially maintain the investors' belief of high stock returns after the acquisitions. Therefore, investors show inability to recognise immediately the poor earning quality of glamour acquirers after the announcement date, so they correct the overextrapolation of past performance in the following time period.

Although the set of independent and control variables help us to increase the explanatory power of our results, further robustness checks are performed to confirm or not the findings as presented in Table 5. Performing robustness checks give us the opportunity to ensure how certain are the estimated coefficients of previous regressions. These checks are presented in Table 5a and Table 5b that can be found in Appendix C. Interpreting the obtained results of Table 5a which runs the regressions of each hypothesis for 3-day and 21-day event window and comparing them with our main regressions, it is observed that no significant differences are found as concern the first hypothesis. Similarly, most of the coefficients for the Hypothesis 2 and 3 are in the same line with the coefficients of our main model.

Additionally, to enrich the robustness check, this thesis analyses how the coefficients change while separating the sample into the fintech and non-fintech subsamples (Table 5b, Appendix C). Three different regressions are used for each subsample and the event windows that have been used are the (-1,1), (-3,3) and (-10,10). As concern the event window (-3,3) which is the main model, it is noticed that four variables (Relative Size, Target Banking Industry, Cash Only Payment

and Acquirer Market Capitalization) of fintech subsample present different effect. Moreover, the coefficients in the fintech subsample are very high. A possible reason could be the small size of the fintech subsample in combination with the fact that for some variables like serial acquirer and cash only payment, there is an uneven distribution of observations.

To sum up, even though this study finds significant results for the Hypothesis 2, that multiple acquisitions adversely affect cumulative abnormal returns or acquiring firm and found a stronger effect for the fintech subsample, the uneven distribution that exists in this subsample creates doubts. In addition, none of the other two regressions provide sufficient evidence, due to the fact that the results lack strong statistical significance. Consequently, the expectations as have been stated in Hypotheses 1 and 3 cannot be confirmed.

6. Conclusions

This research studied the impact of the mergers and acquisitions in the banking industry by analysing deals with fintech and non-fintech target firms. The main question of this study is whether the fintech based M&As lead to value enhancement for the banks in the United States. I used the acquirer's cumulative abnormal return around the acquisition announcement as a proxy for whether the deal creates value. Additionally, this thesis investigates deal and firm characteristics that are relevant for a bank which gets involved in a takeover.

Using a data set of 759 transactions, which covers the period from 2010 to 2018, this study found apparent differences in the firm characteristics between deals with fintech and non-fintech target firms. Mergers and acquisitions across the fintech subsample are most often characterized by higher acquirer market capitalization and higher market-to-book ratio. Since all the transactions occurred in the same environment, in the United States, this raises the question whether the larger banks are more willing to take over fintechs because they believe that are more capable in implementing the target's technology. A possible explanation could be that it is easier for these kinds of banks to take the advantage of firms with technological advancements like fintech firms to maintain their competitive position and advance it further. Another finding of this research is that the proportion of banks with experience in M&As is higher in the fintech subsample. Furthermore, most of fintech firms operate in the financing segment (Haddad and

Hornuf, 2018) and they are more likely private firms. In answer to the question if the M&As with fintechs create more value than non-fintech firms, no significant evidence was found. The results indicate an overall 0.56% statistically significant abnormal returns for banks when involving in M&As but no evidence of higher value creation in the case of fintech target firms. Another result of the research is that deals with public target firms adversely affect the cumulative abnormal returns of acquirers, with a stronger effect by public fintech targets. Additionally, the results indicate that multiple acquisitions have negative impact on banks, however no evidence was found in favour of the higher relative size.

This thesis contributes to understand that these kinds of M&As lead to technological development and digitalization which gives the chance to banks to create value. It will extend the scope of current research by adding valuable information in the fintech field, especially on the relationship between banks and fintech. Fintech's relationship with banks is not yet extensive enough, so this study will contribute to such a narrow and relative topic. Moreover, it will enrich our knowledge and contribute to the overall discussion on whether M&As of banks are value-enhancing. Besides that, this thesis will constitute a guideline not only for the management but for the key stakeholders as well. Even though no evidence is found that fintech based M&As outperform the non-fintech ones, this thesis detected statistically significant positive cumulative abnormal returns to the whole sample and non-fintech subsample. So, this could affect the investment practices of banks and make them more likely to engage in M&As. Furthermore, evidence was found of negative impact of public target firms on the cumulative abnormal returns of banks. This would change and make the management of acquirers to be more careful as concern future potential failures and negative outcomes that may affect the value of the bank. Similarly, they have to become more careful and avoid getting involved in multiple acquisitions.

Searching for alternative explanations that could be consistent with these findings of positive impact of M&As in the value of banks, I could mention the overall increase in the market valuation during the studied period. Since the financial crisis in 2008, there has been an upward trend in the US stock market. In addition, nowadays, the number of banks is shrinking, but the value of the deposits is not following the same trend. The value of deposits in the banks of United

States has increased[10]. Hence, banks are trying to cut costs and become more digital. This situation has probably affected the strategy of banks and the number of M&As with fintechs because fintech companies offer new technologies to enhance consumer experience (offer greater convenience, lower transaction costs, better credit risk assessments) at the same time that banks find it difficult to capture the value of data.

As the majority of research, this study is not flawless. There are imperfections. For example, the data scarcity on M&As deals between banks and fintechs. They are only 37 in total. This decreases the statistical power of this subsample and does not allow for making strong conclusions as concerns the results of the regressions analysis. An additional inhibitory factor which prevents to generalize the findings of this research is the poor data availability of fintech firms. Most of fintech firms constitute private firms and start-ups which makes it difficult to impossible to obtain information as size, assets, returns etc. Moreover, as the author of this paper, I had to check manually every transaction to detect the target firms that belong to the fintech segment. Hence, the process of classification a target firm as fintech or non-fintech involves the risk of making a wrong clear-out. As a consequence, we cannot rule out that our findings are spurious.

Despite the valuable information that this thesis adds to the existing literature, there is room for further investigation. To begin with, a broader or a different market from United States can be studied. Possible areas of interest in conducting a research could be not developed markets like United States but emerging ones. This would help to make comparisons between the two different types of markets and study the interaction between the two markets since the knowledge is transferred easily, so synergy gains and market growth could be achieved. Moreover, there is the possibility someone to consider our sample period short so a longer period of time could be used. Long term studies could be more accurate and provide more statistically significant results. Furthermore, using a longer time horizon of investigation could check whether the developments that have occurred from 2018 to 2020 have affected the factors and the time

[10] Szmigiera, M. (2020), Value of savings deposits at all depository institutions in the United States from 1980 to 2019. Available at: https://www.statista.com/statistics/246246/total-savings-deposits-at-all-depository-instituitions-in-the-united-states/

of completion needed for M&As between banks and fintechs. Besides that, future research could study the dependence of cumulative abnormal returns of banks on other factors. The results presented a considerably low R-squared which indicates that there could be other factors with high explanatory power. Another interesting aspect that could be examined in future research is the impact of the current pandemic of Coronavirus. It would be intriguing to check how this pandemic will affect the cross-border M&A activity within the fintech sector. Coronavirus joins list of causes for infamous market crashes and it has not been over yet. Finally taking into consideration the difficulties that I met in detecting the fintech target firms for every individual transaction, a very helpful action for more precise results in the future is to set global industry codes for the fintech definition.

7. Appendices

A. Descriptive statistics

Table 3a

This table depicts the descriptive statistics of the Non-Fintech subsample. It consists of 722 deals. Target firms do not belong to fintech sector. The variables: Acquirer Market Capitalization (AMC), Market-to-Book (MTB), and Relative Size (RS) are transformed by taking the natural logarithm and winsorizing.

	Mean	Median	St.Dev.	Skewness	Kurtosis	Obs.
CAAR (-3,3)	0.542	0.273	4.452	1.158	10.601	722
Public Target (PT)	0.375	0	0.484	0.514	1.265	722
Serial Acquirer (SA)	0.896	1	0.305	-2.596	7.742	722
Payment Cash (PC)	0.166	0	0.372	1.793	4.216	722
Target Industry IT (T_IT)	0.002	0	0.052	18.921	359.002	722
Acquirer Market Capitalization (AMC)	13.558	13.425	1.558	0.732	3.936	722
Market-to-Book (MTB)	2.334	2.308	0.356	0.452	3.268	702
Relative Size (RS)	0.307	0.381	0.179	-0.871	2.201	722

Table 3b

This table shows the descriptive statistics of the Fintech subsample. It consists of 37 deals between bank and fintech target firms. The variables: Acquirer Market Capitalization (AMC), Market-to-Book (MTB), and Relative Size (RS) are transformed by taking the natural logarithm and winsorizing.

	Mean	Median	St.Dev.	Skewness	Kurtosis	Obs.
CAAR (-3,3)	0.933	-0.980	6.426	1.116	4.358	37
Public Target (PT)	0.216	0	0.417	1.378	2.901	37
Serial Acquirer (SA)	0.918	1	0.276	-3.069	10.421	37
Payment Cash (PC)	0.054	0	0.229	3.944	16.557	37
Target Industry IT (T_IT)	0.270	0	0.450	1.034	2.070	37
Acquirer Market Capitalization (AMC)	14.961	14.907	2.431	-0.087	2.096	37
Market-to-Book (MTB)	2.392	2.461	0.435	-0.070	2.349	26
Relative Size (RS)	0.310	0.309	0.110	0.191	2.488	27
Fintech Age (FA)	28.972	11	41.839	2.022	5.829	37
International Acquirer (IA)	0.135	0	0.346	2.134	5.556	37

B. Cumulative Average Abnormal Returns all event windows

Table 4a

*Cumulative Average Abnormal Returns (CAARs) for the Whole, Non-Fintech Target, and Fintech Target sample. This table reports CAARs and t-statistic for various event windows. The Abnormal Returns are calculated through the market model, having as estimation period 151-trading days, ending 20 days before the event day. * significance at the 10% level, ** at the 5% level, and *** at 1% level.*

Event Window		Whole Sample	Non-Fintech	Fintech
[-1 to 1]	CAAR (%)	0.113	0.089	0.558
	t-statistic	0.88	0.67	0.99
[-3 to 3]	CAAR (%)	0.560*** p<0.01	0.542*** p<0.01	0.933
	t-statistic	3.48	3.34	0.95
[-10 to 10]	CAAR (%)	0.437* p<0.1	0.456** p<0.05	0.064
	t-statistic	1.93	2	0.06

C. Robustness checks

Table 5a

*This table provides robustness checks. Our three hypotheses are tested also on the 3-day and 21-day event windows. The dependent variables are the Cumulative Abnormal Returns (CARs) and the sample consists of all M&As. Coefficients of variables are expressed in percentage points (%) and standard errors are shown in parentheses. As concern the significance level: * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level.*

VARIABLES	CAR (-1,1)	CAR (-10,10)	CAR (-1,1)	CAR (-10,10)	CAR (-1,1)	CAR (-10,10)
Fintech (d)	0.820	0.265	5.655***	10.68**	0.166	-2.309
	(0.640)	(1.108)	(2.648)	(4.614)	(1.909)	(3.375)
Serial Acquirer (d)			-0.263	0.956	-0.101	0.451
			(0.460)	(0.811)	(0.483)	(0.864)
Fintech x Serial Acquirer			-5.303*	-10.16**		
			(2.765)	(4.820)		
Relative Size					0.984	0.890
					(2.140)	(3.791)
Fintech x Relative Size					1.709	10.480
					(4.918)	(8.696)
Public Target (d)	-2.025***	-1.554***	-2.096***	-1.601***	-1.846***	-1.107*
	(0.293)	(0.508)	(0.297)	(0.518)	(0.323)	(0.572)
Target Banking Industry (d)	0.397	0.218	0.507	0.177	0.260	-0.205
	(0.342)	(0.594)	(0.353)	(0.617)	(0.436)	(0.775)
Cash Only Payment (d)	0.321	0.766	0.267	0.782	0.467	1.141
	(0.373)	(0.648)	(0.378)	(0.661)	(0.398)	(0.707)
Acquirer Market Capitalization	-0.292***	-0.525***	-0.198	-0.659***	-0.015	-0.291
	(0.087)	(0.152)	(0.126)	(0.221)	(0.152)	(0.269)
Market-to-Book ratio			0.426	-0.977	1.232	0.352
			(0.533)	(0.930)	(0.582)	(1.031)
Constant	4.454***	7.882***	2.345	11.130**	-2.586	2.957
	(1.302)	(2.260)	(2.759)	(4.818)	(3.368)	(5.965)
Observations	759	756	728	725	580	577
R-squared	0.079	0.032	0.087	0.040	0.087	0.028

Table 5b

*This table provides robustness checks. The dependent variables are the Cumulative Abnormal Returns (CARs) and are tested on the 3-day, 7-day and 21-day event windows both for the Non-Fintech and Fintech subsamples. Coefficients of variables are expressed in percentage points (%) and standard errors are shown in parentheses. As concern the significance level: * denotes significance at the 10% level, ** at the 5% level, and *** at the 1% level.*

VARIABLES	Non-Fintech CAR (-1,1)	Non-Fintech CAR (-3,3)	Non-Fintech CAR (-10,10)	Fintech CAR (-1,1)	Fintech CAR (-3,3)	Fintech CAR (-10,10)
Serial Acquirer (d)	0.076	-0.554	0.735	-10.801***	-20.49***	-16.69
	(0.487)	(0.584)	(0.854)	(3.518)	(5.847)	(10.68)
Relative Size	1.153	0.550	1.220	-8.670	-16.29	41.86
	(2.126)	(2.549)	(3.686)	(18.320)	(17.92)	(55.61)
Public Target (d)	-1.785***	-1.693***	-0.919	-4.480**	-6.281*	-10.34
	(0.327)	(0.392)	(0.567)	(1.952)	(3.492)	(5.927)
Target Banking Industry (d)	0.124	-0.084	-0.355	2.987	1.073	4.276
	(0.446)	(0.534)	(0.776)	(2.232)	(3.934)	(6.775)
Cash Only Payment (d)	0.491	0.241	1.236*	1.374	-2.597	1.494
	(0.399)	(0.478)	(0.693)	(4.324)	(8.349)	(13.13)
Acquirer Market Capitalization	-0.052	-0.218	-0.296	1.367*	1.277	0.273
	(0.156)	(0.187)	(0.270)	(0.671)	(1.414)	(2.037)
Market-to-Book ratio	1.040	0.820	0.172	8.746*	9.909	3.563
	(0.593)	(0.711)	(1.015)	(3.085)	(6.175)	(9.366)
Constant	-1.773	2.503	3.093	-28.36*	-14.37	-2.711
	(3.443)	(4.129)	(5.930)	(15.34)	(30.02)	(46.56)
Observations	554	554	551	21	21	21
R-squared	0.081	0.058	0.023	0.608	0.590	0.285

D. Abbreviation list

Name	*Definition*
AR	Abnormal Return
CAAR	Cumulative Average Abnormal Return
CAR	Cumulative Abnormal Return
CRSP	Center for Research in Security Prices
EY	Ernst and Young
Fintech	Financial Technology
IT	Information Technology
M&As	Mergers and Acquisitions
US	United States

8. Reference list

Adnan, A., Hossain, A., 2016. Impact of M&A announcement on acquiring and target firm's stock price: An event analysis approach. International Journal of Finance and Accounting, 228-232.

Agrawal, A., F. Jaffe, J., N. Mandelker, G., 1992. The post-merger performance of acquiring firms: A re-examination of an anomaly. The Journal of Finance 47, 1605-1621.

Akhavein, J., Berger, A., Humphrey, D., 1997. The effects of megamergers on efficiency and prices: Evidence from a bank profit function. Review of Industrial Organization 12, 95-139.

Alexandridis, G., Petmezas, D., 2010. Gains from mergers and acquisitions around the world: New evidence. Financial Management, 1671-1695.

Al-Sharkas, A., Hassan, M., Lawrence, S., 2008. The impact of M&A on the efficiency of the US Banking Industry: Further Evidence. Journal of Business Finance & Accounting, 50-70.

Beck, Th., Chen, T., Lin, CH., Song, F., 2016. Financial innovation: The bright and the dark sides. Journal of Banking and Finance 72, 28-51.

Bena, J., Li, K., 2014. Corporate Innovations and Mergers and Acquisitions. The Journal of Finance v69 n5, 1923-1960.

Berger, A., 1998. The efficiency effects of bank mergers and acquisition: A preliminary look at the 1990s data. Academic Publishers, 79-111.

Brown, S., Warner, J., 1980. Measuring security price performance. Journal of Financial Economics 8, 205-258.

Brown, S., Warner, J., 1985. Using daily stock returns. The case of event studies. Journal of Financial Economics 14, 3-31.

Capron, L., Shen, J., 2007. Acquisitions of private vs public firms: Private information, target selection, and acquirer returns. Strategic Management Journal 28, 891-911.

Claessens, S., Frost, J., Turner, G., Zhu, F., 2018. Fintech credit markets around the world: size, drivers and policy issues. BIS Quarterly Review.

Danbolt, J., Maciver, G., 2012. Cross-border versus domestic acquisitions and the impact on shareholder wealth. Journal of Business Finance & Accounting 39, 1028-1067.

Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics 7, 197-226.

Dimson, E., Marsh, P., 1983. The stability of UK risk measures and the problem of thin trading. The Journal of Finance 38, 753-783.

Dranev, Y., Frolova, K., Ochirova, E., 2019. The impact of fintech M&A on stock returns. Research in International Business and Finance 48, 353-364.

Fama, E., Fisher, L., Jensen, M., Roll, R., 1969. The adjustment of stock prices to new information. International Economic Review 10, 1-21.

Flanagan, D., O'Shaughnessy, K., 2001. Core-related acquisitions, multiple bidders and tender offer premiums. Journal of Business Research 56, 573-585.

Fuller, K., Netter, J., Stegemoller, M., 2002. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. The Journal of Finance 57, 1763-1793.

Haddad, Ch., Hornuf, L., 2018. The emergence of the global fintech market: economic and technological determinants. Small Business Economics 53, 81-105.

Hornuf, L., Klus, M., Lohwasser, T., Schwienbacher, A., 2018. How do banks interact with fintech startups? CESifo Working Papers 7170, 1-40.

Humphery-Jenner, M., Powell, R., 2014. Firm size, sovereign governance, and value creation: Evidence from the acquirer size effect. Journal of Corporate Finance 26, 57-77.

Ismail, A., 2008. Which acquirers gain more, single or multiple? Recent evidence from the USA market. Global Finance Journal, 72-84.

Jensen, M., 1988. Takeovers: Their causes and consequences. The Journal of Economic Perspectives 2, 21-48.

Kang, Y., Han, K., Park, S., Kim, J., 2016. A study on the trends of fintech. International Journal of u- and e- Service 9, 71-80.

Karolyi, G., Liao, R., Loureiro, G., 2015. The decreasing returns of serial acquirers around the world. Working paper.

Kogut, B., Zander, U., 1992. Knowledge of the firm, combinative, capabilities, and the replication of technology. Organization Science 3, 383-397.

Kohers, N., Kohers, Th., 2000. The value creation potential of high-tech mergers. Financial Analysts Journal 56, 40-50.

Kothari, S., Warner, J., 2007. Econometrics of event studies. Eckbo, E. (Ed.), Handbook of Corporate Finance, 3-36.

Leydesdorff, L., Bensman, S., 2006. Classification and Powerlaws: The logarithmic transformation. Journal of the American Society for Information Science and Technology 57, 1470-1486.

Loughran, T., M. Vijh, A., 1997. Do long-term shareholders benefit from corporate acquisitions? The Journal of Finance 52, 1765-1790.

MacKinlay, A., 1997. Event studies in economics and finance. Journal of Economic Literature 35, 13-39.

Marren, J. H., 1993. Mergers and Acquisitions: A Valuation Handbook. Homewood, IL: Business One Irwin.

Martynova, M., Renneboog, L., 2006. Mergers and Acquisitions in Europe. CentER Discussion Paper.

Mateev, M., 2017. Is the M&A announcement effect different across Europe? More evidence from continental Europe and the UK. Research in International Business and Finance 40, 190-216.

Meager, L., 2017. Fintech deals help banks adapt. International Financial Law Review, 1-3.

Moeller, S., Schlingemann, F., Stulz, R., 2003. Do shareholders of acquiring firms gain from acquisitions? Working paper 9523. National Bureau of Economic Research, Cambridge.

Moeller, S., Schlingemann, F., Stulz, R., 2003. Firm size and the gains from acquisitions. Journal of Financial Economics 73, 201-228.

Neely, W., 1987. Banking Acquisitions: Acquirer and target shareholder returns. Financial Management 16, 66-74.

Palich, L., Cardinal, L., Miller, C., 2000. Curvilinearity in the diversification-performance linkage: An examination of over three decades of research. Strategic Management Journal 21, 155-174.

Rau, P., Vermaelen, T., 1998. Glamour, value and the post-acquisition performance of acquiring firms. Journal of Financial Economics 49, 223-253.

Shleifer, A., Vishny, R.W., 1988. Value maximization and the acquisition process. The Journal of Economic Perspectives 2, 7-20.

Teece, D.J., 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. Research Policy 15, 285-305.

Thu Nguyen, H., Yung, K., Sun, Q., 2012. Motives for mergers and acquisitions: Ex-post Market Evidence from the US. Journal of Business Finance & Accounting 39, 1357-1375.

Travlos, N., 1987. Corporate takeover bids, methods of payment, and bidding firms' stock returns. The Journal of Finance 4, 943-963.