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Studying Market Reactions to Fintech Acquisitions in North America and Europe: The Impact of Fintech Classification of Target Firms on the Acquirers' Cumulative Abnormal Returns

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Abstract

This study examines the short-run effects of Fintech acquisition on the acquirer's announcement returns, focusing on whether the impacts are moderated by the Fintech classifications of the target firm. With a total sample of 99 transactions conducted by 86 acquirers from 2009 to 2018, it is documented that in general, Fintech acquisition generates value for the acquirers, consistent with some previous technological and Fintech acquisitions studies, i.e. Dranev et al. (2019), Ma et al. (2019) and McCarthy & Aalbers (2016). Moreover, Fintech categories of the targets indeed have different influences on the acquisition performance. In specific, two of the most prominent classifications, namely alternative lending/investment technology and payments/billing tech, unexpectedly lower the short-term announcement returns of the acquirers. Oversupply of products, triggered by the strong competitions between players in these segments, are supposed to be the main driver of the negative returns. Secondly, the healthcare Fintech improves the bidder short-term announcement returns, and the gain is relatively high compared to the other categories. The technologies needed by both consumers and suppliers of healthcare are highly similar with the technologies required by users of insurance. As such, healthcare-related Fintech companies are assumed to have characteristics that are very much alike with insurance providers. The most important trait is that the claims they have to pay are very few compared to the total funds they raise from premiums paid by clients. This is believed to be the reason behind the gains of the takeovers of healthcare Fintech. Meanwhile, the growing responsibility of consumers towards their healthcare costs, their constant search for higher transparencies in it, and the nations of observation where healthcare service is highly popular in developed nations, are believed to support the satisfying performance. This research also controls for many other determinants of the acquirer's gains, ranging from deal-specific, firm-specific and financial data of the acquiring companies that are proposed by prior mergers and acquisitions (M&A) researchers. However, the only significant control variable is the relative deal size. It positively affects the acquirers' CAR, indicating that the acquirer short-term returns increase in the relative size of deal values, supporting Asquith et al. (1983), Moeller et al. (2004), and Masulis et al. (2007).

Keywords: Mergers and acquisitions (M&A), Fintech acquisition, Fintech classification, Alternative lending/investment technology, Payments/billing tech, Healthcare Fintech.

JEL Classification: G24, G34

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CHAPTER 1: Introduction

Studies of how M&A activity affects the stock returns demonstrate that in general, M&A has a mixed short-term effect on company stock returns. Besides the evidence that shareholders determine their evaluations on post-announced M&A gains based on different deal features (Agrawal et al., 1992), the reason behind the varied results is also the different periods of the M&A events (Martynova & Reneboog, 2008). Furthermore, some papers show that the variation in such returns is driven by the purpose of the M&A activity. For instance, Berkovitch & Narayanan (1993) propose synergy motives between managers of the acquirer and target for positive results, while negative results take place when the M&A activity manifests the self-interest of the acquirer managers.

Over the current years of this modern era, the active advancement in technology has constantly boosted its significance in many segments (Sears & Hoetker, 2014; Asimakopoulos & Whalley, 2017). Also, it is well-known that technology has become the main driver of economy in this 4.0 era (the fourth industrial revolution). Therefore, this paper realizes the increasingly importance of partnership with technological firms for a vast number of existing companies to benefit from growth prospects. In particular, this research is focused on the acquisition of the transforming financial sector: financial technology (Fintech). In their discussion on finding a future with Fintech, Allayannis & Cartwright (2017) suggest Fintech acquisition as means to bring and (or) enhance acquirers' technological performances in financial services or financial-related procedures to improve customer service. They further imply this activity as a quicker way than modifying internal strategy and products, and a strong action plan for customer focus.

Fintech companies are companies using technology to revolutionize the financial services by increasing their effectiveness and efficiency (McKinsey, 2016). As such, Fintech today serves as innovation in the financial services sector, which could be new products of startups or the adoption of new techniques by technology-led companies (KPMG, 2016). Fintech has brought numerous unprecedented disruptions in the financial system ecosystem, for instance, chatbots for customer service, machine learning and artificial intelligence (AI) for fraud detection, omni-channel banking, biometrics for stronger safety and blockchain for digital transactions.

While the M&A transactions in the financial services market have been huge in the pastimes due to consolidation forces (Berger et al., 1999), the motivations for Fintech takeovers are essentially different since it is mostly targeted on startup companies. The usual purposes of Fintech acquisitions are to connect with new technology faster or to cut the cost of building it in-house, to keep being on top of the financial services revolution and to be an exit strategy for entrepreneurs and players in venture capital. The motivations of the acquisitions reported in this paper evidently follow these suggested motives, with staying on top the financial services revolution being the most popular one.

Since the industry is still in an early phase, and there has not been a clear definition of Fintech to date (Becker & Allayannis (2019), the number of studies exploring M&A activity into the realm of Fintech firms is still few. Related studies by Kohers & Kohers (2000), Ahuja & Katila (2001) and many others argue that the M&A between financial and hi-tech sectors strengthen the business and customer service of conventional financial services. Other papers on technological and more specifically, Fintech takeovers, by Dranev et al. (2019), Ma et al. (2019) and McCarthy & Aalbers (2016) report that such acquisitions are value-creating after the announcements. Together with the aforementioned motives of Fintech acquisitions, which could be summarized as getting external expertise to enhance firm's technological development, these findings build up the main assumption of this paper that Fintech acquisition generates value for investors.

This study aims to cast light on the market response towards Fintech firms through analyzing the short-term reactions of Fintech acquisition announcements on the acquirer's share prices. The acquisition announcements of Fintech firms are gauged by the event study methodology. This method determines the short run impacts of the takeover announcements completely. The short-term market effects of acquisitions capture the shareholders' anticipation of either value-creating or value-destroying development. As the reaction should be demonstrated at once in the stock price, the research question is therefore:

RQ: What is the reaction of the stock markets towards Fintech acquisition announcements?

One of the important aspects of Fintech is, however, the Fintech categories. Since there is still no definite meaning of Fintech, there are many ways to classify these financial services that are influenced by technology. For this reason, this paper also examines the impact the variation in the target's Fintech classification has on the success of the acquisition. To the author's knowledge, there has not been researches investigating such relation. Thus, the difference of this study from other Fintech M&A studies is that it uses the target's Fintech categories as a parameter of Fintech acquisition with better performance.

This paper targets the acquisitions of North-American and European Fintech firms from 2009 to 2018. As reported by KPMG (2018), $57.9 billion investments of Fintech across 875 deals were hit in the first half of 2018, with U.S. and European Fintechs being a significant part of the total worldwide amount of invested money ($14.2 billion investments in U.S. Fintech firms across 427 deals and $26 billion investments in Europe Fintech firms across 198 deals). The period is specifically chosen after the 2008 financial crisis as it marks a critical point in the history of Fintech evolution (Arner et al., 2015), i.e. the new focus point of banks of questioning who has the resources and legitimacy to provide financial services.

Acquirers of these Fintech companies belong to numerous industry sectors. The majority of them are originated from the business services sector, particularly, services that has to do with money like financial transaction processing, reserve and clearinghouse activities, and financial information services. The second

mostly found sector is prepackaged software where many of them develop financial and banking programs. Only a few of the acquirers operate in the sectors of (commercial) banks and bank holding companies.

CHAPTER 2: Literature Review and Hypotheses Development

This chapter presents the theoretical understanding of Fintech M&A, followed by hypotheses revealing the arguments verified by such theoretical insights. To clearly structure the theoretical framework of this study, this chapter discusses two main topics: Fintech elements in a wide context and M&A as the economic theory where this research is embedded. Determinants of acquirer announcement returns are also reviewed, which eventually leads to the logical reasoning of the hypotheses.

2.1 Fintech definition

The concept of 'Fintech' derives from Citigroup's project named 'Financial Services Technology Consortium' in the beginning of 1990s, which was initiated to improve technological collaboration effort (Arner et al., 2015). This sector gained an increased amount of attention from regulators, consumers and market participants since 2014 (Arner et al., 2015). Fintech grew rapidly and consequently boosted regulatory inspection, which could be justified by the meaningful role of Fintech in the financial sector.

To date, there has been no general agreement on the description of Fintech in academic research. Gulamhusinwala et al. (2015) state that Fintech firms are connectors of innovative business models and technologies that are designed to activate, improve as well as to disrupt the financial services sector. Arner et al. (2015), on the other hand, argue that the term 'Fintech' is not only for specific sectors or business models. Rather, the concept applies for all products and services that are originally provided by the financial services sector.

Schueffel (2016) investigates the complicatedness of Fintech and aims to establish a definition by analyzing more than 200 scholarly articles referencing 'Fintech'. After conducting semantic analysis and building on the similarities of 13 peer-reviewed descriptions, Schueffel defines Fintech as a new financial industry that uses technology to develop financial activities. While this definition could be sufficiently wide in its range of application, Fintech, which covers various technologies, companies and business ventures, still needs the help of specific key verticals to be placed into several categories. Section 2.4 will discuss the Fintech verticals, which are the sectors of the financial services offered by Fintech, in more in-depth.

2.2 Fintech evolution

The establishment of the automated teller machine in 1967 marked the onset of financial technology (Arner et al., 2015). Furthermore, from 1967 to 1987, financial services industry began to move from an analogue to a digital industry, whereby in this period, financial institutions started to progressively use information technology (IT) in their internal operations. The formation of NASDAQ in the US (1971) was the preliminary step in the forthcoming development of the National Market System, which allows the transition of the securities trading form, from physical to fully electronic trading (Nasdaq, 2011). And, the launch of the

Society of Worldwide Interbank Financial Telecommunications (SWIFT) in 1973 was the first big event of the payment services internationalization (Swift, 2017). SWIFT was designed to interconnect domestic payment systems from one border to another.

Throughout 1980s, financial institutions continuously improved their use of IT in their internal operations (Arner et al., 2015). Also, the financial services industry eventually turned into a largely digital industry (i.e. electronic transactions among financial firms, mutually and consumers), thrust into quick development by the evolvement of the Internet. The manifestation of the internet-based financial services took place in the early 1995, when Wells Fargo initiated the first online banking platform. The rise of the Internet initiated a new level of development in the 2000s; a number of eight US banks reached over a million online customers around 2001 and by 2005, the first banks without physical branches (customer offices) appeared in the UK.

Nowadays, Fintech has brought a lot of incremental and disruptive innovations of which operators other than banks proposed many of them. The financial crisis of 2008 marks a critical juncture in the history of Fintech evolution (Arner et al., 2015). Following the crisis, the focus has switched from banks suggesting new methods of conducting financial services to questioning who has the resources and legality to provide financial services. The chance of the establishment of new innovative firms in the market is thereby greater, for instance, the revised payment service directive (PSD2) will increasingly open the payments market to third party suppliers instead of banks. The current Fintech industry is indicated by new rivalry and diversity, which therefore brings opportunities as well as risks that has to be carefully recognized.

2.3 Advantages of Fintech

Fintech is enabling people to perform transactions using their mobile phones or tablets, giving improvements in efficiency and the consumer experience. Philippon (2016) argues that Fintech has certain characteristics specialized to the finance industry and the greatest benefits of startups are their readiness to take risks and boundlessness to the present system(s). As discussed in Romãnova & Kudinska (2016), there are some important advantages of Fintech providers. After analyzing the development of Fintech and the distinctiveness of such business fields, the Romãnova and Kudinska identify some circumstances that put Fintech in a favorable business position:

(1) Highly standardized financial services (or products) without additional costs, which therefore increases the number of potential target market.
(2) Internet-based, which allows the business to be less geographically concentrated. The services of Fintech can be provided globally as its potential customers are not only in one country or region.
(3) The shifting of consumer behavior to technology-based solutions (online shopping, social networks, mobile applications, etc.), which has built interest towards Fintech services and consequently created market for Fintech.

(4) Considerably less regulation of financial services for non-banks, of which Dapp et al. (2014) consider as one of the main drivers of Fintech's easiness in penetrating the market. Traditional banks, at the same time, are subject to rules (or standards) related to costs and expertise. They need to adhere to capital adequacy, liquidity and leverage regulations.

2.4 Fintech verticals

The Fintech verticals have been widely interpreted by academic scholars and industry professionals. According to Sahi (2017), two of the most creditable descriptions of Fintech verticals were given in the study of Arner et al. (2015) "The Evolution of Fintech" and the annual Fintech report of KPMG (2016). Arner et al. (2015) state that the Fintech industry constitutes of six main fields: finance and investment, operations and risk management, payments and infrastructure, data security and monetization, customer interface and lastly, regulatory technology. KPMG (2016) describes the verticals as lending tech, payments/billing tech, personal finance/asset management, money transfer/remittance, blockchain/bitcoin, institutional/capital markets tech, equity crowdfunding and insurance tech.

Following Sahi (2017), this paper will refer to KPMG (2016) in defining the verticals with certain adjustments. In his study, Sahi (2017) argues that Arner et al. (2015) classify compliance, regulatory and security into too many verticals (operations and risk management, regulatory technology and data security and monetization, respectively). In reality, these matters are normally closely related. The KPMG (2016) listing, however, lacks this area, thus the suggested vertical for this area is "Fraud prevention and regulatory tech". Further, as the objective of both borrowing technology and equity crowdfunding is to give other platforms for investing and lending or borrowing money, separating lending technology and equity crowdfunding into different verticals is arguable. The alternative vertical used in this paper is thereby "Alternative lending or investment technology".

2.4.1 Alternative lending or investment technology

Fintech firms being classified into alternative lending are generally (online) peer-to-peer (P2P) lending, underwriter and lending platforms, which utilize machine learning technologies and algorithms to estimate the likelihood of a borrower's default on his debt obligations (KPMG & CB Insights, 2016). Oftentimes, alternative lending is backed by digital data and the loans are mostly unsecured or supported by other collaterals (Aveni et al., 2015).

This Fintech field can have an impact on millions of people because of its accessibility, in addition to the innovation, disruption and technological support it has. Many businesses, including online retailers or small businesses in the manufacturing retail or service industry, which can hardly get funding from traditional finance institutes (i.e. banks), choose online lending platform. The term alternative lending includes a wide range of online lending companies. Some of them provide direct online lending (e.g. Lending Club (P2P) and

OnDeck Capital), while others like LendingTree act as brokers and bring together potential borrowers and banks as well as lenders and credit partners.

P2P lending platforms are technological (online) platforms that enable borrowers to ask for loans and private lenders make an offer to finance them (Klafft, 2008). This online platform is impacting millions of borrowers due to its relatively low interest rates, simple application steps and instant lending decision. P2P lending started its iterations by offering small-dollar-amount personal loans. However, the online platform has begun to expand into other asset classes, such as mortgage loans, which banks might perceive as a direct threat to their current customer bases (PWC, 2015).

A major part of the alternative investment field is equity crowdfunding firms. Crowdfunding activity, as explained by Ibrahim (2015), is making use of the Internet to collect money for a product or a certain motive. Ibrahim further differentiates the act of crowdfunding into non-equity based and equity-based. In the non-equity crowdfunding, people can exchange their participations in a project with donating funds or purchasing products or experiences, whereas in equity crowdfunding, investors exchange their money with stocks in the businesses that they are financing.

2.4.2 Payments/billing tech

Payments and billing tech companies are start-ups, seasoned as well as settled payment solution companies, which attempt to revolutionize the payment technology area, from assisting the progress of payments processing, payment card developers to subscription billing software instruments (KPMG & CB Insights, 2016). Large players in the payment card industry, such as Visa and Mastercard, have long been dominating the field of payments (Rochet & Tirole, 2002) and the dominance of such companies is specifically due to the powerful network externalities of this industry. Nowadays, companies operating in the payments field increasingly vary, from providing payment processing to innovations in the digital payment world.

Payment technology even comes to the top of consumer's mind when asked about Fintech and its use. Innovations in this area are substantially occurring and there are several reasons why retail payment has become a highly competing field (Jun & Yeo, 2016): (i) the rapidly increasing growth rate of non-cash payments (excluding credit) (Capgemini & Royal Bank of Scotland, 2015), (ii) the rise of payment acquisition as an essential field for innovation in financial technology (Capgemini & Royal Bank of Scotland, 2013) and (iii) the extra key value for payment service companies given by front-end services due to their closeness to customers (Busch & Moreno, 2014).

Companies falling into non-financial payment service providers are grouped into four based on the steps of the payment chain, kinds of services offered and most important types of relations with banks (CPMI, 2014). The first two groups have direct interaction with customers, namely (i) front-end providers (e.g. ApplePay

and KakaoPay in Korea) and (ii) end-to-end providers (e.g. Paypal and Alipay), while the remaining types are (iii) back-end providers and (iv) operators of retail payment infrastructure.

2.4.3 Personal finance/asset management (WealthTech)

KPMG & CB Insights (2016) describe the vertical as tech firms helping individuals manage their own bills, (bank) accounts, credit, also their own assets and investments. WealthTech is a segment within Fintech that aims to advance and completely change the wealth management and investment by focusing on inefficiencies among the wealth management value chain (FT Partners, 2017). WealthTech increases the efficiency of workflows, the optimum portfolio management, and the access to assets, customer experience and transparence. Any form of technology that backs up financial advisers, whether built in-house or being contracted out, is defined as WealthTech.

Many of the personal finance related tasks have been taken over by the web during the 21st century. In her study on the importance of the development of financial knowledge, Hira (2009) argues that the current financial services market is intricate, specific and needs customers to be knowledgeable and actively involved if they desire to manage their money in an efficient way. Threat and disruption for the conventional investment management and registered investment advisor (RIA) industries appear due to some causes (FT Partners, 2017): (i) the surge of robo-advisors and other possible choices of investment management, (ii) investment strategies that turn to be passive from active, (iii) the need for higher returns via alternate investments, (iv) the potential force from the fiduciary standard laws of the Department of Labor (DOL) and (v) the customer base that has migrated to tech-savvy and youthful investors.

The demand for platforms, which allow customers to improve and optimize their personal finance relevant tasks, therefore arises. Realizing that the traditional investment management firms and RIA industries are not capable of tech-based innovation, a substantial group of Fintech firms has concentrated on such industries by providing stronger digital competence, improved ability to perform distribution and basic outsourced-based operations (FT Partners, 2017). eFront SA is, for instance, a WealthTech firm that is based in the Europe.

2.4.4 Money transfer/remittance

KPMG & CB Insights (2016) determine this vertical as providers of peer-to-peer platforms that enable foreigners to send funds to individuals in his or her native country, known as the act of remittance. The remittance activity is a striking part of global capital flows among countries, particularly in labor-exporting countries as mentioned by Al-Assaf & Al-Malki (2014). Sirkeci & Condick-Brough (2016) further add that the amount of remittances in emerging countries has faced a huge increase, from only below $75 million during 1980s to above $451 billion after 35 years. From these evidences, it is obvious that providers of money transfer and remittance services own an extremely large market.

FT Partners (2017) report that disruptions of the money transfer and remittance sector originate from two main trends. The first one is the emergence of "International Payment Specialists", which accommodate the demands of businesses and high-income customers for foreign exchange and cross-border payment. This industry segment is specific and expands rapidly, bringing huge attraction from strategic users and financial investors. Secondly, there is a threat for "Consumer Remittance Providers", which widely support unbanked or under-banked employees transferring remittances to their native countries, that comes from recent-, arising-, or rapid-growing new leaders in mobile and other forms of tech-based solutions. Examples of firms engaging in this sector include Qiwi PLC and Xoom Corp.

2.4.5 Blockchain/bitcoin

Blockchain and/or bitcoin are the main software or tech-based firms in the distributed ledger space (KPMG & CB Insights, 2016). With its software that spans from bitcoin wallets to safety providers to side chains, the distributed ledger is able to document transactions of multiple parties in an efficient, provable and lasting way. Against this fact, it is understandable why this technology is largely used in the financial activities, of which assets securitization and generating binding contracts are at the core of every operation (Lansiti & Lakhani, 2017).

The transactions blockchain holds also include all the cryptocurrency (non-currency) transactions (Chrishti & Barberis, 2016). In 2009, Satoshi Nakamoto adapted blockchain to create the digital cryptocurrency "bitcoin", of which the most important blockchains come from (Tapscott & Tapscott, 2016). Apart from being a major success, however, Bitcoin also had an issue regarding anonymity, which was raised by Reid & Harrigan (2013) in their investigation of an alleged theft of Bitcoins.

Other cryptocurrencies, namely Etherum and Ripple, also present and are traded on the Internet-based platform for 24 hours a day. Various uses of bitcoin and blockchain are offered by firms in this vertical, for instance, (online) bitcoin wallets, brokerage services, also the act of connecting the conventional finance sector with the digital surroundings of bitcoin and blockchain.

2.4.6 Institutional/capital markets tech

According to KPMG & CB Insights (2016), companies included in the institutional/capital markets tech (one of the biggest of the verticals) offer tools to shape financial institutions (i.e. banks, hedge funds, mutual funds or other institutional shareholders), ranging from alternate trading arrangements to financial modeling and computer programs for analysis.

FT Partners (2015a) review the modernizations in capital markets technology. It is reported that the innovation in capital markets resurge after a short impeding-period caused by the 2008 financial crisis. A more and more low-priced cloud computing, greater bandwidths, various novel supplies of essential

investment data (including social media) and competing forces causing the permanent search for returns – as well as renewed interests of private equity and venture capitalists – support the revival of capital markets innovation.

2.4.7 InsurTech

InsurTech, the financial technology applied in the insurance field, provide innovation in underwriting, claims, platforms of distribution and brokerage, improved consumer experience and computer program to assist a person or company underwriting an insurance risk in dealing with legacy IT problems KPMG & CB Insights (2016).

In fact, novel technology and game-changing business models have not largely disrupted the insurance industry like they have done to many other fields of financial services. PwC (2016) reports that a majority of the insurance firms (74% of firms researched worldwide) realize that financial technology potentially disrupts and innovates the insurance field. As much as 43% of them concentrate their corporate strategy on Fintech, however, only 28% of them cooperate with a Fintech firm. This indicates an inconsistency between the firms' estimated number of disruption and the eagerness to invest in it. The study of Nicoletti (2017) further concludes that in general, the insurance industry could even be two to five years lagged on the 'digital growth curve' because it has not yet taken the entire gain of the usable technology.

However, this situation will certainly change because big data analytics and automation/robotics begin to hugely stimulate the disruption in the insurance area. They can be used for the automation of claims handling, consumers' rights and data securitization, peer-to-peer insurance platforms, smart contracts and dynamic pricing supported by data streams from the IoT (Internet of things). Numerous IoT-related innovations also intend to improve customer engagement by suggesting them techniques to influence policy pricing and content through a favorable and responsible act (Svetlana, 2016).

2.4.8 Fraud prevention/regulatory tech

Fraud prevention and regulatory tech (RegTech) are verticals of financial technology with major potential of success. RegTech is described by Arner et al. (2016) as technology, especially information technology, used for regulatory controlling, reporting as well as compliance. Since the 2008 financial crisis, banks have come up against a situation of persist tightening of financial rules and have to provide solutions to highly tough KYC (know-your-customer) and AML (anti-money laundering) regulations. Consequently, it has become compulsory for banks to invest massively in regulatory technologies.

Authentication, signing solutions, fraud screening and detection platforms are technologies catered by the fraud prevention tech. Apart from that, fraud detection becomes problematic due to the highly restricted information on how to differ fraud from real consumer behavior. This was reported by Wei et al. (2013) on

their study on effective detection of Internet-banking fraud. The detection platforms highly depend on data mining, machine learning and neural networks to snap false transactions, of which could be performed using payment cards, (bank) account transfers or spurious invoices. The field of authentication and signing solutions produce techniques to validate consumers. The lately emerged biometric solution is, for instance, a well-known alternative (FT Partners, 2015b).

2.4.9 Healthcare Fintech

The lifestyle and eating habitat of the modern society has brought a high number of illness invading people's well-being (Hussain, 2018). Consumers are therefore more and more accountable for a bigger part of their healthcare spending and pursue higher transparence in healthcare expenses, reflected in the response of the industry through high-tech solutions (FT Partners, 2018).

The healthcare Fintech is created to facilitate more consumer-friendly payment means. It covers the area of financial-related procedures between healthcare providers and patients, such as insurance authentication, payments and billing handling, claim arrangement, and benefit administration. Surgeries and any other hospital services now cost too much money for many people but new financial technologies improve the easiness of paying for healthcare every day.

For clients of the industry, healthcare Fintech provides similar services to those of other fields of insurance, whereby technology is needed to handle policies, customer billing as well as claims settlement and payment. Meanwhile, the service providers can use technology for checking insurance eligibility, projecting price paid by patient, and treating both client billing and payment. According to FT Partners, the landscape of the healthcare financial management technology spans from patient care administration, benefits management to health insurance sales and distribution. Some selected healthcare-related Fintech firms are Instamed, Oscar, and Kareo, which specialize in payment network, tech-enabled insurance provider, and billing, respectively.

2.4.10 Financial Management Solutions (FMS)

The final classification of Fintech is the Financial Management Solutions (FMS) area, which serves the overall financial-related processes of institutions, regardless their size and sectors (FT Partners, 2018). FMS, in particular, offer products and (or) services of accounting and financial planning, ERP, payroll processing, accounts receivable or payable, treasury, compliance and risk management solutions. Typically, these services are used by the finance and human resources departments of organizations. Few examples of FMS companies include Avidxchange, Chromeriver and Billtrust, which deliver services in the area of accounts payable, expense management, and accounts receivable, respectively. Around 6% of the sample target companies in this paper are FMS, ranging from the categories of accounts payable, expense management, spend management, business (financial) planning to accounting software.

2.5 Mergers and Acquisitions (M&A)

There are four major types of acquisitions as suggested by Damodaran (2002). The first form is the merger or consolidation. Merger refers to when a company is being completely occupied by another and discontinues to operate as a different business entity. Consolidation refers to a similar way, except that an entirely new company is built to facilitate the merged firms and each of their former lawful entities are dismissed. The second one is the acquisition of stock, where a bidding firm acquires the target firm's voting share, trading it for cash, shares of stock or other forms of securities. Generally, the activity is done by giving the target's shareholders a tender offer (the third form of acquisitions) after considering the alternatives together with the management of the target firm. Favorable tender offers subsequently turn into mergers. The fourth form is the acquisition of assets, whereby the acquiring activity is performed through purchasing the whole assets of the target firm. An acquisition is also possibly conducted by a firm's own managers, of which is known as a buyout and is mostly performed through a tender offer. The next sections discuss the relevant academic researches of M&A activity, objectives from the point of view of acquisitions, and performance.

2.5.1 M&A Activity

History proves that the number of M&A activity is naturally happening at regular intervals. It follows "waves" of high and low repetitiveness and capacities of M&As. The periods of M&A activity mirror the periods of other income-generating assets, which mainly cover most dealings in real estate and securities. The frequency and volumes of M&As increasingly boosted into more and more insensible prices until at a certain point, the boost is disrupted by a cause that pushes down the activity to substantially low volumes. The M&A activity in the U.S., for instance, has undergone five waves between 1895 and 2007 (Martynova and Renneboog, 2008). Two possible reasons underlying the periodic nature of M&A activity assumed by researchers are industry shocks and market valuations.

The neoclassical theory reveals the industry-shock reason, explaining that merger waves happen because companies in particular industries respond to economic shocks (i.e. deregulation, the rise of novel technologies or replacement of products and services). Martynova and Renneboog (2008) support this by arguing that other than reacting to an industry shock, merger waves happened in positive economic and political surroundings, in the middle of rapid credit spread and stock market explosions. The second reason of such clustering activity is rather behavioral, indicating that merger waves occur due to the deviations of market valuations from real values. Few supporting researches include the study of Rhodes-Kropf & Viswanathan (2004), which finds that managers likely purchase assets of less-overvalued companies using their firms' overvalued stock during the value deviations, and the study of Rhodes-Kropf et al. (2005), which reveals that low long-run value-to-book companies acquire high long-run value-to-book companies.

2.5.2 M&A Objectives

2.5.2.1 General Motives of Acquisitions

Three main motivations for takeovers have been suggested in the literature (Berkovitch & Narayanan, 1993): synergy, agency and managerial overconfidence (also known as the hubris hypothesis). Profoundly, they find that synergy is the major motive in acquisitions with positive gains and agency is the one in acquisitions with negative gains. The synergy motive, which was originated from neoclassical theories, argues that acquisition must be done when its additional value surpasses its cost because people act logically. In the study of Chatterjee (1986), economic value resources generated by acquisitions are widely grouped into three kinds: 1) cost of capital relevant (financial synergies), 2) cost of production relevant (operational synergies), and 3) price related (collusive synergies). In the later researches, collusive synergies are oftentimes classified into the operational synergies and strategic synergies started to exist in acquisitions.

The agency motive dictates that managers can undergo acquisitions opposing the shareholders' interests. This motive has oftentimes been used to understand moral hazard problems, however, the ways to fight agency costs have also been researched. Tehranian et al. (1987) find that long-term compensation programs increase the acquirer's achievement. Moreover, Datta et al. (2001) conclude that managers who have more stock options conduct more excellent acquisitions. Lastly, the hubris hypothesis, which was first introduced by Roll (1986), states that managers make acquisitions due to their overconfidence on their capability to create value and overestimation of synergies. The managerial overconfidence was really hard to measure until Kolasinski & Li (2013) suggest an insider-trading-based quantification of overconfidence. They declare that managerial overconfidence (i.e. overestimation of the company's value) is indicated when a CEO has bought his/her corporate's stock and been deprived of money on the trade.

2.5.2.2 Motives of Fintech acquisitions

Motivations for acquiring Fintech firms have been defined in this paper by researching the usual motives of the most significant Fintech acquisitions in recent years. The first and perhaps the most common motive are to connect with new technology faster or at a cheaper cost than it would bear to build it in-house. Streamlining back-office operations, advancing the digital consumer experience and cutting costs can be the reason behind the acquisition. For instance, Broadridge Financial Solutions (U.S. based) acquired Message Automation, a chief provider of after-trade control solutions, for an undisclosed amount in March 2017. Message Automation's advanced control framework and innovative technology, which provides flexibility to welcome new regulations and enables the reuse of current data, has reportedly enabled the acquirer's clients (mostly are global companies) to cut risk and demonstrate compliance. Likewise, First Data acquired CardConnect, provider of inventive payment processing technology, for $750 million. First Data Chairman and CEO was reportedly excited to combine CardConnect's most advanced level solutions with some of First Data's most relevant strategic actions, including enterprise payments solutions.

Secondly, as seasoned firms have realized the risk and opportunities of the agile Fintech firms, many firms acquire Fintech to continuously be on top of the financial services revolution. Paypal, for example, invested

the payment management firm TIO Networks in a bid for $233 million. With TIO's digital platform and tangible network of agent positions, paying bills are made simpler, quicker and more affordable as commented by PayPal CEO. As such, by acquiring TIO, Paypal has a new main service in its attempt to become a solution for customers' daily financial life, moving it one step closer to be a worthy opponent of big-league banks.

Third, Fintech acquisitions also reportedly give an exit strategy for entrepreneurs and players in venture capital, i.e. selling their companies to a bigger one for profit, for instance. On February 2017, Accion Venture Lab, the basic investment idea of financial inclusion leader Accion, released its profitable exit after selling its share to Clip, a Mexican newly established business in payment service (Lavca, 2017). Accion Venture Lab supported Clip's vision by trusting it with the initiative of introducing card-acquiring solutions to small ventures on every edge of Mexico. This successful exit proves the worthiness of attaining value-capturing goal through investment in seed-stage startups that give excellent financial services for consumers in untapped markets, argued the Accion President and CEO Michael Schlein.

The purposes of the Fintech acquisitions in this research are elaborated in Table 1. Having classified them into each well-known motive above, it is concluded that the top-two motives are to maintain a top position in the financial services revolution, and to allow an exit strategy for entrepreneurs and players in the venture capital. One of the classical motives of mergers and acquisitions, which is to create synergies, is also present and is considered as one of the means to stay on top of the financial services revolution.

Table 1

Purposes of Fintech Acquisition

To connect with new technology faster	**To cut the cost of building new technology in-house**
-To allow to offer new products and services	-To eliminate duplicate services/operations
To keep being on top of the financial services revolution	**To give an exit strategy for entrepreneurs and players in venture capital**
-To strengthen operations -To expand presence in primary market -To expand presence in secondary market -To expand presence in new/foreign markets -To expand presence in new geographical regions -To create synergies -To benefit from sound investment opportunities	-To increase shareholder value -To dilute number of outstanding shares -To pay down existing outstanding debt -To apply the private-equity buy and build strategy

2.5.3.1 Value creation in M&A

Prior researches have argued that on average, during takeovers of listed targets, the bidding firms receive negative to no abnormal returns at the acquisition announcement. Andrade et al. (2001) report the acquirer's average negative returns of 0.7% in M&A announcements between 1973 and 1998. Likewise, Moeller et al. (2004) document the acquirer's average negative returns of $25.2 million during the announcements in the 1980 to 2001 period. Further, Chang (1998) finds that acquirers in private acquisitions, opposite to public acquisitions, realize positive abnormal returns more. Also, when bidder and target are combined into one entity, most of them gain positive abnormal returns during the announcement date (see, e.g. Mulherin & Boone, 2000).

Fintech firm acquisitions are generally private acquisitions, thus the market reaction during the acquisition announcement is likely to be positive. In a study of 36 Fintech acquisition announcements in OECD countries between 2013 and 2016, Sahi (2017) finds a positive short-term market reaction to the Fintech takeover announcements, with 1.08% positive abnormal return recorded a day after the announcement.

2.5.3.2 Determinants of acquisition returns

Among many factors influencing acquisition returns suggested by academic literatures, this paper considers these related determinants based on its framework and sample qualities used:

1) **Fintech classification of target company:** Considering positive reaction from investors on M&A of technological and Fintech firms (Kohers & Kohers, 2000; Ahuja & Katila, 2001; Sahi, 2017; Dranev et al., 2019; etc.), and the significant help of Fintech categories in describing the unsettled definition of Fintech (Izairi & Amornthanomochoke, 2019), the differences in the number of growths, unique selling position and ways of utilizing technology of each category (Becker & Allayannis, 2019), their various business models, value propositions, and operating mechanisms (Lee & Shin, 2018), and that one classification is evidently more important than the others (Haddad & Hornuf, 2019), the first hypothesis is predicted to be:

   H1: The Fintech acquisition will positively influence the short-term announcement returns of the acquiring company; however, it is moderated by the Fintech classification of the target firm.

2) **Cross-border acquisitions:** Regarding cross-border acquisitions, early studies of Morck & Yeung (1992) and Markides & Ittner (1994) report that cross-border takeovers generally realize positive abnormal returns. They suggest that cross-border bidders could gain certain advantages domestic bidders would not have. On the contrary, Datta & Puia (1995) find that in general, acquirer shareholders experience negative announcement returns in cross-border M&A, arguably because of the cultural distance of the two countries. Moeller & Schlingemann (2005) and Starks & Wei (2013) also show that

cross-border acquirers, relative to domestic acquirers, gain significantly lower returns in M&A announcements in the 1990s. Conn et al. (2005) discovered identical findings among UK bidders.

Dranev et al. (2019) find cross-border Fintech takeover within developed nations underperform domestic takeover. Likewise, Lusyana & Sherif (2016) study that in the short-term, domestic technological takeovers outperform cross-border transactions and McCarthy & Aalbers (2016) argue that M&A transactions may suffer from cultural differences. Sahi (2017)'s study of acquisition announcements across 36 OECD countries reveals that the domestic takeover announcements generate stronger positive reactions than cross-border takeovers (1.30% one day after announcement and high cumulative abnormal returns on days 0 to 5). The performance results of cross-border acquisitions are quite mixed, nonetheless, it is expected that in today's globalization era, the complexity of doing business between two cross-nation boundary firms intensify the unique challenges of cross-border acquisitions. Therefore, the next hypothesis is:

H2: Domestic Fintech takeover announcements will create more positive short-term market reactions than cross-border Fintech takeover announcements.

3) **Method of payment:** The selection of stock in financing mergers generally indicated the acquirer management's confidence that their stock is overvalued (e.g., see Myers and Majluf, 1984). Because of information asymmetry, shareholders see stock-financed acquisitions as indications of managers perceiving their equity is overvalued (e.g. Franks, Harris & Mayer, 1988; Wansley, Lane & Yang, 1983; Travlos et al., 1987).

A variety of past researches provide supporting evidences for this argument; previous studies reported negative performances of stock offers in merger announcements (e.g., see Wansley, Lane & Yang, 1983; Hansen, 1987; Travlos et al., 1987; Bradley, Desai, and Kim, 1988; Amihud, Lev & Travlos, 1990; Brown & Ryngaert, 1991; and Servaes, 1991). Further, current researches by Andrade et al. (2001), Moeller et al. (2004) and Alexandridis et al. (2010) find that equity financed M&A deals significantly underperform the cash financed deals, and Kohers & Kohers (2001) find negative but insignificant performances of stock-financed tech firm takeovers. Considering these preliminary findings, this study predicts the stock-financed acquisitions to perform worse than cash-offered acquisitions.

H3: Stock-financed deals will result in more shareholder wealth destruction than cash-financed deals.

4) **Industry relatedness:** In the case of industry connectedness between acquirer company and target company, from a study of 326 U.S. takeovers from 1975 to 1987, Morck et al. (1990) find that the returns

to acquirer shareholders are worse if their companies diverse. Similarly, Fan & Goyal (2006) find that horizontal merger deals obtain lower returns compared to vertical deals. More specifically, DeLong (2001) indicates that value-creating bank mergers are those that are done between banks with similar activity and geography. Regarding technological firms, particularly Fintech, the M&A activities commonly attempt to attain vertical integration. This is supported by the indication of higher returns from technology M&A relative to non-technology M&A by tech companies in the literatures (Kohers & Kohers, 2000; Yoon & Lee, 2016). As such, the fourth hypothesis is:

H4: Acquirers from technology sectors will receive more positive short-term market reactions than acquirers from non-technology sectors.

5) **Relative size of deal values:** As found by Asquith, et al. (1983), Moeller et al. (2004) and Masulis et al. (2007), the higher the relative size of an M&A transaction value, also called relative deal size, the higher the announcement returns received by the bidders. In line with these studies, the fifth hypothesis of this research is:

H5: The acquisitions' relative size of deal values will be positively correlated with the bidders' returns.

6) **Acquiring firm's size:** A number of past studies suggest that during the M&A announcements, the size of the bidding firm impacts the stock market responses. For instance, Bajaj & Vijh (1995) posit that small acquiring-companies experience greater stock market reactions more. The relatively less information provided for small bidders' stocks in the announcement periods turns the corporate announcement to be more informative for them. Furthermore, Moeller et al. (2004) find that large acquirers underperform small acquirers by 2%; the underlying reason is that large acquirers' managers suffer from hubris (i.e. overpaying the premium paid for M&A transactions). In light of these findings, the next hypothesis of this study is:

H6: Small acquiring firms will generate more value-creative acquisitions than do large acquiring firms.

7) **Acquiring firm's leverage:** According to the free cash flow hypothesis, managers of firms with a lot of free cash flows – but few advantageous investment opportunities – tend to engage in empire building (Jensen, 1986). This is due to their interest in growing their power and significance through making non-value enhancing M&A, instead of raising payouts to the investors (Bebchuk & Fried, 2003; Denis & McConnell, 2003). However, past researches (e.g. Stulz, 1990; Masulis et al., 2007) argue that first of all, leverage may confine managerial discretions. Secondly, higher leverage gives managers incentives to increase firm performance, since they have to produce sufficient earnings to pay off loans and are often discharged when the firm is under financial distress. Finally, as higher

leveraged companies have fewer cash to spend, poor takeovers become less probable (Lang et al., 1991); this keeps managers away from conducting non-valuable M&A. They consequently find that the higher the amount of the acquirer's leverage, the higher is its stock market returns. In line with this, the seventh hypothesis is:

H7: The amount of the acquirer's leverage will be positively correlated with the acquirer's returns.

8) **Target firm's listing status:** Private acquisitions provide the acquirer's shareholder positive gains, in contrast to public acquisitions that lead to negative-to-zero returns (see, e.g. Chang, 1998, Fuller et al., 2002). It is argued that bidders could capture a liquidity discount when acquiring private firms, thus, leading to a more favored market response (e.g. Koeplin, Sarin & Shapiro, 2000; Capron & Shen, 2007; Fuller et al., 2002). Based on these notions, the next hypothesis of this study is:

H8: Acquisition of private Fintech firms will create more positive short-term market reactions than acquisition of public Fintech firms.

9) **Target firm's listing status and method of payment:** Finally, this study considers that the deal payment method affects the correlation between the target's listing status and stock price impact. From the development of H3, it can be implied that in general, acquirers realize negative abnormal returns when they finance the deals with stock. However, it is well-known that bidders experience positive abnormal returns when buying private firms as argued in the construction of H8. Therefore, it is expected that the positive share price impact when buying private Fintechs is more pronounced when the deals are fully paid in cash. These arguments lead to the last hypothesis, which is:

H9: The positive effect of private target status on the acquirers' CAR around acquisition announcements will be more pronounced in takeovers that are entirely paid in cash.

CHAPTER 3: Research Design

This chapter aims to explain each step in the research process properly and in detail. It begins with the data gathering process and sample selection technique, focusing on the particularities used in determining the sample for an uncategorized industry. Afterwards, the definition and measurement of each variable are given. This is followed by the research methodology, which generally discusses the model's mathematical specification, the variables and the analytical techniques used to perform the study.

3.1 Data and Sample Selection

This thesis gathers all the required data from multiple databases. First of all, the Thomson One (T1) database is used to collect deal-specific characteristics from the chosen acquisition events. Thomson One provides financial data from yearly reports and M&A data for companies across the world, both listed and non-listed. Then, the Worldscope Global Database, known as the financial industry's leading provider of financial statement data of non-US listed firms, is used to gather the financial data of the acquirers. Finally, the cumulative abnormal returns value of each transaction is obtained from the Datastream Event Study, a device designed to perform an event study using Datastream data.

The Fintech phenomenon crosses various industry classification codes and there is still no definite taxonomy on Fintech firms. As such, to determine if the target firm is a Fintech company, initially, a group of SIC codes that is relevant to the IT sector is specified. Following Dranev et al. (2019), the primary U.S SIC codes of the target firm are assumed to belong to the 737-industry group (Computer Programming, Data Processing, and Other Computer Related Services), and are limited to sub-categories listed in Appendix A.

The extracted acquisition deals are further selected through the following criteria:

1. The acquisition deals should be completed in order to prevent tentative (rumored), undecided or withdrawn transactions.
2. Both the announcement and the effective dates occur between January 1, 2009, and December 31, 2018 to observe the effect after a critical point in the Fintech evolution history (the 2008 financial crisis), and to ensure the sufficiency of the reported data in each database.
3. The difference between the announcement and the effective date should be no less than zero to remove transactions that are effective prior to the announcement date.
4. Both the acquiring and target companies are either located in North America or Europe, which are the significant parts of the entire global amount of invested money.
5. The acquirers' firm status must be publicly listed for their stock prices data to be retrieved, while the targets' firm status can be both listed and non-listed.
6. As the acquisition deals are known to public, the deal value of the acquisitions is at least 5 million dollars.

Such selection criteria generate a preliminary sample totaling 1,093 acquisition deals made by 667 acquirers, with other important deal information collected from ThomsonOne database, such as announcement date, method of payment and acquirer DataStream code.

In the absence of exact translation of Fintech, following the argument in the literature review section, there are several means of classifying Fintech firms. Therefore, to be included in the final sample, the target Fintech firms should belong to one of the verticals defined in the second chapter and (or) are listed in one of the existing Fintech indexes. The used indexes are the:

(1) Nasdaq KBW Financial Technology Index, a reference point for the performance of publicly-listed Fintech firms.
(2) CedarIBS FinTech Index, a particular equity index of chosen (publicly-listed) Fintech firms worldwide (across 25 exchanges), which are segmented into these key indexes based on each of its base value: CIFTI50, CIFTI Large Cap, CIFTI Mid Cap and CIFTI Small Cap.

Screening for Fintech targets led to 110 remaining announcements made by 97 acquirers. Then, several deal observations are removed because of constraints on other variables, i.e. missing values, leaving a final number of 99 events in the observation sample, which was conducted by 86 acquirers. Finally, the datasets from each database are merged. The acquiring as well as the acquired companies are majorly established in North America rather than Europe. In fact, the United States of America produces most of the Fintech target companies, with Sillicon Valley and New York City as its two biggest tech ecosystems.

All in all, compared to the previous Fintech acquisition researches by Sahi (2017) and Dranev et al. (2019), the contribution of this study is investigating the impact of Fintech classification of the target companies towards the returns for the stocks of the firms taking over Fintech companies in the short-term. Moreover, this paper extends Dranev et al. (2019)'s final step of determining Fintech targets, that is, from having SIC codes of 7371-7374 to also belonging to one of the Fintech verticals defined in the literature review section. Finally, by having Fintech targets that belong to multiple Fintech classifications, this study also complements the research of Sahi (2017) that put Fintech companies into only one classification. In reality, services offered by Fintech companies can be categorized into more than one segment.

3.2 Variables

3.2.1 Dependent Variable: Acquirer returns

The efficient market hypothesis, an investment theory that states that the prices of traded assets (i.e. stocks) already mirror every publicly available information, is an appropriate benchmark to study the behavior of stock prices. Specifically, in an efficient market, the stock prices are simply reflections of the information and expectations at a point of time (Fama, 1991; MacKinlay, 1997; Kothari, 2001). To discover whether an acquiring company conducts a value-creating acquisition, one can study the security price behavior of such

acquirer (Brown & Warner, 1985). Therefore, in light of testing the securities market efficiency, this paper applies the event study methodology to gauge the economic impact of an acquisition on the bidding firm's equity value.

Event studies are significantly useful in explaining the effect of corporate policy resolutions reached, and generally aim at short-term impacts (Eckbo et al., 2007). In particular, these event studies look at short-term price movements around the announcement of a major event, for instance, an acquisition. Kothari (2001) recognizes a short-term event study to be consistent with the efficient market hypothesis (of the semi-strong form) and may give a comparatively clear examination of market efficiency. The semi-strong form of efficient market, which underlies all event studies, suggests that the announced event should be priced in within only a day. In addition, Andrade et al. (2001) acknowledge the short-window event study to be the most dependable method in determining whether an M&A transaction is value creative or destructive. The short-window certainly covers the announcement duration of new information, despite the possibility that they are incomplete or incorrect. Considering these arguments, a short-window event study is used in this paper to measure the economic impact reflected in the short-term adjustment in the market price. The bidders' cumulative abnormal returns (CAR) are formulated as the proxy for the acquisition performance; positive (negative) CAR create (destroy) wealth for the shareholders. Prior to computing the cumulative abnormal returns, there are four important items to be determined:

(1) Event date

The event study methodology focuses the study period on the days surrounding the event and at the time the event takes place. Following Bowman (1983), the event date, or the event of interest is decided to be the date the acquisition plans are announced publicly. The takeover announcement date is preferred above the actual date as the announcement mostly happened a long time before, and possible adjustments in the worth of the targets and acquirers should already be shown in the share price.

(2) Event window (time frame)

The second item that has to be determined is the period where the stock prices of companies involved in this event will be tested – the event window (MacKinlay, 1997). The period of interest, in practice, is frequently extended to numerous days, starting at least from the announcement day to the post-announcement day (to observe the price impact of announcements after the closing of the stock market in the announcement day). To continue finding, for instance, significant abnormal returns of the stock to the days that follow the event date implies that the market is not quickly incorporating the information in the stock pricing (the abnormal returns are lingering). On the other hand, observing abnormal returns prior to the event suggests that there might have been some insider information. To examine the immediate reaction of the market, the (-1, +1) time frame is used in this paper. However, as the market may need a relatively longer time to respond in some cases, this research also works with the (-3, +3) and (-5, +5) event windows.

(3) Benchmark

The abnormal returns are the difference between the normal or benchmark stock returns and the actual stock returns during the event window. For firm *i* and event window τ, the abnormal returns are constructed as:

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}) \quad (1)$$

Where $AR_{i\tau}$ = The abnormal return on security firm *i* for event window τ

$R_{i\tau}$ = The actual ex-post return on security firm *i* for event window τ

$E(R_{i\tau})$ = The normal return on security firm *i* for event window τ

Further, the benchmark stock returns are the normal returns that would have been received in spite of any events occurring in the estimation period. The models to compute the normal (benchmark) stock returns vary, however, in accordance with MacKinlay (1997), this study uses the market model, which presumes a constant linear relationship between the returns of the security firm and of the market wide portfolio.

Market benchmark to calculate normal returns

The chosen market portfolio is a theoretical bundle of investments that includes every type of asset available in the investment universe, with each asset weighted in proportion to its total presence in the market. The expected return of a market portfolio is identical to the expected return of the market as a whole.

The normal (benchmark) stock returns are formulated as:

$$E(R_{i\tau}) = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau} \quad (2)$$

Where α_i and β_i = The parameters of market models

$R_{m\tau}$ = The period-τ returns on the market portfolio

$\varepsilon_{i\tau}$ = The zero mean disturbance term

During the estimation period, the security firm returns on the market portfolio returns is regressed in this research with the OLS regression method. Having the first and second equations combined, the abnormal return ($ARi\tau$) is calculated with the following formula applying the market model:

$$AR_{i\tau} = R_{i\tau} - (\alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau}) \quad (3)$$

Finally, to obtain the cumulated abnormal return (CAR), the abnormal return ($ARi\tau$) in the related event window between τ_1 and τ_2 needs to be aggregated. Therefore, the cumulated abnormal return (CAR) in this paper reflects the aggregated unexpected future economic rents resulting from the M&A announcements for the bidders' shareholders. A positive (negative) CAR means that the market responses positively (negatively) to the acquisitions during the event window. Consequently, the acquisition events generate (do not generate) value for acquirers' shareholders. For firm i and event window τ, the cumulated abnormal return is calculated as:

$$CAR_{i(\tau 1,\tau 2)} = \sum_{\tau=\tau 1}^{\tau 2} AR_{i\tau} \tag{4}$$

(4) Estimation period (time frame)

After a normal performance model is determined, the estimation window, which bases the average expected return computation, has to be selected (MacKinlay, 1997). In accordance with Moeller et al. (2004) and Masulis et al. (2007), this research predicts the normal performance over the event window using the 220 trading days before the acquisition announcement.

Following the use of short-window event study to construct CAR, t-statistics test is applied to examine the significance of this proxy of the acquisition performance:

$$t_{CAR_t} = \frac{CAR_t \sqrt{n}}{\sqrt{t * var + 2 * (t-1) * cov}} \tag{5}$$

3.2.2 Independent and Control Variables

Fintech classification of target company

H1 conjectures that the success of Fintech acquisition depends on the Fintech classification of the target firm. To examine it, for each Fintech category, a dummy variable of "1" is used if the target belongs to that category, and "0" if it does not belong to that category.

Cross-border M&A

H2 compares the performances of cross-border acquisition and domestic acquisition. Consequently, this study uses a dummy variable to determine whether the transaction is cross-border or domestic: "1" is assigned to cross-border deals, and "0" otherwise.

Method of payment

H3 studies the results of stock-financed acquisition relative to cash-financed acquisition. Therefore, the deals' financing method is controlled by a dummy variable of "1" for deals paid in cash, and "0" otherwise.

Industry relatedness

To see whether acquirers from technology sector gain more in Fintech acquisition, the industry relevancy between the acquiring and target companies is controlled. It takes a dummy variable of "1" if the first 3-digit of the acquirer's SIC code is 737, and "0" otherwise.

Relative size of deal values

H5 tests the correlation between the relative size of the acquisitions' deal values and the acquirers' announcement returns. As such, this variable is controlled and defined as the proportion of deal values to bidders' market value of assets.

Acquiring firm's size

H6 investigates the impact of the size of acquiring firms towards stock market reactions. To test this effect, the natural logarithm of bidder's total assets is used as a proxy for the bidding firm size.

Acquiring firm's leverage

H7 conjectures that the acquirer's leverage amount is positively related to their returns. To measure this effect, the number of acquirer's leverage is controlled and calculated as its total short-term and long-term debt scaled by its total assets.

Target firm listing-status

H8 predicts the market reaction to private Fintech firm acquisition to be more favorable than that to public Fintech firm acquisition. To test it, a dummy variable of "1" is set for private Fintech companies, and "0" otherwise.

Interaction variable between target firm's listing status and method of payment

To prove whether the positive effect of private target status on the acquisition performance will be stronger in takeovers that are entirely paid in cash, H9 tests the moderating effect of target firm's listing status on the relation between payment method and the acquirers' CAR around the announcements. This paper uses the interaction term of target firm's listing status and method of payment to fully capture such moderating effect.

3.3 Research Methodology

To examine the stated hypotheses in this paper, first of all, short-window event study is conducted to derive the cumulative abnormal returns (CAR), which measures the acquisitions' performances. Afterwards, t-statistics test is applied to examine the significance of CAR. Then, this paper works with OLS regressions to control for factors affecting both the dependent and independent variables.

Moving on to mathematical model specification, the 3-day, 7-day and 11-day CAR are regressed against the Fintech classification of target firm as the main independent variables of interest, and the control variables, which comprise of transaction- and company-specific variables that are proposed to be relevant by past researches. Below is the full regression equation with each variable defined in Appendix B:

$$\begin{aligned} CAR_{i(\tau 1,\tau 2)} = {} & \alpha + \beta_1 FintechClassification_{i\tau} + \beta_2 CrossBorder_{i\tau} + \beta_3 CashPayment_{i\tau} \\ & + \beta_4 IndustryRelatedness_{i\tau} + \beta_5 RelativeDealSize_{i\tau} + \beta_6 lnTA_{i\tau} \\ & + \beta_7 Leverage_{i\tau} + \beta_8 PrivateTarget_{i\tau} + \beta_9 PrivateTarget * CashPayment_{i\tau} \\ & + \varepsilon_{i\tau} \end{aligned}$$

CHAPTER 4: Results

This chapter aims to present the results from the analysis of the research data comprehensibly and meticulously. It begins with the discussion of the descriptive statistics of the data set in this paper, followed by the description of both the strength and direction of the correlation between variables, and finally, the results from the multiple OLS regressions along with the statistical tests performed for accuracy matters. Both expected and unexpected results are believed to be mentioned appropriately, thus, none of the results are omitted from the report.

4.1 Summary Statistics

First of all, Table 2 documents that in general, Fintech acquisition generates value for the acquirers. The cumulative abnormal returns (-1,1), (-3,3) and (-5,5) are 1.25 %, 1.48% and 1.55%, respectively. The positive wealth effect is consistent with previous studies on private takeover share price effects (see, e.g. Chang, 1998; Fuller et al., 2002). This may due to the relatively inexpensive cost of acquiring private companies, such that investors can gain profits if in the future they sell these firms in case they have good prospects. Besides, Kohers & Kohers (2000) suggests that technological advantages of the targets are the reason behind the successful tech M&A. Accordingly, it is assumed that shareholders respond favorably to Fintech acquisition announcement because they see the opportunity of developing the technology innovated by the Fintech targets.

Moving on to the Fintech classifications of the target companies, the observed Fintech companies lean into nearly all verticals, and the entire breakdown of acquisitions by vertical specifies that 40% have been conducted in payments/billing tech, followed in a distant by alternative lending/investment tech at 16%, and institutional/capital markets tech at 10%. Acquisition towards payments/billing tech was found the most in 2013 and remained relatively stable until present time consistent with the trend that payments space has been continually attracted investors, especially in the last two observation years according to the 2018 Annual Fintech Almanac by FT Partners. In their H2 2018 report, KPMG International's The Pulse of Fintech suggests that this consideration aimed mainly to increase value in the whole payments value chain, or to put payments into wider technology uses to upgrade efficiencies or reduce gaps. Collaboration between financial services firms (i.e. banks) with Fintech lenders, in addition, is considered to be value-creating for both sides in a growing sector due to the huge market of Fintech lending, and the evidence that technology is uniquely positioned as the solution for lending troubles (Becker & Allayannis, 2019).

In terms of acquisition deal features, Table 2 also reports that over the research period, acquirers of Fintech firms are more likely to make domestic acquisitions (63%). Former studies on long-established M&A suggest that domestic transactions are more compelling than cross-border transactions (e.g., Gergen & Renneboog, 2004; Moeller & Schlingemann, 2005), and investors may tend to avoid the institutional and cultural discrepancies resulting from international-made M&A (McCarthy & Aalbers, 2016). These can be political,

economic and governing differences, or conflicts arising from different level of understanding and communication. Lusyana & Sherif (2016) more recently find that in the short-run, returns from domestic tech takeovers outperform that from cross-borders.

This study also discovers that in the majority of the cases, the target Fintech firms are purchased using the mix of cash and stock (56%). Further, the two most popular motives of the acquisitions reported in this study, which are strengthening current operations and expanding presence in primary market, possibly explain the fact that acquirers are generally from tech-oriented sector (57%). The current operations of these bidders are undoubtedly related to those of the targets, and acquiring Fintech surely makes it easier for them to expand their businesses.

The acquiring firms have a rather small amount of total assets, with the average logarithm of total assets of 14.47, which means that for acquirers with average firm size, every change in the amount of average acquiring firm size is associated with a change in CAR of $6,865,432 (almost 7 million US dollars). In addition, the average value of leverage of 22% indicates that overall, the acquirers have a low portion of total debt to total assets. Lastly, the statistical characteristics table presents that in general, the proportion of the value of the deals to the bidders' market value of assets is only around 29%. Tests of normality (Appendix D) have also been conducted, whereby the results show that only lnTA variable that is normally distributed, indicating it as the most homogeneous variable.

Table 2
Summary Statistics

This table displays the summary statistics for the variables used in the analysis, with the definition of each variable presented in Appendix B. The acquirers' CAR is the proxy for acquisition performance, in particular, this study examines the 3-day (-1, +1), 7-day (-3, +3) and 11-day (-5, +5) market-model CAR, appointing date 0 as the announcement date. Further explanation on how to construct CAR can be found in Section 3.2.1. The table comprises of several main independent variables, which are the Fintech verticals of the target companies: (1) Alternative lending/investment tech: a dummy variable that takes the value of "1" if the target is an alternative lending/investment tech, and "0" otherwise, (2) Payments/billing tech: a dummy variable that takes the value of "1" if the target is a payments/billing tech, and "0" otherwise, (3) Personal finance/asset management (WealthTech): a dummy variable that takes the value of "1" if the target is a personal finance/asset management (WealthTech), and "0" otherwise, (4) Blockchain/bitcoin: a dummy variable that takes the value of "1" if the target is a blockchain/bitcoin (WealthTech), and "0" otherwise, (5) Institutional/capital markets tech: a dummy variable that takes the value of "1" if the target is an institutional/capital markets tech, and "0" otherwise, (6) Insurtech: a dummy variable that takes the value of "1" if the target is an Insurtech, and "0" otherwise, (7) Fraud prevention/regulatory tech: a dummy variable that takes the value of "1" if the target is a fraud prevention/regulatory tech, and "0" otherwise, (8) Healthcare Fintech: a dummy variable that takes the value of "1" if the target is a healthcare Fintech, and "0" otherwise, (9) FMS: a dummy variable that takes the value of "1" if the target is an FMS (Financial Management System) Fintech, and "0" otherwise. The table also consists of several other independent and control variables, such as: (1) Cross-border: a dummy variable that takes the value of "1" if the acquirer and target are located in different countries, and "0" otherwise, (2) Industry relatedness: a dummy variable that takes the value of "1" if the first 3-digit of the acquirer's SIC code is 737, and "0" otherwise, (3) Cash payment: a dummy variable that takes the value of "1" if the transaction is fully paid in cash, and "0" otherwise, (4) Relative deal size: the proportion of the transaction value to the bidder's market value of assets, (5) lnTA: the natural logarithm of total assets of the acquirer, which represents the acquiring firm size, (6) Leverage: the percentage of total short-term debt and long-term debt scaled by total assets of the bidder, (7) Private target: a dummy variable that takes the value of "1" if the target is a private Fintech firm, and "0" otherwise.

Variables	Mean	Std. Dev.	Minimum	Median	Maximum
Acquisition Performance					
CAR (-1, 1) (%)	1.25	94.91	-33.55	0.95	62.75
CAR (-3, 3) (%)	1.48	8.97	-33.22	1.50	47.35
CAR (-5, 5) (%)	1.55	10.13	-38.26	1.14	57.08
Independent and Control Variables					
Fintech Verticals of Target Firms					
Alternative lending/investment tech	0.16	0.37	0.00	0.00	1.00
Payments/billing tech	0.40	0.49	0.00	0.00	1.00
Personal finance/asset management (WealthTech)	0.09	0.29	0.00	0.00	1.00
Institutional/capital markets tech	0.10	0.30	0.00	0.00	1.00
Insurtech	0.07	0.26	0.00	0.00	1.00
Fraud prevention/regulatory tech	0.07	0.26	0.00	0.00	1.00
Healthcare Fintech	0.02	0.14	0.00	0.00	1.00
FMS	0.05	0.22	0.00	0.00	1.00

Table 2-*Continued*

Deal Characteristics					
Cross-border	0.37	0.49	0.00	0.00	1.00
Industry relatedness	0.57	0.50	0.00	1.00	1.00
Cash payment	0.44	0.50	0.00	0.00	1.00
Relative deal size	0.29	1.82	0.00	0.05	18.18
Acquiring Firm Characteristics					
lnTA	14.47	2.52	9.07	14.14	21.09
Leverage	0.22	0.18	0.00	0.21	0.80
Target Firm Characteristics					
Private target	0.74	0.44	0.00	1.00	1.00

Afterwards, the Pearson's correlation coefficients test statistics is used to assess the statistical relation among the observed variables. Table 2 presents the Pearson's correlation coefficients among the independent and control variables constructed for the primary analysis, whereby having a coefficient of nearly +1 (perfectly positive) or -1 (perfectly negative) implies that they are strongly interacted. First of all, with no correlation coefficient of above the threshold (± 0.8), it is suggested that there are no issues regarding multicollinearity.

Secondly, the many small correlations between the variables show that there are plentiful independent variations among the variables. Thus, this allows the individually separate and distinct (discrete) effect to be predicted (Markides & Ittner, 1994). Among the strongest correlations are the negative relation between total assets and method of payment (-0.51), the negative relation between target public status and relative deal size (-0.51), the positive relation between leverage and total assets (0.39), and the positive relation between leverage and industry relatedness (0.33).

4.2 Multivariate Analysis

In this section, regression analysis is done to delve into the determinants of the acquirers' wealth gains across the entire sampling section, with the full regression equation repeated as follows:

$$\begin{aligned} CAR_{i(\tau 1,\tau 2)} = {} & \alpha + \beta_1 FintechClassification_{i\tau} + \beta_2 CrossBorder_{i\tau} + \beta_3 CashPayment_{i\tau} \\ & + \beta_4 IndustryRelatedness_{i\tau} + \beta_5 RelativeDealSize_{i\tau} + \beta_6 lnTA_{i\tau} \\ & + \beta_7 Leverage_{i\tau} + \beta_8 PrivateTarget_{i\tau} \\ & + \beta_9 PrivateTarget * CashPayment_{i\tau} + \varepsilon_{i\tau} \end{aligned}$$

The outcomes of the multivariate OLS regressions using varied independent variables are shown in Table 3. First of all, the coefficients of alternative lending/investment tech on CAR are negative in all event windows, with significance level of 1% in CAR (-1, 1). Similar results are found on the coefficients of payments/billing

tech on CAR throughout the event windows. This independent variable, in particular, negatively and significantly affects the 3-day CAR, while significant results are failed to be found at any level of confidence in the 7-day and 11-day CARs.

Lending is undoubtedly a huge market that is uniquely positioned for technical advancements. In their paper that discusses hi-tech improvements in financial services segments, Becker & Allayannis (2019) argue that Fintech lenders have the ultimate edge. Becker and Allayannis even reveal some strong benefits for both financial services (i.e. banks) and Fintech lending companies when these entities collaborate. Fintech payments is undeniably also a new Fintech breed that unbundle banks in the developed world. Besides being one of the most frequently demanded services on a daily basis, it is one of the least regulated sections (Lee & Shin, 2018). With that being said, the service of payments is relatively uncomplicated. Becker & Allayannis (2019) again state that the great enthusiasm and opportunities in this segment have motivated partnership between the traditional financial services firms and the Fintech startups. Nonetheless, in the short-run, the boom of the keen interest and the usefulness of technology in Fintech lending and payments may have triggered tight competitions among players in these two segments. This situation could cause oversupply of products to occur; producers may experience losses on the services they are offering, leading them into the consequence of poor performance in the market. This likely explains the unexpected negative short-term bidder announcement returns.

Further attention drawing results are the coefficients of healthcare Fintech on the bidders' CAR, which are found to be positive and significant at the level of 1% and above in CAR (-1, 1). There are similar features that belong to healthcare-related Fintechs and insurance providers, for instance, the use of technology. For payers of healthcare, technologies are required to manage policies, bills, and settling claims. On the other hand, suppliers of healthcare need technologies to validate insurance eligibility, estimate patient costs, for patient billing and to deal with payment. Therefore, it is believed that the nature of healthcare Fintech business is very much alike with insurance companies, whereby in principle, they raise a very large amount of funds from premiums paid by clients but the claims they have to pay are far less. The positive returns from acquiring this particular Fintech segment is likely due to this reason. Moreover, the magnitude of both correlation coefficients is relatively high. According to the Q3 2019 Fintech Insights of FT Partners, consumers are becoming more and more accountable for their healthcare expenditure as well as looking for higher transparency in its costs. The healthcare industry then increasingly utilizes the segments of Fintech as almost all patient interaction with healthcare providers requires various financial-related procedures. For this potential reason, acquiring healthcare Fintech results in a better performance than the other Fintech verticals. In particular, the observations take place in developed countries, where healthcare service is more in demand due to, for instance, better infrastructure and easiness in recruiting providers.

The other Fintech classifications that are possibly moderating the short-term market reactions of Fintech acquisitions are reported as follows: (i) Personal finance/asset management (WealthTech), which greatly improves the easiness in reaching financial advisors (Izairi & Amornthanomchoke, 2019) as budgeting advices are now available on applications (Gakman, 2017), negatively and insignificantly affects the acquirers' CAR in general; (ii) Institutional/capital markets tech, which immensely automates investing activities for investors as financial instruments can now be traded online (Tokareva, 2018), also negatively and insignificantly affects the acquirers' CAR; (iii) Fraud prevention/regulatory tech, which caters detection technologies that specifically respond the transparency issues after the 2008 global crisis, has negative and insignificant coefficients on the acquirers' CAR; (iv) FMS (Financial Management Solutions), which helps the back-office departments, particularly the finance and human resources divisions of organizations, have mainly negative and insignificant coefficients on the acquirers' CAR; (v) Insurtech, which offers more flexibility to clients compared to the traditional insurance firms (Zavgorodnya, 2018), have positive and insignificant coefficients on the acquirers' CAR. These remaining major Fintech classifications, despite insignificant, have negative impacts towards the short-term bidder announcement returns, similar to the two highly in-demand verticals that have been discussed. Insurtech, which quite resembles the healthcare segment and still tends to collaborate with traditional insurance firms due to high market regulations (Gakman, 2017), have positive albeit insignificant effects on the acquirers' short-term announcement returns.

According to the obtained results, the Fintech verticals have different effects on the short-term bidder announcement returns. Therefore, H1, which predicts the cumulative abnormal returns of acquirer in a short-term Fintech acquisition to be positive but depends on the Fintech classifications of target, is accepted. For the control variables, the magnitudes of the coefficients are fairly stable across the three event windows. Most parameter estimates of the control variables fail to have statistical significance. Nonetheless, the relative deal size variable has a significant and positive effect in each event window. This observation supports the past studies of Asquith, et al. (1983), Moeller, et al. (2004), and Masulis, et al. (2007), which show that bidder announcement returns increase in relative size of deal values. Thus, although this result is fairly expected, it confirms the validity of this variable in this research. Furthermore, it supports H5, which predicts relative deal size to be positively related to bidders' returns.

For the remaining control variables, specifically, it is observed that:
(i) Cross-border coefficient is negative in each event window. Albeit insignificant, it potentially supports Dranev et al. (2019) where cross-border Fintech takeover within developed nations underperform domestic takeover. Similarly, Lusyana & Sherif (2016) study that in the short-term, domestic technological takeovers outperform cross-border transactions and McCarthy & Aalbers (2016) argue that M&A transactions may suffer from cultural differences. Accordingly, H2 that predicts domestic Fintech acquisition to be more successful than cross-border Fintech acquisition cannot be accepted or rejected.

(ii) Cash payment, although insignificant, have positive effects on bidder announcement returns, in line with Kohers & Kohers (2001) that argue that technological takeovers are more advantageous when paid entirely by cash. Paying in stocks leads to the dilution of profits for existing shareholders of the acquiring firm, leading to negative bidder short-term returns. Therefore, H3 that predicts stock-financed Fintech acquisition to be more successful than cash-financed one cannot be accepted or rejected.

(iii) Industry relatedness variable positively affects CAR throughout the three event windows. Although the results are not significant, it is similar to the indication of higher returns from technology M&A relative to non-technology M&A by tech companies in the literature. (Kohers & Kohers, 2000; Yoon & Lee, 2016). Thus, H4 that predicts acquirers from the technology sector to gain more than those from the non-technology sector cannot be accepted or rejected.

(iv) The coefficient behind lnTA (the logarithm of total assets) is positive but not significant. Literature such as Bajaj & Vijh (1995) and Moeller et al. (2004), however, suggest that acquisitions made by larger companies are received less favorably compared to smaller companies. Therefore, H6 that predicts a small acquirer to be more favored by the market than a large acquirer cannot be accepted or rejected.

(v) Leverage, despite insignificant, has positive coefficients in the 3-day, 7-day, and 11-day CARs. This could imply that leverage does avoid managers from conducting bad takeovers (Masulis, et al., 2007). Consequently, H7 that predicts acquirer's leverage to be positively related to acquirer's returns cannot be accepted or rejected.

(vi) The positive effect of private targets on the acquirers' CAR holds in all event windows, despite insignificant. Therefore, it cannot be concluded that the variation in the target listing status explains the acquirers' CAR, although it is well-known that acquirers experience positive abnormal returns when buying private companies. This leads to the failure to accept or reject H8, which predicts more positive short-term market reactions in private-firm takeovers than in public ones.

(vii) The interaction term between the target listing status and the deal's payment method negatively affects the acquirers' CAR around the announcements, failing to explain the stronger positive effect of private target status on acquisition performance when the deal is fully financed in cash. As such, H9 cannot be accepted or rejected.

Table 3
Multivariate OLS Regressions Results for the Acquirer

This table presents the Ordinary Least Squares regressions where the dependent variable is the market-model CAR over day -1 to +1, -3 to +3, and -5 to +5. Further explanation on how to construct CAR can be found in Section 3.2.1. The table comprises of several main independent variables, which are the Fintech verticals of the target companies: (1) Alternative lending/investment tech: a dummy variable that takes the value of "1" if the target is an alternative lending/investment tech, and "0" otherwise, (2) Payments/billing tech: a dummy variable that takes the value of "1" if the target is a payments/billing tech, and "0" otherwise, (3) Personal finance/asset management (WealthTech): a dummy variable that takes the value of "1" if the target is a personal finance/asset management (WealthTech), and "0" otherwise, (4) Blockchain/bitcoin: a dummy variable that takes the value of "1" if the target is a blockchain/bitcoin (WealthTech), and "0" otherwise, (5) Institutional/capital markets tech: a dummy variable that takes the value of "1" if the target is an institutional/capital markets tech, and "0" otherwise, (6) Insurtech: a dummy variable that takes the value of "1" if the target is an Insurtech, and "0" otherwise, (7) Fraud prevention/regulatory tech: a dummy variable that takes the value of "1" if the target is a fraud prevention/regulatory tech, and "0" otherwise, (8) Healthcare Fintech: a dummy variable that takes the value of "1" if the target is a healthcare Fintech, and "0" otherwise, (9) FMS: a dummy variable that takes the value of "1" if the target is an FMS (Financial Management System) Fintech, and "0" otherwise. The table also consists of several other independent and control variables, such as: (1) Cross-border: a dummy variable that takes the value of "1" if the acquirer and target are located in different countries, and "0" otherwise, (2) Industry relatedness: a dummy variable that takes the value of "1" if the first 3-digit of the acquirer's SIC code is 737, and "0" otherwise, (3) Cash payment: a dummy variable that takes the value of "1" if the transaction is fully paid in cash, and "0" otherwise, (4) Relative deal size: the proportion of the transaction value to the bidder's market value of assets, (5) lnTA: the natural logarithm of total assets of the acquirer, which represents the acquiring firm size, (6) Leverage: the percentage of total short-term debt and long-term debt scaled by total assets of the bidder, (7) Private target: a dummy variable that takes the value of "1" if the target is a private Fintech firm, and "0" otherwise. Robust standard-errors are reported in parentheses. ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Variables	Acquisition Performance		
	CAR (-1, 1)	CAR (-3, 3)	CAR (-5, 5)
Alternative lending/investment tech	-0.047***	-0.034	-0.045
	(0.023)	(0.026)	(0.028)
Payments/billing tech	-0.040***	-0.026	-0.032
	(0.020)	(0.023)	(0.025)
Personal finance/asset management (WealthTech)	-0.038	0.002	-0.011
	(0.027)	(0.031)	(0.033)
Institutional/capital markets tech	-0.038	-0.041	-0.040
	(0.029)	(0.033)	(0.036)
Insurtech	0.023	0.020	0.020
	(0.030)	(0.034)	(0.036)
Fraud prevention/regulatory tech	-0.025	-0.024	-0.043
	(0.032)	(0.036)	(0.039)
Healthcare Fintech	0.132***	0.105	0.084
	(0.052)	(0.059)	(0.064)
FMS	-0.045	-0.044	0.024
	(0.037)	(0.042)	(0.046)
Private target	0.038	0.015	0.008
	(0.043)	(0.049)	(0.054)
Cross-border	-0.003	-0.006	-0.010
	(0.015)	(0.017)	(0.019)
Cash payment	0.037	0.020	0.018
	(0.045)	(0.051)	(0.056)

Table 3-*Continued*

Industry relatedness	0.015	0.015	0.011
	(0.018)	(0.021)	(0.022)
lnTA	0.001	0.001	0.003
	(0.004)	(0.004)	(0.005)
Relative deal size	0.032***	0.025***	0.031***
	(0.004)	(0.005)	(0.005)
Leverage	0.003	0.015	0.020
	(0.044)	(0.050)	(0.055)
Private target x Cash payment	-0.038	-0.026	-0.038
	(0.049)	(0.055)	(0.060)
Number of observations	99	99	99
R^2	0.566	0.372	0.419
Adjusted R^2	0.482	0.250	0.306
F-Statistic	6.689	3.041	3.701
Prob > F	0.000	0.001	0.000

4.3 Robustness Check

To establish the obtained results, this study conducts a robustness test by initially reviewing the construction of the variables used in this research model. As market value of equity (i.e. the total dollar value of a firm's equity or market capitalization) is also widely used to measure a company's size, there are possibly other means to calculate the size of the acquiring firm as well as the acquirer's leverage. Accordingly, the multivariate regression is re-estimated using different functional proxies of the two variables. The acquiring firm size, which was originally computed as the natural logarithm of the acquirer's total assets, is calculated as the natural logarithm of the acquirer's market value of equity. Whereas the acquiring firm's leverage, which was originally calculated as a percentage of the sum of short-term debt and long-term debt scaled by the total assets of the acquirer, is now the percentage of the sum of the short-term debt and long-term debt scaled by the acquirer's market value of equity. Table 4 displays the re-estimation results, in which the coefficient of alternative lending/investment tech remains negative and significant at 1% level, and the coefficients of healthcare Fintech and relative deal size remain positive and significant at 1% level.

Table 4
Robustness Check

This table presents the Ordinary Least Squares regressions where the dependent variable is the market-model CAR over day -1 to +1. Further explanation on how to construct CAR can be found in Section 3.2.1. The table comprises of several main independent variables, which are the Fintech verticals of the target companies: (1) Alternative lending/investment tech: a dummy variable that takes the value of "1" if the target is an alternative lending/investment tech, and "0" otherwise, (2) Payments/billing tech: a dummy variable that takes the value of "1" if the target is a payments/billing tech, and "0" otherwise, (3) Personal finance/asset management (WealthTech): a dummy variable that takes the value of "1" if the target is a personal finance/asset management (WealthTech), and "0" otherwise, (4) Blockchain/bitcoin: a dummy variable that takes the value of "1" if the target is a blockchain/bitcoin (WealthTech), and "0" otherwise, (5) Institutional/capital markets tech: a dummy variable that takes the value of "1" if the target is an institutional/capital markets tech, and "0" otherwise, (6) Insurtech: a dummy variable that takes the value of "1" if the target is an Insurtech, and "0" otherwise, (7) Fraud prevention/regulatory tech: a dummy variable that takes the value of "1" if the target is a fraud prevention/regulatory tech, and "0" otherwise, (8) Healthcare Fintech: a dummy variable that takes the value of "1" if the target is a healthcare Fintech, and "0" otherwise, (9) FMS: a dummy variable that takes the value of "1" if the target is an FMS (Financial Management System) Fintech, and "0" otherwise. The table also consists of several other independent and control variables, such as: (1) Cross-border: a dummy variable that takes the value of "1" if the acquirer and target are located in different countries, and "0" otherwise, (2) Industry relatedness: a dummy variable that takes the value of "1" if the first 3-digit of the acquirer's SIC code is 737, and "0" otherwise, (3) Cash payment: a dummy variable that takes the value of "1" if the transaction is fully paid in cash, and "0" otherwise, (4) Relative deal size: the proportion of the transaction value to the bidder's market value of assets, (5) lnTA: the natural logarithm of total assets of the acquirer, which represents the acquiring firm size, (6) Leverage: the percentage of total short-term debt and long-term debt scaled by total assets of the bidder, (7) Private target: a dummy variable that takes the value of "1" if the target is a private Fintech firm, and "0" otherwise. Robust standard-errors are reported in parentheses. ***, **, and * indicate the statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.

Variables	Acquisition Performance
	CAR (-1, 1)
Alternative lending/investment tech	-0.047***
	(0.022)
Payments/billing tech	-0.039
	(0.020)
Personal finance/asset management (WealthTech)	-0.039
	(0.027)
Institutional/capital markets tech	-0.035
	(0.029)
Insurtech	0.032
	(0.031)
Fraud prevention/regulatory tech	-0.026
	(0.032)
Healthcare Fintech	0.137***
	(0.052)
FMS	-0.042
	(0.037)
Private target	0.039
	(0.043)
Cross-border	-0.004
	(0.015)
Cash payment	0.035
	(0.045)

Table 4-*Continued*

Industry relatedness	0.017
	(0.017)
lnTA	0.003
	(0.004)
Relative deal size	0.034***
	(0.004)
Leverage	-5.592
	(0.000)
Private target x Cash payment	-0.038
	(0.048)
Number of observations	99
R^2	0.571
Adjusted R^2	0.487
F-Statistic	6.811
Prob > F	0.000

CHAPTER 5: Concluding Remarks

The era of Fintech disruption has caused many conventional sectors to acquire Fintech firms to better serve customers, or simply to remain successful by becoming more tech driven. Hence, this research investigates the impact of Fintech acquisition on stock returns in North-America and Europe, the significant parts of the total worldwide Fintech investment. The observation starts after the 2008 recession, which led to distrust of banks, stricter regulations, and allowed Fintechs to attain public trust and provide less-regulated products. The reported motives of the acquisitions in this paper follow the usual purposes of Fintech takeovers suggested in the literature, with maintaining the top position in the financial services revolution being the most popular one. This study seeks to contribute to the academic world by introducing targets' Fintech verticals as a new parameter of better performing acquisitions.

This chapter will firstly discuss the acceptance of each formulated hypothesis, which are recapitulated in Table 5. To start with, the research question was "What is the reaction of the stock markets towards Fintech acquisition announcements?", and was supported by H1: "The Fintech acquisition will positively influence the short-term announcement returns of the acquiring company; however, it is moderated by the Fintech classification of the target firm". This hypothesis holds because an average of positive cumulative abnormal returns was reported across event windows, consistent with some technological and Fintech acquisitions studies of Dranev et al. (2019), Ma et al. (2019) and McCarthy & Aalbers (2016).

Also, Fintech verticals of the targets indeed have different influences on the acquisition performance. Interestingly, this research finds that two of the most prominent classifications, the Fintech lending and payment (or billing), significantly lower the short-term announcement returns of the acquirers. The high interest towards these sectors, especially in the short-run, surely triggers strict competitions between players in these segments, and causes oversupply of products to happen. It is also possible that such lending and payment (or billing) targets become too expansive. These underlying reasons are believed to be the cause of the unexpected poor acquisition returns. This evidence suggests that successfully meeting the growing needs of mobility, networking, communication and information with providing attractive financial services may not be enough for a sector to compete against its new rivals (Dapp et al., 2014). A strong marketing strategy is required as well to survive in the market.

Among the significant effects of the targets' Fintech categories, it is also found that the healthcare Fintech improves the bidder short-term announcement returns. Because many of healthcare Fintech's features are similar to insurance companies (i.e. the use of technology), it is assumed that these two businesses have traits that are very much alike. One of them is that the claims they have to pay are very few compared to the total funds they raise from premiums paid by clients, which likely explains the positive results. In addition, the gain from healthcare Fintech acquisition is relatively high compared to the other categories. The growing responsibility of consumers towards their healthcare costs, their constant search for higher transparencies in

it, and the nations of observation where healthcare service is highly popular in developed nations, are believed to support the satisfying performance.

This study also tests other determinants of better performing acquisitions proposed in prior M&A researches. The first four determinants are deal-specific characteristics and are supported by H2, H3, H4, and H5: "Domestic Fintech takeover announcements will create more positive short-term market reactions than cross-border Fintech takeover announcement"; "Stock-financed deals will result in more shareholder wealth destruction than cash-financed deals"; "Acquirers from technology sectors will receive more positive short-term market reactions than acquirers from non-technology sectors"; and "The acquisitions' relative size of deal values will be positively correlated with the bidders' returns." H2, H3, and H4 cannot be accepted or rejected due to insignificant test results, although many of their (positive/negative) signs support prior studies. However, H5 is accepted as the bidder announcement returns increase in the relative size of transaction values. This observation, despite predictable, proves the validity of this variable in this study as it supports Asquith et al. (1983), Moeller et al. (2004), and Masulis et al. (2007).

The next two determinants are firm-specific characteristics of the acquirer, which are supported by H6: "Small acquiring firms will generate more value-creative acquisitions than do large acquiring firms," and H7: "The amount of the acquirer's leverage will be positively correlated with the acquirer's returns." Both hypotheses are rejected because of insignificant test results, as well as the results of the H8 that represents target firm-specific characteristics: "Acquisition of private Fintech firms will create more positive short-term market reactions than acquisition of public Fintech firms." Finally, H9: "The positive effect of private target status on the acquirers' CAR around acquisition announcements will be more pronounced in takeovers that are entirely paid in cash" fails to prove such moderating effect of the deal financing method.

This study is limited to the relatively few amounts of M&A transactions. The small sample size potentially decreases the statistical power, and the given Fintech description is supposed to have eliminated some deals that are probably Fintech-related. This opens the opportunity for further researchers to acquire a larger sample size (i.e. from a longer study time-frame, etc.) to benefit from more precise results. Nevertheless, according to Sahi (2017), the used Fintech identification steps can be followed by similar studies describing tech-based industry, which are impossible to be identified by industry classification. This study also proves that in reality, a Fintech firm can belong to more than one Fintech vertical, casting light to previous identical researches that probably assign a single vertical for each company.

As traditional sectors increasingly need to provide customers with all-money related assistance through value-creating and modern web-based technologies (Dapp et al., 2014), there would definitely be many suggestions for further related researches. First, the segmentation of Fintech acquisition motives, which are proposed in the literature section, can still be developed (i.e. market expansion, market efficiency). A deeper

identification of the acquisition purpose, which can also be tested whether it impacts the returns, is therefore recommended for further studies. Second, Reed Smith in its 2018 Fintech M&A report suggests bidders to consider the potential of Fintech in developing countries, implying that future studies can also construct the same research in the largest emerging markets, such as China and India. Lastly, assessing the long-term effects of Fintech M&As addressed in this research can be useful for academia and practitioners, who intend to study the differences of the effects that the determinants have in both time frames.

Table 5
Recapitulation of Hypothesis Acceptance

Hypothesis	Hypothesis Acceptance
H1: *The Fintech acquisition will positively influence the short-term announcement returns of the acquiring company; however, it is moderated by the Fintech classification of the target firm.*	Accepted
H2: *Domestic Fintech takeover announcements will create more positive short-term market reactions than cross-border Fintech takeover announcements.*	Cannot be accepted or rejected
H3: *Stock-financed deals will result in more shareholder wealth destruction than cash-financed deals.*	Cannot be accepted or rejected
H4: *Acquirers from technology sectors will receive more positive short-term market reactions than acquirers from non-technology sectors.*	Cannot be accepted or rejected
H5: *The acquisitions' relative size of deal values will be positively correlated with the bidders' returns.*	Accepted
H6: *Small acquiring firms will generate more value-creative acquisitions than do large acquiring firms.*	Cannot be accepted or rejected
H7: *The amount of the acquirer's leverage will be positively correlated with the acquirer's returns.*	Cannot be accepted or rejected
H8: *Acquisition of private Fintech firms will create more positive short-term market reactions than acquisition of public Fintech firms.*	Cannot be accepted or rejected
H9: *The positive effect of private target status on the acquirers' CAR around acquisition announcements will be more pronounced in takeovers that are entirely paid in cash.*	Cannot be accepted or rejected

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Appendix A

Target Company Business Description

Target primary US SIC code	Target primary US SIC code description	Target primary business description
7371	Computer programming services	Mobile payment method solutions developer
		Payment processing software developer
		Mobile software applications developer
7372	Prepackaged software	Electronic business payment software developer
		Desktop and mobile data searching web browser software provider
		Automated natural language processing software developer
7373	Computer integrated systems design	Enterprise payments solutions consulting services
7374	Computer processing and data preparation and processing services	Online banking and e-commerce services platform operator
		Online travel transactions management Software-as-a-Service (SaaS) holding company
		Online travel transactions management Software-as-a-Service (SaaS) provider
		Online credit data access and management platform operator
		Mobile publishing platform operator
		Fuel management and logistics to the fuel supply chain Software-as-a-service (SaaS) provider
		Online end to end prepaid program management and processing platform operator
		Online end-to-end software for petroleum company's platform operator
		Online oil and gas industry software and mobile computing platform operator
		Online services for retail fuel stores platform operator
		Online FinTech platform operator
		Online loyalty and coalition marketing Software-as-a-Service (SaaS) provider
		Online petroleum market resource planning (ERP) and customer relationship management (CRM) accounting and enterprise platform operator
		Fuel pricing analytics Software-as-a-Service (SaaS) provider
		Online private capital markets origination and deal management platform operator

Appendix B

Variables Definition

Variables	Definition
CAR	The cumulative abnormal returns of the acquiring firm, divided based on the event window into CAR (-1,1), CAR (-3,3), and CAR (-5,5)
Fintech classification of target company	Alternative lending/investment tech: A dummy variable that takes the value of "1" if the target is an alternative lending/investment tech, and "0" otherwise Payments/billing tech: A dummy variable that takes the value of "1" if the target is a payment/billing tech, and "0" otherwise Personal finance/asset management (WealthTech): A dummy variable that takes the value of "1" if the target is a WealthTech, and "0" otherwise Institutional/capital markets tech: A dummy variable that takes the value of "1" if the target is an institutional/capital markets tech, and "0" otherwise Insurtech: A dummy variable that takes the value of "1" if the target is an Insurtech, and "0" otherwise Fraud prevention/regulatory tech: A dummy variable that takes the value of "1" if the target is a fraud prevention/regulatory tech, and "0" otherwise Healthcare Fintech: A dummy variable that takes the value of "1" if the target is a healthcare Fintech, and "0" otherwise FMS: A dummy variable that takes the value of "1" if the target is an FMS (Financial Management Solutions), and "0" otherwise
Cross-border	A dummy variable that takes the value of "1" if the acquirer and target are located in different countries, and "0" otherwise
Cash payment	A dummy variable that takes the value of "1" if the transaction is fully paid in cash, and "0" otherwise
Industry relatedness	A dummy variable that takes the value of "1" if the first 3-digit of the acquirer's SIC code is 737, and "0" otherwise

Relative deal size	The proportion of the transaction value to the bidder's market value of assets
lnTA	The natural logarithm of total assets of the acquirer
Leverage	The percentage of total short-term debt and long-term debt scaled by total assets of the bidder
Private target	A dummy variable that takes the value of "1" if the target is a private Fintech firm, and "0" otherwise

Appendix C

Test of Multicollinearity: Values of Tolerance and Variance Inflation Factor (VIF)

Independent and control variables	Dependent variable: CAR (-1, 1)	
	Tolerance	Variance Inflation Factor (VIF)
Private target	0.713	1.403
Cross-border	0.976	1.025
Cash payment	0.692	1.446
Industry relatedness	0.667	1.499
lnTA	0.618	1.619
Relative deal size	0.931	1.074
Leverage	0.802	1.247

Independent and control variables	Dependent variable: CAR (-3, 3)	
	Tolerance	Variance Inflation Factor (VIF)
Private target	0.713	1.403
Cross-border	0.976	1.025
Cash payment	0.692	1.446
Industry relatedness	0.667	1.499
lnTA	0.618	1.619
Relative deal size	0.931	1.074
Leverage	0.802	1.247

Independent and control variables	Dependent variable: CAR (-5, 5)	
	Tolerance	Variance Inflation Factor (VIF)
Private target	0.713	1.403
Cross-border	0.976	1.025
Cash payment	0.692	1.446
Industry relatedness	0.667	1.499
lnTA	0.618	1.619
Relative deal size	0.931	1.074
Leverage	0.802	1.247

Appendix D

Test of Normality

Variables	Kolmogorov-Sminrnov[a]		
	Statistic	**df**	**Significance**
CAR (-1,1)	0.230	99	0.000
CAR (-3,3)	0.187	99	0.000
CAR (-5,5)	0.140	99	0.000
Private target	0.466	99	0.000
Cross-border	0.405	99	0.000
Cash payment	0.369	99	0.000
Industry relatedness	0.374	99	0.000
lnTA	0.065	99	0.200*
Relative deal size	0.436	99	0.000
Leverage	0.106	99	0.000

* This is a lower bound of the true significance.

[a] Lilliefors Significance Correction