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Master Thesis - Financial Economics

Financial Regulation Policy Uncertainty and Mergers and Acquisitions by European Banks

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Abstract

This paper seeks to determine the effect of policy uncertainty and financial regulation policy uncertainty on the aggregate level of mergers and acquisitions in Europe, the firm-level acquisition decision for European banks, and the channels it operates through. The first part of this study focusses on the aggregate number of deals and value using a vector auto regression, finding a drop in aggregate European volume and value figures following a shock in policy uncertainty. In the second part, no significant effect is found of policy uncertainty or financial regulation policy uncertainty on the firm-level acquisition decision for European banks, using a logistic regression model. The final part of this research focusses on the channels through which (financial regulation) policy uncertainty affects firm-level acquisition decisions for European banks. The results show that acquisition decisions for European banks are influenced by the interim-risk channel, which concerns value fluctuations of the target firm between announcement and completion. European banks postpone investments prior to times of financial regulation policy uncertainty because of the lengthened time between the announcement date and completion date when financial regulation policy uncertainty levels are elevated.

Keywords: Mergers and Acquisitions; Policy Uncertainty; Financial Regulation Policy Uncertainty

JEL classification: G18; G21; G24; G34; G38

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List of abbreviations

AMLD: Anti-money laundering directive

BBD: Baker, Bloom, Davis (2016)

BCBS: Basel committee on banking and supervision

BCG: Boston Consulting Group

BofAML: Bank of America Merrill Lynch

BHAR: Buy-and-hold abnormal return

CAPE: Cyclically adjusted price/earnings ratio

CAR: Cumulative abnormal return

CEO: Chief Executive Officer

CET I: Common equity tier I

CRD IV: Capital requirements directive

CRR: Capital requirements regulation

DGSD: Deposit guarantee schemes directive

EBA: European banking authority

EPU: Economic policy uncertainty

ESA: European supervisory agencies

FRPU: Financial regulation policy uncertainty

GDP: Gross domestic product

IRF: Impulse response function

JLN: Jurado, Ludvigson, Ng (2015)

M&A: Mergers and acquisitions

MCI: Monetary conditions index

MiFID II: Markets in financial instruments directive

MSCI: Morgan Stanley Capital International

MU: Monetary union

OECD: Organisation for economic co-operation and development

PE: Private equity

P/E ratio: Price over earnings ratio

PSD II: Payment services directive

ROE: Return on equity

R&D: Research and development

SD: standard deviation

SE: Standard error

VAR: Vector auto regression

WUI: World uncertainty index

WTUI: World trade uncertainty index

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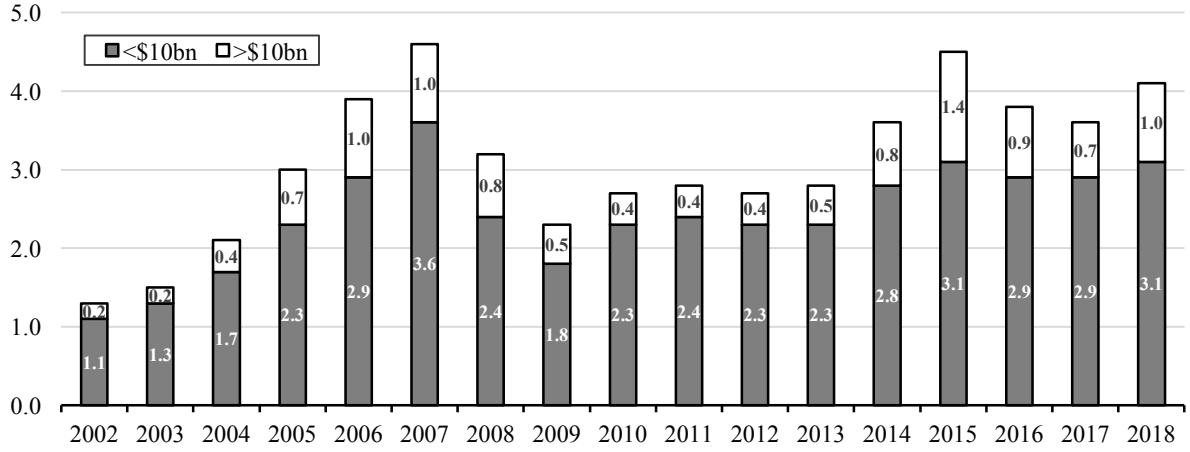
Introduction

Following the Great Recession from 2007 to 2009, there has been a renewed interest by academics into the effects of policy uncertainty. Bloom (2009) analysed the impact of, and found a direct link between, uncertainty shocks and aggregate output and employment. His findings instigated a surge of scientific research on and beyond the topic. This led to arguably one of the most influential papers in this field of research. When Baker, Bloom, and Davis (2016) created their news based policy uncertainty index (hereafter indicated as the BBD index), it opened up the door to a wide variety of research topics on the implications of policy uncertainty and its sub-components on all sorts of macroeconomic and firm-level factors. Among them is the effect of policy uncertainty on mergers and acquisitions,[1] the topic this research will focus on. In line with papers by Bonaime, Gulen, and Ion (2018) and Bhagwat, Dam, and Harford (2016) the aim of this research is to determine the effect of economic policy uncertainty (EPU) on mergers and acquisitions. The effect is determined on both the European aggregate level and the firm-level acquisition decision. The motivation for this paper is rooted in the fact that recently EPU has been remarkably high following the Brexit, increased protectionism, Hong Kong demonstrations, slowdowns of China's and Germany's economies, and wobbling international alliances. Nevertheless, the market for M&A seems to be unfazed by the recent turmoil. In a market report published by J.P. Morgan (2019) table 1 displays the global aggregates in terms of volume which reached its third highest year ever with a whopping $4.1 trillion in transaction value.



Number of deals greater than $10bn

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
9	9	15	33	48	46	34	23	16	20	18	19	35	55	35	32	44

Number of deals greater than $250m

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
939	991	1333	1678	2230	2765	1893	1293	1789	1845	1843	1912	2108	2293	2164	2151	2298

Figure 1. Global M&A volumes. Global M&A volumes as depicted in the market analysis by J.P. Morgan *(J.P. Morgan, 2019)*. The bar chart displays aggregate global M&A volumes from 2002 until 2018, the bottom tables show the number of deals larger than $10bn and $250m, respectively. [2]

[1] Throughout this paper, the terms 'mergers, acquisitions, deals, transactions, takeovers, M&A' will be used interchangeably.

[2] Source: Dealogic data as of 31/12/2018.

According to a report published by Boston Consulting Group (2019), dealmakers do not focus on current threats and trends when it comes to the macroeconomic environment. However, empirical evidence found deal volumes and values are supposed to decline as uncertainty, measured by the EPU index (Baker, Bloom, & Davis, 2016), increases (Bhagwat, Dam, & Harford, 2016; Bonaime, Gulen, & Ion, 2018). This contradiction is investigated in the first part of this paper, with a particular focus on the European market and its banking sector.

Another development after the Great Recession has been of significant interest in Europe. Specifically, in the past decade European supervisory agencies (ESAs) have aimed to sharpen the supervision and regulation of European banks. The European Banking Authority (EBA) introduced regulation on: capital requirements (CRD IV / CRR), deposit guarantees (DGSD), payments services (PSD2), anti-money laundering (AMLD), and the market for financial instruments (MiFID II) among others (European Banking Authority, 2016). Next to the EBA, following the collapse of Lehman Brothers, a new set of capital requirement and liquidity risk management principles were issued by the Basel Committee on Banking and Supervision (BCBS). The "Basel III" accord is a set of standards and practices created to ensure international banks maintain adequate capital to sustain themselves during periods of economic strain. The accord contains but is not limited to: a minimum common equity tier I (CET I) ratio, a countercyclical buffer, and measures to cover counterparty credit risk (Basel Committee on Banking Supervision, 2010). Uncertainty about financial regulation is one of the components proven to be of significant importance when trying to uncover the effect of policy uncertainty on mergers and acquisitions (Bonaime, Gulen, & Ion, 2018). In the light of this wave of financial regulation for European banks, the following research question has been formulated:

What is the effect of financial regulation policy uncertainty on mergers and acquisitions by European banks between 2003 and 2018?

In order to answer the research question, this paper will set out a selection of academic literature on the determinants of (1) fluctuations in M&A levels (merger waves), (2) policy uncertainty, and (3) financial regulation policy uncertainty. The next section provides a comprehensive overview of the current state of the literature surrounding these topics, and develop insights by examining, comparing and analysing the ideas of researchers from these different fields. In the third section, the hypotheses for this research are formulated using the existing literature as academic foundation. Developing testable hypotheses is of paramount importance when answering the research question. In order to test the hypotheses, M&A data is gathered from Thomson Reuters, balance sheet data from DataStream, and data on policy uncertainty from the policy uncertainty website, by Baker, Bloom and Davis.[3] In

[3] For detailed information on the construction of the different BBD indices, please visit their website: https://www.policyuncertainty.com/ (Baker, Bloom, & Davis, Economic Policy Uncertainty, 2012).

order to isolate financial regulation policy uncertainty (FRPU) the overall BBD index is transformed by extracting other forms of uncertainty. The data description section provides an elaborate overview of the data used throughout the study and a comprehensive explanation as to how the FRPU index was created. The first section including the empirical tests seeks to find the effect of an overall policy uncertainty shock on the aggregate European deal values and volumes using a vector auto regression model (VAR). The following test zooms in on the European banking industry and attempts to accept or reject the accompanying hypotheses by testing the effect of shocks in both the BBD index and the FRPU index on M&A volumes and values of European banks. The next section has a focus on testing the effect of the BBD index and the FRPU index on the firm-level acquisition decision by estimating the likelihood of a European bank engaging in an acquisition, using a logistic regression model. The last tests of that section seek to uncover whether managers adjust their acquisition behaviour when they expect an elevation in policy uncertainty, and whether the effect of policy uncertainty on the firm-level acquisition decision is temporary. The section with the final empirical tests has a focus on the channels through which policy uncertainty potentially influences M&A activity. Three particular channels are tested: CEO hubris, risk management, and the interim-risk channel. Finally, the last section of this paper summarizes all results, identifies potential flaws, and offers suggestions for future research.

The results indicate a significant drop in aggregate deal volume and value for listed firms on the European continent following a shock in the BBD index. However, no significant effect is found of a shock in either the BBD or the FRPU index on the aggregate level of M&A volumes and values for European banks. The results on the influence of both the BBD index and the FRPU index on the firm-level acquisition decision are ambiguous, suggesting no direct correlation between (financial regulation) policy uncertainty and the firm-level acquisition decision. Nevertheless, this research finds an increase in acquisition likelihood following times of above median policy uncertainty and finds a drop in M&A activity in the period before elevated (financial regulation) policy uncertainty. The final tests on which channels (financial regulation) policy uncertainty operates though show that neither CEO hubris nor risk management is an important factor for European banks in their investment decision. However, the last test demonstrates that the interim-risk channel is of significant influence when determining the effect of financial regulation policy uncertainty on mergers and acquisitions by European banks. It shows the time between the announcement date and the completion date increases significantly when comparing times of high financial regulation policy uncertainty and times of low financial regulation policy uncertainty. This result indicates that the risk of fluctuating values and shocks in policy and regulation could deter firms of engaging in an M&A trajectory, which offers an explanation for the drop in M&A activity prior to times of elevated financial regulation policy uncertainty.

Related literature

This section identifies and analyses the branches of academic literature this research contributes to. The most important findings of the past few years concerning the determinants of fluctuations in M&A levels, the effect of policy uncertainty on M&A levels, and uncertainty surrounding financial regulation policy are discussed in detail. The insights gained by examining, comparing and analysing the ideas of researchers from these different fields will aid in the forming of the hypotheses for this research in the following chapter, which is of paramount significance when answering the research question.

M&A activity

The previous section briefly touched upon the importance of large investment decisions for companies, and their impact on the global economy. Therefore, it is vital to understand the motives corporations have for engaging in such high value transactions. There is a vast amount of literature on the determinants of the macroeconomic levels of mergers and acquisitions. Brealey, Myers, and Allen (2011) mention: "We don't really understand why merger activity is so volatile", in their leading textbook on corporate finance (Principles of corporate finance, 2011, p. 815). They also agree that at least one of the motives must somehow be associated with the height of stock prices, this notion representing the behavioural explanation of merger waves.

Merger waves. In their revolutionary paper Rhodes-Kropf, Robinson, and Viswanathan (2005) show that high market valuations, captured by high market-to-book ratios across the markets, is a vital determinant on the firm-level decision to engage in an acquisition. Building on papers by Maksimovic and Phillips (2001) and Jovanovic and Rousseau (2001), which both find that high market valuation is correlated with larger M&A activity, the authors propose a model in which managers of both the bidding and target firms have private information about their respective companies and the potential value of the synergies. They assume misvaluation is comprised of two components: market-wide misvaluation and firm-specific misvaluation. Stock bids already contain the expected level of the synergies, the target has little information on the misvaluation, however. This results in the target not being able to optimally assess the synergies, putting them in the position in which they would rationally have to accept any offer which puts the combined firm-value above the stand alone values. Their views are supported by numerous other articles (e.g. Dong, Hirschleifer, Richardson, & Teoh, 2006; Coakley, Fu, & Thomas, 2010; Loveland & Okoeguala, 2016), and supports the notion of market timing, which has been a topic of debate for the past 40 years. Merton (1981) for instance, developed a basic market timing model on when stocks would outperform bonds and vice versa. Another flock of literature concerning M&A and the role of the market on its aggregates, point to the clustering of industry shocks as the main determinant of high levels of aggregate deal volume and value (Gort, 1969; Mitchell & Mulherin, 1996), this is considered the neoclassical theory. In the beginning of this century, Harford (2005) wrote an influencial paper on the matter. He attempts to test which of the theories (behavioral or neoclassical)

best predicts the causes of merger waves in the 1980's and 1990's. Harford's (2005) results provide support for the neoclassical explanation of merger waves, given there is an abundance of capital liquidity in the market, which he connects to the behavioral theory (high valuations relax financing constraints). Table 1 displays all hypotheses found by Harford (2005).

Table 1

Predictions of the neoclassical and behavioural hypotheses for merger waves

	Neoclassical	Behavioral	Finding
Cause of Industry wave	Regulatory or economic shock accompanied by capital liquidity	Overvaluation and dispersion of valuation within industry	Regulatory or economic shock accompanied by capital liquidity
Cause of aggregate wave	Multiple simultaneous industry waves clustering because of macro liquidity factor	Overvaluation and dispersion in the aggregate	Multiple simultaneous industry waves clustering because of macro liquidity factor
Cash partial-firm acquisitions	Increase during wave; could be made by shock bidders	Do not increase during wave; are not made by stock bidders	Increase during waves and are made by stock bidders
Pre-wave returns and market-to-book ratios	High if capital liquidity is tied to asset valuation	High	High
Dispersion in pre-wave returns	No prediction	High	Normal
Post-wave returns	No prediction	Low	Normal
Measures of tight credit	Low if capital liquidity is important	No prediction	Low
Post-merger operating performance	Better than without a merger	Worse in waves	Similar/better in waves

Retrieved from: J. Harford, 2005, Journal of Financial Economics, 77, p. 536. Copyright 2004 by Elsevier B.V.

This research will not focus on the origin of merger waves. However, the results could potentially support either the neoclassical or behavioral side of this argument, adding to the extensive literature on this topic. Next to that, this paper borrows certain assumptions, proxies and controls used in the Harford (2005) paper, in order to analyse the effect of uncertainty shocks on the aggregate level on mergers and acquisitions and on the firm-level acquisition decision.

M&A performance. A key difference between the neoclassical and behavioral approach to the origin of merger waves, is the effect mergers have on the post-merger operating performance. On a firm-level, there is a large set of motives to engange in a transaction, of which post-merger operating performance is one. The extensive literature about the post-merger operating performance identifies three main areas of measurement: accounting measures, stock market performance, and qualitative measures. Nevertheless, the results point to little agreement on any of the three levels. Healy, Palepu, and Ruback (1992) find improved operational performance by analysing the increases in operating cash flow returns on assets for the 50 largest acquisitions between 1979 and 1984 in the US. More recently, Hagendorff and Keasey (2009) find that the cost-cutting strategy, employed by European banks

following mergers and acquisitions, leads to significant performance gains. They analyse this by performing a t-test for differences in means of operating cash flows returns on assets pre- and post-merger. In a research on M&A performance for European banks (much like this one), Altunbas and Marqués (2008) show that operational performance (measured by change in ROE) is positive following both cross-border and domestic acquisitions. They emphasise the significance of their results, which is owed to the scarsity of research on the European market, and stress that most empirical studies focussing on the US find no abnormal stock-market return or efficiency improvements. For instance: Ghosn (2001) finds that researchers tend to overestimate operational performance improvements. He specifically mentions the paper by Healy et al. (1992) as one where post-merger cash flows are overestimated using a regression model. Next to that, the writer highlights that simple comparison models, like the one used by Hagendorff and Keasey (2009), also tend to overestimate changes in operating performance: "The bias would depend on various econometric problems like measurement errors, whether merging firms outperform industry-median firms, and/or whether superior performance arises because of permanent or temporary factors" (Ghosn, 2001, p. 156). Instead, Ghosn (2001) constructs a research design that adjusts the post-acquisition performance for superior pre-acquisition performance, resulting in the dissappearance of increasing in post-acquisition operating cash flow performance. Finally, Martynova, Oosting, and Renneboog (2006) also find no significant long-term profitability synergies, implicating a lack of operating performance improvements.

The second performance measure most often used to analyse the results of mergers and acquisitions is the performance of the stocks of the target and acquiring company upon announcement and in the long-term. In the vast literature concerning M&A performance, short-term announcement returns (CARs) have proved to be positive for targets and negative or close to zero for acquirers, supported by for instance Hackbarth amd Morellec (2008) and Cornett, McNutt and Tehranian (2006). On the other hand, long-term returns (BHARs) are generally found to be negative for the acquirers, these results are supported by Agrawal, Jaffe, and Mandelker (1992) and Aw and Chatterjee (2004) among others. However, according to Abhyankar, Ho, and Zhao (2005), the methodologies used in the aforementioned acticles are flawed. All previously described papers on stock price performance following a merger or acquisition rely on an event study approach. According to the authors, this method is subject to multiple econometric difficulties, for instance: non-normality of abnormal returns, choice of benchmark and cross-sectional correlation over event time. The paper by Abhyankar et al. (2005) uses a stochastic dominance model to investigate "whether an investor with specific preferences prefers a portfolio of acquiring firms relative to an investment in a benchmark portfolio" (2005, p. 683). They find no evidence of stochastic dominance relation between the benchmark portfolios and the merger portfolio indicating no significant underperformance.

The final branch of performance measures for mergers and acquisitions is concerned with qualitative measures. These researches focus on non-financial improvement, including but not limited to: the effect M&A has on employees, innovation/R&D, and the companies' competitive advantage.

James Odeck (2008) for instance, found that merged companies (in the Norwegian transportation sector) are more efficient than companies that had not merged. This lead to the merged companies having a competitive advantage due to economies of scale, whereas non-mergers had to become more technically innovative in order to be competitive. In a scholastic research review, Ghosh and Dutta (2016) analyse a wide variaty of articles concerning the different performance measures following mergers and acquisitions between 2005 and 2015. This research will briefly touch upon the short-term announcement return of the analysed transactions, similar to Hackbarth & Morellec (2008) and Cornett et al. (2006). Next to that, changes in long-term operational performance will also be discussed, in a similar fashion as proposed by Altunbas and Marqués (2008). Performance however, is not the main topic of interest for this research.

Alternative M&A motives. The theories previously elaborated all present motives or deterents for companies to engage in an acquisition, which is an intergral component of examining and explaining the behaviour of European banks during times of uncertainty. Besides performance, there are numerous other broadly documented motives for firms to engage in a merger or acquisition. Among them is risk management, an extension of the neoclassical economic school with regard to merger waves. Garfinkel and Hankins (2011) introduce a risk management perspective to merger waves, general industry merger activity, and firm-specific acquisition decisions. They specifically analyse the effect of vertical integration on merger waves, and find that risk management plays an important role in merger activity. According to studies by Berger (2000), and Kling et al. (2013) cross-border and cross-industry acquisitions are another way of risk management through a transaction, whereas Amihud, DeLong and Saunders (2002) find no significant increase or decrease in either total risk or systematic risk. This paper only briefly touches upon the risk management motive of engaging in mergers and acquisitions. However, this research does implement certain econometric methods proposed by previously discussed papers. Specifically the papers by Harford (2005) and Garfinkel and Hankins (2011) use controls and assumptions which are highly relevant when analysing the effect of policy uncertainty shocks on aggregate M&A parameters and the firm-level acquisition decision.

A final theory tested in this paper, popular among behavioral theorists, looks at CEO hubris as a motive for entering in an M&A process. Goel and Thakor (2010) look at the difference in gains top management makes at the start of a merger wave compared to their compensation package at the end of a merger wave using an empirical study. They find strong empirical evidence that transactions at the start of a merger wave not only perform better, but also yield better compensations for the managers engaging in the transaction. Malmendier and Tate (2008) show that overconfident CEOs overestimate their abilities to create value. Their results prove that overconfident CEOs overestimate their internally generated returns, and have a strong inclination to feel that outside investors undervalue their firm. Hence, they do not find that overconfidence induces merger waves: in order to perform a transaction, external capital may be required. If the CEO believes their company is undervalued by the providers of capital, they will forgo the transaction. Therefore, Malmendier and Tate (2008) conclude overconfident

managers are more likely to engage in M&A given they have ample internal funds. Next to that, they find that an increase in merger frequency decreases the quality of the deals, an implication used in this research as well. Finally, Duchin and Schmidt (2013) found that M&A performance is significantly lower during merger waves because of worse analyst monitoring and weaker governance, leading to agency problems.

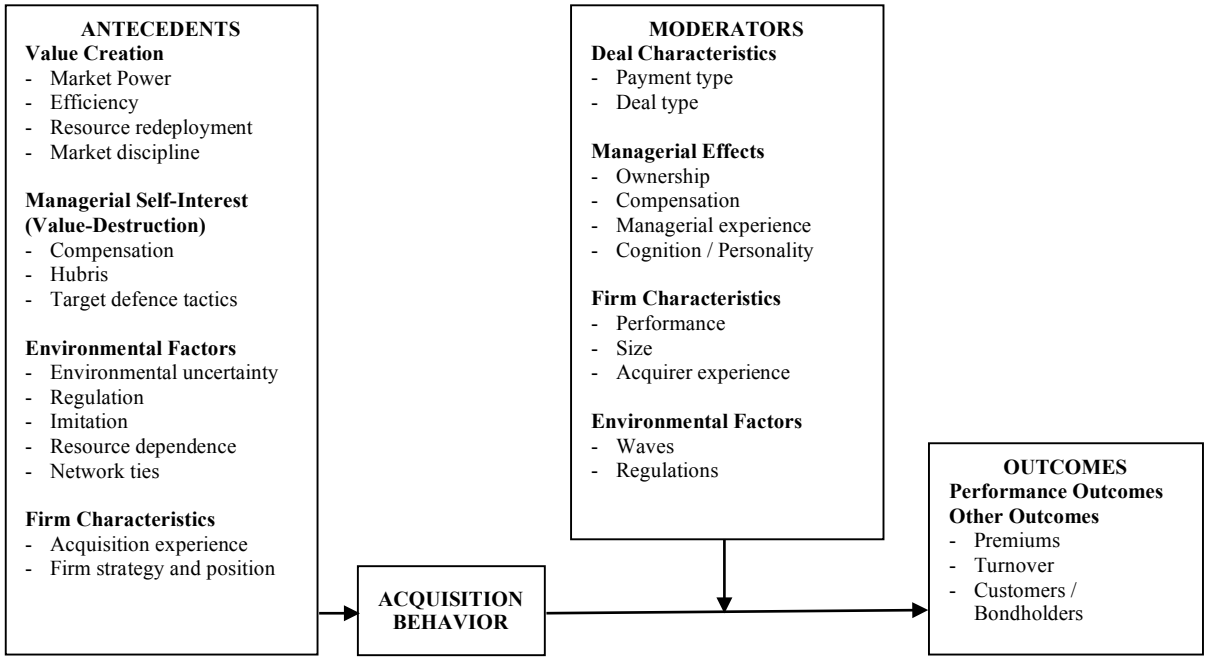


Figure 2. Haleblian Framework. Comprehensive theoretical framework categorizing recent research into three areas: motives for firms to engage in M&A (Antecedents), internal and external factors (on the macro- and firm-level) that influence M&A performance (Moderators), and performance and other outcomes (Outcomes). By J. Haleblian, C. E. Devers, G. McNamara, M. A. Carpenter, R. B. Davison, 2009, Journal of Management, 35, p. 473. Copyright 2009 by Southern Management Association.

Finally, Haleblian et al. (2009) summarized all motives, moderators, and outcomes of mergers and acquisitions in a comprehensive framework displayed in figure 2. This paper contributes, in the spirit of the presented framework, on the antecedents side within the M&A universe. This paper purports that uncertainty surrounding waves in regulation (financial regulation specifically) affects the aggregate levels of mergers and acquisitions value and volume in Europe and seeks foundation to base its conclusions on the firm-level acquisition decision.

Policy uncertainty

Besides its contribution to the literature surrounding the determinants of aggregate levels of mergers and acquisitions, and the determinants of the firm-level acquisition decision, this paper contributes to another growing branch of academic literature. Bernanke (1983) is most likely one of the first academics to link uncertainty to investment fluctuation. However, the topic has gained more attention in financial papers over the past decade, with interest being reignited by Bloom (2009) who found a direct link between uncertainty shocks and aggregate output and employment.

Policy uncertainty and investment activity. The bulk of this research is centred around economic policy uncertainty and investment activity. EPU is best captured by the index created by

Baker, Bloom and Davis (2016) who mention the following in their paper: "our indexes have a market use validation: commercial data providers that include Bloomberg, FRED, Haver, and Reuters carry our indexes to meet demands from banks, hedge funds, corporations, and policy makers" (Baker, Bloom, & Davis, 2016, p. 1595). In further research the authors find that their index is positively correlated with major shocks in (geo-)politics, economy, and large shifts in fiscal policy. Next to that, using firm level data, the writers find that their index is associated with stock price volatility increases, reduced investment, and unemployment in policy sensitive sectors. There are various reasons why policy uncertainty has an effect on investment activity. Bhagwat, Dam & Harford (2016) propose that high levels of uncertainty decreases deal activity through the delay between announcement and completion dates (interim risk). The writers use the VIX[4] as a proxy for interim uncertainty, and find that one SD increase in the VIX is associated with a 6% drop in deal activity in the following month. Next to that, the writers find that the effect of interim risk is larger when uncertainty is higher. Gulen and Ion (2016) use the BBD index to estimate the effect of policy uncertainty on corporate investment, measured by capital expenditure over total assets. Although closely related, this research is interested in the effect of uncertainty on aggregate deal parameters and the firm-level acquisition decision. However, a large set of controls used in the Gulen and Ion (2016) are useful when controlling for non-policy related uncertainty and will be used at a later stage in this paper. Julio and Yook (2012) examine the effect of political uncertainty (mainly due to elections) on corporate investment behaviour. Their hypothesis states that firms delay investment in the face of uncertainty. They find that in the period prior to an election, investment expenditures decline combined with a rise in cash-holdings, suggesting companies are holding on to their cash during times of political uncertainty. Next to that, the authors find that in the period following political uncertainty, the increase in investment is not as pronounced as the decrease before the period of political uncertainty. This suggests that investments are postponed rather than delayed, a theory which will be tested in this paper as well. Another approach to measuring the effect of elections on investment activity was presented by Chen et al. (2018). They used a difference-in-difference model to show that US M&A activity dropped in states with high political uncertainty compared to states with low political uncertainty. However, because the European market (unlike the US) does not have a single legal framework, this method cannot be used to measure the effect of uncertainty on mergers and acquisitions in Europe.

Alternative effects of policy uncertainty. Another field of literature links policy uncertainty to asset prices. Pástor and Veronesi (2012) develop a general equilibrium model relating uncertainty about government policy to falling stock prices. An interesting finding of Páster and Veronesi (2012) is their numerical proof that a fraction of firms cut investment following a policy uncertainty shock, a

[4] Widely used expected volatility index for the US stock market (CBOE, 2020).

result similar to the one found by Julio and Yook (2012). Liu and Zhang (2015) examine whether the predictability of EPU, constructed by Baker, Bloom and Davis (2013), influences stock market volatility using eight different volatility models. They find a significant positive effect of EPU on volatility for all models. Finally, Brogaard and Detzel (2015) link the economic policy uncertainty index constructed by Bloom et al. (2013) to excess market returns, by regressing the EPU index on excess returns. They find that an EPU increase of one SD is associated with a 1.31% decrease in market returns and a 1.53% increase in future (3 month) log excess returns. As mentioned before, the reaction of the stock price of the bidder are taken into consideration in this research, nevertheless corporate investment decisions remain the vocal point of this paper. The latest literature surrounding economic policy uncertainty seeks to forecast upcoming uncertainty. In a recent research, Degiannakis and Filis (2019), present a framework with which policy makers or other users can predict future movements of EPU in Europe adequately. They use a heterogeneous auto regressive model first proposed by Degiannakis and Filis (2017) with global asset market realised volatilities, the European-implied volatility index, and the global EPU index to best capture future movements in the European EPU index. Wang, Zhang, Diao, and Wu (2015) find similar results using commodity prices to predict EPU. Predicting uncertainty with reasonable accuracy could be a vital tool for companies, as they can adjust their strategies concerning uncertainty and its previously discussed implications in advance.

Implications. This paper seeks to follow the approaches proposed by Gulen and Ion (2016), Bhagwat et al. (2016), and most importantly Bonaime, Gulen and Ion (2018) closely in order to find an answer to the research question. The latter seeks to find the relation between policy uncertainty and M&A activity. They use shocks in the BBD index to estimate impulse response functions of M&A activity given a set of macroeconomic controls. Next to that, they attempt to isolate the effect policy uncertainty has on the firm-level acquisition decision, by modelling the likelihood of engaging in an acquisition as the function of policy uncertainty in the previous year combined with a set of macroeconomic and firm-specific controls. Finally, they seek to uncover the channels through which uncertainty affects M&A decisions on a firm-level, investigating the real options theory, the interim-risk theory, the empire building theory, and finally the risk-management theory. This research will perform similar analyses to uncover the effects of policy uncertainty on the firm-level M&A decision.

Financial regulation policy uncertainty

The final strand of literature this paper contributes to concerns the financial limitations posed by regulators on its subjects. As this is a relatively novel and still evolving topic, little research can be found that addresses the actual effects of financial regulation on corporations and banks, especially when looking at their merger activity and performance. The most notable research was done by Nodari (2014), who used shocks in the US FRPU index constructed by Baker, Bloom and Davis (2013) to assess the effects of FRPU on economic indicators. Similar to this research, they perform a VAR model in order to find significant effects of FRPU on five variables: industrial production, prices, unemployment, federal funds rate, and the Baa-Aaa corporate bond spread. The author finds a shock in

FRPU induces a drop in production levels, prolonged dis-inflation, an increase in unemployment, a federal funds rate decrease (in line with a monetary policy easing), and higher cost of external financing (documented by the corporate bond spread). Killins, Johnk and Egly (2019) attempt to quantify the impact of FRPU on bank profits and risks. They use a dynamic panel regression approach the assess the effects on financial regulation policy uncertainty on widely used banking risk and profitability metrics like ROE and ROA and their risk adjusted equivalents. Their results indicate that FRPU has a negative effect on profits for small and large banks. Next to that, they find a positive relation between FRPU and risk in small and medium-sized banks. Finally, Mahoney (2019) links FRPU to lending activity, finding a 7.7% fall in loan growth for a shock in FRPU of one SD. These results describe the impact of FRPU on macroeconomic level and on the firm-level, influencing volatility, returns and the cost of external financing, all of which could have an impact on investment.

Contribution to existing literature

In this section, the current state of the literature about the determinants of M&A activity, policy uncertainty, and financial regulation policy uncertainty is analysed. This research will contribute to each of these topics. Firstly, the results attempt to provide evidence to support the neoclassical hypothesis for merger waves, since the tests will determine the effect of shocks in policy uncertainty determine the aggregate levels of M&A activity. Next to that, the analysis will provide evidence of the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision. Secondly, this research adds to the literature surrounding the effect of policy uncertainty, which has been a popular topic among academics ever since the Great Recession. Additional tests provide evidence on the channels policy uncertainty operates through on the firm level. Thirdly, this paper adds to the novel and mostly ignored topic of financial regulation policy uncertainty and its effects by extracting FRPU from the European BBD index. Finally, this research attempts to perform its analysis the European market for banks, a sector and geography regularly overlooked by researchers, due to the influences of Fama and French who mention the following on the topic: “We exclude financial firms because the high leverage that is normal for these firms probably does not have the same meaning as for nonfinancial firms, where high leverage more likely indicates distress.” (Fama & French, 1992, p. 429)

Hypothesis development

This section seeks to link the previously analysed academic literature to the research question specified in the introduction by defining a set of testable hypotheses. Each hypothesis is linked to its own branch of literature and combined will provide an answer to the research question. The first set of hypotheses is focused on the effect of policy uncertainty on the aggregate M&A volumes and values in Europe. Following the neoclassical theory for fluctuation in merger activity, discussed by for instance Harford (2005), shocks in uncertainty should negatively influence the aggregate amount of deals and the aggregate value of those deals. Hence, the two hypotheses which will be tested will predict the following:

Hypothesis 1.1: A policy uncertainty shock causes a negative shock of aggregate deal value in Europe

Hypothesis 1.2: A policy uncertainty shock causes a negative shock of the aggregate number of deals in Europe

Related to that, this paper focusses on the effect of both policy uncertainty and financial regulation policy uncertainty on mergers and acquisitions in the European banking sector. Following the same theoretical background, there is no reason to suspect European banks would behave any different compared to the cross-section aggregate. The following set of hypotheses predict the effect of policy uncertainty and financial regulation policy uncertainty on the European banking industries M&A parameters:

Hypothesis 2.1: A policy uncertainty shock causes a negative shock of aggregate deal value for European banks

Hypothesis 2.2: A policy uncertainty shock causes a negative shock of the aggregate number of deals for European banks

Hypothesis 2.3: A financial regulation policy uncertainty shock causes a negative shock of aggregate deal value for European banks

Hypothesis 2.4: A financial regulation policy uncertainty shock causes a negative shock of the aggregate number of deals for European banks

Following the approaches of Bhagwat et al. (2016) and Bonaime et al. (2018), the next section seeks to identify the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision for banks. Guided by the firm-specific effects of both EPU and FRPU found by the papers presented in the previous section, the following hypotheses are formulated:

Hypothesis 3.1: An increase in policy uncertainty decreases the chance of engaging in an acquisition for European banks

Hypothesis 3.2: An increase in financial regulation policy uncertainty decreases the chance of engaging in an acquisition for European banks

Hypothesis 3.3: Elevated policy uncertainty decreases the chance of engaging in an acquisition for European banks

Hypothesis 3.4: Elevated financial regulation policy uncertainty decreases the chance of engaging in an acquisition for European banks

According to the research done by Degiannakis and Filis (2019) managers potentially have tools available to predict upcoming uncertainty. Assuming a rational manager would use all tools available to their advantage, the next part of the paper focusses on the actions of firms prior to times of uncertainty. In order to examine this, the following hypotheses are tested:

Hypothesis 4.1: European banks with the ability to predict upcoming policy uncertainty have a lower chance of engaging in an acquisition

Hypothesis 4.2: European banks with the ability to predict upcoming financial regulation policy uncertainty have a lower chance of engaging in an acquisition

Following the findings of Julio and Yook (2012), the next tests focus on whether banks delay or forego their acquisitions following heightened uncertainty. Julio and Yook found that firms tend to postpone their investments rather than to pick them back up after uncertain times. Hence the following hypotheses are tested in this research:

Hypothesis 5.1: An increase in policy uncertainty causes European banks to postpone planned acquisitions

Hypothesis 5.2: An increase in financial regulation policy uncertainty causes European banks to postpone planned acquisitions

In order to explore the implications made by Bonaime et al. (2018) and Duchin et al. (2013), whether CEO's use uncertain times to enter into value destroying transactions, the effects of uncertainty on short-term and long-term performance are tested. On the other hand, the empirical evidence found by Nodari (2014) showed that higher uncertainty leads to higher costs of external financing. Malmendier and Tate (2008) showed that overconfident managers only engage in value-destroying transactions when having access to ample financing opportunities. The tests in this research will attempt to find out whether mergers and acquisitions performed during times of uncertainty create or destroy value, leading to the following set of hypotheses:

Hypothesis 6.1: Acquisitions completed during times of high policy uncertainty destroy value compared to acquisitions completed during times of little policy uncertainty

Hypothesis 6.2: Acquisitions completed during times of high financial regulation policy uncertainty destroy value compared to acquisitions completed during times of little financial regulation policy uncertainty

Following the different risk-shifting theories by Killins, Johnk and Egly (2019), Berger (2000), and Kling et al. (2013), this research attempts to find out whether European banks use mergers and acquisitions as a tool to manage their riskiness following times of uncertainty. In order to do so, the following hypotheses are tested:

Hypothesis 7.1: High policy uncertainty causes banks to be more likely to engage in a cross-border acquisition

Hypothesis 7.2: High financial regulation policy uncertainty causes banks to be more likely to engage in a cross-border acquisition

Hypothesis 7.3: High policy uncertainty causes banks to be more likely to engage in a cross-industry acquisition

Hypothesis 7.4: High financial regulation policy uncertainty causes banks to be more likely to engage in a cross-industry acquisition

In their paper, Bhagwat, Dam & Harford (2016) showed that the high levels of uncertainty decreases deal activity through the delay between announcement and completion dates using the VIX index. In order to test whether the BBD index and the FRPU index have a similar effect on the firm-level acquisition decision, the following hypotheses are tested:

Hypothesis 8.1: High policy uncertainty increases the time between announcement and completion for acquisitions by European banks

Hypothesis 8.2: High financial regulation policy uncertainty increases the time between announcement and completion for acquisitions by European banks

Data description

This section covers the data gathering process and contains more detailed information on all variables used in order to perform the empirical analyses. First, the proxy for policy uncertainty is described, after which the process of creating an European FRPU index is described in more detail. To conclude, the different M&A datasets are described in more detail.

Policy uncertainty

As previously mentioned, this paper makes extensive use of the index introduced by Baker et al. (2016) which is based on newspaper articles regarding policy uncertainty in order to measure European policy-related economic uncertainty. They gather newspaper articles containing the terms "uncertain"," uncertainty"," economic"," economy", and one or more policy related terms, scaled by a measure of the number of articles in the same newspaper and month. In order to construct the European index, Baker et al. (2016) used articles from Le Monde and Le Figaro (France), Handelsblatt and Frankfurter Allgemeine Zeitung (Germany), Corriere Della Sera and La Republica (Italy), El Mundo and El Pais (Spain) and finally The Times London and the Financial Times (UK). In table 2, summary statistics of the index are presented. Next to the European index, the table contains summary statistics and correlations of the uncertainty index created for the United States and the uncertainty index covering the entire world. The two additional indices are constructed in a similar manner as the European index. The US index is constructed as a weighted average of three components. The first is a news-based component which counts articles surrounding economic uncertainty in the ten largest US newspapers. The second component measures uncertainty surrounding taxes using reports by the congressional budget office. The final component measures economic forecaster disagreement using the federal reserve bank of Philadelphia's survey of professional forecasters. The Global BBD index ia a GDP-weighted average of national EPU indices for 20 countries.[5]

The results in table 2 clearly indicate the European and global BBD indices are much more correlated compared to either of them with the index created for the US. This can be explained by the fact that the US policy uncertainty index also includes a tax and government spending component not found in either of the two other indices. It could also be explained by the fact that both the European and global index are comprised of the uncertainty indices of dozens of countries, whereas the US index is only applicable to one country. Figure 3 displays the European BBD index, US BBD index, and the global index over time. Clear jumps in all three indices are observed during large macroeconomic events. Next to that, it seems that compared to the US the European and global indices are overall more elevated ever since the Great Recession of 2007-2008.

[5] Australia, Brazil, Canada, Chile, China, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the UK, and the US.

Table 2

BBD indices

Panel A: Summary statistics	N	Mean	SD	Min	Max
European BBD index	192	156.42	67.98	47.69	433.28
US BBD index	192	75.80	47.51	17.62	300.75
Global BBD index	192	120.63	50.19	50.76	311.80

Panel B: Correlations	European BBD Index	US BBD index
US BBD index	0.256***	
	(0.000)	
Global BBD index	0.905***	0.282***
	(0.000)	(0.000)

Note. the Baker et al. *(2016)* policy uncertainty index for Europe, the US policy uncertainty index, and the global index during the sample period (2003 - 2018). Panel A presents summary statistics. Panel B presents correlation coefficients, associated p-values are displayed in parentheses. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

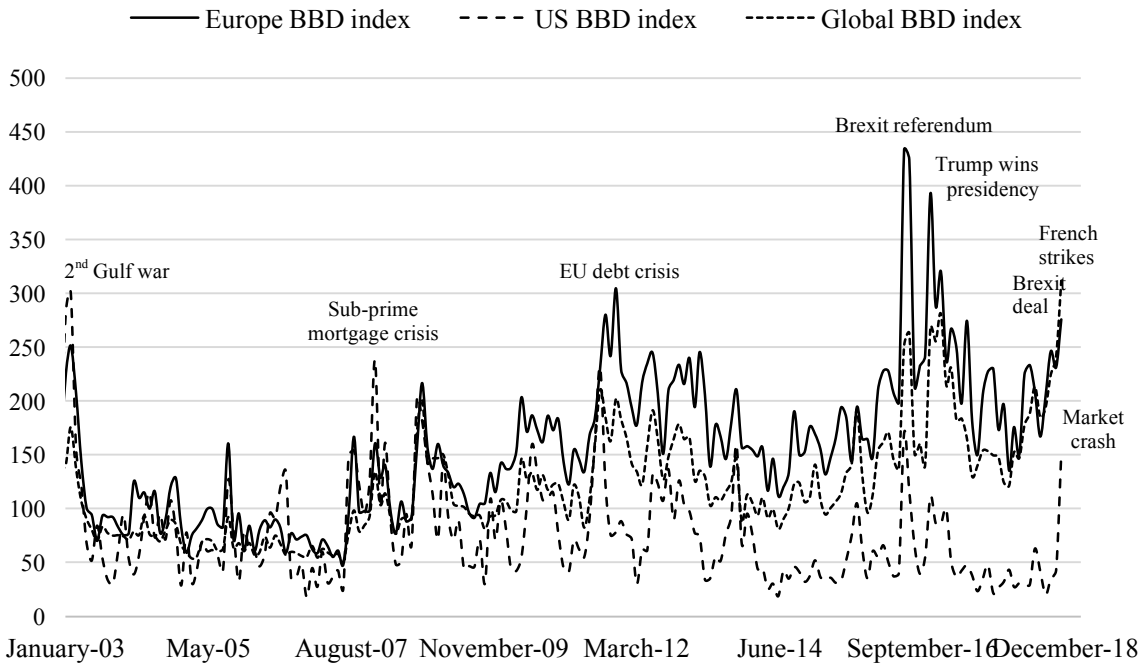


Figure 3. Policy uncertainty indices. This figure plots the three described policy uncertainty indices together over the period 2003 – 2018. Clear jumps in the indices can be observed around the major global events indicated in the figure.

Financial regulation policy uncertainty

In order to isolate Financial Regulation Policy Uncertainty, the European BBD index needs to be adjusted for all non-FRPU components it covers. To do this, the BBD index is used as a dependent variable in a regression containing all non-FRPU controls as independent variables. The residuals are assumed to be non-correlated with the sources of uncertainty controlled for and therefore a close approximation to what is left of the overall index: financial regulation policy uncertainty. The Bonaime et al. (2018) paper finds that the overall index is actually comprised of several distinct types of policy uncertainty, all with their own effect on the BBD index. Specifically, the authors find the following significant contributors to the broad index: fiscal policy, taxes, government spending, monetary policy and financial regulation. In order to construct a suitable FRPU index for Europe, the European policy uncertainty index would need control variables for the other relevant policy uncertainties. In pursuance of controling for fiscal policy, comprised of taxes and government spending, the overall index is adjusted for volatility of both government expenditures and government revenues (taxes), both being a proxy of uncertainty surrounding their underlying parameter. The European Commission posts annual aggregate data on taxes and government expenditures, which can be used to construct the controls for the effect of tax uncertainty, government spending uncertainty and therefore fiscal policy uncertainty in Europe (Eurostat, 2019). The volatilities are calculated using the rolling three-year variance of both variables. Consequently, these controls also cover for uncertainty surrounding government spending and taxation. The final control for the relevant policy uncertainties found in the Bonaime et al. (2018) paper (monetary policy) is the volatility of the general Monetary Conditions Index (MCI), as constructed by the European Commission. The index is calculated from a linear combination of the short-run interest rate and the exchange rate. As a rule, the weights reflect the relative effects of the respective MCI component on aggregate demand (European Commission, 2019). In order to isolate financial regulation policy uncertainty, the index is adjusted for several other potential sources of uncertainty not related to financial regulation. With regard to controlling for uncertainty surrounding trading, the WTUI is introduced. The WTUI is constructed by Ahir et al. (The World Uncertainty Index, 2018), and measures trade uncertainty around the globe. In the spirit of the papers by Bhagwat et al. (2016), Garfinkel (2011), and Bonaime et al. (2018), the European BBD index is adjusted for volatility (VSTOXX), general economic conditions (MSCI index return), market liquidity (high yield spread index), and the CAPE (Shiller's P/E) to control for overvaluation. What remains is the movement in financial regulation policy uncertainty. For practical purposes, as it's not possible to calculate the natural logarithm of a negative value, the index is adjusted to be all positive with a mean of 100, making the interpretation index-like. Summary statistics of the newly constructed FRPU index, which should capture financial regulatory uncertainty, and its US equivalent (based on newspaper articles surrounding FRPU), compared to the non-adjusted European BBD index, the US BBD index, and the global BBD index are displayed below in table 3.

Table 3

BBD and FRPU indices

Panel A: Summary statistics	N	Mean	SD	Min	Max
European BBD index	192	156.4	67.98	47.69	433.3
US BBD index	192	75.80	47.51	17.62	300.7
Global BBD index	192	120.6	50.19	50.76	311.8
FRPU index	192	100.0	43.73	11.80	323.8
US FRPU index	192	121.5	127.29	0	877.5

Panel B: Correlations	European BBD Index	US BBD index	Global BBD index	FRPU index
US BBD index	0.256***			
	(0.000)			
Global BBD index	0.905***	0.282***		
	(0.000)	(0.000)		
FRPU index	0.643***	0.300***	0.515***	
	(0.000)	(0.000)	(0.000)	
US FRPU index,	0.220***	0.500***	0.273***	0.099
	(0.002)	(0.000)	(0.000)	(0.171)

Note. The BBD *(Baker, Bloom, & Davis, 2016)* policy uncertainty index for Europe, the U.S, the Global BBD index, and the newly constructed FRPU indices. Panel A presents summary statistics, Panel B displays a correlation matrix and associated p-values (in parentheses). *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Merger and acquisition data

For European aggregate activity and deal value, data was extracted from Thomson Reuters. The sample of announced deals spans from the 1st of January 2003 until the 31st of December 2018, and only includes data from publicly traded acquirers. The time window represents the first full year of the MU until the last available full year at the moment of writing. Next to that, the acquirer owned less than 50% of the targets shares prior to the merger or acquisition, and obtains a majority stake through the deal. Naturally, only completed deals are included in the sample. Summary statistics about the initial aggregate sample of deals are displayed in panel A in table 4 (top panel). In order to make predictions and conclusions for the banking industry more specifically, any institution with an SIC code between 6012 – 6221 is qualified as a "European bank", which are obliged to comply with the regulatory framework expounded in the introduction. Changes in financial regulation are assumed to be the main source of financial regulatory uncertainty. Summary statistics about the deals involving European banks as an acquirer are displayed in table 4 panel B (middle panel). Finally, panel C (the bottom panel) displays the deals used in the firm-level acquisition decision analyses. These final deals are merged with company-specific data extracted from DataStream.

Table 4

Merger and acquisition summary statistics

Panel A: Full sample	Number of deals	Average monthly deal value (EURm)	Average deal size (EURm)	Median deal size (EURm)
All deals	32,793	19,305	113	0
Deals known value	16,712	19,305	222	16

Panel B: Banking sample	Number of deals	Average monthly deal value (EURm)	Average deal size (EURm)	Median deal size (EURm)
All deals	1445	1,767	235	0.01
Deals known value	723	1,767	469	68.5

Panel C: Banking sample including firm-specific data	Number of deals	Average yearly deal value (EURm)	Average deal size (EURm)	Median deal size (EURm)
All deals	527	14,026	427	2.1
Deals known value	270	14,026	831	92.2

Note. Merger and acquisition summary statistics of the full sample of deals made by European public companies between 2003 and 2018 (top panel) and the sample of deals made by publicly traded European banks between 2003 and 2018 (middle panel). The bottom panel displays the subset of deals merged with DataStream company specific data. In order to be included in the "known value" samples, the Thomson Reuters database must have a reported deal value (in euros) of the specific deal. Finally, through the deal, the acquirer must obtain a previously absent majority share (>51% of the shares) in the target company.

In figure 4, the European aggregate deal volume (top panel) and value (bottom panel) are plotted against the overall European policy uncertainty index. Especially the plot in the top panel suggests a negative relationship between policy uncertainty and the aggregate number of deals. Aggregate monthly deal volume has a correlation coefficient of -0.36 with the index, whereas the aggregate monthly deal value has a slightly less pronounced relation with a correlation coefficient of -0.24, the respective p-values are 0.000 and 0.001 and therefore the correlations are highly significant. However, the correlations alone are not enough statistical evidence to base any reliable conclusions on.

Other variables

In order to control for different macro- and firm-level variables, a host of other data sources are used to construct proxies and controls throughout the paper. Ranging from accounting data from DataStream to indices constructed by Bank of America Merrill Lynch (BofAML) or European fiscal and monetary policy proxies. Appendix A provides a detailed description of all variables, their construction and its sources used throughout this research. The next sections describe the different tests performed in order to test the formulated hypotheses. Next to that, all relevant assumptions and proxies used in order to specify the models, estimate the parameters, and statistically infer the results are set out in more detail in the sections to which they apply.

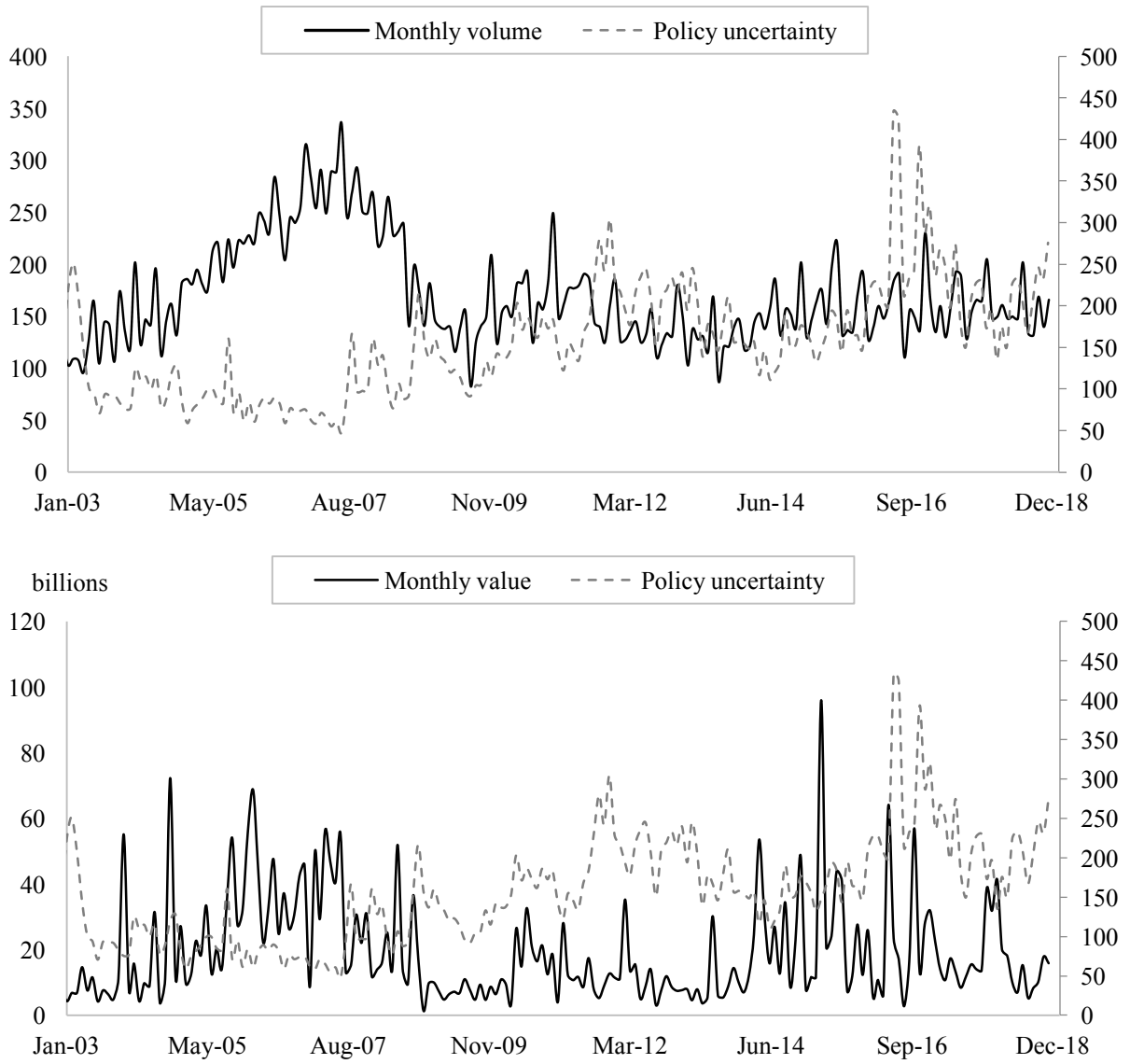


Figure 4. Aggregate monthly deal volume and value. Aggregate monthly deal volume and aggregate monthly deal value of corporate mergers and acquisitions by European public companies. These figures depict actual monthly volumes (top panel) and values (bottom panel) of M&A by European public firms plotted together with the BBD *(Baker, Bloom, & Davis, 2016)* European policy uncertainty index from January 2003 until December 2018. Monthly value (bottom panel), reported in billions (€) and monthly number of deals (top panel) correspond to the left axis, whereas the BBD index corresponds to the right axis in both panels.

Policy uncertainty and aggregate European M&A activity

The first part of this research looks at the aggregate level of mergers and acquisitions in Europe and in the European banking industry. Following Bonaime et al. (2018), Baker et al. (2016), and Gulen et al. (2016), a Vector Auto Regression (VAR, as proposed by Christopher A. Sims (1971)) is estimated using aggregate activity (aggregate parameters), the uncertainty index and a set of controls which will be elaborated in more detail below. Finally, estimated impulse response functions (IRF) should indicate whether European (banking) M&A activity reacts as heavily to uncertainty shocks as in the US.[6] More specifically, these tests are performed in order to accept or reject the first set of hypotheses.

Aggregate European M&A activity

A VAR model fits multiple variables, over the same time-period, on lags of itself and lags of all other dependent variables. The number of lags used is determined by minimizing the Akaike information criterion and the Schwarz information criterion for all tests, resulting in a single lag-VAR model for all tests. These criterions test the quality of the statistical model and are instrumental when determining the number of lags to use in a VAR model. In this case, the specification also includes exogenous variables. Consequently, the VAR model estimates the following equation:

$$Y_t = \alpha + A_1 Y_{t-1} + \beta_0 X_t + e_t \quad (1)$$

In equation (1) Y_t is a vector of endogenous variables containing: (1) either the natural logarithm of monthly aggregate deal value or the natural logarithm of monthly aggregate number of deals in Europe, (2) the natural logarithm of the European BBD uncertainty index, (3) the VSTOXX index, which captures investor sentiment and overall economic uncertainty, (4) the return on the MSCI value-weighted Europe index, capturing general economic conditions, (5) the BofAML Option-Adjusted High Yield Index spread as a proxy for market liquidity, and finally (6) the Shiller PE ratio (Cyclically Adjusted PE ratio, or CAPE).[7] Whereas X_t is a vector of exogenous variables containing a linear time trend variable and an index measuring the availability of internally generated funds (cash reserves) of the acquiring companies, following the paper of Bonaime et al. (2018). The cash holdings are extracted from Compustat and winsorised in order to deal with extreme outliers. Finally, α, A_1, and β_0, are vectors of parameters. e_t represents the unobserved error term with a mean of 0 and is thus assumed to be independent of all other variables. The IRFs are estimated using the following order of the dependent variables: policy uncertainty, VSTOXX, the CAPE, the MSCI index, the rate spread index, and finally

[6] Bonaime et al. (2018, pp. 538 - 539) find that a 1% increase in uncertainty is associated with an estimated 0.57% decrease in aggregate deal value and a 0.34% decrease in the number of deals.

[7] Appendix A includes a more detailed list of all variables used in this paper, including the once described here.

merger activity[8]. Following the results found by Bonaime et al. (2018), who found a shock in policy uncertainty has a negative effect on both aggregate deal value and deal volume in the US, hypotheses 1.1 and 1.2 predict similar results for the European aggregates. In figure 5 and 6, the estimated IRFs are depicted. The IRF in figure 5 shows that a shock in policy uncertainty has a statistically significant effect on the aggregate deal value, where a slight drop in value around periods 1 and 2 can be observed. More specifically, a 1% increase in policy uncertainty decreases the aggregate deal value in the next quarter by an estimated 0.19%. Given that the SD of the BBD index is equal to 67.98 (a 43.46% deviation from its mean), a one SD increase in the European BBD index decreases the aggregate deal value in the next quarter by approximately 8.25%, making this effect economically highly significant. Next to that, in figure 6, a statistically significant drop in the aggregate number of deals can be observed in months 3, 4, and 5 following a shock in overall policy uncertainty. More specifically, a 1% increase in policy uncertainty decreases the aggregate number of deals by approximately 0.05%. Similar to the aggregate value of deals, a one SD increase in the BBD index decreases the aggregate number of deals by approximately 2.17% in the months 3, 4, and 5 following the policy uncertainty shock. These results lead to the acceptance of hypotheses 1.1 and 1.2, which predicted a decline in aggregate deal volumes and values following a policy uncertainty shock.

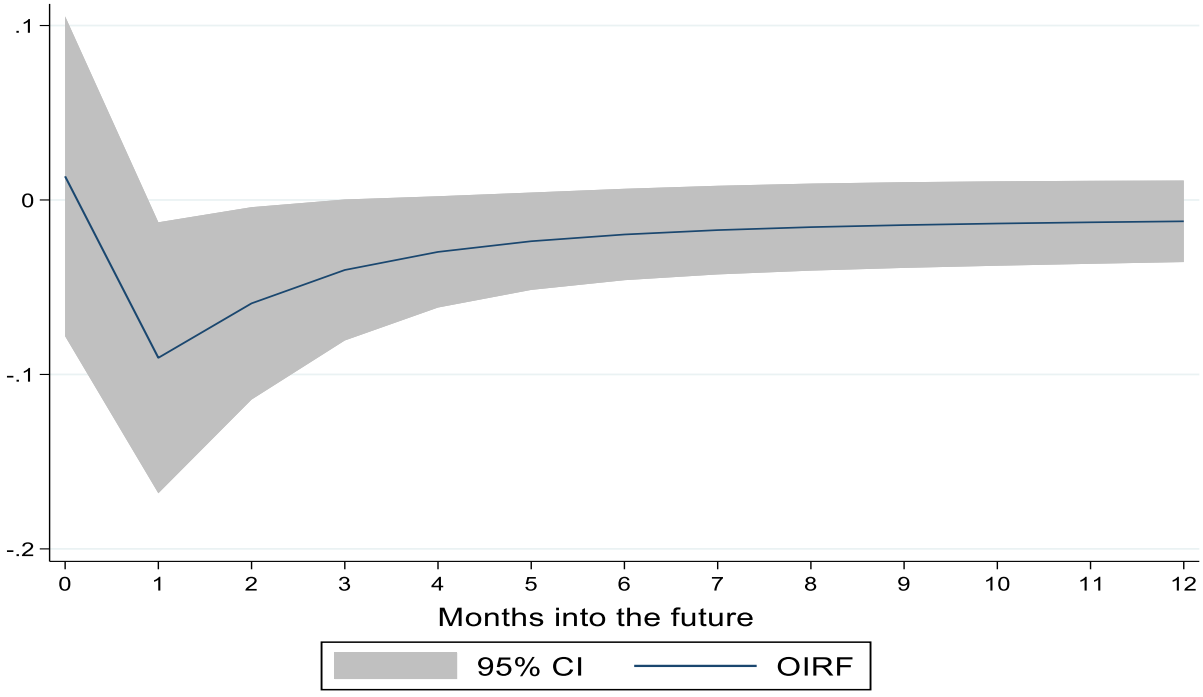


Figure 5. IRF of aggregate deal value to a policy uncertainty shock. Impulse response functions of the aggregate deal value reacting to a shock in the BBD index. The IRF is ordered as follows: natural logarithm of policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm of total deal value. The grey area marks the 95% confidence interval.

[8] Orthogonalised IRFs can be sensitive to the ordering of the variables. Unreported results verified that the IRFs are robust to every possible order imposed on the endogenous variables.

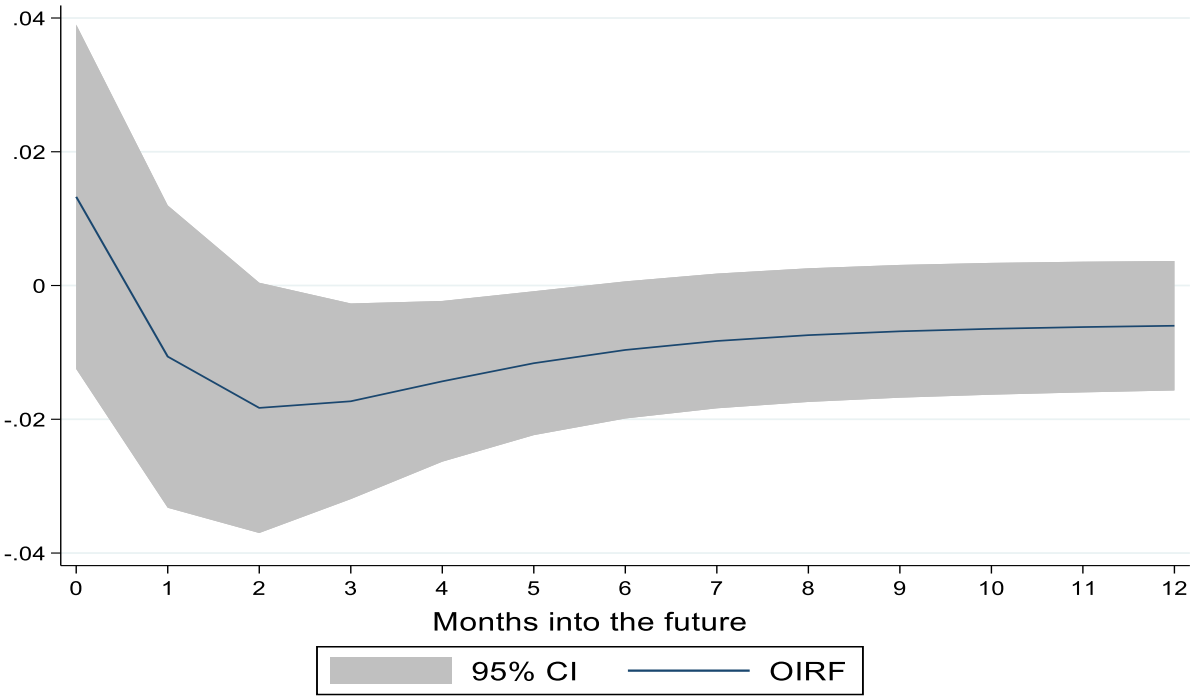


Figure 6. IRF of aggregate deal volume to a policy uncertainty shock. Impulse response functions of the aggregate number of deals reacting to a shock in the BBD index. The IRF is ordered as follows: natural logarithm of policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm of the total number of deals. The grey area marks the 95% confidence interval.

M&A activity within the European banking industry

Adjusting equation (1) by using M&A data from the European banking industry allows for more concrete conclusions about this sector which has seen a large number of regulatory changes in the past ten years. Next to using different M&A data (panel B in table 4), adjusting equation (1) by swapping the BBD index with the newly constructed FRPU index isolates the effect of a shock in FRPU on mergers and acquisitions in the European banking sector. This modification is useful when attempting to isolate the effect of FRPU on the M&A appetite of European banks following times of elevated FRPU. Similar to the previous part of this section, there is no theory predicting banking M&A figures would react any differently on (financial regulation) policy uncertainty compared to the coefficients found for the cross-section of the European market. Hence, the set of hypotheses related to this part of the research (hypothesis 2.1 until hypothesis 2.4) predict a negative relation between an uncertainty shock and M&A volumes and values for European banks. Figures 7 through 10 display the IRFs estimated for the response of aggregate banking mergers and acquisitions values and volumes following a shock in either the financial regulation policy uncertainty index or the overall BBD (2016) uncertainty index.[9]

[9] Similar to the previous section, Unreported results verified that the IRFs are robust to every possible order imposed on the endogenous variables.

Although similar, no significant effect of either uncertainty index on the aggregate banking M&A volumes and values is found, leading to the rejection of hypotheses 2.1 through 2.4. There are multiple reasons to explain the difference in results between the full sample and the banking sample. First of all, it could be that the banks in the sample are less affected by a shock in policy uncertainty or by uncertainty surrounding financial regulation. As mentioned in the data section, only transactions by publicly traded banks are used in this study. A study by Jin, Kanagaretnam, Liu, and Lobo (2019) found that during the financial crisis, banks' discretionary loan loss provisions rose significantly, allowing them to take on risk without losing out on earnings. Besides that, according to a study by Beltratti and Paladino (2013), there are abnormal returns to be made with acquisitions completed during crises. The authors find a positive abnormal return for transactions completed during times of heightened uncertainty. These theories present both a means and a motive for banks to engage in acquisitions during uncertain times. Secondly, it is possible there are simply not enough transactions to find a significant effect. Compared to the 32,793 deals (16,712 deals with known value) analysed in the cross-sectional sample, it is possible there is not enough variation in the 1445 (723) European banking deals to make a statistical difference. Thirdly, due to the segregated European operating environment the banks are in, it is possible that uncertainty levels vary over the different countries, balancing out spikes in M&A activity in one country with drops in another, making the aggregate effect neutral or insignificant. Fourth and finally, it is possible these results are contaminated due to a lack of controls which would make the VAR estimation's parameter space unmanageable.

These results mean very little in terms of economic significance, as it is still possible European banks' acquisition decisions are affected by the BBD or the FRPU indices, but the effect is not large enough to be picked up by banks over the entire continent. In the next section, further analyses on the firm-level M&A decision will perhaps give a clearer perspective on the reasons banks postpone or push forward M&A decisions during and following times of (financial regulation) policy uncertainty.

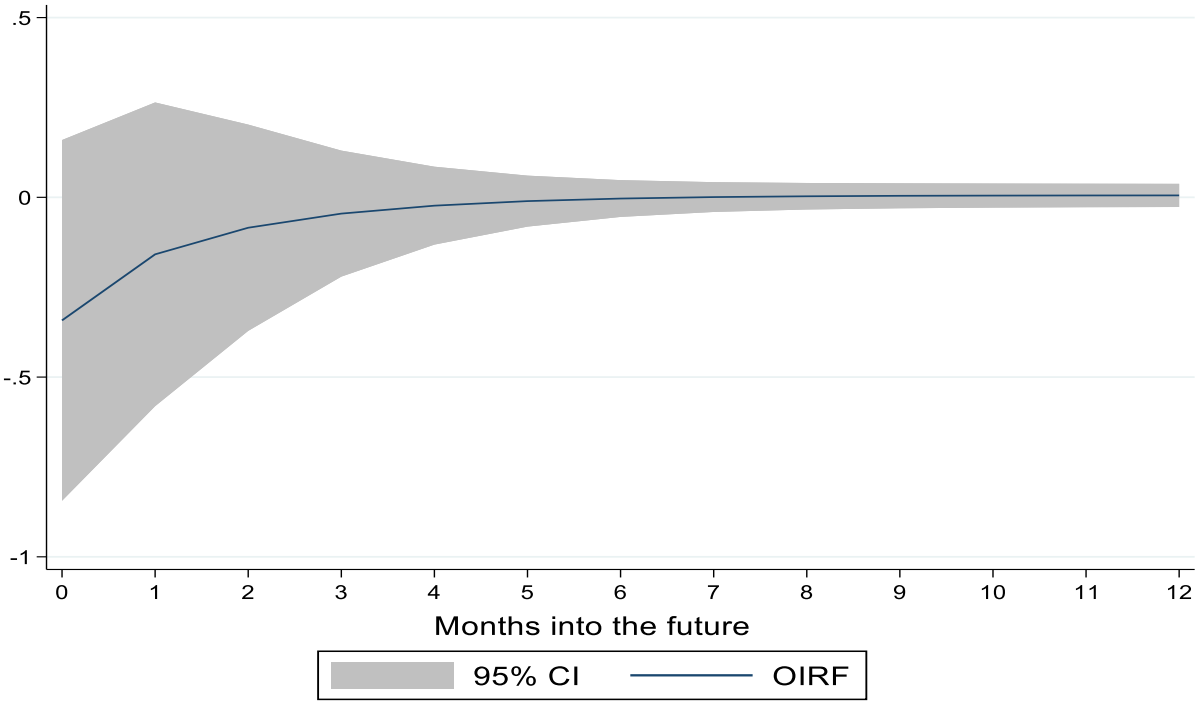


Figure 5. IRF of aggregate deal value for banks reacting to a shock in the FRPU index. The IRF is ordered as follows: natural logarithm of financial regulation policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm of the total deal value. The grey area marks the 95% confidence interval.

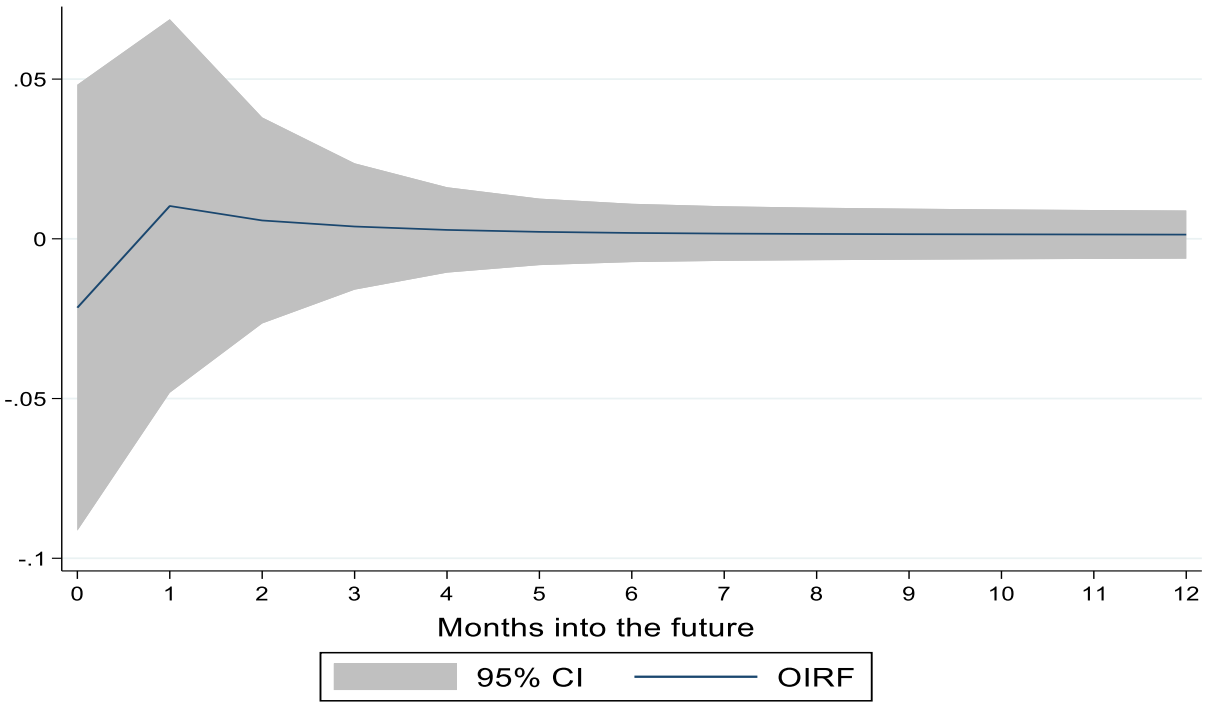


Figure 8. IRF of aggregate number of deals by banks reacting to a shock in the FRPU index. The IRF is ordered as follows: the natural logarithm of financial regulation policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm if the aggregate number of deals by banks. The grey area marks the 95% confidence interval.

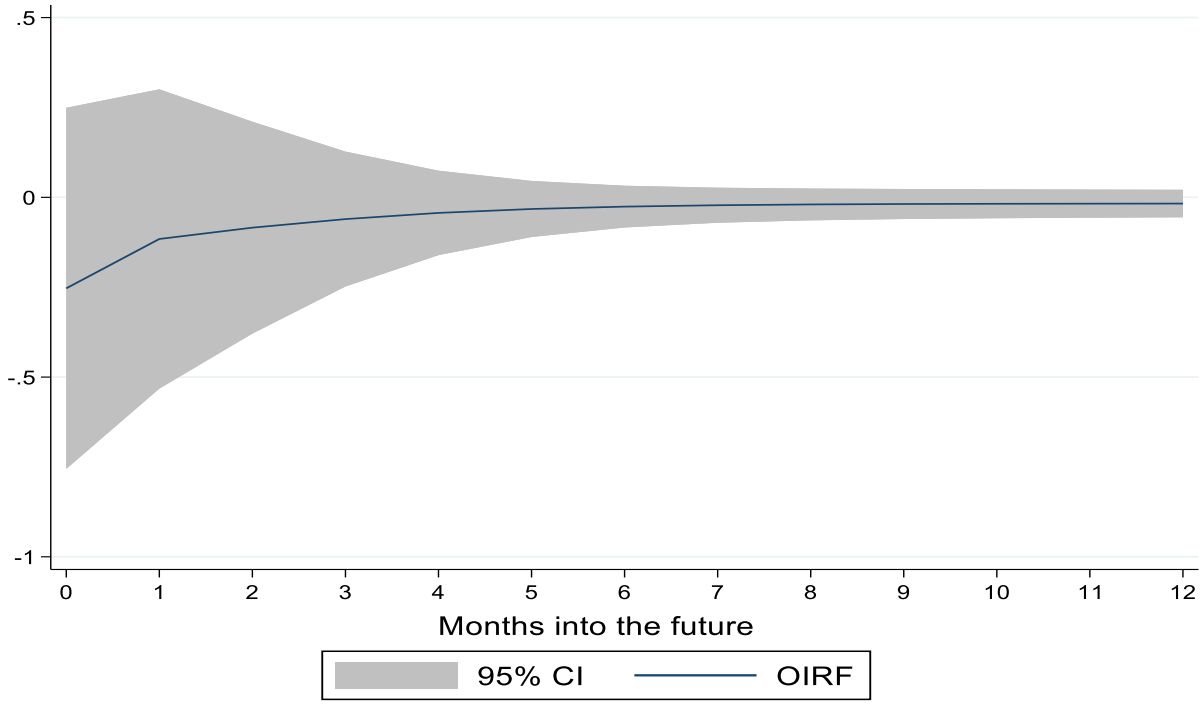


Figure 9. IRF of aggregate deal value for banks reacting to a shock in the BBD index. The IRF is ordered as follows: natural logarithm of policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm of the total deal value. The grey area marks the 95% confidence interval.

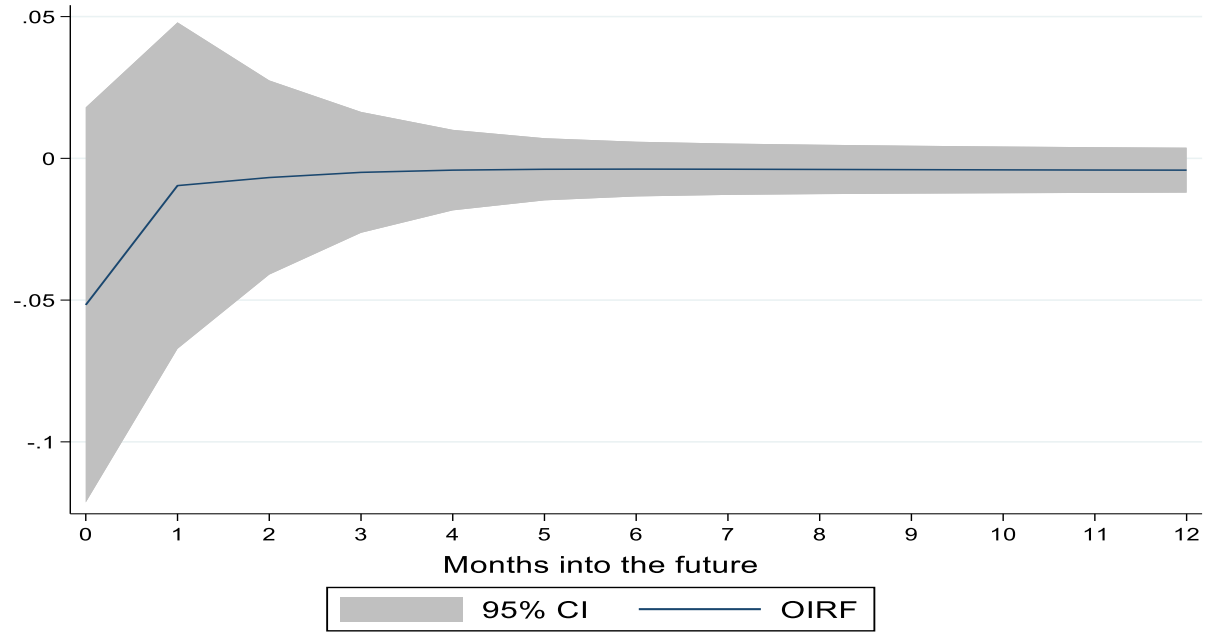


Figure 10. IRF of aggregate number of deals by banks reacting to a shock in the BBD index. The IRF is ordered as follows: the natural logarithm of policy uncertainty, VSTOXX index, CAPE ratio, the MSCI index, the rate spread index, and finally the natural logarithm if the aggregate number of deals by banks. The grey area marks the 95% confidence interval.

Firm-level acquisition decision

This part of the research looks at the firm-level decisions to engage in mergers and acquisitions for European banks and the role of policy uncertainty on those decisions. Given a set of macroeconomic and firm-specific control variables elaborated on below, this paper seeks to analyse the effect of policy uncertainty, measured by the BBD (2016) index, and financial regulation policy uncertainty on individual investment decisions of European banks. Similar to the approaches of Harford (2005), Bhagwat et al. (2016), and especially Bonaime et al. (2018), this research models the firm-level likelihood of being an acquirer in a certain calendar year as the function on the average policy uncertainty in the year before that, while controlling for a variety of other lagged firm-level and macro-level variables. Bhagwat et al. (2016) looked at the effect of macroeconomic and firm-level volatility on the chance of becoming a takeover target. Harford (2005) on the other hand, looked whether firms whom engage in mergers are also buyers in partial-firm transactions, using a logit model given a set of dependent variables and a variety of macroeconomic and firm-level controls. Finally, Bonaime et al. (2018) perform a study similar to the one performed in this section. They run a logistic regression of the acquisition likelihood on the BBD index for a given firm using a set of macroeconomic and firm-level controls. They find a significant negative relation between the US BBD index and acquisition likelihood in the following year. Hence, the hypotheses (3.1 & 3.2) concerning this part of the research predict something similar. Following the approach of Bonaime et al. (2018), this research controls for four economic indicators in order to best eradicate the possibility of an omitted variable bias. Without these controls, the results could simply measure the effect of another factor previously elaborated on in the related literature section. The four indicators being: investment opportunities, capital availability, valuations, and other forms of uncertainty unrelated to (financial regulation) policy. These four determinants of M&A decisions are broken down in more detail below. Next to that, this section estimated the effect of times of above median policy uncertainty compared to times of below median uncertainty and their effect on the firm-level acquisition decision of European banks, in order to test hypotheses 3.3 and 3.4. The tests for hypotheses 4.1 and 4.2 seek to find the effect of the ability to forecast uncertainty on the acquisitiveness of European banks, following the theory presented by Degiannakis and Filis (2019). The hypotheses predict a drop in M&A appetite in the period coming up to elevated (financial regulation) policy uncertainty. Finally, the last part of this section investigates the long-term relation between policy uncertainty and M&A activity in order to establish whether European banks postpone or delay their investments following times of uncertainty. The results by Julio and Yook (2016) suggest firms tend to hold on to their cash during politically uncertain times (coming up to an election). The increase in investment following times of heightened uncertainty however is not as pronounced as the decrease prior to the event causing uncertainty, indicating firms postpone rather than delay their investments. These results lead to hypotheses 5.1 and 5.2 on that exact topic, predicting similar results for the European banking sector given times of (financial regulation) policy uncertainty.

Acquisition likelihood

Before deciding on how to test the firm-level acquisition likelihood, a Hausman test (1987) was performed in order to test the difference in consistency of the estimated (less efficient) fixed effects model and the estimated random effects model. The test failed to reject the notion that the fixed effects estimators and the random effects estimators are statistically significantly different, meaning it is better to use the more efficient random effect estimator to find the effect of (financial regulation) policy uncertainty on acquisition likelihood. Hence, following the paper by Bonaime et al. (2018), the likelihood of being an acquirer is estimated using the following logistic regression:

$$Y_{it} = \alpha + \beta_1 UNCERTAINTY_{t-1} + A_1 C_{1t-1} + A_2 C_{2it-1} + \tau_t + \tau_i + e_{it} \quad (2)$$

With Y_{it} being the binary likelihood of being an acquirer in a given calendar year, where it takes on a one if firm i announced an acquisition in year t and a 0 otherwise. $UNCERTAINTY_{t-1}$ is the mean level of policy uncertainty (or financial regulation policy uncertainty) in the prior calendar year. C_{1t-1} is a vector of lagged economic indicators which reduce the chances of encountering an omitted variable bias. Following the papers by Gulen and Ion (2016) and Bonaime et al. (2018), the first economic indicator which could potentially affect acquisition likelihood is poor investment opportunities. In his paper, Bloom (2014) finds that uncertainty acts countercyclical, meaning poor economic conditions and bad investment opportunities coincide with high policy uncertainty. In order to find the effect of policy uncertainty on the firm-level acquisition decision, controlling for these factors is insurmountable. The investment opportunities factor is comprised of consumer confidence, a leading economic indicator predicting GDP, and inflationary pressure. These variables are reduced to their first principal component in order to avoid any multicollinearity issues. As mentioned in the related literature section, Harford (2005) found that capital liquidity has a significant effect on the relation between economic shocks and M&A activity. Hence, following Bonaime et al. (2018), an economic shock indicator is added to control for the effect of economic shocks on the firm-level decision to engage in an M&A trajectory. The economic shock indicator is constructed by taking the first principal component of the median annual change of five bank-specific economic shock variables: dividends per share, EPS, net interest income, net margin, and ROE. In order to control for the market-wide liquidity, the BofAML Option-Adjusted High Yield Index spread is introduced. In his paper, Harford (2005) explains how both the neoclassical and the behavioural theory on fluctuations in M&A activity find a correlation with heightened valuations. Therefore, a control for the relative height of stock market valuation needs to be introduced in order to correctly find the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision for European banks. Following Bonaime et al. (2018) and Bhagwat et al. (2016), Robert Shiller's CAPE ratio is included in order to control for market-wide overvaluation. Next to that, following Harford (2005) and Garfinkel et al. (2011) values for the industry-median value of Tobin's Q and industry-median past returns are added in order to control for industry specific overvaluation. Finally, in order to control for market-timing, which is a possible reason for fluctuations

in M&A activity following Rhodes-Kropf et al. (2005), the industry-median past returns volatility (SD) is calculated and included. The final macroeconomic control is the first principal component of a variety of other uncertainty measures. Since this paper seeks to filter out the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision, controls for other potential sources of uncertainty, which could affect the acquisition likelihood need to be included.[10] The vector C_{2it-1} contains certain lagged firm-level controls, consisting of: the natural logarithm of total assets, debt/equity, cash/deposits, earnings per share, market-to-book ratio, return on equity (ROE), dividend yield, Tier 1 capital (%), past stock returns, and past stock volatility. All firm-level controls are measured in the fiscal year ending in the previous year, all macroeconomic controls are measured in the calendar year $t-1$. Appendix A contains a more specific description of all control variables used in this study. Given the constructed likelihood function, a logistic regression estimates the likelihood of being an acquirer as a function of the average policy uncertainty and FRPU in the previous year, controlling for all firm- and macro-level controls. Additionally, the specification includes a time-trend variable (τ_t) and the SE's are clustered on the firm-level.[11] Finally, α, β_1, A_1, and A_2 are vectors of parameters. e_t represents the unobserved error term with a mean of 0 and is thus assumed to be independent of all other variables.

The results displayed in table 5 differentiate between the overall BBD index and the constructed FRPU index. Next to that, the estimated odds ratios are provided. The estimated coefficients uniformly accept the null-hypotheses, that neither the BBD index nor the FRPU index has any statistically significant effect on firm-level acquisitiveness when solely looking at European banks. Possible reasons for this (lack of) effect can be sought in multiple directions. First of all, due to the segregated regulatory frameworks between countries, measuring (financial regulation) policy uncertainty on the continent level might not capture the "true" level of uncertainty for these firms. Secondly, in line with the BCG report (2019) cited in the introduction of this paper, it might very well be the case that uncertainty is not a determinant for M&A by European banks after all. It is possible these institutions' motives are more connected to other macro- and firm-level variables. Thirdly, it could be the case European banks have not yet made enough acquisitions for any statistically significant results to be found with regard to (financial regulatory) policy uncertainty. Finally, there is a chance that uncertainty doesn't affect banking M&A within one year. This notion explored in following sections by looking at the persistence of the (lack of) effect of uncertainty on the firm-level acquisition decision for European banks.

[10] The macroeconomic uncertainty proxy is constructed by taking the first principal component of the JLN uncertainty index (Jurado, Ludvigson, & Ng, 2015), the VSTOXX implied volatility index, σ of the cross-sections past returns, and the World Uncertainty Index as constructed by Ahir, Bloom, and Furceri (2018).

[11] and are assumed uncorrelated with firm specific random effects τ_i across all time periods.

Table 5

Firm-level acquisition decision

Acquisition likelihood	Logit	Odds ratio	Logit	Odds ratio
Policy uncertainty (BBD)	-0.001	0.999		
	(-0.31)	(-0.31)		
FRPU			-0.004	1.004
			(1.14)	(1.14)
Investment opportunities	0.814*	2.256*	0.636	1.888
	(1.81)	(1.81)	(1.31)	(1.31)
Economic shock indicator	-0.158	0.854	-0.208	0.812
	(-0.72)	(-0.72)	(-0.94)	(-0.94)
High-Yield spread	0.342*	1.408*	0.274	1.315
	(1.77)	(1.77)	(1.34)	(1.34)
Shiller's CAPE ratio	0.003	1.003	0.011	1.011
	(0.03)	(0.03)	(0.10)	(0.10)
Median Tobin's Q	6.079	436.7	5.499	244.5
	(0.54)	(0.54)	(0.49)	(0.49)
Median past returns	0.379	1.461	0.536	1.710
	(0.84)	(0.84)	(1.18)	(1.18)
Median past return volatility	-10.34	3.24e-05	-9.899	0.000
	(-1.51)	(-1.51)	(-1.40)	(-1.40)
Uncertainty	-0.259	0.771	-0.241	0.786
	(-0.77)	(-0.77)	(-0.71)	(-0.71)
Log total assets	0.463***	1.589***	0.463***	1.589***
	(8.47)	(8.47)	(8.46)	(8.46)
ROE	0.0045	1.004	0.004	1.004
	(0.88)	(0.88)	(0.89)	(0.89)
Earnings per share	-0.0001	1.000	-0.000	1.000
	(-1.04)	(-1.04)	(-1.07)	(-1.07)
Leverage	0.0001	1.000	0.000	1.000
	(1.39)	(1.39)	(1.38)	(1.38)
Cash to Deposits	-0.001*	0.999*	-0.001*	0.999*
	(-1.78)	(-1.78)	(-1.76)	(-1.76)
Market-to-book	0.514	1.672	0.565	1.759
	(0.43)	(0.43)	(0.47)	(0.47)
Dividends per share	0.001**	1.001**	0.001**	1.001**
	(2.03)	(2.03)	(2.05)	(2.05)
Tier 1 capital (%)	0.0184*	1.019*	0.018*	1.018*
	(1.82)	(1.82)	(1.74)	(1.74)
Past returns	0.170	1.186	0.176	1.192
	(1.05)	(1.05)	(1.08)	(1.08)
Past volatility	5.101	164.2	4.654	105.02
	(1.12)	(1.12)	(1.03)	(1.03)
Time trend	-0.0998*	0.905*	-0.122**	0.885**
	(-1.84)	(-1.84)	(-2.30)	(-2.30)
Constant	182.7	2.268e+79	228.1**	1.21e+99**
	(1.60)	(1.60)	(2.02)	(2.02)
Wald-Chi (20)[2]	128.96	128.96	129.49	129.49
N	2,022	2,022	2,022	2,022
Number of companies	213	213	213	213

Note. Logistic regression estimates of acquisition likelihood on policy uncertainty (columns 2 and 3) and financial regulation policy uncertainty (columns 4 and 5). The dependent variable equals one if firm i announced a transaction in year $t + 1$. All independent variables are measured at time *t*. The sample is made up of all publicly traded European banks. All macro-level controls are measured as averages at year end, whereas all firm-level controls are measured at the end of the prior fiscal year. Appendix A provides definitions of all variables used. Robust standard errors are clustered on the firm-level. *z*-statistics are reported in parenthesis. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

High versus low uncertainty

The results in table 5 categorically found no significant effect of either overall policy uncertainty (measured by the BBD index) or financial regulatory policy uncertainty (FRPU) on the firm-level acquisition decision for European banks. This part of the research aims to adjust that specification in order to find out whether there is a difference in acquisition likelihood between times of higher uncertainty and times of lower uncertainty (compared to the median level of either the FRPU or the BBD index). Table 6 displays results to the same exact logistic regression performed in previous section. However, this time differentiating between times where uncertainty is high (above its own median) and low (below its own median), by using dummy variables instead of the average (financial regulation) policy uncertainty function of the year before.

Table 6

High vs. low uncertainty

Acquisition likelihood	BBD	Marginal effect	FRPU	Marginal effect
High uncertainty	0.713***	0.084***	0.282	0.034
	(2.56)	(2.58)	(1.27)	(1.27)
Macro controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes

Note. Logistic regression estimates of acquisition likelihood on policy uncertainty (column 2) and financial regulation policy uncertainty (column 4). Columns 3 and 5 display the corresponding odds ratios of the effect of the BBD dummy and the FRPU dummy, respectively. The dependent variable equals one if firm i announced a transaction in year $t+1$. All independent variables are measured at time t. The sample is made up of all transactions made by publicly traded European banks between 2003 and 2018. All macro-level controls are measured as averages at year end, whereas all firm-level controls are measured at the end of the prior fiscal year. Row 2 displays the coefficients of the dummy which equals 1 if the uncertainty index is above its own median and 0 otherwise. Robust standard errors are clustered on the firm-level. z-statistics are reported in parentheses. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The results in table 6 show that contrary to the hypothesised outcome, the chance of a European bank engaging in an acquisition following times of above median policy uncertainty (measured by the BBD index) increases by 8.4 percentage points, given that all other control variables remain at their respective means. The results are economically highly significant, since the unconditional chance a European bank engaging in an acquisition is equal to 11.68%. The 8.4 percentage points increase is equal to an actual increase of more than 72%. This result presents ample evidence to reject hypothesis 3.3. In fact, the opposite seems to be true: policy uncertainty increases the chance of engaging in an acquisition for European banks on the firm-level. There are multiple possible reasons for this finding. First of all, it is possible that due to the highly segregated European regulatory environment, companies in country X are not affected by uncertainty in country Y. The overall European BBD index is calculated using two newspapers of only five countries on the entire continent (at the moment of writing, there are 44 countries in Europe). Hence, it is plausible the European BBD index is in fact not a good estimate of European policy uncertainty. Secondly, following the papers of Paladino and Beltratti (2013) and Jin, Kanagaretnam, Liu, and Lobo (2019), banks tend to be able to work around uncertainties by

adjusting accounting prudence and still profit from the investment opportunities which arise when there is an elevated level of policy uncertainty.

Predicting uncertainty

The national and supranational laws, although strict sometimes, are very transparent. For example, the BCBS posts all of its past and future framework changes on its website.[12] Next to that, as elucidated in the related theory section, firms are able to predict upcoming uncertainty using asset price volatilities. All of this allows banks to possibly anticipate periods of larger (financial regulation) policy uncertainty in the near future, and prepare accordingly. In order to test the findings of Degiannakis and Filis (2019), who found managers are able to predict upcoming uncertainty using European asset price volatilities, the following section seeks to prove companies take pre-emptive action when approaching times of heightened uncertainty. These results are also related to the paper by Julio and Yook (2012), who found that managers tend to withhold investment before times of political uncertainty. In line with the theories by Julio and Yook (2012), the hypotheses (4.1 and 4.2) about predicting uncertainty and the firm-level acquisition decision anticipate firms will hold on to their cash and stall their investment. The next section will attempt to find out whether firms simply delay their investment or postpone it alltogether. Table 7 presents the same logistic regressions as the ones in the beginning of this section, apart from the fact that the acquisition likelihood (at $t+1$) is not predicted by the uncertainty, macroeconomic controls, and firm-level controls at time t. In this logistic regression acquisition likelihood is predicted by the future (expected) values of uncertainty and all controls.

Table 7

Predicting uncertainty

Acquisition likelihood	Uncertainty predicting (t-1)	Uncertainty predicting (t-2)
Policy uncertainty (BBD)	-0.008***	-0.004
	(-3.33)	(-1.61)
FRPU index	-0.008***	0.004
	(-2.61)	(1.27)
Macro controls	Yes	Yes
Firm-level controls	Yes	Yes
N	2,200	2,200
Number of companies	217	217

Note. Logistic regression estimates of acquisition likelihood on policy uncertainty (row 2) and financial regulation policy uncertainty (row 3). The dependent variable equals one if firm i announced a transaction in year $t-1$ and year $t-2$. All independent variables are measured at time t. The sample is made up of all publicly traded European banks. All macro-level controls are measured as averages at year end, whereas all firm-level controls are measured at the end of the corresponding fiscal year. Appendix A provides definitions of all variables used. Robust standard errors are clustered on the firm-level. z-statistics are reported in parenthesis. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

[12] Visit: https://www.bis.org/basel_framework/timeline.htm?type=all for all future and past regulation changes.

The results in table 7 support the formulated hypotheses 4.1 and 4.2 and indicate firms are cautious in the year coming up to expected uncertainty, measured both by the BBD index and the FRPU index. Converting the estimated values to marginal effects, the results show that a 1 unit increase in expected uncertainty (BBD) is associated with an 0.08 percentage point decrease in acquisition likelihood. The SD of the BBD index (presented in the data description section) is 67.98. Therefore, one SD increase in expected policy uncertainty in the next year is associated with a 5.56 percentage points decrease in acquisition likelihood for a European bank. Given that the unconditional probability of making an acquisition is 11.68% it means that the economic significance is substantial: a decrease 47.78%. For the FRPU, similar results are found. The marginal effect of a one unit increase in FRPU is equal to -0.08 percentage point. The SD of FRPU is 43.73, hence the effect of a one SD increase in expected financial regulatory policy uncertainty in the coming year decreases the chance of engaging in an acquisition by 3.5 percentage points for European banks. This result is economically significant as well, as this represents over a third of the unconditional firm-level acquisition probability. These results indicate firms tend to withhold their investments in the period coming up to both expected elevated policy uncertainty and FRPU.

Persistence

Given the results found in the previous section and the findings of Julio and Yook (2016), who find that firms tend to postpone rather than delay investment following times of uncertainty, this section attempts to find out whether the effect of (financial regulation) policy uncertainty on acquisition likelihood is dependent on the lags used in the analysis for European banks. The formulated hypotheses (5.1 and 5.2) are in line with the findings of Julio and Yook (2016), predicting firms postpone rather than delay their investments. As mentioned before, the effect of uncertainty on the firm-level acquisition decision could be delayed, and therefore not show up in the results found in table 5. In table 8 the same logistic regressions (odds ratios are omitted for visualisation purposes) using the BBD and the FRPU indices are performed using more severely lagged control variables, in order to find out the persistence of the (lack of) effect of uncertainty on firm-level acquisitiveness for European banks, following the methods used in the Bonaime et al. (2018) paper.

Table 8

Persistence

Acquisition likelihood	*t*+1	*t*+2	*t*+3	*t*+4
Policy uncertainty (BBD)	-0.001	0.001	-0.004	-0.005
	(-0.31)	(0.49)	(-0.77)	(-0.92)
FRPU index	0.003	-0.001	-0.006	-0.011**
	(1.14)	(-0.23)	(1.45)	(-2.51)
Macro controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
N	2,022	1,852	1,686	1,527
Number of companies	213	208	199	194

Note. Logistic regression estimates of acquisition likelihood on policy uncertainty (row 2) and financial regulation policy uncertainty (row 4). The dependent variable equals one if firm i announced a transaction in year $t + 1$ (column 2), $t + 2$ (column 3), $t + 3$ (column 4), or $t + 4$ (column 5). All independent variables are measured at time t. The sample is made up of all publicly traded European banks. All macro-level controls are measured as averages at year end, whereas all firm-level controls are measured at the end of the fiscal year. Appendix A provides definitions of all variables used. Robust standard errors are clustered on the firm-level. z-statistics are reported in parenthesis. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The results in table 8 largely support the previously found results: that policy uncertainty does not have a significant effect on firm-level acquisitiveness for European banks. However, when measuring uncertainty with the FRPU index, policy uncertainty does have a statistically significant negative effect on the acquisition likelihood for European banks, four years after the period of heightened financial regulation policy uncertainty. The marginal effect of an additional SD of FRPU (43.73 points) induces a statistically significant decrease in acquisition likelihood for European banks by 5.42 percentage points. This result is economically significant, since the unconditional acquisition likelihood is 11.68%. An increase of 5.42 percentage points would mean the acquisition likelihood increases by approximately 47%. Interpreting these results is difficult, as no scientific evidence exists on the long-term (4 years into the future) effects of financial regulation policy uncertainty on the acquisition likelihood of European banks. If firms delay but not forgo the acquisitions, the results should have shown a significant rise in acquisition likelihood in the years following the rise in uncertainty. A possible reason for the delayed negative reaction is the long time it takes for financial regulation to be implemented. For instance: the newest set of rules called Basel IV, which have been agreed upon in 2017, are only fully implemented by the 1st of January in 2027.[13] The findings of Jin, Kanagaretnam, Liu, and Lobo (2019), who found banks are able to adjust their discretionary loan loss provisions in order to deal with additional risk, offer another explanation for the belayed reaction of banks on financial regulation policy uncertainty. Given banks have the means and motive to not immediately react prudently on the heightened risk levels, it seems it takes at least four years for the FRPU to significantly affect the firm-level acquisition decision for European banks.

[13] Visit https://www.bis.org/bcbs/publ/d424.pdf to find the implementation schedule and transitional agreements.

Channel analysis

This section seeks to extend the results found in the previous two chapters by analysing the channels through which (financial regulation) policy uncertainty affects the firm-level acquisition decision. First, the short-term and long-term performance of transactions made during times of above median uncertainty are compared to the short-term and long-term performance of transactions made during times of below median uncertainty, in order to test whether managers use policy uncertainty to engage in value destroying transactions. Second, following Berger (2000), Kling et al. (2013), and Killins, Johnk and Egly (2019), this research attempts to find out whether European banks use mergers and acquisitions as a tool to manage their riskiness following times of uncertainty. Third, the notion introduced by Bhagwat et al. (2016), that uncertainty increases the likelihood of companies' values changing during the period between announcement and completion, is tested.

Performance

In his influential paper on agency costs, Jensen (1986) mentions the following: "Managers have incentives to cause their firms to grow beyond the optimal size" (Jensen, 1986, p. 323). He argues that growth is positively related to managers' compensation, incentivising empire-building. Bonaime et al. (2018) suggest that during uncertain times, managers of poorly governed firms engage in empire-building strategies. They find support in a research by Duchin and Schmidt (2013) who shows that acquisitions made during merger waves tend to be more value destroying compared to acquisitions made during the times outside a merger wave. Bonaime et al. (2018) argue that due to the higher firm-level uncertainty, poorer quality of analysts' forecasts, and smaller manager turnover following bad acquisitions, the managers have a larger incentive to take on suboptimal investments for the sake of company growth. In a paper written by Kanniainen (2000) a similar effect is found: higher uncertainty is related to empire-building strategies by managers through their compensation packages. Following these theories, mergers and acquisitions made during uncertain times would be more prone to value-destruction. In this research, the focus will be on both short-term (announcement) returns and long-term operating performance improvements (deterioration), following the papers by Hackbarth & Morellec (2008) and Altunbas and Marqués (2008).

The hypotheses formulated on this topic (6.1 and 6.2) seek to test whether CEO hubris (overconfidence) is a significant factor when analysing the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision. The four panels in table 9 display the differences in announcement returns between periods of high (financial regulation) policy uncertainty and periods of low (financial regulation) policy uncertainty. Announcement returns are calculated using the DataStream Event Study tool (developed by Arco van Oord and Da Zhang) based on the article 'Event Studies in Economics and Finance' (MacKinlay, 1997). The two panels in table 10 display the differences in long-term operational performance indicators (return on equity, fee and commission income, and net interest income) between periods of high (financial regulation) policy uncertainty and

periods of low (financial regulation) policy uncertainty. The hypotheses predict a negative relation between short-term and long-term performance indicators and the level of uncertainty, proving managers engage in more value-destroying transactions during times of elevated uncertainty.

Table 9

Cumulative abnormal returns

Panel A: BBD *Return vs. mean return*	Low policy uncertainty	High policy uncertainty	Low-High
$CAR_{(-1,1)}$	0.0002	0.0072***	-0.0069
	(0.635)	(20.02)	[0.2562]
$CAR_{(-2,2)}$	0.0013***	0.0069***	-0.0056
	(3.62)	(12.35)	[0.5152]
$CAR_{(-5,5)}$	-0.0023***	0.0041***	-0.0065
	(-5.23)	(5.71)	[0.5626]
Panel B: BBD *Return vs. index*	Low policy uncertainty	High policy uncertainty	Low-High
$CAR_{(-1,1)}$	-0.0010***	0.0066***	-0.0076
	(-3.62)	(19.69)	[0.1865]
$CAR_{(-2,2)}$	0.0009***	0.0070***	-0.0062
	(2.60)	(13.56)	[0.4439]
$CAR_{(-5,5)}$	-0.0017***	0.0017***	-0.0034
	(-4.29)	(2.41)	[0.7457]
Panel C: FRPU *Return vs. mean return*	Low policy uncertainty	High policy uncertainty	Low-High
$CAR_{(-1,1)}$	0.0070***	0.0002	0.0068
	(22.10)	(0.634)	[0.2660]
$CAR_{(-2,2)}$	0.0121***	-0.0040***	0.0160*
	(31.01)	(-7.76)	[0.0589]
$CAR_{(-5,5)}$	0.0060***	-0.0043***	0.0103
	(10.04)	(-7.34)	[0.3502]
Panel D: FRPU *Return vs. index*	Low policy uncertainty	High policy uncertainty	Low-High
$CAR_{(-1,1)}$	0.0046***	0.0008***	0.0038
	(15.83)	(2.53)	[0.5118]
$CAR_{(-2,2)}$	0.0083***	-0.0005	0.0088
	(24.78)	(-1.03)	[0.2664]
$CAR_{(-5,5)}$	0.0024***	-0.0025***	0.0049
	(4.37)	(-4.37)	[0.6393]

Note. The four panels display average announcement returns for mergers and acquisitions made during uncertain times compared with announcement returns for mergers and acquisitions made during times when uncertainty is relatively low. In panels A and B, the BBD uncertainty index is used to proxy for policy uncertainty. In panels C and D, the FRPU index is used to proxy for financial regulation policy uncertainty. Panels A and C display announcement returns of the stock compared to its own mean return, measured in the three months prior to the transaction, following Campa and Hernando (2006). Panels B and D display announcement returns of the stock compared to the EURO STOXX 50 index (2019). All panels show announcement returns measured using difference event windows: $t-1$ until $t+1$, $t-2$ until $t+2$, and $t-5$ until $t+5$. t-statistics are reported in parentheses. The p-values of the difference in mean tests are presented in brackets. *, **, *** indicate statistical significance at the 10%, 5% and, 1% level, respectively.

Table 10

Operational performance indicators

Panel A: BBD	Low policy uncertainty	High policy uncertainty	Low-High
Change in ROE	0.1165***	-1.813***	1.930
	(10.77)	(-14.04)	[0.3090]
Change in commission	0.2869***	0.4466***	-0.1594
and fee income	(170.72)	(23.67)	[0.5565]
Change in net interest	0.3340***	0.2760***	0.0580
income	(179.84)	(25.60)	[0.7190]
Panel B: FRPU	Low policy uncertainty	High policy uncertainty	Low-High
Change in ROE	-1.1288***	-0.3046***	-0.8242
	(-12.51)	(-6.09)	[0.6118]
Change in commission	0.2788***	0.4521***	-0.1733
and fee income	(90.72)	(25.27)	[0.5108]
Change in net interest	0.3164***	0.2969***	0.3164
income	(210.90)	(195.87)	[0.9030]

Note. Panel A (top panel) displays the differences in means from long-term operational performance indicators for European banks during periods of high uncertainty (BBD index is above its median) and low uncertainty (BBD index is below its mean). Panel B (bottom panel) displays the differences in means from long-term operational performance indicators for European banks during periods of high uncertainty (FRPU index is above its median) and low uncertainty (FRPU index is below its mean). t-statistics are reported in parentheses. The p-values of the difference in mean tests are presented in brackets. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

The results on the differences in both the short-term announcement returns and the long-term performance indicators show there is hardly any significant difference between the performance of acquisitions made during times of heightened (financial regulation) policy uncertainty and times of lower (financial regulation) policy uncertainty. The only marginally significant (p-value of a little over 5%) difference is found when comparing the 5-day (2 days prior to the announcement until 2 days after announcement) cumulative abnormal return between announcement returns when FRPU is above its own median and the announcement returns when FRPU is below its own median. This result indicates 5-day CARs are significantly lower (1.6 percentage points) following times of financial regulation policy uncertainty compared to times of little financial regulation policy uncertainty. This result is in line with the CEO hubris theory, which assumes CEOs use times of uncertainty to engage in value-destroying transactions. However, as this is the only (marginally) significant result on the entire set of tests for differences, these findings don't provide enough evidence to accept the hypotheses on value-destructing managers (6.1 and 6.2). These results can be explained by Nodari (2014) who showed that higher uncertainty leads to higher costs of external financing. Malmendier and Tate (2008) showed that overconfident managers only engage in value-destroying transactions when having access to ample financing opportunities. The lack of liquidity potentially restricts the CEOs of the European banks to engage in M&A processes during times of (financial regulation) policy uncertainty.

Risk management

Because European financial institutions in different countries are obliged to follow both the rules of their home country and the rules of the supranational entities, being located in a certain European country can prove to be beneficial. On the other hand, political uncertainty can deter investment (Cao, Li, & Liu, 2019), and can be a determinant to invest in a certain country (or not). In order to find out whether European banks manage their risks by investing in other countries during times of uncertainty, following the predictions by Kling et al. (2013), the firm-level acquisition analysis is re-estimated. However, the estimation below adjusts the acquisition likelihood function on which the logistic regression is run. First, the probability of engaging in a cross-border acquisition is estimated as the function of average policy uncertainty (BBD or FRPU) in the previous year, again controlling for all previously mentioned macro-level and firm-level variables (see Appendix A for a detailed description of all variables used in this research). Secondly, the same logistic regression is run on cross-industry acquisitions, measured by the targets industry indicator. The industry indicators are measured on both the mid-level and macro-level (classified by CRSP), the results are robust to the use of either industry classification. The hypotheses on this topic (7.1 until 7.4), following the presented literature, support risk-management (by differentiation through cross-industry or cross-border acquisitions) as a channel through which (financial regulation) policy uncertainty affects the firm-level acquisition decision. The results of all six regressions are displayed in table 11.

Table 11

Cross-border and cross-industry acquisitions

Acquisition likelihood	Policy uncertainty (BBD)	FRPU index
Cross-border	-0.015**	-0.010
	(-2.10)	(-1.15)
Cross-industry (macro)	0.005	0.000
	(0.96)	(0.08)
Cross-industry (mid)	0.002	0.004
	(0.37)	(0.49)
Macro controls	Yes	Yes
Firm-level controls	Yes	Yes

Note. Logistic regression estimates of acquisition likelihood on policy uncertainty (column 2) and financial regulation policy uncertainty (column 3). The dependent variable equals one if firm i announced a cross-border (row 2), cross-industry (macro, row 3), or cross-industry (mid, row 4) transaction in year $t + 1$. All independent variables are measured at time t. The sample is made up of all publicly traded European banks. All macro-level controls are measured as averages at year end, whereas all firm-level controls are measured at the end of the prior fiscal year. Robust standard errors are clustered on the firm-level. z-statistics are reported in parentheses. *, **, ***, indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The results in table 11 indicate the chance that banks engage in cross-industry (measured both on the mid-level and macro-level) acquisitions following times of uncertainty doesn't statistically significantly increase or decrease. However, the likelihood of a European bank engaging in a cross-border acquisition does seem to be influenced by the BBD policy uncertainty index. The marginal effect of one additional SD of uncertainty (measured by the BBD index), decreases the chances of an acquisition by 16.71 percentage points for European banks. This is almost two times the unconditional likelihood of an European bank engaging in an cross-border acquisition (8.84%), and therefore highly economically relevant. There are multiple possible explanations for this result. First, in line with the results found in the European cross-section, it is possible the investment appetite of European banks is reduced due to the negative effects policy uncertainty can have on for instance the availability of external capital. These results would be in line with most of the presented theory on this topic. In this research however, there has been no significant proof European banks' acquisition likelihood decreases following times of (financial regulation) policy uncertainty on a firm-level. Another reason for a drop in cross-border acquisitions following times of elevated policy uncertainty could again be related to the segregated European environment. It is possible European banks limit their acquisitions following periods of elevated policy uncertainty to domestic targets, since these are already adapted to the regulatory framework of their home country. This would incidentally also explain why cross-industry acquisitions are not affected by either policy uncertainty index.

Interim-risk

Bhagwat et al. (2016) found that macroeconomic uncertainty has a negative effect on M&A activity due to value fluctuations between the announcement date and the completion date (interim risk). If the acquiring firm and the target firm agree on a price, but there is a large chance of the value of the target fluctuating between the moment of agreement of the price (announcement) and the moment of closing the deal (completion), it could deter firms from engaging in this risky investments. In order to test whether the theory of Bhagwat et al. (2016) also applies to the sample of European banks, a standard t-test for differences in means is performed. These tests are performed on the full sample, and the sample excluding deals where the announcement date is equal to the completion date (which suggests either one of them is unavailable). The formulated hypotheses on this part of the research (8.1 and 8.2) follow the findings of Bhagwat et al. (2016), predict an increasing window between announcement and completion following times of (financial regulation) policy uncertainty. The results of all t-tests for differences in means are displayed in table 12.

Table 12

Duration

Panel A: BBD	Low policy uncertainty	High policy uncertainty	Low-High
Interim duration (days)	87.44***	96.69***	-9.244
	(211.08)	(198.78)	[0.3703]
Interim duration (days)	133.11***	153.59***	-20.489
Adjusted sample	(205.92)	(198.57)	[0.1168]
Panel B: FRPU	Low policy uncertainty	High policy uncertainty	Low-High
Interim duration (days)	84.00***	100.31***	-16.305
	(207.33)	(203.27)	[0.1144]
Interim duration (days)	129.09***	157.63***	-28.54**
Adjusted sample	(201.58)	(204.11)	[0.0287]

Note. these tables display differences in means between the number of days between the announcement dates and completion dates for banking mergers and acquisitions for periods of high policy uncertainty and periods of low policy uncertainty. Panel A (top panel) presents the results where uncertainty is measured by the BBD index, Panel B (bottom panel) displays the results where the previously constructed FRPU index was used to proxy uncertainty. t-statistics are reported in parentheses. The p-values of the difference in mean tests are presented in brackets. *, **, *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

The results displayed in the top panel of table 12 show that there is no significant difference between the mean number of days between announcement and completion during times of high (above median) uncertainty index compared to during times of low uncertainty, if uncertainty is measured by the BBD index. However, the results in the bottom panel show there is a significant difference between the time it takes to complete a transaction following elevated FRPU compared to the time it takes to complete a transaction following a time of low FRPU. On average, this difference is over 28 days, when not including transactions with the same announcement and completion date. This result is economically significant as it represents an increase in the time the firm-value can fluctuate of over 22%. Next to that, this result strongly supports the hypothesis 8.2, and presents a channel through which financial regulation policy uncertainty could affect the firm-level acquisition decision for European banks. Killins, Johnk and Egly (2019) found that due to an increase in financial regulation policy uncertainty, volatility could increase. Given an elevated volatility, the risk of value changes between the announcement date and completion date increases, which could deter European banks to engage in an M&A process.

Conclusion and discussion

This concluding section summarises all findings accumulated throughout this paper, and seeks to answer the research question. Next to that, the second part of this section identifies potential limitations and flaws in the research design and provides suggestions for future research.

Conclusion

This paper seeks to add to the extensive research done on mergers and acquisitions and the effect of policy uncertainty on them, with a particular focus of financial regulation policy uncertainty for European banks. In order to do so, the following research question was formulated as to provide a clear focus for this paper:

What is the effect of financial regulation policy uncertainty on mergers and acquisitions by European banks between 2003 and 2018?

In order to answer the research question, this paper is split up in three broad sections. (1) The effect of overall policy uncertainty, measured by the widely discussed BBD index (2016), on the aggregate number of European acquisitions and their value. (2) The effect of (financial regulation) policy uncertainty on the firm-level acquisition decision for European banks. (3) The channels through which (financial regulation) policy uncertainty affect the firm-level acquisition decision for European banks. All three sections have their own sub-set of testable hypotheses which provide direction and predictions based on the literature on that particular topic.

Previous literature mostly predicted a negative relationship between both policy uncertainty and financial regulation policy uncertainty on the aggregate M&A levels and the firm-level acquisition decision. Next to that, there is little consensus on which channels (financial regulation) policy uncertainty mainly affects M&A through. The testable hypotheses formulated around the three main sections in this paper all predict outcomes similar to the ones found in the related literature. In order to answer the first set of hypotheses (1.1 until 2.4) a vector auto regression was estimated using European (banking) M&A data, the different uncertainty measures, and a set of control variables that could potentially induce shocks in M&A activity. In the corresponding impulse response functions, a statistically significant effect of policy uncertainty on both the aggregate deal value and the aggregate number of deals was found in Europe. However, neither the BBD index nor the FRPU index proved to have a significant effect on the total deal volumes and values for European banks.

The second sub-set of hypotheses (3.1 until 5.2) revolved around the firm-level acquisition decision, the effect of managers' ability to predict uncertainty levels, and the influence of time following elevated uncertainty. The results in table 5, displaying the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision for European banks, failed to produce significant results. However, the results in table 6, which uses a dummy variable in order to indicate times of elevated uncertainty, present evidence that the firm-level chance of engaging in an acquisition increases

following times of elevated policy uncertainty for European banks. The final tests concerning the firm-level acquisition decision seek to find out (1) what the effect is of an expected rise in policy uncertainty on acquisitiveness and (2) whether the effects of (financial regulation) policy uncertainty increase or decrease over time. The results in table 7 find support for hypotheses 4.1 and 4.2, in line with the findings of Julio and Yook (2012), indicating European banks hold off on their investments when they face times of uncertainty. The results in table 8 find little evidence to accept hypotheses 5.1 and 5.2, concerning the actions of firms following times of elevated uncertainty. In fact, instead of an increase in firm-level acquisitiveness in the years following elevated (financial regulation) policy uncertainty, the results show that European banks decrease their M&A appetite 4 years after a period of elevated financial regulation policy uncertainty. All results found in the firm-specific acquisitions decision section are robust to controlling for alternative measures of investment opportunities, uncertainty, and economic shocks which could lead to elevated M&A appetite.

The third and final sub-set of hypotheses (6.1 until 8.2) concern the channels through which the policy uncertainty indices affect the firm-level acquisition decision for European banks. Three channels are tested in the final part of this research: (1) CEO overconfidence, (2) risk-management, and (3) interim-risk. The results presented in tables 9 and 10 fail to prove there are significant differences between short-term and long-term results of acquisitions made during times of elevated (financial regulation) policy uncertainty compared to the short-term and long-term results of acquisitions made during times of low (financial regulation) policy uncertainty. These results fail to accept hypotheses 6.1 and 6.2, leading to the conclusion that CEO overconfidence is no significant factor when determining the effect of (financial regulation) policy uncertainty on the firm-level acquisition decision of European banks. The results in table 11, concerning hypotheses 7.1 – 7.4, find no support of any fluctuations in cross-industry acquisitions following an elevation in (financial regulation) policy uncertainty. However, contrary to the predictions of hypothesis 7.1, there is a significant drop in cross-border acquisitions following elevated levels of policy uncertainty (measured by the BBD index). This indicates that European banks favour their home operating environment following times of policy uncertainty instead of looking for foreign targets. Finally, the last test seeks to prove hypotheses 8.1 and 8.2 on the interim-risk channel. The results in the bottom panel of table 12 show there is a significant difference between the time it takes to complete a transaction following elevated FRPU compared to the time it takes to complete a transaction following a time of low FRPU. This result provides evidence to accept hypothesis 8.2, proving the risk of value fluctuation between the announcement date and the completion date is a significant factor affecting M&A decisions for European banks.

The final results found in the last section of this paper perhaps provide the most relevant answer to the research question. The mixed conclusions as to the effects of (financial regulation) policy uncertainty on mergers and acquisitions on an aggregate-level and firm-level on the basis of this research are in line with the results found in the discussed literature. There is no definitive answer as to what is the effect of policy uncertainty on M&A activity. Possible explanations for this inability to

capture the effect could be the ambiguity of the concept "policy uncertainty" and the struggles to measure it. The final part of this research attempts to define shortcomings of this paper and provide suggestions to direct future research in this field in order to find a more definitive relationship between FRPU, EPU and M&A.

Discussion and additional research

As previously mentioned, there are multiple shortcomings to this research. First of all, due to the segregated European regulatory environment, it is difficult to make predictions applicable to all countries concerned. Next to that, the indices used to estimate the parameters for the effect of (financial regulation) policy uncertainty on M&A appetite for European banks measure their respective levels of uncertainty on the continent level. However, it is possible that these uncertainty indices actually vary per country, making the results of these tests irrelevant for banks not operating in a large part of Europe. One way to solve this problem, is to zoom in even further and look at the effect of policy uncertainty on M&A levels on a country level. However, at the moment of writing there are no BBD indices for all individual European countries, making it very hard to find European parameters. In order to do so, comparable BBD indices for all European countries would have to be created.

Secondly, deriving the FRPU index from the European BBD index using a regression always subject to criticism. In order to isolate the effect of FRPU, assumptions had to be made, and proxies had to be used. There is a possibility that the FRPU index used does not in fact capture the actual level of financial regulation policy uncertainty in Europe. This problem could potentially be solved by reproducing the creation of the US FRPU index in Europe. Instead of adjusting the overall BBD index. The algorithm counting news-articles on financial regulation policy uncertainty could produce the European equivalent of the already existing US FRPU index, assuming the US FRPU index does correctly capture FRPU in the united states.

Thirdly, it is common for European data to be less complete that its American equivalent. Future research could either lengthen the timeframe (to before the MU) or adjust the company specific data in order to increase its completeness (by using different data sources or including deals made by unlisted companies). This way, variations and their significance may be more applicable to the market of interest and more statistically significant effects can potentially be found.

Finally, the results presented in this research prove the interim-risk channel is of significant influence when determining the effect of financial regulation policy uncertainty on mergers and acquisitions by European banks. However, the results do not show who bares the risk of the value of the target firm fluctuating between the announcement date and the completion date. Future research could attempt to find out the implications of interim-risk, and what measures could be taken in order to hedge against this risk.

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Appendix A: variable definitions

Description of all control variables used in this study (both on the firm- and the macroeconomic-level)

BBD indices:

Constructed by Baker, Bloom & Davis (2016), extracted from their website (https://www.policyuncertainty.com), constructed by counting the number of newspaper articles containing the terms: uncertain, uncertainty, economic, economy, and one or more policy-related terms (in the native language of that particular paper). The different indices are constructed by looking at different newspapers (among other index-specific adjustments listed below) per country or region:

- European index: Le Monde and Le Figaro for France, Handelsblatt and Frankfurter Allgemeine Zeitung for Germany, Corriere Della Sera and La Repubblica for Italy, El Mundo and El Pais for Spain, and The Times of London and Financial Times for the United Kingdom
- US: USA Today, the Miami Herald, the Chicago Tribune, the Washington Post, the Los Angeles Times, the Boston Globe, the San Francisco Chronicle, the Dallas Morning News, the Houston Chronicle, and the WSJ (next to the news component, this index includes two other components covering Taxes and Economic Forecast Disagreement)
- Global: GDP-weighted average of national EPU indices for 20 countries: Australia, Brazil, Canada, Chile, China, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States
- USA FRPU index: extracted from the Categorical EPU dataset

FRPU construction:

- Fiscal policy uncertainty is assumed to be the combination of uncertainty surrounding tacation and uncertainty surrounding government expenditures:
    - Tax policy uncertainty: 3-month rolling volatility of the total tax income for all European countries
    - Government expenditure uncertainty: 3-month rolling volatility of the total government expenditures of all European countries
- Monetary policy uncertainty: monetary condition index, extracted from the European commission (Monetary conditions index, 2019)
- World Trade Uncertainty Index (WTUI) (Ahir, Bloom, & Furceri, 2018)
- The VSTOXX index, which captures investor sentiment and overall economic uncertainty by measuring the 30-day implied volatility of the EURO STOXX 50 index. In order to fit the daily volatility index to the monthly M&A activity data, I decided to take the average the daily index values per month (Deutsche Börse Group, 2019)
- The return on the MSCI value-weighted Europe index, capturing general economic conditions (MSCI, 2019). This index is based on a traditional market cap weighted parent index (MSCI

Europe Index), which includes large- and mid-cap stocks across 15 European developed countries. However, the value weighted index reweights each security of the parent index to emphasize stocks with lower valuations

- Following Garfinkel and Hankins (2011), who proxy market liquidity using the spread between Baa bonds and the Federal Funds rate, I use the BoAML Option-Adjusted High Yield Index spread which measures the European equivalent. This measure was manufactured by ICE Benchmark Administration (IBA, 2019)
- Shiller PE ratio (Cyclically Adjusted PE ratio, or CAPE), the CAPE Ratio has been calculated by Barclays Research using levels of country-specific indices published by MSCI Inc. ("MSCI") representing the equity markets for the relevant country, adjusted for inflation using data from DataStream (Barclays Bank PLC, 2019)

Aggregate VAR:

- Cash Index: natural logarithm of average cash-holdings (winsorised) from the complete CompuStat database (European companies) to control for internally generated funds
- Time trend variable: variable equal to the time index in a given year, controlling for exogenous increase in the dependent variable not explained by the independent variables

Firm-level acquisition decision:

- Investment opportunities: first principal component of a consumer confidence index (OECD, 2019), a GDP forecast (OECD, 2019), and the CPI (European Commission, 2019)
- Industry economic shock indicator: first principal component of economic shocks to the operating environment of the banking industry, measured by using the following firm-level indicators: dividends per share, earnings per share, net interest income, net margin, and return on equity -> in order to control for merger waves
- Uncertainty: first principal component first principal component of the JLN uncertainty index (Jurado, Ludvigson, & Ng, 2015), the VSTOXX, σ of the cross-sections past returns, and the World Uncertainty Index (Ahir, Bloom, & Furceri, 2018)
- Median Tobin's q: annual median Tobin's Q (book value of assets – book value of equity + market value of equity all over book value of assets)
- Median cumulative past returns: annual median of the firm-level 36-month cumulative stock return
- Median past returns volatility: annual median of the firm-level 36-month stock return volatility