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The impact of financial market regulatory announcements on the European listed real estate sector

Content table

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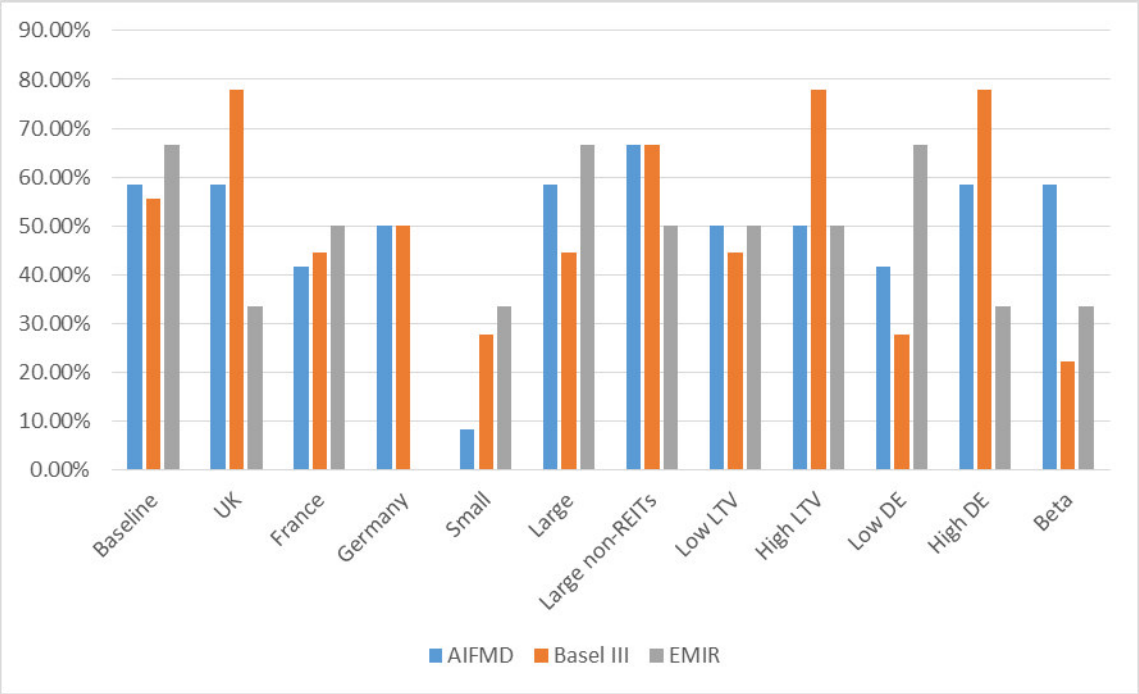
Executive summary

This study investigates the impact of international financial regulation on listed real estate companies. In particular, we look at how three regulatory reforms undertaken in the aftermath of the global financial crisis have affected returns and credit default swap (CDS) spreads of real estate companies. The three reforms are aimed at regulating different segments of the market – Basel III targets banks, and could restrict the availability of bank debt to the sector, the Alternative Investment Fund Management Directive (AIFMD) targets funds, which could increase compliance costs and reduce the potential investor pool, while the European Market Infrastructure Regulation (EMIR) is aimed at derivative trading and could impact the cost of debt capital.

We employ an event study methodology using daily financial market data and identify the regulatory events through news in the media. A regulatory reform is associated with several dates as the regulatory proposals are subject to changes prior to the enactment. What counts as the dates of the reform, are news articles appearing in major international financial newspapers and news agencies which announce the introduction of a new regulation and amendments to it (either tightening or loosening).

Our results are summarised in Figure A below. On average, market participants trading real estate equities and CDSs respond significantly to regulatory announcements; however, we observe differences across countries, types of companies (large versus small, more leveraged versus less leveraged) and the regulations themselves. The strongest effects for real estate equities are associated with Basel III and AIFMD. The effects on the credit performance are much larger in scale but only a few are significant. The most significant effects following regulatory news are observed for British companies, large European companies and highly leveraged European companies. This is in line with what we would expect. Larger companies are more likely to be affected as they have greater stock liquidity which provides a mechanism for an immediate stock market response to news regarding financial regulation. Higher leveraged companies are more responsive to changes in regulations targeting primary the debt funding sources for listed real estate companies. However, we do not see that the abnormal returns are associated with increased credit risks as CDS spreads do not respond significantly to most news. We observe that companies respond significantly to regulatory announcements mainly associated with negative news rather than positive news which can be seen as evidence for asymmetrical return response to shocks. Overall, albeit not directly regulated, the listed real estate market is affected by news about financial regulatory reforms with the majority of the returns significantly decreasing following the announcements.

Figure A: Share of significant responses of European listed property companies following news announcements about Basel III, AIFMD and EMIR



Note: The figure summarises the findings from Tables 2-7. It shows the share of significant average abnormal returns (AARs) for different samples of listed real estate companies. The time period spans from January 2009 until April 2015 using an estimation window of 80 trading days. The baseline estimation includes 17 European companies. UK, France, Germany stays for estimations including companies only from those respective countries. Small/large includes the top 10-20 smallest versus largest companies in Europe. Large non-REITs stay for the 20 largest listed real estate companies which do not have the REIT status. Low/high LTV stays for the companies with the lowest/highest loan-to-value ratios in Europe. Low/high DE stays for the companies with the lowest/highest debt-to-equity ratios in Europe. Beta stays for an estimation of the baseline model (including 17 companies) accounting for changes in the beta-risk of the company next to the AARs.

1. Introduction

In the aftermath of the global financial crisis (GFC) regulators tried to strengthen the resilience of the financial system and reduce systemic risks by improving the existing financial market regulations and putting new regulations in place. Some of the main regulatory reforms which have been introduced at the international level include Basel III, the Alternative Investment Fund Management Directive (AIFMD) and the European Market Infrastructure Regulation (EMIR). Whereas Basel III extends the regulations for depository institutions imposed by Basel II, the AIFMD targets non-UCITS funds, which are regarded as alternative funds including private equity, hedge funds, real estate funds, etc. in order to increase the transparency of that market and better protect investors. EMIR is another European Union regulation whose aim is to increase the transparency of the over-the-counter (OTC) derivative markets.

Overall, there is scarce research assessing the impacts of the recent financial market reforms. The lack of empirical research in this area thus far is due to the dearth of data and the uncertainty surrounding the regulatory changes. Although we still cannot assess the long term welfare implications without awaiting the full implementation of the regulations in the national legislations, this study aims to provide a first assessment of the contemporaneous effects on the listed real estate sector. Our main focus is on

analysing the short-term impact of regulation on the price of equity and credit as well as the price of market risk of listed real estate companies in selected European countries with well-developed markets (France, Germany and the UK). We assess whether announcements about regulatory reforms affect those companies. Moreover, we assess whether some listed real estate companies respond differently to those announcements depending i.e. on the country of origin of the company. We use an event study methodology and look at how major regulatory events targeted on the financial markets in the aftermath of the global financial crisis affect equity returns and CDS spreads. Event studies have traditionally been used to evaluate the impact of regulatory news and go back to Schwert (1981). More recently, this methodology has been applied to assess the impacts of policy and regulatory actions associated with the GFC. For example, Schäfer et al. (2015) look at the effects on stock returns of four major banking regulations in Germany, Switzerland, the UK and the US which followed as a response to the GFC. They find that the largest implications for stock returns stem from the Dodd-Frank reform enacted in the US and in particular from the Volcker rule. Veronesi and Zingales (2010) study the effect of the Paulson Plan on the valuation of banks relative to non-financial firms, while Fratianni and Marchionne (2009) evaluate the effect from fiscal support measures in the banking sector during the financial crisis.

The use of event studies requires the correct identification of the regulatory events or event periods. An investigation of international financial market regulations such as Basel III can present a challenge since the regulation has been discussed over several years and has been phased out several times. Such large-scale regulations involve a lot of parties, such as consultants, lawyers, politicians, governments, regulated institutions (i.e. banks, fund managers), investors, etc., who meet to discuss the reforms which can affect the likelihood of one or another outcome. This means that financial market participants continuously adjust their expectations with regards to the regulation following unexpected announcements. Therefore, markets would react only if the outcomes differ from their expectations. If, for example, there is news about regulation becoming more lax, markets would respond positively, and vice versa. However, the reforms can be a predictable process and could have already been reflected in the prices of stocks prior to the official announcement. Therefore, we want to identify the true impact of the regulatory event, not when the reform has officially been introduced, but when, for the first time, news about the regulatory reform has become available. We follow the methodologies in O'Hara and Shaw (1990) and Schäfer et al. (2015) to identify events by looking at major newspapers. In particular, we follow a three-step approach. First, we search for news containing the name of the regulatory reform in the Financial Times. We select as news associated with Basel III those articles which have been published on the front page. The reason is that Basel III is a major international financial market reform and information representing real news should appear as a headline of a major international financial newspaper. Regarding the identification of the AIFMD and EMIR, a front page search is problematic, as these are more specific regulations which do not necessary feature on front pages. For them, we consider articles across all pages which contain the name of the regulation. Second, the ultimate choice of the events is made by screening all identified articles and assessing if it is considered news or not. Third, we double check if the dates identified feature in other media such as other newspapers, regulatory bodies' websites or news agencies (i.e. Bloomberg).

Our results show that, on average, market participants trading real estate stocks and CDSs respond significantly to announcements about Basel III, AIFMD and EMIR; however, we observe differences across countries, types of companies (large versus small, more leveraged versus less leveraged) and across the regulations themselves. The strongest effects for equities are associated with Basel and AIFMD. The effects on the credit side are much larger in scale but less frequent. The effects of the regulations are strongest for UK companies, large companies and companies with high leverage. Overall, albeit not directly, the listed real estate market is significantly affected by news about financial regulatory reforms.

The paper is organised as follows. The following section describes the regulatory reforms, while section 3 contains a discussion of our methodology and data. Section 4 presents the results and some concluding remarks are contained in the final section.

2. Description and expected effects of international regulatory reforms

2.1 Basel III

The main objective of Basel III is to avoid future bank failure and systemic risk in the wider economy by requiring depository financial institutions to hold more capital against expected losses or to change their assessment of risk. The third instalment of the Basel Accords was developed as a response to the problems associated with banking regulation revealed by the GFC between 2010 and 2011 and is phased in until March 2019. Pillar I tightens the definition of what can be included in the calculation of bank capital and tries to make the methodology of calculating risk-weighted assets more sensitive to risks.

One way through which real estate companies can be affected is a reduction in the amount of bank debt available due to a change in the risk assessment of real estate loans under Basel III as compared to Basel II. For example, one change is the risk weighting for a new category of loans – high-volatility commercial real estate (HVCRE) loans – which receive a risk weighting of 150% compared to 100% previously under Basel II. A loan is classified as an HVCRE loan when it finances the acquisition, development, or construction of real property mostly with loan-to-value (LTV) ratios above 80%. As a result of the higher weighting, banks will end up with higher regulatory capital requirements of 12% instead of currently 8% for this type of loans and decide to reduce the loan provision to developers and, hence, real estate companies. Moreover, Basel III increases the risk weight of mortgage servicing rights (MSRs) which are generated when banks originate mortgages. As a result, banks can decide to sell off the MSRs to other non-bank companies to manage them instead of keeping them on their balance sheets. This may increase the costs for them and these costs can be outsourced to the mortgage borrowers, hence the real estate companies. The short-term or immediate impacts on the returns can be negative if markets perceive that bank regulation will have a negative impact on the access of real estate companies to bank funding – either through a change in the cost of debt or through a change in the quantity of debt. The above effects can be seen as direct effects on the listed real estate sector. An indirect effect will stem from a change in the profitability of the real estate companies which is driven by demand and supply factors on the underlying direct real estate market.

In the medium to long term, however, there may not be a significant impact of listed real estate companies' funding. The reason can be that bank funding can be replaced by funding from non-depository institutions which do not comply with Basel regulations. A tightening in the banking regulation creates a window for 'shadow banks' to take on market share by providing such loans. Alternatively, if regulation is perceived to be too tight, traditional financial intermediaries can shift funds off-balance sheets towards the less regulated financial sector through special purpose vehicles (SPVs) in a similar fashion as they did prior to the GFC. This process is known as regulatory arbitrage. Kroszner and Strahan (2011) argue that the Basel reforms "encouraged firms outside the regulatory umbrella to engage in activities traditionally done by those under the umbrella" leading to the emergence of balance sheets of unregulated banks. Kim and Mangla (2012) explain the excessive flow of investment into the shadow sector prior to the financial crisis with "too tight" banking regulation. An increased interconnection between the shadow and the traditional financial sector has been observed in both the euro area and the US with a significant share of financing coming from the shadows (see Bakk-Simon et al., 2012). Therefore, despite the potential short-term negative impact of lower bank lending to the listed real estate sector, larger listed companies could be able to access the debt capital markets (through the issuance of corporate bonds, or other non-bank lenders) to reduce dependence upon the banking sector.

2.2 AIFMD

Talks about the Alternative Investment Fund Managers Directive (AIFMD) started in 2009 with the directive being published on July 1, 2011. The directive had to be adopted into the national laws by July 22, 2013. The AIFMD introduces for the first time a harmonised European regulatory regime for managers of Alternative Investment Funds (AIFs). The AIFMD defines an AIF as any collective investment scheme which raises capital from a number of investors with a view to investing that capital in accordance with a defined investment policy. Thus, the definition of an AIF is extremely wide and captures many open-ended and closed-ended listed and unlisted real estate funds. It may also apply to a subset of global real estate investment trusts (REITs) and property companies depending on the decisions by national regulators and companies' management.

While AIFMD is a European-wide regulation – it is up to the discretion of the national authorities how they will proceed with it. Therefore, we may observe a different approach to classifying companies into AIF across European countries. The approach adopted in countries like the UK, Germany and France is on a "case-by-case" basis. Whether a listed property company qualifies as an AIF depends on the purpose and the investment strategy of the company.

The impact of the AIFMD on the European listed real estate sector is not clear yet. Despite the potential benefits (e.g "passporting"), the new regulation is also associated with some burdens for real estate investment vehicles and could therefore redefine existing boundaries in the real estate sector. On the one hand, given the high compliance costs, the AIFMD may crowd out some non-European Union (EU) REITs despite their interest in the EU market. As a result, this may lead to a significantly smaller number of players in the European market if non-EU managers together with some EU managers exit the EU market. Moreover, the uncertainty for non-EU investors surrounding the new legislation may deter investment in REITs which are classified as AIFs. In particular, this can be the case for Chinese investors who face restrictions for holdings in foreign funds. On the other hand, the AIFMD may encourage the passive rather than the active model with REITs adopting the structure of a fund rather than that of an actively managed property business with implications for the financing of real estate development and infrastructure projects. Moreover, whether a listed property company is qualified as an AIF or not could also determine the underwriting status for insurance companies, pension funds and banks and lead to changes in the shareholders' structure of REITs. In Belgium, for example, the majority of REITs are currently seeking shareholder approval to adopt a new corporate status that legally separates them from funds, thereby avoiding the additional regulatory constraints and higher costs that AIFMD would have imposed.

2.3 EMIR

If REITs fall under the AIFMD regulation they will be classified as financial entities becoming subject to the European Infrastructure Market Regulation (EMIR). It regulates any entity classified as a "financial counterparty" which includes any real estate vehicle which is an AIF under the AIFMD and subjects the real estate vehicle to mandatory clearing of derivative transactions. This can have negative implications for the company as it may be required to hold extra cash-collateral with a central counterparty whenever it uses swap arrangements to hedge property loans against floating interest rates or exchange rate risks. As a result, small companies may decide not to hedge against those risks and this can make them riskier.

3. Methodology and data

3.1 Selection of events

In order to measure the regulatory impacts, we look at announcements associated with regulatory changes. Thereby, we want to account for the fact that the majority of the regulatory events do not involve a single well-defined announcement and are not associated with a single date. Large regulations such as Basel III rather involve a series of smaller announcements which can gradually affect the listed real estate companies.

There are several ways to collect information on announcements associated with regulatory changes. One way is to look at reports by regulatory bodies and their representatives, such as the European Commission (EC), the European Securities and Markets Authority (ESMA), and the Basel Committee on Banking Supervision (BCBS). However, using such sources of information only can leave us with incorrect identification of events if market participants have already priced the news prior to the official announcement of the regulatory body. Therefore, we want to identify the true regulatory event, not when the reform has officially been introduced, but when, for the first time, news with regards to the regulation has become available. We use a common way of identifying events by using the editor process of news agencies such as the Wall Street Journal and Financial Times. This approach has been used in previous studies such as O'Hara and Shaw (1990) and Schäfer et al. (2015). The selection of the event dates in this paper consists in several steps for the purpose of ensuring the right identification of events. In the first step, we search for events in the paper edition of the Financial Times (FT) UK and FT Europe using ProQuest. The search is conducted using the full name of the regulation as a keyword to sort out potential articles. For Basel III, we select all articles containing the word 'Basel III' which feature on the front page. A similar selection process has been applied by Schäfer et al. (2015). The reason is that Basel III is the major international financial market reform in recent years and information representing real news should appear as a headline of a major international financial newspaper. Regarding the identification of the AIFMD and EMIR, a front page search is problematic, as these are more specific regulations which do not necessary feature on front pages because they affect specific industries only and are conducted on a smaller scale. For them, we conduct a keyword search of articles across all pages.

After narrowing down the potential pool of events, we read each article and make a decision if it is real news or just a commentary not announcing anything new. In this process we look for keywords which may indicate some new information associated with amendments to the regulations. For example, there can be an interview for a regulator who announces that the regulation will be tighter than expected. If an article reports a past event, such as a meeting of the Basel committee, we look up when the meeting was and whether there were any previous news associated with it. In a next step, we double check if the news has been announced on that date and in this newspaper first or features somewhere else earlier. The way we account for it is by searching in the Bloomberg news database one month prior to the identified FT article for similar news. As Bloomberg covered a wide range of sources including newspapers, we can be confident that it accounts for major news. Moreover, during the Bloomberg search, we account for the exact time at which the news was first published online as it can be the case that the paper edition has a delay and the news first features online. This is important as some articles can be published after stock markets have closed, so market participants cannot account for the news on that day. If this is the case, we choose as the event date, the following day. The final step is to control for other news/events which have taken place on the same day as the regulation news. For this purpose, we screen the front page of the paper edition of the FT Europe for each of the dates we have identified through the above procedure. We are looking for events which can also have strong effects on the listed real estate companies and major economic news (e.g. the Greek crisis, ECB policy, etc.). The final event dates are presented in Table 1. Along the event date, we include the title of the article, a short description of the event, the source of the news, the publication date of the news as well as the expected effect on returns following the news – positive or negative. The effect should be interpreted relative to the market expectations. If there is an amendment to an announced reform, markets can

respond in both directions – increasing or decreasing returns – depending on whether the regulation is tightened (negative effect) or loosened (positive effect).

Table 1: Identified events associated with financial market regulation

1A. Events associated with Basel III

Article title	Publication date	Event date	Positive news	Source
Summit	02.04.2009	02/04/2009	no	Bloomberg
Banks win battle for limits to Basel III; Basel III proposals eased by regulators	25.06.2010	25/06/2010	yes	FT
Basel deal reached on banks' reserves; Bankers fear race to toughen regimes	13.09.2010	13/09/2010	no	FT
Reducing the moral hazard posed by systemically important financial institutions, Wall St dividend constraints are eased	20.10.2010	20/10/2010	yes	FSB
Shadow banks to face global scrutiny, says Turner	17.11.2010	12/11/2010	no	FT
Guidance for national authorities operating the countercyclical capital buffer, Strengthening the resilience of the banking sector	16.12.2010	16/12/2010	no	FT, BCBS
Basel III break for banks in EU	27.05.2011	27/05/2011	yes	FT
Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement—Rules Text	19.07.2011	19/07/2011	no	BIS
Basel chief pushes tough line on bank reforms	10.10.2011	10/10/2011	no	FT
Update on Basel III implementation	18.10.2011	18/10/2011	no	BIS
Bank regulators reject industry pleas for delay to liquidity buffers	09.01.2012	09/01/2012	no	FT
Progress report on Basel III implementation and procedures for conducting country reviews published by Basel Committee	03.04.2012	03/04/2012	yes	BIS
European Union seeks strict newcurbs to cap bankers' bonuses; EU seeks new curbs to cap bank bonuses	13.04.2012	12/04/2012	no	FT
EU to push for binding investor vote on pay	16.05.2012	16/05/2012	no	FT
Europe's banks face tougher demands	16.07.2012	11/07/2012	no	FT
Massive softening' of Basel bank rules	07.01.2013	07/01/2013	yes	FT
Basel watchdog to close loophole over use of pricey credit protection	25.03.2013	22/03/2013	no	FT
Banks win Basel leverage concessions	13.01.2014	13/01/2014	yes	FT

1B. Events associated with AIFMD

Article title	Publication date	Event date	Positive news	Source
Private equity leaders condemn draft EU law	20.04.2009	20/04/2009	no	FT
EU 2, Locusts 0	06.05.2009	06/05/2009	no	FT
Hope for alternatives redraft	10.08.2009	10/08/2009	yes	FT
ECB warns Brussels over hedge fund regulation; ECB sees danger in Europe's hedge fund plan	23.10.2009	23/10/2009	yes	FT
Veto EU hedge fund curbs, say peers	10.02.2010	10/02/2010	yes	FT
EU rebuff for Geithner over rules on hedge funds	12.03.2010	12/03/2010	yes	FT
EU plans hurdles for hedge funds	10.05.2010	10/05/2010	no	FT
AIFMD rules to be diluted	12.07.2010	12/07/2010	yes	FT
Funds and buy-outs braced for rise in regulation	17.11.2011	10/11/2011	no	FT
Brussels revives funds' fears over rules	02.04.2012	02/04/2012	no	FT
BaFin Consultation 03/2013 – Scope Of The KAGB-E/Interpretation Of The Term "Investment Fund"	03.04.2013	28/03/2013	no	Bafin Consultation
German regulator in property U-turn	01.07.2013	01/07/2013	yes	FT

1C. Events associated with EMIR

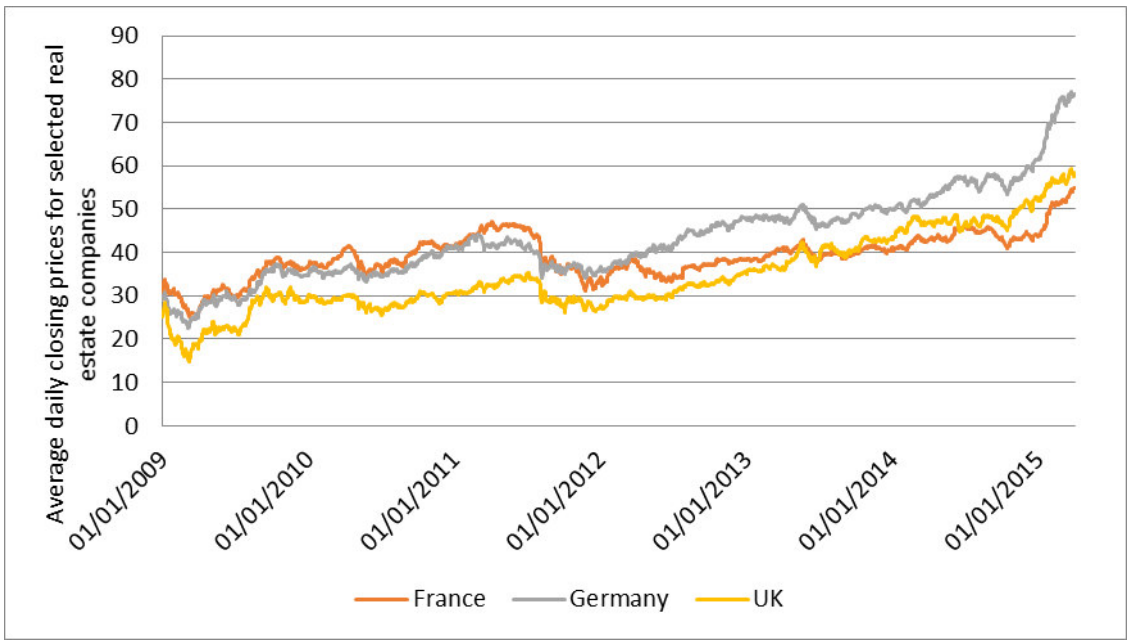
Article title	Publication date	Event date	Positive news	Source
Commission proposal for a regulation on OTC derivatives, central Counterparties and trade repositories	15.09.2010	15/09/2010	no	EC
Geithner urges EU to fall in line with derivatives rules	09.06.2011	09/06/2011	no	FT
Dodd-Frank delays offer OTC reprieve	06.07.2011	15/06/2011	yes	FT
Fears on OTC derivatives plan	15.07.2011	15/07/2011	no	FT
Clearing house push set for delay	25.01.2013	25/01/2013	yes	FT
Deadline set for derivatives dealers	08.11.2013	08/11/2013	no	FT

Given the international nature of the reforms and the large number of parties involved in the consultations, information is less likely to remain confidential. For this purpose, we choose an event window of three days instead of just one day allowing for market anticipation and delayed reaction. Schäfer et al. (2015) also choose an event window of three days – one day before the announcement, the day of the announcement when the article is published and one day after the announcement.

3.2 Market data

We use stock prices and prices of CDSs of real estate companies sourced from Datastream. The focus on European countries is explained by the fact that the regulatory reforms we study affect predominately European-domiciled companies. The countries are selected as they have the largest listed real estate markets and we expect little effect of the European sovereign debt crisis. We conduct the study for several sets of companies. The baseline estimation consists of a sample of 17 companies from France, Netherlands and the UK with a market capitalisation of more than 2 billion euro. A country-specific estimation consisting of 15 French property companies, 13 German companies and 23 British companies has also been conducted to compare the outcomes across different countries. A sample of companies distinguishing between low LTV companies including 17 companies from the UK, France and Germany all together with the lowest LTV ratio, and a sample of companies including 20 companies with the highest LTV ratio are also considered. A low Debt-to-Equity (DE) ratio sample includes 13 companies from the UK, France and Germany with the lowest DE ratio, and a high DE sample including 17 companies with the highest DE ratio. We also account for small versus large companies. The small sample includes the 7 smallest companies from the UK, France and Germany in terms of assets; the large sample includes the 16 largest companies. We also look at a sample of the 20 largest listed real estate companies which do not have the REIT status. With regards to equity performance, we use daily prices. In Figure 1 we show daily equally-weighted country indices of the stocks from the full sample from January 1, 2009 to April 1, 2015, which spans the entire sample period.

Figure 1: Real estate companies' daily stock prices in periods of financial market regulation



Note: The graph shows equally-weighted indices of real estate companies for each country, ranging from January 2009 to April 2015.

With regards to the market returns, we use a global market index in the baseline estimations in order to exclude the possibility of spillover effects across stock markets in different countries. Such an approach has been adopted in Ongena et al. (2003) and Schäfer et al. (2015). We use the Stoxx Global Total Market Net Return Index. For robustness purposes, alternative estimations are conducted using the Global MSCI index.

3.3 Estimation procedure

One way to account for the impact of regulatory announcements is to use an event study (Schwert, 1981; Binder, 1985; Brown and Warner, 1985; Lamdin, 2001). We measure the effect of a regulatory event on the day of its announcement by calculating the abnormal returns for each company. In order to capture the effect of regulation we augment the market model by event dummy variables (Binder, 1985; Schäfer et al., 2015). This approach differs from the standard way event studies are conducted. The majority of studies applying event studies account for abnormal returns by looking at the residuals applying a two-stage OLS regression. The reason for using the dummy variable approach rather than the classical two-stage estimation is that our events are associated with regulations simultaneously affecting all companies rather than with company-specific events. Shipper and Thompson (1983) and Campbell et al. (1996) argue that the dummy-variable approach increases the efficiency of the estimation accounting for (1) multiple announcement events for a given regulatory change, (2) high cross-sectional correlation in the residuals and (3) small sample size. The correlation across the residuals can be due to the fact that the announcement of news occurs on the same date for all companies, as is the case for international regulations and to common industry factors across the companies. The model for equity consists of stock returns regressed on a constant, the return of the market index and event dummy variables for the respective regulation:

$$
\begin{aligned}
R_{1t} &= \alpha_1 + \beta_1 R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{1n} D_{1nt} + \varepsilon_{1t} \\
&\dots \\
R_{it} &= \alpha_i + \beta_i R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{in} D_{int} + \varepsilon_{it} \\
&\dots \\
R_{It} &= \alpha_I + \beta_I R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{In} D_{Int} + \varepsilon_{It}
\end{aligned}
\tag{1}
$$

with i the return in day t with i = 1, ..., I and t = 1, ..., $T+1$, where T is the day of the regulatory announcement. R_{Mt} is the global market return which is the same for each company. However, the estimation coefficients – alpha and beta, as well as those for the dummy variables – differ across the companies. D_{int} denotes a vector of dummy variables for all sub-events in the estimation window associated with one regulation. Normally each equation will contain only one sub-event. However, if during the estimation window there have been previous news associated with the regulation, we follow Schäfer et al. (2015) and include those event dummies as well as a means of 'dummying out' the 'old' news. The idea is that the estimated returns account for previous adjustment to past events and the impact of the news is correctly estimated. For each sub-event there are three dummies. A pre-event dummy that takes the value 1 one day before the event (T–1) and zero otherwise. It is included in order to account for investors anticipating the regulatory news. An event dummy takes the value 1 on the day of the event (T) and the value of zero otherwise; and a post-event dummy which is equal to 1 one day after the event (T+1) and zero otherwise. The latter is included in order to account for investors who react to regulatory news with some lag due to e.g. differences in trading times. The dummy coefficient τ_{in} measures the abnormal return for a company i for a given day t in the event window. The estimation window begins 80 trading days before the sub-event and ends one day after it. For robustness purposes, we estimate the models using an estimation window of 40 days and 120 days as well.

We estimate model (1) as a system of equations using a seemingly unrelated regression (SUR) (Zellner, 1962; Binder, 1985). The alternative would be to use a two-stage least square regression as in Campbell al. (1996) but the SUR is shown to be more appropriate to estimate the standard errors as it accounts for regulatory events which have a simultaneous effect on a large sample of companies at the same time. For each sub-event a separate system is estimated which leaves us in the case of Basel III with 18 systems for the 18 sub-events.

Moreover, in order to measure the impact of regulatory news on the market risk of each firm, we expand the system in (1) to directly account for regulatory effects on the beta coefficients during the event:

$$R_{1t} = \alpha_1 + \beta_1 R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{1n} D_{1nt} + \delta_1 D_{1Et} R_{Mt} + \varepsilon_{1t}$$

...

$$R_{it} = \alpha_i + \beta_i R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{in} D_{int} + \delta_i D_{iEt} R_{Mt} + \varepsilon_{it} \quad (2)$$

...

$$R_{It} = \alpha_I + \beta_I R_{Mt} + \sum_{n=T-1}^{T+1} \tau_{In} D_{Int} + \delta_I D_{IEt} R_{Mt} + \varepsilon_{It}$$

with D_{iEt} an interaction dummy variable which is set equal to one during the event. δ_i accounts for the instantaneous change in the asset's sensitivity to the market which occurs on the day of the announcement. As discussed by Lamdin (2001), δ_i is an estimate of the transitional response of beta as it captures the change in beta only during the event but not before or after the regulatory announcement. Therefore, model (2) simultaneously tests for the required return effect (β_i) and the revaluation effect (δ_i).

The CDS spreads are modelled using the constant return model (Campbell et al., 1996). The model is similar to that in (1); however, it does not include the market return:

$$\Delta CDS_{1t} = \alpha_1 + \sum_{n=T-1}^{T+1} \tau_{1n} D_{1nt} + \varepsilon_{1t}$$

...

$$\Delta CDS_{it} = \alpha_i + \sum_{n=T-1}^{T+1} \tau_{in} D_{int} + \varepsilon_{it} \quad (3)$$

...

$$\Delta CDS_{It} = \alpha_I + \sum_{n=T-1}^{T+1} \tau_{In} D_{Int} + \varepsilon_{It}$$

Where α_i denotes the mean of the first difference of the CDS spreads (ΔCDS_{it}) within the estimation window. The estimation is as described above. The number of equations in (3) is six as only a few real estate companies issue CDSs.

4. Results

4.1 Equities

4.1.1 Basel III

The baseline results are presented in Table 2. We show the average abnormal returns (AARs) across all 17 European companies for each announcement together with a test for the joint significance of the company returns for each announcement. In 10 out of the 18 Basel III news, we observe significant AARs which vary between -2% and 3%. This means that even though Basel does not regulate property companies directly, the banking regulation has a significant indirect effect on their returns through the channels described above. It seems that the market responds significantly to both positive and negative news. In nearly 50% of the positive (negative) news, we observe a significant increase (decrease) in AARs. It can be the case that companies which rely more heavily on debt would be more strongly affected by Basel III announcements as it is a regulation for banks and as such affects the provision of capital for developers. Hence, we would expect that if the companies rely more heavily on bank loans, they would be more strongly and negatively affected by Basel III. Table 3 shows how the most indebted companies in terms of LTV and DE ratios respond to the news as compared to the least indebted ones. Our assumption is confirmed by the results. We observe that companies which have some of the highest LTV ratios respond significantly to a much larger proportion of the news. In 14 out of the 18 cases we observe a significant response. For the companies with the lowest LTV ratio – only eight events are significant – however, this is still nearly 50% of the cases. We also observe that the AARs are larger for the companies with high LTV ratios.

Table 2: Average abnormal returns for European property companies associated with news about Basel III, AIFMD and EMIR

Note: The table shows the average abnormal return (AAR) for a sample of 17 companies from the UK, France and Netherlands. The sample period spans from January 2009 until April 2015. AAR refers to the average abnormal return of the real estate operating companies for each subevent. The results are based on SUR regressions using an estimation window of 80, and for robustness checks of 40 or 120 trading days. Stock returns are estimated on the basis of the Stoxx Total Market Return Index and the MSCI Global Return Index. The dependent variable is daily stock returns of real estate companies. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

2A. Basel

		80 days						40 days			120 days		
		STOXX			MSCI			STOXX			STOXX		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
02/04/2009	no	-0.0006	***	0.0000	-0.0010	***	0.0000	0.0044	***	0.0000	-0.0006	***	0.0000
25/06/2010	yes	0.0040		0.3552	0.0024		0.3364	0.0023	***	0.0044	0.0025		0.7065
13/09/2010	no	-0.0038	***	0.0019	-0.0064	***	0.0019	-0.0035	***	0.0000	-0.0015	**	0.0230
20/10/2010	yes	0.0303	*	0.0611	0.0316	***	0.0027	0.0315	***	0.0000	0.0348		0.3790
12/11/2010	no	-0.0019		0.7680	-0.0022		0.6991	-0.0011		0.1858	-0.0024		0.9736
16/12/2010	no	-0.0069	*	0.0645	-0.0049	*	0.0761	-0.0075	***	0.0000	-0.0056		0.2065
27/05/2011	yes	0.0202		0.2234	0.0139		0.5217	0.0230	*	0.0750	0.0192		0.4631
19/07/2011	no	-0.0011	***	0.0000	-0.0060	***	0.0001	-0.0014	***	0.0000	-0.0027	***	0.0015
10/10/2011	no	-0.0068		0.8935	-0.0132		0.8200	-0.0057		0.9250	-0.0062		0.8773
18/10/2011	no	-0.0211	**	0.0277	-0.0187		0.1014	-0.0201	***	0.0000	-0.0213	**	0.0384
09/01/2012	no	0.0008		0.1679	0.0003	*	0.0811	0.0024	***	0.0004	0.0011		0.4961
03/04/2012	yes	0.0059		0.3539	0.0073		0.4768	0.0067	***	0.0001	0.0104		0.7936
12/04/2012	no	-0.0232		0.2141	-0.0265		0.3559	-0.0304	***	0.0000	-0.0210		0.2949
16/05/2012	no	0.0089	***	0.0005	0.0066	***	0.0000	0.0158	***	0.0000	0.0062		0.2205
11/07/2012	no	-0.0002		0.9507	-0.0010		0.8640	-0.0004	***	0.0001	-0.0009		0.9655
07/01/2013	yes	0.0134	***	0.0000	0.0113	***	0.0000	0.0130	***	0.0000	0.0129	*	0.0673
22/03/2013	no	-0.0034	**	0.0430	-0.0037		0.0590	-0.0049	***	0.0053	-0.0026	**	0.0328
13/01/2014	yes	-0.0030	***	0.0001	-0.0025	***	0.0000	-0.0025	***	0.0000	-0.0034	***	0.0044

2B. AIFMD

		80 days						40 days			120 days		
		STOXX			MSCI			STOXX			STOXX		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
20/04/2009	no	-0.0135	***	0.0017	-0.0137	***	0.0016	-0.0147	***	0.0000	-0.0135	***	0.0017
06/05/2009	no	-0.0035	***	0.0011	-0.0007	***	0.0026	-0.0026	***	0.0000	-0.0051	***	0.0066
10/08/2009	yes	0.0908		0.2201	0.0916		0.2722	0.0920	***	0.0000	0.0931		0.6957
23/10/2009	yes	0.0000		0.9389	0.0013		0.9540	0.0022	*	0.0978	-0.0021		0.9967
10/02/2010	yes	0.0082	***	0.0000	0.0100	***	0.0000	0.0074	***	0.0000	0.0059	***	0.0000
12/03/2010	yes	0.0016		0.9985	-0.0029		0.9994	0.0015		0.2566	0.0020		0.9999
10/05/2010	no	0.0319	***	0.0000	0.0350	***	0.0000	0.0400	***	0.0000	0.0340	***	0.0000
12/07/2010	yes	-0.0012		0.7739	0.0003		0.8077	-0.0047		0.2823	-0.0025		0.6517
10/11/2011	no	-0.0044	**	0.0261	-0.0079	**	0.0325	-0.0060	***	0.0001	-0.0050	***	0.0025
02/04/2012	no	0.0054		0.9903	0.0035		0.9795	0.0032	*	0.0516	0.0022		0.9989
28/03/2013	no	-0.0016	***	0.0000	-0.0017	***	0.0000	-0.0020	***	0.0000	-0.0009	***	0.0000
01/07/2013	yes	-0.0209	***	0.0001	-0.0208	***	0.0001	-0.0201	***	0.0000	-0.0211	***	0.0001

2C. EMIR

		80 days						40 days			120 days		
		STOXX			MSCI			STOXX			STOXX		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
15/09/2010	no	0.0067	***	0.0021	0.0064	***	0.0028	0.0074	***	0.0000	0.0095	***	0.0033
09/06/2011	no	-0.0058		0.7772	-0.0012		0.7020	0.0005	***	0.0002	-0.0056		0.9978
15/06/2011	yes	-0.0041		0.9976	-0.0025		0.5846	-0.0068	**	0.0319	-0.0049		0.9996
15/07/2011	no	-0.0103	***	0.0000	-0.0091	***	0.0000	-0.0102	***	0.0000	-0.0123	***	0.0000
25/01/2013	yes	0.0050	**	0.0336	0.0035	***	0.0174	0.0040	***	0.0000	0.0051		0.4495
08/11/2013	no	-0.0047	***	0.0000	-0.0055	***	0.0000	-0.0041	***	0.0000	-0.0027	***	0.0000

Table 3: Comparison of average abnormal returns associated with news about Basel III, AIFMD and EMIR for property companies with different leverage levels

Note: The table shows the average abnormal return (AAR) for property companies from the UK, France and Germany. The low LTV sample includes the 17 companies from UK, France and Germany all together with the lowest LTV ratio, the high LTV sample includes the 20 companies with the highest LTV ratio. The low DE ratio sample includes the 13 companies from the UK, France and Germany all together with the lowest DE ratio, the high DE sample includes the 17 companies with the highest DE ratio. The sample period spans from January 2009 until April 2015. AAR refers to the average abnormal return of the real estate operating companies for each subevent. The results are based on SUR regressions using an estimation window of 80 trading days. Stock returns are estimated on the basis of the Stoxx Total Market Return Index. The dependent variable is daily stock returns of real estate companies. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

3A. Basel III

		Low LTV			High LTV			Low Debt-to-Equity			High Debt-to-Equity		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
02/04/2009	no	0.0044	***	0.0000	-0.0259	***	0.0000	0.1802	***	0.0056	0.0853	**	0.0269
25/06/2010	yes	0.0056		0.3054	-0.0163		0.4096	0.0386		0.1740	-0.0122		0.3602
13/09/2010	no	0.0005		0.1339	-0.0118	***	0.0000	0.0830		0.1323	-0.0009	**	0.0308
20/10/2010	yes	0.0159		0.3443	-0.0221	***	0.0000	0.0542		0.1928	-0.0232	***	0.0000
12/11/2010	no	-0.0184	***	0.0000	-0.0002		0.1988	-0.0063	*	0.0586	-0.0018	***	0.0000
16/12/2010	no	-0.0082	***	0.0000	-0.0491	***	0.0000	-0.0160	***	0.0000	-0.0038	***	0.0014
27/05/2011	yes	0.0184		0.8071	-0.0170		0.9625	0.0328		0.7434	-0.0042		0.9992
19/07/2011	no	-0.0098	***	0.0005	-0.0213	***	0.0074	-0.0184	***	0.0000	-0.0019	**	0.0398
10/10/2011	no	-0.0098		0.3406	-0.0070		0.4422	-0.0115		0.9855	-0.0457	*	0.0857
18/10/2011	no	-0.0201		0.1352	-0.0071	***	0.0121	-0.0030		0.9414	-0.0038	**	0.0180
09/01/2012	no	0.0095		0.4646	-0.0130	***	0.0004	-0.0281		0.6818	-0.0175	***	0.0003
03/04/2012	yes	-0.0154	**	0.0727	-0.0375	***	0.0011	-0.0283		0.1058	-0.0071		0.1671
12/04/2012	no	-0.0005		0.4925	-0.0124	*	0.0795	-0.0246		0.4839	-0.0140		0.9476
16/05/2012	no	-0.0007	***	0.0000	-0.0111	***	0.0000	-0.0494	***	0.0000	-0.0121	**	0.0150
11/07/2012	no	-0.0026		0.6948	-0.0244	***	0.0001	-0.0081		0.5759	-0.0094	***	0.0000
07/01/2013	yes	0.0027	***	0.0014	-0.0102	***	0.0000	-0.0019		0.4105	-0.0047	***	0.0154
22/03/2013	no	-0.0058		0.1545	-0.0082	***	0.0000	-0.0019		0.2660	-0.1420	***	0.0123
13/01/2014	yes	-0.0018	***	0.0000	-0.0190	***	0.0000	-0.0033		0.1095	-0.0026	***	0.0000

3B. AIFMD

		Low LTV			High LTV			Low Debt-to-Equity			High Debt-to-Equity		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
20/04/2009	no	-0.0789		0.4047	0.0015		0.1591	0.0542		0.3518	0.0636		0.5862
06/05/2009	no	0.0008	***	0.0000	-0.0095	***	0.0017	-0.0178	***	0.0000	0.0061	***	0.0007
10/08/2009	yes	-0.0319	***	0.0042	-0.0065	***	0.0000	0.0230	***	0.0092	0.0011	***	0.0000
23/10/2009	yes	0.0022		0.1547	0.0294		0.6042	0.0129		0.7159	0.0074		0.7804
10/02/2010	yes	-0.0128	*	0.0507	0.0088		0.4652	-0.0698		0.9879	-0.0012		0.3254
12/03/2010	yes	0.0057		0.4692	0.0193		0.5058	-0.0009		0.9674	-0.0022		0.6079
10/05/2010	no	0.0496	***	0.0000	0.1359	***	0.0000	-0.0278	***	0.0000	0.0203	***	0.0000
12/07/2010	yes	0.0197		0.2242	-0.0030	***	0.0000	0.0147		0.1546	0.0015	***	0.0010
10/11/2011	no	-0.0105		0.1802	-0.0243	***	0.0000	0.0067		0.9603	-0.0035	***	0.0036
02/04/2012	no	0.0110	***	0.0095	0.0162	***	0.0000	-0.0367	**	0.0228	0.0008	**	0.0106
28/03/2013	no	0.0130		0.1757	0.0151		0.8830	0.0631		0.9419	-0.1292		0.5116
01/07/2013	yes	-0.0069	***	0.0000	-0.0017		0.1427	-0.0039	***	0.0001	0.0052	***	0.0092

3C. EMIR

		Low LTV			High LTV			Low Debt-to-Equity			High Debt-to-Equity		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
15/09/2010	no	0.0035	***	0.0133	-0.0083	***	0.0000	-0.0123	**	0.0425	-0.0281	**	0.0256
09/06/2011	no	0.0047	***	0.0005	-0.0127	**	0.0439	0.0447	***	0.0059	-0.0096		0.4212
15/06/2011	yes	-0.0169		0.2963	-0.0159		0.3209	-0.0204		0.1122	-0.0087		0.5938
15/07/2011	no	-0.0128	***	0.0000	-0.0188		0.1908	0.0028	***	0.0000	0.0342	***	0.0001
25/01/2013	yes	0.0025		0.1310	-0.0114	***	0.0000	0.0033		0.3736	0.0028		0.5932
08/11/2013	no	0.0096		0.2798	-0.0195		0.7810	-0.0063	***	0.0092	-0.0300		0.1309

In a similar way, we observe that companies with the highest DE ratio respond significantly in 14 cases whereas companies which have the lowest DE ratios respond significantly in only four times. The coefficients are also much larger in the first group with AARs as high as 8.5% and as low as -14%. This is a large difference suggesting that Basel III has almost no effect on companies which are highly relying on equity financing. We can see that some of the news show the opposite sign as to what the effect of the news is expected to be. It suggests that the market may have expected some news about the regulation; however, those expectations have been worse or better than the actual news. This can be common in large-scale regulatory events for which the market forms some expectations which with the onset of the news are adjusted upwards or downwards.

With regards to the size of the companies, we split the sample in three categories – small property companies, large property companies (most of them are REITs) and large non-REITs. We see the highest responsiveness in non-REIT companies (see Table 4). When we include all of the largest companies we see that in eight cases the response is significant – similar to the baseline results. When we account for the smallest companies, only five news have a significant effect. This result is surprising as we would expect that large companies would have access to diverse sources of capital in comparison with smaller companies. We suggest that the possible reason for large companies being more affected lies in their greater stock liquidity providing a mechanism for an immediate market response.

Table 4: Comparison of average abnormal returns for small versus large property companies as well as for large non-REITs associated with news about Basel III, AIFMD and EMIR

Note: The table shows the average abnormal return (AAR) for property companies from the UK, France and Germany. The small sample includes the 7 smallest companies from the UK, France and Germany all together in terms of assets, the large sample includes the 16 largest companies and the large non-REIT sample includes the 20 largest non-REITs. The sample period spans from January 2009 until April 2015. AAR refers to the average abnormal return of the real estate operating companies for each subevent. The results are based on SUR regressions using an estimation window of 80 trading days. Stock returns are estimated on the basis of the Stoxx Total Market Return Index. The dependent variable is daily stock returns of real estate companies. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

4A. Basel III

		Small			Large			Large non-REITs		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
02/04/2009	no	0.1254	***	0.0000	0.0654		0.1587	0.1469	***	0.0197
25/06/2010	yes	-0.0022		0.4492	0.0043	***	0.0101	0.0061	**	0.0418
13/09/2010	no	-0.0008		0.9805	0.0023		0.1813	-0.0008		0.7609
20/10/2010	yes	-0.0155		0.7119	0.0009	***	0.0038	0.0775	***	0.0001
12/11/2010	no	-0.0041		0.5068	-0.0051		0.2579	-0.0192		0.1278
16/12/2010	no	-0.0157	***	0.0060	-0.0116		0.2129	0.0003	***	0.0124
27/05/2011	yes	-0.0241		0.8178	0.0092	*	0.0638	-0.0021		0.4493
19/07/2011	no	0.0246	***	0.0000	0.0060	***	0.0000	0.0251	***	0.0000
10/10/2011	no	0.0350		0.9569	-0.0265		0.4465	-0.0111		0.1676
18/10/2011	no	0.0020		0.9982	-0.0375		0.1961	-0.0204		0.9042
09/01/2012	no	-0.0046		0.9978	-0.0161	***	0.0001	0.0160	***	0.0002
03/04/2012	yes	-0.0010		0.8887	0.0084		0.5178	0.0064	***	0.0007
12/04/2012	no	-0.0013		0.9552	0.0277		0.1856	0.0089		0.2641
16/05/2012	no	-0.0026	***	0.0000	0.0021	***	0.0000	0.0061	***	0.0000
11/07/2012	no	-0.0031	***	0.0058	0.0052		0.1700	0.0089	***	0.0000
07/01/2013	yes	-0.0042		0.2775	0.0017	***	0.0000	0.0228	***	0.0000
22/03/2013	no	0.0007		0.9151	0.0114	***	0.0006	0.0215	***	0.0000
13/01/2014	yes	0.0012		0.9922	0.0115		0.1567	0.0009	***	0.0196

4B. AIFMD

		Small		Large		Large non-REITs	
Event date	**Positive news**	**AAR**	**p-value**	**AAR**	**p-value**	**AAR**	**p-value**
20/04/2009	no	0.0054	0.7610	-0.0484 **	0.0342	-0.0233 ***	0.0002
06/05/2009	no	0.0305	0.1999	-0.0077 ***	0.0013	-0.0536 ***	0.0000
10/08/2009	yes	-0.0036	0.3766	-0.0103	0.5001	-0.0337 ***	0.0021
23/10/2009	yes	-0.0016	0.9812	-0.0017	0.9042	-0.0162 ***	0.0145
10/02/2010	yes	0.0020	0.7849	-0.0145 ***	0.0000	-0.0032	0.9800
12/03/2010	yes	0.0043	0.6387	0.0000	1.0000	0.0126	0.9722
10/05/2010	no	-0.0067 ***	0.0000	-0.0681 ***	0.0000	-0.0426 ***	0.0000
12/07/2010	yes	-0.0028	0.3771	-0.0103	0.2070	-0.0105	0.3213
10/11/2011	no	-0.0068	0.9881	-0.0167 *	0.0657	-0.0194 *	0.0866
02/04/2012	no	-0.0020	0.4993	-0.0210	0.9081	-0.0205 ***	0.0011
28/03/2013	no	-0.0012	0.9842	-0.0132 ***	0.0027	-0.0105	0.1877
01/07/2013	yes	0.0032	0.8864	-0.0153 ***	0.0001	-0.0142 ***	0.0055

4C. EMIR

		Small		Large		Large non-REITs	
Event date	**Positive news**	**AAR**	**p-value**	**AAR**	**p-value**	**AAR**	**p-value**
15/09/2010	no	-0.0030	0.9110	-0.0191 *	0.0730	-0.0059	0.1788
09/06/2011	no	-0.0044 **	0.0104	-0.0091	0.9518	-0.0021	0.1503
15/06/2011	yes	-0.0008 **	0.0273	-0.0001	0.9691	-0.0254	0.8462
15/07/2011	no	-0.0026	0.2655	-0.0050 ***	0.0000	-0.0012 ***	0.0002
25/01/2013	yes	-0.0060	0.9999	-0.0089 ***	0.0006	-0.0042 ***	0.0001
08/11/2013	no	-0.0057	0.9930	-0.0021 **	0.0480	-0.0156 ***	0.0000

When assessing whether there are different effects across the countries, we extend the sample and estimate a separate system of equations for each country (see Table 5). We can see that the most significant AARs are observed in the UK – 14 out of 18 of the news have significant effects. In comparison, in France and Germany the effect is nearly the half with 8 and 9 significant events, respectively. The AARs for the UK are also considerably larger than those for the other two countries

varying between -2.5% and 7.5%. For France, the AAR ranges between -2.7% and 1%. In Germany, the abnormal returns vary between -2.9% and 1.6%. Overall, the most positive effect of Basel III is reported in the UK, the most negative effect is observed in Germany.

Table 5: Comparison of average abnormal returns for UK, French and German property companies associated with news about Basel III, AIFMD and EMIR

Note: The table shows the average abnormal return (AAR) for property companies from the UK, France and Germany. The sample period spans from January 2009 until April 2015. AAR refers to the average abnormal return of the real estate operating companies for each subevent. The results are based on SUR regressions using an estimation window of 80 trading days. Stock returns are estimated on the basis of the Stoxx Total Market Return Index. The dependent variable is daily stock returns of real estate companies. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

5A. Basel III

		UK			France			Germany		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
02/04/2009	no	0.0745	***	0.0000	-0.0081	***	0.0001	-0.0163	***	0.0000
25/06/2010	yes	0.0089	*	0.0816	0.0058		0.3082	-0.0294		0.1482
13/09/2010	no	0.0028	**	0.0255	-0.0050	***	0.0000	-0.0005		0.0966
20/10/2010	yes	-0.0069		0.2649	-0.0053		0.6112	-0.0003	***	0.0000
12/11/2010	no	-0.0172		0.1214	-0.0087		0.8933	-0.0127		0.1373
16/12/2010	no	-0.0255	***	0.0017	-0.0045		0.3648	-0.0038	**	0.0467
27/05/2011	yes	-0.0111		0.5732	-0.0081	*	0.0746	-0.0155		0.9997
19/07/2011	no	-0.0054	***	0.0039	-0.0060	***	0.0000	-0.0226	***	0.0000
10/10/2011	no	-0.0013	*	0.0589	-0.0075		0.4200	-0.0039		0.5523
18/10/2011	no	-0.0005	***	0.0074	-0.0246		0.3121	-0.0041	***	0.0003
09/01/2012	no	0.0216	***	0.0034	-0.0075	***	0.0002	0.0003		0.9636
03/04/2012	yes	0.0085	***	0.0000	-0.0049		0.5570	-0.0088		0.5949
12/04/2012	no	-0.0233	*	0.0637	-0.0207		0.1403	-0.0060	***	0.0045
16/05/2012	no	-0.0089	***	0.0000	-0.0271	***	0.0000	-0.0187	***	0.0000
11/07/2012	no	0.0015		0.6569	0.0117		0.9561	0.0123		0.2213
07/01/2013	yes	0.0227	***	0.0003	-0.0035	***	0.0076	-0.0026		0.2728
22/03/2013	no	0.0026	***	0.0000	-0.0014	***	0.0000	-0.0164	***	0.0001
13/01/2014	yes	0.0120	***	0.0032	0.0021		0.3253	-0.0162	***	0.0004

5B. AIFMD

		UK			France			Germany		
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**		**p-value**
20/04/2009	no	-0.0243	**	0.0183	-0.0178	***	0.0039	-0.0216		0.1517
06/05/2009	no	-0.0227	**	0.0101	-0.0127		0.1283	-0.0145	***	0.0000
10/08/2009	yes	-0.0219	**	0.0229	-0.0007	***	0.0000	-0.0643	***	0.0013
23/10/2009	yes	-0.0401		0.6194	-0.0012		0.9996	-0.0076	**	0.0156
10/02/2010	yes	-0.0144		0.2965	-0.0040		0.1927	-0.0091	***	0.0000
12/03/2010	yes	-0.0078		0.1459	-0.0005		1.0000	-0.0016		0.9244
10/05/2010	no	-0.0008	***	0.0000	-0.0099	***	0.0000	-0.0186	***	0.0000
12/07/2010	yes	-0.0005	**	0.0341	-0.0029		0.5275	-0.0059		0.9824
10/11/2011	no	-0.0040		0.8229	-0.0044	**	0.0293	-0.0214		0.9104
02/04/2012	no	-0.0146	***	0.0000	-0.0268	***	0.0000	-0.0157		0.1422
28/03/2013	no	-0.0145		0.1512	-0.0096		0.0000	-0.0072		0.8308
01/07/2013	yes	-0.0032	***	0.0000	-0.0242		0.0002	-0.0400	**	0.0142

5C. EMIR

		UK			France			Germany	
Event date	**Positive news**	**AAR**		**p-value**	**AAR**		**p-value**	**AAR**	**p-value**
15/09/2010	no	-0.0250		1.0000	-0.01065	***	0.0051 6	-0.0042	0.6957
09/06/2011	no	-0.0181	***	0.0000	-0.03074		0.9991 4	-0.0160	0.1743
15/06/2011	yes	-0.0194	***	0.0000	-0.01216		0.9931 6	-0.0177	0.2754
15/07/2011	no	-0.0134		1.0000	-0.00191	***	0.0043 5	-0.0013	0.2805
25/01/2013	yes	-0.0044		0.9998	-0.00291		0.1756 7	-0.0045	0.3856
08/11/2013	no	-0.0026		0.9525	-0.00051	***	0.0046	-0.0119	0.1912

4.1.2 AIFMD

For the baseline estimation, we can see that the AAR varies between -2% and 9% for AIFMD depending on the news (see Table 2). We observe that in seven out of the 12 events, property companies respond significantly. This means that even though AIFMD does not regulate all listed property companies, the regulation has a significant indirect effect on their returns which can be due to the uncertainty regarding whether companies fall within the regulation. The highest significant response is observed on 10.05.2010 when the AAR increased by 3.2%. On average the effect is similar to that observed for the Basel III event though AIFMD is not such a large-scale regulation. However, the reason can be that regulation targeting these institutions have been introduced for the first time and hence market participants can be 'surprised' by such announcements. The results show that the market is more responsive to negative news than to positive news. Out of the seven significant cases, five are associated with negative news given that the total number of negative news with regards to AIFMD is six. In two out of the seven cases, we observe the opposite sign to what we expect given the news. This often happens on the stock exchange when market participants have different expectations. If they have expected that the news will be worse than what has been announced, even though the overall impact is negative, AARs can increase.

Regulation can have different impacts on the property company's returns depending on their level of leverage (Table 3). We find that there are between 5 to 7 significant responses out of 12 regulatory events. We do not observe differences between the high and low LTV ratio companies. The difference is that once we look at each category separately, market expectations seem to be the reverse of what has been announced since most coefficients have the opposite signs. This is not so much the case of the DE ratio split. We find that high DE ratio companies respond positively to both negative and positive news whereas companies with low DE ratios respond significantly negatively to negative news mainly.
We find strong differences between the responses of the small versus the large companies (Table 4). Small companies do not respond significantly to the news. Only in one out of the 12 cases we find a significant response. Whereas the opposite is true for the large companies – in 7-8 cases the response is significant. Again as above, the market is more responsive to negative news than to positive news. One difference to the baseline results is that in the case of large companies – the sign of the coefficients in most cases is the opposite to what we expect. This means that the market has incorporated expectations about the regulation but is caught by surprise about the direction of it.

When assessing the responses of property companies on an individual country level, we find that French, German and UK companies respond differently to the same regulatory news (see Table 5). Most significant responses are observed in the UK (seven cases). The AAR for UK varies between -2.2% and 2.4%. For France, the AAR ranges between -2.6% and 1.7% with only five significant events. In Germany, the abnormal returns vary between -4% and 6% which indicates the high volatility caused by the fund regulation. Again as above, most of the AARs are responsive to the negative news but to a lesser extent to positive news. That is not the case for Germany, where markets seem to respond to both – positive and negative news. The expectations of the market participants with regards to French companies seem to be least in line with the actual news. We see that in three out of the five significant cases, AARs have the opposite sign as to what has been expected to be the effect of the regulation. For German companies there is only one case with the opposite sign. These results can indicate that while market participates trading in German companies are surprised by the news overall, the French ones might be surprised by the extent of the regulation. Also, we find that different events have different impacts on companies in the three countries. Only in two of the cases, all countries respond significantly.

4.1.3 EMIR

EMIR is a much smaller scale regulation as compared to Basel III. However, it can affect all financial institutions which trade with derivatives and not only banks as Basel III. For this reason, we also assess the impact of it and compare it to the effects of large scale regulations. The baseline results in Table 2 show that EMIR has overall a significant impact on property companies' returns. The AAR varies

between -1% and 0.67% depending on the news. This effect is much smaller than the effects observed by the above two regulations which is understandable given the small scope of this regulation.

Furthermore, we do not find that there are large differences between companies with high versus low LTV ratios (Table 3). With regards to the DE ratio, it seems that companies with low DE ratio respond more often significantly to news about EMIR than companies with high DE ratios. When we compare the effect of the regulation across large and small companies (Table 4), we observe that the impact is stronger for large companies. This makes sense since most of the large companies actively hedge interest rate and exchange rate risks using derivatives such as swaps.

When assessing whether there are different effects across the countries (Table 5), we find some differences in the AARs across the UK, France and Germany. The AAR for UK is always positive but significant only in two cases with an AAR of 1.9%. For France, most of the AARs are negative and there are three significant announcements. In Germany, we do not observe any significant response. This is an interesting finding and differs from the effects of Basel III and AIFMD. While the latter have similar effects across the countries and the responses to them are significant, it seems that EMIR is perceived by the market participants differently in each country.

4.2 The effect of regulation on systemic asset risk

We can see that Basel III and EMIR do not lead to changes in the systematic risk as measured by beta on the day of the event (see Table 6). However, the AIFMD regulation leads to significant changes in the beta coefficient on the day of the announcement. In most cases however, the coefficient has the opposite sign to what the effect of the regulation is expected to be. When there are some negative news about AIFMD, we observe a decrease in the beta coefficient associated with a decrease in the systematic risk. This again as described above can be due to the fact that since the regulation has taken place over a longer period of time, market participants could develop some expectations about the reform and the market corrects for them once the news are announced. Overall, it seems that on average the systematic asset risk of property companies significantly decreases on the day of the announcement associated with news about the AIFMD.

Table 6: Changes in beta for European property companies due to regulatory news about Basel III, AIFMD and EMIR

Note: The table shows the average transitional beta value for the day of the news announcement for a sample of 17 companies from the UK, France and Netherlands. The sample period spans from January 2009 until April 2015. The results are based on SUR regressions using an estimation window of 80 trading days. Stock returns are estimated on the basis of the Stoxx Total Market Return Index. The dependent variable is daily stock returns of real estate companies. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

6A. Basel III

Event date	Positive news	Transitional beta		p-value
02/04/2009	no	-0.00001		0.1111
25/06/2010	yes	0.00004		0.1718
13/09/2010	no	-0.00004		0.2083
20/10/2010	yes	0.00033		0.0133
12/11/2010	no	-0.00002		0.7137
16/12/2010	no	-0.00007		0.8849
27/05/2011	yes	0.00020	**	0.0260
19/07/2011	no	-0.00001		0.1317
10/10/2011	no	-0.00008		0.7106
18/10/2011	no	-0.00023		0.2854
09/01/2012	no	0.00001		0.6830
03/04/2012	yes	0.00006		0.9901
12/04/2012	no	-0.00023		0.6615
16/05/2012	no	0.00009	***	0.0000
11/07/2012	no	0.00000		0.6479
07/01/2013	yes	0.00012	***	0.0000
22/03/2013	no	-0.00003		0.6477
13/01/2014	yes	-0.00002	***	0.0009

6B. AIFMD

Event date	Positive news	Transitional beta		p-value
0/04/2009	no	-0.00021	***	0.0028
06/05/2009	no	-0.00005	**	0.0283
10/08/2009	yes	0.00120	**	0.0376
23/10/2009	yes	0.00000		0.7109
10/02/2010	yes	0.00010	***	0.0002
12/03/2010	yes	0.00002		0.7459
10/05/2010	no	0.00034	***	0.0000
12/07/2010	yes	-0.00001		0.4804
10/11/2011	no	-0.00005		0.6140
02/04/2012	no	0.00005		0.6447
28/03/2013	no	-0.00001	***	0.0000
01/07/2013	yes	-0.00018	*	0.0561

6C. EMIR

Event date	Positive news	Transitional beta		p-value
15/09/2010	no	0.00007		0.1438
09/06/2011	no	-0.00006	*	0.0558
15/06/2011	yes	-0.00004		0.9965
15/07/2011	no	-0.00010		0.9041
25/01/2013	yes	0.00004	**	0.0397
08/11/2013	no	-0.00004		0.1865

4.3 Credit default swaps

The effect of Basel III is much smaller in terms of significance as only five out of 18 of the news have significant effects (see Table 7). The strongest significant negative abnormal return is -53% and the highest significant positive return is 4%. These are much larger AARs than those observed for the equity returns which shows that even though the market does not respond significantly to each announcement, once it does, the negative impact of Basel III on credit risk is much larger. The effect of the AIFMD on CDS swaps is significant in less than one half of the cases. It seems that the market responds significantly mainly to negative news and not so much to positive announcements. It means that the credit risk increases with negative news but does not decrease once there are positive announcements. The lowest significant average abnormal swap spread is -18% and the highest is 27%. The effect of EMIR on CDS spreads is small and in most cases not significant. The significant responses are biased to positive news only. The highest significant return is 3%.

Table 7: Average abnormal CDS spreads of European listed property companies associated with news about Basel III, AIFMD and EMIR using different rolling windows

Note: The table shows the average abnormal return (AAR) of CDS spreads for a sample of six companies from the UK and France. The sample period spans from January 2009 until April 2015. AAR refers to the average abnormal return of the real estate operating companies for each subevent. The results are based on SUR regressions using an estimation window of 80 trading days. All regressions include pre-event and post-event dummies in order to account for anticipation effects. Moreover, other news associated with the regulation in case they fall within the estimation window are dummied out.

7A. Basel III

		80 days		40 days		120 days	
Event date	**Positive news**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**
02/04/2009	no	-0.1076	0.6510	-0.1152 ***	0.0000	-0.1076	0.6510
25/06/2010	yes	-0.3070 **	0.0334	-0.3088 ***	0.0003	-0.3060 ***	0.0038
13/09/2010	no	-0.0099	1.0000	-0.0055	1.0000	-0.0192	1.0000
20/10/2010	yes	-0.0081	0.9954	0.0064	0.9522	-0.0181	0.9990
12/11/2010	no	0.0538	1.0000	0.0635	1.0000	0.0485	1.0000
16/12/2010	no	0.0019	0.6642	-0.0187	0.2772	0.0002	0.9757
27/05/2011	yes	0.0227	0.9999	0.0249 *	0.0717	0.0237	1.0000
19/07/2011	no	0.0245	0.7964	0.0208	0.2488	0.0243	0.8606
10/10/2011	no	-0.0303	0.1158	-0.0314 **	0.0218	-0.0214 **	0.0115
18/10/2011	no	-0.0104	0.9996	-0.0186	0.9996	-0.0026	0.9997
09/01/2012	no	0.0000 .		0.0000 .		0.0000 .	
03/04/2012	yes	0.0415 **	0.0145	-0.0681 **	0.0197	-0.0238	0.2105
12/04/2012	no	0.0222 ***	0.0041	-0.0464 ***	0.0033	-0.0329 **	0.0147
16/05/2012	no	-1.3675	0.5993	-1.3873 **	0.0230	-1.3017	0.6699
11/07/2012	no	-0.0612	0.9999	-0.0434	1.0000	-0.0396	1.0000
07/01/2013	yes	0.0510 ***	0.0000	0.2005 ***	0.0000	-0.0121 ***	0.0000
22/03/2013	no	-0.5343 ***	0.0001	-0.6370 ***	0.0000	-0.5252	0.1014
13/01/2014	yes	-0.1402	1.0000	-0.1197	0.9999	-0.1338	1.0000

7B. AIFMD

		80 days		40 days		120 days	
Event date	**Positive news**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**
20/04/2009	no	0.0016	0.9280	0.0045	0.9363	0.0016	0.9280
06/05/2009	no	-0.0612 ***	0.0000	-0.0531 ***	0.0000	-0.0597 ***	0.0000
10/08/2009	yes	-0.0210 ***	0.0000	-0.0299 ***	0.0000	-0.0184 ***	0.0000
23/10/2009	yes	-0.0098 ***	0.0000	-0.0012 ***	0.0000	-0.0121 ***	0.0000
10/02/2010	yes	-0.0004	1.0000	-0.0068	1.0000	0.0032	1.0000
12/03/2010	yes	0.0360	0.3696	0.0380 ***	0.0052	0.0437	0.3163
10/05/2010	no	-0.1833 ***	0.0000	-0.1956 ***	0.0000	-0.1843 ***	0.0000
12/07/2010	yes	0.1358	0.9771	0.1525	0.9719	0.1417	0.9576
10/11/2011	no	0.1477	0.5450	0.1583	0.4120	0.1583	0.2787
02/04/2012	no	0.2683 **	0.0053	0.2217 ***	0.0011	0.2020	0.1839
28/03/2013	no	0.0500	0.9632	-0.0430 ***	0.0018	0.0615	0.9341
01/07/2013	yes	-0.2244	1.0000	-0.1809	1.0000	-0.2133	1.0000

7C. EMIR

		80 days		40 days		120 days	
Event date	**Positive news**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**	**AAR (6 companies)**	**p-value**
15/09/2010	no	-0.0563	1.0000	-0.0628	0.9914	-0.0677	1.0000
09/06/2011	no	0.0106 ***	0.0000	0.0060 ***	0.0000	0.0137 ***	0.0000
15/06/2011	yes	0.0296 ***	0.0000	0.0239 ***	0.0000	0.0315 ***	0.0000
15/07/2011	no	-0.1314	0.1251	-0.1396 ***	0.0000	-0.1314	0.3026
25/01/2013	yes	0.2951	0.9999	0.3828	0.9991	0.3118	1.0000
08/11/2013	no	-0.0056	0.9501	0.0001	0.9315	0.0195	0.9997

4.4 Further robustness tests

Tables 2 and 7 also show results for estimations using an alternative market index – the MSCI global – and alternative estimation windows – 40 days and 120 days. Overall the results remain robust when using the alternative market index across the different specifications. With regards to the estimation windows, we observe that there are more significant announcements for the 40-day rolling window than for the 80-day window. When the sample is estimated using 120 days, there are even fewer significant responses. The same is observed for both equity and debt.

5. Concluding remarks

This study assesses the impact of announcements about international financial market regulatory reforms following the GFC on the equity and credit performance of listed real estate companies. In particular, we look at three international regulatory reforms undertaken in the aftermath of the global financial crisis – Basel III, AIFMD and EMIR – on returns of equity and the spreads of CDSs of real estate companies. The regulations have different scopes and affect differently financial institutions. While Basel III is a large-scale financial regulation which has widely been discussed in the media, EMIR has a smaller scope. However, Basel III regulated only banks while EMIR can affect all financial institutions which trade with derivatives. The challenge to assess the impact of the regulations lies in identifying the regulatory event dates. The reason is that large-scale reforms are phased out over many years and their final enactment can have already been anticipated by market participants. Therefore, we employ an event study using daily financial market data. The regulatory event dates are manually identified using media from international financial newspapers and news agencies. As we look at regulatory reforms enacted at a European level, we compare the effects across several European countries (the UK, Netherlands, Germany, and France) with large listed real estate sectors.

Our results show that, on average, market participants trading real estate securities and CDSs respond significantly to announcements about Basel III, AIFMD and EMIR; however, we observe differences across countries, types of companies (large versus small, more leveraged versus less leveraged) and the regulations themselves. The strongest effects for equity are associated with Basel III and AIFMD. The effects on the credit side are much larger in scale but less frequent. The effects of the regulations are strongest for UK companies yielding more significant and larger AARs. The regulatory announcements also have stronger impacts on larger companies and companies with high leverage. Overall, albeit not directly, the real estate market is significantly affected by news about financial regulatory reforms.

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