Bank Credit Risk Events and Peers' Equity Value

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Abstract

This paper documents a negative cross-transmission of bank-idiosyncratic credit risk events to the equity value of peers comprising other banks, insurance and real estate firms inter alia. Large jumps in the idiosyncratic component of bank CDS spreads significantly reduce the equity value of peers, particularly on the event day. The negative externality does not hinge on the "information connectedness" between the two entities as proxied by characteristics such as common core line of business, common country or region, and inter-country common legal tradition. The negative externality is stronger in turmoil market conditions when risk-aversion levels are higher and/or investors are subject to pessimism. The more fragile the risk profile of the event bank and peer firm prior to the event the stronger the cross-transmission. The findings lend support to the wake-up call paradigm at micro level, and are insightful towards a better assessment of the vulnerability of the financial system.

[150 words]

Keywords: Credit Risk Events; Credit Default Swaps; Equity value; European banking; Cross-transmission; Wake-up Call.

JEL classifications: C13; C58; G14; G20.

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1. Introduction

The late 2000s global financial crisis and European sovereign debt crisis triggered renewed interest about how distress specific to one bank transmits to other banks and more generally, to any financial institution (FI). A good understanding of the externalities of bank idiosyncratic distress is important for policymakers and regulators to measure systemic risk, preserve stability of the financial system and, in turn, to promote real economic growth.

This paper studies the externalities of bank-idiosyncratic credit events to the equity value of peer firms (hereafter, bank-event to peer transmission) in the European financial system. We depart from the literature in providing a fully disaggregated bank-to-peer analysis, as opposed to extant industry-level analyses that preclude firm heterogeneity in the cross-transmission (see e.g., Kenourgios et al., 2011; Baur, 2012; Mink & De Haan, 2013; Bekaert et al., 2014; Kenourgios & Dimitriou, 2015). As the aforementioned papers argue, studying the European financial system (instead of the US one, as it is most typical in the literature) is relevant because the two systems notably differ in supervision, regulation, structure and composition (degree of integration of local financial sectors).[1] Our paper thus enables micro insights towards a better assessment and management of the vulnerabilities of the European financial system.

Our work is inspired by the wake-up call theory of distress transmission at sovereign country level. The notion of wake-up calls in finance can be originally ascribed to Goldstein (1998); it has been formalized more recently in the theoretical model of Ahnert & Bertsch (2015). The main tenet is that awareness of financial distress in one sovereign induces investors to re-assess the fundamentals of other sovereigns regardless of their connectedness. We adapt the wake-up call theory at micro level to formulate and test various hypotheses. One hypothesis is that a bank-idiosyncratic credit risk shock induces investors to reassess the fundamentals of peers even if they perceive the two firms as weakly or no "informationally connected" regarding shared risk factors and other indirect links. Another hypothesis is that the negative externality is stronger if the shock arrives during turmoil market conditions than in calmer markets. Our analysis further seeks to ascertain the extent to which the negative externality of bank-specific credit risk shocks to peers' equity value hinges on the pre-shock fundamentals (risk profile) of the two firms. The analysis is conducted for a sample of 556 firms (banks, insurance, real estate

[1] For instance, by contrast with the US financial system, diverse FIs coexist in the European financial system such as those pertaining to the European Union (EU) versus non-EU countries, Euro currency area versus other currency countries, and FIs supervised through the Single Supervisory Mechanism (SSM) versus those supervised by national authorities; see, e.g., Allen et al. (2004) for a comprehensive discussion of differences between the European and US financial systems.

firms, and other types of FIs such as asset management and specialty finance firms) headquartered in 25 countries, which is fairly representative of the European financial system.

The literature recognizes that conducting tests for the wake-up call hypothesis at firm level is a challenge (e.g., Forbes, 2012; Ludwig, 2014) because the shock ought to be bank-specific. Accordingly, the first step of our analysis is the thorough identification of a set of bank idiosyncratic credit risk shocks, as opposed to more general shocks that comprise also a systematic component. We follow Jorion & Zhang (2007) and Saka et al. (2015) inter alia in using single-name CDS contracts to identify the credit events. CDS spreads enable a market-based measure of credit risk (e.g., Kiesel & Spohnholtz, 2017). Using a conservative rule, we identify an initial set of 124 credit risk shocks as the 0.1% most extreme unexpected CDS spread changes using a stylized pricing model that comprises local, global and industry risk factors. We then exclude from this initial set those events that are too close to each other in time (within a window of eleven days around each event) and comb the news to confirm that the events are bank-specific. At step two, the cross-transmission of each bank-specific credit risk event to the equity value of each peer is captured through the alpha-shift parameters of a market model with time-varying-volatility to accommodate event-induced heteroskedasticity.

The alpha-shift parameter estimates reveal that bank-idiosyncratic credit events adversely affect the equity value of peers on day 0 (event date) as borne out by a statistically significant daily abnormal return of -0.095% on average (an annualized -29.31% equity price fall) and the externality remains 5-days post-event, albeit lessening notably, as borne out by significant average daily abnormal return of -0.015% (an annualized -5.33% equity price fall).

Further analysis reveals that the externalities do not hinge on the actual or perceived "informational linkages" between event-bank and peer. Following Aharony & Swary (1996), Helwege & Zhang (2015), and Saka et al. (2015), we entertain the core line of business and cross-country economic/political integration as baseline proxies that capture shared risk factors between both entities. As regards core business, we classify the bank-peer pairs according to whether the peer is also a bank or some other FI. As regards cross-country economic/political integration, we follow Saka et al. (2015) inter alia and group the bank-peer pairs according to whether they are headquartered in the same country or different country within the same/different region. Additionally, we consider more subtle "informational linkages" proxies stemming from the home bias and gravity model literature that relate to shared characteristics of the event-bank country and peer country such as legal and cultural ties, a common geographical border, and measures of the interrelation between their banking sectors such as

the number of cross-country bank mergers and acquisitions (M&As) and inter-country bank branches (Portes & Rey, 2005; Guiso et al., 2009; Mayer & Zignago, 2011; Saka, 2020).

Our findings indicate that bank-idiosyncratic credit risk events negatively cross-transmit to peers' equity value not only in the case of the peers most likely to be perceived by market participants as "informationally linked" to the event-bank, but more generally. Thus our study adds new micro-level evidence to a richer literature that documents negative intra-industry externalities of individual bankruptcy announcements (e.g., Jorion & Zhang, 2009; Helwege & Zhang, 2015), financial distress (Akhigbe et al., 2015) and rating adjustments (e.g., Abad et al., 2020). Whereas these studies attribute the externalities mostly to common risk factors and shared information, our findings from a fully disaggregate (firm level) bank-to-peer analysis reveal an event transmission that does not hinge on such links, in line with wake-up calls.

The results suggest also a stronger equity value decline for peers with a less favourable risk profile in the year preceding the bank credit risk event. Likewise, the riskier the profile of the event-bank as captured, for instance, by higher average CDS spreads during the preceding year, the stronger the cross-transmission. These findings align well with the wake-up call tenet that a bank idiosyncratic credit risk shock prompts investors to reassess the risk of peers in the financial system, and more so when the event-bank itself is riskier pre-shock. As a by-product, we find that credit events originating in global systemically important (GSI) banks are transmitted more mildly to peers' equity which endorses "too-big-to-fail" policies and informs an ongoing debate on the effectiveness of implicit government guarantees for GSI banks.

Finally, using various measures of heightened financial risks and uncertainty about macroeconomic fundamentals, the results reveal a stronger cross-transmission of bank-idiosyncratic credit risk events to peers' equity value during turmoil market periods. This finding aligns with the notion that investors are more prone to wake-up calls when they are outside their comfort zone and experience higher risk aversion and/or are subject to pessimism.

Our paper adds new evidence to a scarce literature that tests for the presence of wake-up call (shock-transmission) effects in financial markets. Extant studies provide tests for wake-up calls in crises at country level (e.g., Van Rijckeghem & Weder, 2003; Karas et al., 2013; Mink & De Haan, 2013; Audzeyeva & Fuertes, 2018) or aggregate sector and region levels (e.g., Kenourgios et al., 2011; Bekaert et al., 2014; Kenourgios & Dimitriou, 2015). We contribute to this literature by providing micro (firm-level) evidence of wake-up calls. In doing so, we implement a strategy to identify bank-idiosyncratic credit-risk events, and also contribute specifically by analysing the behaviour of a wide set of European financial firms, banks and

peers, from countries with different levels of financial and economic integration and informational linkages that reinforces the extant evidence (mostly at aggregate level) on wake-up calls in the literature. Ours is also a first attempt to assess the role played by fundamentals of the event-bank and peers in the extent of the wake-up call transmission. By focusing on negative shocks affecting the bank-specific component of credit risk, our work also speaks to the literature on the analysis of intra-industry transmission of negative events to equity value (e.g., Jorion & Zhang, 2007; Helwege & Zhang, 2015 and Abad et al., 2020, inter alia).

In what follows, Section 2 presents the related literature and develops the hypotheses. Section 3 describes the data and methodology. Sections 4 and 5 discuss the empirical results and robustness tests, respectively. Section 6 concludes with a summary and implications.

2. Related literature and hypotheses development

Most studies documenting wake-up call effects in financial markets have been conducted at the level of macro shocks. Van Rijckeghem & Weder (2003) show that the Russian crisis had wake-up call effects on emerging bond markets. Audzeyeva & Fuertes (2018) find evidence to suggest that emerging bond markets became more realigned with fundamentals in the aftermath of the Lehman Brothers' collapse as a result of wake-up calls. Karas et al. (2013) support wake-up call effects induced by different banking crises in Russia, while Mink & De Haan (2013) find that the Greek sovereign debt crisis acted as a wake-up call for peripheral European countries. Using international asset pricing models with global and local factors, Bekaert et al. (2014) document that the late 2000s financial crisis transmitted globally via wake-up calls.

The present paper revisits empirically the main tenet of the wake-up call model of Ahnert & Berch (2015), namely, investors react to financial distress in a sovereign by appraising the risk of other (un)related sovereigns. The key novelty of our study is that we adapt the model's predictions at micro level to shed light on how financial distress transmits from firm to firm.

We begin by formulating a first hypothesis H1 that encapsulates the general cross-transmission notion that bad news about the credit risk of one bank adversely influences investors' perceptions about the fundamentals of peers in the financial system, namely

> H1*: Bank-specific credit risk shocks induce negative externalities in peers* (*banks and other financial firms*) *that materialize as a negative abnormal equity return or alpha shift.*

Such negative externalities can be induced, in principle, by a wake-up call mechanism and/or by an information-contagion mechanism.[3] Under the wake-up call theory, the investors' reassessment of peers' risk triggered by a bank-idiosyncratic credit risk shock does not hinge on any "information linkages" broadly defined here as any aspect of the shock receiver's (bank) risk profile that is perceived by investors as informative about the risk profile of the peer. Baseline aspects of information proximity that signal exposure to common risk factors are the core line of business (e.g., both entities are banks), and cross-country economic/political integration (e.g., both entities are headquartered in the same European region). More subtle aspects of "information connectedness" are signaled by the existence of cultural/ historical heritage ties between the countries where the two entities are, respectively, headquartered, sharing a geographical border or an official language inter alia (see Portes & Rey, 2005; Guiso et al., 2009; Saka, 2020). In sum, adapted at micro level the wake-up call theory predicts a peer's equity externality regardless of its "informational linkages" with the event bank. Bekaert et al. (2014) show that neither banking, trade nor financial linkages across countries played a key role in the cross-transmission of the recent global financial crisis; namely, the cross-transmission was not stronger from distress countries towards highly interconnected countries; accordingly, they rationalize the cross-transmission largely as a result of wake-up calls.

Hence, given that ruling out "information linkages" as drivers of the cross-transmission is key to rationalize the externalities as wake-up call effects, we formulate the hypothesis

H2*: The externalities of bank-idiosyncratic credit risk shocks to peers' equity value occur independently of actual/perceived "information linkages" between the two firms.*

We proxy "information linkages" by a broad set of indicators that are defined according to the firms' core line of business and country of headquarters. The highest level of proximity is deemed to occur when the peer is also a bank like the shock receiver, and when both firms are headquartered in the same country or in countries with a common legal tradition or cultural/historical heritage ties, among other aspects that we will discuss in detail in Section 3.

We should recall that, by definition, bank idiosyncratic credit events are rare and can happen at any time and in any market conditions. Forbes (2012) argues that during periods of more

[3] According to the information-contagion theory, the distress in one bank is relevant to pricing peer firms due to the exposure to common factors such as investments in the same assets, shared markets and portfolio or balance-sheet connections. Thus, the key prediction is that the cross-transmission is greater for peers that are highly connected with the bank where the distress originates. Dasgupta (2004) and Acharya & Yorulmazer (2008) provide theoretical models of information contagion, and Jorion & Zhang (2007), Helwege & Zhang (2015) and Aharony & Swary (1996) empirical evidence for the U.S.

uncertainty about economic fundamentals or financial institutions, the likelihood that such events trigger wake-up calls exacerbates. Cai et al. (2017) find evidence of stronger sovereign wake-up calls during crisis periods, namely, investors are then more prone to react to a sovereign-specific shock by paying substantially more attention to other sovereigns' fundamentals. The rationale for this is not only that investors' risk aversion levels tend to increase in turmoil periods, but also that investor sentiment turns more pessimistic (e.g., Baker & Wurgler, 2007; Zhou, 2018; Niţoi & Pochea, 2020). For instance, Niţoi & Pochea (2020) find that increases in pessimism amplify the correlation among European equity markets during the 2004-2016 period. Saka et al. (2015) find that pessimism contributed to the dramatic increase in sovereign CDS spreads and correlations during the 2009 Eurozone sovereign debt crisis. Bethke et al. (2017) also find that adverse investor sentiment increases risk factor correlation in the US bond market. Accordingly, in periods of financial turmoil the higher risk aversion levels and/or pessimism of market participants makes them more predisposed to interpret bank-idiosyncratic credit risk shocks as wake-up calls to reappraise the risk of other financial entities – this results in a greater cross-transmission of such events to peers' equity value (regardless of information linkages). These ideas can be encapsulated as the hypothesis

> H3*: The negative externalities of bank-idiosyncratic credit risk shocks to peers' equity value resulting from wake-up calls are greater in turmoil than calmer market conditions.*

To test this hypothesis we compare the extent of the cross-transmission during: *i*) the turmoil market period from December 2007 until December 2012 which captures the late 2000s global financial crisis and the European sovereign debt crisis, and *ii*) from January 2013 to April 2016 which can be seen as a 'recovery' period that ensued the announcement of several risk-stabilization policies such as the 2012 Outright Monetary Transactions (OMT) program by the European Central Bank. In robustness tests for this hypothesis, we entertain various proxies of financial market conditions, economic uncertainty and investor sentiment from the literature.

3. Data and methodology

The main data are daily CDS spreads and equity prices obtained from *Thomson Reuters Datastream* over the 10-year period from December 2, 2007 to April 14, 2016.[4] We collect

[4] Narayan & Sharma (2015) argue that data frequency matters in financial economics and that data sampled at a high frequency, such as daily, provides richer information than lower frequency data, such as weekly or monthly, to address particular research questions. For the purposes of our paper, the use of daily data is more appropriate for separating bank-specific or idiosyncratic credit risk shocks from systematic shocks (i.e., shocks that reflect shared risks across banks). Moreover, since it is expected that the cross-transmission of these shocks is short-lived (same-day effect or within-week effect), the evidence of wake-up call transmission is likely to be diluted in the context of lower frequency data.

single name closing daily bank CDS spread quotes for all European banks (reference entities) with CDS contracts available any time during the observation window; we use a broad definition of bank to include both conventional banks (listed and private) and other stakeholder-based FIs, known as mutual banks, that compete directly with banks in providing certain services such as mortgage lending and savings accounts – building societies in the UK, cooperative banks in France, landesbanken or sparkasse in Germany, and cajas de ahorro in Spain. The focus is on the (most actively traded and hence, liquid) 5-year maturity CDS contracts with the Modified Modified (MM) restructuring convention.[5] So as to further dispel any liquidity concerns, following Kiesel et al. (2016), we discard the CDS contracts with no spread changes in more than 35% of the sample days. The bank headquarters' location is used to classify the bank by country/region. Thus, we have an unbalanced panel of daily CDS spreads for 65 banks from 15 European countries. The start date is December 14, 2007 (for 39 banks), miscellaneous dates within 2008 (for 21 banks) or June 24, 2010 (for 5 banks).

The time-series of daily closing equity prices pertain to 794 FIs comprising 169 banks and 625 other non-bank FIs (75 are insurance companies, 202 real estate firms and 348 are firms providing other financial services).[6] To address liquidity concerns as for the CDS spreads but, bearing in mind the higher liquidity of equity, we adopt a stricter threshold – an equity time-series is discarded if the corresponding stock experiences no trade in more than 10% of sample days. Thus, we end up with another unbalanced panel of daily time-series of equity prices (556 in total) pertaining to 113 banks, 64 insurers, 112 real estate and 267 other FIs from the same 25 European countries. For FIs pertaining to non-Euro countries, the local-currency stock prices are converted into euros using FX exchange rate data from *Thomson Reuters Datastream*. Details on the entire cross-section FIs are provided in the online Annex Table A.1.

The main two variables for the analysis are the daily change in CDS spread, $\Delta CDS_{i,t} \equiv CDS_{i,t} - CDS_{i,t-1}$ for i=1,…,65 banks, and the daily logarithmic equity return $r_{j,t} \equiv \ln(P_{j,t}/P_{j,t-1})$ for j=1,…,556 FIs. Table 1 summarizes them per type of firm and country. As in Saka et al. (2015), we consider 5 country groups according to economic/political integration: core Eurozone (Austria, Belgium, Finland, France, Germany, Luxembourg and the

[5] A CDS contract insures the holder against bankruptcy, failure to pay and restructuring of the reference entity. To limit moral hazard, CDS contracts have different restructuring conventions (Packer & Zhu, 2005). The standard in Europe is the MM convention which establishes a time limit on deliverables based on the contract maturity. In order to have a fairly large sample of banks, when MM-convention CDS contracts are not available for a given bank, we use CDS contracts under the CR convention.

[6] Other FIs are investment fund and asset management firms, and specialty finance firms that focus on lending to consumers and small to medium-sized businesses that cannot otherwise obtain financing.

Netherlands); peripheral Eurozone (Greece, Ireland, Italy, Portugal and Spain); Core Standalone EU (Denmark, Norway, Sweden and the UK); peripheral standalone EU (Bulgaria, Channel Islands, Croatia, Czech Republic, Hungary, Poland and Romania); and Switzerland.

The Financial Stability Board (FSB), an international body that monitors the global financial system, classifies a bank or insurance firm as GSI if due to its size, complexity and interconnectedness, it is likely to disrupt the wider financial system and economic activity in the event of distress or disorderly failure. This classification is available on an annual basis for banks from 2011 on and for insurance firms from 2014 on. Since the FSB classifications are rather stable, we take the conservative approach of labelling a firm as GSI if it is classified as such by the FSB on any sample year. Our sample includes all GSIs in Europe according to the FSB (19 banks and 6 insurance firms). Table 1 gives the number of GSIs per country.

[Insert Table 1 around here]

The time period under study comprises the European sovereign debt crisis and therefore, it is not surprising to see higher and more volatile daily changes in CDS spreads for peripheral Eurozone countries, especially, Greece, Ireland and Portugal. The smallest and more stable CDS changes are for FIs in Norway and Sweden, both of which pertain to the standalone EU group. The mean daily equity returns are negative for FIs of peripheral Eurozone countries and of most Eurozone countries and peripheral standalone EU countries. The volatility of daily equity returns is relatively high for real estate firms relative to banks located in the peripheral Eurozone and standalone peripheral EU. The equity returns of banks and non-bank FIs with headquarters in Switzerland are on average positive and the volatility is relatively low.

3.1. Identification of bank-specific credit risk events

In order to identify the bank idiosyncratic credit risk events, we estimate a stylized CDS pricing model which allows the CDS spread of bank *i* to be driven by systematic *sovereign* credit risks of the local market (proxied by the corresponding country CDS index, I_1, and a European sovereign CDS index, I_2), the global market (proxied by a US sovereign CDS index, I_3), and by specific *banking industry* credit risks (proxied by a European bank CDS and US bank CDS index, I_4 and I_5, respectively). Data on the CDS indices are obtained from *Thomson Reuters Datastream*.[7] The stylized empirical CDS pricing model for bank *i* can be formalized as

[7] The series codes are Country Code + G5EAC for sovereign CDS indices (e.g., FRG5EAC for France and ESG5EAC for Spain); DSESV5y and DSNSV5y for the European and US sovereign CDS indices, respectively; DSEBG5y and DSNBG5y for the banking sector European and US indices, respectively.

$$\Delta CDS_{it} = a_{i0} + \sum_{f=1}^{5} b_{i,f}\Delta I_{ft} + \varepsilon_{it}, t = 1, \dots, T_i \quad (1a)$$

$$\sigma_{it}^2 = \theta_{0,i} + \theta_{1i}\sigma_{i,t-1}^2 + \varphi_i\varepsilon_{it}^2 \quad (1b)$$

where $\Delta I_{ft} \equiv I_{ft} - I_{f,t-1}$ with I_{ft} the CDS index spread f=1,…,5. Equation (1a) captures the conditional mean of the daily CDS spread change, and equation (1b) captures its time-varying conditional variance through a generalized autoregressive conditional heteroskedasticity (GARCH) specification. The daily CDS index spread changes, ΔI_{ft} are summarized in Table A.3 of the online Annex. The model is estimated per bank by Quasi Maximum Likelihood (QML) with T_i observations (T_i ranges from 1285 to 2130 days across banks $i = 1, \dots, 65$).

We identify the bank *credit events* using the Trutwein et al. (2011) approach that fully accommodates bank heterogeneity. Specifically, for each bank *i* in the sample we obtain the empirical distribution of idiosyncratic CDS changes as follows

$$\hat{z}_{it} = \frac{\hat{\varepsilon}_{i,t}}{\hat{\sigma}_{i,t}} = \frac{\Delta CDS_{it} - E_t(\Delta CDS_{it})}{\hat{\sigma}_{i,t}}, \; t = 1, \dots, T_i, \quad i = 1, \dots N, \quad (2)$$

where $\{\hat{\varepsilon}_{it}\}_{t=1}^{T_i}$ is the residual from the conditional mean Equation (1a) and $\hat{\sigma}_{i,t}$ is the conditional variance estimate from Equation (1b). Adopting the 99.9th percentile of $\{\hat{z}_{it}\}_{t=1}^{T_i}$ as a conservative threshold to define large positive CDS spread changes or jumps, we categorize day *t* for bank *i* as an idiosyncratic credit risk event date according to the following criteria

$$\Delta CDS_{it}^{*} \equiv \{\hat{z}_{it} | (\hat{z}_{it} > \hat{z}_i^{99.9})\}. \quad (3)$$

Altogether, this identification approach enables a set of 124 dispersed events (2 events per bank at most) hereafter denoted $\{\Delta CDS_k^*\}_{k=1}^{124}$ where *k* represents each event-bank *i* and event-day *t* combination. We discard from this set the events that overlap with any other event (pertaining to the same or another bank) within an 11-day centered window;[8] this is further to ensure that the events are bank idiosyncratic, that is, the CDS jumps truly reflect bank-specific news.[9] As summarized in Table 2 and Figure 1, we thus identify $K = 42$ events: 64% pertain to peripheral

We proxy the industry (local) credit risk factor with a European bank CDS index instead of country-specific bank CDS indices because the latter are not available for various countries in the sample.

[8] For instance, if the 11-day window around event A for bank *i* (centered on day 0) includes also event B for bank *i* on day 2 and event C for bank *j* on day -2 we discard all three overlapping events.

[9] A large CDS spread rise on day *t* is likely to reflect news arriving within the same day since price discovery has been shown to be rather efficient in CDS markets. Following Saka et al. (2015) and Mink and De Haan (2013), we comb *Thomson Reuters* and *Dow Jones Factiva* news, own banks and security and exchange commissions (SEC) websites to identify the negative bank-specific news per bank. Even though these news may not be the causes of the bank CDS events, mapping the identified events with bank-specific news allows us somewhat to corroborate the events' idiosyncratic nature. Details on the news associated with each event (bank *i*, day *t*) are provided in the online Annex Table A.2.

Eurozone banks, 23% to core Eurozone banks, 10% to standalone core EU banks, and 2% by Switzerland. Table 2 shows that 23 (55%) of the credit risk events occur during the 2008-2012 crisis period, and the remaining 19 (45%) events during the 2013-2016 recovery period.[10]

[Insert Table 2 and Figure 1 around here]

3.2. Proxies for "information linkages" between event-bank and peer

One important implication from the wake-up call paradigm at micro-level is that the cross-transmission ought to occur regardless of any actual or perceived "information linkages" between the bank (shock-receiver) and the peer, as discussed above in the context of hypothesis H2. We consider various proxies for bank-peer "information linkages" to test this hypothesis.

We begin with two baseline indicators – core line of business and headquarters' country/region – that capture shared market risk exposures. We account for the core business of the event-bank and peer by grouping peers as banks, insurance firms, real estate firms and other FIs. Next we group each bank-peer pair according to whether they are headquartered in the same/different country or in different countries within the same/different regions.

We follow the home bias and gravity model literature in considering other more subtle "informational linkages" proxies that relate to cross-country legal and cultural/historical ties (La Porta et al., 2008; Portes & Rey, 2005; Guiso et al., 2009; Mayer & Zignago, 2011; Saka, 2020).[11] Guiso et al. (2009) argue that an advantage to investors is that the cost of gathering information regarding institutional/legal infrastructure is lower when the two countries share a legal tradition. Following La Porta et al. (2008) we group the bank-peer pairs according to whether their respective headquarter countries share a legal tradition (i.e., English, German, French or Scandinavian law). This nexus can also exist if the event-bank and peer are

[10] We identified initially a much broader set of events during the turmoil period than the recovery period, 88 versus 33, but subsequently many of the former 88 events were filtered out due to event-clustering within 11-day event-centered windows. Credit risk events affecting banks from Core Eurozone and Standalone core EU tend to be more clustered that those from the Periphery Eurozone, so they are filtered out more frequently. During turmoil markets, there are instances of 5 or more overlapping events, particularly in January 2008, September 2008 and January 2011. Credit risk events in January and September 2008 (related to the subprime crisis and the default of Lehman Brothers, respectively) affect predominantly banks from Core Eurozone and Standalone core EU. Events in January 2011 affect banks exposed to the sovereign debt crisis from Core Eurozone, Periphery Eurozone and Standalone core EU. Details on the initial and final set of CDS events are provided in the online Annex Table A.1.

[11] Guiso et al. (2009) find that international equity and bond portfolio holdings hinge on the trust of investors in one country towards other countries. Portes & Rey (2005) find geographical proximity, proxied by bank branches across countries or telephone call traffic, as a relevant factor in explaining cross-border capital flows. Geographical proximity has been shown to be a crucial factor also for US investors as they show a bias towards firms that are "close" to them in terms of geography, culture and language such as Australia and Canada (Grinblatt & Keloharju, 2000; Coval & Moskowitz, 2001).

headquartered inside the Eurozone because member states operate within the SSM legislative/institutional framework so we also consider this as grouping criteria.

Grinblatt & Keloharju (2000), Mayer & Zignago (2011) and Saka (2020) argue that cultural and historical heritage ties between countries can be perceived by investors as signalling information linkages between firms. Following this wisdom from the gravity model literature, we group the bank-peer pairs according to whether their headquarter countries: *i*) were one sovereign state in the past,[12] *ii*) have had colonial relationships, and *iii*) currently share an official language. In addition, we account for whether the countries share a border since this may reflect other forms of proximity (e.g., cultural/legal) that contribute to generate cross-border social linkages, easing the flow of information and trust; see Nilsson & Mattes (2015).[13]

Finally, we group the bank-peer pairs according to other "information connectedness" criteria associated with cross-country banking sector linkages. Following Saka (2020), we use data on the total number of cross-country bank mergers and acquisitions (M&As) that occurred during the 1985-2007 pre-crisis period from the *Securities Data Company (SDC) Platinum* database, and the number of bank branches in the peer's country which belong to a bank from the event-bank's country using current data from the *SNL Financial* database. Detailed definitions and sources for all the aforementioned variables are listed in Table 3.[14]

[Insert Table 3 around here]

Finally, we should note that as the correlation "heat map" reported in Table A.4 of the online Annex shows, it seems fair to assert that these proxies for "information linkages" are not highly overlapping. The highest correlation is observed between *Historical bank M&As* and *Shared bank branches* at 89%, which is expected, as both account for financial linkages pertaining roughly to the same nature of interrelation between the banking sectors of the event-bank country and peer country; nevertheless, we maintain both proxies in our analysis following, for instance, the study by Saka (2020) also for the European system. The remaining correlations are milder ranging between -55% and 65%, with an average (absolute) correlation of 25%.

[12] The specific criteria used in the literature is that the two countries were the same sovereign state for a period of 25-50 years in the 20th century, 75 years in the 19th century, and 100 years previously.
[13] The terminology "gravity model" stems from the trade flows literature in which the explanatory (gravity) variables capture the proximity between countries, not only in terms of geographical distance but also regarding cultural and legal distance inter alia. Portes & Rey (2005) pioneer the use of gravity models in international finance, while Okawa & van Wincoop (2012) offer theoretical foundations.
[14] We thank Orkun Saka for providing us with the data on M&A, branches and gravity measures.

3.3. Measuring peer's equity value changes around bank-idiosyncratic credit risk events

We seek to measure the abnormal equity return of each peer $j = 1, \dots, J$ in the sample on the 11-day window around each bank-event $k = 1, \dots, K$. To do this, using daily observations denoted $t = -250, \dots . -1,0, +1, \dots + 5$ in event time we estimate by QML an equity pricing model extended with pre-event (D_{kt}^{pre}), event day (D_{kt}^{0}) and post-event (D_{kt}^{post}) dummies

$$r_{jt} = \alpha_{kj} + \beta_{kj} r_{Mt} + \alpha_{kj}^{pre} D_{kt}^{pre} + \alpha_{kj}^{0} D_{kt}^{0} + \alpha_{kj}^{post} D_{kt}^{post} + u_{jt}, \quad (4a)$$

$$\sigma_{jt}^{2} = \theta_{0kj} + \theta_{1kj} u_{jt-1}^{2} + \varphi_{kj} \sigma_{jt-1}^{2}, \quad (4b)$$

where r_{jt} is the equity return of peer firm *j*, r_{Mt} is the market return, D_{kt}^{0} takes the value 1 on the event-day and 0 otherwise, D_{kt}^{post} takes the value 1 on days $t = +1, \dots, +5$, and u_{jt} is a zero-mean error term. Following Ricci (2015) and Schäfer et al. (2016) inter alia, the above pricing equation assumes that the main systematic risk factor the peer's equity is exposed to is the European stock market factor; accordingly, we proxy the latter with the EU equity market index from *Thomson Reuters Datastream* (series code: TOTMKEU). In robustness tests below, we re-estimate the alpha-shifts using a pricing model that extends (4a) with other risk factors.

For our research agenda, the parameters of interest are: *i*) the alpha-shift α_{kj}^{0} that captures the abnormal return on the event day, that is, the instantaneous response of the *j*th peer's equity value to the *k*th bank-specific credit risk event, and *ii*) the alpha-shift α_{kj}^{post} that captures the average abnormal daily return on the subsequent 5-day window. If the bank-specific credit risk event *k* serves as a wake-up call for investors as regards peer *j*, then the parameters α_{kj}^{0} and α_{kj}^{post} should be significantly negative (i.e., signalling effect). However, if investors perceive the financial health deterioration of the event-bank as opportunistic/beneficial for peer *j* to gain market share these parameters should be significantly positive (i.e., competition effect).

For completeness, including the pre-event dummy variable D_{kt}^{pre} that takes value 1 on days t=$-5, \dots, -1$, and 0 otherwise, allows us to control for information leakages or any market anticipation of the credit risk event *k* that could bias the estimation of the parameters of interest.

Inferences are based on standard errors obtained from the Bollerslev-Wooldridge covariance matrix that is robust to conditional non-normality. Estimating the pricing model (4) separately for each event *k*-peer *j* pair and examining the distribution of alpha-shifts thus obtained, $k =$

$1, \ldots, K, j = 1, \ldots, J$, has the advantage of allowing for full parameter heterogeneity versus pooling the data across all (or sectoral) bank-peer pairs to estimate a panel pricing model.[15]

The ensuing discussion of results focuses on the alpha-shift parameters α_{kj}^{0} and α_{kj}^{post}. The online Annex Table A.5 summarizes the remaining parameters (alpha α_{kj}, market beta β_{kj}, pre-event alpha shift α_{kj}^{pre}, and GARCH parameters θ_{0kj}, θ_{1kj}, and φ_{kj}). Using the lax significance level of 10%, the overall picture is that the alpha is always close to zero and statistically insignificant in 88% of bank-event pairs; the beta (systematic market risk exposure) is significant in 93% of the cases and on average higher for banks and insurance firms than for real-estate firms and other FIs, and it is also higher during the crisis period; while the pre-event alpha shift α_{kj}^{pre} is negative but close to zero and insignificant in over 80% of pairs.

4. Empirical results

4.1. Event-day alpha shift of peer firms

We begin by examining the distribution of event-day alpha-shift $\hat{\alpha}_{kj}^{0}$ measures obtained across all bank-idiosyncratic credit risk events $k = 1, \ldots, K$ and peers $j = 1, \ldots, J$, as summarized in the first row of Table 4. The remaining rows of the table summarize $\hat{\alpha}_{kj}^{0}$ across various groups formed according to the "information linkages" criteria (proxies) discussed previously: the baseline criteria (A) firms' core business, and (B) economic/political cross-country integration, and the additional criteria (C) cross-country legal proximity, (E) cultural/historical heritage and geographical proximity, and (F) cross-country banking sector linkages. The final grouping is by the prevailing (turmoil/calm) market conditions when the bank credit event occurs.

[Insert Table 4 around here]

In order to assess statistical significance, the left section of Table 4 reports the parametric *t*-statistic for mean alpha shifts. However, as it is well-known that parametric tests can be distorted by outliers and departures from normality we also rely on the Wilcoxon non-parametric signed-rank *W*-statistic for median alpha shifts. This non-parametric test has also the merit of controlling for event-date peer clustering since the events affect various peers simultaneously which would induce alpha shift cross-correlations. The right section of Table 4

[15] Strictly-speaking the total number of estimates $\hat{\alpha}_{kj}^{0}$ and $\hat{\alpha}_{kj}^{post}$, is not $K \times J$ but $J_1 + J_2 + \cdots + J_k + \cdots + J_K$ with $0 \leq J_k \leq J$ denoting the number of peers influenced by the k^{th} bank-event.

reports differentials in mean/median alpha shifts across bank-peer groups; significance is tested with the parametric Welch statistic and non-parametric Mann-Whitney U statistic, respectively.

We observe that the equity value of peers decreases on the bank credit risk event day as borne out both by a negative mean $\hat{\alpha}_{kj}^{0}$ of -0.095% across all bank-peer cases which is strongly significant (t-stat $= -7.114$), and by a negative outlier-robust median alpha-shift of -0.036% (W-stat = 7.969). The individual alpha-shift estimates $\hat{\alpha}_{kj}^{0}$ are negative and significant in over 80% of the total bank-peer cases. This significantly negative response indicates that investors consider bank-specific credit shocks as wake-up signals that prompt them to reassess the equity value of other financial companies. This evidence lends strong support to hypothesis H1, namely, bank-idiosyncratic credit risk shocks significantly transmit to peers' equity value.

The results in Panel A reveal a strongly significant bank-specific credit risk event transmission not only to peers that are banks (like the shock receiver) with a mean alpha-shift of -0.146% on day 0 (t-stat $= -4.447$) but also to insurance firms, -0.130% (t-stat $= -3.532$), and other FIs, -0.088% (t-stat $= -5.232$). The results are corroborated by the mean alpha shifts. This evidence of externalities from bank-specific credit risk events to peer's equity for various types of peers endorses hypothesis H2 which holds that, in line with the wake-up call paradigm, the cross-transmission of financial distress at micro level is not necessarily greater for peers that have stronger "information linkages" with the event-bank as regards their core line of business (common risk factors). The statistical significance of this evidence is borne out by the results from the (non)parametric Welch (Mann-Whitney U) tests that are unable to reject the null hypothesis of equal mean (median) cross-transmission of bank-idiosyncratic credit risk events to insurance firms versus banks, and to other FIs versus banks.

The peers' alpha-shift measures and significance tests reported in Panel B of Table 4, left section, reveal that bank-idiosyncratic credit risk events transmit to peer's equity value no only when event-bank and peer are headquartered in the same country but also when they are headquartered in different countries within the same or different regions. The results from the mean alpha-shift differential Welch test and outlier-robust median alpha-shift differential MW test altogether in the right section of Table 4 suggest that economic/political integration of the respective headquarter countries is not key to the transmission, in line with hypothesis H2.

Next we examine the peer's alpha-shift $\hat{\alpha}_{kj}^{0}$ measures for bank-peer groups formed according to the additional "information connectedness" proxies described in Panels C, D and E of Table 3. According to the cross-country legal framework criteria (Panel C) the only

significant difference in the magnitude of alpha-shifts occurs for event-bank and peer pairs that are both headquartered in the Eurozone (mean alpha shift -0.153%) versus the remaining pairs (-0.076%) as revealed by the Mann-Whitney U (and Welch) differential tests. For the cultural/historical heritage and geographical proximity criteria, Panel D, the only significant finding, according to the (non-)parametric Welch (Mann-Whitney U) test, is that the externality is not stronger for bank-peer pairs headquartered in countries that share an official language versus those headquartered in different language countries.[16] There is no significant difference in the mean nor median alpha-shift according to cross-country bank M&As and shared bank branches, as shown in Panel E. Altogether, the evidence from Panels C to E further suggests that "information linkages" do not drive the alpha-shifts which points towards wake-up calls at micro level as the key cross-transmission mechanism, in line with hypothesis H2.

Overall, a plausible explanation of the evidence presented in panels A to E is that investors holding equity of financial firms in their portfolio react to bank-specific credit events signals independently of the information connectedness between these equity firms and the event-banks, given that the tests do not reveal a stronger reaction for the more-connected cases.

The final two rows of Table 4 provide tests for the differential magnitude in the peer's alpha-shift $\hat{\alpha}_{kj}^{0}$ according to whether k is a bank-event that occurred in the turmoil market period 2008-2012 or in the recovery market period 2013-2016. The alpha-shift is significantly more pronounced on average in the turmoil period (at -0.130) than that in the recovery period (at -0.058) and the differential is strongly statistically significant at the 1% level according to the parametric Welch test. However, the non-parametric MW test does not reveal a significant difference in median alpha-shift in the two periods. Below we re-assess the influence of market conditions in the cross-transmission through multivariate regressions that allow controlling for a number of other effects that can also potentially influence the cross-transmission such as the risk profile of the event-bank and the risk profile of the peer prior to the event.

[16] The counteractive finding that the cross-transmission is stronger for bank-peer pairs headquartered in countries that do not share an official language may relate to the diversity of languages in Europe (e.g., 24 official languages in the EU). Thus, more than 88% of bank-peer pairs in our sample are respectively headquartered in countries that do not share any official language and any instances of shared language involve countries with 2 to 4 official languages (e.g., Ireland, Belgium, Luxembourg and Switzerland).

4.2. Post-event-day alpha shift of peer firms

Now we discuss the estimates of the alpha-shift $\hat{\alpha}_{kj}^{post}$ measure from model (4) that reflects the cross-transmission on days [+1, +5] post-event alongside the significance tests shown in Table 5. To simplify the exposition, hereafter we refer to this effect as the short-term alpha shift.

[Insert Table 5 around here]

The daily average abnormal return 5-days post-event remains significantly negative in line with hypothesis H1 which states that bank-specific credit risk shocks drive down peers' equity value. But the externality quickly wanes 5-days post event as borne out by a mean and median alpha-shift $\hat{\alpha}_{kj}^{post}$ values of -0.015% and -0.006%, respectively (cf. -0.095% and -0.036%, respectively, for the day 0 alpha-shift, as shown in Table 4)

Next we examine the short-term alpha shift $\hat{\alpha}_{kj}^{post}$ for bank-peer groups formed according to proxies for the actual or perceived "information linkages" between event-bank and peer. Starting with the baseline criteria (Panels A-B) we observe, on the one hand, that the median (but not the mean) short-term cross-transmission in Panel A is significantly stronger towards peers that are also banks like the shock receiver than for any other type of peer, against hypothesis H2. On the other hand, as shown in Panel B, the magnitude of the cross-transmission does not hinge on whether event-bank and peer are headquartered in the same or different country (or region), in favor of hypothesis H2.

We study the role played by the more subtle "information connectedness" measures through the tests provided in Panels C, D and E. The outlier-robust median difference Mann-Whitney U test suggests, on the one hand, that the magnitude of the short-term cross-transmission does not hinge on whether the two entities are both headquartered in the Eurozone, in countries that share a common official language or that have been a single sovereign in the past. Moreover, the externality is stronger if the two entities are located in countries that do not share a border, have not experienced inter-country bank M&As, and have no inter-country bank branches, than otherwise. The only 2 (out of 9) criteria that represent exceptions are the common (versus different) legal tradition and formerly (versus never) colonial relationship for which greater alpha shifts are found. Altogether the evidence suggests that the "information connectedness" between event-bank and peer is not key to the cross-transmission, in line with hypothesis H2.

Finally, as shown in the last rows of Table 5, although the median short-term alpha shift on days [+1,+5] is -0.013% in turmoil markets and a smaller -0.001% in calm markets, the Mann-Whitney U test is unable to reject the null hypothesis of no difference in median alpha-shift.

In sum, the analysis of short-term alpha shifts on days [+1,+5] corroborates that bank-idiosyncratic credit risk events tend to significantly decrease peers' equity value, in line with hypothesis H1. However, the effect wanes as suggested by a negative abnormal return that is much smaller in magnitude on average on days [+1,+5] than on the event day. Overall the evidence suggests also that the short-term cross-transmission does not strongly depend on any actual or perceived "information linkages" between event-bank and peer, in line with hypothesis H2. These findings point to a wake-up call mechanism by which, in the aftermath of a bank-idiosyncratic credit risk event, investors reappraise the risk profile of peers regardless of how much they perceive the event to reveal *information* that is associated with those peers.

4.3. Multivariate analysis of variation in bank-event to peer's equity cross-transmission

Next we seek to shed light on the drivers of the variation across the alpha-shift parameters by adopting a fully parametric regression approach. This permits us to examine the effect of each "information linkage" measure, e.g. core line of business, while controlling for the remaining ones, e.g. cross-country economic/political integration and legal tradition.[17] Furthermore, this regression approach allows us to introduce in the analysis two sets of covariates that characterize the event-bank's risk profile and peer's risk profile, respectively, during the reference period [-250, -6]. Specifically, we formulate the multivariate regression model

$$\begin{aligned}\hat{\alpha}_{kj} = \gamma_0 + \ & \gamma_{Insur} Insur_{kj} + \gamma_{REst} REst_{kj} + \gamma_{OFI} OFI_{kj} + \\ & \gamma_{DCSR} DCSR_{kj} + \gamma_{DCDR} DCDR_{kj} + \gamma_{Turmoil} Turmoil_{kj} + \\ & \boldsymbol{\gamma}'_{PC} \mathbf{PC}_{kj} + \boldsymbol{\gamma}'_{EBC} \mathbf{EBC}_{k} + e_{kj}, \quad k = 1, \dots, K; j = 1, \dots, J \end{aligned} \tag{5}$$

where the dependent variable $\hat{\alpha}_{kj}$ denotes the alpha shift of peer j associated with the idiosyncratic credit risk event k. Specifically, we estimate two sets of regressions: one set for the alpha shift on day 0 obtained as $\hat{\alpha}^0_{kj}$ from Equation (4); another set for the 5-day post-event alpha-shift, $\hat{\alpha}^{post}_{kj}$ from Equation (4). The estimation method is OLS and we report heteroskedasticity- and peer cluster-robust significance *t*-statistics, with peer clusters defined at the event level. It is worth noting that this multivariate regression aims to explain both cross-sectional and time variation since the observations for the dependent variable, $\hat{\alpha}_{kj}$, pertain either to different bank-peer pairs, or to the same bank-peer pairs for different events in time.

[17] The analysis conducted in Tables 4 and 5 can be seen as a simplified univariate regression but has the merit of allowing for both parametric (mean-based tests) and non-parametric (median-based tests).

As potential drivers of the variation in peers' alpha-shifts, first we consider the baseline "information linkages" criteria (core business and cross-country economic/political integration) that we studied previously, alongside the market conditions (turmoil versus recovery periods). Specifically, the candidate drivers are defined as follows: (*i*) starting with the core line of business, $Insur_j$ is equal to 1 if the *j*th peer is an insurance firm (0 otherwise), $REst_j$ equal to 1 if the peer is a real estate firm, OFI_j equal to 1 if the peer is another FI (investment funds or asset management firms) – thus the reference scenario (both entities are banks) is represented in the regression as $Insur_j = REst_j = OFI_j = 0$; (*ii*) as regards the cross-country economic/political integration, $DCSR_{kj}$ takes value 1 when both firms are headquartered in different countries within the same region (core Eurozone, periphery Eurozone, standalone core EU, or Switzerland) and $DCDR_{kj}$ when both firms are headquartered in different countries and different regions – thus the reference set of bank-peer pairs that are headquartered in the same country are captured in the regression as $DCSR_{kj} = DCDR_{kj} = 0$; (*iii*) market conditions are captured through the dummy $Turmoil_k$ equal to 1 if the bank-event *k* occurred in 2008-2012, and 0 if it occurred in the calmer period 2013-2016.

The multivariate regression includes also as candidate drivers a set of peer covariates, $\mathbf{PC}_{kj}$, and a set of event-bank covariates, $\mathbf{EBC}_k$, to capture the corresponding risk profiles in the pre-event reference period. Specifically, the vector $\mathbf{PC}_{kj}$ gathers a set of characteristics of the *j*th peer measured over the reference period preceding the *k*th bank-event: *i*) $\hat{\beta}_{kj}$, the systematic market risk exposure or beta of the peer obtained from the estimation of pricing model (4); *ii*) the ratio of idiosyncratic volatility to total volatility of the peer measured as $Ivol_{kj} \equiv 1 - R^2_{kj}$ where R^2_{kj} is the coefficient of determination of Equation (4a), which can be cast as a bounded measure of idiosyncratic risk (e.g., Ferreira & Laux, 2007); *iii*) the peer's Merton's distance-to-default or *z*-score defined as the number of standard deviations that its return on assets (ROA) must drop below the mean ROA in order to deplete equity as a percentage of assets, leading to insolvency (the higher the *z*-score the more stable the peer) – following Schäfer et al. (2016) and others, we compute the *z*-score from equity market data and convert it to a discrete variable Z^{high}_{kj} which equals 1 if the peer has a high *z*-score above the 75th percentile of the distribution of all peer *z*-scores, and 0 otherwise; *iv*) the log of total peer assets, $Size_{kj}$, and a dummy D^{GSI}_{kj} equal to 1 if peer *j* is classified as GSI by the FSB at any point during the reference window (0 otherwise) – given the existence of implicit government guarantees for big institutions (the "too-big-to-fail" policy), the latter two variables can control for the

possibility that bank-idiosyncratic credit risk events have a lesser impact on the equity value of big peers (e.g., Laeven et al., 2016); *v*) a credit risk or leverage dummy Lev_{kj} equal to 1 if the peer has a leverage or total liabilities to equity ratio (inverse of capitalization ratio) above the 75th percentile of the distribution of all peer leverage ratios, and 0 otherwise; *vi*) and the creditworthiness of the country where the peer is headquartered as given by the S&P's credit rating, CR_{kj}, expressed in a scale from 1 (top AAA rating) to 21 (bottom C rating).

Likewise, the event-bank covariates ($\mathbf{EBC}_k$) are proxies for different aspects of the risk profile of the bank that suffers the *k*th event during the reference period:[18] *i*) the exponentially-weighted-moving-average of the bank's daily credit default swap spread CDS_k^{EWMA} to capture the level of creditworthiness while giving more importance to the recent spreads; *ii*) a dummy D_k^{listed} equal to 1 if the shock-receiver is a bank that is listed in an official stock exchange, and 0 if it is a mutual bank with shared ownership, for instance, a building society, cooperative bank, caja de ahorros or landesbank – this allows us to accommodate different levels of cross-transmission arising from different risk-taking incentives of the shock receiver;[19] *iii*) a $Size_k$ variable and a GSI dummy D_k^{GSI} defined as above for the peer; *iv*) a leverage dummy for the event-bank, Lev_k, and S&P's credit rating of its headquarter country, CR_k, both variables defined also as above for the peer. Data for the $\mathbf{PC}_{kj}$ and $\mathbf{EBC}_k$ covariates are obtained either from the *Thomson Reuters Datastream* database or *Orbis Bank Focus* database.

Table 6 reports estimation results for model (5) with the event-day alpha shift, $\hat{\alpha}_{kj}^0$, as dependent variable in the first four columns and the 5-day post-event alpha shift, $\hat{\alpha}_{kj}^{post}$, in the last four columns. We start by assessing whether our earlier findings as regards the role in the cross-transmission of "information linkages" between event-bank and peer as well as the market conditions remain unchanged when the risk profiles of the two firms are controlled for.

[Insert Table 6 around here]

Panel A, column (1), provides evidence marginally at the 10% significance level of a stronger instantaneous cross-transmission, $\hat{\alpha}_{kj}^0$, from event-bank to peer that is also a bank than from event-bank to peer that is instead a real estate firm. This mild effect completely vanishes

[18] The sample of event-banks, as detailed in the online Annex Table A.1, comprises both listed and non-listed banks which precludes the use of stock market-based measures of risk such as the systematic beta.
[19] The literature suggests higher risk-taking, notably moral hazard, for banks owned by shareholders, than for banks with mutual or cooperative ownership, such as the UK building societies or Spanish cajas de ahorro (e.g., Iannotta et al., 2007). The deposit insurance increases the banks' shareholders incentives to take risk but the problem is milder in mutual banks due to their diffuse ownership structure.

when the models control for the peer's risk profile and/or event-bank risk profile prior to the event, cols. (2) to (4). Moreover, the multivariate regression-based tests suggest that the cross-transmission is not stronger when event-bank and peer are headquartered in the same country versus different country (same region). There is only some evidence (at the 5% significance level) that the cross-transmission lessens when event-bank and peer are headquartered in different regions. Altogether, the findings indicate that the cross-transmission of idiosyncratic-bank credit risk events to peers' equity value is not significantly stronger when there are shared market risk factors and/or direct portfolio linkages between the two entities either because they are both banks or because they are headquartered in the same country or in different countries. These findings endorse the notion of "wake-up calls" as the main channel of the bank credit risk event to peers' equity cross-transmission, in line with hypothesis H2.

Regarding the influence of market conditions, there is strong evidence to suggest that the cross-transmission of bank-idiosyncratic credit risk events to peer's equity value is stronger in the turmoil period 2008-2012 than in the calmer period 2013-2016, consistent with hypothesis H3, as borne out by significant tests at the 1% significance level for the baseline model, column (1) of Table 6. This finding remains unchallenged in the full model that incorporates both peer and event-bank risk profile characteristics in column (4). This evidence supports the notion that when financial markets are in turmoil, investors are pushed outside their "comfort zone" and they are likely to experience higher risk aversion and/or be subject to pessimism, panic and fear emotions which makes them more predisposed to wake-up calls (hypothesis H3).

Having established that our earlier novel evidence about the presence of wake-up calls as distress transmission mechanism at micro level is not challenged when we allow for the effect of peer and event-bank risk profile covariates, we now discuss the coefficients of the latter. In the presence of wake-up calls, as formalized in the Ahnert & Bertsch (2015) model, a bank distress event will prompt investors to re-assess a peer's risk because the credit event induces them to perceive the same peer's fundamentals now as riskier. Thus the response to bank-specific credit events may be stronger for peers with a riskier profile prior to the bank event.

Starting with the peer's characteristics, the strongly significant (1% level or better) negative coefficient of the market beta and positive coefficient of the *z*-score in cols. (2) and (4) of Table 6 suggest that the riskier the peer prior to the bank-idiosyncratic credit risk event, the stronger its instantaneous drop in equity value. This finding further endorses the wake-up call theory in so far as the investors' reaction indicates that they consider the same peers' fundamentals as riskier after the distress event. The change in risk perceptions implies that the cross-

transmission of idiosyncratic bank credit shocks to peer's equity value is greater for peers with weaker fundamentals pre-event. At macro level, Bekaert et al. (2014) document similar evidence suggesting that the 2007-2009 financial crisis was cross-transmitted more strongly to countries with weaker fundamentals pre-crisis.

Examining now the coefficients of the event-bank's risk profile covariates, we observe that higher credit risk levels of the event-bank prior to the event (as captured by the EWMA of its daily CDS spread) and lower creditworthiness of the country where it is headquartered (as captured by its sovereign credit rating) induce a stronger cross-transmission on day 0. This is rather plausible since a given bank-specific credit risk shock (idiosyncratic jump in its CDS spread) is expected to have a stronger impact on investors' behaviour as a wake-up call when the bank affected has a weak risk profile than when it has a sound risk profile pre-shock. This result indicates that credit shocks affecting riskier banks act as a stronger wake-up call than those affecting less risky ones, inducing a more intense investors' reappraisal of peers' risk.

As a by-product, the significantly positive coefficient of the GSI dummy for the event-bank in the full model, column (4), endorses the implicit government guarantees or "too-big-to-fail" policy. Namely, credit risk events originating in banks that are officially classified as (large and highly interconnected) GSI entities trigger significantly weaker decreases in peer's equity value. The rationale is that investors perceive these banks as relatively safe, at least partly due to the implicit guarantees that GSI banks enjoy under their systemic status and hence, these credit risk events end up triggering mild wake-up call effects.[20] Finally, the financial leverage coefficient is positive, suggesting that credit risk events associated with highly-leveraged (risky) banks prompt milder negative externalities towards peer's equity. This finding can be interpreted as that the credit risk events have also a competition/portfolio rebalancing effect by which investors sell shares of highly-leveraged event-banks to buy those of competitors.

The estimation results for the multivariate regression model (5) to explain the variation in the 5-day post event alpha-shift $\hat{\alpha}_{kj}^{post}$ are shown in cols. (5) to (8) of Table 6. There is some evidence at the 5% level that the short-term externality of bank-idiosyncratic credit events is stronger from event-bank to other banks than to insurance firms; however, the short-term externality from event-bank to other banks is insignificantly different to that from event-bank

[20] The credit events of GSI banks could be news related to their sovereign protection, instead of bank-specific, which would represent good news for peers due to competition. We rule out this possibility by combing the news in days around GSI-bank credit events (see online Annex Table A.2). Unreported results for models with the GSI and size variables entered separately are qualitatively similar.

to real estate firms and to other FIs. The short-term cross-transmission is not stronger from event-bank to peer when both entities are headquartered in the same country versus pairs that are headquartered in different countries (within the same/different regions). Overall these findings reinforce those stemming from the instantaneous cross-transmission analysis in columns (1) to (4) and hence, are overall supportive of hypothesis H2 about wake-up calls.

As regards the effect of market conditions, the statistical tests for the full model in col. (8) of Table 6 reveal strongly at the 1% significant level that the short-term cross-transmission of the bank credit risk events to peer's equity is greater in turmoil than calm markets. One interpretation is that on days [+1,+5] the crisis-type sentiment of investors (pessimism, panic or fear) may serve to sustain the "wake-up call" effect, namely, they continue to reassess the peers' risk profile and perceive them as more risky even though their fundamentals may not have changed. Moreover, the results in cols. (7) and (8) strongly suggest at the 1% significance level or better that events originating in GSI banks trigger milder wake-up calls (the "too-big-to-fail" effect); this finding reinforces the earlier evidence from the instantaneous alpha shifts. Likewise, as with the instantaneous alpha-shift, the coefficient of the sovereign credit rating variable (country creditworthiness environment of the event-bank) is also significantly negative across models, cols. (7) and (8), in line with predictions from the wake-up call theory.

The main contrast between the instantaneous and post-event alpha-shift regression results as regards the effect of the event-bank's and peer's risk profile is that the coefficient of the event-bank's CDS spread is significantly positive in the post-event alpha-shift models, cols. (7) and (8), in sharp contrast with the significantly negative effect observed in the instantaneous alpha-shift models, cols. (3) and (4). The contrast is aligned with the overreaction-reversal pattern that has been widely documented in other contexts (Daniel et al., 1998). Equity investors initially overreact to events originating in less creditworthy banks by pessimistically over-weighting the event-bank's past CDS spreads; as days pass, there is a correction.

To sum up, the multivariate regression analysis suggests that certain risk profile characteristics of event-bank and peer play a significant role in explaining the variation in the cross-transmission of bank's credit events to peers' equity value. The least favourable the risk profile of event-bank and peer prior to the credit risk event, the greater the wake-up call.

5. Robustness Checks

5.1 Alternative measures of information proximity

One of our main findings is that the magnitude of the negative peer's alpha-shift measures obtained from model (4) for each bank-event and peer combination at best depends very mildly on the "information linkages" between the two entities. This evidence points towards wake-up calls at micro level as a key channel of the cross-transmission of bank-idiosyncratic credit risk shocks to peers' equity value (hypothesis H2). We now expand the preceding multivariate regression, Equation (5), by including additional proxies for "information linkages" over and above the core line of business and headquarters' country. These alternative proxies are, as described in section 3.2 (and listed in Table 3), measures of cross-country common legal framework, cultural/historical heritage, border/distance and banking sector linkages. Bearing in mind the results from the preceding section, the peer risk-profile and event-bank risk profile covariates ($\mathbf{PC}_{kj}$ and $\mathbf{ECB}_{k}$, respectively) are adopted as controls throughout. Table 7 reports the OLS coefficient estimates alongside heteroskedasticity- and peer cluster-robust *t* statistics.

[Insert Table 7 around here]

One pervasive result across all nine model specifications, cols (1) to (9), is that the coefficients of the *Core line of business* variables are insignificant suggesting that the cross-transmission of bank-idiosyncratic shocks to peers' equity value is not stronger when the peer is also a bank. The results also confirm the prior finding that the extent of the cross-transmission is not statistically different when the two entities, event-bank and peer, are headquartered in the same country or in different countries within the same region. There is evidence, although relatively mild in 4 out of the 9 models and at no better than the 5% significance level, of lesser cross-transmission when the two entities are headquartered in different regions. Overall, these findings from models with additional "information linkages" proxies do not challenge our earlier evidence in support of hypothesis H2. Finally, the pervasive result of a negative and significant coefficient of the *Turmoil market 2008-2012* dummy variable in all 9 models further endorses our earlier contention of stronger wake-up calls in turmoil conditions (hypothesis H3).

Having established that the findings from the main empirical Section 4 as regards the role of the baseline information linkages (*Core line of business*, *Cross-country economic/political integration*, and *Turmoil market*) are not challenged when we incorporate additional "information linkages" proxies, we now discuss the specific effects associated with the latter. The coefficient of the *Common legal tradition* indicator is positive and significant, albeit only

at the 5% level, as suggested by a coefficient of 0.075 ($t = 2.082$) suggesting that the negative externality is not stronger when event-bank and peer pertain to countries that share a legal tradition.[21] The negative cross-transmission is, however, stronger when both entities are headquartered in the Eurozone, as borne out by a coefficient of -0.177 ($t = -4.288$).

We turn now to the cross-country cultural/historical heritage and distance (gravity) measures – *Formerly colonial relationships, Formerly same country*, *Common official language, Common border,* and *Weighted-distance* between countries – as defined in Table 3. Only the coefficient of the *Common official language* is significant at the 1% level and positive suggesting that the cross-transmission is not stronger when event-bank and peer are headquartered in countries that share an official language, in line with the results of Section 4. Finally, none of the two proxies for the financial linkages between the event-bank country and peer country – *Historical banks M&As* and *Shared bank branches* – have significant explanatory power for the peer's alpha shifts.

According to the theoretical model of wake-up call transmission of Ahnert and Bertsch (2015), the transmission of idiosyncratic distress can occur also in situations when investors perceive weak or absent information links between the distressed firm and its peers. Overall, the coefficients of all nine additional "informational linkages" proxies (the only exception is *Both inside Eurozone*) support hypothesis H2, as they indicate that these information linkages play no role in explaining the peers' equity response to bank-specific credit risk shocks.

5.2. Time-varying market conditions

We now revisit hypothesis H3 by expanding the alpha-shift regression model, Equation (5), with additional proxies for economic/financial market conditions from the literature: *i*) the VStoxx implied volatility index, that reflects market expectations of 30-day-ahead European equity market volatility as conveyed by the Eurostoxx50 stock index option prices – high VStoxx values signal that markets are more uncertain/pessimistic and/or that risk aversion levels are higher; *ii*) the business conditions index proposed by Aruoba, Diebold & Scotti (2009; ADS) with higher values signalling better economic conditions; *iii)* the financial uncertainty index proposed by Jurado, Ludvigson & Ng (2015; JLN) with higher values signalling less confidence; and *iv*) the Financial and Economic Attitudes Revealed by Search

[21] The positive sign of the *Common legal tradition* indicator stands in contrast with the test results for the mean alpha-shifts reported in Table 4. The rationale is that these tests may reflect some omitted variable bias as they did not allow controlling for the effect of many other "information linkages" proxies nor for the risk profile of event-bank and peer as the current multivariate regressions do.

index of Da et al. (2015; FEARS) with higher values signalling more pessimistic investor sentiment.[22] Table 8 reports the OLS coefficient estimates of the models without and with the former *Turmoil market* 2008-2012 dummy alongside heteroskedasticity- and peer cluster-robust *t* statistics.

[Insert Table 8 around here]

The results corroborate that, consistently across all models, the baseline proxies for information linkages (*Core line of business* and *Economic/political integration*) play no role as determinants of the instantaneous peer's alpha-shift, further in support of hypothesis H2. Only the *Diff. country* (*diff. region*) indicator is positive and significant, albeit marginally at the 10% level. Moreover, the signs of all the additional indicators of market conditions point in the same direction, aligned with hypothesis H3; namely, less favourable market conditions increase the likelihood of wake-up call effects. However, in terms of statistical significance only the ADS index and the FEAR index have explanatory power for the alpha-shifts.

5.3. Asset pricing model for alpha shift measurement

A key starting point of our analysis has been gauging the event-day and 5-day post-event alpha-shift for each bank-event *k* and peer *j* combination in the sample, α_{kj}^{0} and α_{kj}^{post} , respectively, through the estimation of an empirical pricing model. In order to corroborate that the results are not an artefact of the model specification, in this section we expand Equation (4a) with additional sources of systematic risk (data sourced from *Thomson Reuters Datastream*): a global market risk factor proxied by the US equity index (series code: TOTMKUS), a local market risk factor proxied by the country-specific peer's equity market index, and a financial European risk factor and financial global risk factor proxied by the European/US financial equity indices, respectively (FINANEU/FINANUS).[23] The results reported in the online Annex Table A.6 are qualitatively similar, suggesting that the $\hat{\alpha}_{kj}^{0}$ and $\hat{\alpha}_{kj}^{post}$measures thus obtained from this new pricing equation do not materially differ from those discussed in Section 4.

[22] *Thomson Reuters Datastream* is the source for VStoxx, the Federal Reserve Bank of Philadelphia for ADS (www.philadelphiafed.org/research-and-data/real-time-center/business-conditions-index), and the authors' websites for JLN (www.sydneyludvigson.com) and FEARS (www3.nd.edu/~zda).

[23] *Thomson Reuters Datastream* computes the indices from a representative sample of stocks covering a minimum of 75% to 80% of total market capitalisation. The TOTMKEU and TOTMKUS indices include listed firms in the EU and US, respectively. The FINANEU and FINANUS index includes listed firms from the entire financial sector across countries in Europe and the US, respectively.

6. Conclusions

The propagation of financial distress in the financial system is a threat that central bankers, regulators and policymakers endeavour to understand and, in turn, appropriately manage. Awareness of the distress propagation mechanisms (the underlying relationships and their determinants) is crucial to decide when and how to intervene. Our paper complements the literature by providing disaggregate firm-level empirical evidence to understand how European financial institutions are inter-connected as regards the impact of bank-idiosyncratic credit risk events on peers' equity value. The paper provides novel evidence of negative externalities from bank-specific credit risk events to peers' equity value that are consistent with wake-up calls. The analysis is based on a sample of 556 banks and other financial firms headquartered in 25 European countries which is fairly representative of the European financial sector.

The findings reveal that large idiosyncratic increases in the CDS spreads of banks tend to reduce the equity value of peer firms on the event day and also, albeit to a lesser extent, up to five days post-event. Formal parametric (mean based) and non-parametric (median based) univariate tests, and tests based on multivariate regressions with a range of control variables (e.g., event-bank's and peer's risk profile) indicate that the cross-transmission is not stronger for firms that have "informationally linkages" in terms of common risk factors; namely, the cross-transmission is not stronger when the shock receiver and peer are both banks nor when they are headquartered in the same country or different country within the same region. The cross-transmission is not stronger either when event-bank and peer have more subtle, actual or perceived "information linkages" according to proxies from the home bias and gravity model literature such as cross-country legal framework or cultural/historical heritage inter alia. Thus overall the results support at micro level the wake-up call channel of distress transmission.

The findings indicate also that, on the one hand, the more adverse the risk profile of the peer prior to the event, as borne out by a higher market beta and a shorter Merton's distance-to-default, the stronger the cross-transmission. Likewise, the less creditworthy the event-bank prior to the event, the stronger the cross-transmission. As a by-product, our investigation endorses the "too-big-to-fail" policy to promote stability of the European financial system.by showing that the negative externalities are milder if the event originates in banks officially classified as global systemically important. Finally, the results suggest that investors are more predisposed to interpret bank-specific distress as wake-up calls in adverse market conditions.

The evidence presented in the paper offers insights that are potentially useful to regulators and policymakers seeking to develop appropriate stress-testing methodologies with a view

towards appropriately assessing the stability of the European financial system and towards formulating adequate policy responses to bank-specific credit risk events. But we ought to recognise that, as any empirical study, ours has some limitations. Alternative data-driven methods for the identification of idiosyncratic credit events is part of our future research agenda, as is also the application of alternative approaches to measure the extent of the wake-up call effect. Also, tests for the same hypotheses in other geographical contexts such as the US financial market (or even emerging markets) in a comparative study could provide the additional evidence which is needed to establish whether our conclusions about firm-level wake-up call effects in the European financial system can be actually generalized.

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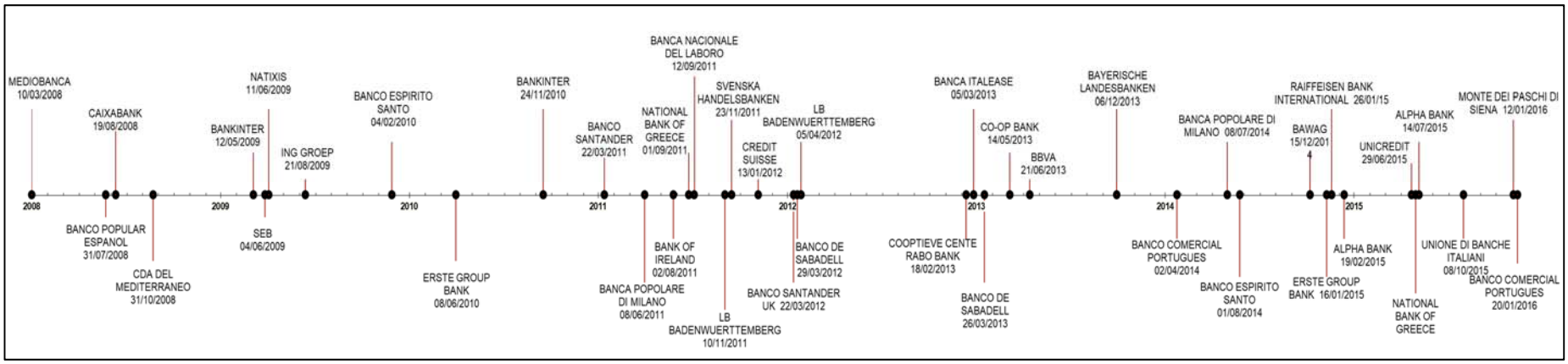
Figure 1. Timeline of Credit Events



The figure depicts chronologically the 42 bank-idiosyncratic credit risk events, bank name and date, that are identified as extreme positive jumps in the idiosyncratic component of daily CDS spread changes per bank according to the methodology, Equations (1) to (3), discussed in Section 3.1.

Table 1. Descriptive statistics for daily CDS spread changes and stock returns.

	CDS spread changes					Stock returns												
	Banks					Banks				Insurance firms				Real Estate firms			Other FIs		
	N	Mean	StDev	Building societies	GSI	N	Mean	StDev	GSI	N	Mean	StDev	GSI	N	Mean	StDev	N	Mean	StDev
Core Eurozone	***22***	***0.027***	***6.717***	***10***	***8***	***17***	***-0.038***	***2.772***	***7***	***17***	***-0.006***	***2.141***	***3***	***34***	***0.020***	***1.946***	***36***	***0.008***	***1.877***
Austria	3	0.028	7.109	1	1	2	-0.036	3.127		2	-0.041	2.008		1	0.058	1.299			
Belgium	1	0.009	7.174			3	-0.017	2.936		1	-0.069	4.209		8	0.010	1.576	7	0.013	1.360
Finland										1	0.039	1.743							
France	6	0.022	6.750	1	4	6	-0.017	2.423	4	6	-0.018	2.100	1	7	0.012	2.049	6	0.006	2.035
Germany	8	0.026	6.971	5	2	4	-0.111	3.011	2	4	0.030	1.759	1	12	0.055	2.191	9	0.012	2.698
Luxembourg														1	0.006	0.606	5	-0.005	1.313
Netherlands	4	0.041	5.751	3	1	2	0.014	2.736	1	3	0.002	2.267	1	5	-0.039	2.202	9	0.011	1.667
Periphery Eurozone	***24***	***0.153***	***22.276***	***4***	***3***	***34***	***-0.083***	***2.943***	***3***	***9***	***-0.029***	***2.365***	***1***	***7***	***-0.073***	***2.865***	***10***	***0.008***	***2.177***
Greece	2	0.639	110.155			4	-0.247	4.610											
Ireland	1	0.045	49.252			1	-0.131	5.096											
Italy	9	0.077	10.054	1	1	16	-0.054	2.550	1	7	-0.039	2.414	1	5	-0.121	3.418	8	0.011	2.243
Malta						1	-0.002	1.942											
Portugal	2	0.211	18.975			3	-0.038	2.589											
Spain	10	0.120	12.706	3	2	9	-0.064	2.746	2	2	0.005	2.196		2	0.046	1.481	2	-0.003	1.913
Standalone core EU	***17***	***0.014***	***5.385***	***3***	***6***	***25***	***-0.011***	***2.478***	***6***	***27***	***0.010***	***2.211***	***2***	***43***	***0.003***	***2.251***	***176***	***0.015***	***1.599***
Denmark	1	0.028	4.288			5	0.003	1.975		3	0.013	1.833		1	0.010	1.381	1	0.016	1.177
Norway	1	-0.001	3.153			4	0.007	2.272		3	0.032	2.443		3	-0.011	2.164	1	-0.013	2.462
Sweden	4	0.011	3.561		1	4	0.006	2.507	1					7	0.044	2.149	9	0.039	2.027
United Kingdom	11	0.015	6.271	3	5	12	-0.033	2.800	5	20	0.006	2.247	2	32	-0.004	2.308	165	0.014	1.573
Standalone peripheral EU						***23***	***-0.018***	***2.533***		***5***	***-0.042***	***2.580***		***15***	***-0.005***	***3.391***	***35***	***0.009***	***2.651***
Bulgaria						3	-0.040	2.897		1	-0.022	3.608		5	0.035	1.655	11	0.039	3.286
Channel Islands														1	-0.083	2.358	5	0.017	1.379
Croatia						3	-0.023	2.730		2	-0.031	2.626		2	-0.009	4.078			
Czech Republic						1	0.015	2.223									3	0.019	1.822
Hungary						1	-0.007	2.995		1	-0.119	2.360		4	-0.052	4.742	8	-0.011	3.312
Poland						12	-0.013	2.371		1	-0.006	1.680		2	-0.009	2.762	1	-0.028	1.691
Romania						3	-0.028	2.572						1	0.072	7.583	7	-0.019	2.299
Switzerland	2	0.042	5.371		2	20	0.009	1.454	2	7	0.029	1.895		13	0.018	1.176	10	0.040	1.984
Total	65	0.068	11.812	17	19	119	-0.032	2.476	18	64	-0.002	2.213	6	112	0.004	2.225	267	0.014	1.811

The table reports descriptive statistics for the time-series of daily CDS spread changes and equity returns. *N* is the number of financial firms for which data on the corresponding variable is available. GSI denotes a Globally Systemically Important firm according to Financial Stability Board classifications.

Table 2. Distribution of bank-idiosyncratic credit risk events and event banks.

	Bank credit risk events				Event banks			
	N	Listed banks	Mutual banks	GSI	N	Listed banks	Mutual banks	GSI
Panel A: Full sample	42	35	7	6	33	27	6	6
Panel B: Economic region								
Core Eurozone	10	5	5	2	8	4	4	2
Periphery Eurozone	27	27	2	4	20	27	2	3
Standalone core EU	4				4			
Switzerland	1			1	1			1
Panel C: Market conditions								
Turmoil market 2008-2012	23	19	4	5	21	17	4	4
Recovery market 2013-2016	19	16	3	2	17	15	2	2

Panel A reports statistics about the bank-specific credit risk events identified over the entire observation period 2007-2016. Panel B provides a breakdown per economic region according to event-bank's headquarters, and Panel C by market conditions. Mutual banks include building societies, cooperative banks, landesbanken, sparkasse and cajas de ahorro. GSI denotes a Global Systemically Important bank according to the Financial Stability Board (FSB) classification.

Table 3. Proxies for "information linkages" between event-bank and peer: Definitions and literature sources.

Variable	Definition	Main literature source
A. Firms' core line of business		
Peer is a Bank	Dummy variable equal to 1 for peers that are banks, 0 otherwise	Helwege & Zhang (2015)
Peer is an Insurance firm	Dummy equal to 1 for peers that are insurer companies, 0 otherwise	
Peer is a Real Estate firm	Dummy equal to 1 for peers that are Real Estate companies, 0 otherwise	
Peer is other FI	Dummy equal to 1 for peers that are financial entities that but not banks, insurers or real estate firms (e.g., investment funds, asset management, specialty finance firms), 0 otherwise	
B. Cross-country economic/political integration		
Same country	Dummy equal to 1 when event-bank and peer are headquartered in the same country, 0 otherwise	Aharony & Swary (1996), Saka, Fuertes & Kalotychou (2015)
Different country (same region)	Dummy equal to 1 when event-bank and peer are headquartered in different countries from the same region, 0 otherwise	
Different country (diferent region)	Dummy equal to 1 when event-bank and peer are headquartered in different regions, 0 otherwise	
C. Cross-country legal framework		
Common legal tradition	Dummy equal to 1 when event-bank and peer are headquartered in countries that share a common legal tradition (either British, French, German or Scandinavian), 0 otherwise	La Porta, Lopez-de Silanes & Shleifer (2008).
Both Eurozone	Dummy equal to 1 when event-bank and peer are headquartered in countries that share the euro currency, 0 otherwise	Balli, Basher & Ozer-Balli (2010)
D. Cross-country cultural/historical heritage and geographical distance (gravity measures)		
Formerly colonial relationship	Dummy equal to 1 when event-bank and peer are headquartered in countries that have had colonial relationships anytime in history, 0 otherwise	Mayer & Zignago (2011)
Formerly same country	Dummy equal to 1 when event-bank and peer are headquartered in countries that were the same state or the same administrative entity for a period of 25-50 years in the twentieth century, 75 year in the ninetieth century and 100 years before, 0 otherwise	
Common official language	Dummy equal to 1 when event-bank and peer are headquartered in countries that share a common official language, 0 otherwise	
Weighted distance	Distance between both countries weighted by population	
Common border	Dummy variable equal to 1 when event-bank and peer are headquartered in countries that share a border, 0 otherwise	
E. Cross-country banking sector linkages		
Historical bank M&As	Total number of cross-country bank mergers and acquisitions in the pre-crisis 1985-2007 period	Saka (2019)
Shared bank branches	Total number of bank branches in the peer country which ultimately belong to a bank from the event bank country as of 2016	

The table provides definitions of various proxies for the actual or perceived "information linkages" between event-bank and peer. The regions are Core Eurozone (Austria, Belgium, Finland, France, Germany, Luxembourg, and the Netherlands), Peripheral Eurozone (Greece, Ireland, Italy, Portugal and Spain), Core Standalone EU (Denmark, Norway, Sweden and the UK), Peripheral Standalone EU (Bulgaria, Channel Islands, Croatia, Czech Republic, Hungary, Poland and Romania), and Switzerland. Data for legal framework and gravity measures are from The Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) *Gravity*, *GeoDist* and *Language* databases Branches data are from the *SNL Financial* database. Cross-border M&As data are from the Securities Data Company (SDC) *Platinum* database.

Table 4. Instantaneous peers' equity response to bank-idiosyncratic credit risk events (day 0).

	Peer's alpha-shift					Peer's alpha-shift differential				
	N	Mean	*t* test	Median	*W* test		Mean diff.	*Welch* test	Median diff.	*MW* test
Full sample	20379	-0.095 ***	-7.114	-0.036 ***	7.969					
Groupings by "information linkages" between event-bank and peer										
A. Firms' core line of business										
Peer is also a Bank	4254	-0.146 ***	-4.447	-0.066 ***	5.201					
Peer is an Insurance firm	2372	-0.130 ***	-3.532	-0.064 ***	3.366	Peer is Insurance firm vs Bank	-0.015	0.094	-0.002	0.610
Peer is a Real estate firm	4144	-0.041	-1.157	-0.013 *	1.779	Peer is Real estate firm vs Bank	-0.105 **	4.741	-0.053 **	2.329
Peer is other FI	9609	-0.088 ***	-5.232	-0.032 ***	5.292	Peer is other FI vs Bank	-0.058	2.486	-0.034 *	1.884
B. Cross-country economic/political integration										
Same country	950	-0.195 ***	-3.499	-0.101 ***	2.912					
Different country	19429	-0.090 ***	-6.560	-0.034 ***	7.507	Same country vs Diff. country	-0.104 *	3.319	-0.067	1.326
Same region	2198	-0.197 ***	-3.791	-0.144 ***	5.694	Same country vs Diff. country (Same region)	0.003	0.001	0.044	0.881
Different region	17231	-0.077 ***	-5.464	-0.022 ***	5.823	Same country vs Diff. country (Diff. region)	-0.118 **	4.235	-0.079	1.622
C. Cross-country legal framework										
Common legal tradition	5129	-0.106 ***	-3.657	-0.045 ***	4.877					
Different legal tradition	15008	-0.093 ***	-6.159	-0.035 ***	6.508	Different vs Common legal tradition	0.012	0.146	0.01	1.161
Both inside Eurozone	5083	-0.153 ***	-5.126	-0.090 ***	6.552					
Not both inside Eurozone	15296	-0.076 ***	-5.132	-0.022 ***	5.329	Not both inside Eurozone vs Both Eurozone	0.077 **	5.303	0.068 ***	3.409
D. Cross-country cultural/historical heritage and geographical distance (gravity measures)										
Formerly colonial relationship	1237	-0.192 ***	-3.926	-0.071 ***	3.068					
Never colonial relationship	18900	-0.09 ***	-6.444	-0.035 ***	7.574	Never vs Formerly colonial relationship	0.102 **	4.007	0.035	1.147
Formerly same country	1090	-0.171 ***	-3.270	-0.058 **	2.527					
Never same country	19047	-0.092 ***	-6.618	-0.036 ***	7.725	Never vs Formerly same country	0.079	2.115	0.022	0.701
Common official language	2323	-0.025	-0.679	0.019	0.177					
Different official language	17814	-0.106 ***	-7.314	-0.044 ***	8.574	Different vs Common official language	-0.081 **	4.209	-0.063 ***	2.767
Shared border	2517	-0.069 *	-1.680	-0.023 **	2.064					
No shared border	16898	-0.101 ***	-6.964	-0.037 ***	7.621	No vs Shared border	-0.032	0.527	-0.014	0.691

(*Cont.*)

Table 4. Instantaneous peers' equity response to bank-idiosyncratic credit risk events (day 0).

	Peer's alpha-shift					Peer's alpha-shift differential				
	N	Mean	*t* test	Median	*W* test		Mean diff.	*Welch* test	Median diff.	*MW* test
E. Cross-country banking sector linkages										
Historical bank M&As	12825	-0.099 ***	-5.950	-0.025 ***	5.699					
No historical bank M&As	7312	-0.092 ***	-4.008	-0.062 ***	5.913	No vs Historical bank M&As	0.008	0.076	-0.037	1.244
Shared bank branches	14512	-0.087 ***	-5.705	-0.033 ***	6.129					
No shared bank branches	5625	-0.121 ***	-4.327	-0.051 ***	5.462	No vs Shared bank branches	-0.033	1.103	-0.018	1.52
Groupings by market conditions										
Turmoil market 2008-2012	10492	-0.130 ***	-6.394	-0.034 ***	6.024					
Recovery market 2013-2016	9887	-0.058 ***	-3.392	-0.038 ***	5.428	Recovery vs Turmoil market	0.072 ***	7.259	-0.004	0.868

The table summarizes in the left section the QML estimates of parameter a^0 in model (4) that captures the peers' equity alpha shift on event day 0 (daily percentage abnormal return). *t* test is the parametric Student's *t* test for the significance of the mean. *W* test is the non-parametric Wilcoxon signed rank test for the significance of the median. N is the number of sample event *k* and peer *j* pairs in each group. The right section reports the *Welch* test (Mann-Whitney U test, *MW* test) for the significance of the alpha-shift mean (median) differential across different bank-peer pair groupings. Panel A reports results for all bank-peer pairs. Panels B to E provide results for bank-peer pair groupings according to various proxies of "information linkages" between the two entities. *, ** and *** denote significant at the 10%, 5% and 1% levels, respectively.

Table 5. Short-term peers' equity response to bank-idiosyncratic credit risk events (days +1 to +5).

	Peer's alpha-shift					Peer's alpha-shift differential				
	N	Mean	*t* test	Median	*W* test		Mean diff.	*Welch* test	Median diff.	*MW* test
Full sample	20379	-0.015 **	-2.067	-0.006 ***	3.818					
Groupings by "information linkages" between event-bank and peer										
A. Firms' core line of business										
Peer is also a Bank	4254	-0.027 *	-1.599	-0.038 ***	4.876					
Peer is an Insurance firm	2372	0.011	0.630	0.010	1.004	Peer is Insurance firm vs Bank	-0.038	2.457	-0.048 ***	3.827
Peer is a Real estate firm	4144	-0.027	-1.547	0.009	0.300	Peer is Real estate firm vs Bank	0.000	0.000	-0.047 ***	3.242
Peer is other FI	9609	-0.011	-1.057	-0.004 **	2.571	Peer is other FI vs Bank	-0.016	0.689	-0.034 ***	3.548
B. Cross-country economic/political integration										
Same country	950	-0.023	-0.890	-0.005	1.049					
Different country	19429	-0.014 *	-1.946	-0.006 ***	3.683	Same country vs Diff. country	-0.008	0.097	0.000	0.191
Same region	2198	0.016	0.678	-0.002	0.225	Same country vs Diff. country (Same region)	-0.038	1.242	-0.004	0.646
Different region	17231	*-0.018* **	-2.341	-0.006 ***	3.854	Same country vs Diff. country (Diff. region)	-0.004	0.027	0.001	0.119
C. Cross-country legal framework										
Common legal tradition	5129	-0.043 ***	-2.987	-0.011 ***	4.067					
Different legal tradition	15008	-0.006	-0.697	-0.005 **	2.163	Different vs Common legal tradition	0.037 **	4.973	0.007 ***	2.595
Both inside Eurozone	5083	-0.025 *	-1.638	-0.010 ***	2.797					
Not both inside Eurozone	15296	-0.011	-1.418	-0.005 ***	2.798	Not both inside Eurozone vs Both Eurozone	0.013	0.594	0.005	1.224
D. Cross-country cultural/historical heritage and geographical distance (gravity measures)										
Formerly colonial relationship	1237	-0.137 ***	-4.854	-0.057 ***	5.061					
Never colonial relationship	18900	-0.007	-0.973	-0.004 ***	2.743	Never vs Formerly colonial relationship	0.130 ***	19.750	0.053 ***	4.372
Formerly same country	1090	-0.035	-1.324	-0.002	1.011					
Never same country	19047	-0.014 *	-1.889	-0.006 ***	3.807	Never vs Formerly same country	0.021	0.571	-0.004	0.067
Common official language	2323	-0.050 ***	-2.920	-0.017 **	2.413					
Different official language	17814	-0.011	-1.360	-0.005 ***	3.313	Different vs Common official language	0.040 **	4.392	0.012	1.142
Shared border	2517	0.007	0.307	0.014	0.680					
No shared border	16898	-0.018 **	-2.270	-0.008 ***	4.147	No vs Shared border	-0.024	1.059	-0.022 **	2.146

(*Cont.*)

Table 5. Short-term peers' equity response to bank-idiosyncratic credit risk events (days +1 to +5).

	Peer's alpha-shift					Peer's alpha-shift differential				
	N	Mean	*t* test	Median	*W* test		Mean diff.	*Welch* test	Median diff.	*MW* test
E. Cross-country banking sector linkages										
Historical bank M&As	12825	-0.002	-0.224	0.000	1.271					
No historical bank M&As	7312	-0.038 ***	-3.636	-0.019 ***	4.848	No vs Historical bank M&As	-0.036 **	6.403	-0.020 ***	3.077
Shared bank branches	14512	0.001	0.166	-0.001	1.490					
No shared bank branches	5625	-0.058 ***	-3.962	-0.019 ***	4.923	No vs Shared bank branches	-0.059 ***	12.490	-0.017 ***	3.652
Groupings by market conditions										
Turmoil market 2008-2012	10492	-0.014	-1.166	-0.013 ***	3.359					
Recovery market 2013-2016	9887	-0.016 **	-2.055	-0.001 *	1.902	Recovery vs Turmoil market	-0.002	0.019	0.012	1.417

The table summarizes in the left section the QML estimates of parameter a^{post} in model (4) that captures the peer's equity alpha shift on the post-event [+1, +5] window (daily percentage abnormal return). *t* test is the parametric Student's *t* test for the significance of the mean. *W* test is the non-parametric Wilcoxon signed rank test for the significance of the median. N is the number of sample event *k* and peer *j* pairs in each group. The right section reports the *Welch* test (Mann-Whitney U test, *MW* test) for the significance of the alpha-shift mean (median) differential across different bank-peer pair groupings. Panel A reports results for all bank-peer pairs. Panels B to E provide results for bank-peer pair groupings according to various proxies for "information linkages" between the two entities. *, ** and *** denote significant at the 10%, 5% and 1% levels, respectively.

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Table 6. Drivers of cross-transmission of bank-idiosyncratic credit events to peers' equity.

Regressors	Panel A: instantaneous alpha-shift α_{kj}^{0} (1)	(2)	(3)	(4)	Panel A: post-event alpha-shift α_{kj}^{post} (5)	(6)	(7)	(8)
Baseline "information linkages" proxies								
A. Core line of business								
Peer is an Insurance firm	0.012	0.006	0.015	0.005	**0.039** *	**0.037** *	**0.040** *	**0.044** **
	(0.220)	(0.111)	(0.271)	(0.097)	(1.840)	(1.703)	(1.867)	(2.032)
Peer is a Real Estate firm	**0.097** *	0.027	0.088	0.026	0.003	0.002	0.005	0.009
	(1.799)	(0.420)	(1.619)	(0.411)	(0.126)	(0.053)	(0.264)	(0.331)
Peer is other FI	0.044	-0.016	0.040	-0.017	0.020	0.013	0.020	0.022
	(1.065)	(-0.249)	(0.936)	(-0.256)	(1.137)	(0.384)	(1.120)	(0.681)
B. Economic/political integration								
Diff. country (same region)	-0.001	0.033	0.050	0.068	0.040	0.022	0.040	0.022
	(-0.008)	(0.448)	(0.696)	(0.925)	(1.209)	(0.635)	(1.180)	(0.652)
Diff. country (diff. region)	**0.102** *	0.088	**0.153** **	**0.129** **	0.004	-0.006	0.010	0.001
	(1.701)	(1.420)	(2.474)	(2.068)	(0.160)	(-0.215)	(0.358)	(0.019)
Market conditions								
Turmoil market 2008-2012	**-0.068** ***	-0.032	**-0.097** ***	**-0.078** **	0.001	0.003	**-0.074** ***	**-0.061** ***
	(-2.684)	(-0.994)	(-3.420)	(-2.346)	(0.113)	(0.216)	(-4.535)	(-3.108)
Peer's risk profile								
Market beta		**-0.198** ***		**-0.198** ***		0.032		0.031
		(-2.963)		(-2.919)		(0.875)		(0.804)
Idiosyncratic risk		-0.135		-0.136		-0.033		-0.003
		(-0.971)		(-0.957)		(-0.509)		(-0.043)
z -score		**0.103** ***		**0.104** ***		0.008		0.018
		(3.118)		(3.091)		(0.447)		(1.025)
GSI		0.017		0.019		-0.003		-0.002
		(0.321)		(0.341)		(-0.145)		(-0.080)
Size (log assets)		0.001		0.001		**-0.011** *		-0.008
		(0.082)		(0.093)		(-1.748)		(-1.180)
Leverage		0.016		0.015		0.049		0.040
		(0.164)		(0.160)		(1.143)		(0.920)
Country credit rating		-0.004		-0.005		0.006		0.010
		(-0.228)		(-0.238)		(0.612)		(1.052)
Event-bank's risk profile								
CDS spread (EWMA)			**-0.213** **	**-0.165** **			**0.184** ***	**0.171** ***
			(-2.558)	(-2.011)			(4.629)	(4.105)
Publicly listed			0.074	0.057			-0.009	-0.001
			(1.537)	(1.189)			(-0.397)	(-0.022)
GSI			0.075	**0.107** **			**0.127** ***	**0.111** ***
			(1.458)	(2.075)			(4.959)	(4.298)
Size (log assets)			0.007	-0.007			-0.009	-0.005
			(0.447)	(-0.447)			(-1.133)	(-0.621)
Leverage			**0.264** ***	**0.268** ***			-0.008	-0.004
			(3.057)	(3.021)			(-0.193)	(-0.099)
Country credit rating			**-0.021** ***	**-0.025** ***			**-0.027** ***	**-0.024** ***
			(-2.715)	(-3.190)			(-4.780)	(-4.190)
R^2	0.102	0.334	0.333	0.488	0.090	0.095	0.588	0.524
F -statistic	**3.459** ***	**4.820** ***	**4.625** ***	**5.326** ***	0.881	0.930	**9.413** ***	**5.127** ***
[*p* -value]	[0.002]	[0.000]	[0.000]	[0.000]	[0.508]	[0.520]	[0.000]	[0.000]
Observations	20379	18730	20379	18730	20379	18730	20379	18730

The table reports OLS estimation results for the multivariate regression model (5) with dependent variable the alpha-shift $\hat{\alpha}_{kj}^{0}$ ($\hat{\alpha}_{kj}^{post}$) measure that captures the event-day (5-day post-event) cross-transmission of bank-idiosyncratic credit risk events to peers' equity value. Heteroskedasticity and peer cluster robust *t*-ratios, with clusters defined at the event level, are shown in parentheses. *, ** and *** denote significant at the 10%, 5% and 1% levels, respectively.

Table 7. Wake-up call tests with additional "information linkages" proxies.

Regressors	Cross-country legal framework		Cross-country cultural/historical heritage and geographical distance					Cross-country financial relations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Baseline "information linkages" proxies									
A. Core line of business									
Peer is an Insurance firm	0.009	0.011	0.007	0.007	0.008	0.008	0.002	0.005	0.005
	(0.156)	(0.197)	(0.121)	(0.118)	(0.135)	(0.132)	(0.039)	(0.086)	(0.083)
Peer is a Real Estate firm	0.012	0.031	0.018	0.017	0.013	0.022	0.017	0.019	0.019
	(0.169)	(0.457)	(0.262)	(0.241)	(0.190)	(0.313)	(0.251)	(0.273)	(0.266)
Peer is other FI	-0.023	-0.004	-0.022	-0.022	-0.023	-0.021	-0.024	-0.024	-0.025
	(-0.353)	(-0.071)	(-0.336)	(-0.338)	(-0.364)	(-0.324)	(-0.394)	(-0.378)	(-0.385)
B. Economic/political integration									
Diff. country (same region)	0.101	0.049	0.158	0.171	**0.186** **	0.034	0.110	-0.083	-0.056
	(1.259)	(0.658)	(1.391)	(1.426)	**(2.201)**	(0.429)	(1.074)	(-0.776)	(-0.557)
Diff. country (diff. region)	**0.177** **	0.087	**0.212** **	**0.227** **	**0.253** ***	0.082	**0.174** *	-0.024	0.004
	(2.385)	(1.332)	**(2.091)**	**(1.965)**	**(3.142)**	(1.130)	**(1.697)**	(-0.255)	(0.052)
Additional "information linkages" proxies									
C. Cross-country legal framework									
Common legal tradition	**0.075** **								
	(2.082)								
Both inside Eurozone		**-0.177** ***							
		(-4.288)							
D. Cross-country cultural/historical heritage and distance (gravity measures)									
Formerly colonial relationship			0.098						
			(1.155)						
Formerly same country				0.113					
				(1.124)					
Common official language					**0.151** ***				
					(3.013)				
Weighted distance						0.043			
						(1.378)			
Common border							-0.031		
							(-0.745)		
E. Cross-country banking sector linkages									
Historical bank M&As								-0.051	
								(-1.583)	
Shared bank branches									-0.013
									(-1.489)
Market conditions									
Turmoil market 2008-2012	**-0.076** **	**-0.062** *	**-0.075** **	**-0.071** **	**-0.070** **	**-0.077** **	**-0.061** *	**-0.070** **	**-0.069** **
	(-2.195)	**(-1.843)**	**(-2.157)**	**(-2.074)**	**(-2.034)**	**(-2.209)**	**(-1.828)**	**(-2.044)**	**(-2.019)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.493	0.562	0.475	0.477	0.511	0.481	0.485	0.488	0.485
F- statistic	**4.463** ***	**5.293** ***	**4.299** ***	**4.317** ***	**4.631** ***	**4.358** ***	**4.564** ***	**4.419** ***	**4.396** ***
[*p*-value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	18050	18050	18050	18050	18050	18050	18050	18050	18050

The table reports OLS estimation results for the multivariate regression model (5) using as dependent variable the alpha-shift $\hat{\alpha}_{kj}^{0}$ that captures the instantaneous or event-day cross-transmission of bank-idiosyncratic credit risk events to peers' equity. Detailed definitions for all the "information connectedness" proxies can be found in Table 3. The controls are a set of covariates that capture the respective risk profiles of event-bank and peer over the reference period [-250, -6] in event time, as listed in Table 6 and discussed in Section 4.3. The numbers in parenthesis are heteroskedasticity and peer cluster robust *t*-ratios with clusters defined at the event level. *, ** and *** denote significant at the 10%, 5% and 1% levels, respectively.

Table 8. Wake-up call tests with additional measures of market conditions.

Regressors	VStoxx index		ADS index		JLN index		FEAR index	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Baseline "information linkages" proxies								
A. Core line of business								
Peer is an Insurance firm	0.004	0.001	0.007	0.001	0.011	0.004	0.008	0.001
	(0.070)	(0.013)	(0.122)	(0.015)	(0.208)	(0.077)	(0.154)	(0.020)
Peer is a Real Estate firm	0.021	0.017	0.024	0.016	0.029	0.020	0.026	0.016
	(0.320)	(0.247)	(0.351)	(0.232)	(0.437)	(0.292)	(0.387)	(0.237)
Peer is another FI	-0.022	-0.027	-0.018	-0.027	-0.017	-0.028	-0.015	-0.027
	(-0.354)	(-0.435)	(-0.293)	(-0.437)	(-0.277)	(-0.444)	(-0.244)	(-0.428)
B. Economic/political integration								
Diff. country (same region)	0.046	0.051	0.051	0.056	0.054	0.060	0.037	0.043
	(0.637)	(0.688)	(0.704)	(0.766)	(0.746)	(0.815)	(0.508)	(0.586)
Diff. country (diff. region)	**0.105** *	**0.109** *	**0.112** *	**0.115** *	**0.119** *	**0.121** *	0.104	**0.107** *
	(1.651)	**(1.693)**	**(1.765)**	**(1.797)**	**(1.879)**	**(1.911)**	(1.616)	**(1.654)**
Market conditttons								
Turmoil market 2008-2012		-0.039		-0.052		**-0.060** *		**-0.063** *
		(-1.011)		(-1.527)		**(-1.789)**		**(-1.885)**
Additional meassures of market conditions								
VStoxx index	-0.004	-0.003						
	(-1.470)	(-0.990)						
ADS index			**0.076** **	**0.071** **				
			(2.547)	**(2.358)**				
JLN index					-0.208	-0.191		
					(-0.957)	(-0.880)		
FEAR index							**-0.063** *	**-0.065** *
							(-1.753)	**(-1.796)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.489	0.493	0.499	0.511	0.479	0.495	0.482	0.499
F- statistic	**4.843** ***	**4.641** ***	**4.943** ***	**4.810** ***	**4.739** ***	**4.655** ***	**4.778** ***	**4.697** ***
[p -value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	18749	18749	18749	18749	18749	18749	18749	18749

The table reports OLS estimation results for the multivariate regression model (5) using as dependent variable the alpha-shift $\hat{\alpha}_{kj}^{0}$ that captures the instantaneous cross-transmission of bank-idiosyncratic credit risk events to peers' equity. VStoxx is the implied volatility index of near term EuroStoxx 50 options; ADS is the business condition index of Aruoba, Diebold & Scotti (2009); JLN is the financial uncertainty index of Jurado, Ludvigson & Ng (2015); FEARS is the Financial and Economic Attitudes Revealed by Search index of investor sentiment developed by Da et al. (2015). The controls are a set of covariates that capture the risk profiles of event-bank and peer over the reference period [-250, -6] in event time, as listed in Table 6 and discussed in Section 4.3. The numbers in parenthesis are heteroskedasticity and peer cluster robust *t*-ratios, with clusters defined at the event level. *, ** and *** denote significant at the 10%, 5% and 1% levels, respectively.

Online Annex

Bank Credit Risk Events and Peers' Equity Value

November 27, 2020

Table A.1 Firm-composition of CDS and equity panels.

The table lists the cross-section of firms observed, the start- and end-date of the CDS and equity time-series and the credit risk event dates. Firms are labelled by type according to the 2016 *Thomson Reuters Business Classification* methodology – for firms that operate in multiple business segments, a representative business is selected according to the largest revenue contribution but the assignment process also considers factors such as profitability, asset utilization, and market perception when appropriate. The non-listed banks are private banks, building societies (UK financial institution owned by its members as a mutual organization that offers mainly savings and mortgage lending), cooperative banks (Netherlander banks owned by their customers that follow the cooperative principle of one person, one vote and provide services such as savings and loans to non-members as well as to members), cajas de ahorro (Spanish financial institutions that specialize in accepting savings deposits and granting loans) and landesbanken (German state-owned bank whose business is predominantly wholesale banking). The firms are classified into regions according to headquarter's location. The regions follow the classification in Saka et al. (2015). We only consider those CDS/equity time-series that fulfil the liquidity criteria of less than 10% (35%) unchanged daily quotes. The restructuring convention conforms to the 2003 ISDA Credit Derivatives definitions. The columns "Initial set" within the credit risk events section reports the initially identified set of credit events separately during the calm (2008-2012) and recovery (2013-2016) periods. The "Clean events" column shows the final set of events after filtering out those that overlap with any other event (from the same or another bank) within 11-day event-centered windows.

				Equity data			CDS data				Credit risk events			
											Initial set		Clean	
Banks	Type	Country	Region	Start	End	*T*	Start	End	*T*	Rest. conv.	2008-2012	2013-2016	events	#
1 BAWAG P.S.K	Private	Austria	Core Eurozone				31/01/2008	12/02/2016	2097	MM	26/09/2011	15/12/2014	15/12/2014	1
2 ERSTE GROUP BANK	Listed bank	Austria	Core Eurozone	02/01/2006	14/04/2016	2517	14/12/2007	12/02/2016	2130	MM	08/06/2010	16/01/2015	08/06/2010; 16/01/2015	2
3 RAIFFEISEN BANK INTERNATIONAL	Listed bank	Austria	Core Eurozone	02/01/2006	14/04/2016	2528	14/12/2007	12/02/2016	2075	MM	28/01/2013	26/01/2015	26/01/2015	1
4 BANQUE NATIONALE DE BELGIQUE	Listed bank	Belgium	Core Eurozone	02/01/2006	14/04/2016	2539								
5 KBC ANCORA	Listed bank	Belgium	Core Eurozone	02/01/2006	14/04/2016	2564								
6 KBC GROUP	Listed bank	Belgium	Core Eurozone	02/01/2006	14/04/2016	2609	29/02/2008	12/02/2016	2130	MM	02/09/2008; 17/05/2012			
7 CB BULGARIAN AMERICAN CREDIT BANK	Listed bank	Bulgaria	Standalone peripheral	04/04/2006	14/04/2016	2589								
8 CB FIRST INVESTMENT BANK	Listed bank	Bulgaria	Standalone peripheral	25/06/2007	14/04/2016	2274								
9 TEXIM BANK	Listed bank	Bulgaria	Standalone peripheral	10/06/2013	14/04/2016	730								
10 HRVATSKA POSTANSKA BANKA	Listed bank	Croatia	Standalone peripheral	02/01/2006	14/04/2016	2653								
11 PRIVREDNA BANKA	Listed bank	Croatia	Standalone peripheral	02/01/2006	14/04/2016	2658								
12 ZAGREBACKA BANKA SER A	Listed bank	Croatia	Standalone peripheral	02/01/2006	14/04/2016	2660								
13 KOMERCNI BANKA	Listed bank	Czech Rep.	Standalone peripheral	02/01/2006	14/04/2016	2665								
14 DANSKE BANK	Listed bank	Denmark	Standalone core EU	02/01/2006	14/04/2016	2656	14/12/2007	12/02/2016	2130	MM	13/02/2009; 27/06/2011			
15 JYSKE BANK	Listed bank	Denmark	Standalone core EU	02/01/2006	14/04/2016	2656								
16 RINGKJOBING LANDBOBANK	Listed bank	Denmark	Standalone core EU	02/01/2006	14/04/2016	2655								
17 SPAR NORD BANK	Listed bank	Denmark	Standalone core EU	02/01/2006	14/04/2016	2654								
18 SYDBANK	Listed bank	Denmark	Standalone core EU	02/01/2006	14/04/2016	2656								
19 BNP PARIBAS	Listed bank	France	Core Eurozone	02/01/2006	14/04/2016	2610	24/06/2010	12/02/2016	2130	MM	27/04/2010; 10/01/2011			
20 CREDIT AGRICOLE	Listed bank	France	Core Eurozone	02/01/2006	14/04/2016	2617	24/06/2010	12/02/2016	2130	CR	22/01/2008; 27/04/2010			
21 CREDIT AGRICOLE BRIE PICARDIE	Listed bank	France	Core Eurozone	13/06/2007	14/04/2016	2143								
22 CREDIT AGRICOLE ILE DE FRANCE	Listed bank	France	Core Eurozone	02/01/2006	14/04/2016	2468	24/06/2010	12/02/2016	1471	MM	10/08/2011			
23 CREDIT LYONNAIS	Private	France	Core Eurozone				24/06/2010	12/02/2016	2130	CR	22/01/2008; 27/04/2010			
24 NATIXIS	Listed bank	France	Core Eurozone	02/01/2006	14/04/2016	2573	07/10/2008	12/02/2016	2002	MM	16/09/2008; 11/06/2009		11/06/2009	1
25 SOCIETE GENERALE	Listed bank	France	Core Eurozone	02/01/2006	14/04/2016	2602	24/06/2010	12/02/2016	2130	MM	27/04/2010; 07/01/2011			
26 BAYERISCHE LANDESBK	Landesbank	Germany	Core Eurozone				10/04/2008	12/02/2016	2130	MM	24/11/2009	06/12/2013	06/12/2013	1
27 COMMERZBANK	Listed bank	Germany	Core Eurozone	02/01/2006	14/04/2016	2597	24/06/2010	12/02/2016	2130	MM	10/01/2011; 09/05/2012			
28 DEUTSCHE BANK	Listed bank	Germany	Core Eurozone	02/01/2006	14/04/2016	2598	24/06/2010	12/02/2016	2130	MM	22/01/2008	23/09/2014		

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

				Equity data			CDS data				Credit risk events			
										Rest.	Initial set		Clean	
Banks	Type	Country	Region	Start	End	*T*	Start	End	*T*	conv.	2008-2012	2013-2016	events	#
29 DEUTSCHE PFANDBRIEFBANK	Listed bank	Germany	Core Eurozone	15/07/2015	14/04/2016	190								
30 HSH NORDBANK AG	Landesbank	Germany	Core Eurozone				31/10/2008	12/02/2016	1245	MM	27/11/2009; 25/04/2012			
31 IKB DEUTSCHE INDUSTRIEBANK	Listed bank	Germany	Core Eurozone	02/01/2006	14/04/2016	2468	14/12/2007	12/02/2016	2130	MM	22/01/2008; 01/09/2008			
32 LB BADENWUERTTEMBERG	Landesbank	Germany	Core Eurozone				14/12/2007	12/02/2016	1997	MM	10/11/2011; 05/04/2012		10/11/2011; 05/04/2012	2
33 PORTIGON AG	Landesbank	Germany	Core Eurozone				29/02/2008	12/02/2016	2130	MM	24/11/2009; 30/06/2011			
34 UNICREDIT BANK AG	Landesbank	Germany	Core Eurozone				14/12/2007	12/02/2016	1471	MM	11/07/2011			
35 ALPHA BANK	Listed bank	Greece	Periphery Eurozone	02/01/2006	14/04/2016	2448	14/12/2007	12/02/2016	1997	MM		19/02/2015; 14/07/2015	19/02/2015; 14/07/2015	2
36 BANK OF GREECE	Listed bank	Greece	Periphery Eurozone	02/01/2006	14/04/2016	2471								
37 EUROBANK ERGASIAS	Listed bank	Greece	Periphery Eurozone	02/01/2006	14/04/2016	2439								
38 NATIONAL BANK OF GREECE	Listed bank	Greece	Periphery Eurozone	02/01/2006	14/04/2016	2456	14/12/2007	12/02/2016	1888	MM	01/09/2011	07/07/2015	01/09/2011; 07/07/2015	2
39 OTP BANK	Listed bank	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2662								
40 BANK OF IRELAND	Listed bank	Ireland	Periphery Eurozone	02/01/2006	14/04/2016	2446	14/12/2007	12/02/2016	2130	MM	17/01/2011; 02/08/2011		02/08/2011	1
41 BANCA CARIGE	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2492								
42 BANCA FINNAT EURAMERICA	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2474								
43 BANCA ITALEASE SPA	Private	Italy	Periphery Eurozone				14/12/2007	13/04/2015	1856	MM	10/01/2011	05/03/2013	05/03/2013	1
44 BANCA MONTE DEI PASCHI	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2563	24/06/2010	12/02/2016	2130	MM	10/01/2011	12/01/2016	12/01/2016	1
45 BANCA PICCOLO CREDITO VALTELL	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2525								
46 BANCA POPOLARE DI MILANO	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2555	14/12/2007	12/02/2016	2130	MM	08/06/2011	08/07/2014	08/06/2011; 08/07/2014	2
47 BANCA PROFILO	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2503								
48 BANCO DI DESIO E DELLA BRIANZA	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2462								
49 BANCO POPOLARE	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2566	14/12/2007	12/02/2016	2130	MM	22/01/2008; 17/02/2009			
50 BNL SPA	Listed bank	Italy	Periphery Eurozone				18/06/2010	12/02/2016	2130	MM	10/01/2011; 12/09/2011		12/09/2011	1
51 CREDITO EMILIANO	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2549								
52 FINECOBANK SPA	Listed bank	Italy	Periphery Eurozone	02/07/2014	14/04/2016	441								
53 INTESA SANPAOLO	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2547	14/12/2007	12/02/2016	2075	CR	16/09/2008; 10/05/2010			
54 INTESA RSP	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2544								
55 MEDIOBANCA BANCA DI CREDITO FIN	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2565	14/12/2007	12/02/2016	2130	MM	10/03/2008; 14/05/2012		10/03/2008	1
56 UNICREDIT	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2553	24/06/2010	12/02/2016	2130	MM	10/05/2010	29/06/2015	29/06/2015	1
57 UNIONE DI BANCHE ITALIAN	Listed bank	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2572	24/06/2010	12/02/2016	1907	MM	04/02/2013	08/10/2015	08/10/2015	1
58 FIMBANK	Listed bank	Malta	Standalone peripheral	02/01/2006	14/04/2016	2651								
59 ABN AMRO GROUP GDR	Listed bank	Netherlands	Core Eurozone	19/11/2015	14/04/2016	101								
60 COOPTIEVE CENTE RABO BA	Cooperative bank	Netherlands	Core Eurozone				14/12/2007	11/01/2016	2106	MM		18/02/2013	18/02/2013	1
61 ING GROEP	Listed bank	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2610	14/12/2007	12/02/2016	2130	CR	28/08/2008; 21/08/2009		21/08/2009	1
62 SNS BANK N.V.	Cooperative bank	Netherlands	Core Eurozone				14/12/2007	12/02/2016	2130	MM	16/09/2008; 25/04/2012			
63 THE RBS N.V.	Cooperative bank	Netherlands	Core Eurozone				24/06/2010	12/02/2016	1471	MM		30/01/2013		
64 DNB BANK ASA	Listed bank	Norway	Standalone core EU	02/01/2006	14/04/2016	2656	14/12/2007	12/12/2013	1509	MM	06/03/2009			
65 SKANDIABANKEN	Listed bank	Norway	Standalone core EU	02/11/2015	14/04/2016	116								
66 SPAREBANK 1 SMN	Listed bank	Norway	Standalone core EU	02/01/2006	14/04/2016	2655								
67 SPAREBANK 1 SR BANK	Listed bank	Norway	Standalone core EU	02/01/2006	14/04/2016	2656								
68 ALIOR BANK	Listed bank	Poland	Standalone peripheral	14/12/2012	14/04/2016	858								
69 BANK BGZ BNP PARIBAS	Listed bank	Poland	Standalone peripheral	27/05/2011	14/04/2016	1261								
70 BANK BPH	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								
71 BANK MILLENNIUM	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2656								
72 BANK POLSKA KASA OPIEKI	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

				Equity data			CDS data				Credit risk events			
										Rest.	Initial set		Clean	
Banks	Type	Country	Region	Start	End	*T*	Start	End	*T*	conv.	2008-2012	2013-2016	events	#
73 BANK ZACHODNI WBK	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								
74 GETIN NOBLE BANK	Listed bank	Poland	Standalone peripheral	20/01/2012	14/04/2016	1092								
75 HANDLOWY	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								
76 IDEABANK	Listed bank	Poland	Standalone peripheral	29/04/2015	14/04/2016	249								
77 ING BANK SLASKI	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								
78 MBANK	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2658								
79 PKO BANK	Listed bank	Poland	Standalone peripheral	02/01/2006	14/04/2016	2656								
80 BANCO BPI	Listed bank	Portugal	Periphery Eurozone	02/01/2006	14/04/2016	2469								
81 BANCO COM PORT UR	Listed bank	Portugal	Periphery Eurozone				24/06/2010	12/02/2016	2130	MM		02/04/2014; 20/01/2016	02/04/2014; 20/01/2016	2
82 BANCO ESPIRITO SANTO SA	Listed bank	Portugal	Periphery Eurozone				29/02/2008	18/08/2014	1741	MM	04/02/2010	01/08/2014	04/02/2010; 01/08/2014	2
83 BANCA COMERCIALA CARPATICA	Listed bank	Romania	Standalone peripheral	02/01/2006	14/04/2016	2663								
84 BANCA TRANSILVANIA CLUJ	Listed bank	Romania	Standalone peripheral	02/01/2006	14/04/2016	2667								
85 BRD GROUPE SOCIETE GENERALE	Listed bank	Romania	Standalone peripheral	02/01/2006	14/04/2016	2663								
86 BANCO BILBAO VIZCAYA ARGENTARIA	Listed bank	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2593	24/06/2010	12/02/2016	2130	MM	10/01/2011	21/06/2013	21/06/2013	1
87 BANCO DE SABADELL	Listed bank	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2531	14/12/2007	12/02/2016	2046	MM	29/03/2012	26/03/2013	29/03/2012; 26/03/2013	2
88 BANCO POPULAR ESPANOL	Listed bank	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2559	29/02/2008	12/02/2016	1997	MM	17/05/2012; 31/07/2008		31/07/2008	1
89 BANCO SANTANDER	Listed bank	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2571	24/06/2010	12/02/2016	2130	CR	17/01/2011; 22/03/2011		22/03/2011	1
90 BANCO SANTANDER UK	Listed bank	Spain	Periphery Eurozone				14/12/2007	12/02/2016	1471	MM	22/03/2012		22/03/2012	1
91 BANKIA	Listed bank	Spain	Periphery Eurozone	20/07/2011	14/04/2016	1171								
92 BANKINTER 'R'	Listed bank	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2591	14/12/2007	12/02/2016	1900	MM	12/05/2009; 24/11/2010		12/05/2009; 24/11/2010	2
93 CAIXABANK	Listed bank	Spain	Periphery Eurozone	10/10/2007	14/04/2016	2107	29/01/2009	01/09/2014	1696	MM	06/03/2009; 19/08/2008		19/08/2008	1
94 CDA DE VLNCIA CASTLN	Caja de Ahorro	Spain	Periphery Eurozone				18/06/2008	05/03/2013	1362	MM	16/09/2008			
95 CDA DEL MEDITERRANEO	Caja de Ahorro	Spain	Periphery Eurozone				14/12/2007	12/02/2016	2130	MM	09/08/2011; 31/10/2008		31/10/2008	1
96 CDA Y MP DE MADRID	Caja de Ahorro	Spain	Periphery Eurozone				14/12/2007	01/02/2013	1285	MM	23/09/2011			
97 LIBERBANK	Listed bank	Spain	Periphery Eurozone	16/05/2013	14/04/2016	693								
98 NORDEA BANK	Listed bank	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657	16/06/2009	12/02/2016	1997	MM		08/02/2016		
99 SEB 'A'	Listed bank	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657	14/12/2007	12/02/2016	2130	MM	23/09/2011; 04/06/2009		04/06/2009	1
100 SVENSKA HANDELSBANKEN 'A'	Listed bank	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657	14/12/2007	12/02/2016	2130	MM	10/01/2011; 23/11/2011		23/11/2011	1
101 SWEDBANK 'A'	Listed bank	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657	14/12/2007	12/02/2016	1900	MM	03/03/2009	08/02/2016		
102 BANK COOP	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
103 BANK LINTH 'N'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
104 BANQUE CANTONALE DE GENEVE	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
105 BANQUE CANTONALE VAUDOISE 'N'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
106 BASELLANDSCHAFTLICHE KANTONALBANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
107 BASLER KB 'P'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
108 BERNER KANTONALBANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

				Equity data			CDS data				Credit risk events			
										Rest.	Initial set		Clean	
Banks	Type	Country	Region	Start	End	*T*	Start	End	*T*	conv.	2008-2012	2013-2016	events	#
109 CEMBRA MONEY BANK N ORD	Listed bank	Switzerland	Switzerland	30/10/2013	14/04/2016	632								
110 CREDIT SUISSE GROUP N	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654	24/06/2010	12/02/2016	2130	MM	13/01/2012	23/09/2014	13/01/2012	1
111 EFG INTERNATIONAL N	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2652								
112 GRAUB KB 'P'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
113 JULIUS BAR GRUPPE	Listed bank	Switzerland	Switzerland	01/10/2009	14/04/2016	1686								
114 LLB 'B'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
115 LUZERNER KANTONALBANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
116 ST GALLER KANTONALBANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
117 UBS GROUP	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654	24/06/2010	12/02/2016	2130	MM	16/09/2008	23/09/2014		
118 VALIANT 'R'	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
119 VONTOBEL HOLDING	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
120 VP BANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
121 ZUGER KANTONALBANK	Listed bank	Switzerland	Switzerland	02/01/2006	14/04/2016	2654								
122 ALDERMORE GROUP	Listed bank	UK	Standalone core EU	09/03/2015	14/04/2016	284								
123 ALL.& LCSTER LTD.	Building society	UK	Standalone core EU				14/12/2007	21/07/2014	1666	MM	31/10/2011		31/10/2011	1
124 BARCLAYS	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2654	24/06/2010	12/02/2016	2130	MM		23/09/2014; 05/02/2016		
125 BGEO GROUP HOLDINGS	Listed bank	UK	Standalone core EU	27/02/2012	14/04/2016	1064								
126 BK OF SCOTLAND PLC	Private	UK	Standalone core EU				24/06/2010	12/02/2016	2130	CR	07/05/2010	12/02/2016		
127 HBOS	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2645	24/06/2010	12/02/2016	1918	MM	21/01/2009; 10/01/2011			
128 HSBC HOLDINGS	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2654	14/12/2007	12/02/2016	2075	MM	05/01/2012	23/09/2014		
129 HSBC BANK PLC SNR MM 5Y E	Listed bank	UK	Standalone core EU				24/06/2010	12/02/2016	2130	MM				
130 LLOYDS BANKING GROUP	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2652	24/06/2010	12/02/2016	2130	MM	21/01/2009; 07/05/2010			
131 ROYAL BANK OF SCOTLAND GROUP	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2654	24/06/2010	12/02/2016	2075	MM	07/05/2010; 10/01/2011			
132 RBS PLC SNR MM 5Y EUR	Listed bank	UK	Standalone core EU				24/06/2010	12/02/2016	2130	MM				
133 SHAWBROOK GROUP	Listed bank	UK	Standalone core EU	31/03/2015	14/04/2016	268								
134 STANDARD CHARTERED	Listed bank	UK	Standalone core EU	02/01/2006	14/04/2016	2652	14/12/2007	12/02/2016	2130	CR	23/01/2009; 13/12/2010			
135 THE CO-OP BANK PLC	Building society	UK	Standalone core EU				14/12/2007	12/02/2016	1471	MM		14/05/2013	14/05/2013	1
136 VIRGIN MONEY HOLDINGS	Listed bank	UK	Standalone core EU	12/11/2014	14/04/2016	365								

Total: 42

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

	Insurance firms	Country	Region	Equity data Start	End	*T*
1	BULSTRAD VIENA INSURANCE GROUP	Austria	Core Eurozone	01/03/2006	14/04/2016	2458
2	UNIQA INSU GR AG	Austria	Core Eurozone	02/01/2006	14/04/2016	2435
3	AGEAS (EX-FORTIS)	Belgium	Core Eurozone	02/01/2006	14/04/2016	2602
4	BULSTRAD VIENA INSURANCE GROUP	Bulgaria	Standalone peripheral	01/03/2006	14/04/2016	2614
5	CROATIA OSIGURANJE	Croatia	Standalone peripheral	02/01/2006	14/04/2016	2657
6	JADRANSKO OSIGURANJE D D	Croatia	Standalone peripheral	25/04/2007	14/04/2016	2317
7	ALM BRAND	Denmark	Standalone core EU	02/01/2006	14/04/2016	2648
8	TOPDANMARK	Denmark	Standalone core EU	02/01/2006	14/04/2016	2654
9	TRYG	Denmark	Standalone core EU	02/01/2006	14/04/2016	2653
10	SAMPO 'A'	Finland	Standalone peripheral	02/01/2006	14/04/2016	2547
11	APRIL	France	Core Eurozone	02/01/2006	14/04/2016	2520
12	AXA	France	Core Eurozone	02/01/2006	14/04/2016	2611
13	CNP ASSURANCES	France	Core Eurozone	02/01/2006	14/04/2016	2585
14	COFACE	France	Core Eurozone	26/06/2014	14/04/2016	450
15	EULER HERMES GROUP	France	Core Eurozone	02/01/2006	14/04/2016	2555
16	SCOR SE	France	Core Eurozone	02/01/2006	14/04/2016	2523
17	ALLIANZ	Germany	Core Eurozone	02/01/2006	14/04/2016	2602
18	HANNOVER RUECKVERSICHERUNG	Germany	Core Eurozone	02/01/2006	14/04/2016	2591
19	MUENCHENER RUECKVERSICHERUNG	Germany	Core Eurozone	02/01/2006	14/04/2016	2596
20	TALANX AKTIENGESELLSCHAFT	Germany	Core Eurozone	01/10/2012	14/04/2016	889
21	CIG PANNONIA LIFE INSURANCE	Hungary	Standalone peripheral	08/11/2010	14/04/2016	1403
22	ASSICURAZIONI GENERALI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2573
23	BANCA MEDIOLANUM	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2560
24	CATTOLICA ASSICURAZIONI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2540
25	POSTE ITALIANE	Italy	Periphery Eurozone	27/10/2015	14/04/2016	113
26	UNIPOL GRUPPO FINANZIARI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2534
27	UNIPOLSAI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2572
28	VITTORIA ASSICURAZIONI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2493
29	AEGON	Netherland	Core Eurozone	02/01/2006	14/04/2016	2598
30	DELTA LLOYD GROUP	Netherland	Core Eurozone	02/11/2009	14/04/2016	1630
31	NN GROUP	Netherland	Core Eurozone	01/07/2014	14/04/2016	446
32	GJENSIDIGE FORSIKRING	Norway	Standalone core EU	10/12/2010	14/04/2016	1379
33	PROTECTOR FORSIKRING	Norway	Standalone core EU	25/05/2007	14/04/2016	2293
34	STOREBRAND	Norway	Standalone core EU	02/01/2006	14/04/2016	2655
35	PZU GROUP	Poland	Standalone peripheral	12/05/2010	14/04/2016	1532
36	GRUPO CATALANA OCCIDENTE	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2525
37	MAPFRE	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2535
38	BALOISE-HOLDING AG	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
39	CHUBB (FRA)	Switzerland	Switzerland	02/01/2006	14/04/2016	2443
40	HELVETIA HOLDING N	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
41	SWISS LIFE HOLDING	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
42	SWISS RE	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
43	VAUDOISE 'B'	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
44	ZURICH INSURANCE GROUP	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
45	ADMIRAL GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
46	AVIVA	UK	Standalone core EU	02/01/2006	14/04/2016	2653
47	BEAZLEY	UK	Standalone core EU	02/01/2006	14/04/2016	2652
48	CHESNARA	UK	Standalone core EU	02/01/2006	14/04/2016	2650
49	DIRECT LINE INSURANCE GROUP	UK	Standalone core EU	10/10/2012	14/04/2016	903
50	ESURE GROUP	UK	Standalone core EU	21/03/2013	14/04/2016	790
51	HASTINGS GROUP HOLDINGS	UK	Standalone core EU	09/10/2015	14/04/2016	132
52	HISCOX (DI)	UK	Standalone core EU	02/01/2006	14/04/2016	2652
53	JARDINE LLOYD THOMPSON	UK	Standalone core EU	02/01/2006	14/04/2016	2654
54	JRP GROUP	UK	Standalone core EU	11/11/2013	14/04/2016	624
55	LANCASHIRE HOLDINGS	UK	Standalone core EU	02/01/2006	14/04/2016	2651
56	LEGAL & GENERAL	UK	Standalone core EU	02/01/2006	14/04/2016	2652
57	NOVAE GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2650
58	OLD MUTUAL	UK	Standalone core EU	02/01/2006	14/04/2016	2653
59	PARTNERSHIP ASSURANCE GROUP	UK	Standalone core EU	06/06/2013	14/04/2016	735
60	PHOENIX GROUP HOLDINGS	UK	Standalone core EU	16/11/2009	14/04/2016	1653
61	PRUDENTIAL	UK	Standalone core EU	02/01/2006	14/04/2016	2653
62	RSA INSURANCE GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2653
63	SAINT JAMES'S PLACE	UK	Standalone core EU	02/01/2006	14/04/2016	2653
64	STANDARD LIFE	UK	Standalone core EU	07/07/2006	14/04/2016	2518

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

				Equity data		
	Real Estate Firms	**Country**	**Region**	**Start**	**End**	***T***
1	BUWOG	Austria	Core Eurozone	28/04/2014	14/04/2016	476
2	AEDIFICA	Belgium	Core Eurozone	23/10/2006	14/04/2016	2251
3	ATENOR GROUP	Belgium	Core Eurozone	02/01/2006	14/04/2016	2423
4	BEFIMMO	Belgium	Core Eurozone	02/01/2006	14/04/2016	2558
5	COFINIMMO	Belgium	Core Eurozone	02/01/2006	14/04/2016	2569
6	INTERVEST OFF-WARE	Belgium	Core Eurozone	02/01/2006	14/04/2016	2465
7	LEASINVEST	Belgium	Core Eurozone	02/01/2006	14/04/2016	2458
8	RETAIL ESTATES	Belgium	Core Eurozone	02/01/2006	14/04/2016	2445
9	WDP	Belgium	Core Eurozone	02/01/2006	14/04/2016	2513
10	ADVANCE TERRAFUND	Bulgaria	Standalone peripheral	31/07/2006	14/04/2016	2506
11	BALKAN SEA PROPERTIES REIT	Bulgaria	Standalone peripheral	24/04/2009	14/04/2016	1800
12	GALATA INVESTMENT AD	Bulgaria	Standalone peripheral	22/11/2013	14/04/2016	612
13	REGALA INVEST AD-VARNA	Bulgaria	Standalone peripheral	22/11/2013	14/04/2016	613
14	SOPHARMA PROPERTIES REIT	Bulgaria	Standalone peripheral	24/04/2009	14/04/2016	1800
15	REDEFINE INTERNATIONAL REIT	Channel Isl	Standalone peripheral	02/01/2006	14/04/2016	2650
16	EXCELSA NEKRETNINE	Croatia	Standalone peripheral	01/03/2007	14/04/2016	2354
17	SN HOLDING	Croatia	Standalone peripheral	02/01/2006	14/04/2016	2655
18	JEUDAN	Denmark	Standalone core EU	02/01/2006	14/04/2016	2656
19	EIFFEL(SOCIETE DE LA TOUR)	France	Core Eurozone	02/01/2006	14/04/2016	2417
20	FONCIERE DES REGIONS	France	Core Eurozone	02/01/2006	14/04/2016	2530
21	GECINA	France	Core Eurozone	02/01/2006	14/04/2016	2579
22	KLEPIERRE	France	Core Eurozone	02/01/2006	14/04/2016	2593
23	MERCIALYS	France	Core Eurozone	02/01/2006	14/04/2016	2514
24	NEXITY	France	Core Eurozone	02/01/2006	14/04/2016	2590
25	UNIBAIL-RODAMCO	France	Core Eurozone	02/01/2006	14/04/2016	2600
26	ADO PROPERTIES	Germany	Core Eurozone	23/07/2015	14/04/2016	184
27	ALSTRIA OFFICE REIT	Germany	Core Eurozone	02/04/2007	14/04/2016	2203
28	DEUTSCHE EUROSHOP	Germany	Core Eurozone	02/01/2006	14/04/2016	2573
29	DEUTSCHE WOHNEN BEARER SHARES	Germany	Core Eurozone	27/03/2006	14/04/2016	2496
30	DO DT OFFICE	Germany	Core Eurozone	30/06/2011	14/04/2016	1196
31	GSW IMMOBILIEN	Germany	Core Eurozone	14/04/2011	14/04/2016	1207
32	LEG IMMOBILIEN	Germany	Core Eurozone	31/01/2013	14/04/2016	805
33	PATRIZIA IMMOBILIEN	Germany	Core Eurozone	30/03/2006	14/04/2016	2500
34	TAG IMMOBILIEN	Germany	Core Eurozone	02/01/2006	14/04/2016	2483
35	TLG IMMOBILIEN	Germany	Core Eurozone	23/10/2014	14/04/2016	368
36	VIB VERMOEGEN	Germany	Core Eurozone	02/01/2006	14/04/2016	2436
37	VONOVIA	Germany	Core Eurozone	10/07/2013	14/04/2016	695
38	BUDAPESTI PROPERTY UTILIZATION&.DI	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2656
39	GRAPHISOFT PARK SE SHARE	Hungary	Standalone peripheral	25/08/2006	14/04/2016	2490
40	PANNON VALTO	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2653
41	TWDINVEST	Hungary	Standalone peripheral	30/11/2010	14/04/2016	1375
42	AEDES LIGURE LOMBARDA	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2501
43	BENI STABILI	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2521
44	IMMOBILIARE GRANDE DISTRIBUZIONE	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2511
45	PRELIOS	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2553
46	RISANAMENTO	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2516
47	BLUECOASTPROPER PREFERENCE	Luxembour	Core Eurozone	18/06/2010	14/04/2016	1493
48	EUROCOMMERCIAL	Netherland	Core Eurozone	02/01/2006	14/04/2016	2559
49	KARDAN N V	Netherland	Core Eurozone	02/01/2006	14/04/2016	2465
50	NSI	Netherland	Core Eurozone	02/01/2006	14/04/2016	2487
51	VASTNED RETAIL	Netherland	Core Eurozone	02/01/2006	14/04/2016	2577
52	WERELDHAVE	Netherland	Core Eurozone	02/01/2006	14/04/2016	2595
53	ENTRA	Norway	Standalone core EU	17/10/2014	14/04/2016	383
54	NORWEGIAN PROPERTY	Norway	Standalone core EU	15/11/2006	14/04/2016	2427
55	OLAV THON EIENDOMSSELSKAP	Norway	Standalone core EU	02/01/2006	14/04/2016	2656
56	ECHO INVESTMENT	Poland	Standalone peripheral	02/01/2006	14/04/2016	2657
57	GLOBE TRADE CENTRE	Poland	Standalone peripheral	02/01/2006	14/04/2016	2656
58	PRACTIC BUCURESTI	Romania	Standalone peripheral	02/01/2006	14/04/2016	2657
59	HISPANIA ACT INM	Spain	Periphery Eurozone	14/03/2014	14/04/2016	510
60	MERLIN PROPERTIES	Spain	Periphery Eurozone	30/06/2014	14/04/2016	442

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

				Equity data		
	Real Estate Firms	**Country**	**Region**	**Start**	**End**	***T***
61	ATRIUM LJUNGBERG 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
62	CASTELLUM	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
63	FABEGE	Sweden	Standalone core EU	02/01/2006	14/04/2016	2656
64	FASTIGHETS BALDER 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2656
65	HUFVUDSTADEN 'A'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
66	JM	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
67	WALLENSTAM 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2656
68	ALLREAL HOLDING	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
69	EDMOND DE ROTHSCHILD ASSET MANAGE	Switzerland	Switzerland	22/03/2011	14/04/2016	1306
70	HIAG IMMOBILIEN	Switzerland	Switzerland	16/05/2014	14/04/2016	493
71	IMMO HELVETIC	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
72	INTERSHOP N	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
73	MOBIMO HOLDING	Switzerland	Switzerland	02/01/2006	14/04/2016	2653
74	ORASCOM DEVELOPMENT HOLDING N	Switzerland	Switzerland	14/05/2008	14/04/2016	2044
75	PLAZZA IMMOBILIEN	Switzerland	Switzerland	26/06/2015	14/04/2016	207
76	PSP SWISS PROPERTY AG	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
77	SCHRODER IMMOPLUS	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
78	SWISS PRIME SITE	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
79	WARTECK 'R'	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
80	ZUG ESTATES HOLDINGS	Switzerland	Switzerland	02/07/2012	14/04/2016	976
81	ASSURA	UK	Standalone core EU	02/01/2006	14/04/2016	2651
82	BIG YELLOW GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2652
83	BRITISH LAND	UK	Standalone core EU	02/01/2006	14/04/2016	2652
84	CAPITAL & COUNTIES PROPERTIES	UK	Standalone core EU	07/05/2010	14/04/2016	1533
85	CAPITAL & REGIONAL	UK	Standalone core EU	02/01/2006	14/04/2016	2650
86	CLS HOLDINGS	UK	Standalone core EU	02/01/2006	14/04/2016	2652
87	COUNTRYWIDE	UK	Standalone core EU	19/03/2013	14/04/2016	791
88	DAEJAN HOLDINGS	UK	Standalone core EU	02/01/2006	14/04/2016	2647
89	DERWENT LONDON	UK	Standalone core EU	02/01/2006	14/04/2016	2654
90	FOXTONS GROUP	UK	Standalone core EU	19/09/2013	14/04/2016	661
91	GRAINGER	UK	Standalone core EU	02/01/2006	14/04/2016	2653
92	GREAT PORTLAND ESTATES	UK	Standalone core EU	02/01/2006	14/04/2016	2653
93	HAMMERSON	UK	Standalone core EU	02/01/2006	14/04/2016	2654
94	HANSTEEN HOLDINGS	UK	Standalone core EU	02/01/2006	14/04/2016	2649
95	HELICAL BAR	UK	Standalone core EU	02/01/2006	14/04/2016	2651
96	INTU PROPERTIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
97	LAND SECURITIES GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
98	LONDONMETRIC PROPERTY	UK	Standalone core EU	06/11/2007	14/04/2016	2176
99	LSL PROPERTY SERVICES	UK	Standalone core EU	15/11/2006	14/04/2016	2426
100	MCKAY SECURITIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
101	MOUNTVIEW ESTATES	UK	Standalone core EU	02/01/2006	14/04/2016	2643
102	MUCKLOW (A & J) GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2652
103	PRIMARY HEALTH PROPERTIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
104	RAVEN RUSSIA	UK	Standalone core EU	02/01/2006	14/04/2016	2648
105	SAFESTORE HOLDINGS	UK	Standalone core EU	08/03/2007	14/04/2016	2348
106	SAVILLS	UK	Standalone core EU	02/01/2006	14/04/2016	2654
107	SEGRO	UK	Standalone core EU	02/01/2006	14/04/2016	2653
108	SHAFTESBURY	UK	Standalone core EU	02/01/2006	14/04/2016	2653
109	ST MODWEN PROPERTIES	UK	Standalone core EU	02/01/2006	14/04/2016	2654
110	U AND I GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2650
111	UNITE GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
112	WORKSPACE GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2651

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

	Other FIs	Country	Region	Equity data Start	End	*T*
1	ACKERMANS & VAN HAAREN	Belgium	Core Eurozone	02/01/2006	14/04/2016	2580
2	BREDERODE	Belgium	Core Eurozone	02/01/2006	14/04/2016	2482
3	COMPAGNIE DU BOIS SAUVAGE	Belgium	Core Eurozone	02/01/2006	14/04/2016	2427
4	GBL NEW	Belgium	Core Eurozone	02/01/2006	14/04/2016	2599
5	GIMV	Belgium	Core Eurozone	02/01/2006	14/04/2016	2566
6	SOFINA	Belgium	Core Eurozone	02/01/2006	14/04/2016	2579
7	TINC	Belgium	Core Eurozone	11/05/2015	14/04/2016	222
8	AGRIA GROUP HOLDING	Bulgaria	Standalone peripheral	11/03/2008	14/04/2016	2089
9	CAPITAL MANAGEMENT REIT	Bulgaria	Standalone peripheral	21/01/2009	14/04/2016	1866
10	CHIMIMPORT	Bulgaria	Standalone peripheral	30/10/2006	14/04/2016	2442
11	CREDISSIMO AD SOFIA	Bulgaria	Standalone peripheral	25/06/2014	14/04/2016	465
12	EUROHOLD BULGARIA	Bulgaria	Standalone peripheral	14/02/2007	14/04/2016	2366
13	HOLDING NOV VEK	Bulgaria	Standalone peripheral	01/03/2006	14/04/2016	2612
14	HOLDING VARNA A	Bulgaria	Standalone peripheral	02/01/2006	14/04/2016	2657
15	INDUSTRIAL CAPITAL HOLDING	Bulgaria	Standalone peripheral	01/03/2006	14/04/2016	2611
16	INDUSTRIAL HOLDING BULGARIA	Bulgaria	Standalone peripheral	02/01/2006	14/04/2016	2646
17	SILA HOLDING	Bulgaria	Standalone peripheral	01/03/2006	14/04/2016	2599
18	SYNTHETICA	Bulgaria	Standalone peripheral	20/05/2013	14/04/2016	749
19	BH GLOBAL GBP	Channel Island	Standalone peripheral	22/05/2008	14/04/2016	2036
20	BH MACRO	Channel Island	Standalone peripheral	08/03/2007	14/04/2016	2345
21	HARBOURVEST GLOBAL PRIVATE EQUITY	Channel Island	Standalone peripheral	11/05/2010	14/04/2016	1531
22	MEDICX FUND	Channel Island	Standalone peripheral	27/10/2006	14/04/2016	2438
23	NB PRIVATE EQUITY PARTNERS	Channel Island	Standalone peripheral	18/07/2007	14/04/2016	2257
24	ENERGOCHEMICA	Czech Rep.	Standalone peripheral	02/07/2012	14/04/2016	976
25	OCEL HOLDING	Czech Rep.	Standalone peripheral	30/04/2012	14/04/2016	1021
26	RM-S HOLDING	Czech Rep.	Standalone peripheral	02/01/2006	14/04/2016	2525
27	CARNEGIE WORLDWIDE	Denmark	Standalone core EU	02/01/2006	14/04/2016	2656
28	AMUNDI (WI)	France	Core Eurozone	11/11/2015	14/04/2016	104
29	EURONEXT	France	Core Eurozone	19/06/2014	14/04/2016	457
30	FIMALAC	France	Core Eurozone	02/01/2006	14/04/2016	2513
31	SOCIETE FONCIERE FINANCIERE ET DE PART	France	Core Eurozone	02/01/2006	14/04/2016	2552
32	UNION FINANCIERE FRANCAIS	France	Core Eurozone	02/01/2006	14/04/2016	2444
33	WENDEL	France	Core Eurozone	02/01/2006	14/04/2016	2587
34	AAREAL BANK	Germany	Core Eurozone	02/01/2006	14/04/2016	2580
35	AURELIUS SE & COMPANY KGAA	Germany	Core Eurozone	23/06/2006	14/04/2016	2385
36	CHORUS CLEAN ENERGY	Germany	Core Eurozone	06/10/2015	14/04/2016	131
37	COMDIRECT BANK	Germany	Core Eurozone	02/01/2006	14/04/2016	2552
38	DEUTSCHE BETEILIGUNGS	Germany	Core Eurozone	02/01/2006	14/04/2016	2532
39	DEUTSCHE BOERSE	Germany	Core Eurozone	02/01/2006	14/04/2016	2600
40	FERRATUM	Germany	Core Eurozone	04/02/2015	14/04/2016	297
41	MLP	Germany	Core Eurozone	02/01/2006	14/04/2016	2572
42	ROCKET INTERNET	Germany	Core Eurozone	01/10/2014	14/04/2016	386
43	ALTERA WEALTH MANAGEMENT	Hungary	Standalone peripheral	25/06/2013	14/04/2016	723
44	APPENINN NYILVANOSAN	Hungary	Standalone peripheral	05/07/2010	14/04/2016	1492
45	EHEP SHARE	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2654
46	FHB SHARE	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2661
47	FINEXT SHARE	Hungary	Standalone peripheral	16/11/2009	14/04/2016	1654
48	FORRAS FORRAS/T	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2657
49	FORRAS TRUST & INVESTMENT	Hungary	Standalone peripheral	02/01/2006	14/04/2016	2661
50	PLOTINUS HOLDING	Hungary	Standalone peripheral	15/02/2011	14/04/2016	1332
51	ANIMA HOLDING	Italy	Periphery Eurozone	16/04/2014	14/04/2016	494
52	AZIMUT HOLDING	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2530
53	BANCA GENERALI	Italy	Periphery Eurozone	15/11/2006	14/04/2016	2342
54	BANCA IFIS	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2481
55	BANCA SISTEMA	Italy	Periphery Eurozone	02/07/2015	14/04/2016	197
56	DEA CAPITAL	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2507
57	EXOR ORD	Italy	Periphery Eurozone	02/03/2009	14/04/2016	1777
58	MITTEL	Italy	Periphery Eurozone	02/01/2006	14/04/2016	2422
59	ACHERON PORTFOLIO CLASS B	Luxembourg	Core Eurozone	21/11/2008	14/04/2016	1907
60	ACHERON PORTFOLIO CORPORATION	Luxembourg	Core Eurozone	21/11/2008	14/04/2016	1907
61	GEFINOR	Luxembourg	Core Eurozone	02/01/2006	14/04/2016	2655
62	MIDILUX HOLDINGS	Luxembourg	Core Eurozone	02/01/2006	14/04/2016	2655
63	QUILVEST	Luxembourg	Core Eurozone	02/01/2006	14/04/2016	2656

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

	Other FIs	Country	Region	Equity data Start	End	*T*
64	BINCKBANK	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2555
65	FLOW TRADERS	Netherlands	Core Eurozone	09/07/2015	14/04/2016	193
66	HAL TRUST	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2525
67	INTERTRUST GROUP HOLDING	Netherlands	Core Eurozone	14/10/2015	14/04/2016	121
68	KAS BANK	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2465
69	PERSHING SQUARE HOLDINGS	Netherlands	Core Eurozone	10/10/2014	14/04/2016	389
70	ROBECO	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2567
71	ROBECO DH EUR ICVC	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2453
72	ROLINCO	Netherlands	Core Eurozone	02/01/2006	14/04/2016	2547
73	AKER	Norway	Standalone core EU	02/01/2006	14/04/2016	2656
74	WARSAW STOCK EXCHANGE	Poland	Standalone peripheral	09/11/2010	14/04/2016	1403
75	SC BURSA DE VALORI BUCURESTI	Romania	Standalone peripheral	08/06/2010	14/04/2016	1516
76	SC FONDUL PROPRIETATEA	Romania	Standalone peripheral	25/01/2011	14/04/2016	1352
77	SIF 1 BANAT CRISANA	Romania	Standalone peripheral	02/01/2006	14/04/2016	2666
78	SIF 2 MOLDOVA	Romania	Standalone peripheral	02/01/2006	14/04/2016	2664
79	SIF 3 TRANSILVANIA	Romania	Standalone peripheral	02/01/2006	14/04/2016	2667
80	SIF 4 MUNTENIA	Romania	Standalone peripheral	02/01/2006	14/04/2016	2663
81	SIF 5 OLTENIA	Romania	Standalone peripheral	02/01/2006	14/04/2016	2666
82	BOLSAS Y MERCADOS ESPANOLES	Spain	Periphery Eurozone	14/07/2006	14/04/2016	2459
83	CORPORACION FINANCIERA ALBA	Spain	Periphery Eurozone	02/01/2006	14/04/2016	2552
84	INDUSTRIVARDEN 'A'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
85	INDUSTRIVARDEN 'C'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
86	INTRUM JUSTITIA	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
87	INVESTOR 'A'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
88	INVESTOR 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
89	KINNEVIK 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
90	LATOUR INVESTMENT 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
91	LUNDBERGFORETAGEN 'B'	Sweden	Standalone core EU	02/01/2006	14/04/2016	2657
92	MELKER SCHORLING	Sweden	Standalone core EU	05/09/2006	14/04/2016	2481
93	CASTLE PRIVATE EQUITY	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
94	COMPAGNIE FINANCIERE TRADITION	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
95	GAM HOLDING	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
96	HBM HEALTHCARE INVESTMENTS	Switzerland	Switzerland	14/02/2008	14/04/2016	2107
97	LEONTEQ	Switzerland	Switzerland	19/10/2012	14/04/2016	897
98	PARGESA 'B'	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
99	PARTNERS GROUP HOLDING	Switzerland	Switzerland	24/03/2006	14/04/2016	2594
100	ROTHSCHILD 'B'	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
101	SWISSQUOTE 'R'	Switzerland	Switzerland	02/01/2006	14/04/2016	2654
102	VZ HOLDING 'N'	Switzerland	Switzerland	23/03/2007	14/04/2016	2337
103	3I GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2653
104	3I INFRASTRUCTURE	UK	Standalone core EU	26/02/2007	14/04/2016	2353
105	ABERDEEN ASIAN INCOME FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2648
106	ABERDEEN ASIAN SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2651
107	ABERDEEN ASSET MANAGEMENT	UK	Standalone core EU	02/01/2006	14/04/2016	2653
108	ABERDEEN NEW DAWN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
109	ABERDEEN UK TRACKER	UK	Standalone core EU	02/01/2006	14/04/2016	2651
110	ABERFORTH GEARED INCOME TRUST	UK	Standalone core EU	29/03/2010	14/04/2016	1558
111	ABERFORTH SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2653
112	ADVANCE DEVELOPING MARKETS TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
113	ALCENTRA EUROPEAN FLOATING INCOME FUND	UK	Standalone core EU	27/02/2012	14/04/2016	1061
114	ALLIANCE TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654
115	ALLIED MINDS	UK	Standalone core EU	19/06/2014	14/04/2016	469
116	AP ALTERNAT ASSETS	UK	Standalone core EU	08/08/2006	14/04/2016	2502
117	ARROW GLOBAL GROUP	UK	Standalone core EU	07/10/2013	14/04/2016	649
118	ASHMORE GROUP	UK	Standalone core EU	11/10/2006	14/04/2016	2451
119	BACIT LIMITED	UK	Standalone core EU	29/08/2012	14/04/2016	934
120	BAILLIE GIFFORD JAPAN	UK	Standalone core EU	02/01/2006	14/04/2016	2654
121	BANKERS INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
122	BBGI SICAV SA	UK	Standalone core EU	28/11/2011	14/04/2016	1125
123	BLACKROCK GREATER EUROPE INVESTMENT TRU	UK	Standalone core EU	02/01/2006	14/04/2016	2651
124	BLACKROCK INCOME STRATEGIES	UK	Standalone core EU	02/01/2006	14/04/2016	2651
125	BLACKROCK SMALLER COMPANIES TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
126	BLACKROCK THROGMORTON TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2650
127	BLACKROCK WORLD MINING	UK	Standalone core EU	02/01/2006	14/04/2016	2654
128	BLUEFIELD SOLAR INCOME FUND	UK	Standalone core EU	29/05/2013	14/04/2016	741
129	BREWIN DOLPHIN	UK	Standalone core EU	02/01/2006	14/04/2016	2650
130	BRITISH EMPIRE TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653

(*Cont.*) **Table A.1 Firm-composition of CDS and equity panels.**

	Other FIs	Country	Region	Equity data Start	End	*T*
131	BRUNNER INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
132	CALEDONIA INVESTMENTS	UK	Standalone core EU	02/01/2006	14/04/2016	2653
133	CITY OF LONDON INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
134	CLOSE BROTHERS GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
135	CQS NEW CITY HIGH YIELD FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2644
136	CUSTODIAN REIT	UK	Standalone core EU	26/02/2014	14/04/2016	549
137	CVC CREDIT PARTNERS EUROPEAN OPPORTUNITIES GBP	UK	Standalone core EU	29/05/2013	14/04/2016	741
138	DIVERSE INCOME TRUST (THE)	UK	Standalone core EU	29/03/2011	14/04/2016	1298
139	DUNEDIN INCOME GROWTH	UK	Standalone core EU	02/01/2006	14/04/2016	2653
140	ECOFIN WATER AND POWER OPPORTUNITIES ORDINARY	UK	Standalone core EU	02/01/2006	14/04/2016	2648
141	EDINBURGH DRAGON TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
142	EDINBURGH INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653
143	EDINBURGH WORLDWIDE	UK	Standalone core EU	02/01/2006	14/04/2016	2650
144	ELECTRA PRIVATE EQUITY	UK	Standalone core EU	02/01/2006	14/04/2016	2651
145	EMPIRIC STUDENT PROPERTY	UK	Standalone core EU	28/04/2014	14/04/2016	506
146	F&C CAPITAL & INCOME	UK	Standalone core EU	02/01/2006	14/04/2016	2651
147	F&C COMMERCIAL PROPERTY TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
148	F&C GLOBAL SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
149	F&C UK REAL ESTATE INVESTMENTS LIMITED	UK	Standalone core EU	02/01/2006	14/04/2016	2650
150	FIDELITY CHINA SPECIAL SITUATION	UK	Standalone core EU	29/03/2010	14/04/2016	1563
151	FIDELITY EUROPEAN VALUES	UK	Standalone core EU	02/01/2006	14/04/2016	2654
152	FIDELITY SPECIAL VALUES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
153	FINSBURY GROWTH & INCOME TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
154	FOREIGN & COLONIAL	UK	Standalone core EU	02/01/2006	14/04/2016	2653
155	FORESIGHT SOLAR FUND	UK	Standalone core EU	26/09/2013	14/04/2016	655
156	FUNDSMITH EMERGING EQUITY TRUST	UK	Standalone core EU	28/04/2014	14/04/2016	507
157	GCP INFRASTRUCTURE INVESTMENTS	UK	Standalone core EU	28/06/2010	14/04/2016	1494
158	GENESIS EMERGING MARKETS	UK	Standalone core EU	02/01/2006	14/04/2016	2652
159	GREENCOAT UK WIND	UK	Standalone core EU	26/02/2013	14/04/2016	804
160	HARGREAVES LANSDOWN	UK	Standalone core EU	14/05/2007	14/04/2016	2302
161	HENDERSON EUROPEAN FOCUS TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
162	HENDERSON EUROTRUST ORDINARY	UK	Standalone core EU	02/01/2006	14/04/2016	2649
163	HENDERSON FAR EAST INCOME	UK	Standalone core EU	02/01/2006	14/04/2016	2651
164	HENDERSON GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2652
165	HENDERSON HIGH INCOME NEW	UK	Standalone core EU	02/01/2006	14/04/2016	2649
166	HENDERSON SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
167	HERALD INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
168	HG CAPITAL TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
169	HICL INFRASTRUCTURE	UK	Standalone core EU	24/02/2006	14/04/2016	2609
170	HIGHBRIDGE MULTI-STRATEGY FUND	UK	Standalone core EU	29/03/2006	14/04/2016	2584
171	ICAP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
172	ICG ENTERPRISE TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
173	IG GROUP HOLDINGS	UK	Standalone core EU	02/01/2006	14/04/2016	2652
174	IMPAX ENVIRONMENTAL MARKETS	UK	Standalone core EU	02/01/2006	14/04/2016	2647
175	INTERMEDIATE CAPITAL GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2653
176	INTERNATIONAL BIOTECHNOLOGY	UK	Standalone core EU	02/01/2006	14/04/2016	2646
177	INTERNATIONAL PERSONAL FINANCE	UK	Standalone core EU	13/07/2007	14/04/2016	2259
178	INTERNATIONAL PUBLIC PARTNERSHIPS	UK	Standalone core EU	27/10/2006	14/04/2016	2439
179	INVESCO PERPETUAL UK SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2651
180	INVESTEC	UK	Standalone core EU	02/01/2006	14/04/2016	2654
181	IP GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2650
182	JOHN LAING ENVIRONMENTAL ASSETS GROUP	UK	Standalone core EU	26/02/2014	14/04/2016	548
183	JOHN LAING GROUP (WI)	UK	Standalone core EU	11/02/2015	14/04/2016	301
184	JOHN LAING INFRASTRUCTURE FUND	UK	Standalone core EU	25/11/2010	14/04/2016	1384
185	JPMORGAN AMERICAN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654
186	JPMORGAN ASIAN	UK	Standalone core EU	02/01/2006	14/04/2016	2652
187	JPMORGAN CLAVERHOUSE	UK	Standalone core EU	02/01/2006	14/04/2016	2653
188	JPMORGAN EMERGING MARKETS	UK	Standalone core EU	02/01/2006	14/04/2016	2651
189	JPMORGAN EUROPEAN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
190	JPMORGAN EUROPEAN SMALL COMPANY	UK	Standalone core EU	02/01/2006	14/04/2016	2650
191	JPMORGAN GLOBAL CONVERTIBLES INCOME FUND	UK	Standalone core EU	29/05/2013	14/04/2016	740
192	JPMORGAN GLOBAL EMERGING MARKETS INCOME TRUST	UK	Standalone core EU	28/06/2010	14/04/2016	1495
193	JPMORGAN INDIAN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654
194	JPMORGAN JAPANESE	UK	Standalone core EU	02/01/2006	14/04/2016	2654
195	JPMORGAN MID CAP INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654
196	JPMORGAN OVERSEAS INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653
197	JUPITER EUROPEAN OPPORTUNITIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
198	JUPITER FUND MANAGEMENT	UK	Standalone core EU	15/06/2010	14/04/2016	1505
199	KENNEDY WILSON EUROPE REAL ESTATE	UK	Standalone core EU	29/01/2014	14/04/2016	569
200	KEYSTONE INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653

(*Cont.*) Table A.1 Firm-composition of CDS and equity panels

	Other FIs	Country	Region	Equity data Start	End	*T*
201	LAW DEBENTURE	UK	Standalone core EU	02/01/2006	14/04/2016	2652
202	LONDON STOCK EXCHANGE GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2653
203	LOWLAND INVESTMENT	UK	Standalone core EU	02/01/2006	14/04/2016	2652
204	MAN GROUP	UK	Standalone core EU	02/01/2006	14/04/2016	2654
205	MERCANTILE INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
206	MERCHANTS TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653
207	MONKS INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
208	MURRAY INCOME	UK	Standalone core EU	02/01/2006	14/04/2016	2653
209	MURRAY INTERNATIONAL	UK	Standalone core EU	02/01/2006	14/04/2016	2652
210	NB GLOBAL FLOATING RATE INCOME FUND	UK	Standalone core EU	29/03/2011	14/04/2016	1300
211	NEW INDIA INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653
212	NEXTENERGY SOLAR FUND	UK	Standalone core EU	25/04/2014	14/04/2016	506
213	NORTH AMERICAN INCOME TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
214	NORTH ATLANTIC SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2650
215	ONESAVINGS BANK	UK	Standalone core EU	04/06/2014	14/04/2016	480
216	P2P GLOBAL INVESTMENTS	UK	Standalone core EU	28/04/2014	14/04/2016	507
217	P2P INVESTMENTS C	UK	Standalone core EU	26/06/2015	14/04/2016	205
218	PACIFIC ASSETS	UK	Standalone core EU	02/01/2006	14/04/2016	2651
219	PANTHEON INTERNATIONAL	UK	Standalone core EU	02/01/2006	14/04/2016	2651
220	PARAGON GROUP OF COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2652
221	PERPETUAL INCOME & GROWTH	UK	Standalone core EU	02/01/2006	14/04/2016	2652
222	PERSONAL ASSETS	UK	Standalone core EU	02/01/2006	14/04/2016	2651
223	PICTON PROPERTY INCOME	UK	Standalone core EU	02/01/2006	14/04/2016	2648
224	POLAR CAPITAL GLOBAL HEALTHCARE GROWTH	UK	Standalone core EU	27/05/2010	14/04/2016	1517
225	POLAR CAPITAL TECHNOLOGY TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
226	PROVIDENT FINANCIAL	UK	Standalone core EU	02/01/2006	14/04/2016	2654
227	PURETECH HEALTH	UK	Standalone core EU	18/06/2015	14/04/2016	213
228	RATHBONE BROTHERS	UK	Standalone core EU	02/01/2006	14/04/2016	2653
229	RIT CAPITAL PARTNERS	UK	Standalone core EU	02/01/2006	14/04/2016	2653
230	RIVERSTONE ENERGY	UK	Standalone core EU	26/09/2013	14/04/2016	656
231	RUFFER INVESTMENT COMPANC REDEEMABLE PARTICIPA	UK	Standalone core EU	02/01/2006	14/04/2016	2647
232	S & U	UK	Standalone core EU	02/01/2006	14/04/2016	2648
233	SCHRODER ASIA PACIFIC FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2653
234	SCHRODER JAPAN GROWTH FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2649
235	SCHRODER ORIENTAL INCOME FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2650
236	SCHRODER REAL ESTATE INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2648
237	SCHRODER UK GROWTH FUND	UK	Standalone core EU	02/01/2006	14/04/2016	2651
238	SCHRODERS	UK	Standalone core EU	02/01/2006	14/04/2016	2654
239	SCOTTISH AMERICAN	UK	Standalone core EU	02/01/2006	14/04/2016	2651
240	SCOTTISH INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2653
241	SCOTTISH MORTGAGE	UK	Standalone core EU	02/01/2006	14/04/2016	2652
242	SCOTTISH ORIENTAL SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2651
243	SQN ASSET FINANCE INCOME FUND	UK	Standalone core EU	26/06/2014	14/04/2016	463
244	STANDARD LIFE EQUITY INCOME TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
245	STANDARD LIFE EUROPEAN PRIVATE EQUITY TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2650
246	STANDARD LIFE INVESTMENT PROPERTY INCOME TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2648
247	STANDARD LIFE UK SMALLER COMPANIES	UK	Standalone core EU	02/01/2006	14/04/2016	2647
248	STARWOOD EUROPEENNE REAL ESTATE FINANCE	UK	Standalone core EU	28/11/2012	14/04/2016	866
249	SVG CAPITAL	UK	Standalone core EU	02/01/2006	14/04/2016	2653
250	TEMPLE BAR	UK	Standalone core EU	02/01/2006	14/04/2016	2654
251	TEMPLETON EMERGING MARKETS INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654
252	TETRAGON FINANCIAL GROUP	UK	Standalone core EU	19/04/2007	14/04/2016	2322
253	THE BIOTECH GROWTH TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2651
254	THE EUROPEAN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
255	THE RENEWABLES INFRASTRUCTURE GROUP	UK	Standalone core EU	29/05/2013	14/04/2016	741
256	TR EUROPEAN GROWTH	UK	Standalone core EU	02/01/2006	14/04/2016	2653
257	TR PROPERTY INVESTMENT	UK	Standalone core EU	02/01/2006	14/04/2016	2653
258	TRITAX BIG BOX REIT	UK	Standalone core EU	29/10/2013	14/04/2016	633
259	TROY INCOME & GROWTH TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2645
260	TULLETT PREBON	UK	Standalone core EU	13/12/2006	14/04/2016	2407
261	TWENTYFOUR INCOME FUND	UK	Standalone core EU	26/02/2013	14/04/2016	805
262	UK COMMERCIAL PROPERTY TRUST	UK	Standalone core EU	29/08/2006	14/04/2016	2479
263	UTILICO EMERGING MARKETS	UK	Standalone core EU	02/01/2006	14/04/2016	2649
264	VPC SPECIALTY LENDING INVESTMENTS	UK	Standalone core EU	29/12/2014	14/04/2016	331
265	WITAN INVESTMENT TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2652
266	WOODFORD PATIENT CAPITAL TRUST	UK	Standalone core EU	27/03/2015	14/04/2016	270
267	WORLDWIDE HEALTHCARE TRUST	UK	Standalone core EU	02/01/2006	14/04/2016	2654

Table A.2. Bank-specific news.

The news sources are *Thomsom Reuters* (TR), *Factiva*, *Comisión Nacional del Mercado de Valores* (CNMV; Spanish security exchange commission), and the websites of credit rating agencies or of the own banks. The news are organized in chronological order (News Date). Event date refers to the date of the event (large bank-idiosyncratic CDS jump) as identified through the methodology described in Section 3.1 of the manuscript.

Banks	Country	Event date	News Description	Source	News Date
MEDIOBANCA	Italy	10/03/2008	Earnings Release	TR	07/03/2008
BANCO POPULAR ESPANOL	Spain	31/07/2008	Quarterly Financial results release	CNMV	29/07/2008
CAIXABANK	Spain	19/08/2008	Caixabank supported the takeover of Gas Natural on Unión Fenosa	Factiva	15/08/2008
CDA DEL MEDITERRANEO	Spain	31/10/2008	Moodys announce problems with the collateral arrangements taken by CAM after its downgrade below A1 to fulfill its Swap Agreements	Moody's	28/10/2008
BANKINTER	Spain	12/05/2009	Announcement of 361.4 million euros capital increase through the issuance of 67.55 million new shares needed to buy 50% of Línea Directa Aseguradora.	TR	13/05/2009
SEB	Sweden	04/06/2009	Investor presentation	bank	04/06/2009
NATIXIS	France	11/06/2009	Doubts about the future of the employees after the merger of the Banque Fédérale des Banques Populaires (that includes NATIXIS) and the Caisse Nationale des Caisses d'Epargne.	Factiva	11/06/2009
ING GROEP	Netherlands	21/08/2009	Moody downgrade several scurities of ING Groep N.V. to Ba1 from A3 among other securities that remain under review for possible further downgrade.	Moody's	20/08/2009
BANCO ESPIRITO SANTO	Portugal	04/02/2010	News about the renewed of technology		
ERSTE GROUP BANK	Austria	08/06/2010	Erste Bank Investor Conference	TR	10/06/2010
BANKINTER	Spain	24/11/2010	Bankinter S A at BNP Paribas, Steinberg and Deloitte's Spain Investors Conference	TR	22/11/2010
BANCO SANTANDER	Spain	22/03/2011	Santader Consumer Finance issued notes that constitude a re-securitation of CitiFinancial Auto Issuance Trust 2009-1 (CFAIT 2009-1, the underlying transaction) sponsored by CitiFinancial Auto, LTD.	TR	21/03/2011
BANCA POPOLARE DI MILANO	Italy	08/06/2011	The Board of Directors approved the "Document on the Remuneration and Incentive Policies of the BPM Group"	TR	07/06/2011
NATIONAL BANK OF GREECE	Greece	01/09/2011	National Bank of Greece SA Earnings Conference Call	TR	30/08/2011
BANCA NACIONALE DEL LABORO	Italy	12/09/2011	Moody's maintains review for downgrade long-term ratings to consider impact of funding challenges on Credit Profile.	Moody's	12/09/2011
ALLIANCE & LEICESTER	UK	31/10/2011	Fitch Ratings downgraded several bank's securities	Fitch	03/11/2011
LB BADENWUERTTEMBERG	Germany	10/11/2011	Technology and Engineering Investment Day	TR	15/11/2011
SVENSKA HANDELSBANKEN	Sweden	23/11/2011	Corporate Investor Roadshow	TR	22/11/2011
CREDIT SUISSE GROUP	Switzerland	13/01/2012	Credit Suisse - Taiwan Conference 2012	TR	12/01/2012
BANCO SANTANDER UK	Spain	22/03/2012	Ordinary General Meeting	bank	22/03/2012
BANCO DE SABADELL	Spain	29/03/2012	Sabadell closed the sale of their 20% of Banco del Bajío, Mexico.	bank	30/03/2012
LB BADENWUERTTEMBERG	Germany	05/04/2012	Regular dividend announcement	TR	30/03/2012
COOPTIEVE CENTE RABO BANK	Netherlands	18/02/2013	Immofinanz AG at Rabobank Roadshow-Netherlands	TR	19/02/2013
BANCO DE SABADELL	Spain	26/03/2013	Annual Shareholders Meeting	TR	26/03/2013
THE CO-OP BANK	UK	14/05/2013	Annual Shareholders Meeting	TR	18/05/2013
BANCO BILBAO VIZCAYA ARGENTARIA	Spain	21/06/2013	Completion of the merger by absorption between Banco Bilbao Vizcaya Argentaria, S.A. and Unnim Banc, S.A.U.	CNMV	21/06/2013
BAYERISCHE LANDESBANKEN	Germany	06/12/2013	BLsold its large equity interest in fund and asset management specialists KGAL GmbH & Co. KG, Grünwald.	TR	09/12/2013
BANCO COMERCIAL PORTUGUES	Portugal	02/04/2014	Corporate Conference Presentation	TR	01/04/2014
BANCO ESPIRITO SANTO	Portugal	01/08/2014	Earnings Conference Call	TR	31/07/2014
BAWAG	Austria	15/12/2014	Negative outlook on the long-term ratings of BAWAG P.S.K. by Moody's	Moody's	15/12/2014
ERSTE GROUP BANK	Austria	16/01/2015	Erste Group affected by the appreciation of CHF, as its borrowers with CHF-denominated loans lose repayment ability.	Bank	15/01/2015
ALPHA BANK	Greece	19/02/2015	Alpha Bank, reported losses in the fourth quarter on Thursday after provisions for bad loans hammered their bottom lines.	TR	19/02/2015
UNICREDIT	Italy	29/06/2015	UniCredit SpA-Bad Loans is acquired by Aktiv Kapital AS	TR	30/06/2015
ALPHA BANK	Greece	14/07/2015	Alpha bank was aquired by a the Bulgarian Agro Holding	TR	14/07/2015
UNIONE DI BANCHE ITALIANI	Italy	08/10/2015	Annual Shareholders Meeting	TR	09/10/2015
BANCO COMERCIAL PORTUGUES	Portugal	20/01/2016	European Central Bank was scrutinizing non-performing loan	TR	18/01/2016

Table A.3. Distribution of daily CDS index changes.

The table provides summary statistics for the five systematic credit risk factors utilized in Equation (1) at the daily frequency to extract the idiosyncratic component of a bank's daily CDS changes: local market risk is proxied by a country-specific sovereign CDS index (I_1) and a European sovereign CDS index (I_2), global market risk is proxied by a US sovereign CDS index (I_3), industry local market risk is proxied by a European banking sector CDS index (I_4), industry global market risk factor is proxied by a US banking sector CDS index (I_5). The statistics reported summarize the distribution of the index changes $\Delta I_{ft} \equiv I_{ft} - I_{f,t-1}$, f=1,…,5, AC(1) is the autocorrelation coefficient of order one.

	Mean	StDev	Skewness	Kurtosis	AC(1)
Country-specific sovereign CDS indices (I_1)					
Core Eurozone					
Austria	-0.057	3.570	1.310	36.667	-0.050
Belgium	0.011	4.866	-0.417	24.100	0.183
France	0.010	3.270	-0.202	19.538	0.110
Germany	0.003	1.708	0.210	22.749	0.085
Netherlands	0.005	2.062	0.157	17.973	0.235
Periphery Eurozone					
Greece	6.989	188.34	9.432	254.45	-0.248
Ireland	-0.011	12.112	-0.720	25.708	0.270
Italy	0.052	8.754	0.162	19.202	0.200
Portugal	0.112	19.371	-0.191	30.324	0.179
Spain	0.036	8.453	-0.283	15.034	0.177
Standalone core EU					
Denmark	-0.024	2.362	0.406	20.246	0.257
Norway	-0.008	0.864	1.095	22.423	0.096
Sweden	-0.026	2.255	-0.466	27.475	0.097
United Kingdom	-0.012	2.494	0.176	12.681	0.021
Switzerland	0.067	7.954	0.438	34.389	-0.117
European sovereign CDS index (I_2)	0.017	6.575	-4.920	121.843	0.030
US sovereign CDS index (I_3)	0.005	1.369	0.889	31.345	0.079
European banking CDS index (I_4)	0.083	10.627	-0.353	36.966	-0.169
US banking CDS index (I_5)	0.006	9.463	-3.907	170.781	0.177

Table A.4. Correlation heat-map among "informational linkages" proxies.

The table reports pairwise Pearson correlations for the eight proxies of "informational linkages" across financial entities as employed in the analysis. The variables are described in Section 3.2 of the paper.

	Common legal tradition	*Both Eurozone*	*Formerly colonial relationship*	*Formerly same country*	*Common official language*	*Weighted distance*	*Common border*	*Shared bank branches*
Both Eurozone	9%							
Formerly colonial relationship	27%	3%						
Formerly same country	22%	1%	53%					
Common official language	23%	-30%	38%	24%				
Weighted distance	-19%	9%	-23%	-21%	-41%			
Common border	-28%	24%	-21%	-10%	-55%	45%		
Shared bank branches	7%	8%	46%	58%	21%	-10%	5%	
Historical bank M&As	18%	2%	54%	65%	32%	-23%	-9%	89%

Table A.5. Estimation results for peer's equity pricing model.

The table reports the averages of the Quasi Maximum Likelihood (QML) estimates of the parameters (beyond α_{kj}^{0} and α_{kj}^{post} which are reported in the manuscript) of the peer's equity pricing model, Equations (4a)-(4b). N is the number of sample event *k* and peer *j* pairs in each group. The parameters alpha α_{kj}, beta β_{kj} and α_{kj}^{pre} pertain to the conditional mean equation (4a), while θ_{0kj}, θ_{1kj}, and φ_{kj} pertain to the conditional variance GARCH equation (4b). % ≠ 0 is the proportion of cases in which the parameter is significant at the 10%, 5% or 1% levels using *t*-statistics computed with Bollerslev-Wooldridge standard errors. R^2 is the average coefficient of determination of equation (4a) across all bank-event versus peer pairs.

	N	α	%≠0	β	%≠0	α^{pre}	%≠0	θ_0	%≠0	θ_1	%≠0	φ	%≠0	R^2
Full sample	20379	0.002	12%	0.744	93%	-0.016	21%	0.821	42%	0.197	57%	0.55	71%	0.32
Groupings by "information linkages" between event-bank and peer														
A. Core line of business														
Peer is also a Bank	4254	-0.027	12%	0.992	93%	-0.072	22%	0.777	43%	0.200	61%	0.58	74%	0.39
Peer is an Insurance firm	2372	-0.001	9%	0.878	97%	-0.021	24%	0.739	43%	0.213	53%	0.55	70%	0.35
Peer is a Real estate firm	4144	-0.002	11%	0.580	88%	0.011	21%	1.440	45%	0.225	56%	0.52	69%	0.20
Peer is other FI	9609	0.018	13%	0.672	94%	-0.001	19%	0.594	41%	0.180	56%	0.55	70%	0.34
B. Economic/political cross-country integration														
Same country	949	-0.002	14%	0.854	98%	-0.059	20%	0.714	42%	0.179	59%	0.56	74%	0.37
Different country	19430	0.002	12%	0.739	93%	-0.014	21%	0.827	43%	0.198	57%	0.55	70%	0.32
Same region	16604	0.004	12%	0.717	92%	-0.007	21%	0.824	43%	0.200	57%	0.55	70%	0.32
Different region	2827	-0.006	13%	0.869	96%	-0.054	23%	0.844	42%	0.187	58%	0.55	71%	0.35
Groupings by market conditions														
Turmoil market 2008-2012	10492	-0.016	9%	0.779	94%	-0.041	20%	0.898	42%	0.187	64%	0.60	77%	0.35
Recovery market 2013-2016	9887	0.021	15%	0.707	91%	0.011	22%	0.737	43%	0.208	49%	0.49	64%	0.29

Table A.6. Peers' equity response to bank-idiosyncratic credit risk events: Multifactor pricing model.

The table summarizes in the left section the QML estimates of parameters α^0 (Panel I) and α^{post} (Panel II) from Equation (4a) extended with risk factors (global and local market factor, and global and European financial market factors) that capture, respectively, the peers' equity alpha shifts on event day 0 and post-event [+1, +5] window (daily percentage abnormal return). *t* test is the parametric Student's *t* test for the significance of the mean. *W* test is the non-parametric Wilcoxon signed rank test for the significance of the median. N is the number of event *k*, peer *j* cases. The right section reports the *Welch* test (Mann-Whitney U test, *MW* test) for the significance of the alpha-shift mean (median) differential across groups. *, ** and *** are significant at the 10%, 5% and 1% levels.

	Peer's alpha-shift					**Peer's alpha-shift differential**				
	N	Mean	*t* test	Median	*W* test		Mean diff.	*Welch* test	Median diff.	*MW* test
Panel I. Event day										
Full sample	20379	-0.093 ***	-6.559	-0.063 ***	9.72					
Groupings by "information linkages" between event-bank and peer										
A. Core line of business										
Peer is also a Bank	4254	-0.111 ***	-3.254	-0.095 ***	4.866					
Peer is an Insurance firm	2372	-0.042	-1.097	-0.017	1.182	Peer is Insurance firm vs Bank	-0.069	1.725	-0.078 **	2.070
Peer is a Real estate firm	4144	-0.054	-1.418	-0.048 ***	2.999	Peer is Real estate firm vs Bank	-0.057	1.217	-0.047	1.264
Peer is other FI	9609	-0.116 ***	-6.627	-0.070 ***	8.559	Peer is other FI vs Bank	0.004	0.011	-0.025	0.037
B. Economic/political cross-country integration										
Same country	950	-0.198 ***	-3.451	-0.112 ***	3.112					
Different country	19429	-0.088 ***	-6.022	-0.061 ***	9.272	Same country vs Diff. country	0.110 *	3.244	0.051	1.201
Same region	2198	-0.128 ***	-3.825	-0.112 ***	5.499	Same country vs Diff. country (Same region)	0.069	1.038	0.000	0.381
Different region	17231	-0.085 ***	-5.427	-0.051 ***	8.096	Same country vs Diff. country (Diff. region)	0.113 *	3.394	0.061	1.309
Groupings by market conditions										
Turmoil market 2008-2012	10492	-0.103 ***	-4.753	-0.060 ***	6.185					
Recovery market 2013-2016	9887	-0.083 ***	-4.566	-0.067 ***	7.74	Recovery vs Turmoil market	-0.020	0.473	0.007	0.176
Panel II. Event window [+1,+5]										
Full sample	20379	-0.014 **	-2.124	-0.005 *	1.91					
Groupings by "information linkages" between event-bank and peer										
A. Core line of business										
Peer is also a Bank	4254	-0.003	-0.169	-0.022 **	2.013					
Peer is an Insurance firm	2372	0.0127	0.737	0.014 *	1.617	Peer is Insurance firm vs Bank	-0.015	0.41	-0.035 **	2.493
Peer is a Real estate firm	4144	-0.014	-0.817	0.020	1.054	Peer is Real estate firm vs Bank	0.011	0.224	-0.042 **	2.167
Peer is other FI	9609	-0.026 ***	-3.108	-0.010 ***	3.304	Peer is other FI vs Bank	0.024	1.584	-0.012	0.35
B. Economic/political cross-country integration										
Same country	950	-0.026	-1.026	-0.025 *	1.785					
Different country	19429	-0.014 **	-1.976	-0.003	1.562	Same country vs Diff. country	0.012	0.200	0.022	1.418
Same region	2198	-0.009	-0.551	-0.015	1.469	Same country vs Diff. country (Same region)	0.017	0.296	0.010	0.894
Different region	17231	-0.015 **	-2.103	-0.003	1.395	Same country vs Diff. country (Diff. region)	0.010	0.144	0.022	1.433
Groupings by market conditions										
Turmoil market 2008-2012	10492	-0.032 ***	-2.996	-0.019 ***	3.845					
Recovery market 2013-2016	9887	0.0042	0.547	0.004	1.483	Recovery vs Turmoil market	-0.037 ***	7.199	-0.023 ***	3.948