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Crises, Financial Contagion and the Real Economy: Intraregional Evidence from Transition Economies

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Abstract

In this paper, we investigate how financial contagion affects lending to the broader economy in the Transition region in the aftermath of the global financial crisis and the sovereign debt crisis in the euro area. Our analysis reveals that during the global financial crisis, bank lending in the Transition region declined significantly in countries with high joint tail dependence with Western markets, highlighting the sensitivity of lending to both negative and positive extreme market comovements. Foreign-owned banks were particularly exposed, with sharper reductions in credit supply observed in more financially integrated subregions such as the Baltics and the Visegrad Four. In contrast, the sovereign debt crisis showed a weaker overall relationship between market comovement and lending, with only limited vulnerability observed among banks in the Balkan region. Overall, this study provides valuable insights for policymakers in effectively managing financial contagion and crisis transmission in the Transition region.

1. Introduction

The economies of the Transition region have witnessed remarkable economic growth over the past three decades, largely attributed to financial globalization and the integration of their financial systems with Western Europe (Friedrich et al., 2013). This integration has brought about numerous benefits, including improvements in the legal and institutional environment and the development of vibrant stock markets in the region, attracting international investors prior to 2008. However, the severe downturn experienced by transition markets following the collapse of Lehman Brothers in 2008 and the subsequent sovereign debt crisis in the euro area in 2010 revealed the potential downsides of financial integration and globalization. Integrated markets became vulnerable to financial contagion, with negative shocks spreading from both close and distant parts of the world. As bank lending plays a pivotal role in driving economic growth, any reversal of fortunes in global markets has the potential to abruptly halt economic expansion in the Transition region (Dietz et al., 2012). Understanding the mechanisms through which financial shocks transmit between Western markets and the Transition region is crucial for designing effective measures to prevent and mitigate the adverse effects of such shocks on the real economy.

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This study aims to provide an extensive analysis of the transmission of financial shocks between Western and Transition region[1] financial markets during the global financial crisis and the euro area sovereign debt crisis, specifically focusing on how these shocks affected the real economy through the lending activities of global banks. The large foreign ownership of domestically operating banks is a key factor linking international financial markets and the Transition region. Schnabl (2012) demonstrates that shocks in international stock markets, such as the Russian Debt Crisis in 1998, result in reduced domestic lending, particularly by foreign-owned banks and banks that heavily rely on foreign markets for funding. Consequently, our primary objective is to investigate how financial interconnectedness has facilitated the transmission of risks between WE and transition economies during the global financial crisis and sovereign debt crisis in the euro area, paying close attention to whether the internal capital markets of global banks affect the transmission of shocks across borders.

Our methodology builds upon recent advancements in the measurement of financial contagion by focusing on nonlinear dependence structures and the role of tail events (see, e.g., Aloui, et al. 2011; Bouoiyour et al., 2019; Patton, 2006, 2012; Reboredo, 2012, 2013; Rodriguez, 2007; Silva Filho et al., 2012; Pham et al., 2025). Departing from the limitations of linear correlation measures, we adopt a regime-switching copula approach that captures time-varying comovements in the tails of the return distribution – where crises are most pronounced (Longin & Solnik, 2001; Hartmann et al., 2004; Rodriguez, 2007). The use of Markov Chain models such as SWARCH enables the endogenous identification of crisis periods, rather than relying on arbitrarily fixed dates, as in previous studies. By allowing the data to dictate the transition between low- and high-volatility states,[2] this approach enhances the robustness of crisis detection and mitigates potential biases arising from exogenously imposed crisis definitions.

To this end, we define financial contagion between markets as an increase in tail dependence, that is, the probability of two markets to have jointly positive (upper tail dependence, or UTD) or negative (lower tail dependence, or LTD) returns and measure it using a switching-copula approach to differentiate between high-volatility and low-volatility periods in financial markets. Specifically, we apply the contagion identification strategy of Rodriguez (2007) and implement a switching mixture copula model based on the Symmetrized Joe-Clayton copula (Radev, 2021b), which allows us to isolate direct estimates of the probability of joint extreme positive and negative return realizations between Western European markets and individual transition countries. This approach enables the identification of both shifts in the strength of financial linkages and structural changes in their nature across different volatility regimes. Unlike most prior work that provides static tail dependence estimates, we employ dynamic measures of tail dependence, making our approach compatible with panel macroeconomic and banking data. This enables a more granular, time-sensitive analysis of contagion effects and their implications for cross-border credit transmission.

For the purposes of econometric identification, we use the collapse of Lehman

[1] In this study, we define the Transition region to encompass Central and Eastern Europe and Turkey.
[2] In this paper, we use the terms "high/low volatility", "high/low state" and "high/low volatility state" interchangeably.

Brothers and the sovereign debt crisis in the euro area as exogenous events[3] for Transition region subsidiaries that have a significant impact on the Region. We employ these shocks as tools to identify the effect of financial contagion on bank lending and to examine the heterogeneous responses within the region to both crises. By exploiting these exogenous shocks, we can overcome endogeneity concerns and establish a more robust causal relationship between financial contagion and bank lending by means of difference-in-differences estimation.

Our results show that prior to the global financial crisis, having more joint extreme events (positive or negative) in the tails of the distribution leads to a decrease in bank lending. The findings indicate that during the global financial crisis, overall bank lending in the Transition region declined significantly, particularly in countries with below-median lower tail dependence and above-median upper tail dependence – suggesting that lending contractions were driven by both negative and positive extreme market comovements. This result implies that lending activity in such countries is particularly sensitive to volatility, irrespective of the direction of market movements. Conversely, during the sovereign debt crisis, we observe no such pattern in the aggregate sample, indicating a weaker link between financial market shocks and lending during that period.

Disaggregating by bank ownership reveals that foreign-owned subsidiaries were more vulnerable during the global financial crisis. These institutions reduced lending significantly in countries with elevated probabilities of both negative and positive comovements with Western markets. However, this sensitivity was not replicated during the sovereign debt crisis. Domestic banks, by contrast, appeared more insulated from negative market comovements in 2008–2009 but remained susceptible to positive tail events. Notably, during the sovereign debt crisis, domestic banks in both high and low comovement countries reduced lending, highlighting divergent dynamics across ownership structures and crisis episodes.

Further insights emerge from the subregional analysis. During the global financial crisis, the Baltics experienced the sharpest contraction in overall lending – an unsurprising result given that all banks in the sample from the region are foreign-owned. In the Visegrad Four countries, foreign-owned banks in highly comoving countries saw a significant reduction in lending, while domestic banks remained more resilient. In the Balkans, domestic banks were affected by negative comovements, while foreign-owned banks were particularly sensitive to positive tail dependence. These patterns suggest that foreign bank ownership amplifies the transmission of financial shocks, particularly in more integrated economies like those of the Visegrad group.

During the sovereign debt crisis, however, the subregional effects were muted. No significant lending contraction was observed in the aggregate, and the estimated impacts for individual subregions were largely insignificant or mixed. An exception was the Balkan region, where banks – particularly foreign-owned institutions – appeared more vulnerable to extreme market comovements. However, this vulnerability was more

[3] Although the parent banks in our sample are based in Western countries where the crisis shocks originate, their subsidiaries operate in the Transition region, which is geographically and financially removed from the initial shock. As such, these shocks can be considered exogenous to the banking systems of the Transition region. Moreover, the subsidiaries are relatively small in scale compared to their parent institutions and therefore could not have contributed to the crisis events analyzed in this study.

strongly associated with positive rather than negative comovements, offering only partial support for the hypothesis that joint downside risk constrains lending in crisis periods.

Our paper contributes to two main strands of literature. First, we build on the research examining the cross-border transmission of shocks through the internal capital markets of global banks (Peek & Rosengren, 1997; De Haas et al., 2005; Cetorelli & Goldberg, 2009, 2011, 2022a,b,c; Popov and Udell, 2012; Barth & Radev, 2022; Radev, 2021a, 2022a,b). In transition economies, where the banking sector is central to financial intermediation, the presence of foreign-owned banks has generally been linked to enhanced financial stability, efficiency, and capital allocation (De Haas et al., 2005; Badulescu & Morutan, 2019). However, this integration also creates channels for crisis transmission, as internal capital reallocation can amplify the spread of shocks (Lamont, 1997; Shin & Stulz, 1998; Brunnermeier et al., 2012; Jeon et al., 2013). Empirical evidence confirms that global banking groups' internal capital flows are sensitive to financial conditions abroad (Cetorelli & Goldberg, 2012a,b,c; Pelletier, 2018; Radev, 2021a; Goyal et al., 2022). While prior work has studied how equity shocks abroad affect lending in host markets (e.g., Ongena et al., 2015; Radev, 2021c), we advance this line of inquiry by incorporating a bivariate measure of tail dependence – capturing the probability of joint extreme returns across markets – to quantify the exposure of subsidiaries and their host countries to fluctuations in international stock markets.[4]

Second, we contribute to the literature on financial contagion and stock market comovement between Western Europe (WE) and the transition economies. Early studies documented increased correlations during crises but questioned the presence of structural breaks after adjusting for heteroskedasticity (Longin & Solnik, 2001; Boyer et al., 1999; Forbes & Rigobon, 2002). To better capture extreme market events, recent studies employ copula functions to measure tail dependence and model nonlinear, regime-specific linkages (Cook & Johnson, 1981; Patton, 2006; Hartmann et al., 2004). A quickly expanding body of literature applies Markov-switching copulas to capture regime shifts in the most volatile periods of a crisis (see, e.g., Aloui, et al. 2011; Bouoiyour et al., 2019; Reboredo, 2012, 2013; Rodriguez, 2007; Silva Filho et al., 2012; Pham et al., 2025). Using Markov-switching copulas, Radev (2021b) finds stronger lower-tail dependence between WE and transition markets during the global financial crisis, while also identifying episodes of declining comovement that suggest a diversification potential. By using the Lehman Brothers collapse and the Euro Area sovereign debt crisis as exogenous shocks, in this paper we identify causal effects of financial contagion on cross-border bank lending. Since intra-group capital flows are not directly observable, we argue that comovement between local equity markets and those of parent banks' home countries serves as a high-frequency proxy for internal capital market pressures affecting lending.

Our approach offers several significant methodological and empirical advantages in analysing the transmission of financial shocks to bank lending. First, by employing a high-frequency measure of stock market comovements, we are able to proxy real-time investor expectations about macroeconomic synchronicity between countries. This is particularly valuable given the inherent limitations of low-frequency macroeconomic indicators (e.g., GDP), which lag behind market sentiment and constrain timely policy

[4] In the international banking literature and in the current paper, a "host" country or market is the country of the subsidiary of the foreign parent.

responses. For instance, while the macroeconomic effects of U.S. trade policy shifts – such as President Trump's tariff threats – may take months to appear in national accounts data, their impact is immediately reflected in cross-country equity market comovements, thereby influencing lending behavior through changes in risk perception. Second, our bilateral comovement measure captures the relative positioning of economies vis-à-vis each other, rather than relying on a unidirectional or gap-based macroeconomic comparison, such as the conventional GDP gap. Third, unlike models that use rolling correlations or cointegration techniques – both of which focus on the center of the joint distribution – our approach emphasizes tail dependence, which enables us to investigate the effects of joint extreme market movements. This is critical for understanding systemic risk and banking sector behaviour during periods of financial stress. Finally, the switching-copula framework endogenously identifies volatility regimes, allowing us to detect and isolate the effects of micro-episodes of heightened market stress within broader crisis periods. This added granularity facilitates a more comprehensive understanding of how market turbulence affects bank lending, and offers a promising direction for future research on financial contagion and policy transmission.

The paper is organized as follows. Section 2 presents an overview of the institutional setup of foreign operations of global banks and the dynamic switching copula methodology used to identify financial market contagion. In Section 3, we introduce our empirical model and data. Section 4 presents our empirical results. Section 5 concludes.

2. Institutional Details and Identifying Financial Contagion

2.1 Institutional Details: Internal Capital Markets of Global Banks

The internal capital market within banking conglomerates is an important concept in the context of cross-border activities. It refers to the allocation of funds within a banking group to finance projects without losing control to creditors and to prevent leakage of strategic information. Internal funding provides flexibility for management and enables more efficient use of bank capital (De Haas et al., 2005; Badulescu & Morutan, 2019). However, interconnectedness within the internal capital market also poses hidden risks, as shocks affecting one unit can influence the performance of the entire group (Peek and Rosengren, 1997, 2000; Acharya and Naqvi, 2012; Ivashina and Scharfstein 2010; Cetorelli and Goldberg, 2012; Radev, 2021. De Haas et al. (2005) assert that the performance of the parent bank significantly influences both the internal capital market and the loan supply provided by foreign subsidiaries.

When banks expand their operations abroad, they must carefully consider the optimal organizational structure for their foreign presence, taking into account the differences between subsidiaries and branches. Subsidiaries are distinct legal entities incorporated in the host country, whereas branches are units of the parent bank and lack legal independence. In practice, branches serve as representative offices of the parent company in the host country, while subsidiaries function as separate banks with greater legal autonomy.

Branches offer certain advantages that make them a common choice. Maintaining a subsidiary entails higher costs, including capital and liquidity requirements, as well as compliance with host country regulations. Moreover, differences in taxation, economic

conditions, and political risks between the home and host jurisdictions may motivate global banks to minimize their exposure to these factors (Cerutti, Ariccia, & Martinez-Peria, 2007).

The issue of cash flow restrictions between the parent bank and its affiliate is also relevant. Branches facilitate liquidity and risk management, while foreign affiliates can help absorb losses incurred by the parent bank during crises. The preferred organizational form may vary depending on the bank's business model.

Regarding financial reporting, the requirements for branches of banks are not as comprehensive as for bank subsidiaries and branch data is not publicly available.[5] These data limitations pose challenges for rigorous econometric analysis (Radev, 2021a; Radev, 2022b). As a result, our study focuses on subsidiary data obtained from Bureau van Dijk's Bankscope, allowing us to overcome some of the limitations associated with branch-level reporting. The larger corporate distance between parents and subsidiaries works against us finding significant results. Therefore, any effect that we manage to capture, represents a lower bound for the actual effect of financial market contagion.

2.2 Lehman Brother's Bankruptcy and the Sovereign Debt Crisis

The bankruptcy of Lehman Brothers in September 2008 stands as a pivotal moment in global financial history, triggering a chain reaction that catalyzed the global financial crisis. As a major player in the U.S. financial system, Lehman's collapse severely disrupted global banking networks, exposing vulnerabilities in interbank funding, cross-border capital flows, and financial intermediation. While the Transition region (Eastern Europe and Turkey) was not directly exposed to the American market due to its limited integration with U.S.-based financial institutions, the region was not immune to the broader consequences of the crisis. Banks in these economies were indirectly affected through various contagion channels and these market dynamics transmitted the crisis to the Transition region, amplifying concerns about liquidity, credit availability, and economic stability (de Haas et al., 2015).

The sovereign debt crisis in the euro area between 2010 and 2012 marked a critical juncture in the global financial system, exposing significant vulnerabilities in the fiscal and financial frameworks of the European Monetary Union. Originating from escalating concerns over the solvency of heavily indebted eurozone countries – such as Greece, Ireland, and Portugal – the crisis eroded confidence in sovereign debt markets and reverberated throughout the European banking sector, given the high levels of exposure of banks to sovereign bonds. The Transition region was once again not directly involved in the epicenter of the crisis, and therefore the event was exogenous to the region's financial systems. Banks in the Transition region were largely insulated from the specific fiscal risks that plagued eurozone economies due to their limited holdings of euro-area sovereign debt. Nevertheless, they may have been significantly affected by the broader financial contagion transmitted through stock market volatility and shifts in investor sentiment. These fluctuations reflected mounting fears about financial stability in Europe and their potential spillovers to the real economy, particularly via trade and investment channels. As a result, while the sovereign debt crisis originated in the euro

[5] Databases such as Bankscope and Bankfocus typically consolidate branch data with the data of the headquarters. These databases report only data for banks that are independently incorporated (parents, subsidiaries, standalone banks).

area, its ripple effects highlighted the interconnectedness of financial markets and the vulnerability of peripheral regions to external shocks.

2.3 Identifying Financial Contagion: A Switching Copula Approach

Our methodological approach employs a dynamic switching copula model to trace the evolving dependence structure between Western European (WE) and Transition region financial markets. The primary objective is to capture variations in market interdependence across different volatility states, particularly during financial crises. Our framework builds upon established literature on copula modeling and financial contagion (Hamilton & Susmel, 1994; Rodriguez, 2007; Patton, 2006).

An important step towards answering the research questions at hand involves defining financial contagion and devising a way to identify and measure it. To this end, we follow Rodriguez (2007) and Radev (2021b), and use a switching copula methodology to capture shifts in dependence between Western European and Transition region markets during volatile periods.

Radev (2021b) argues in favour of the use of a particular copula, a Symmetrized Joe-Clayton Copula to model the pairwise dependence structure between the returns of the financial market of WE and each transition country's financial market in the period 2006 and 2015. An additional benefit of this copula is that its parameters are consistent estimates of lower and upper tail dependence. The former term reflects the probability of joint *negative* returns while the latter captures the probability of joint *positive* returns between two financial markets or stocks.

The first step in our approach involves modeling the marginal distributions of the individual stock markets under investigation. Following the methodology of Hamilton and Susmel (1994) and Rodriguez (2007), we employ a Switching ARCH (SWARCH) model to characterize the marginal behavior of each stock market in our sample. This technique allows us to account for regime shifts in market volatility, providing a robust foundation for analyzing financial market dynamics in the presence of structural breaks.

In the second step, we incorporate the results of the SWARCH estimation into a copula-based model to examine the joint dependence structure between Western and Transition region. We extend the approach of Rodriguez (2007) by introducing a switching parameter version of the symmetrized Joe-Clayton (SJC) copula (Patton, 2006). This specific copula is selected for its flexibility in capturing differences in both the magnitude and structure of dependence, particularly in the tails of the distribution. Unlike traditional copula mixtures, which can be non-nested and difficult to compare across markets, our approach allows for direct estimation of tail dependence parameters. These parameters provide a probabilistic measure of the likelihood that WE and Transition markets will experience simultaneous extreme positive or negative returns, thereby offering a more accurate representation of financial contagion dynamics.

The switching copula mechanism is structured as a four-state Markov Switching Model, where Western Europe serves as the trigger for shifts in dependence. This framework follows Ramchard & Susmel (1998) and Rodriguez (2007) in defining the switching states based on volatility levels. Specifically, at any given time tt, the volatility regime is classified into one of four states:

1. low variance in both WE and, e.g., Bulgarian stock markets,
2. high variance in Bulgaria and low variance in WE,

3. low variance in Bulgaria and high variance in WE, and
4. high variance in both markets.

The transition matrix governing these states allows for flexible interactions between the variance states of different markets. If volatility shifts in WE do not influence Bulgaria's market, the transition probabilities are independent, whereas if the two markets exhibit synchronized movements, the probabilities are dependent.

We designate WE as the originator of the crisis due to its financial dominance and strong economic interlinkages with Transition markets (Friedrich et al., 2013). The transmission of shocks from WE to the Transition region is primarily facilitated through direct and indirect participation of WE firms in Transition stock exchanges and financial institutions. Consequently, we model financial contagion by allowing the dependence structure to change only when WE transitions from a low- to a high-volatility state. In other words, dependence remains constant in states 1 and 2, but shifts when moving to states 3 or 4.

Rodriguez (2007) and Radev (2021b) calculate static measures of tail dependence over the full periods of their samples. While providing consistent estimates of tail dependence, static measures do not capture fully the changes in interdependence between WE and Transition stock markets across time and thus are not suitable for our panel data regression analysis. In this paper, we estimate dynamic tail dependence using a rolling window of 250 days, which begins on 1 January 2005 and extends to 28 February 2015. Each day, the window advances by one period, recalculating tail dependence estimates based on the most recent observations. The primary advantage of this enhancement is the ability to track variations in tail dependence over time, capturing the asymmetric responses of markets to crisis and non-crisis conditions.

It is important to note that this methodology results in a loss of initial observations due to the rolling window requirement. The first set of tail dependence values becomes available in March 2006, marking the starting point of our regression analysis. Despite this minor limitation, the rolling window technique significantly enhances the precision of our empirical estimates, ensuring that our analysis captures the dynamic nature of financial contagion between WE and Transition markets.

3. Empirical Regression Model, Theoretical Predictions and Data

In this section, we present our testable hypotheses and empirical model, as well as our data.

3.1 Hypotheses

In this section, we outline our main hypotheses. We are particularly interested in understanding how financial contagion spreads during the global financial and sovereign debt crises, and whether the interconnections between WE and Transition economies financial markets play a role in this transmission process.

Our hypotheses aim to examine whether we can identify evidence of financial contagion in our data and assess its impact on lending in a statistically significant manner. The first two hypotheses are related to lending specifically during periods of crises. This enables us to assess the effects of lending determinants and the distinct response patterns of banks in the Transition region to the crises occurring in Western Europe.

Hypothesis 1 deals with the lending behavour in crisis times and we expect that, other things equal, lending drops during crises, irrespective of whether there are joint positive or joint negative moments in WE and Transition region markets.

Hypothesis 1. *Subsidiaries reduce lending during financial crises.*

With Hypothesis 2, we focus specifically on the effect of lower tail dependence in crisis periods:

Hypothesis 2. *During a crisis, larger joint negative returns (higher lower tail dependence) lead to an additional decrease in subsidiary lending.*

With our last hypothesis, we test whether financial contagion correlates with a reduction of lending of foreign subsidiaries. The transmission of shocks across borders through internal capital markets is a phenomenon that has been widely documented in the literature. Two main perspectives emerge regarding contagion through internal capital markets. One perspective posits that cross-border flows, triggered by shocks at the parent bank level, can disrupt foreign markets – a view supported by Reinhart and Rogoff (2009) and Forbes and Warnock (2012). Models developed by Bruno and Shin (2015) and Devereux and Yetman (2010) reinforce this perspective, suggesting that global banking flows are primarily driven by the liquidity management strategies of parent banks, as conceptualised by Cetorelli and Goldberg (2012b). The alternative perspective argues that global banks may adhere to a locational pecking order, where internal capital flows are allocated based on the strategic importance of subsidiaries. Stein (1997) suggests that internal capital markets facilitate efficient capital allocation by enabling subsidiaries with promising investment opportunities to overcome cash constraints. Empirical studies by Cetorelli and Goldberg (2012b) and Claessens and van Horen (2013) provide further support, indicating that parent banks tend to protect strategically important subsidiaries from shocks while adjusting lending in less critical markets. To test which of the views prevails in the Transition region in crisis times, we formulate the following hypothesis.

Hypothesis 3. *During a crisis, larger joint negative returns (higher lower tail dependence) lead to an additional decrease in* ***foreign*** *subsidiary lending.*

Therefore, we expect that: *In the overall sample and during crises:* 1) lending in the Transition region drops overall and 2) joint negative returns on financial markets lead to an even higher reduction in lending. Furthermore, 3) the drop in lending of Transition Region subsidiaries of foreign global banks is higher during crises.

3.2 Empirical Model

To test the hypotheses outlined in the previous section, we estimate the following model for for four measures of tail dependence: 1) LTD in high volatility state; 2) LTD in low volatility state; 3) UTD in high volatility state; and 4) UTD in low volatility state:

$$
\begin{aligned}
\text{growth } (Loans)_{i,j,k,t} = {} & +\alpha_1 \cdot \text{Measure\_Below}_{\,k,t-1} \\
& +\alpha_2 \cdot \text{Measure\_Above}_{k,t-1} \\
& +\alpha_3 \cdot \text{Crisis}_t \cdot \text{Measure\_Below}_{\,k,t-1} \\
& +\alpha_4 \cdot \text{Crisis}_t \cdot \text{Measure\_Above}_{\,k,t-1} \\
& +\alpha_5 \cdot \text{Interactions}_{\,i,j,k,t-1} \\
& +\alpha_6 \cdot \text{SubsidiaryControls}_{\,j,t-1} \\
& +\alpha_7 \cdot \text{ParentControls}_{\,i,j,k,t-1} \\
& +\alpha_8 \cdot \text{MacroVariables}_{\,i,j,k,t} \\
& +\gamma_i + \epsilon_{i,j,k,t},
\end{aligned}
\tag{1}
$$

where *growth(Loans)*$_{i,j,k,t}$ is the unconsolidated loan growth of subsidiary *i* in country *k* of parent *j* at time *t*; *Measure_Below* $_{k,t-1}$ takes the value of 1 if the level of the respective indicator of tail dependence between the financial markets of country *k* and Western Europe is below its median value at time *t−1* and zero otherwise; *Measure_Above* $_{k,t-1}$ takes the value of 1 if the level of the respective indicator of tail dependence between the financial markets of country *k* and Western Europe is above its median value at time *t−1* and zero otherwise; Crisis_t takes the value of 0 before the crisis period and the value of 1 during a crisis period; $\text{Crisis}_t \cdot \text{Measure\_Below/Above}_{j,t-1}$ is an interaction variable between the crisis dummy and the respective tail dependence indicator. *SubsidiaryControls*$_{i,j,k,t-1}$ is a vector of individual unconsolidated bank-related variables for subsidiary *i* in country *k* of parent *j* at time *t-1*; *ParentControls*$_{j,t-1}$ is a vector of individual unconsolidated bank-related variables for parent *j* at time *t-1*; *MacroVariables*$_{k,t-1}$ is a vector of macroeconomic variables for economic strength, openness, financial development and quality of governance of country *k* at time *t-1*; *Interactions*$_{j,k,t-1}$ is a vector of interaction terms of tail dependence median, the crisis dummy and various subsidiary and parent variables; β_t is a time-fixed effect for period *t*; γ_i is an entity fixed effect for subsidiary *i*.

In our main baseline model, we diverge from the standard representation of difference-in-differences estimation and follow Puri, Rocholl and Steffen (2011) who include both dummy variables for below and above the median of the respective tail dependence measure and interact both of them with the crisis dummy. The resulting coefficients α_1 and α_2 reflect the standalone effects *before* the crisis for subsidiaries in countries with below-median and above-median tail dependence, respectively. Analogously, α_3 and α_4 reflect the standalone effects *after* the crisis for subsidiaries in countries with low and high tail dependence, respectively. We do this to manage to disentangle the dynamics of both groups before and after the crisis. To arrive at the traditional difference-in-differences estimator, we need to additionally take the difference between α_4 and α_3.

Further, we winsorize our variables at the 1st and the 99th percentile values of each variable to avoid extreme outliers that may affect our results. All standard errors are clustered at the parent bank level.

3.3 Data and Variables

Subsidiary and Parent Bank Samples

The dataset used in this study is constructed by aggregating data from multiple sources. Bank-level information is acquired from Bankscope, covering the period from March 2006 to March 2015. The estimation is performed at the subsidiary level with various controls for subsidiary, parent and macroeconomic characteristics. The banking dataset encompasses data pertaining to the subsidiaries of international commercial parent banks operating in Western markets and the Transition region. The subsidiaries are located in Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, and Turkey. Our parent and subsidiary collection effort yields information for 100 parent banks, of which 62 belong to Western markets and 38 belong to the Transition region. The final banking dataset for our estimation comprises data for a sample of 212 subsidiaries, with 157 subsidiaries affiliated with Western parent banks and 55 subsidiaries affiliated with Transition region parent banks. The Online Appendix contains Tables A3 and A4, which provide a summary of the final sample of parent banks. A table with the full sample of subsidiaries is omitted for the sake of brevity, but available upon request. To facilitate our tail dependence calculations, historical daily and monthly data for 13 international stock prices are obtained from Datastream. Macroeconomic data are gathered from Eurostat, EBRD's Banking Survey, World Bank's World Development Indicators, and International Monetary Fund's World Economic Outlook.

Our model aims to identify the drivers of lending and shed light on the channels through which risk is transmitted during the global financial and the European sovereign debt crises. Drawing on empirical literature, we incorporate factors at the micro and macro levels that have been identified as significant drivers of credit growth during normal periods (see, e.g., Jean, 2012 and Radev, 2021). Our model incorporates various lagged variables related to both parent banks and subsidiary banks, as well as macroeconomic factors. [6] All bank balance sheet data are unconsolidated, including the parent controls. The definitions of all variables, as well as their descriptive statistics are provided in Tables A1, A5a and A5b in the Online Appendix.

Given the disparate frequencies of the variables in our dataset, several adjustments are made. The higher frequency daily tail dependence data is aggregated to the monthly level, ensuring that the majority of variation is preserved. Additionally, the frequency of annual subsidiary and parent balance sheet data is increased to the monthly level through the use of linear interpolation, following Barth and Schnabel (2013). Consequently, our analysis incorporates a total of 10,928 monthly observations for regression purposes. In order to ensure comparability, all data is converted from the original country currencies to U.S. dollars, as the latter represents the sole available common exchange rate in Bankscope. Daily exchange rate data are sourced from Datastream.

[6] Since the available data in Bankscope for risk weighted assets, Tier 1 and Tier 2 ratios are of very poor quality prior to 2010 (or in any time period for our bank sample for that matter), we resort to a proxy for capitalization: the ratio of subsidiary equity to subsidiary total assets. We do not expect that using a more directly aligned measure to risk-weighted capital ratios would change our results substantially.

Definitions of Crisis Periods

We consider the global financial crisis and the sovereign debt crisis as significant events for regime shifts in our data and apply the following timeline for the pre-, mid- and post-crisis periods:

- Pre-global financial crisis from March 2006 to August 2008;
- Global financial crisis from September 2008 to April 2009;
- Pre-sovereign debt crisis from May 2009 to April 2010;
- Sovereign debt crisis from May 2010 to June 2012;

We consider official announcements as milestones for our timeline. In September 2008, the fourth biggest US bank, Lehman Brothers filed for bankruptcy as a result of the global financial crisis in the United States. The bankruptcy triggered the biggest global financial crisis of recent history. The crisis in WE continued until mid-2009. In May 2010, 27 countries of the European Union agreed to establish the European Financial Stability Facility with the main goal to support Greece and other European countries in servicing their debt (in exchange for austerity measures and structural reforms). The announcement of the support package triggered massive protests in Greece that led foreign investors to expect that Greece will be the first euro area country to default on its government debt. We associate the end of the sovereign debt crisis with the speech of the then-president of the European Central Bank Mario Draghi in June 2012 (Draghi, 2012), who stated that the European Central Bank would do "whatever it takes" to support the euro. That was a deciding factor that reduced the volatility in European financial markets.

3.4 Data Descriptives

Country Characteristics and Balance Sheet Data

Tables A1 and A2, respectively, provide descriptives about the stock market data we use, and the tail dependence estimates from the resulting estimation. Figures A1 to A14 in the appendix depict the dynamics of tail dependence with Western Europe in all individual Transition markets, as well as the region overall.

Tables A3 defines the variables in our regression analysis, while Table A4 presents a list of the parents of our subsidiary banking sample with the respective number of subsidiaries per parent. Table A5 lists the parent bank countries and the number of parents in each. As mentioned above, a full list of the subsidiaries used in our estimations is available upon request. Tables A6a, A6b provide descriptive statistics for all variables used in our regression analysis, focusing on a sample comprising subsidiaries to parent banks from Western markets (i.e., foreign-owned subsidiaries) and the Transition region itself (i.e., domestically owned subsidiaries).[7] At the country level, all countries display a positive mean value for the loan growth rate. Poland exhibits the highest maximum loan growth rate (12.44 percent), while the Czech Republic has the highest maximum value for the subsidiary profitability variable (0.31). On average, the unconsolidated subsidiary and parent bank data reveals that foreign subsidiaries have lower

[7] In our particular sample, no Transition region parent bank owns a bank in another Transition country.

capitalization compared to their parent banks.[8] Foreign subsidiaries also exhibit higher risk, lower liquidity, and generate fewer internal funds. Host countries,[9] on average, show positive GDP growth at 2.48 percent, with a minimum of over -18 percent and a maximum of more than 12 percent over the sample period. The average inflation rate is 3.72 percent, ranging from -4.2 percent to 20.6 percent. Host countries generally exhibit a gross trade level above their GDP, with an average of 107 percent and a range of 46.5 percent to 198 percent. The average rule of law index is 0.39. Foreign ownership of banking systems in the matched panel sample varies between 27.4 percent and 93 percent.

Table A6b presents descriptive statistics for the sample comprising Transition region parent banks and Transition region subsidiaries. This table focuses on the scenario where Transition region banks act as domestic subsidiaries owned by banks from the respective Transition region country. Hungary shows the highest maximum loan growth rate (5.90 percent). Turkey exhibits the highest mean and maximum values for subsidiary profitability (0.04 and 0.29, respectively), while Slovenia has the lowest minimum value (-0.097). Interestingly, subsidiary bank characteristics are generally more favourable compared to domestic parent banks. On average, Transition region subsidiaries of Transition region parent banks demonstrate higher profitability, capitalization, liquidity, and lower risk than their parents. However, parent Transition region banks exhibit higher internal fund generation on average, although with a larger standard deviation.

Overall, the comparison between Table A6a and Table A6b reveals that parent banks from Western Europe exhibit higher values for bank characteristics compared to parent banks from the Transition region. Western European banks are larger, less risky, more profitable, more liquid, better capitalized, and generate more internal funds than Transition region banks. Additionally, some macroeconomic characteristics differ between the two tables due to the matching process with the less balanced sample of domestic Transition region banks.

4. Empirical Results: Financial Contagion and the Transition Economies

In this section, we analyse and summarize the results from the different specifications of our regression model with subsidiary loan growth rate as the dependent variable.

4.1 Difference-in-Differences Results: The Global Financial Crisis and the Sovereign Debt Crisis

To gauge the sources of differences in bank lending during crises, we estimate Equation (1). The estimates of α_3 and α_4 evaluate the effect on bank lending of below- and above-median joint financial market comovement, respectively. Each column displays the results corresponding to a specific form of tail dependence – either lower or upper – across distinct financial market volatility regimes, namely high and low volatility

[8] We resort to a equity-to-assets-based measure of capitalization as opposed to the risk-weighted-based version stipulated by the Basel Accords due to a limited data availability regarding risk-weighted assets and capital adequacy ratios of the subsidiaries in our sample.

[9] Although subsidiaries legally are local banks in the respective jurisdiction, we define their countries as "host countries" as opposed to the "home country" of the parent headquarters. This delineation is common in banking literature (see, e.g., De Haas et al., 2005; and Cetorelli and Goldberg, 2011).

states. This approach allows for a more granular analysis of how differing levels of financial market comovement influence lending behaviour, particularly during periods of financial crises. The findings from this estimation are presented in Tables 1 through 3.

Table 1 presents the results from the estimation procedure, highlighting differential lending responses during the Lehman Brothers crisis. In the overall sample, a reduction in lending is evident (Hypothesis 1), with the contraction driven by banks located in countries characterised by below-median lower tail dependence – reflecting a greater sensitivity to extreme negative comovements – and by those in above-median upper tail dependence countries, indicating exposure to extreme positive comovements. These findings suggest that the theoretical predictions linking financial market comovements to bank lending are more noticeable at low to moderate levels of lower tail dependence, where vulnerability to joint adverse market events is particularly pronounced (Hypothesis 2). By contrast, banks in countries with higher levels of lower tail dependence appear less responsive in terms of lending reductions, implying a potential desensitisation or adaptation to consistently elevated joint downside risk (rejected Hypothesis 2). At the same time, the strong negative sensitivity of bank lending to extreme positive comovements points to a more generalised exposure to volatility, whereby lending activity responds to fluctuations irrespective of their sign (Hypothesis 1). Notably, the sovereign debt crisis does not exhibit comparable patterns in the aggregate sample, suggesting that the transmission of market comovements to lending behaviour was less pronounced in that period.

Focusing on subsidiaries with foreign parents (Table 2), we find that during the global financial crisis, lending dropped primarily for countries with high probability of extreme comovement with foreign markets, both negative and positive (Hypothesis 1). We observe this effect also during the sovereign debt crisis for below-median lower and upper tail dependence (Rejected hypothesis 1). We also note that banks in these countries are associated with lower lending growth already before the crisis. Overall, foreign-owned banks are less insulated from market comovements during the Lehman crisis than during the sovereign debt crisis.

Moving to the results for the domestic sample in Table 3, we note that these banks seem to be more insulated from extreme negative comovements during the global financial crisis, but not from extreme positive comovement. Moderate negative comovement leads to a reduction in domestic bank lending. Domestic banks in both below- and above-median countries see a reduced lending during the sovereign debt crisis (Hypothesis 1).

Overall, we find that comovement of transition region stock markets with western stock markets matter for bank lending decisions. We also find mixed evidence about foreign bank ownership: foreign bank ownership within a global banking group may reduce or exacerbate the correlation between bank lending and extreme market comovement.

Table 1 Baseline Regressions: Separate Coefficients, Overall Sample.

	Global financial crisis				*Sovereign debt crisis*			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Measure_Below(t-1)	0.3114***	0.1446	0.3636***	0.3931***	0.2207**	0.1102	0.0895	0.1044
	(0.000)	(0.110)	(0.000)	(0.000)	(0.011)	(0.219)	(0.315)	(0.249)
Measure_Above(t-1)	-0.1596**	0.0868***	0.0534	0.0337	-0.1143***	-0.0280	-0.0769***	-0.0796***
	(0.031)	(0.008)	(0.054)	(0.746)	(0.000)	(0.240)	(0.001)	(0.004)
Measure_Below(t-1) *Lehman	-0.1094***	-0.1148***	-0.0603**	-0.0470**	-0.0858***	-0.0060	-0.0276	-0.0388
	(0.000)	(0.000)	(0.013)	(0.037)	(0.006)	(0.818)	(0.578)	(0.191)
Measure_Above(t-1) *Lehman	-0.0053	-0.0348	-0.0836***	-0.0960***	0.0189	0.0069	-0.0678	0.0231
	(0.830)	(0.132)	(0.001)	(0.003)	(0.499)	(0.832)	(0.138)	(0.421)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5467	5467	5467	5467	5917	5917	5917	5917
R^2	0.1357	0.1344	0.1305	0.1298	0.1188	0.1174	0.1182	0.1182
Adjusted R^2	0.1326	0.1312	0.1273	0.1266	0.1158	0.1144	0.1152	0.1152

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 2 Baseline Regressions: Separate Coefficients, Foreign Sample

	Global financial crisis				***Sovereign debt crisis***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Measure_Below(t-1)	-1.0280***	-0.9834***	-1.0195***	-1.0777***	0.1243	0.1261	0.1667**	0.1232
	(0.000)	(0.000)	(0.000)	(0.000)	(0.134)	(0.126)	(0.049)	(0.139)
Measure_Above(t-1)	0.0014	0.0259	0.0141	0.0357	-0.1782***	-0.0866***	-0.1128***	-0.1169***
	(0.958)	(0.302)	(0.529)	(0.153)	(0.000)	(0.002)	(0.000)	(0.001)
*Measure_Below(t-1) *Lehman*	-0.0179	-0.0667***	-0.0530**	-0.0155	-0.1586***	-0.0736***	-0.0611***	-0.0885***
	(0.416)	(0.006)	(0.029)	(0.475)	(0.000)	(0.009)	(0.007)	(0.010)
*Measure_Above(t-1) *Lehman*	-0.0707***	-0.0342*	-0.0491**	-0.1006***	0.0199	0.0538	0.0094	0.0294
	(0.001)	(0.080)	(0.022)	(0.000)	(0.543)	(0.167)	(0.812)	(0.391)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3962	3962	3962	3962	4148	4148	4148	4148
R^2	0.2404	0.2399	0.2391	0.2401	0.2136	0.2116	0.2119	0.2119
Adjusted R^2	0.2365	0.2360	0.2353	0.2362	0.2098	0.2078	0.2080	0.2081

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 3 Baseline Regressions: Separate Coefficients, Domestic Sample

	Global financial crisis				*Sovereign debt crisis*			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Measure_Below(t-1)	0.5237	0.8985***	0.3293	0.2838	0.4916**	0.5573**	0.4774*	0.4926**
	(0.130)	(0.009)	(0.335)	(0.398)	(0.046)	(0.030)	(0.053)	(0.048)
Measure_Above(t-1)	-0.2402***	0.3205***	0.1921***	0.4000***	-0.0416	0.0466	-0.0630*	0.0031
	(0.001)	(0.000)	(0.003)	(0.001)	(0.379)	(0.227)	(0.090)	(0.944)
Measure_Below(t-1)*Lehman	-0.1275**	-0.1927***	0.0473	-0.0403	-0.2028***	-0.0387	-0.1975***	-0.1148**
	(0.020)	(0.005)	(0.427)	(0.430)	(0.000)	(0.421)	(0.000)	(0.020)
Measure_Above(t-1)*Lehman	0.0797	0.0315	-0.1336**	-0.3946***	-0.1261***	-0.2036***	-0.1196***	-0.1476***
	(0.289)	(0.577)	(0.031)	(0.003)	(0.003)	(0.000)	(0.007)	(0.000)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1505	1505	1505	1505	1769	1769	1769	1769
R^2	0.2588	0.2730	0.2587	0.2599	0.2157	0.2201	0.2157	0.2153
Adjusted R^2	0.2488	0.2632	0.2487	0.2500	0.2068	0.2112	0.2067	0.2063

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

4.2 Subregional Results: The Visegrad Four, the Baltics and the Balkans

In this section, we delve deeper into the intraregional heterogeneity across Transition countries. The region is often considered relatively homogenous in the banking literature (see, e.g., Haselmann, Pistor, and Vig, 2009), which is not always supported by the data on economic convergence and policy responses. To gauge any regional heterogeneity, we split our country sample into three subregions: the Visegrad Four, the Baltics and the Balkans (including Turkey). The Visegrad Four (Poland, Hungary and Czech Republic, Slovakia) are typically considered the most advanced economies in the region and are usually defined as high-income countries (World Bank, 2025). These also have the most integrated financial markets to Western financial markets (see, e.g., Cappiello, et al., 2006; Aslanidis, et al., 2009 and Horváth & Petrovski, 2013). The Baltics rank next in terms of economic development, while the Balkans and Turkey are the least developed subregion in our sample (EBRD, 2024).[11]

To evaluate the differences in lending responses across the three subregions, we

[11] For the sake of brevity, we group Turkey into the Balkan region.

re-estimate Equation (1). Tables 4 through 6 present the results for the global financial crisis for the three subregions, while Tables 7-9 focuses on the sovereign debt crisis in the euro area.

In Table 4, for the overall sample during the global financial crisis, we observe a negative impact on the overall lending in the Baltics compared to the remaining two subregions (Hypothesis 1). Moving to the sample of foreign-owned banks, in Table 5, it is revealed that the results for the Baltics match the overall results, reflecting the fact that all Baltic banks in our sample are foreign-owned. We observe that foreign bank ownership affects negatively the lending growth of banks in countries of the Visegrad Four with above-median stock market comovement both during low- and high-volatility periods (Hypothesis 2 and 3). Table 6 reveals that domestic banks in the Visegrad Four and the Balkans are relatively insulated to stock market comovements, with Visegrad Four having positive loan growth in countries with both below-median and above-median comovement with Western markets (rejected Hypotheses 1 and 2). For the Balkans, we find statistically significant effects for countries with below-median comovement, and insignificant effects for countries with above-median comovement with Western markets. Overall, we find evidence that foreign-owned banks in the Visegrad Four region are more affected by extreme comovements of their host-country stock markets with the markets of their parents (Hypothesis 3).

Moving to the sovereign debt crisis, we find no significant effects in the overall sample (Table 7). For the Baltics, these results are again related to the fully foreign-owned bank sample at our disposal – the results for Table 7 and 8 are the same. Tables 8 and 9 reveal non-significant to mixed results, with domestic banks increasing lending in below-median Visegrad Four countries, and decreasing lending in the Balkans. The drop in lending is evident also for foreign banks in Balkan countries with higher probability for positive comovement. Overall, we do not find support for the hypothesis that negative joint comovements reduce lending in the Transition region during the sovereign debt crisis (Hypothesis 3). However, the Balkans seem more vulnerable to higher probability of extreme comovements (Hypothesis 1).

Table 4 Subregional Regressions: Lehman Brothers' Bankruptcy, Overall Sample

					Global financial crisis							
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Measure_Below(t-1)	0.0094	-0.1637***	-0.0591**	-0.1220***	0.0348	0.0000	0.1510	-0.0319	0.1955**	0.0211	-0.0517	0.0887
	(0.753)	(0.000)	(0.025)	(0.002)	(0.265)	(.)	(0.156)	(0.758)	(0.014)	(0.676)	(0.295)	(0.252)
Measure_Above(t-1)	1.1338***	1.0225***	1.2204***	0.9699***	-4.3670***	-4.3830***	-4.1797***	-3.2294***	1.5052***	1.8259***	1.7429***	1.6235***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Measure_Below(t-1)*Lehman	-0.0085	0.0607*	0.0835***	-0.0217	-0.2021***	-0.1903***	-0.1859***	-0.2033***	0.1789***	0.2343***	0.2371***	0.2173***
	(0.746)	(0.071)	(0.005)	(0.494)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Measure_Above(t-1)*Lehman	-0.0310	-0.0265	-0.0987***	-0.0736*	-0.1627***	0.0000	0.0472	0.0000	0.2669***	0.0508	0.0371	0.0704
	(0.390)	(0.332)	(0.001)	(0.050)	(0.001)	(.)	(0.714)	(.)	(0.004)	(0.268)	(0.480)	(0.418)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2397	2397	2397	2397	354	354	354	354	1545	1545	1545	1545
R^2	0.3135	0.3202	0.3180	0.3148	0.8425	0.8422	0.8440	0.8522	0.3053	0.2993	0.3017	0.3066
Adjusted R^2	0.3077	0.3144	0.3122	0.3091	0.8330	0.8337	0.8347	0.8438	0.2962	0.2901	0.2926	0.2975

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015

Table 5 Subregional Regressions: Lehman Brothers' Bankruptcy, Foreign Sample

	Global financial crisis											
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Measure_Below(t-1)	-0.0016	-0.1868***	-0.0610**	-0.1961***	0.0348	0.0000	0.1510	-0.0319	0.1955**	0.0211	-0.0517	0.0887
	(0.962)	(0.000)	(0.034)	(0.000)	(0.265)	(.)	(0.156)	(0.758)	(0.014)	(0.676)	(0.295)	(0.252)
Measure_Above(t-1)	0.9285***	0.7554***	0.9619***	0.6518***	-4.3670***	-4.3830***	-4.1797***	-3.2294***	1.5052***	1.8259***	1.7429***	1.6235***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
*Measure_Below(t-1)*Lehman*	-0.0378	0.0332	0.0412	-0.0364	-0.2021***	-0.1903***	-0.1859***	-0.2033***	0.1789***	0.2343***	0.2371***	0.2173***
	(0.173)	(0.362)	(0.141)	(0.286)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
*Measure_Above(t-1)*Lehman*	-0.1291***	-0.0904***	-0.1642***	-0.1805***	-0.1627***	0.0000	0.0472	0.0000	0.2669***	0.0508	0.0371	0.0704
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(.)	(0.714)	(.)	(0.004)	(0.268)	(0.480)	(0.418)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1804	1804	1804	1804	354	354	354	354	1545	1545	1545	1545
R^2	0.1751	0.1827	0.1791	0.1762	0.8425	0.8422	0.8440	0.8522	0.3053	0.2993	0.3017	0.3066
Adjusted R^2	0.1658	0.1736	0.1699	0.1670	0.8330	0.8337	0.8347	0.8438	0.2962	0.2901	0.2926	0.2975

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 6 Subregional Regressions: Lehman Brothers' Bankruptcy, Domestic Sample

	Global financial crisis											
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Measure_Below(t-1)	-0.0027	-0.3265***	-0.1650***	-0.1390**	0.0000	0.0000	0.0000	0.0000	0.2126*	-0.0595	-0.0063	-0.0176
	(0.944)	(0.000)	(0.000)	(0.010)	(.)	(.)	(.)	(.)	(0.074)	(0.619)	(0.947)	(0.922)
Measure_Above(t-1)	9.2948***	9.3439***	9.6241***	9.0954***	0.0000	0.0000	0.0000	0.0000	-0.4486	0.2772	-0.1559	-0.1644
	(0.000)	(0.000)	(0.000)	(0.000)	(.)	(.)	(.)	(.)	(0.236)	(0.482)	(0.678)	(0.706)
*Measure_Below(t-1)*Lehman*	0.1792***	0.3235***	0.3702***	0.1355**	0.0000	0.0000	0.0000	0.0000	0.0005	0.2956***	0.1567**	0.1913***
	(0.001)	(0.000)	(0.000)	(0.046)	(.)	(.)	(.)	(.)	(0.994)	(0.000)	(0.036)	(0.005)
*Measure_Above(t-1)*Lehman*	0.1504***	0.1408***	-0.0230	0.1023***	0.0000	0.0000	0.0000	0.0000	0.0424	-0.1317	-0.0958	-0.1562
	(0.004)	(0.001)	(0.583)	(0.005)	(.)	(.)	(.)	(.)	(0.783)	(0.106)	(0.298)	(0.430)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	593	593	593	593	0	0	0	0	823	823	823	823
R^2	0.7928	0.8037	0.8029	0.7937	0	0	0	0	0.4993	0.4987	0.4972	0.4989
Adjusted R^2	0.7855	0.7968	0.7961	0.7864	0	0	0	0	0.4868	0.4862	0.4847	0.4864

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 7 Subregional Regressions: Sovereign Debt Crisis, Overall Sample

	Sovereign debt crisis											
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Measure_Below(t-1)	0.0105	0.0715*	-0.0377	-0.0411	0.1659***	0.0000	-0.0136	0.3802***	-0.0604	-0.0008	0.0501*	0.1840***
	(0.815)	(0.092)	(0.394)	(0.604)	(0.001)	(.)	(0.792)	(0.001)	(0.229)	(0.986)	(0.097)	(0.000)
Measure_Above(t-1)	0.3583	0.5177	0.2561	0.4244	50.2003***	49.8306***	49.9018***	55.7066***	0.6776***	0.5647***	0.6477***	0.6490***
	(0.418)	(0.238)	(0.570)	(0.344)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Measure_Below(t-1)*Lehman	-0.0056	0.0688	0.1387**	0.0501	0.0761	0.0326	0.0476	0.0663	0.0844*	-0.0204	-0.0394	-0.1512***
	(0.931)	(0.203)	(0.033)	(0.318)	(0.405)	(0.564)	(0.439)	(0.248)	(0.077)	(0.560)	(0.222)	(0.000)
Measure_Above(t-1)*Lehman	0.0549	0.0004	0.0416	0.0567	-0.0352	0.0000	0.0794	0.4995***	-0.0392	0.0221	0.0414	0.0416
	(0.252)	(0.993)	(0.369)	(0.260)	(0.477)	(.)	(0.311)	(0.000)	(0.271)	(0.683)	(0.409)	(0.263)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2582	2582	2582	2582	348	348	348	348	2582	2582	2582	2582
R^2	0.1649	0.1648	0.1649	0.1645	0.9032	0.9011	0.9015	0.9066	0.2753	0.2740	0.2741	0.2766
Adjusted R^2	0.1583	0.1583	0.1583	0.1580	0.8972	0.8957	0.8955	0.9009	0.2696	0.2683	0.2685	0.2709

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 8 Subregional Regressions: Sovereign Debt Crisis, Foreign Sample

					Sovereign debt crisis							
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*	*τ^L (high vol)*	*τ^L (low vol)*	*τ^U (high vol)*	*τ^U (low vol)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
Measure_Below(t-1)	0.0881	-0.0267	0.0231	0.3595***	0.1659***	0.0000	-0.0136	0.3802***	-0.0477	0.0230	0.0333	0.0903***
	(0.117)	(0.607)	(0.700)	(0.001)	(0.001)	(.)	(0.792)	(0.001)	(0.366)	(0.548)	(0.199)	(0.010)
Measure_Above(t-1)	0.2302	0.4042	0.0642	0.2998	50.2003***	49.8306***	49.9018***	55.7066***	-0.1500	-0.1474	-0.0881	-0.0796
	(0.629)	(0.415)	(0.898)	(0.536)	(0.000)	(0.000)	(0.000)	(0.000)	(0.425)	(0.408)	(0.623)	(0.643)
Measure_Below(t-1)*Lehman	-0.0031	0.0160	0.0865	0.0211	0.0761	0.0326	0.0476	0.0663	-0.0110	-0.0437	-0.0499*	-0.1117***
	(0.968)	(0.796)	(0.220)	(0.727)	(0.405)	(0.564)	(0.439)	(0.248)	(0.810)	(0.113)	(0.059)	(0.000)
Measure_Above(t-1)*Lehman	0.0816	0.0921	0.0584	0.0712	-0.0352	0.0000	0.0794	0.4995***	-0.0503*	0.0176	0.0009	-0.0051
	(0.161)	(0.151)	(0.297)	(0.231)	(0.477)	(.)	(0.311)	(0.000)	(0.063)	(0.720)	(0.982)	(0.862)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1862	1862	1862	1862	348	348	348	348	1671	1671	1671	1671
R^2	0.2691	0.2699	0.2691	0.2711	0.9032	0.9011	0.9015	0.9066	0.5928	0.5928	0.5927	0.5936
Adjusted R^2	0.2612	0.2620	0.2611	0.2631	0.8972	0.8957	0.8955	0.9009	0.5878	0.5879	0.5878	0.5887

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

Table 9 Subregional Regressions: Sovereign Debt Crisis, Domestic Sample

	Sovereign debt crisis											
Region	***Visegrad Four***				***Baltics***				***Balkans***			
Measure	τ^L (high vol)	τ^L (low vol)	τ^U (high vol)	τ^U (low vol)	τ^L (high vol)	τ^L (low vol)	τ^U (high vol)	τ^U (low vol)	τ^L (high vol)	τ^L (low vol)	τ^U (high vol)	τ^U (low vol)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Measure_Below(t-1)	-0.0119	-0.2113***	-0.1351	0.0014	0.0000	0.0000	0.0000	0.0000	0.1555*	0.1381	0.0494	0.2134**
	(0.899)	(0.003)	(0.114)	(0.992)	(.)	(.)	(.)	(.)	(0.069)	(0.136)	(0.455)	(0.020)
Measure_Above(t-1)	1.4352***	2.0418***	1.3631***	1.3900**	0.0000	0.0000	0.0000	0.0000	1.8705***	1.9433***	1.8442***	1.9034***
	(0.006)	(0.000)	(0.009)	(0.014)	(.)	(.)	(.)	(.)	(0.000)	(0.000)	(0.000)	(0.000)
Measure_Below(t-1)*Lehman	0.0248	0.1326*	0.2212**	0.1614**	0.0000	0.0000	0.0000	0.0000	-0.1959**	-0.1059	-0.1317**	-0.2300***
	(0.794)	(0.081)	(0.028)	(0.044)	(.)	(.)	(.)	(.)	(0.030)	(0.143)	(0.036)	(0.003)
Measure_Above(t-1)*Lehman	0.0778	-0.0869	0.0629	0.0685	0.0000	0.0000	0.0000	0.0000	-0.0378	-0.0026	-0.0278	-0.0318
	(0.310)	(0.317)	(0.388)	(0.383)	(.)	(.)	(.)	(.)	(0.598)	(0.979)	(0.755)	(0.671)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tail Dep. Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Subsidiary Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parent Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	720	720	720	720	0	0	0	0	911	911	911	911
R^2	0.5575	0.5606	0.5576	0.5568	0	0	0	0	0.3640	0.3629	0.3616	0.3623
Adjusted R^2	0.5449	0.5480	0.5449	0.5442	0	0	0	0	0.3497	0.3486	0.3472	0.3479

Notes: The dependent variable is the Loan growth rate. The numbers in parentheses are p-values. Standard errors are clustered at the parent level. Statistical significance at the 1%, 5% and 10% levels is denoted by ***, **, and *, respectively. Sample period: March 2006 to March 2015.

5. Summary

In conclusion, our empirical analysis sheds light on the impact of financial contagion and crisis transmission mechanisms in Transition economies. Through a comprehensive examination of the global financial crisis and the sovereign debt crisis, we have explored various factors and interactions that influence lending behaviour in the region. Our findings provide valuable insights and implications for policymakers and researchers alike.

Overall, the study finds that financial comovements with Western markets materially influence lending behaviour in the Transition region, particularly during the global financial crisis. The role of foreign ownership is complex: while it facilitates integration with global financial markets, it also increases vulnerability to external shocks, with significant variation across subregions.

Based on our findings, policymakers should consider a comprehensive approach to crisis management and lending resilience. We argue that to strengthen financial resilience in the Transition region, policymakers should incorporate high-frequency, tail-risk indicators – such as dynamic measures of stock market comovement – into macroprudential monitoring frameworks, enabling earlier detection of financial contagion and more responsive policy action. Given the differentiated vulnerability across subregions, especially the Baltics and the Visegrad Four, region-specific capital and liquidity buffers should be considered, particularly for foreign-owned banks that are more exposed to volatility in Western markets. Enhanced cross-border supervisory coordination is essential to improve transparency around intragroup capital flows and ensure effective oversight of internal capital markets. Authorities should also develop contingency frameworks based on volatility regimes, leveraging endogenous crisis detection tools to activate countercyclical support measures proactively. Supporting the development and resilience of domestic banks – through stronger governance, diversified funding, and prudent risk management – can mitigate external shock transmission and stabilize lending during crises. Integrating these elements into a comprehensive macro-financial policy strategy will better safeguard credit supply and economic stability in the face of global financial and economic shocks.

Descriptives of Stock Index Returns and Tail Dependence

Table A4 in the Appendix presents the descriptive statistics of stock returns for individual stock markets in the Transition region. Most of the indices exhibit positive mean returns during the period, except for Bulgaria, Slovakia, and Slovenia, which show slightly negative returns (-0.01 percent). The standard deviations range from 1.14 percent for Slovakia to 1.72 percent for Turkey. The minimum and maximum values are both observed in Slovenia (-40.35 percent and 40.47 percent), followed by the Czech Republic (-16.19 percent to 12.36 percent) and Croatia (-10.76 percent to 14.78 percent).

Table A1 Descriptive Statistics: Individual Stock Markets

Markets	*STOXX 600*	*Bulgaria*	*Croatia*	*Czech*	*Estonia*	*Hungary*	*Latvia*
Mean	0.02	-0.01	0.00	0.00	0.02	0.01	0.00
Std. Dev.	1.21	1.27	1.25	1.50	1.15	1.64	1.29
Median	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Min	-7.93	-11.36	-10.76	-16.19	-7.05	-12.65	-7.86
Max	9.41	7.29	14.78	12.36	12.09	13.18	10.18
Skewness	-0.15	-0.92	0.05	-0.55	0.22	-0.08	0.10
Kurtosis	7.59	10.13	17.24	15.20	10.38	6.82	7.54
Jarque-Bera	6392.95	11739.87	32903.32	25699.21	11956.23	5151.83	6299.11
Observation	2656	2656	2656	2656	2656	2656	2656

Markets	*Lithuania*	*Poland*	*Romania*	*Slovakia*	*Slovenia*	*Turkey*
Mean	0.02	0.03	0.02	-0.01	-0.01	0.04
Std. Dev.	1.21	1.28	1.68	1.14	1.68	1.72
Median	0.00	0.01	0.00	0.00	0.00	0.04
Min	-13.52	-8.29	-13.12	-14.81	-40.35	-11.06
Max	11.87	6.08	10.56	11.88	40.47	12.13
Skewness	-0.37	-0.49	-0.64	-1.12	-0.10	-0.28
Kurtosis	25.32	3.94	8.36	24.84	287.90	3.75
Jarque-Bera	70982.45	1825.78	7909.82	68843.68	8046994.77	1588.03
Observations	2656	2656	2656	2656	2330	2656

Notes: This table presents descriptive statistics for the transition countries' stock market indices and the Stoxx600 index time series. Time period: 01.01.2005 to 06.03.2015. Countries: as shown in the table.

Tail dependence reflects the extreme-value dependence between the movements of WE stock market and each stock market of the following countries: Bulgaria, the Czech Republic, Estonia, Croatia, Lithuania, Latvia, Poland, Romania, Slovenia, Slovakia and Turkey. The performance of the Western Europe stock market is measured by the Stoxx600 index.

Table A2 summarizes the averaged results of the switching copula estimation of

tail-dependence coefficients for each country. The superscripts low and high indicate values for periods of high volatility and low volatility, respectively. Poland has the highest *average* value of UTD (Low Vol) and LTD (Low Vol) equal to 0.3458 and 0.4580 respectively.[12] The highest UTD (High Vol) and the highest LTD (High Vol) belong to Latvia (0.9089 and 0.8633 respectively).

Table A2 Tail dependence results, switching SJC copula model: individual markets

Markets	*Bulgaria*	*Croatia*	*Czech*	*Estonia*	*Hungary*	*Latvia*
τ^{U} (Low Vol)	0.0004***	0.1525***	0.2783***	0.0580**	0.2954***	0.0125
	(0.000)	(0.021)	(0.034)	(0.024)	(0.016)	(0.810)
τ^{U} (High Vol)	0.0000***	0.0006***	0.4791***	0.0549	0.3223***	0.9089
	(0.000)	(0.000)	(0.000)	(0.032)	(0.025)	(2.770)
τ^{L} (Low Vol)	0.1129	0.2510***	0.4119***	0.1687***	0.3467***	0.0773
	(0.080)	(0.003)	(0.046)	(0.024)	(0.044)	(0.403)
τ^{L} (High Vol)	0.1109	0.2761***	0.5249***	0.2103***	0.4911***	0.8633
	(0.068)	(0.021)	(0.000)	(0.004)	(0.022)	(2.839)

Markets	*Lithuania*	*Poland*	*Romania*	*Slovakia*	*Slovenia*	*Turkey*
τ^{U} (Low Vol)	0.0378	0.3458***	0.2203***	0.0000	0.0244***	0.2718***
	(0.022)	(0.013)	(0.015)	(1.020)	(0.000)	(0.025)
τ^{U} (High Vol)	0.0000	0.4308***	0.0314	0.0001	0.0001***	0.2916***
	(0.398)	(0.061)	(0.072)	(0.776)	(0.000)	(0.057)
τ^{L} (Low Vol)	0.1760***	0.4580***	0.2067***	0.0000	0.0554***	0.3873***
	(0.015)	(0.014)	(0.027)	(0.922)	(0.000)	(0.040)
τ^{L} (High Vol)	0.2665	0.5720***	0.3248***	0.0010	0.1699***	0.3714***
	(10.224)	(0.015)	(0.061)	(3.429)	(0.000)	(0.018)

Notes: This table presents the tail dependence estimates of a switching symmetrized Joe-Clayton (SJC) copula between Western Europe (WE) and the individual market in the Transition region. Time period: 01.01.2005 to 06.03.2015. Countries: as shown in the table. Standard errors for the individual tail dependence coefficients in parentheses. Statistical significance at the 1, 5 and 10 percent levels is denoted by ***, **, and *, respectively.

Figures A1 to A12 illustrate the tail dependence relationships between the Stoxx600 index and the indices for all Transition region stock markets in our sample: Bulgaria, Croatia, the Czech Republic, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, and Turkey, respectively. It is important to note that throughout the sample period, all three countries exhibit statistically and economically significant lower tail dependence, indicating the probability of simultaneous negative returns in the respective market and the Western European (WE) markets, at approximately 45%, even during periods of relative calm (as indicated by the low volatility state in the top left

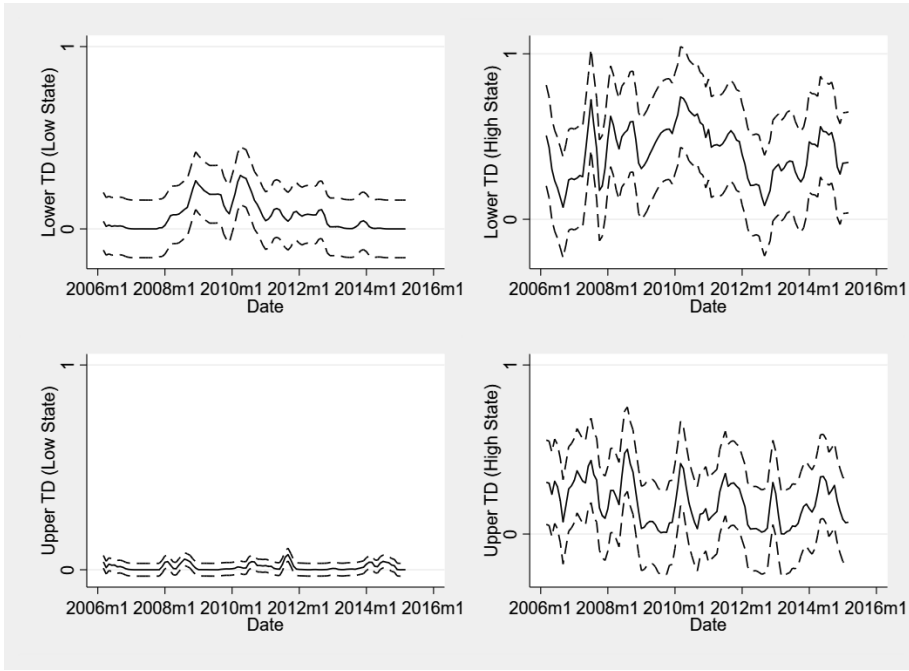
[12] LTD stands for lower tail dependence (the probability of occurrence of joint negative stock market returns), while UTD stands for upper tail dependence (the probability of occurrence of joint positive stock market returns). Low Vol indicates estimates of the respective tail dependence measures when the Western market (represented by Stoxx600) is in low-volatility states, while High Vol stands for estimates of the respective tail dependence measures when the Western market is in high-volatility states.

panel). The only exceptions occur during two relatively short periods in the Turkish market, namely the end of 2011 and the beginning of 2015. Notably, the Czech Republic displays a narrow 95-percentile standard error band, suggesting a stable tail dependence relationship with WE markets. In high-volatility states, the lower tail dependence for all three countries is consistently higher compared to low-volatility states throughout the period. As anticipated, the largest spikes in tail dependence occur in 2008, coinciding with the collapses of Bear Stearns and Lehman Brothers, as well as in the first half of 2010, corresponding to the initial Greek bailout. Moreover, during high-volatility states, the dispersion of coefficients is also higher, indicating a less stable relationship with WE markets.

In terms of upper tail dependence (the probability of joint positive returns), the presented countries exhibit lower and less stable values during low-volatility states, typically lacking statistical significance at the 5 percent level. However, in high-volatility states, the upper tail dependence becomes highly statistically and economically significant for all three markets. This suggests that positive news tends to propagate more readily across markets during crisis periods compared to normal times.

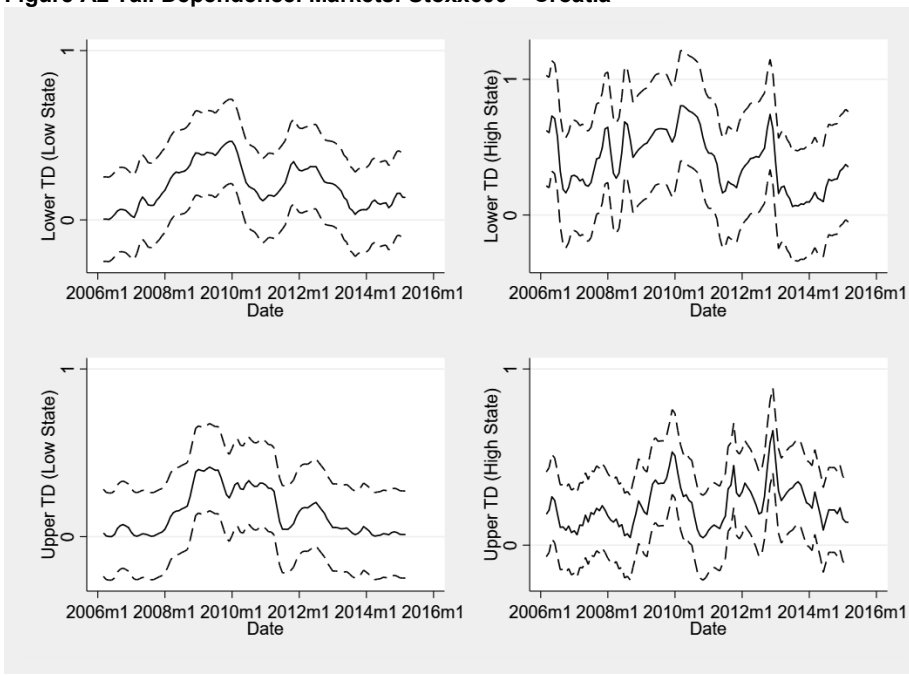
Overall, there is an observable increase in lower tail dependence across the region during high-volatility states, indicating a heightened reliance on negative returns during times of turmoil. However, no consistent pattern of shifts is observed in terms of upper tail dependence (joint positive returns). If anything, the Polish stock market shows a tendency for decreased dependence on positive returns during high-volatility states. Notably, the periods encompassing the global financial crisis and the sovereign debt crisis significantly elevate dependence levels across the region.

Figure A1 Tail Dependence. Markets: Stoxx600 – Bulgaria



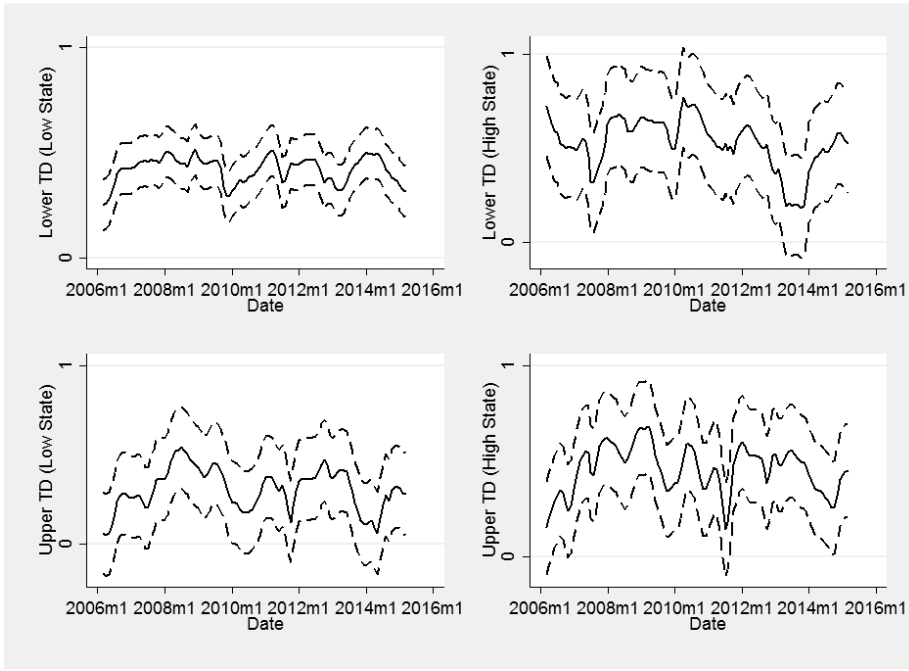
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A2 Tail Dependence. Markets: Stoxx600 – Croatia



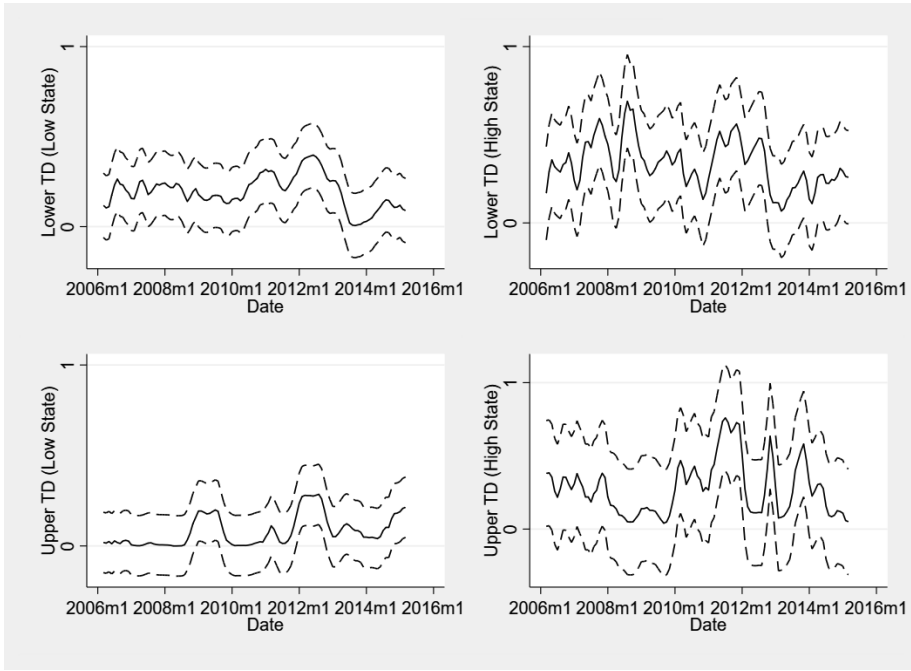
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A3 Tail Dependence. Markets: Stoxx600 – the Czech Republic



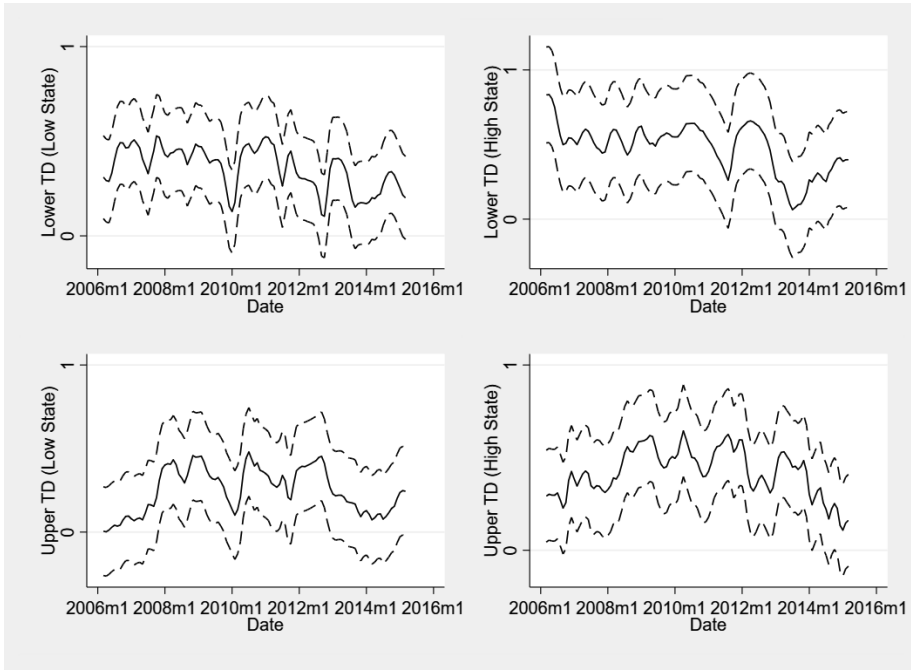
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A4 Tail Dependence. Markets: Stoxx600 – Estonia



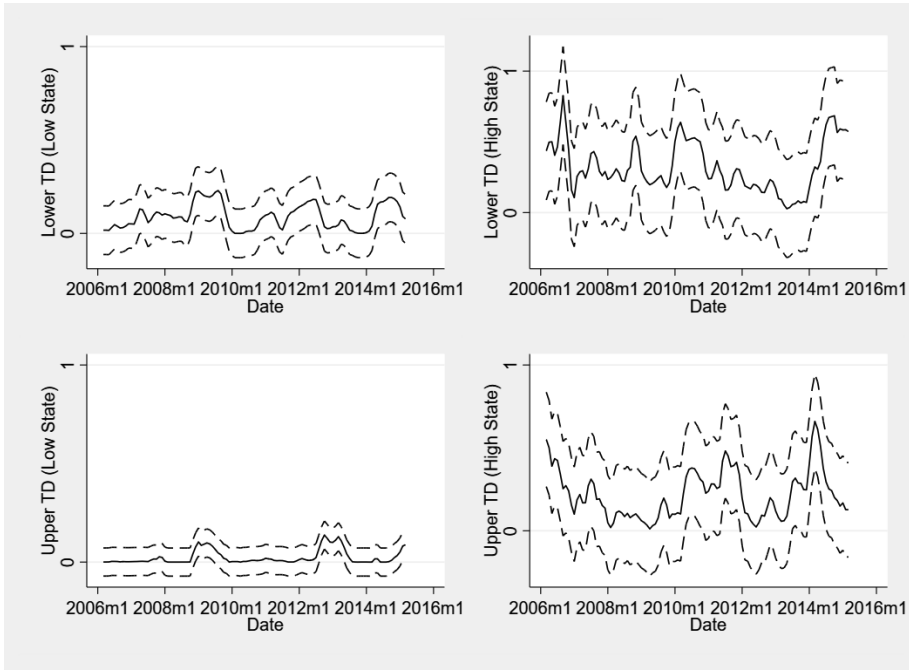
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A5 Tail Dependence. Markets: Stoxx600 – Hungary



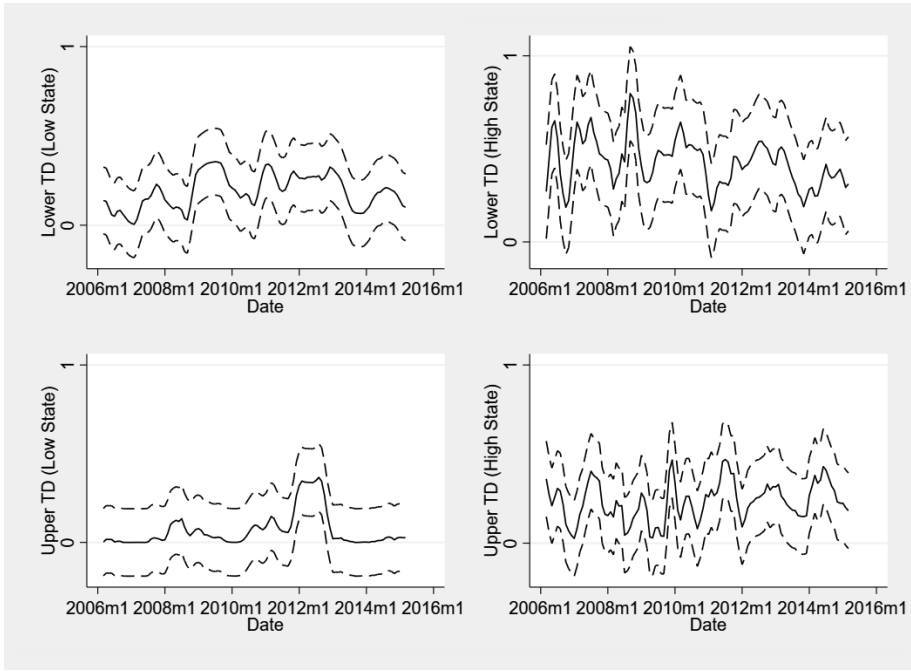
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A6 Tail Dependence. Markets: Stoxx600 – Latvia



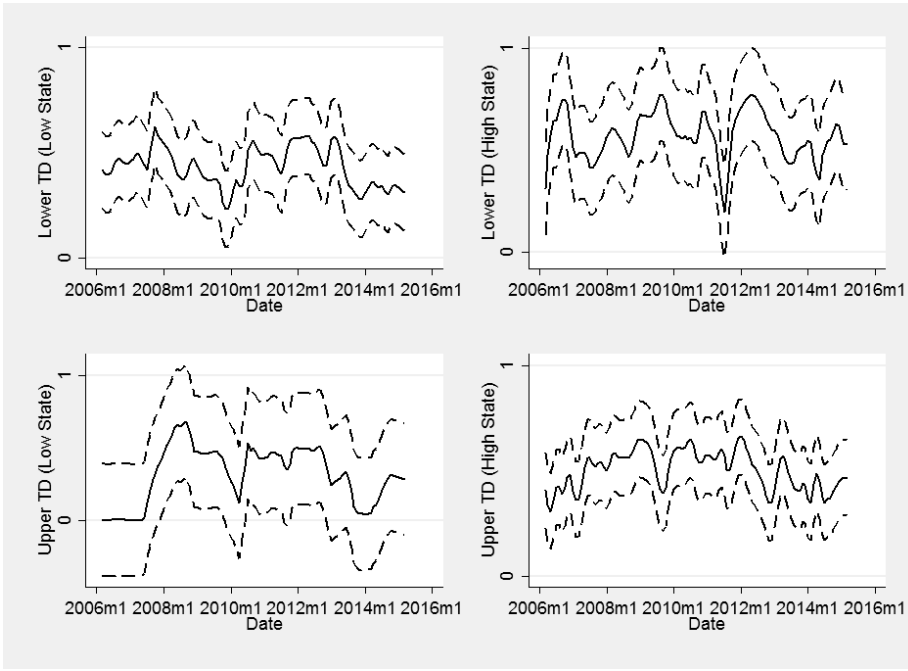
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A7 Tail Dependence. Markets: Stoxx600 – Lithuania



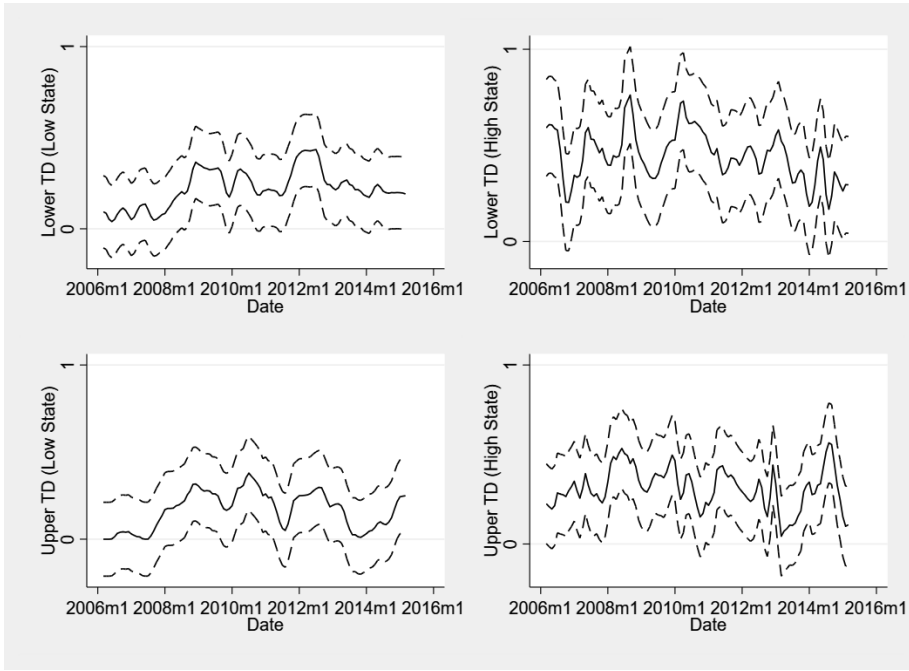
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A8 Tail Dependence. Markets: Stoxx600 – Poland



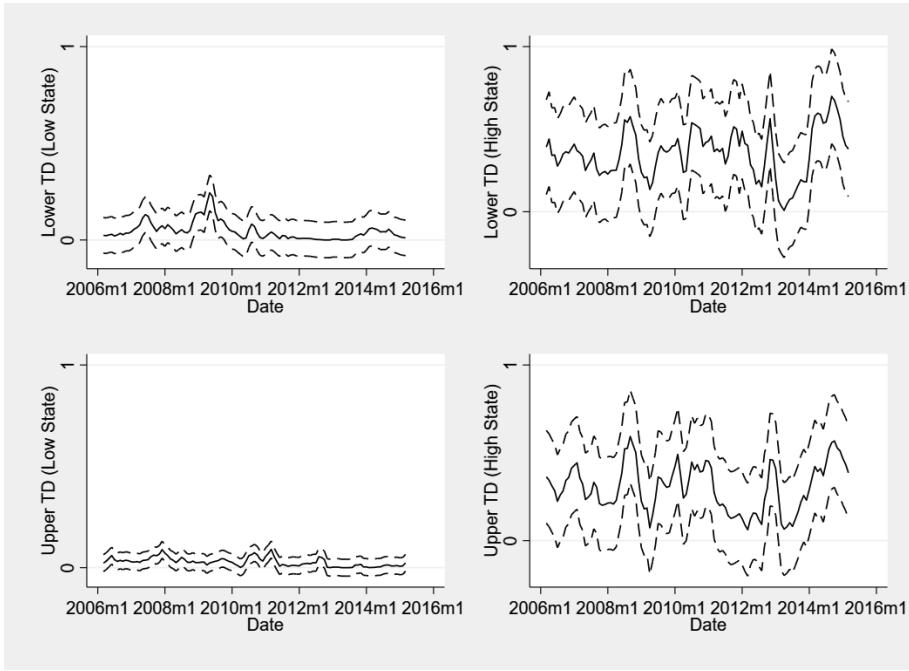
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A9 Tail Dependence. Markets: Stoxx600 – Romania



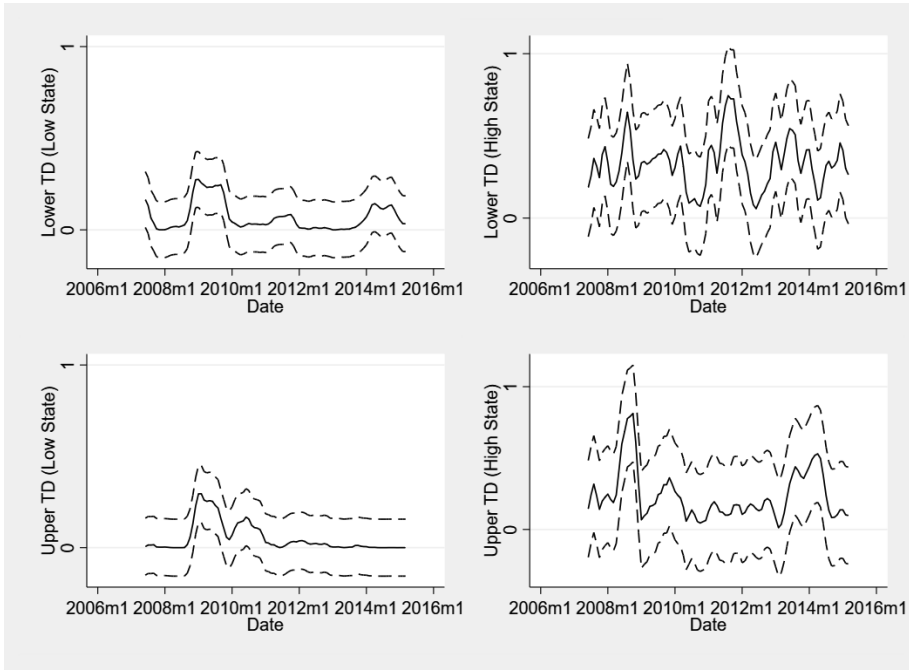
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A10 Tail Dependence. Markets: Stoxx600 – Slovakia



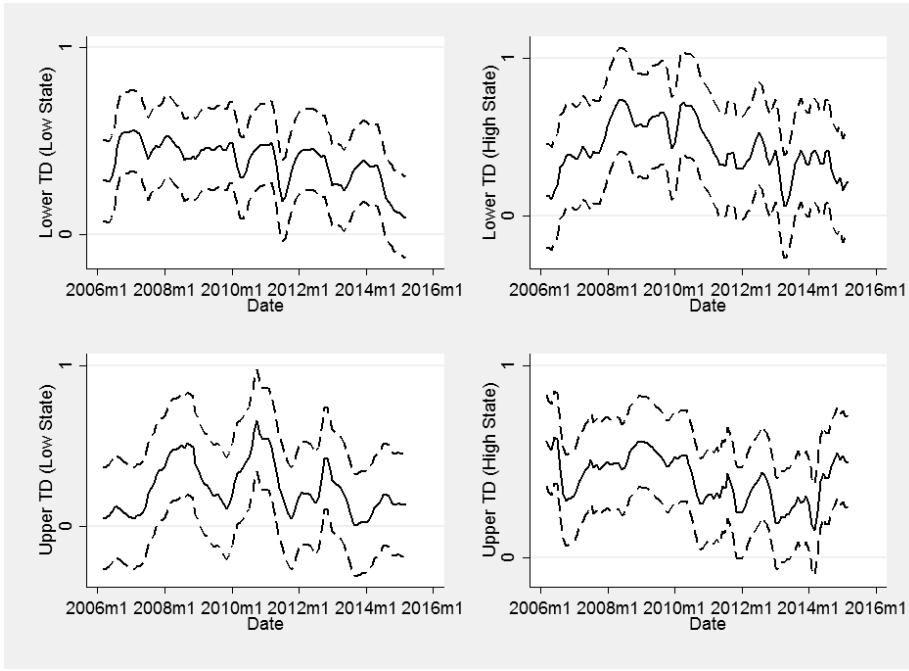
Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A11 Tail Dependence. Markets: Stoxx600 – Slovenia



Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figure A12 Tail Dependence. Markets: Stoxx600 – Turkey

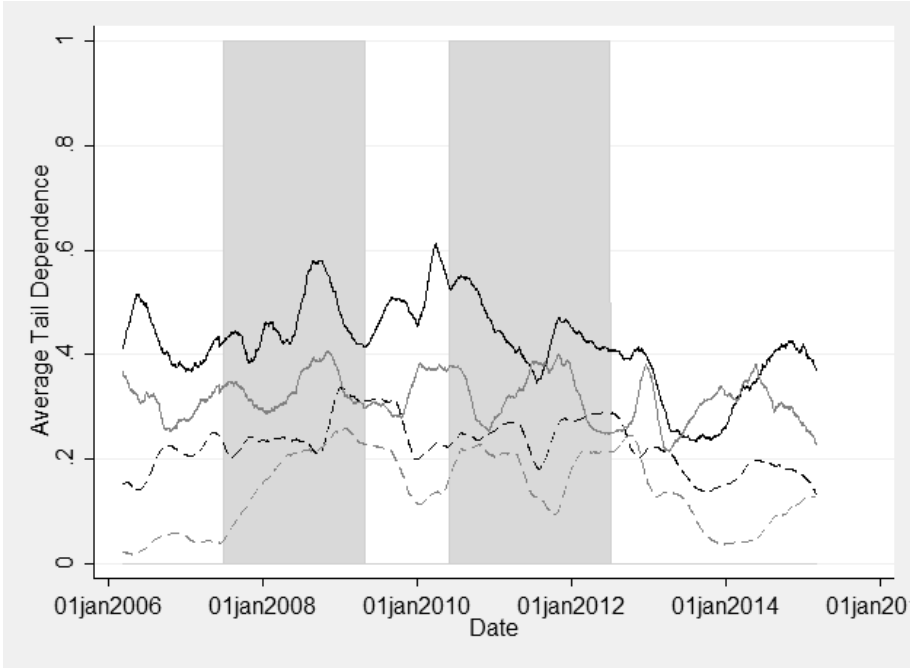


Notes: Dashed lines – 95th Percent error band. Sample period: March 2006 to March 2015. Source: own calculations.

Figures A13 and A14 illustrate the temporal dynamics of the averaged values for our four measures of tail dependence, captured at the daily and monthly frequencies, respectively. The solid black line represents average lower tail dependence (LTD) during high-volatility states, the solid grey line corresponds to average upper tail dependence (UTD) during high-volatility states, the dashed black line represents average LTD during low-volatility states, and the dashed grey line depicts average UTD during low-volatility states. The shaded grey areas indicate the periods encompassing crises, as well as the pre- and between-crisis periods, as initially defined in this section.

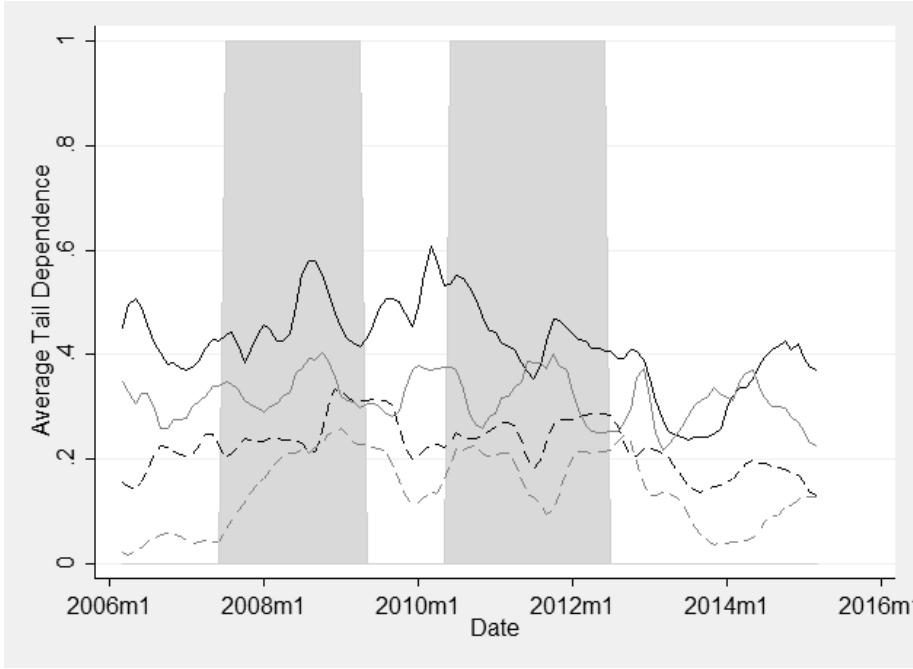
The observed pattern is evident, wherein the lower tail dependence consistently surpasses the upper tail dependence within their respective volatility states. Furthermore, on average, high-volatility states tend to amplify both measures of tail dependence. Additionally, we can discern an increasing trend in LTD during the global financial crisis, followed by a subsequent decrease during the sovereign debt crisis.

Figure A13 Average Tail Dependence (Daily). Markets: Stoxx600 – Transition Economies



Notes: Solid black line – average LTD (high volatility state). Solid grey line – average UTD (high volatility state). Dashed black line – average LTD (low volatility state). Dashed grey line – average UTD (low volatility state). Grey areas – crisis periods. Sample period: March 2006 to March 2015. Source: Radev (2022b) and own calculations.

Figure A14 Average Tail Dependence (Monthly). Markets: Stoxx600 – Transition Economies



Notes: Solid black line – average LTD (high volatility state). Solid grey line – average UTD (high volatility state). Dashed black line – average LTD (low volatility state). Dashed grey line – average UTD (low volatility state). Grey areas – crisis periods. Sample period: March 2006 to March 2015. Source: Radev (2022b) and own calculations.

Regression Analysis

Table A3 Panel Regression Variables

Variable	Description	Data Source
	Panel A: Bank Variables	
Subsidiary Variables		
Subsidiary Loan Growth Rate	Growth of total subsidiary USD-denominated loans	Bankscope
Subsidiary Size	Natural logarithm of total subsidiary USD- denominated assets	Bankscope
Subsidiary Profitability	Ratio of subsidiary profits to total earning assets	Bankscope
Subsidiary Riskiness	Ratio of subsidiary loan-loss provisions to total loans	Bankscope
Subsidiary Capitalization	Ratio of subsidiary equity to total assets	Bankscope
Subsidiary Liquidity	Ratio of subsidiary liquid assets to total assets	Bankscope
Subsidiary Internally generated funds	Ratio of subsidiary net income at period t to loans at period (t-1)	Bankscope
Parent Variables		
Parent Size	Natural logarithm of total parent USD- denominated assets	Bankscope
Parent Profitability	Ratio of parent profits to total earning assets	Bankscope
Parent Riskiness	Ratio of parent loan-loss provisions to total loans	Bankscope
Parent Capitalization	Ratio of parent equity to total assets	Bankscope
Parent Liquidity	Ratio of parent liquid assets to total assets	Bankscope
Parent Internally generated funds	Ratio of parent net income at period t to loans at period (t-1)	Bankscope
	Panel B: Country Characteristics	
GDP p.c. growth	Growth of Gross Domestic Product per capita	Eurostat
Inflation	Consumer Price Index	Eurostat
Trade Openness	Trade as percentage of GDP	World Bank's World Development Indicators
Foreign Bank Ownership	Foreign ownership share in percentages. Foreign ownership is defined as banks with assets of foreign ownership > 50%	EBRD's Banking Survey
Domestic Credit/GDP	Domestic credit to the private sector to GDP	International Monetary Fund's World Economic Outlook
Rule of Law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank's World Development Indicators

Notes: This table presents a description of the variables and data sources for the panel regressions. All relevant balance sheet variables are converted to U.S. dollars for an easier interpretation of the results.

Bank Sample

Table A4 Parents and Subsidiaries

#	Parent Name	Parent Country	Number of Subsidiaries
	Foreign Parents		
1	Bausparkasse der Oesterreichischen Sparkassen AG	AUSTRIA	1
2	Erste Bank der Oesterreichischen Sparkassen AG	AUSTRIA	1
3	Sberbank Europe AG	AUSTRIA	4
4	Raiffeisenlandesbank Oberoesterreich AG	AUSTRIA	2
5	Raiffeisen Landesbanken Holding GmbH	AUSTRIA	1
6	Raiffeisen Bank International AG	AUSTRIA	4
7	Bausparkasse Wuestenrot	AUSTRIA	3
8	Steiermaerkische Bank und Sparkassen AG-Bank Styria	AUSTRIA	2
9	Raiffeisen Zentralbank Oesterreich AG - RZB	AUSTRIA	5
10	Immigon Portfolioabbau AG	AUSTRIA	1
11	BKS Bank AG	AUSTRIA	1
12	Erste Group Bank AG	AUSTRIA	14
13	UniCredit Bank Austria AG-Bank Austria	AUSTRIA	3
14	Porsche Bank AG	AUSTRIA	2
15	DenizBank AG	AUSTRIA	1
16	Commonwealth Bank of Australia	AUSTRALIA	1
17	KBC Groep NV/ KBC Groupe SA-KBC Group	BELGIUM	2
18	KBC Bank NV	BELGIUM	3
19	Commerzbank AG	GERMANY	1
20	Deutsche Bank AG	GERMANY	5
21	Volkswagen Financial Services AG	GERMANY	2
22	Union Asset Management Holding AG	GERMANY	1
23	DZ Bank AG-Deutsche Zentral-Genossenschaftsbank	GERMANY	2
24	VR-Leasing AG	GERMANY	1
25	Deutsche Sparkassen Leasing AG & Co KG	GERMANY	1
26	ProCredit Holding AG & Co. KGaA	GERMANY	2
27	Toyota Kreditbank Gmbh	GERMANY	1
28	Danske Bank A/S	DENMARK	3
29	Banco Santander SA	SPAIN	2
30	RCI Banque SA	FRANCE	3
31	Banque PSA Finance SA	FRANCE	1

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Table A4 Parents and Subsidiaries Continued

#	Parent Name	Parent Country	Number of Subsidiaries
32	BNP Paribas Personal Finance SA	FRANCE	2
33	Societe Generale SA	FRANCE	5
34	BNP Paribas	FRANCE	3
35	Credit Agricole S.A.	FRANCE	3
36	HSBC Bank plc	UNITED KINGDOM	1
37	HSBC Holdings Plc	UNITED KINGDOM	1
38	Investec Plc	UNITED KINGDOM	1
39	National Bank of Greece SA	GREECE	3
40	Alpha Bank AE	GREECE	2
41	Eurobank Ergasias SA	GREECE	1
42	Piraeus Bank SA	GREECE	2
43	Cassa di Risparmio di Firenze SpA-Banca CR Firenze SpA	ITALY	1
44	UniCredit SpA	ITALY	10
45	Intesa Sanpaolo	ITALY	4
46	FCA Bank SPA	ITALY	1
47	Veneto Banca scpa	ITALY	1
48	Banca di Cividale SpA	ITALY	
49	Banca Popolare di Vicenza Societa cooperativa per azioni	ITALY	1
50	Royal Bank of Scotland NV (The)-RBS NV	NETHERLANDS	1
51	ING Bank NV	NETHERLANDS	1
52	DNB Bank ASA	NORWAY	3
53	Banco Banif Mais SA	PORTUGAL	1
54	Banco Comercial Portugus, SA-Millennium bcp	PORTUGAL	1
55	Swedbank AB	SWEDEN	6
56	Skandinaviska Enskilda Banken AB	SWEDEN	7
57	Nordea Bank AB	SWEDEN	6
58	State Street Corporation	UNITED STATES OF AMERICA	5
59	JPMorgan Chase & Co	UNITED STATES OF AMERICA	2
60	Goldman Sachs Group, Inc	UNITED STATES OF AMERICA	1
61	Northern Trust Corporation	UNITED STATES OF AMERICA	2
62	Morgan Stanley	UNITED STATES OF AMERICA	3

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Table A4 Parents and Subsidiaries Continued

#	Parent Name	Parent Country	Number of Subsidiaries
	Domestically Incorporated Parents		
63	Corporate Commercial Bank AD	BULGARIA	1
64	Ceska Sporitelna a.s.	CZECH REPUBLIC	1
65	Komercni Banka	CZECH REPUBLIC	1
66	Privredna Banka Zagreb d.d-Privredna Banka Zagreb Group	CROATIA	1
67	Banka Splitsko-Dalmatinska dd Split	CROATIA	1
68	VABA dd Banka	CROATIA	1
69	Zagrebacka Banka dd	CROATIA	2
70	National Bank of Hungary ZRT-Magyar Nemzeti Bank	HUNGARY	1
71	OTP Bank Plc	HUNGARY	1
72	MFB Hungarian Development Bank Private Limited Company	HUNGARY	1
73	FHB Mortgage Bank Plc	HUNGARY	1
74	mBank SA	POLAND	3
75	Powszechna Kasa Oszczednosci Bank Polski SA - PKO BP SA	POLAND	3
76	Getin Noble Bank SA	POLAND	1
77	Getin Holding SA	POLAND	2
78	Patria Bank	ROMANIA	1
79	Transilvania Bank-Banca Transilvania SA	ROMANIA	1
80	NLB dd-Nova Ljubljanska Banka d.d.	SLOVENIA	3
81	Nova Kreditna Banka Maribor d.d.	SLOVENIA	1
82	Slovenska sporitel'na as-Slovak Savings Bank	SLOVAKIA	1
83	Ceskoslovenska obchodna banka CSOB	SLOVAKIA	1
84	Ko Financial Services-KOC Finansal Hizmetler AS	TURKEY	2
85	C Faktoring A.S.	TURKEY	1
86	GSD Holding Anonim Sirketi	TURKEY	1
87	Fiba Holding AS	TURKEY	3
88	Turkiye is Bankasi A.S. - ISBANK	TURKEY	3
89	T.C. Ziraat Bankasi A.S.	TURKEY	2

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Table A4 Parents and Subsidiaries Continued

#	Parent Name	Parent Country	Number of Subsidiaries
	Domestically Incorporated Parents		
90	Akbank T.A.S.	TURKEY	1
91	Yapi Ve Kredi Bankasi A.S.	TURKEY	1
92	Turkiye Garanti Bankasi A.S.	TURKEY	1
93	Arab Turkish Bank-Arap Turk Bankasi	TURKEY	1
94	Turkiye Ihracat Kredi Bankasi - Turk Eximbank-Export Credit Bank of Turkey	TURKEY	2
95	Sekerbank T.A.S.	TURKEY	1
96	Turkiye Sinai Kalkinma Bankasi A.S.-Industrial Development Bank of Turkey	TURKEY	2
97	Finansbank A.S.	TURKEY	1
98	Turkish Bank A.S.	TURKEY	1
99	Alternatifbank A.S.	TURKEY	1
100	Turkiye Vakiflar Bankasi TAO	TURKEY	1
		Total:	212
		Total (foreign parents):	157
		Total (domestic parents):	55

Notes: This table presents the 100 parent commercial banks of the subsidiaries used in our sample and an overall number of subsidiaries of a bank.

Table A5 List of the Parent Bank Countries

	Parent Country	*Number of Subsidiaries*
Western Country		
1	AUSTRALIA	1
2	AUSTRIA	43
3	BELGIUM	5
4	DENMARK	3
5	FRANCE	16
6	GERMANY	16
7	GREECE	8
8	ITALY	17
9	THE NETHERLANDS	2
10	NORWAY	3
11	PORTUGAL	2
12	SPAIN	1
13	SWEDEN	19
14	THE UNITED KINGDOM	3
15	THE UNITED STATES OF AMERICA	13
Transition Country		
16	BULGARIA	2
17	CROATIA	6
18	THE CZECH REPUBLIC	4
19	HUNGARY	7
20	POLAND	11
21	ROMANIA	2
22	SLOVAKIA	2
23	SLOVENIA	4
24	TURKEY	25
Total		212

Notes: This table presents parent bank's countries and the number of subsidiaries.

Regression Variable Descriptives

Table A6a Descriptive Statistics of Variables (Foreign-Owned Subsidiary Bank Sample)

Variable	*Mean*	*Median*	*Min*	*Max*	*Std.Dev.*	*Number*
Loan Growth Rate	0.221	0.067	-1.888	12.439	0.753	13729
τ^{L} (High Vol)	0.356	0.476	0.008	0.835	0.172	13818
τ^{L} (Low Vol)	0.295	0.326	0.000	0.622	0.168	13818
τ^{U} (High Vol)	0.368	0.370	0.000	0.813	0.164	13818
τ^{U} (Low Vol)	0.201	0.175	0.000	0.683	0.174	13818
Subsidiary Size	7.795	7.904	-2.224	11.537	1.769	13923
Subsidiary Profitability	0.019	0.014	-0.149	0.312	0.044	13913
Subsidiary Riskiness	0.016	0.009	-0.111	0.257	0.028	13059
Subsidiary Capitalization	0.128	0.107	-0.033	0.779	0.102	13923
Subsidiary Liquidity	0.174	0.139	-0.042	0.994	0.160	13874
Subsidiary Internally Generated Funds	0.041	0.017	-1.847	1.538	0.160	13728
Parent Size	11.349	11.758	6.113	14.969	1.877	13923
Parent Profitability	0.018	0.007	-0.107	0.437	0.061	13923
Parent Risk	0.010	0.005	-0.021	0.261	0.019	11973
Parent Capitalization	0.153	0.083	-0.026	1.280	0.198	13923
Parent Liquidity	0.260	0.240	-0.013	0.723	0.172	13805
Parent Internally Generated Funds	0.168	0.013	-0.415	13.162	1.022	12414
GDP Growth	2.475	2.631	-18.080	12.536	4.301	13923
Inflation	3.725	3.125	-4.233	20.604	3.310	13923
Trade Openness	106.956	90.384	46.495	198.019	38.289	13923
Foreign Bank Ownership	0.659	0.711	0.274	0.930	0.187	13923
Domestic Credit/GDP	55.994	53.579	19.880	105.486	15.392	13923
Rule of Law	0.475	0.554	-0.192	1.241	0.392	13923

Notes: This table presents the descriptive statistics of variables used in our regression analysis. Time period: March 2006 to March 2015.

Table A6b Descriptive Statistics of Variables (Domestically Owned Subsidiary Bank Sample)

Variable	*Mean*	*Median*	*Min*	*Max*	*Std.Dev.*	*Number*
Loan Growth Rate	0.282	0.110	-7.890	5.898	0.674	5010
τ^{L} (High Vol)	0.446	0.447	0.008	0.835	0.173	5273
τ^{L} (Low Vol)	0.330	0.369	0.000	0.622	0.159	5273
τ^{U} (High Vol)	0.393	0.406	0.000	0.813	1.150	5273
τ^{U} (Low Vol)	0.219	0.194	0.000	0.683	0.170	5273
Subsidiary Size	6.734	6.663	2.096	11.995	1.591	5303
Subsidiary Profitability	0.021	0.015	-0.097	0.289	0.043	5303
Subsidiary Riskiness	0.016	0.007	-0.117	0.176	0.031	4951
Subsidiary Capitalization	0.154	0.108	0.003	0.858	0.135	5303
Subsidiary Liquidity	0.196	0.108	-0.093	1.009	0.238	5303
Subsidiary Internally Generated Funds	0.004	0.018	-7.471	2.301	0.585	5010
Parent Size	9.112	9.585	3.232	11.583	1821.000	5303
Parent Profitability	0.016	0.018	-0.175	0.350	0.034	5303
Parent Risk	0.021	0.012	-0.024	0.127	0.028	5231
Parent Capitalization	0.146	0.114	0.009	0.966	0.136	5303
Parent Liquidity	0.176	0.139	-0.011	0.723	0.137	5303
Parent Internally Generated Funds	0.059	0.027	-22.977	11.983	1.737	5210
GDP Growth	2.929	2.788	-7.797	1.254	4.020	5303
Inflation	4.611	4.009	-2.450	15.726	3.343	5303
Trade Openness	94.354	81.658	46.495	181.370	42.822	5303
Foreign Bank Ownership	0.591	0.449	0.274	0.930	0.210	5303
Domestic Credit/GDP	53.856	53.339	19.880	92.659	16.092	5303
Rule of Law	0.386	0.194	-0.192	1.059	0.371	5303

Notes: This table presents the descriptive statistics of variables used in our regression analysis. Time period: March 2006 to March 2015.

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