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Credit spread drivers and cross-country connectedness: a study of emerging economies in Asia

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Abstract

Purpose – While the existing literature lacks a holistic approach to determining credit spreads and is limited to mostly developed countries, this study investigates credit spread determinants and their cross-country connectedness in the context of four emerging economies in Asia by incorporating bonds, market risk, macroeconomic and global factors.

Design/methodology/approach – This study utilizes principal component analysis for dimensionality reduction and variable representation. Furthermore, we employ the dynamic conditional correlation–generalized autoregressive conditional heteroskedasticity model to capture the cross-country credit spread connectedness between the variables.

Findings – The findings indicate that market volatilities are the most significant drivers of credit spreads, while global factors play a moderating role. Furthermore, the results provide compelling evidence of cross-country credit spread connectedness, with China as the primary transmitter and Malaysia as the primary receiver among the selected emerging economies.

Originality/value – This study addresses the limitations of previous research by extending the analysis beyond the commonly studied developed economies and focusing on emerging economies in Asia. It also employs a comprehensive approach to determine credit spread and explores cross-country credit spread connectedness in developing economies, thereby shedding light on financial risks and vulnerabilities within interconnected global financial systems.

Keywords Credit spreads, Corporate bonds, Emerging countries, Cross-country connectedness

Paper type Research paper

JEL Classification — B22, D53, E43, F15, G12, G15

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1. Introduction

Corporate bond markets in Asia have exhibited quadruple growth after the 2008 global financial crisis. The outstanding local currency bonds in the region reached USD 16.3 trillion, with corporate bonds representing USD 6.4 trillion [1]. However, a significant increase in leverage also brings about an underlying credit risk, increasing the debt vulnerability of emerging countries. Credit spread serves as a prominent indicator of susceptibility in this context. It can offer valuable insights into the prevailing market landscape and facilitate predictions pertaining to a country's macroeconomic scenario (Wang *et al.*, 2019). Credit spreads reflect not only the changes in firms' net worth but also the credit willingness of financial sectors (Gilchrist *et al.*, 2009). By investigating the drivers of credit spreads, we gain a comprehensive understanding of the intricate mechanisms that shape the indicators of market vulnerability. Additionally, given the increased integration among global economies, the cross-market contagion of credit spreads is a topic worth investigating. Interconnectivity among markets can lead to systemic repercussions, whereby events in one economy can substantially affect others within a region. This phenomenon, known as contagion, has gained significant attention since the 2008 global financial crisis.

However, despite the extensive body of research dedicated to examining the factors influencing credit spreads and exploring cross-market linkages, the existing literature has certain limitations. First, most studies have focused primarily on developed economies, with limited attention paid to the analysis of credit spreads in emerging economies. This limitation leaves a critical gap in our understanding of credit spreads in emerging economies whose unique financial structures, regulatory environments, and economic challenges may yield substantially different dynamics.

Emerging economies account for over half of the global GDP (in terms of purchasing power parity) [2] and are home to most of the world's population, making them major drivers of global growth, demand, and innovation. Credit spread drivers and their connectedness are particularly important in emerging economies because of their heightened vulnerability, reliance on external financing, and susceptibility to global shocks. A deep understanding of these factors is essential to maintain financial stability, foster sustainable growth, and navigate the complexities of global financial integration.

Second, the existing literature tends to focus on specific aspects of credit spread determinants, such as bond-specific or macroeconomic factors, thereby lacking a comprehensive and holistic approach. This limitation highlights the need to provide a comprehensive and holistic understanding of credit spread behavior, which is likely to be influenced by the complex interplay of multiple factors across different levels of analysis.

Third, studies on cross-market linkages have primarily focused on market volatilities and their implications, thereby neglecting the exploration of cross-country credit spread connectedness, particularly in the context of emerging economies. Moreover, studies exploring cross-country linkages have predominantly examined sovereign credit default swaps in emerging markets (Zhang *et al.*, 2022). Although valuable, these studies do not directly address corporate credit spreads, which reflect different sets of risks and respond differently to economic shocks.

The current study addresses fills critical gaps by offering timely insights into the era of growing global financial interconnectedness. Focusing on emerging economies and exploring cross-country corporate credit spread linkages, it advances theoretical understanding and practical risk management in these crucial but underexplored financial markets.

Given this context, this study has two primary objectives. The first objective is to investigate the drivers of credit spreads in emerging economies, namely, China, India, Malaysia, and South Korea, from January 2010 to June 2022. The second objective of the study is to examine the connectedness of credit spreads across select emerging countries following the DCC-GARCH model.

The findings reflect the changing nature of spread determinants across different economies and maturity series and suggest their relative significance. The analysis reveals that market volatility factors have a substantial impact on credit spreads, establishing them as the strongest drivers. However, the influence of global factors appears to offer limited support, indicating a relatively weak association. Furthermore, we provide compelling evidence of cross-country credit spread connectedness. Our empirical analysis provides important implications for policymakers as understanding the drivers of credit spreads will help them effectively manage fixed-income securities in developing countries. These findings contribute to the existing literature on cross-market connectedness and enhance our understanding of the financial risks as well as vulnerabilities in emerging economies.

2. Literature review

2.1 Credit spread drivers

The existing literature demonstrates that credit spreads are influenced by multiple factors, which reflect their multidimensional nature. While Merton (1974) developed a theoretical framework for firm-level default risk, Collin-Dufresne *et al.* (2001) provided empirical evidence of credit spread determinants. Subsequently, many empirical studies have deliberated on credit spread drivers. Nagler (2020) found liquidity to be an important factor in US corporate bond credit spreads. Less liquidity, low credit ratings, and shorter issue age have also been identified as drivers of credit spreads (Huang *et al.*, 2019). In addition to liquidity and ratings, several studies have shown the influence of accounting and reporting on credit spreads (Liu and Magnan, 2016). Duffie *et al.* (2007) demonstrated that macroeconomic variables such as GDP growth rate can increase the forecast accuracy of extended structural models. This argument is supported by Gilchrist and Zakrajsek (2007), who pointed out that macroeconomic and liquidity-related activities substantially influence credit spread fluctuations. Furthermore, David (2008) stated that during periods of economic expansion, credit spreads tend to decrease, confirming that industrial production growth is a significant determinant of its shifts. However, Giesecke *et al.* (2011) found no role for macroeconomic factors in predicting credit spreads, although these factors are strong predictors of default rates.

2.2 Cross-country linkages

The concept of "contagion" has garnered significant attention in the field of economics, particularly following the Asian currency crisis in 1997–1998. It has been defined as the co-movement in asset markets resulting from both informational and institutional factors. In other words, contagion is a substantial increase in cross-market linkages when a shock affects one or more groups of markets (Forbes and Rigobon, 2002). Understanding financial contagion is crucial because of increased global interdependence, in which shocks originating in one asset market can spread to other markets within and across countries, potentially causing widespread financial turmoil in the region. Although the literature provides substantial evidence of cross-market linkages, a gap remains in the exploration of cross-country credit spread connectedness, particularly in the corporate bond market.

Several studies have examined the relationship across asset markets, shedding light on the dynamics of contagion and interlinkages. Zhang and Wei (2010) investigated the relationship between gold and oil volatility and found that changes in crude oil prices Granger-cause volatility in gold prices but not vice versa. Du *et al.* (2011) employed a bivariate stochastic model of volatility to study the volatility linkages among three commodities: crude oil, corn, and wheat. However, their findings suggest that these relationships vary across countries and time periods.

Emerging countries are particularly vulnerable during financial crises because of their dependence on developed nations. For example, the impact of the 2008 global financial crisis extended beyond developed stock markets and affected developing countries as well. Building on the work of Forbes and Rigobon (2002) and Caporale *et al.* (2005) examined cross-market co-movements within Asian stock market returns in the aftermath of the Asian crisis and identified evidence of linkages within East Asian countries.

Similar studies have been conducted on events such as the Eurozone debt crisis, the 2015 Chinese market crash, and the recent COVID-19 pandemic. For example, Diebold and Yilmaz (2009, 2012) developed new connectedness measures to illustrate that returns and volatility spillover across global equity, bond, commodity, and currency markets rose markedly during critical events such as the global financial crisis of 2007–2009. Similarly, multiple studies have investigated cross-country and cross-market connectedness during the more recent COVID-19 pandemic and Russia–Ukraine war (Akyildirim *et al.*, 2022; Kumar, 2023). These studies capture how both crises created turbulence and uncertainty that tightened global market linkages. However, most of these studies have focused on stock, commodity, and exchange markets, paying less attention to the corporate bond market.

3. Data and methodology

3.1 Sample data

Monthly corporate bond data were obtained from DataStream for the period between January 2010 and June 2022. This study focused on China, India, Malaysia, and South Korea, which were chosen based on their inclusion in the Morgan Stanley Capital International Emerging Market Index. However, owing to a lack of data, other countries that are part of the index were excluded. The sample only included bonds with standard features and excluded those with non-standard features such as mortgages, call and put options, floating rates, and annual adjusting rates. The study considered bonds with similar credit ratings because the data on credit ratings were either unavailable or inconsistent. Therefore, we considered bonds with Aaa ratings only. Market-related data, including stock markets, exchange markets, and bond yields, were obtained from Investing.com. Macroeconomic data, including the country's industrial production, consumer price index, and money supply, were sourced from the websites of the central banks of the respective countries. Global variable data, including the TED spread, WTICO price index, and VIX, were obtained from the website of the Federal Reserve Bank of St. Louis.

3.2 Variable selection and methodology

For the dependent variable, this study uses credit spread, which is defined as the difference between a corporate bond yield and a sovereign bond of the same maturity. The independent variables are classified into four categories: bond-specific, market volatility, macroeconomic, and global variables.

We selected these four categories because they provide broad terms encompassing the variables used in this study. In other words, we group the variables based on the overarching market categories they represent. The existing literature provides evidence of grouping the variables under different market categories. For instance, several studies have examined inflation and GDP as macroeconomic factors (Giannone *et al.*, 2006). Similarly, trading volume, duration, and maturity reflect bond-specific characteristics (Hotchkiss and Jostova, 2017). Along the same lines, stock and foreign exchange markets have been labeled as financial market variables (Narayan and Zheng, 2010; Slepov *et al.*, 2019). While the Chicago Board Options Exchange Volatility Index (VIX), West Texas Intermediate crude oil (WTICO) price index, and the Eurodollar spread have been used under the umbrella term of global

factors (Liew *et al.*, 2022; Smales, 2022). The details of each category are explained in the following sections.

3.2.1 Bond-specific variables. Bond-specific variables include modified duration, residual maturity, and trading volume. Bond duration measures the sensitivity of bond prices to changes in interest rates. As changes in credit spreads are often accompanied by changes in overall interest rates, an increase in modified duration leads to a decrease in bond prices, resulting in a higher credit spread. Similarly, a higher residual maturity poses more uncertainty regarding the bond price. Investors demand higher yields to compensate for this uncertainty. Conversely, the relationship between trading volume and credit spread is negative as a high trading volume indicates high security liquidity. Bonds with high liquidity offer lower yields; hence, the credit spread is narrow for such bonds.

3.2.2 Market volatility variables. We include the volatilities of stock, forex, and treasury bonds as market volatility variables. Stock market volatility represents uncertainty in financial markets. The contingent claims model implies that debt claims have characteristics similar to those of short-put option positions. As option values increase when volatility increases, credit spreads are also expected to increase. Similarly, earlier studies provide evidence that higher equity volatility widens credit spreads (Campbell, 2001; John and Taksler, 2003). Similarly, volatile exchange rates heighten uncertainty and economic fragility, increasing the risk of business defaults and widening credit spreads. Treasury bonds, viewed as risk-free assets, show higher yield volatility during uncertain times, prompting investors to demand higher premiums on corporate bonds. Additionally, interest rate volatility signals market uncertainty about future growth, further widening credit spreads (Alexander *et al.*, 2000).

3.2.3 Macroeconomic variables. Macroeconomic variables such as industrial production growth (IPG), inflation, and money supply significantly impact credit spreads. IPG reflects economic growth through increased production, leading to lower default probabilities and narrower credit spreads during growth phases (David, 2008). Conversely, resource shortages during economic downturns increase default events and credit spreads.

Higher inflation leads central banks to raise interest rates, increasing yields on both government and corporate bonds, with corporate bond yields rising more due to higher perceived risk, thus widening spreads. Inflation also reduces the real value of future bond payments, prompting higher returns on riskier corporate bonds and further widening spreads. Additionally, inflation creates uncertainty about future prices, growth, and policies, increasing the credit risk premium and making it harder for long-term investors to preserve asset value, leading to wider spreads (Chun *et al.*, 2014).

Money supply can negatively impact credit spreads by lowering interest rates, which stimulates borrowing and investment, leading to higher demand for corporate bonds and compressing spreads as investors accept lower premiums. Adequate money supply also supports economic growth, reduces default risks, and results in narrower credit spreads. In contrast, geopolitical tensions and economic uncertainty increase investor risk aversion, widening credit spreads as higher risk premiums are demanded. Conversely, higher foreign exchange reserves signal economic stability, boosting investor confidence and narrowing credit spreads.

3.2.4 Global variables. We include three global uncertainty variables: VIX, the Eurodollar–treasury spread, and the international oil price proxy measured by the WTICO price index. VIX measures investor fear and global stock market volatility. Spikes in VIX signal increased uncertainty, prompting shifts toward safer assets such as treasuries and widening credit spreads due to higher perceived corporate credit risk. High VIX levels often lead to economic downturns as uncertainty discourages spending and investment, increasing the probability of default. Similarly, WTICO tracks global oil price fluctuations, with high oil prices and volatility hurting corporate profit margins, especially in

manufacturing, and widening credit spreads. Extreme oil price volatility also creates uncertainty about inflation, GDP growth, and monetary policy, affecting bond pricing.

Finally, The Eurodollar–treasury spread reflects market sentiment and credit risk in the banking system. A wider spread signals rising credit risk and shifts toward safer assets, further widening corporate credit spreads. Table A1 [4] presents a summary of each category and the associated variables.

We analyze the credit spread determinants in the short, medium, and long term by dividing the dataset into six distinct maturity series: 1, 2, 5, 10, 15, and 20 years. Each maturity series across countries is subjected to a separate analysis. The econometric models are shown below. Following the approach of Jacoby *et al.* (2009) to reduce dimensionality and multicollinearity, we use principal component analysis for each category and utilize the first components as the final proxy of the particular category of variables. Finally, we have four independent variables representing the four different segments of the economy.

The model is represented as follows:

$$CS_{i,t} = \beta_0 + \pi_1 bond_{i,t} + \varphi_2 market_{i,t} + \omega_3 macro_{i,t} + \gamma_3 global_{i,t} + \varepsilon_t \quad (1)$$

where.

$CS_{i,t}$ = credit spread, $\pi_1 bond_{i,t}$ = component of bond-specific variables, $\varphi_2 market_{i,t}$ = component of market volatility variables, $\omega_3 macro_{i,t}$ = component of macroeconomic variables, $\gamma_3 global_{i,t}$ = component of global variables, and ε_t = stochastic error term.

4. Results and findings: what drives credit spread?

Table A2 [4] illustrates the determinants of credit spreads in emerging economies in Asia. The regression analysis revealed the factors influencing credit spreads across different maturities. The results indicate a positive association between bond-specific variables and credit spreads, which aligns with previous research findings (David, 2008; Chun *et al.*, 2014). High duration, longer maturity, and low trading volume all contribute to higher credit spreads. Bonds with longer durations are more sensitive to interest rate risk, and longer maturities increase uncertainty, leading investors to demand higher yields. Additionally, lower trading volumes indicate lower liquidity, resulting in higher yields for less liquid bonds.

Regarding market risk factors, this study finds a positive and significant association between credit spread and market volatility. The increased uncertainty affects the pricing of financial instruments, including corporate bonds. As market volatility rises (including stocks, exchanges, and government bonds), investors become more risk averse and demand higher compensation for taking on the additional risks associated with holding corporate bonds (Carr and Wu, 2007; Collin-dufresne *et al.*, 2001; John and Taksler, 2003).

The macroeconomic factors show a negative relationship with credit spread, suggesting that a positive economic environment reduces the default probability of firms and, hence, credit spread. For instance, when inflation is low, assets in the capital structure experience less depreciation, and the proportion of liabilities decreases. Consequently, firms' default probabilities decrease, leading to narrower credit spreads (Kim and Sorensen, 2016). Similarly, higher production growth indicates a more robust economic environment. When business profits increase, firms can promptly repay their debts, thereby reducing credit risk and spreads (David, 2008; Chun *et al.*, 2014). Furthermore, an increased money supply indicates a positive investment scenario as investors have more money to invest and are willing to take on more risk. The same is true for higher foreign exchange reserves.

Countries with high foreign exchange reserves are less likely to default on their debt obligations. This status boosts investor confidence as the probability of default for firms operating in such an environment is relatively low; hence, credit spreads are lower. Similarly, lower economic policy uncertainty and geopolitical risk reduce the overall economic risk in a country, which is vital for financial stability. Firms operating in such an environment are the least affected by economic uncertainty, leading to lower risk and thus lower spreads.

With regard to global variables, the finding suggests a positive association between global factors and credit spread. As mentioned above, global variables include the TED spread, commodity index, and volatility index. These global variables reflect market uncertainty, which can impact domestic markets through trade and credit channels, increasing domestic market volatility. As a result, investors demand higher yields to compensate for the added risk, leading to wider spreads. Notably, the findings are mostly consistent across all maturity series, except for bonds aged 20 years and older.

5. Credit spread connectedness

5.1 DCC-GARCH model

We follow the DCC-GARCH model of Engle (2002), who introduced and formulated this model to estimate time-varying conditional correlations. This model has been used extensively in the literature to examine the dynamic relationships and interconnectedness between time series. Gabauer (2020) introduced the volatility impulse response function (VIRF) within a two-step DCC-GARCH model to measure volatility transmission mechanisms. We utilize this methodology to understand credit spread connectedness by replacing volatility with credit spread. Unlike traditional methods such as the vector autoregressive (VAR)-based connectedness approach, the DCC-GARCH model eliminates the need to select a rolling window size, preventing a loss of observations (Gabauer, 2020). Previous researchers (Antonakakis, 2012; Hoesli and Reka, 2013) extended the DCC-GARCH model of Engle (2002) and the VAR methodology of Diebold and Yilmaz (2009) to establish a conditional volatility transmission mechanism. However, the DCC-GARCH-based dynamic connectedness approach requires only a single model to construct this mechanism. In addition, the model estimates time-varying conditional correlations between credit spreads, providing a more accurate representation than static models, especially during financial distress.

Given these advantages, we use this methodology to understand the credit spread connectedness mechanism. This model can be expressed as follows:

$$x_t = \mu_t + s_t \qquad s_t|P_{t-1} \sim M(0, H_t) \tag{2}$$

$$s = H^{1/2} u_t \qquad u_t \sim M\,(0, I) \tag{3}$$

$$H_t = D_t R_t D_t \tag{4}$$

P_{t-1} = all available information from time 1 to t – 1, x_t = a vector of dimension $M \times 1$ that represents the analyzed time series, μ_t = a vector of dimension $M \times 1$ that expresses the conditional mean, s_t = a vector of dimension $M \times 1$ that expresses the error term, Ut = a vector of dimension $M \times 1$ that represents the standardized error term, R_t = a matrix of dimension $M \times M$ that expresses the dynamic conditional correlations, H_t = a matrix of dimension $M \times M$ that explains the time-varying conditional variance–covariance matrix,

and $D_t = \text{diag}\,(h_{11t}^{1/2}, \ldots, h_{NNt}^{1/2})$ is the $M \times M$ dimensional matrix explaining time-varying conditional variances.

5.2 Volatility impulse response function (VIRF)

The dynamic conditional model proposed by Diebold and Yilmaz (2012) is based on the generalized impulse response functions (GIRFs) introduced by Koop *et al.* (1996) and later by Pesaran and Shin (1999). GIRFs quantify the J-step-ahead influence of a shock in variable i on variable j regardless of variable ordering. In our study, J was fixed at 5 days, indicating the forecasting timeframe. Similarly, Gabauer (2020) developed the VIRF, which measures the impact of a shock in variable i on the conditional volatility of variable j. In the DCC-GARCH model, the VIRF is used as a basis for forecasting the conditional variance–covariance. Utilizing this concept, we model the VIRF as a credit spread impulse response function.

5.3 Dynamic connectedness approach

To calculate the generalized forecast error variance decomposition (GFEVD), Gabauer (2020) employed the VIRF. The GFEVD measures the directional connectedness between variables, indicating the influence of variable j on variable i. The variance shares in the GFEVD are normalized, ensuring that each row sums up to 1. This normalization demonstrates that all the variables collectively account for 100% of the forecast error variance for variable i. This condition can be explained as follows:

$$\phi_{\mathrm{ij,t}}^{\sim \mathrm{g}}(\mathrm{J}) = \frac{\sum_{\mathrm{t=1}}^{\mathrm{J-1}} \psi_{\mathrm{ij,t}}^{2,\mathrm{g}}}{\sum_{\mathrm{j=1}}^{\mathrm{M}} \sum_{\mathrm{t=1}}^{\mathrm{J-1}} \Psi_{\mathrm{ij,t}}^{2,\mathrm{g}}} \tag{5}$$

where

$$\sum_{j=1}^{M} \phi_{ij,t}^{\sim g}(J) = 1 \text{ and } \sum_{i,j=1}^{M} \phi_{ij,t}^{\sim g}(J) = M$$

The numerator explains the cumulative effect of the ith shock while the denominator specifies the cumulative impact of all shocks. By utilizing the GFEVD, we can elucidate the overall interconnectedness as follows:

$$c_{\mathrm{t}}^{\mathrm{g}}(\mathrm{J}) = \frac{\sum_{\mathrm{i,j=1,i\neq j}}^{\mathrm{J-1}} \phi_{\mathrm{ij,t}}^{\sim \mathrm{g}}(J)}{M} \tag{6}$$

The total connectedness index (TCI) is a measure that indicates the extent to which one variable's forecast error variance is accounted for by all other variables. It quantifies the average impact of a particular variable on the remaining variables in the system.

Once the TCI is determined, the total directional connectedness to other variables can be calculated. This process refers to the transmission of spillover from variables i to j. The calculation is as follows:

$$C^{g}_{i\rightarrow j,t}(J) = \frac{\sum_{j=1,i\neq j}^{M} \phi^{\sim g}_{ij,t}(J)}{\sum_{i=1,i\neq j}^{M} \phi^{\sim g}_{ij,t}(J)} \tag{7}$$

Equation (8) describes the overall directional connectedness, that is, how spillover is transmitted to variable i from other variables.

$$C^{g}_{i\leftarrow j,t}(J) = \frac{\sum_{j=1,i\neq j}^{M} \phi^{\sim g}_{ji,t}(J)}{\sum_{i=1,i\neq j}^{M} \phi^{\sim g}_{ji,t}(J)} \tag{8}$$

Finally, net directional connectedness is calculated by subtracting Equation (7) from Equation (8). In other words, it is the difference between the spillovers given and the spillovers received.

6. Results: credit spread connectedness

6.1 Total connectedness

Table A3 [4] shows the average total cross-country credit spread connectedness. The results indicate that China exhibits the highest level of transmission (59.05%) of credit spread shocks to other markets among the selected Asian economies, followed by Korea and India. This result can be attributed to the significant growth observed in the Chinese bond market in recent years coupled with China's status as a major trading partner within the region. Consequently, any disturbance in the Chinese corporate bond market is likely to generate significant spillover effects on neighboring countries. Korea is one of the most vibrant and liquid corporate bond markets in Asia. Additionally, foreign investors have a significant stake in the Korean corporate bond market. Korea's local currency bond market registered high foreign inflows in Q2 2021 [3]. This trend makes the contagion increasingly evident.

In terms of receiving spillovers, Malaysia experienced the highest level of credit spread transmission (44.07%) among all countries. Meanwhile, India demonstrated the lowest level of receiving spillovers, as indicated by the high diagonal values in the analysis. This result can be attributed to the underdeveloped nature of India's corporate bond market relative to other emerging markets. Although India's corporate debt market has expanded, it remains relatively less developed in terms of its bank lending practices. The overall connectedness index is 45%, providing further evidence of cross-country credit spread interconnectedness.

6.2 Total dynamic connectedness index

Figure A1 [4] shows a comprehensive measure of dynamic connectedness throughout the observation period. The graph shows that the spillover effect reached its highest level (120%) between 2011 and 2014. During this period, economies worldwide grappled with the aftermath of the European debt crises (EDC), which originated in Greece in 2011. Subsequently, the index displayed certain fluctuations, notably around events such as the

COVID-19 pandemic and the Russia–Ukraine conflict. However, compared with those during the EDC, the fluctuations exhibited a lower magnitude around other economic crises. This observation can be attributed to the nature of the EDCs, which were primarily centered on issues of indebtedness and emerged three years after the 2008 global financial crisis. Notably, the global financial crisis also contributed to the proliferation of debt instruments, particularly CDS.

Similarly, Figure A2 [4] depicts the time-varying transmission of the credit spread spillover from an individual country to other countries, while Figure A3 [4] illustrates the time-varying absorption of the credit spread spillover by one country from the others. In line with the TCI, the figures show that each country experienced the most significant spillovers during the EDC, with some fluctuations observed during other crisis episodes, including the Chinese stock market crash, the COVID-19 pandemic, and the ongoing Russia–Ukraine conflict. These findings provide empirical evidence affirming the presence of credit spread connectedness among developing countries, thereby supporting the contagion theory.

Overall, this study provides substantial evidence of credit spread spillovers among the four countries and contributes to the existing literature on cross-country contagion. Identifying such credit spread spillover effects is crucial for understanding the interconnectedness and interdependencies of global financial markets.

7. Policy implications and concluding remarks

Despite extensive research on credit spreads and cross-market linkages, the existing literature has several limitations. First, most studies have focused on developed economies, thereby neglecting the analysis of credit spreads in developing countries. Second, the literature tends to concentrate on specific aspects of credit spread determinants and lacks a comprehensive approach. Third, studies on cross-market linkages primarily focus on market volatilities, neglecting cross-country credit spread connectedness in developing countries.

To address these gaps, the study investigated the drivers of credit spreads in emerging economies and their connectedness across countries and maturities. The findings reveal that spread determinants vary across economies and maturities, with market factors being the strongest drivers. The study also shows significant cross-country credit spread connectedness, identifying China as the highest transmitter and Malaysia as the highest receiver of credit spread spillovers among emerging economies.

This study has multiple implications for policymakers, investors, and regulators. First, by providing valuable insights into the drivers of credit spreads in emerging economies, this study assists policymakers and market participants in better assessing and mitigating the risks associated with fixed-income securities. Second, the findings support informed policy formulations that empower policymakers to implement targeted measures to promote stability and sustainable economic growth. Third, investors can benefit from the study's insights when devising investment strategies because understanding the factors influencing credit spreads allows for better risk assessment and portfolio management. Furthermore, this study sheds light on cross-country credit spread connectedness, enabling policymakers to identify transmission channels and the countries vulnerable to spillover effects, crucial for reducing systemic risks and promoting financial stability. The findings can guide international investors in portfolio diversification, aid policymakers in developing early warning indicators of financial stress, inform monetary policy in emerging economies, enhance financial stability assessments by international institutions, and provide insights into corporate finance. However, the study is limited to four developing Asian countries. Future research thus can include other developing countries or regional groups, such as ASEAN and BRICS nations. Owing to the unavailability or inconsistency of data, this study included limited factors for each market category. Future research could include other

developing regions such as ASEAN and BRICS, incorporate additional factors such as differential bonds with differential ratings, and conduct comparative analyses between developed and developing economies.

Notes

1. https://www.adb.org/sites/default/files/publication/612686/asia-bond-monitor-june-2020.pdf
2. https://www.imf.org/external/datamapper/profile/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD
3. https://asianbondsonline.adb.org/korea/market_summary/kr_market_summary_202109.pdf
4. Please see it on the Online Appendix

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Supplementary material

The supplementary material for this article can be found online.

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