Determinants of country risk premium revisit: Evidence for emerging market and developing economies

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Abstract

This paper aims to revisit the issue on the determinants of the country risk premium for emerging market and developing economies to enrich its empirical evidence. The major contributions of this study to the existing literature are: to sample the majority of emerging market and developing economies by estimating the country risk premium, to focus on the domestic fundamentals rather than the world market factors by targeting the period after the 2000s, and to screen the determinants by the causality check between the country risk premium and its supposed determinants in a vector-autoregressive model framework considering their endogeneity problem. The empirical analyses finally identified the factors of the inflation, the external debt, the public debt and the foreign reserves as the determinants of the country risk premium.

Key words: country risk premium, emerging market and developing economies, fundamentals, causality, vector-autoregressive model
JEL Classification: F41, F34

1. Introduction

The country risk premium has been one of the essential issues for policy managements and investors' behaviors for emerging market and developing economies. The country risk premium is, according to ordinary textbooks (e.g. Krugman et al., 2018) , shown by the difference between the riskiness of domestic and foreign assets under the assumption of imperfect asset substitutability. The premium reflects the risk associated with the probability that a country will default on its debts, and thus the compensation to investors for default risk (Edwards, 1984 and 1986). In general, emerging market and developing economies, who often owe some external debts, are considered to have a higher country risk premium than advanced economies.

From the macroeconomic perspective, a high country risk premium is detrimental for emerging market and developing economies, such that a high interest rate accompanied with a high premium would reduce investment and aggregate income in the short run, and further lower capital accumulation and economic growth in the long run (e.g. Mankiw, 2019). In addition, the country risk premium has tended to affect domestic economies and/or to be affected by the world economic conditions in more sensitive ways under the progressing globalization during the recent decades. As the World Bank (1997) started to argue, private capital flows toward developing countries have been intensified since the 1990s, and their financial integrations have raised the sensitivity of their interest rates to global economic climates such as the US interest rates (e.g. Arora and Cerisola, 2000).

The growing concerns with the country risk premium for emerging market and developing economies have brought academic researchers to accumulating the theoretical and empirical studies of the risk premium determinants. Some works focus on the importance of domestic factors such as heterogeneities in fundamentals, liquidity and solvency variables, and the importance of fiscal and monetary policy variables. The other works, on the other hand, highlight the influence of global factors such as global liquidity, risk appetite and contagion effects. In spite of a plenty of the studies above, there have not necessarily been clear consensuses on the risk premium determinants so far.

This paper aims to revisit the issue on the determinants of the country risk premium for emerging market and developing economies, and to enrich the evidence through the following contributions to the existing literature. First, this study's sample economies (98 economies) covers the majority of emerging market and developing economies, which would be much wider than the coverages of the previous studies. Most of the previous studies adopted the JPMorgan Emerging Markets Bond Index Global (EMBIG) for sovereign bond spreads to represent the country risk premium, which confined the

number of sample countries due to the constraint of its data availability. This study, instead, estimates the premium by using short-term interest rates (represented by money market rates) and exchange rates, so that many of economies could be targeted as the estimation sample. In case of estimating the country risk premium, the question would rise on whether the usage of money market rates instead of sovereign bond yields could be a possible choice, since the money market rates often reflect policy manipulations by central banks. There have been the cases in developing countries, however, that their policy rates themselves have been affected by the country risks. The Bank of Mongolia, for instance, could not help raising its policy rate up to 15 percent in August 2016 even under just two-percent inflation in 2016, just because of the endangered currency crisis due to the lack in the foreign reserves.[1] Mongolia has developed her bond market, but it is not included in the target samples of the JPMorgan EMBIG due to its premature stage. Thus the only way to show the country risk premium of Mongolia is to estimate it based on her money market rate. On the other hand, even in the country whose bond market is targeted in JPMorgan EMBIG, there seems to be the case that its bond yield does not necessarily reflect the risk premium precisely. Shimizu (2018), for instance, pointed out as one of the challenges in China's bond market that the holding ratio of foreign investors in the bond market is just about 2% due to the regulation that limits participation from abroad. Thus neither money market rates or bond yields are perfect indicators to gauge the country risk premium. Then this study prioritizes enlarging the sample size by using money market rates to enrich the evidence on their country risk premiums.

Second, this study focuses on the factors of the fundamentals of domestic economies as the determinants of the country risk premium by targeting the period of 2001-2019 as the estimation sample. Whereas the 1990s had experienced the Mexican crisis (1994-), the Asian crises (1997-) and the Russian crisis (1998-) that caused contagion effects widely to emerging market economies, the major world- and region- wide financial crisis after the 2000s was the global financial crisis for 2007-2008 triggered by the US subprime shock, which had, however, a limited impact on emerging market economies as Dooley and Hutchison (2009) called it the decoupling. Thus this study could concentrate on the domestic fundamental factors by only setting the 2008-2009 dummy as an exogenously control variable in the estimation.

Third, this study applies not a single-equation regression but a vector-autoregressive (VAR) model for an analytical methodology, which a fewer previous studies have ever tried on. The reason why the study adopts a VAR model is that the VAR model allows for

[1] See the "Annual Report 2016 by the Bank of Mongolia": https://www.mongolbank.mn/eng/listpublications.aspx

potential and highly-likely endogeneity among estimation variables, and also for tracing out the dynamic responses of an explained variable to the structural shock of a set of explaining variables. The endogeneity in this study could be described in the reciprocal interaction between the country risk premium and the fundamentals of domestic economies as its supposed determinants: whereas the fundamentals determine the level of the country risk premium, the country risk premium itself would also affect the fundamentals, for instance, through investment activities and capital accumulation as aforementioned. In that case, a single-equation regression causes an estimation bias, and a VAR model estimation, instead, lets the data determine the causality between targeted variables, and makes it possible to trace out the dynamic responses of variables to exogenous shocks overtime. To be specific, this study conducts the test of Granger causality and impulse response under a VAR model estimation among the variables of the country risk premium and the fundamentals of domestic economies.

The rest of the paper is structured as follows. Section 2 reviews the literature related to this study and clarifies this study' contributions to the existing literature. Section 3 conducts an empirical analysis of the determinants of the country risk premium. Section 4 summarizes and concludes.

2. Literature Review and Contributions

This section reviews the literature related to the determinants of the country risk premium, and clarifies this study' contributions to the existing literature. There has been a large volume of the literature in this field, and the literature review focuses on the works after the 2010s, which have adopted sophisticated methodologies to identify the risk premium determinants.

Looking at the sample sizes of targeting economies in the first place, some works focus on the selective samples from specific regions such as Africa, Europe and Latin America. The other ones target emerging market economies in general, but their sample sizes are not so large with the maximum being 46 economies, while the total number of emerging market and developing economies amounts to 155.[2] The limitation of the sample sizes would come from the fact that most of previous works have used the database of JPMorgan EMBIG as the indicator of country risk premium (sovereign bond spreads). The index provider (JP Morgan) imposes the highly restrictive criteria to confine a number of targeting economies (Tebaldi et al. 2018).

[2] The number is based on World Economic Outlook Database of International Monetary Fund.

Regarding the determinants of the country risk premium, they could be classified into the following five categories: macroeconomic factors (GDP, inflation, stock index and interest rate), external factors (exchange rate, terms of trade, trade openness, current account, external debt, foreign reserves and recent default), fiscal and monetary factors (public debt, fiscal balance and M2), governance factors (government effectiveness, rule of law, fiscal governance and political index), and the world market factors (commodity prices and market sentiment). The determinants commonly used in the category of the macroeconomic factors are GDP and inflation; those in the external factors are external debt and foreign reserves; those in the fiscal and monetary factors are public debt and fiscal balance; that in the governance factors is political index; and that in the world market factors is market sentiment.

The previous works have some variations in their emphases on the categories of determinants: Palic et al. (2017), Iara and Wolff (2014), Baldacci et al. (2011), and Baldacci and Kumar (2010) place a premium on fiscal factors; Tebaldi et al. (2018), Martinez et al. (2013), and Hilscher and Nosbusch (2010) prioritize external factors; and the others, namely, Mpapakika and Malikane (2019), Tkalec et al. (2014), Maltritz and Molchanov (2013), and Bellas et al. (2010) cover both categorized factors.

As for the estimation methodologies shown in the bottom line of Table 1, a generalized method of moments (GMM) is applied in the five out of the total eleven studies, while a VAR model is adopted in Palic et al. (2017). Both methodologies are common in that they address the endogeneity problem between the country risk premium and its supposed determinants, but they have the pros and cons in each estimation method as follows. The VAR method allows the causality check between the country risk premium and its supposed determinants in the Granger sense. The VAR is, however, based on the strict assumption that the expected value in interest yields follows the "adaptive" formation (people form their expectations based on their past observations), since the VAR inherently has such a structure as the past variables determine the country risk premium. The GMM method, on the other hand, does not confine the way of expectations, but assumes the causality to the country risk premium in a priori manner.

The main features of this study in comparison with the previous works in the literature above are highlighted as follows. First, the coverage of the sample economies of this study (98 economies) that uses the estimated country risk premium instead of EMBIG is much wider than those of previous works (46 economies at maximum), and accounts for the majority of emerging market and developing economies (155 economies). Second, this study targets the determinants of the country risk premium from all the categories above, though they are selected from the ones used commonly in the previous

works in each category. As for the category of the world market factors, this study only uses the 2008-2009 dummy as the variable to control exogenously the impacts of the global financial crisis during the total sample range for 2001-2019. Third, this study prioritizes the causality check between the country risk premium and its supposed determinants in a VAR model framework, since the premium and the country's fundamentals would be endogenously interacted as was aforementioned. There have been less studies using the VAR model than those applying the GMM method as far as the literature shown in Table 1 is concerned. Thus this study would contribute to enrich the evidence on the determinants of the country risk premium.

3. Empirical Analysis

This section conducts an empirical analysis of the determinants of the country risk premium for emerging market and developing economies. The section starts with describing key variables and data for the estimation, clarifies the estimation methodology, and then presents the estimation outcomes with their discussions.

3.1 Key Variables

The dependent variable, the country risk premium, is estimated in this study, and the explanatory variables, the determinants of the country risk premium, are chosen from the ones commonly used in the previous works: inflation and GDP as the macroeconomic factors, external debt and foreign reserves as the external factors, public debt and fiscal balance as the fiscal factors, and political index as the governance factors. For the world market factors, the 2008-2009 dummy is set to control the impacts of the global financial crisis. All the variable data for the estimation are annual data running for 2001-2019. The variables are listed with their measurements, expected signs of coefficients and data sources in Table 2, and their descriptive statistics are presented in Table 4. The details of each variable are described as follows.

The estimation of the country risk premium (denoted by *crp*) follows the ordinary formula of interest rate parity (e.g. Krugman et al., 2018 and McKinnon, 2001).

$$crp = i - i^* - Ee \tag{1}$$

where i is the domestic interest rate; i^* is the world interest rate; and Ee is the expected change in exchange rate. For the domestic and the world interest rates, this study applies

the "money market rate" of domestic economies and the US, retrieved from International Financial Statistics (IFS) of International Monetary Fund (IMF).[3] As for the expected change in exchange rate, there are two kinds of the expectation formations: "adaptive" and "rational" expectations. This study assumes the "adaptive" expectation by $Ee = e_{t-1}$ for the estimation to keep the consistency with the VAR model structure.[4] In addition, the estimation is based on the strong assumption that the observation of the annual change in exchange rate forms the expectations that are applied to short-term money market. The exchange rate is expressed by the local currency value per the US dollar, retrieved also from IFS.

Regarding the explanatory variables, the inflation (*inf*) is expressed by "a percent change in average consumer prices", taken from World Economic Outlook (WEO) Database of IMF. Its coefficient is expected to have a positive sign, since the high inflation is one of the factors of macroeconomic instabilities to raise a country risk.

The GDP (*gdp*) is shown by "a percent change in gross domestic product at constant prices" taken from WEO, and its coefficient is supposed to have a negative sign since the economic growth usually lessons the country's default risk.

The external debt (*exd*) is shown by "external debt stocks as a percentage of GNI (gross national income)" retrieved from World Development Indicator (WDI) of World Bank, and its coefficient's sigh is expected to be positive since the external debt could be a major component of the country risk.

The foreign reserves (*res*) are expressed by "total reserves as a percentage of total external debt" taken from WDI, and its coefficient's sign is supposed to be negative since the accumulation of foreign reserves could be a factor to mitigate the country risk.

The public debt (*pud*) is shown by "general government gross debt as a percentage of GDP" taken from WEO, and its coefficient's sign is expected to be positive since the public debt could also be a major component of the country risk.

The fiscal balance (*fsb*) is expressed by "general government net lending / borrowing as a percentage of GDP" retrieved from WEO, and its coefficient's sign is expected to be negative since the fiscal surplus could a factor to mitigate the country risk.

The political index (*pol*) is shown by "political stability and absence of violence / terrorism" compiled by Worldwide Governance Indicators of World Bank. The index takes the values from -2.5 (weak) to 2.5 (strong), and its coefficient's sign is supposed to

[3] In case that the data of the money market rate is not available, the study instead uses the "monetary policy-related interest rate" as a short-term interest rate.

[4] This study also applied the "rational" expectation for the estimation, and the subsequent estimations were not affected seriously by the differences in the expectation formations.

be negative since the political stability could reduce the country risk.

3.2 Panel Data Setting

Based on the setting of the key variable above, the study constructs the panel data for the period of 2001-2019 with 98 economies. The sample period after the 2000s is chosen since the study focuses on the fundamentals of domestic economies as the determinants of the country risk premium. As was stated in the introduction, the 1990s was the decade when there had been frequent crises originated in emerging market economies and the crises' contagions had affected the country risk premium. The 98 sample economies, which are listed in Table 3, are selected based on the data availability of the short-term interest rates (money market rate or monetary policy-related interest rate), out of 155 emerging market and developing economies defined by WEO database. The study winsorises the data of all the variables except the foreign reserves at the 0.5th and 99.5th percentile to remove the outliers.[5]

For the subsequent estimation, the study investigates the stationary property of the constructed panel data by employing panel unit root tests: Levin, Lin and Chu test (see Levin et al., 2002) and Im, Pesaran and Shin test (see Im et al., 2003). The former test assumes that there is a common unit root process across cross-sections, and the latter test allows for individual unit root processes that vary across cross-sections. These tests are conducted on the null hypothesis that a level of panel data has a unit root, by including "intercept" and "trend and intercept" in the test equations. Table 5 reports that the null hypothesis of a unit root is rejected at 99 percent significant level in all the variables in both of the tests with their equations including "intercept". The study thus uses the level of panel data for the estimation.

3.3 Screening Variables by Causality Tests

This study, as was aforementioned, prioritizes the causality investigation between the country risk premium and its supposed determinants, since the premium and the country's fundamentals would be endogenously interacted. To be specific, the study conducts the pairwise Granger causality tests for the combinations between the estimated country risk premium and the explanatory variables set in Section 3.2, and screens the variables that are identified to have the causalities running from them to the country risk premium for

[5] The data of the foreign reserves is winsorised at the 0.1th and 99.9th percentile by observing the data distribution.

the subsequent VAR model estimation. The test takes a one-year lag length, following the Schwarz Information Criterion with the maximum lags being equal to three year lags under the limited number of time-series data. The test equation is specified as follows.

$$crp_t = \alpha_1 + \beta_1\, det_{t-1} + \gamma_1\, crp_{t-1} + \varepsilon_{1t}$$
$$det_t = \alpha_2 + \beta_2\, det_{t-1} + \gamma_2\, crp_{t-1} + \varepsilon_{2t} \qquad (2)$$

where *det* is the supposed determinant of the country risk premium: *inf*, *gdp*, *exd*, *res*, *pud*, *fsb* or *pol*; α_1, α_2, β_1, β_2, γ_1 and γ_2 are constant terms and coefficients of variables; and ε_1 and ε_2 are random error terms. The pairwise Granger causality tests are conducted on the null hypothesis: $\beta_1 = 0$ and $\gamma_2 = 0$. The *crp* is considered to be Granger-caused by *det* if the null hypothesis, $\beta_1 = 0$, is rejected by F-statistics, and the *det* is Granger-caused by *crp* if $\gamma_2 = 0$ is rejected.

Table 6 reports the results of the pairwise Granger causality tests. It is the inflation (*inf*), the external debt (*exd*), the foreign reserves (*res*) and the public debt (*pud*) that do Granger cause the country risk premium (*crp*) at conventionally significant levels of more than 95 % with the expected signs: positive causalities from *inf*, *exd* and *pud* to *crp* and negative causality from *res* to *crp*.

The causality from the GDP growth (*gdp*) to the country risk premium (*crp*) is not identified against the study's hypothesis. It is speculated that the "convergence" effects are mixed up in the test results. The convergence proposed by Sala-i-Martin (1996) represents the tendency of the less-developed countries to grow faster. The less-developed countries would often be accompanied with the higher country risk, thereby leading to the positive association between the GDP growth and the risk premium. In this study's sample, Vietnam with her per capita GDP being one-tenth of that of Malaysia in 2001, records a higher GDP growth (6.7 percent) than that of Malaysia (4.9 percent) on the average for 2001-2019, following the convergence. At the same time, Vietnam's risk premium (3.0 percent) is higher than that of Malaysia (0.8 percent) for the same period. This observation tells that the GDP growth could not simply be a factor to lower the country risk premium.

Regarding the fiscal balance (*fsb*), its causality to the country risk premium (*crp*) is not significant though its sign is negative as expected. It might be because the balance contains the cyclical factor affected by business fluctuations, which has little to do with the country risk with structural property.

As for the political index (*pol*), its causality to the country risk premium (*crp*) is not confirmed. It might come from the fact that political turmoil has less happened after the

2000s than before it with e.g. the disintegration of the Soviet Union in 1991, and thus the political risk might not be a major influential factor to constitute the country risk in the sample period.

Another point to be worth noting is that the opposite causalities running from the country risk premium (*crp*) to the inflation (*inf*) and the external debt (*exd*) are all negative at conventionally significant levels. These results imply that the risk premium might provide some disciplines for the macroeconomic balances: the high risk premium take a role to restrain excessive inflations and explosions of external debts.

To sum up, the pairwise Granger causality tests in this section have eventually screened the determinant variables for the subsequent VAR model estimation, by choosing the inflation (*inf*), the external debt (*exd*), the foreign reserves (*res*) and the public debt (*pud*), and dropping the GDP growth (*gdp*), the fiscal balance (*fsb*) and the political index (*pol*).

3.4 VAR Estimation and Results with Discussions

This section turns to the VAR model estimation to examine the impulse responses of the selected explanatory variables on the country risk premium. Before constructing the model, the study investigates the multicollinearity among the explanatory variables. Table 7 shows the bivariate correlations and the variance inflation factors (VIF) among the explanatory variables. Table 7-1 including all the variables reveals that there is a high correlation (0.546) between the external debt (*exd*) and the public debt (*pud*). The VIF, a method of measuring the level of collinearity between the regressors in an equation, tells that the values of both variables (around 5) are in the risky zone inducing multicollinearity. In case the external debt (*exd*) and the public debt (*pud*) are separately estimated in Table 7-2 and 7-3, there are no serious threat in the multicollinearity among the explanatory variables. Thus, the subsequent VAR model sets up the two groups of variables with the external debt (*exd*) and the public debt (*pud*) being separately included.

Then the model equation is specified for the estimation as follows.

$$y_{it} = \alpha\, y_{it-1} + \mu\, d_{0809} + \varepsilon_{it} \qquad (3)$$

where y_{it} is a column vector of the endogenous variables with economy i and year t: y = (*crp*, *inf*, *exd*, *res*)' denoted as Model I, and y = (*crp*, *inf*, *pud*, *res*)' as Model II; y_{it-1} is a vector of the lagged endogenous variables; d_{0809} is the 2008-2009 dummy variable to control exogenously the impacts of the global financial crisis, taking a value one if the

year of the data belongs to 2008 and 2009, and zero otherwise; α and μ are coefficient matrixes; and ε_{it} is a vector of the random error terms in the system. The lag length (-1) is selected by the Schwarz Information Criterion with the maximum lags being three year lags under the limited number of time-series data.

Based on the VAR model estimation (2), the study examines the impulse responses of the country risk premium (*crp*) to the shocks of its determinant variables, *inf*, *exd*, *pud* and *res*. Table 8 and Figure 1 report the estimation outcomes of the VAR model and the impulse responses, respectively.

Regarding the impulse responses, the Model I in Figure 1-1 shows that the country risk premium (*crp*) responds positively to the shock of the inflation (*inf*) and the external debt (*exd*) with the conventional error bands, but insignificantly to the shock of the foreign reserves (*res*). The Model II in Figure 1-2 presents that the country risk premium (*crp*) responds positively to the shock of the inflation (*inf*) and the public debt (*pud*) robustly, and negatively to the shock of the foreign reserves (*res*) with the weak significance. Figure 1-1 and 1-2 also indicate that the accumulated responses of the country risk premium toward eight years to the shock of one percent point of the inflation rate are around 0.4 percent point; and those to the shocks of the external debt as a percentage of GNI and the public debt as a percentage of GDP are 0.2 – 0.3 percent points. These results meet the study's hypotheses described in Section 3.1.

In a nutshell, the VAR model analyses in this study could identify the factors of the inflation, the external debt, the public debt and the foreign reserves as the determinants of the country risk premium. This results are also consistent with the previous works presented in Section 2: the inflation is proven to be the determinant common to Mpapakika and Malikane (2019), Palic et al. (2017), Tkalec et al. (2014) and Martinez et al. (2013); the external debt common to Tkalec et al. (2014), Martinez et al. (2013), Maltritz and Molchanov (2013), Bellas et al. (2010) and Hilscher and Nosbusch (2010); the public debt common to Mpapakika and Malikane (2019), Palic et al. (2017), Tkalec et al. (2014), Iara and Wolff (2014), Baldacci et al. (2011) and Baldacci and Kumar (2010); and the foreign reserves common to Mpapakika and Malikane (2019), Tebaldi et al. (2018), Tkalec et al. (2014), Martinez et al. (2013), Maltritz and Molchanov (2013) and Hilscher and Nosbusch (2010).

4. Concluding Remarks

This paper revisited the issue on the determinants of the country risk premium for emerging market and developing economies to enrich its empirical evidence. The major

contributions of this study are: to sample the majority of emerging market and developing economies by estimating the country risk premium, to focus on the domestic fundamentals rather than the world market factors by targeting the period after the 2000s and, to screen the determinants by the causality check between the country risk premium and its supposed determinants in a VAR model framework.

Through the VAR model estimation, this study could eventually identify the factors of the inflation, the external debt, the public debt and the foreign reserves as the determinants of the country risk premium, which is consistent with the findings of the majority of the previous works. The strategic policy implication is the significance in consolidating fiscal, external and macroeconomic balances for emerging market and developing economies, so that they could avoid excessive risk premiums that would hamper their capital accumulation and their long-term economic growth.

References

Arora, V. and Cerisola, M. (2000), How does U.S. monetary policy influence economic conditions in emerging markets? *IMF Working Paper*, WP/ 00/148.

Baldacci, E. and Kumar, M. (2010), Fiscal Deficits, Public Debt and Sovereign Bond Yields, *IMF Working Paper*, WP/10/184.

Baldacci, E., Gupta, S. and Mati A. (2011), Political and fiscal risk determinants of sovereign spreads in Emerging markets, *Review of Development Economics*, Vol. 15, pp. 251–63.

Bellas, D., Papaioannou, M. and Petrova, I. (2010), Determinants of Emerging market Sovereign Bond Spreads: Fundamentals vs. Financial Stress, *IMF Working paper*, WP/10/281.

Dooley, M. and Hutchison, M. (2009), Transmission of the U.S. subprime crisis to emerging markets: evidence on the decoupling – recoupling hypothesis, *Journal of International Money and Finance*, Vol. 28, pp. 1331–1349.

Edwards, S. (1984), LDC foreign borrowing and default risk: an empirical investigation 1976–80, *American Economic Review*, Vol. 74, pp. 726–734.

Edwards, S. (1986), The pricing of bonds and bank loans in international markets, *European Economic Review*, Vol. 30, pp. 565–589.

Hilscher, J. and Nosbusch, Y. (2010), Determinants of sovereign risk: Macroeconomic fundamentals and the pricing of sovereign debt, *Review of Finance*, Vol. 14, pp. 235–62.

Iara, A. and Wolff, G. (2014), Rules and risk in the Euro area, *European Journal of Political Economy*, Vol. 34, pp. 222–36.

Im, K.S., Pesaran, M.H. and Shin, Y. (2003), Testing for Unit Roots in Heterogeneous Panels, *Journal of Econometrics*, Vol. 115, pp. 53–74.

Krugman, P.R., Obstfeld, M. and Melitz, M. (2018), *International Economics: Theory and Policy, 11th edition*, Pearson Education Limited, Harlow.

Levin, A., Lin, C.F. and Chu, C. (2002), Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, Vol. 108, pp. 1–24.

Maltritz, D. and Molchanov, A. (2013), Analyzing determinants of bond yield spreads with Bayesian model averaging, *Journal of Banking and Finance*, Vol. 37, pp. 5275–84.

Martinez, L., Terceno, A. and Terruel, M. (2013), Sovereign bond spreads determinants in Latin American countries: Before and during the XXI financial crisis. *Emerging Markets Review*, Vol. 17, pp. 60–75.

Mankiw, N.G. (2019), *Macroeconomics, 10th Edition*, Worth Publishers, New York.

McKinnon, R.I. (2001), After the Crisis, the East Asian Dollar Standard Resurrected: An Interpretation of High-Frequency Exchange Rate Pegging, in Stiglitz, J.E. and Yusuf, S. (eds) *Rethinking the East Asian Miracle*, the World Bank and Oxford University Press, pp. 197–246.

Mpapalika, J. and Malikane, C. (2019), The Determinants of Sovereign Risk Premium in African Countries, *Journal of Risk and Financial Management*, Vol. 12, pp. 1–20.

Palic, P., Simovic, P.P. and Vizek, M. (2017), The Determinants of Country Risk Premium Volatility: Evidence from a Panel VAR Model, *Croatian Economic Survey*, Vol. 19, pp. 37-66.

Sala-i-Martin, X.X. (1996), The Classical Approach to Convergence Analysis, *The*

Economic Journal, Vol. 106, pp. 1019-1036.
Shimizu, S. (2018). Development of Asian Bond Markets and Challenges: Keys to Market Expansion, *Public Policy Review*, Vol. 14, pp. 955-1000.
Tebaldi, E., Nguyen, H. and Zuluaga, J. (2018), Determinants of emerging markets' financial health: A panel data study of sovereign bond spreads, *Research in International Business and Finance*, Vol. 45, pp. 82–93.
Tkalec, M., Vizek, M. and Verbic, M. (2014), Balance sheet effects and original sinners' risk premiums, *Economic Systems*, Vol. 38, pp. 597–613.
World Bank (1997), *Private Capital Flows to Developing Countries: The Road to Financial Integration*, Oxford University Press, New York.

Table 1 List of Previous Studies after the 2010s

Variables	Mpapakika & Malikane (2019)	Tebaldi et al. (2018)	Palic et al. (2017)	Tkalec et al. (2014)
dependent variable	*gov. bond spread central banks*	*gov. bond spread EMBIG* [1)]	*gov. bond spread EMBIG* [1)]	*gov. bond spread EMBIG* [1)]
[Macroeconomic Factors]				
GDP	*	*	*	*
inflation	*		*	*
stock index				
interest rate			*	
[External Factors]				
exchange rate		*		*
terms of trade				
trade openness [2)]	*	*		
current account [2)]				
external debt [2)]				*
foreign reserves [2)]	*	*		*
recent default				
[Fiscal & Monetary Factors]				
public debt [2)]	*		*	*
fiscal balance [2)]				
M2 [2)]				
[Governance Factors]				
gov. effectiveness				
rule of law				
fiscal governance				
political index		*		
[World Market Factors]				
commodity prices	*			
market sentiment	*			*
Samples	10 African countries 1971-2011	31 emerging countries 1994-2014	24 European countries 1994-2015	8 European transition countries 2001-2013
Methodology	Dynamic Fixed Effects Model, GMM	GMM	GARCH, Panel VAR Volatility Analysis	Dynamic Panel Error Correction Model

(continued)

Variables	Iara & Wolff (2014)	Martinez et al. (2013)	Maltritz & Molchanov (2013)	Baldacci et al. (2011)
dependent variable	*gov. bond spread Bloomberg*	*gov. bond spread EMBIG* [1)]	*gov. bond spread EMBIG* [1)]	*gov. bond spread EMBIG* [1)]
[Macroeconomic Factors]				
GDP				
inflation		*		
stock index		*	*	
interest rate				
[External Factors]				
exchange rate			*	
terms of trade		*		
trade openness [2)]				
current account [2)]		*		
external debt [2)]		*	*	
foreign reserves [2)]		*	*	
recent default			*	
[Fiscal & Monetary Factors]				
public debt [2)]	*			*
fiscal balance [2)]	*		*	*
M2 [2)]		*		
[Governance Factors]				
gov. effectiveness		*		
rule of law				
fiscal governance	*			
political index				*
[World Market Factors]				
commodity prices				
market sentiment				
Samples	11 Euro area countries 1999-2009	7 Latin America coutries 2003-2012	35 emerging countries 1996-2010	46 emerging countries 1997-2008
Methodology	GMM	Dynamic Fixed Effects Model	Bayesian Model Averaging	GMM

(continued)

Variables	Baldacci &Kumar (2010)	Bellas et al. (2010)	Hilscher & Nosbusch (2010)
dependent variable	*gov. bond yields IFS, etc.*	*gov. bond spread EMBIG* [1)]	*gov. bond spread EMBIG* [1)]
[Macroeconomic Factors]			
GDP	*		
inflation			
stock index			
interest rate			
[External Factors]			
exchange rate			*
terms of trade			
trade openness [2)]		*	
current account [2)]		*	
external debt [2)]		*	*
foreign reserves [2)]			*
recent default			*
[Fiscal & Monetary Factors]			
public debt [2)]	*		
fiscal balance [2)]	*	*	
M2 [2)]			
[Governance Factors]			
gov. effectiveness			
rule of law			
fiscal governance			
political index		*	
[World Market Factors]			
commodity prices			
market sentiment		*	*
Samples	31 advanced & emerging countries 1980-2008	14 emerging countries 1997-2009	32 emerging countries 1998-2007
Methodology	GMM	Pooled Mean Group (PMG) Estimator	Fixed Effects Model

Notes
1) EMBIG denotes JPMorgan Emerging Market Bond Index Global.
2) The indicators are usually expressed as a percentage of GDP.
3) The selected indicators by * are the ones whose coefficients have expected signs and significances at conventional levels.

Source: The author's description

Table 2 List of Variables for Estimation

Variables	Description	Exp. Sign	Sources
Dependent Variable: County Risk Premium			
crp	$i - i^* - Ee$		
	i : money market rate in emerging market and developing economies		
	i^* : money market rate in the US		IFS
	Ee : expected change in exchange rate (per US dollar) = e_{t-1}		
Explanatory Variables			
inf	inflation, % change in average consumer prices	+	WEO
gdp	% change in gross domestic product at constant prices	-	WEO
exd	external debt stocks (% of GNI)	+	WDI
res	total reserves (% of total external debt)	-	WDI
pud	general government gross debt (% of GDP)	+	WEO
fsb	general government net lending/borrowing (% of GDP)	-	WEO
pol	Political Stability and Absence of Violence/Terrorism [from -2.5 (weak) to 2.5 (strong)]	-	WGI

Notes: The data sources are shown as follows:
IFS: International Financial Statistics, International Monetary Fund
WEO: World Economic Outlook Databases, International Monetary Fund
WDI: World Development Indicators, World Bank
WGI: Worldwide Governance Indicators, World Bank
Source: The author's description

Table 3 List of Sample Economies

Afghanistan	Côte d'Ivoire	Libya	São Tomé and Príncipe
Albania	Croatia	Madagascar	Saudi Arabia
Algeria	Dominica	Malaysia	Senegal
Angola	Dominican Republic	Mali	Serbia
Antigua and Barbuda	Egypt	Mauritius	Sierra Leone
Argentina	Eswatini	Mexico	South Africa
Armenia	Fiji	Moldova	Sri Lanka
Aruba	The Gambia	Mongolia	St. Kitts and Nevis
Azerbaijan	Georgia	Morocco	St. Lucia
The Bahamas	Ghana	Mozambique	St. Vincent and the Grenadines
Bahrain	Grenada	Nepal	Suriname
Bangladesh	Guatemala	Niger	Tajikistan
Belarus	Guinea-Bissau	Nigeria	Thailand
Belize	Guyana	Oman	Togo
Benin	Honduras	Pakistan	Trinidad and Tobago
Bolivia	Hungary	Panama	Tunisia
Brazil	India	Papua New Guinea	Turkey
Bulgaria	Indonesia	Paraguay	Ukraine
Burkina Faso	Iraq	Peru	Uruguay
Cabo Verde	Jamaica	Philippines	Uzbekistan
Chile	Jordan	Poland	Vanuatu
China	Kazakhstan	Qatar	Venezuela
Colombia	Kenya	Romania	Vietnam
Democratic Republic of the Congo	Kuwait	Russia	
Costa Rica	Kyrgyz Republic	Rwanda	

Source: The author's selection from emerging market and developing economies defined by WEO.

Table 4 Descriptive Statistics

Variables	Obs.	Median	Std. Dev.	Min.	Max
Dependent Variable					
crp	1,552	2.924	9.021	-46.089	25.494
Explanatory Variables					
inf	1,835	4.314	7.124	-2.406	80.744
gdp	1,842	4.253	3.774	-15.100	20.720
exd	1,381	40.546	33.585	3.460	250.744
res	1,231	36.523	249.93	0.710	3,636.70
pud	1,783	44.681	31.199	4.641	244.967
fsb	1,835	-2.519	5.055	-19.257	31.355
pol	1,723	-0.227	0.863	-2.500	1.287

Source: The author's description

Table 5 Unit Root Tests

	Levin, Lin & Chu Test		Im, Pesaran and Shin W-stat	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
crp	-11.715 ***	-16.843 ***	-10.847 ***	-12.283 ***
inf	-15.562 ***	-15.945 ***	-10.493 ***	-9.576 ***
gdp	-12.312 ***	-14.638 ***	-11.391 ***	-9.566 ***
exd	-10.201 ***	-4.116 ***	-4.715 ***	0.418
res	-5.079 ***	-3.155 ***	-2.466 ***	1.732
pud	-20.730 ***	-24.345 ***	-7.314 ***	-3.423 ***
fsb	-4.968 ***	-5.294 ***	-5.092 ***	-3.750 ***
pol	-6.478 ***	-8.562 ***	-4.989 ***	-5.434 ***

Note: *** denotes the rejection of null hypothesis at the 99% level of significance.
Sources: The author's estimation

Table 6 Pairwise Granger Causality Test

Null Hypothesis	Obs	Lags	F-statistic
inf does not Granger Cause *crp*	1,423	1	6.942 ***
crp does not Granger Cause *inf*		1	36.891 *** (negative)
gdp does not Granger Cause *crp*	1,429	1	0.021
crp does not Granger Cause *gdp*		1	0.704
exd does not Granger Cause *crp*	1,105	1	15.652 ***
crp does not Granger Cause *exd*		1	5.865 ** (negative)
res does not Granger Cause *crp*	986	1	4.885 ** (negative)
crp does not Granger Cause *res*		1	1.099
pud does not Granger Cause *crp*	1,386	1	17.851 ***
crp does not Granger Cause *pud*		1	0.020 (negative)
fsb does not Granger Cause *crp*	1,421	1	0.159 (negative)
crp does not Granger Cause *fsb*		1	0.008
pol does not Granger Cause *crp*	1,337	1	0.879
crp does not Granger Cause *pol*		1	0.342 (negative)

Note: ***, ** denote the rejection of null hypothesis at the 99% and 95% level of significance.
Sources: The Author's estimation

Table 7 Correlation Matrix and Variance Inflation Factors

Table 7-1	*inf*	*exd*	*pud*	*res*
inf	1.000			
exd	0.026	1.000		
pud	-0.028	0.546	1.000	
res	-0.072	-0.278	-0.210	1.000
VIF	1.634	4.903	4.970	1.076

Table 7-2	*inf*	*exd*	*res*
inf	1.000		
exd	0.021	1.000	
res	-0.072	-0.270	1.000
VIF	1.544	1.524	1.060

Table 7-3	*inf*	*pud*	*res*
inf	1.000		
pud	-0.026	1.000	
res	-0.055	-0.198	1.000
VIF	1.576	1.568	1.035

Sources: The Author's estimation

Table 8 VAR Model Estimation Results

[Table 8-1 Model I]

	crp	*inf*	*exd*	*res*
crp_{-1}	0.248 ***	-0.184 ***	-0.308 ***	0.217
	[8.499]	[-14.798]	[-11.378]	[1.258]
inf_{-1}	0.207 ***	0.761 ***	0.101 **	-0.021
	[4.545]	[39.151]	[2.405]	[-0.079]
exd_{-1}	0.014 **	0.025 ***	0.962 ***	0.014
	[2.197]	[9.101]	[157.218]	[0.374]
res_{-1}	-0.002 *	0.000	-0.000	0.988 ***
	[-1.754]	[0.954]	[-0.181]	[143.395]
d0809	-0.366	0.718	2.251 **	1.604
	[-0.340]	[1.572]	[2.263]	[0.252]
Adj. R^2	0.101	0.519	0.924	0.951

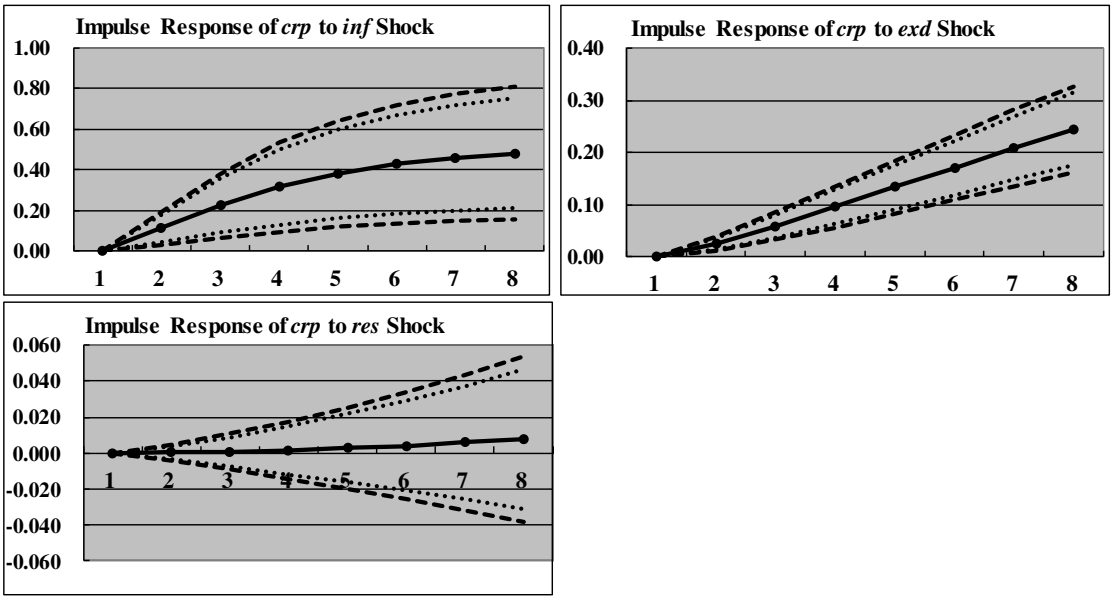
[Table 8-2 Model II]

	crp	*inf*	*pud*	*res*
crp_{-1}	0.247 ***	-0.250 ***	-0.184 ***	0.213
	[8.411]	[-14.568]	[-7.951]	[1.231]
inf_{-1}	0.085 **	1.080 ***	-0.024	-0.025
	[2.029]	[44.119]	[-0.729]	[-0.102]
pud_{-1}	0.034 ***	0.006	0.966 ***	0.021
	[4.777]	[1.643]	[170.736]	[0.504]
res_{-1}	-0.002 *	-0.000	0.001	0.988 ***
	[-1.729]	[-0.732]	[1.195]	[142.080]
d0809	0.100	-1.532 **	2.887 ***	1.547
	[0.092]	[-2.416]	[3.379]	[0.242]
Adj. R^2	0.099	0.640	0.927	0.951

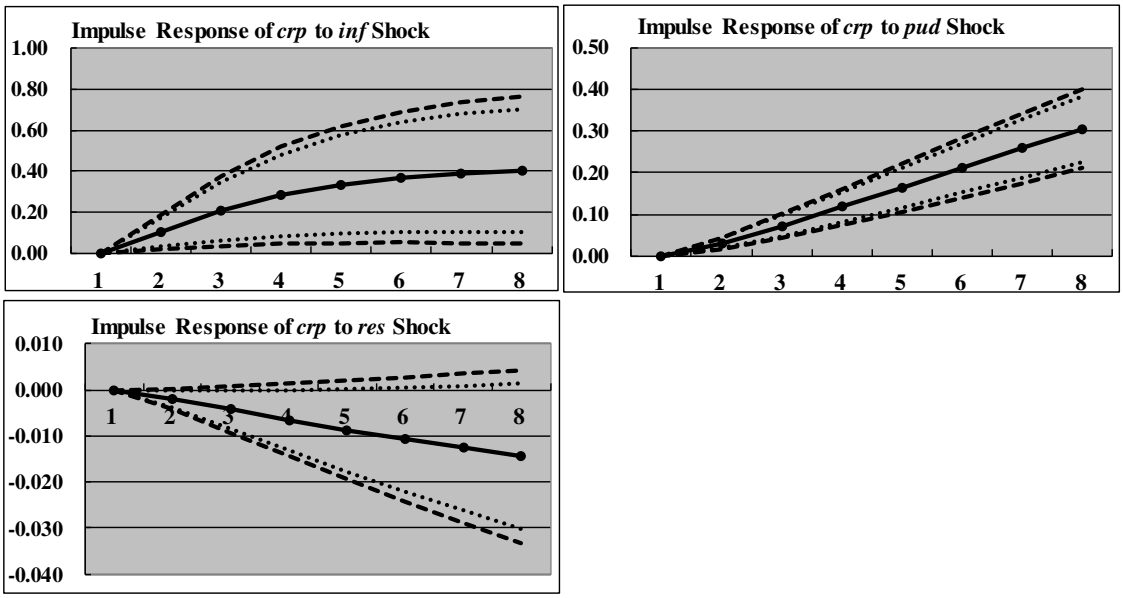
Note: ***, **, * denote the rejection of null hypothesis at the 99%, 95% and 90% level of significance.
Sources: The Author's estimation

Figure 1 Impulse Responses

[Figure 1-1 Model I]



[Figure 1-2 Model II]



Note: The fine and coarse dotted lines denote a 90 and 95 percent error band over 8-quarter horizons.
Source: The author's estimation