

Local Currency Bond Risk Premia of Emerging Markets: The Role of Local and Global Factors

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Abstract

This paper investigates the sources of variation in emerging market (EM) local currency bond risk premium. Empirical results suggest that both global and local factors contain valuable information in explaining the local currency bond excess returns. We show that economic policy uncertainty causes the excess bond returns to increase while positive innovations in the term spread, CP factor and implied FX volatility have downward impacts on the excess returns. Besides, the high level of spillover from developed markets to EMs may confine the diversification benefits from holding EM local currency bonds.

Keywords: Local currency bond risk premium, Dynamic factor model, Emerging markets, panel VAR

JEL classification: C55, E44, G15, H63, O16

1. Introduction

In the recent decade, central banks of the advanced economies that adopted the unconventional monetary policies with an increasing pace have massively increased their balance sheets through assets purchasing programmes¹. Aggressive quantitative easing pushes treasury yields down in developed markets and creates an environment that is characterized by very low (even negative) yields. Since emerging markets (EM) local currency bonds offer higher yields relative to the developed markets fixed income securities, global investors' appetite for EM local debt has increased in recent years. As a result, the share of foreign participation across major EM local currency bond markets has risen substantially². However, this trend leads to significant volatility in the prices of EM local currency bonds through swings in the global risk sentiment.

¹In particular, the ECB, BoJ, BoE, and the FED have added over USD11tn in government debt and private assets to their balance sheets between 2007-2017.

²For example, in 2017, the share of non-resident investors in local currency bond markets was above 30% in Indonesia, Mexico, Peru, Poland, and South Africa (IMF (2018)).

Hence, it is clear that investing in an asset class with such a risk-return profile requires a comprehensive understanding of factors driving the EM local currency bond risk premia.

Local currency risk premium, or term premium, is the difference between the bond yield and the average expected short rate over the life of the bond. Despite the risk premium is a quantitatively important driver of long term bond yields, fewer studies have focused on the determinants of it for the EM local currency bonds. In particular, recent empirical studies provide evidence on how financial and macroeconomic variables perform in predicting the bond risk premiums (Cochrane and Piazzesi (2005), Ludvigson and Ng (2009), Zhu (2015) and Akgiray et al. (2016)).

Although empirical research typically has an exclusive focus on using only local macroeconomic and financial data to explain the movements in the local currency risk premium, uncertainties regarding policy-maker' decisions on economic policies have received growing attention since the beginning of 2018. For example, the acrimonious trade war between countries, Brexit negotiations with the EU, discussions on Italy's fiscal planning, and the slowdown of Chinese economy create additional uncertainty for global investors to invest in EM local currency bonds through currency risk exposure. At the same time, we are at the beginning of the end of the quantitative easing era, the possible spillover effects of bond risk premiums in major bond markets to EMs will make it difficult for an investor to disentangle exposure to local dynamics from global ones.

Building on these views, this paper aims to explore the links between the EM local currency bond risk premia and the global factors as well as the local macroeconomic and financial factors. We construct country spillover indices of bond risk premiums by employing the Diebold and Yilmaz (2009) methodology to quantify the propagation of shocks in any of the G4 (Euro Area, Japan, the UK, and the US) countries to EMs. In order to capture the effects of economic policy uncertainty (EPU), we use global EPU index that is constructed by Baker et al. (2016)³. In addition to these global factors, we employ a dynamic factor model to extract the monthly macro factor of each EM using a large dataset of macroeconomic variables and investigate how the EM bond risk premiums are related to local macroeconomic factors. In doing so, we employ a panel VAR model using GMM approach based on the data of fourteen major EMs.

Overall, our findings underscore the importance of local and global factors when explaining the variation in the EM local currency bond risk premium. The results of our study provide valuable insights to the global

³Global EPU is calculated as the GDP-weighted average of monthly EPU index values for US, Canada, Brazil, Chile, the UK, Germany, Italy, Spain, France, Netherlands, Russia, India, China, South Korea, Japan, Ireland, and Australia.

investors seeking greater yields and diversification benefits for their portfolios. Also, policy-makers may find them beneficial to improve the effectiveness of the monetary policy to influence the behaviour of long-term yields.

2. Empirical Methodology

2.1. Extraction of country-specific macro factors using dynamic factor model

We estimate the common factors from a large dataset of economic activity related variables to explore the relevance of incorporating richer information sets into analysis of local currency bond risk premium. For each country, we employ the dynamic factor model of Giannone et al. (2008) to estimate the monthly macro factors from macroeconomic variables released at higher frequencies than GDP.

We consider a panel of observable economic variables $X_{i,t}$ where i indicates the cross-section unit, $i = 1, \dots, N$ and t denotes the monthly time index, $t = 1, \dots, T$. Each variable can be expressed as the sum of a common component and an idiosyncratic component, where the common components capture co-movements in the data, and are driven by a small number of shocks. Formally, the dynamic factor model can be written as:

$$X_t = \Lambda F_t + \xi_t, \quad \xi_t \sim N(0, \Sigma_e), \quad (1)$$

$$F_t = \sum_{i=1}^p \Psi_i F_{t-i} + u_t, \quad u_t \sim N(0, Q), \quad (2)$$

where F_t is an $r \times 1$ vector of unobserved common factors with zero mean and unit variance, that attributes all of the co-movements in the variables, Λ is a corresponding $N \times r$ factor loading matrix, and the idiosyncratic disturbances, ξ_t , are uncorrelated with F_t at all leads and lags, and have a diagonal covariance matrix, Σ_e . It is assumed that the common factors, F_t , follow a stationary VAR(p) process driven by the common shocks, $u_t \sim N(0, Q)$, and that the Ψ_i are $r \times r$ matrices of autoregressive coefficients. The lags of the factors are chosen according to the Schwarz information criteria. We apply the Kalman filter and smoother in order to extract the common latent factors and select the first factor that explains the highest variation in the data. To handle the missing observations at the end of the sample, we characterize the variance of the idiosyncratic component as extremely large to ensure that the Kalman filter will put zero weight on missing observations.

2.2. Measuring country specific spillovers

As we are in the era of the quantitative tightening process, it is crucial to take into consideration in term premium will spillovers across countries. For this purpose, we use the framework of Diebold and Yilmaz (2009) to measure the interdependencies among G4 countries and emerging markets that are included in our sample. For each country, we consider the VAR(2) model including $N = 5$ (G4 and selected EM) excess bond risk premiums to construct spillover index. The model is estimated using daily data from January 2009 to June 2018 on a rolling basis 252-day window size. In particular, the following reduced form VAR(2) is estimated:

$$X_t = AX_{t-1} + BX_{t-2} + \varepsilon_t \quad \varepsilon_t \sim N(0, \Sigma) \quad (3)$$

where the matrices A and B denote the reduced form coefficient estimates, ε_t is the vector of error terms assumed to be serially uncorrelated, and Σ is their variance-covariance matrix. We obtain variance decompositions from generalised VAR models relying on Pesaran and Shin (1998) which are independent of variable ordering. The generalized forecast error variance decomposition for the variable i in $j = 1, \dots, N$ at horizon h is then given by:

$$\theta_{ij}(t+h) = \frac{\sum_{l=0}^h GIRF(i, t+l, \delta_{j,t})^2}{\sum_{j=1}^N \sum_{l=0}^h GIRF(i, t+l, \delta_{j,t})^2} \quad (4)$$

where $\delta_{j,t}$ is a one standard deviation shock to variable j at time t . We set $h = 10$, as is standard in the literature. Using these estimates of the forecast error variance decomposition, we then measure total spillover from G4 countries to the selected EMs, which is called country specific spillover indices, as follows:

$$S = \frac{\sum_{j=1}^N \theta_{ij}(t+h)}{N} * 100, \quad i \neq j \quad (5)$$

After the construction of daily spillover indices, we compute the monthly average from the daily data. We consider this index as a measure of connectedness between developed and emerging markets. This allows us to interpret how the variation in the degree of connectedness between EM and DMs affects the EM fixed income markets due to propagation within financial markets.

2.3. Panel VAR model using GMM approach

To determine the dynamic relation between local currency bond risk premium and several economic and financial variables, we employ the panel VAR methodology. Following Abrigo and Love (2016) that estimate the panel VAR using GMM approach, our model can be formulated as the following:

$$Z_{it} = Z_{it-1}A_1 + Z_{it-2}A_2 + \dots + Z_{it-q+1}A_{q-1} + Z_{it-q}A_q + X_{it}B + u_i + e_{it} \quad (6)$$

where Z_{it} is a $(1 \times m)$ vector of endogenous variables and X_{it} is a $(1 \times n)$ vector of exogenous variables. u_i and e_{it} represent the $(1 \times m)$ dependent variable specific panel fixed effects and idiosyncratic errors, respectively.

Our methodology has three main steps. First, we confirm that the variables under consideration are stationary. Table 1 in the Supplemental Appendix provide the results of the panel unit root tests. Second, we apply the lag selection criteria for choosing the appropriate panel VAR model. Standard lag-length selection criteria and Hansen (1982) J statistics of over-identifying restrictions suggest using third lags of the dependent variables in the estimation. We also control for exogenous variables that are expected to affect the dynamic relationships such as the Citi Global Economic Surprise Index, VIX and a deterministic trend. Third, after the estimation, we check the stability of the results.

Figure S1 in the Supplemental Appendix shows that the eigenvalues lie inside the unit circle. Before proceeding to the analysis, we introduce our scheme for the identification of shocks which is the recursive Cholesky decomposition. Following Miyajima et al. (2015) and Cheng (2017), we employ the variables in the model in the order of global variables (*EPU, country spillover*), local variables (*Macro factor, implied FX volatility, CP factor and term spread*) and the local currency bond risk premium. In this framework, ordering of the variables does not alter the coefficient estimates for the panel VAR, while it is expected to influence the IRFs. However, we observe that the IRFs remain virtually unchanged by changing the order of variables.

3. Data

We have a balanced panel dataset of monthly observations for fourteen EMs (Brazil, Chile, China, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Poland, South Africa, Russia, Thailand, and Turkey) between January 2010 and June 2018. The choice of the sample length and country set is motivated by data availability. Our dependent variable is the one year holding period return on a 5-year treasury bond in excess of the return on a 1-year T-bill.

Let $p_t^{(n)}$ is the log price of n -year discount bond at time t . Then the log yield is $y_t^{(n)} = \frac{-1}{n} p_t^{(n)}$. We denote the log holding period return from buying n year bond at time t and selling an $n - 1$ year bond at time $t + 1$ as $r_{t+1}^{(n)} = p_{t+1}^{(n-1)} - p_t^{(n)}$. Accordingly, excess returns can be defined as $rx_{t+1}^{(n)} = r_{t+1}^{(n)} - y_t^{(1)}$.

To capture the effect of uncertainty on bond risk premia, we construct the EPU index developed by Baker et al. (2016) that is based on the proportion of newspaper articles related to economy, policy and uncertainty. We use the country-specific spillover index to assess the contagion effects across the major bond markets. These explanatory variables can be considered as global factors. Since global investors have exposure to currency risk when investing in local currency bond markets, we include 1-year implied FX volatility in our dataset. As discussed in Cochrane and Piazzesi (2005), we also use the linear combination of 1-year spot yield, 1y1y, 2y1y, 3y1y, and 4y1y forward rates (CP factor) to capture the information on yield-spreads. Moreover, we include the term spread in our dataset which is defined as the difference between 5 year Treasury bond return and 1 year T-Bill yield.

Finally, we estimate macro factors from a large panel of economic activity indicators ranges from 13 to 35 variables for emerging markets in our sample. For this purpose, we collect both hard and soft indicators such as industrial production indices, electricity consumption and Markit PMI survey, etc. All data downloaded from Bloomberg Terminal. Moreover, all series are transformed into stationary series by differencing if needed. The complete list of Bloomberg tickers is provided in Tables 2-15 in the supplemental appendix.

4. Empirical Results

Figure 1 presents the orthogonalized impulse-response functions from the estimated panel VAR.⁴ The 95 percent confidence intervals are constructed using 1000 Monte Carlo simulation draws. The forecast horizon is set as 24 months.

Our results in Figure 1 reveal various interesting insights. First, an increase in economic policy uncertainty has a strong upward impact on the risk premium. The impact that occurs right after uncertainty shock is statistically significant and lasts up to 11 months. The mean response peaks after around three months. This result shows that the elevated uncertainty about economic policy can trigger capital outflows from emerging markets due to increased demand for safe assets which in turn result in a positive relationship with EM bond risk premiums. Second, the impact of an increase in the macro factor leads to a decline in the

⁴We present the forecast error variance decomposition in Figure S2 in the Supplemental Appendix.

local currency risk premium. However, the impulse is quite short-lived and become statistically insignificant in less than three months. This implies that a better macroeconomic fundamental tends to reduce bond risk premiums indicating that investors pay more attention to changes in economic activity in the short term. However, the better macroeconomic performance may produce inflationary pressure in the long term so that the relationship turns to positive, although it is insignificant, after a few months. This finding validates the results of Pericoli and Taboga (2012) that positive shocks to output lead to a reduction of the risk premiums on the German and US bonds. Indeed, risk premia appear to be counter-cyclical.

Third, following a one unit shock to implied FX volatility, local currency bond risk premium declines i.e. higher implied FX volatility leads to the smaller risk premium. The impact that occurs right after the implied FX volatility shock is statistically significant and lasts up to seven months. This possibly reflects that most of the EM central banks deliver additional rate hikes to stabilize their currencies in case of increased volatility. This situation puts downward pressure on EM bond risk premiums because of the rise in short term rates and leads to the inverted or flattened yield curve.

Fourth, a positive shock to term spread leads to a statistically significant decline in the local currency risk premium. However, the impact of the shock is short-lived that it dies out within three months. It is generally acknowledged that the slope of yield curve provides some insight into the future economic activity and in general yield spread is narrowed ahead of recessions. Put differently, a positive shock to yield spread typically indicates a stronger economic activity and a more accommodative monetary policy stance. Hence, the better growth prospects of economic conditions attract global investors and tend to increase the capital flow into EM assets.

Fifth, a positive impulse to country spillover which can be interpreted as a shock to connectedness causes local currency risk premium to increase in the following month. On the other hand, the impact is very short-lived. The response of the impact is reversed after six months indicating that local currency risk premium responses strongly to the country spillover shock for the period between six and eighteen months. The negative impact of country spillover is significant and persistent for twelve months that can be considered as long-lasting. This shows that the high level of global bond risk premium synchronization may reduce the benefits of international diversification in bond portfolios and make it difficult for a global investor to disentangle exposure to local dynamics from foreign ones. This situation puts upward pressure on the long-term bond risk premiums due to an adverse shift in market sentiment. On the other hand, the continued propagation of spillovers can lead to an increase in the short rate expectations because of possible

EM central bank rate hikes which imply higher short-term rates, thereby resulting in a negative relationship with bond risk premiums in the long run. In Figure 2-3, we plot the selected country spillover indices together with central bank funding rates to underline their co-movements.

Finally, an unexpected increase in the CP Factor is associated with a persistent decline in the local currency risk premium. The impact that occurs right after the CP factor shock is statistically significant and lasts up to fourteen months. Similar to Sekkel (2011) and Cochrane and Piazzesi (2005), this finding shows that a linear combination of forward rates has an essential role in explaining the risk premiums.

Figure 1: Impulse-Response Functions

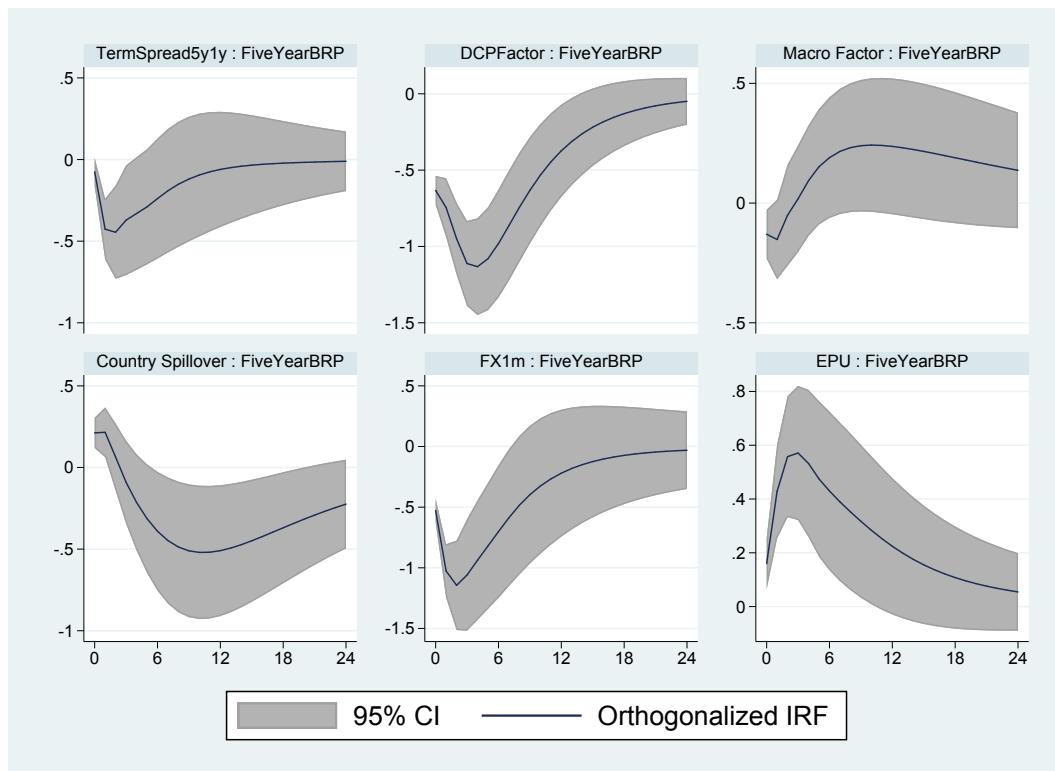


Figure 2: Co-movements of country specific spillover indices and Central Bank funding rates - 1

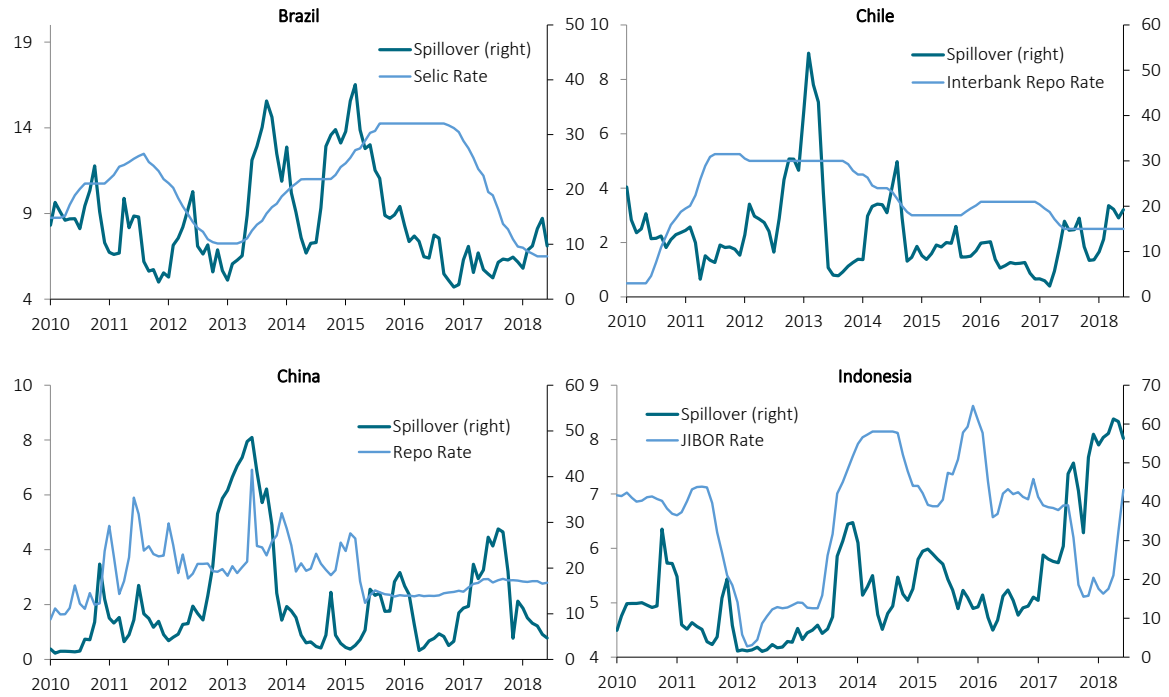
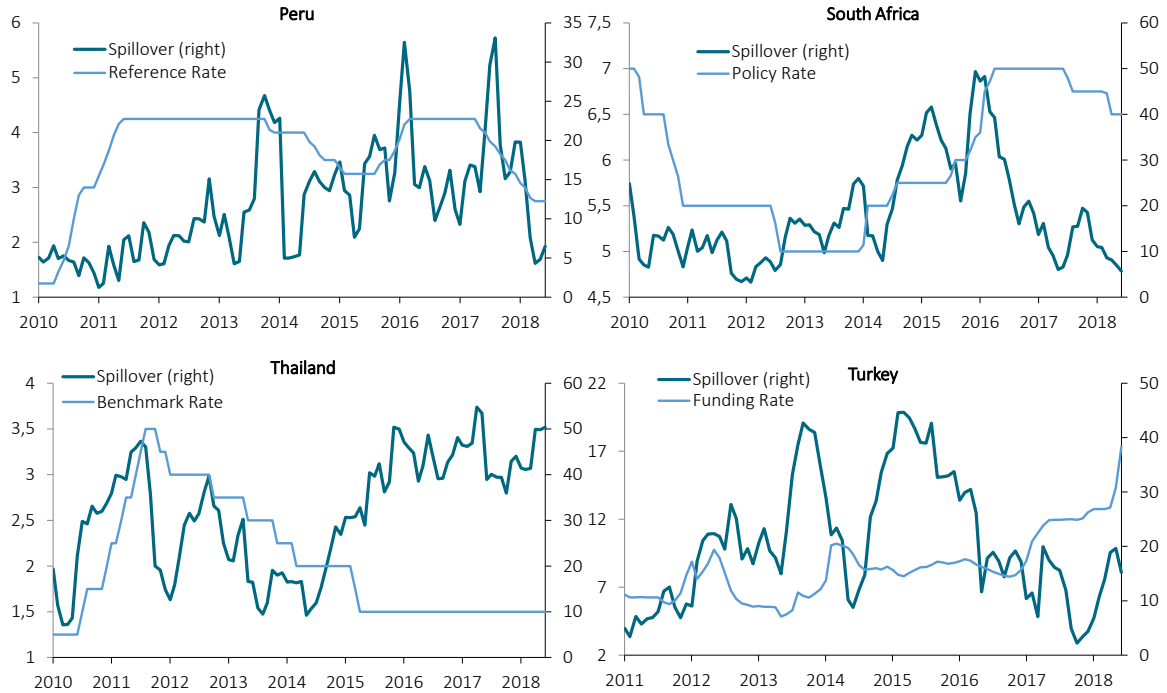


Figure 3: Co-movements of country specific spillover indices and Central Bank funding rates - 2



5. Conclusion

Given the massive size of the EM local debt markets, it is crucial to investigate which factors dictate the EM local currency government bonds. In this paper, we examined how exogenous shocks to global and local factors affect the behaviour of EM local currency bond risk premiums. Our results may give additional insights to policy-makers and global investors. In particular, EM governments would want to develop new policies to increase their resilience to global shocks, particularly those associated with uncertainty. Furthermore, global investors might adopt necessary actions to reduce their exposures to macroeconomic risk more effectively through using hedging instruments. Our results also suggest that EM local currency bonds may not provide enough diversification opportunity in the presence of a high degree of spillover effects.

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