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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 programmes[1]. 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 substantially[2]. However, this trend leads to significant volatility in the prices of EM local currency bonds through swings in the global risk sentiment.

[1]In 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.

[2]For 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

[3]Global 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, $i = 1, ..., N$ and t denotes the monthly time index, $t = 1, ..., T$. 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:

$$X_t = \Lambda F_t + \xi_t, \qquad \xi_t \sim N(0, \Sigma_e), \tag{1}$$

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

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:

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

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 $j = 1, ..., N$ at horizon h is then given by:

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

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:

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

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:

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

where Z_{it} is a $(1xm)$ vector of endogenous variables and X_{it} is a $(1xn)$ vector of exogenous variables.u_i and e_{it} represent the $(1xm)$ 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

[4]We 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

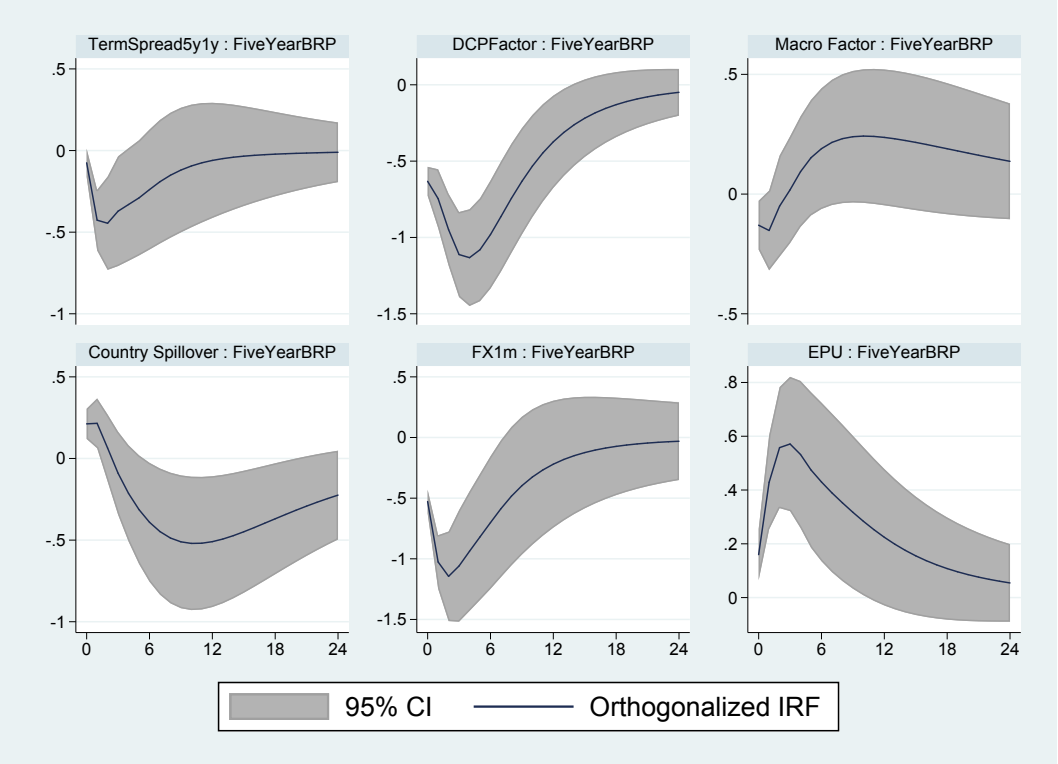


Figure 2: Co-movements of country specific spillover indices and Central Bank funding rates - 1

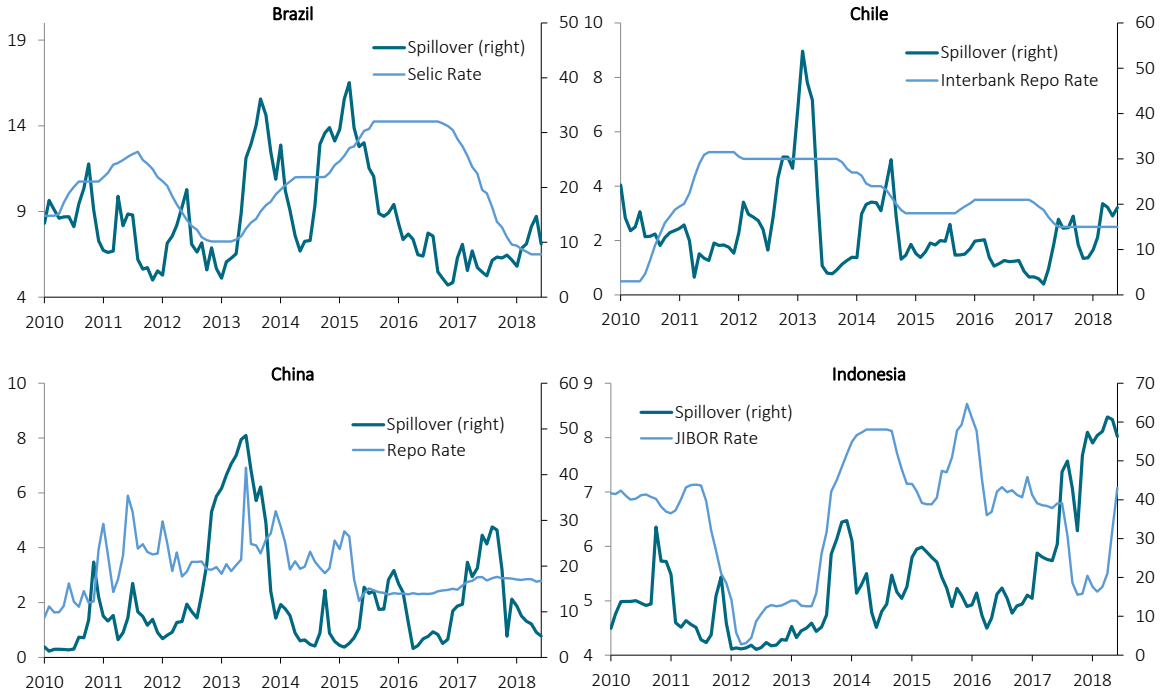
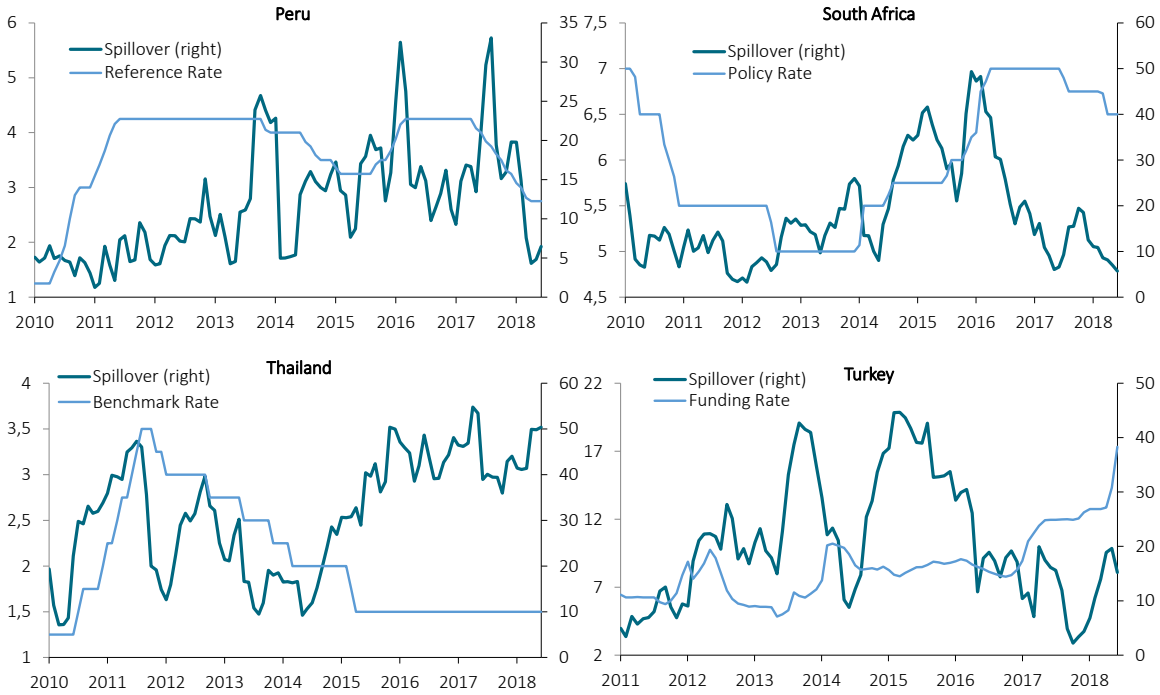


Figure 3: Co-movements of country specific spillover indices and Central Bank funding rates - 2



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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Supplemental Appendix

Panel Unit Root Tests

Table 1: Panel Unit Root Test Results

	Im-Pesaran-Shin Test			Levin-Li-Chu Test		
	Level		First Diff.	Level		First Diff.
Variables	C	C&T	C	C	C&T	C
Excess Bond Risk Premium	-3.30***	-3.93***	-20.25***	-3.20***	-2.64***	-23.58***
Term Spread	-5.91***	-5.56***	-21.86***	-1.58*	-1.46*	-23.84***
CP-Factor	0.32	-1.90**	-21.09***	0.74	-0.89	-27.07***
Country Spillover	-2.73***	-3.30***	-21.81***	-1.76**	-1.32*	-27.98***
Implied FX Volatility	-4.74***	-5.95***	-22.65***	-2.73***	-3.00***	-31.09***
Macro Factor	-2.66***	-1.51*	-24.57***	-2.86***	-2.08**	-27.58***
Economic Policy Uncertainty	-9.99***	-11.04***	-27.23***	-37.46***	-43.44***	-53.52***

Stability Test

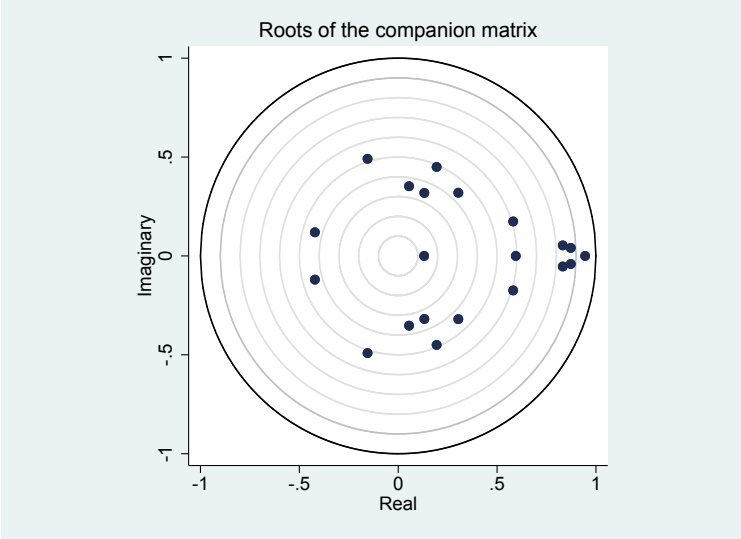

Figure S1: Stability Condition

Forecast Error Variance Decomposition

The three leading sources of the variance in the forecast error of local currency risk premium are the variable itself, CP Factor and the implied volatility of the domestic currency. Based on the FEVD, around 60-80% of the variation in the local currency risk premium is explained by previous realizations of this variable in the first quarter. In the very short run, FX implied volatility contributes more to the local currency risk premium than does the CP Factor. On the other hand, the contributions of the shocks to both variables on the variance of the forecast error of local currency risk premium are similar in 12 months. Although the contribution of the previous realizations of the local currency risk premium declines steadily in the coming months, it still remains as the most important source of variation in the forecast variance. In the first year, roughly 40% of the variation in the excess risk premium is explained by its previous realizations. The shocks to CP Factor and FX implied volatility contribute to the variation by around 26% and 20% in twelve months, respectively. These three variables explain most of the variation in the variance of the forecast error such that the contribution of the other variables seems to be negligible.

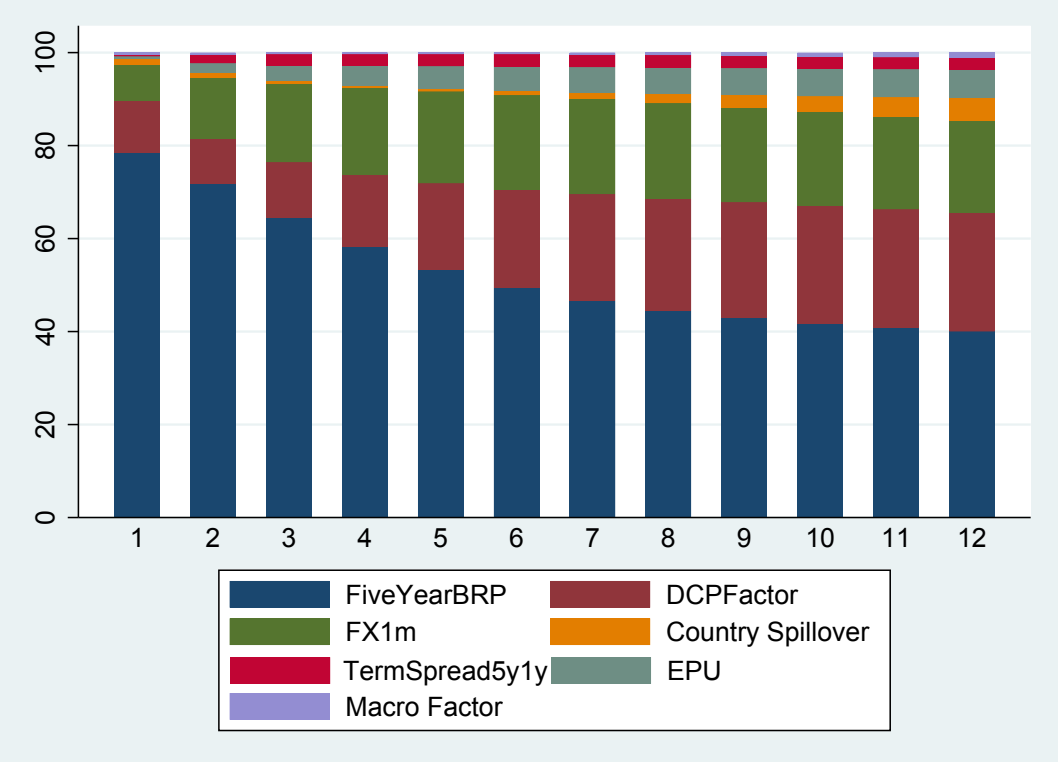

Figure S2: Forecast Error Variance Decomposition

Table 2: Dataset-Brazil

Number	Ticker	Description
1	2236689 Index	IMF Brazil Unemployment Rate
2	BZJCYTOT Index	Brazil Government Registered Job Creation Total NSA YTD
3	BZREPERD Index	Secovi Brazil Real Estate Units Average Sale Time Period
4	BZRESOLD Index	Brazil Sao Paulo Secovi Real Estate Units Sold
5	IBREINCM Index	FGV Brazil IGP-M Construction Prices INCC-M
6	BZLNTOTA Index	Brazil Financial System Loans
7	BZICINDX Index	CNI Brazil Industrial Confidence General
8	BZCCI Index	CNI Brazil Consumer Confidence
9	OLEDBRAZ Index	OECD Brazil Composite Leading Ind. Total Trend Restored Stck
10	BZTBEXPM Index	Brazil Trade Balance FOB Exports
11	BZTBIMPM Index	Brazil Trade Balance FOB Imports NSA
12	BZIPTLSA Index	Brazil Real Industrial Production SA 2012=100
13	BZIXEXTR Index	Brazil Industrial Production Activity Extractive Industry2012
14	BZASSUBT Index	Brazil Auto Sales Subtotal
15	BZCNCNIS Index	CNI Brazil Manufacture Industry Capacity Utilization SA
16	BZCNSALS Index	CNI Brazil Manufacture Industry Real Sales SA 2006=100
17	BZCNEMPS Index	CNI Brazil Manufacture Industry Employment SA 2006=100
18	BZVPTLVH Index	Anfavea Brazil Vehicle Production
19	BZRTRTSA Index	Brazil Retail Sales Volume SA
20	BZRTCOSA Index	Brazil Retail Sales Volume Construction Materials Index SA
21	BZRTFDSA Index	Brazil Retail Sales Volume Supermarket Food Beverages & Tobacco SA
22	OEBRV008 Index	OECD Brazil Prod. Manufacturing Total Manufacturing SA 2010=100
23	BZEASA Index	Economic Activity GDP SA IBC-BR

Table 3: Dataset-Chile

Number	Ticker	Description
1	CHUETOTL Index	INE Chile Total Unemployment Rate
2	CHIPMFGY Index	Chile Industrial Production Manufacturing YoY
3	CHBCIMCE Index	Chile Businessman Confidence
4	CLIMYOYS Index	Chile IMACEC Economic Activity Indicator SA YoY 2013=100
5	CHRSTYOY Index	Chile Retail Sales YoY
6	CHSSNOYO Index	Chile Supermarket Sales Nominal YoY
7	CHIPMINY Index	Chile Industrial Production Mining YoY
8	CLACIPEC Index	Chile Adimark Consumer Confidence Overall Index
9	ITMRCHLI Index	Chile Economic Itau Surprise Index
10	CHHSNO Index	Chile Housing Starts & Approvals Projects
11	CHTBEXPM Index	Chile Trade Balance FOB Exports
12	CHTBIMPM Index	Chile Trade Balance FOB Imports
13	CHVSAUTO Index	Chile Vehicle Sales Cars

Table 4: Dataset-China

Number	Ticker	Description
1	CNFREXPY Index	China Export Trade USD YoY
2	CHCSCONF Index	China Consumer Confidence Index
3	CPMINMAN Index	China Non-Manufacturing PMI SA
4	CNFRIMPY Index	China Import Trade USD YoY
5	CHBNINDX Index	China Bloomberg Monthly GDP Estimate YoY
6	CNRSACMY Index	China Retail Sales Cumulative Value YoY
7	CPMINORD Index	China New Orders PMI SA
8	CHTPFR1Y Index	China Freight Turnover (ton-kilometers) YoY - Railways
9	CHYXELEC Index	China Industrial Output YoY - Electricity
10	CNODDUR% Index	China Order Index - Durable Goods%
11	CPMINDOD Index	China Backlogs of Orders PMI SA
12	CPMINDX Index	China Manufacturing PMI SA
13	CNLCTTLY Index	China Electricity - Total Energy Consumption YoY
14	CLKQINDX Index	Li Keqiang Index (yoy %)
15	CHVAIOY Index	Industrial Production (yoy %)
16	CHRESALY Index	Building Sales Cumulative (yoy %)
17	CNLNTTL Index	China Total CNY Loans of Financial Institutions
18	CNVSTTL Index	China Automobile Sales Model Type Total
19	CHMMCEMT Index	China Output of Industrial Products Cement
20	CNFARYTT Index	China Investment of Real Estate Development - Total - YoY
21	CHTPPTAV Index	China Passenger Traffic Volume Civil Aviation
22	CPMIEMPL Index	China Employment PMI SA

Table 5: Dataset-Hungary

Number	Ticker	Description
1	HUGWLYOY Index	Hungary Avg Gross Wages YoY
2	HUPMISA Index	Hungary PMI SA
3	HUEMUNR Index	Hungary Unemployment Rate
4	HUIPIYOY Index	Hungary Industrial Production SWDA YoY
5	GKIESNDX Index	GKI Hungary Economic Sentiment
6	HUCCINDX Index	GKI Hungary Consumer Confidence
7	HUBCINDX Index	GKI Hungary Business Confidence Index
8	EUESHU Index	European Commission Economic SentiMent Indicator Hungary
9	HUTREXP Index	Hungary Foreign Trade Exports EUR
10	HUTRIMP Index	Hungary Foreign Trade Imports EUR
11	OEHUKLAP Index	Hungary OECD Leading Indicators CLI Trend Restored YoY SA
12	EUBPHU Index	EU Residential Permits Excluding Residences for Communities Hungary SWDA
13	HURTAYOY Index	Hungary Retail Trade Yearly
14	HURTYFDT Index	Hungary Retail Trade Food Drinks Tobacco Yearly

Continued on next page

Table 5 – *Continued from previous page*

Number	Ticker	Description
15	WCARHUY Index	Europe Hungary New Passenger Car Registrations YoY
16	EUUCHU Index	European Commission Capacity Utilization Hungary SA
17	HUHHHHTO Index	Hungary Loans to Households Total

Table 6: Dataset-India

Number	Ticker	Description
1	INMTEXUY Index	India Merchandise Exports Including Re exports YoY
2	INMTIMUY Index	India Merchandise Imports YoY
3	INIMPETR Index	India Imports of Principal Commodities Petroleum Crude and Products
4	INOEMS Index	India Exports of Motor Spirit/Petrol
5	INOEHSD Index	India Exports of High Speed Diesel
6	INVSDTOT Index	India SIAM Total Vehicle Sales Domestic
7	INPICONS Index	India Industrial Production Consumer Goods Base 2004-05
8	SBIICYOY Index	SBI Composite YoY
9	OEINKLAP Index	India OECD Leading Indicators CLI Trend Restored YoY SA
10	PETCHSD Index	India High Speed Diesel Consumption Monthly
11	INTATOTY Index	India Monthly Foreign Tourist Arrivals YoY
12	INFRIDXY Index	India Eight Core Industries Overall Growth rate
13	INCPAGLY Index	India CPI Agricultural Laborers YoY
14	INFRCEMY Index	India Eight Core Industries Growth of Cement
15	INFDTOT$ Index	India Monthly Foreign Direct Investment Inflow Tot USD
16	OEINKLAC Index	India OECD Leading Indicators CLI Amplitude Adjusted SA
17	PETCLDO Index	PETCLDO Index

Table 7: Dataset-Indonesia

Number	Ticker	Description
1	IDEMUNE% Index	Indonesia Unemployment Rate
2	IDTIBPRD Index	Indonesia Business Tendency Index - Production Capacity
3	IDTIBTOT Index	Indonesia Business Tendency Index - Total
4	IDTIIRCG Index	Indonesia Consumer Tendency Index - Inflation Related Consumer Goods
5	IDTIHINC Index	Indonesia Consumer Tendency Index - Household Income
6	IDPUMANU Index	Indonesia Production Utilization - Manufacture Industry
7	IDPUTOTL Index	Indonesia Production Utilization - Total
8	IDWGCDN Index	Indonesia Wage for Construction Worker per Day Nominal
9	IDWGSMN Index	Indonesia Wage for Household Servant per Month Nominal
10	IDBLHOUS Index	Indonesia Outstanding Loans by Economic Sector Housing
11	IDWCTOTL Index	Indonesia Working Capital Loans Total
12	IDWCMANU Index	Indonesia Working Capital Loans Manufacturing Industry

Continued on next page

Table 7 – *Continued from previous page*

Number	Ticker	Description
13	IDEXPEGY Index	Indonesia Export Oil & Gas YoY
14	IDIMPEGY Index	Indonesia Import Oil & Gas YoY
15	ASEAINDO Index	Automotive Production by Indonesia
16	ASEAINDS Index	Automotive Sales for Indonesia
17	IDVHCLOC Index	Astra Indonesia Motor Vehicle Local Car Sales
18	IDVHMTLC Index	Asosiasi Industri Sepedamotor
19	IDCETOTL Index	Indonesia Cement Consumption
20	IDTOTOT Index	Indonesia Tourist Arrivals
21	IDHTTOTL Index	Indonesia Hotel Occupancy Rate
22	OLE3INDO Index	Indonesia OECD Leading Indicators CLI Trend Restored YoY SA

Table 8: Dataset-Malaysia

Number	Ticker	Description
1	MAETEYOY Index	Malaysia External Trade Gross Exports FOB YoY
2	MAETIYOY Index	Malaysia External Trade Gross Imports CIF YoY
3	MIERCSI Index	MIER Malaysia Consumer Sentiments Index
4	MAMNYOY% Index	Malaysia Manufacturing Sales of Products Ex Factory YoY %
5	MIERBSI Index	MIER Malaysia Business Conditions Index
6	MRSUSTRT Index	Malaysia Residential Property Starts
7	POEXTOTL Index	SGS Malaysia Palm Pdt Bulk Shipment Export Data
8	MAVSTTL Index	Malaysia Vehicle Sales - Total
9	MAEPMUN% Index	Malaysia Monthly Unemployment Rate
10	ASEAMLAY Index	Motor Vehicle Production
11	MIERCSI Index	Consumer Confidence
12	MYEILI Index	Malaysia Economic Indicator - Leading Index 2005=100
13	MYEILGI Index	Malaysia Economic Indicator - Lagging Index 2005=100
14	MYEICI Index	Malaysia Economic Indicator - Coincident Index 2005=100
15	MIUSSTRT Index	Malaysia Industrial Units Starts
16	MACCCBAL Index	Consumer Credit Outstanding (Nonmortgage)
17	MATAGT Index	Malaysia Tourist Arrivals

Table 9: Dataset-Mexico

Number	Ticker	Description
1	MXSDGCFY Index	Mexico Supply & Demand Total SA Annual Change 2008 Pesos
2	MXUEUNSA Index	Mexico Unemployment Rate SA for Workers 15 and Older ENOE
3	MXWICONS Index	Mexico Formal Job Temporary & Permanent Workers Construction
4	MXWIMANU Index	Mexico Formal Job Temporary & Permanent Workers Manufacturing
5	MXWITOTL Index	Mexico Formal Job Temporary & Permanent Workers Total

Continued on next page

Table 9 – *Continued from previous page*

Number	Ticker	Description
6	MXMIMITO Index	Mexico Wages by Manufacturing Industry Total
7	IMEFMNOR Index	Mexico Manufacturing Index New Orders SA
8	MXCSBUIL Index	Mexico Construction Spending Buildings
9	MXLCCOLO Index	Mexico Consumption Loans
10	MXBLMAIN Index	Mexico Bank Lending Manufacturing Industry
11	MPPRIMPT Index	Mexico International Trade Import Price NSA 1980=100
12	IMEFMAIN Index	Mexico Manufacturing Index SA
13	IMEFNMIN Index	Mexico Non Manufacturing Index SA
14	IMEFMPRO Index	Mexico Manufacturing Index Production SA
15	SCMXPROI Index	Mexico Producer Confidence Indicator SA
16	MXMAAITR Index	Mexico Manufacturing Aggregate Trend Indicator
17	CSMXCONU Index	MX Consumer Confidence Index SA
18	MXCLYLEA Index	Mexico Leading Indicator YoY
19	MXCLSACO Index	Mexico Seasonally Adjusted Coincident Indicator
20	MXTBBEXP Index	Mexico Trade Balance Exports Monthly Total USD Million
21	MXRETOT$ Index	Mexican Remittances Money Sent from Workers Outside Mexico
22	IGAEINDX Index	Mexico Indicator of Economic Activity Index SA
23	MXPSTOTL Index	Mexico Industrial Production Total Seasonally Adjusted
24	MXPSOGSA Index	Mexico Industrial Production Oil and Gas Extraction Seasonally Adjusted
25	MXPSCONS Index	Mexico Industrial Production Construction Seasonally Adjusted
26	MXPSMANF Index	Mexico Industrial Production Manufacturing Seasonally Adjusted
27	MXSATOTL Index	Mexico Antad Same-Store Sales Overall YoY%
28	MXSLMOGA Index	Mexico Gasoline Sales Monthly
29	MXSLDIES Index	Mexico Diesel Sales Monthly
30	MXMNMCEQ Index	Mexico Capacity Utilization Manufacture of Machinery and Equipment
31	MXVPTOTL Index	Mexico Vehicle Production Total Production
32	MXWRTWHO Index	Mexico Wholesale/Retail Sale Totl Whole
33	MXVHTOTL Index	Mexican Vehicle Sales Auto+truck NSA
34	MDPCSAIN Index	Mexico Total Season Adjusted Index Base 2008
35	MINVTOSA Index	Mexico Gross Fixed Inv Total Seasonally Adjusted

Table 10: Dataset-Peru

Number	Ticker	Description
1	PRUEUER Index	Peru Unemployment Rate Lima Metropolitan Region
2	PRMWI Index	Peru Central Bank Real Wage Index
3	PRSRDEMD Index	Peru Central Bank Supply & Demand Demand
4	PERTEXP Index	INEI Peru Trade Exports
5	PERTIMP Index	INEI Peru Trade Imports
6	PEIPTOTY Index	Peru Industrial Production Index YTD
7	PEIPCONY Index	Peru Industrial Production Construction Index YTD

Continued on next page

Table 10 – *Continued from previous page*

Number	Ticker	Description
8	PEIPMANY Index	Peru Industrial Production Manufacturing Index YTD
9	PRCNCNPR Index	Peru Construction Production Index
10	PECSSALE Index	Peru Business Conf Sales
11	PECSORDE Index	Peru Business Conf Orders
12	PECSDEMA Index	Peru Business Conf Expected Demand in 3 Months
13	ITMRPI Index	Peru Economic Itau Surprise Index
14	PELOLRMT Index	Peru Banking Loans Residential Mortgage Loans
15	PECSECON Index	Peru Business Conf Economic Expectations in 3 Months
16	PECSSECT Index	Peru Business Conf Sector Expectations in 3 Months

Table 11: Dataset-Poland

Number	Ticker	Description
1	POUER Index	Poland Unemployment Rate
2	POWGYOY Index	Poland Average Monthly Gross Wage YoY%
3	PORSYOY Index	Poland Retail Sales YoY
4	POISCYOY Index	Poland Sold Industrial Output of Goods & Services at Constant Prices YoY
5	POOSCYOY Index	Poland - Sales of Construction and Assembly Production YoY
6	EUESPL Index	European Commission Economic SentiMent Indicator Poland
7	EUCCPL Index	European Commission Consumer Confidence Indicator Poland
8	POPENGAB Index	Poland Synthetic Banking Climate Indicator Pengab
9	OEPLKLAP Index	Poland OECD Leading Indicators CLI Trend Restored YoY SA
10	WCARPOY Index	Europe Poland New Passenger Car Registrations YoY
11	E6BDFPLY Index	EU Ind Prod Mining and Quarrying Manufacturing Energy & Cons Poland WDA
12	EUILPOY Index	Eurostat Industrial Production Poland Industry Ex Construction YoY WDA
13	EUUCPL Index	European Commission Capacity Utilization Poland SA
14	OEPLKLAC Index	Poland OECD Leading Indicators CLI Amplitude Adjusted SA
15	POFTTX Index	Poland Foreign Trade Exports at Current Prices
16	POFTTM Index	Poland Foreign Trade Imports at Current Prices

Table 12: Dataset-South Africa

Number	Ticker	Description
1	EHUPZA Index	South Africa Unemployment Rate (%)
2	SACWC Index	South Africa Consumer Confidence
3	SACUI Index	South Africa Utilization of Production Capacity
4	SASGAGR Index	South Africa Agriculture SA Constant Prices
5	SASGMINE Index	South Africa Mining SA Constant Prices
6	SASGMANU Index	South Africa Manufacturing SA Constant Prices
7	SASGCON Index	South Africa Construction sa constant 2000 prices

Continued on next page

Table 12 – *Continued from previous page*

Number	Ticker	Description
8	SASGWRH Index	South Africa Wholesale Retail Hotels SA Constant Prices
9	SATCTREM Index	Trade Activity Index Employment
10	SAPME Index	South Africa Barclays PMI Employment SA
11	SATCTRNO Index	Trade Activity Index New Orders
12	SACSPSTO Index	SA Recorded Building Plans Total SA
13	SACSPSNR Index	SA Recorded Building Plans Non-Residentual Buildings SA
14	SACBLI Index	Composite Business Cycle Indicator - Leading Indicator
15	SACBLG Index	Composite Business Cycle Indicator - Lagging Indicator
16	SACBCI Index	Composite Business Cycle Indicator - Coincident Indicator
17	SATBEX Index	South Africa Trade Balance Exports Incl Oil Arms & Bullion
18	SATBIM Index	South Africa Trade Balance Imports Incl Oil Arms & Bullion
19	NAAMTTMS Index	NAAMSA South Africa Total Market Sales Level
20	SARSTCSA Index	South Africa Retail Sales Total Sales Constant Prices SA 2012=100
21	SFMPPET Index	South Africa Manufacturing Production SA 2005=100 Petroleum Chemical Prod
22	SFPMI Index	South Africa Manufacturing Production SA 2010=100
23	SAMPTTSY Index	South Africa Mining Production Volume Total Inc Gold SA YoY
24	SAPW09Y Index	South Africa Electricity Production Index Year on Year %
25	SAPW08Y Index	South Africa Electricity Consumption Year on Year %

Table 13: Dataset-Russia

Number	Ticker	Description
1	RUIPRNYY Index	Russia Industrial Production 2010=100 YoY
2	RURSRYOY Index	Russia Retail Sales Real YoY
3	RUUER Index	Russia Unemployment Rate
4	RUMEREAL Index	Russia Real Monthly Wages YoY
5	RUMERDIY Index	Russia Monthly Earnings Real Disposable Income YoY
6	RUTBAL Index	Russia Merchandise Trade Balance
7	RUAUTTYY Index	Russia Car Sales YoY
8	RUCNCNCF Index	Russia Consumer Confidence Overall
9	RUCICSI Index	Russia Consumer Sentiment Index March 2008=100%
10	RUTBEX Index	Russia Merchandise Trade Exports
11	RUCTTRYY Index	Russia Cargo Shipment Monthly YoY
12	RFBCMANU Index	Russia Business Confidence Manufacturing
13	RUCCBRYY Index	Russia Construction Contracts Real YoY
14	RUTBIM Index	Russia Merchandise Trade Imports
15	RUCISSI Index	Russia Social Sentiment Index March 2008=100%
16	RUCNCCMP Index	Russia Consumer Confidence Conditions for Major Purchases
17	RUBPLYOY Index	Russia Residential Construction YoY
18	RUCNECSP Index	Russia Consumer Confidence Economic Situation Last 12 Months
19	RUIEECRO Index	Russia Export of Crude Oil in Tons

Continued on next page

Table 13 – *Continued from previous page*

Number	Ticker	Description
20	ECOYERUN Index	Russia Exports (Billion USD) NSA
21	ECOYMRUN Index	Russia Imports (Billion USD) NSA
22	RURSFDYY Index	Russia Retail Sales Food YoY
23	RUWTYOY Index	Russia Wholesale Trade YoY %
24	RIPDDIET Index	Russian Output Of Diesel Volume
25	RIPDGAST Index	Russian Output Of Gasoline Volume
26	BIRTARU Index	Russia Bloomberg Indicator of Real-Time Activity 3 Month Moving Average
27	OERUKLAC Index	Russia OECD Leading Indicators CLI Amplitude Adjusted SA

Table 14: Dataset-Thailand

Number	Ticker	Description
1	THCTEXPY Index	Thailand Customs Department Foreign Trade Exports YoY
2	THCTIMPY Index	Thailand Customs Department Foreign Trade Imports YoY
3	THCCI Index	Thailand Consumer Confidence
4	THNFEXPY Index	Thailand Foreign Trade Merchandise Exports YoY
5	THBSI Index	Thailand Business Sentiment Index
6	THVHSCAR Index	Thailand Car Sales
7	THNFIMPY Index	Thailand Foreign Trade Merchandise Imports YoY
8	THLMUERT Index	Thailand Unemployment Rate
9	THRSY Index	Thailand Retail Sales YoY
10	THCCECON Index	Thailand Consumer Confidence Economic
11	THPIIYOY Index	Thailand Private Investment YoY 2010=100
12	THNHTOTL Index	Thailand New Housing
13	THBSORD Index	Thailand Business Sentiment Index Order Book
14	THBSEMP Index	Thailand Business Sentiment Index Employment
15	THBSINV Index	Thailand Business Sentiment Index Investment
16	THPIPDNF Index	TH Private Investment -Permitted by Department Industrial Work-No of Factories
17	THA CEI Index	Thailand Coincident Economic Index 2000=100
18	THCRTTCR Index	Thailand Outstanding Credit Amount
19	THEMIRTL Index	Thailand Labor Home Inward Remittances

Table 15: Dataset-Turkey

Number	Ticker	Description
1	TULSUR Index	Turkey Labor Statistics Unemployment Rate SA
2	TBRDELT Index	Export Loans - Total
3	TBRDWCLT Index	Working Capital Loans - Total
4	TBRDLOAN Index	Turkey SME Loans Total
5	TURWL Index	Turkey Gross Foreign Exchange Reserves (Weekly)

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Table 15 – *Continued from previous page*

Number	Ticker	Description
6	TUCOGY2S Index	Turkey Real Sector Confidence Index Volume of Orders (Current Situation) SA
7	TUCOGY3S Index	Turkey Real Sector Confidence Stocks of Finished Goods (Current Situation) SA
8	TUCOGY7S Index	Turkey Real Sector Confidence Index Export Orders (Next 3 Months) SA
9	TUCOREAL Index	Turkey Conf IndxReal Sect
10	TUCDCONF Index	Consumer Confidence
11	TUCOGY1S Index	TU Real Sector Confidence SA
12	TUCOGY9S Index	TU Business Situation SA
13	ECOCTRN Index	Turkey Current Account Balance (Billion USD) NSA
14	ECOYMTRN Index	Turkey Imports (Billion USD) NSA
15	TUCSET Index	Turkey Current Account Balance (Billion USD) NSA
16	E50DGTR Index	Turkey Motor Vehicle Industry Export Total
17	E50KGTR Index	EU Ind Prod Durable Consumer Goods Turkey SWDA
18	TUIOMT Index	EU Ind Prod Intermediate Goods Turkey SWDA
19	TUINTURN Index	EU Ind Prod Capital Goods Turkey SWDA
20	TUIOSA Index	Turkey Industrial Production Manufacturing 2010=100
21	TUIOST Index	Turkey Industry Turnover 2010=100
22	TUIOET Index	Turkey Industrial Production SWDA 2010=100
23	TYCOLEVS Index	Turkey Industrial Production Mining 2010=100
24	TUCSPT Index	Turkey Industrial Production Electricity 2010=100
25	TUCSMT Index	Turkey Capacity Utilization SA
26	TUCSMP Index	Turkey Motor Vehicle Industry Production Total