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# Do local and global factors impact the emerging markets' sovereign yield curves? Evidence from a data-rich environment

Oguzhan Cepni $^{a,b,\star}$ , I. Ethem Guney<sup>b</sup>, Doruk Kucuksarac<sup>b</sup>, and M. Hasan Yilmaz<sup>b,c</sup>

#### Abstract

This paper investigates the relation between yield curve and macroeconomic factors for ten emerging sovereign bond markets using the sample from January 2006 to April 2019. To this end, the diffusion indices obtained under four categories (global variables, inflation, domestic financial variables, and economic activity) are incorporated by estimating dynamic panel data regressions together with the yield curve factors. Besides, in order to capture dynamic interaction between yield curve and macroeconomic/financial factors, a panel VAR analysis based on the system GMM approach is utilized. Empirical results suggest that the level factor responds to shocks originated from inflation, domestic financial variables and global variables. Furthermore, the slope factor is affected by shocks in global variables, and the curvature factor appears to be influenced by domestic financial variables. We also show that macroeconomic/financial factors captures significant predictive information over yield curve factors by running individual country factor-augmented predictive regressions and variable selection algorithms such ridge regression, LASSO and Elastic Net. Our findings have important implications for policymakers and fund managers by explaining the underlying forces of movements in the yield curve and forecasting accurately dynamics of yield curve factors.

*Keywords:* Yield Curve, Macroeconomic Factors, Nelson Siegel Model, Panel VAR, Forecasting, Variable Selection.

JEL Classification: C1, C5, F2, F3, F4, G1.

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#### 1. Introduction

In conformity with the experienced wave of globalization and financial development in emerging markets (EM) for the last decades, local bond markets of those economies have gained prominence regarding the financing of economic entities. In recent years, monetary policies of advanced economies have been designed on the expansionary front coupled with unconventional measures leading to abundant liquidity in the financial system. This leads to a swift decline in policy rates and puts downward pressure on the yields of financial assets. Given the "search for yield" behavior of global investors and relatively higher yields offered by EM financial assets, there have been observed voluminous capital inflows to EM economies through debt securities. Furthermore, differentiation of local economic factors in EM countries from developed counterparts creates potential diversification benefits and a strong appetite for this asset class (Miyajima et al. (2015)). Apart from this, broadening and deepening of cross-border financial links reinforced by the behavior of global market participants, financial liberalization attempts of local authorities and economic integration actions of supranational organizations have resulted in rising momentum of local EM bond markets (Wooldridge et al. (2003), Garcia-Herrero and Wooldridge (2007)).

Accordingly, prominent foreign interest in EM debt securities has brought financial deepening in the market structure. International bond issuance from the selected EM group appear to increase dramatically since the beginning of the 2000s (Figure 1). On the other hand, domestic bond markets mostly consisted of local currency issuance also grew in size<sup>1</sup>. Although these markets were historically dominated by sovereign entities, non-financial corporations also started to obtain financing through local debt markets (Figure 1).

#### - Insert Figure 1 about here. -

Given the relevance of macroeconomic fundamentals with yield curve modeling parameters, recently, the academic literature has focused on extensions of yield curve models that incorporate macroeconomic variables (see Exterkate et al. (2013), Ullah et al. (2013), Ullah (2016), Yang (2020) ). Diebold et al. (2006) combine the Nelson-Siegel (NS) model with inflation, output and the policy rate to provide new insights into the relationship between the term structure of interest rates and the US economy. They show that the level factor is somewhat correlated with inflation whereas the slope factor is related to economic activity. Unlike the level and the slope factors, the curvature factor appears to be unrelated to any of the main US

<sup>&</sup>lt;sup>1</sup>This data corresponds to the summation of the notional outstanding amount of selected EM countries comprising the sample of this study. Details about countries are provided in Section 2.

macroeconomic variables. Lu and Wu (2009) examine the interactions between the US Treasury yield curve and 17 macroeconomic data and find that shocks on inflation-related variables such as consumer prices and producer prices have a sizeable positive impact on the yield curve, resulting in a parallel shift across different maturities. On the other hand, shocks on real activity variables such as GDP growth, industrial production, and capacity utilization have broader impacts on the short end than on the long end of the yield curve, thus resulting in a flatter or a steeper yield curve. Hännikäinen (2017) evaluates the predictive content of yield curve factors for US real activity in a data-rich environment. It is shown that while predictive power is subject to alterations from a historical perspective, slope emerges as a key parameter in understanding the real economic fluctuations. By covering the advanced economies such as US, Germany, Canada, and UK, Argyropoulos and Tzavalis (2016) provide evidence supporting the importance of slope and curvature for future changes in economic activity. As a recent study, Paccagnini (2016) interpolates the term structure of the US Treasury Rates for the period 1984-2007 with the help of three yield curve parameters. It is founded that term structure informs policymakers about how macroeconomic shocks are related to yield curve dynamics.

While there exists profound literature about developed markets, few studies directly examine EM yield curve parameters and their interaction with the macroeconomic environment. Kanjilal (2013) examines the debt market in India over the period 1997-2011. By applying NS methodology, the sovereign yield curve is estimated and almost all of the movements across the yield curve are found to be explained by latent level, slope, and curvature factors. Rodriguez et al. (2011) utilize the dynamic version of the NS model to reproduce stylized facts of Brazil's term structure and find that the model fits the data well. Kaya (2013) conducts the same exercise for the Turkish economy and find similar results. In a more recent study, Prasanna and Sowmya (2017) analyze the contemporaneous relation between macroeconomic factors and yield curve movements in nine Asian sovereign bond markets. They indicate that increases in the policy rate and inflation affect the slope of the term structure while the output growth has a significant influence on the long-term rates in the region.

The purpose of this paper is to extend the empirical evidence addressing the question of how yield curve factors are related to macroeconomic factors for ten emerging sovereign bond markets using the large set of macroeconomic and financial variables unlike the previous studies that use only a limited set of explanatory variables. To this end, firstly, we extract the yield curve factors by employing the NS methodology. Secondly, we estimate dynamic panel data regressions between yield curve factors and latent factors that

are constructed on a relatively large set of economic indicators, namely global variables, domestic financial variables, economic activity, and inflation-related variables. Furthermore, we provide a characterization of the dynamic interactions between the yield curve and macroeconomics factors via estimating panel VAR model and computing impulse response functions. Finally, utilizing an individual factor augmented predictive regressions and variable selection algorithms for each emerging market, we investigate whether macroeconomic/financial factors have predictive ability for yield curve factors.

Our findings can be summarized as follows. First, it is observed that a shock coming to the inflation factor is being transmitted to a positive response in the level factor of the yield curve. Second, one unit shock of innovation to the factor representing economic activity brings about an increase in the slope component leading to steepening in EM countries' yield curve shape. Third, the response of the slope factor to the shocks in the global factor is negative and significant after around the first month which has a lasting effect on the slope factor. This finding implies that global factors have the power to explain movements in the yield curves of emerging markets, in addition to the local factors. Fourth, macroeconomic/financial factors capture significant predictive information over yield curve factors. Fifth, employing variable selection algorithms improves the forecast accuracy of the model further.

This paper is organized as follows: Section 2 provides detailed information about utilized data sets. Section 3 covers the dynamic factor model to summarize macroeconomic and financial forces, NS methodology to estimate yield curve factors of individual countries as well as dynamic panel regressions and panel VAR model constructed to assess the interaction between yield curve factors and macroeconomic forces. Section 4 presents empirical results, and Section 5 concludes the discussion.

### 2. Data

We have a balanced panel dataset of monthly observations between January 2006 and April 2019 for ten emerging markets<sup>2</sup>. The dataset includes a large set of indicators that are selected to represent a broad range of macroeconomic variables that can be classified into the following four categories:

- *Real Economic activity:* unemployment, industrial production, balance of payments statistics, retail trade, vehicle productions, completed buildings recorded and new orders;
- Prices: producer prices and consumer prices;

<sup>&</sup>lt;sup>2</sup>Brazil, Hungary, India, Malaysia, Mexico, Poland, Russia, South Africa, Thailand, and Turkey

- *Domestic Financial variables:* interest rates, exchange rates, implied volatility, money supply and stock prices;
- *Global variables:* Economic activity and financial market variables on global scale such as US term premium, US economic policy uncertainty, EU industrial production, ISM manufacturing PMI, MSCI emerging markets indices and Nomura China stress indicator;
  - Insert Table 1 about here. -

Table 1 shows the final number of series in each category, as well as the total number of series for each country. The final selection of the variables for each country is determined based on data availability. We consider the series of indicators that are followed most closely by market participants. It is thus fairly comprehensive as the data include both supply-side and demand-side indicators. All variables are subject to preliminary transformations to induce stationarity as needed. Detailed descriptions of the individual macroeconomic variables are provided in the Tables A1-A10 of the appendix.

In addition to the above set of macroeconomic and financial indicators, which are used in our construction of local and global factors, we collect monthly zero-coupon yields of maturities 3, 6, 12, 24, 36, 48, 60, 72, 84, 96, 108 and 120 months to estimate the yield curve factors for each emerging markets in our sample. All data is downloaded from the Bloomberg terminal.

#### 3. Empirical Methodology

#### 3.1. Extraction of common factors using dynamic factor model

In our analysis, we separately extract potentially useful common factors from our four datasets (i.e., real economic activity, prices, domestic variables and global variables) for each country. To do this, we utilize the widely used dynamic factor model (DFM) of Giannone et al. (2008). As is typical in such models, individual variables are represented as the sum of components that are common to all variables in the economy (i.e., the factors) and an orthogonal idiosyncratic part.

Formally, the DFM can be written as a system of equations: a measurement equation (i.e., Eq. (1)) that links the observed variables to the unobserved common factor to be estimated, and transition equation (Eq. (2)) that describe the dynamics of the common factor. Once Eqs. (1)-(2) are written in state space form, we employ the Kalman filter and smoother in order to extract the common factors and generate projections for all of the variables in the model. We start by characterizing the dynamics for the monthly data. Let  $X_{i,t}$  denote panel of observable economic variables where *i* shows the cross-section unit of macroeconomic variables, i = 1, ..., N and *t* indicates the monthly time index, t = 1, ..., T. We assume that  $X_{i,t}$  has the following factor model representation:

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

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

where  $F_t$  is an  $r \times 1$  vector of unobserved common factors with zero mean and unit variance, that reflect "most" of the co-movements in the variables,  $\Lambda$  is a corresponding  $N \times r$  factor loading matrix, and the idiosyncratic disturbances,  $\xi_t$ , are uncorrelated with  $F_t$  at all leads and lags, and have a diagonal covariance matrix,  $\Sigma_e$ . The common factors are modeled as a stationary vector autoregressive (VAR) process of order pdriven by the common shocks,  $u_t \sim N(0, Q)$ , and that the  $\Psi_i$  are  $r \times r$  matrices of autoregressive coefficients. Also, the common shocks,  $u_t$ , and the idiosyncratic shocks,  $\epsilon_t$ , are assumed to be serially independent and independent of each other over time. We estimate the model using the two-step approach proposed by Giannone et al. (2008)<sup>3</sup> and select the first factor that explains the highest variation in each dataset<sup>4</sup>. The lags of the factors are chosen via use of Schwarz information criteria. In particular, four diffusion indexes (i.e., factors) are constructed. While three of the four factors that are separately extracted using the datasets belonging to real economic activity, prices, domestic variables are called local factors, the factor extracted from the set of global variables is called global factor.

#### 3.2. Estimation of yield curve factors: Nelson-Siegel Model

The yield curve factors are obtained using NS model where the zero rates can be described explicitly by the following functional form:

$$y_t(m) = \beta_1 + \beta_2 \left(\frac{1 - e^{-\frac{m}{\tau}}}{\frac{m}{\tau}}\right) + \beta_3 \left(\frac{1 - e^{-\frac{m}{\tau}}}{\frac{m}{\tau}} - e^{-\frac{m}{\tau}}\right)$$
(3)

Accordingly,  $y_t(m)$  denotes the continuously compounded zero-coupon nominal yield at time *t* of a bond with maturity *m*, and  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\tau$  are NS parameters to be estimated. Eq.(3) represents a four-component

<sup>&</sup>lt;sup>3</sup>see, Doz et al. (2011) for details.

<sup>&</sup>lt;sup>4</sup>Explanatory powers of extracted first three factors are presented in Table A11 of the Appendix. The expanatory power of first factors range between 22% and 53%.

approximation to the cross-section of yields at any time. Diebold and Li (2006) interpret the NS parameters as the level ( $\beta_1$ ), slope ( $\beta_2$ ) and curvature ( $\beta_3$ ). The coefficient  $\tau$ , which is frequently referred to as the shape parameter, determines both the steepness of the slope factor and the location of the hump (Annaert et al. (2013)). The parameters are estimated using non-linear least squares where the objective function is to minimize the squared difference between duration-inverse weighted actual and fitted prices.

However, employing the non-linear least squares optimization leads to non-smooth parameter estimates, especially for the slope and curvature parameters. Therefore, we estimate level, slope and curvature parameters by Ordinary Least Squares (OLS) fixing  $\tau$  parameter to reduce the volatility of these parameters as proposed by Diebold and Li (2006). We run a grid search to find the optimal  $\tau$  parameter, which gives us the smallest Root Mean Squared Error (RMSE) for each emerging markets in our sample<sup>5</sup>.

#### 3.3. Dynamic Panel Data Estimations

Before undertaking dynamic interaction between yield curve factors and macroeconomic/financial determinants, an initial empirical investigation is performed by using an estimation technique exploiting the longitudinal nature of the data which also incorporates the timewise autoregressive structure of yield curve factors. In this context, difference generalized method of moments (GMM) approach developed by Holtz-Eakin et al. (1988) and Arellano and Bond (1991) is implemented where explained variables are dynamic (meaning they are being dependent on their own past realizations) and explanatory variables are not strictly exogenous (meaning they are correlated with the past and present realizations of the error term).

Arellano-Bond estimation involves a transformation of regressors (mostly by differencing) and an application of GMM. Modeling through fixed effects, despite the fact that underlying data generating process is dynamic by nature, creates a correlation between error term and regressors because of the demeaning attempt of dependent and independent variables in fixed effects estimation. Since demeaning operation creates a set of regressors which are not distributed independently of the disturbance term, coefficient estimator for lagged dependent variable is inconsistent (Nickell, 1981). The solution to this evident problem is to apply a transformation to the model. First differencing to the original model is mostly used in practice to remove the unobserved individual effect. When model is transformed, then it becomes eligible for instrumental variable estimation. Difference GMM method is doing this by establishing a system of equations (for each time period) and by economizing internal instruments (lagged values of instrumented variables)

<sup>&</sup>lt;sup>5</sup>For this purpose, the estimations are iterated for more than one million times.

to make the estimation. Hence, our methodological framework entails the use of one-step difference GMM method of Arellano and Bond (1991).

For this study, we utilize following series of specifications in which yield curve components are defined as dependent variables and static factors describing inflation, economic activity, local financial conditions and global financial outlook are added as explanatory variables in an incremental manner. As the most comprehensive specification, the final model includes all the macroeconomic/financial factors.

$$YC_{it} = \rho \sum_{s=1}^{2} YC_{it-s} + \gamma_1 Inflation_{it} + u_i + e_{it}$$
(4)

$$YC_{it} = \rho \sum_{s=1}^{2} YC_{it-s} + \gamma_2 Activity_{it} + u_i + e_{it}$$
(5)

$$YC_{it} = \rho \sum_{s=1}^{2} YC_{it-s} + \gamma_3 Financial_{it} + u_i + e_{it}$$
(6)

$$YC_{it} = \rho \sum_{s=1}^{2} YC_{it-s} + \gamma_4 Global_{it} + u_i + e_{it}$$
(7)

$$YC_{it} = \rho \sum_{s=1}^{2} YC_{it-s} + \gamma_1 Inflation_{it} + \gamma_2 Activity_{it} + \gamma_3 Financial_{it} + \gamma_4 Global_{it} + u_i + e_{it}$$
(8)

where  $YC_{it}$  refers to the yield curve components which are level, slope and curvature.  $\rho$  stands for the auto-regressive parameters obtained from the first and second lags of yield curve components included as covariates<sup>6</sup>.  $\gamma$  coefficients measure the impact of macroeconomic and financial dynamics on yield curve formation.

#### 3.4. Dynamic Common Correlated Effects

Dynamic panel data models with system GMM estimations have advantages such as accounting from dynamic structure in the variable of interest and capability to handle endogeneity problems (Roodman (2006, 2009), Labra and Torrecillas (2018)). However, as noted by Ruiz-Porras (2012), applying this methodology on data structures with longer time dimensions (T) and shorter cross-sectional dimension (N) could result in the over-identification of the model.<sup>7</sup> Furthermore, it does not account for unobserved

<sup>&</sup>lt;sup>6</sup>Lag-length is chosen based on SIC criteria.

<sup>&</sup>lt;sup>7</sup>We thank the anonymous referee for pointing out this issue and suggesting alternative estimation technique.

dependencies between cross-sectional units in the examined data set. Despite the fact that in system GMM estimations we tried to mitigate over-identification problem by limiting the number of lags of instruments in level and difference equations, specifications described above are also estimated by utilizing dynamic common correlated effects for robustness.<sup>8</sup>

In this context, estimation procedure conceptualized by Chudik and Pesaran (2015) and operationalized by Ditzen (2018) is implemented. Following empirical identification is considered:

$$Y_{i,t} = \lambda_i Y_{i,t-1} + \beta_i X_{i,t} + \sum_{k=0}^{P} \gamma'_{i,k} \bar{Z}_{t-k} + \varepsilon_{i,t}, \qquad \bar{Z}_t = \left(\bar{Y}_t, \bar{X}_t\right)$$
(9)

where Y and X describe dependent and independent variables, whereas  $\beta_i = \beta + v_i, v_i \sim IID(0, \Omega_v)$  and  $\lambda_i = \lambda + \zeta_i, \zeta_i \sim ID(0, \Omega_f)$  represent heterogeneous coefficients which are randomly distributed around a common mean. As quoted in Ditzen (2018), Pesaran (2006) in static models with no lagged dependent variable terms as additional explanatory variables, estimations will be consistent by approximating the unobserved common factors with cross-section averages  $\bar{Y}_t$  and  $\bar{X}_t$  under strict exogeneity. On the other hands, in dynamic models, Chudik and Pesaran (2015) show that estimator gains consistency if  $P = \sqrt[3]{T}$ lags of the cross-sectional averages are incorporated into the specification.

We follow this methodology to obtain coefficient estimations for level, slope and curvature factors. In addition to this, we also implement Pesaran (2015) test for cross-sectional dependence to evaluate dependencies across countries<sup>9</sup>.

#### 3.5. Panel VAR model using a system GMM approach

In the following part of our empirical setting, we exploit the informative content of yield curve parameters and macroeconomic factors within the context of panel VAR model. This class of modelling framework has been increasingly utilized to study interdependencies, particularly in the fields of macroeconomics and finance such as economic activity, business cycle tendencies, and transmission of financial shocks among many others (Canova and Ciccarelli (2013)).

To assess the dynamic relation between yield curve components and macro-factors, we utilize a panel VAR model using generalized method of moments (GMM) approach as described by Abrigo and Love

<sup>&</sup>lt;sup>8</sup>As it does not vary over cross-section units, the variable termed "global" is excluded from these estimations.

<sup>&</sup>lt;sup>9</sup>The test results are presented in Table A12 of the Appendix.

(2016). The estimated system of equations referring for the panel VAR model of order p with countryspecific fixed effects can be specified as the following:

$$Y_{it} = A_1 Y_{it-1} + A_2 Y_{it-2} + \dots + A_p Y_{it-p} + u_i + e_{it}$$

$$E[e_{it}] = 0, \qquad E[e'_{it}e_{it}] = \Sigma,$$

$$E[e'_{it}e_{is}] = 0, \quad fort > s$$
(10)

where  $Y_{it}$  is a (1xm) vector of endogenous variables (prices, economic activity, domestic financial, global, level, slope, curvature),  $u_i$  and  $e_{it}$  represent the  $(1 \times m)$  dependent variable specific panel fixed effects and idiosyncratic errors, respectively. The idiosyncratic disturbances  $e_{it}$  have a diagonal covariance matrix,  $\Sigma$ . As mentioned before, variables are obtained from yield curve factors by utilizing Nelson and Siegel (1987) methodology and the common factors related to each category (prices, economic activity, domestic financial, global) are extracted by applying dynamic factor model based on the large sets of variables included in each category.

The ordering in panel VAR is chosen to reflect the transmission channel for EM in which originated global shocks are propagated to local financial conditions and, in the next step, they are incorporated in the formulation of yield curve dynamics to characterize the influence on economic activity and pricing behavior. In this framework, ordering of the variables does not alter the coefficient estimates for the panel VAR, while it is expected to affect the impulse-response functions (IRFs). However, it is found that IRFs are not subject to alterations when order of the variables is changed.

Empirical analysis with panel VAR model is multifaceted for which the initial results are obtained for the stationarity of variables to make reliable inferences. In this context, we benefit from the panel unit root testing procedures of Im et al. (2003) and Levin et al. (2002). Additionally, consistent moment and model selection criteria of Andrews and Lu (2001) as well as the Hansen (1982) J-statistics of over-identifying restrictions are reviewed to decide on the optimal lag length of the mode. While IRFs are utilized to gain deeper insight about the dynamic inter-relation of yield curve factors with macro-forces in the EM countries, the stability conditions of panel VAR estimates are also checked by calculating the modulus of eigenvalues of the estimated model.

#### 3.6. Out-of-sample forecasting exercise for individual countries

Apart from investigating dynamic interdependencies, we employ factor augmented predictive regressions commonly used in the empirical finance studies, for investigating the predictability of yield curve factors separately for each countries. Specifically, we construct our predictive regressions of the following form:

$$y_{t+1} = \alpha_0 + \beta' Z_t + \varepsilon_{t+1} \tag{11}$$

where  $y_{t+1}$  is the yield curve factors in period t + 1 and  $Z_t$  includes factors (prices, economic activity, domestic financial) extracted using the dynamic factor model approach of Giannone et al.(2008). We select the benchmark model as random-walk (RW) model since comparing our model results with this model will tell us whether macroeconomic factors add value to forecasting of yield curve factors. Out-of-sample forecasting exercise over the period January, 2012 to April, 2019, with an in-sample period of January, 2006 to December, 2011, is employed recursively to provide insight into the predictive ability of macroeconomic and financial factors for yield curve factors. For each month, we produce a sequence of six *h*-month-ahead forecast for h = 1, 2, 3, 4, 5, 6. To assess the statistical significance of forecast performance of different models compared to our benchmark model, the Diebold and Mariano (2002, DM) test is utilized using quadratic loss function.

### 4. Empirical Results

#### 4.1. Relation between yield curve factors and extracted common factors

Before moving into dynamic panel estimations, it is informative to visually investigate the co-movements between macroeconomic factors and yield curve parameters. By pooling cross-sectional dimensions of sample countries with historical time series, Figure 2 depicts the scatterplots of yield curve factors with macro-forces that are theoretically known to be relevant. Here, it is seen that there exists a positive correlation between level factor of EM sovereign yield curves and inflation factor extracted from CPI and PPI series of sample countries. Hence, we suspect that price pressures entailing high inflation rates can be preemptively associated with higher level of the yield curve. While the degree of association is lower compared to level-inflation case, there is a negative linear relation between slope factor and local macroeconomic activity component. In other words, steepening in yield curves can be relevant to the loss of momentum in growth tendencies. Lastly, as a striking finding, we demonstrate a relation between curvature factor and local financial factor as a common pattern in EM countries.

- Insert Figure 2 about here. -

#### 4.2. Dynamic Panel Estimation Results

First of all, dynamic panel estimations reveal that, as expected, autoregressive dependence on time dimension is evident for yield curve components. When level, slope and curvature factors are defined as dependent variables, corresponding regressions support the expectation that lags of the explained variables are statistically significant.

For the univariate specifications for level factor, it is seen that inflation factor is an important determinant of long-term component of the yield curve. In particular, upward movements in inflation factor tracking the price pressures in EM countries create significant and positive impact on level factor. In addition to this, local financial factors, for which increases are corresponding to deterioration in financial indicators and volatility in financial markets, turn out to be associated with level factor as well.

In univariate cases, economic activity and global factors are found to be somewhat significant supporting the expectation that growth outlook and global forces might have an influence the formation of slope component. However, when multivariate case is considered, while economic activity retains its significance, local financial conditions emerge as a significant determinant of slope factor. In terms of curvature factor, unlike most of the studies in the previous literature, local financial conditions is found to be an important driver.

- Insert Table 2 about here. -

– Insert Table 3 about here. –

– Insert Table 4 about here. –

#### 4.3. Dynamic Common Correlated Effects Results

Results obtained from dynamic common correlated effects estimations are vastly in line with system GMM results. Lag dependence structure of level factor is still evident. Univariate specifications for level equation shows that inflation and economic activity factors are significantly associated with level component of EM yield curves in which former is positively and latter is negatively related with long-term yield curve factor entailing long-term interest rates. When we change the estimation technique, previously documented significant role of domestic financial conditions in explaining level dynamics disappear. In full specification, as expected, only significant explanatory variable for level equation is inflation outlook. In the second step, similar estimations are conducted for slope component. Here, in contrast to previous estimations, the predictive power of the equations regarding in-sample context is improved, as manifested

by statistically significant effects of inflation and financial factors, on top of theoretically and empirically suggested economic activity factor. Significance is also retained in the broadest specification.

Lastly, curvature factor is considered. As it is not widely observed in the empirical literature, dynamic common correlated effects estimations indicate that curvature component of EM yield curves is significantly driven by the course of domestic financial conditions. Hence, any movements in sub-components of domestic financial conditions including credit growth, exchange rates, stock market outlook and capital flows will have implications on the yield curve formations.

For each yield curve factor, Pesaran (2015) test results in broadest specifications show that null hypothesis of weak cross-sectional dependence is vastly rejected pointing out the fact that common correlated effects estimations controlling for unobserved dependencies across EM countries are reliable in this setting<sup>10</sup>.

- Insert Table 5 about here. -

- Insert Table 6 about here. -
- Insert Table 7 about here. -

#### 4.4. Panel VAR results

As stated in Section 3.5, the stationarity behavior of variables utilized in panel VAR model are evaluated with IPS and LLC panel unit root test. When level values are assessed with these tests (with only constant and with both constant and trend terms in test specifications), there appears to be some evidence pointing out non-stationarity. Hence, we proceed with transformation of variables into first differences yielding stationarity before conducting estimations<sup>11</sup>. In terms of the selection of lag length, the informative content of Hansen's J-statistic and information criterion are considered. In this case, overwhelming evidence is the use of one lag in the specification of panel VAR model<sup>12</sup>.

To analyze the interaction among common factors and yield curve factors, we perform impulse response functions. Figure 3 presents the cumulative orthogonalized impulse-response functions from the estimated panel VAR. 95% confidence interval to analyze the statistical significance are created by using 1000 Monte Carlo simulation draws. The forecast horizon is determined as 12 months. It is observed that a shock coming

<sup>&</sup>lt;sup>10</sup>The test results are reported in Table A13 of the Appendix.

<sup>&</sup>lt;sup>11</sup>Results of panel unit root tests are provided in Table A14 in the appendix.

<sup>&</sup>lt;sup>12</sup>Information criterion results are given in Table A15 in the appendix.

to inflation factor is being transmitted to a positive response in the level factor of yield curve. The impact that occurs following the inflationary shock lasts almost 6 months, whereas it losses the significance after 3rd month. Thus, it supports the argument that level is the long term factor in the yield curve formulation which reflects the inflationary dynamics as well as inflation expectations.

#### - Insert Figure 3 about here. -

Impulse-response functions also reveal the statistically significant relation between economic growth and slope component of the yield curve. Following one unit shock to the factor representing the economic activity, the slope component increases leading to steepening in EM countries' yield curve formation. The impact seems to peak around 6-months horizon. It is interesting to note that local financial conditions in EM countries are found to be strongly associated with curvature component of yield curve. In particular, one unit impulse given to the factor summarizing local financial dynamics is tracked to have a statistically significant influence on curvature factor, while the majority of the impact occurs within a shorter period of time.

The response of slope factor to shocks in global factor is negative and significant after around 1st month and also these shocks have a lasting effect on the slope factor. This result supports the findings of Jotikasthira et al. (2015), that U.S. yield factor have power to explain movements in the curves of other countries. The inverse relation between global and slope factor might indicate that a shock to the global factor may increase the expectations of raising the short-term policy rate by central banks. Hence, this situation puts upward pressure on short-term government bonds, thereby resulting in a negative relationship. This is often seen as a bag sign for the economy since the yield spread is historically narrowed ahead of recessions.

We also examine the impulse-response among yield curve factors themselves from the estimated panel VAR model (Figure 4). It could be seen that shocks coming to level factor significantly and negatively affect slope and curvature factors in the examined horizon. Impulse-response function also depicts the strong influence of slope factor on level factor, whereas no significant result is obtained for the impact of slope on curvature. Lastly, impulse-response functions display that shocks coming to curvature does not produce statistically significant responses for level factor. On the other hand, impulses occurred to curvature is tracked to create slightly significant responses on slope parameter. Overall, our results highlight the relevance of local and global factors for better understanding the movements of yield curves in emerging markets.

- Insert Figure 4 about here. -

#### 4.5. Out-of-sample forecasting results

The ratios of root mean squared errors (RMSEs) for our set of forecasting models are presented in Table 8 for each of the forecast horizons. Models that yield the lowest RMSE values at each horizon are denoted in bold. Overall, the entries in Table 5 in general are less than unity, which reveals that the factor-augmented predictive regressions usually produce better forecasts than the benchmark RW model. This finding is further supported by the DM test, indicating statistically significant improvements in forecast accuracy compared to the RW model. Our results also suggest that the RMSE values generally increase with the forecast horizon, confirming the out-of-sample predictive power of macro and financial factors especially for short term horizons. In particular, the predictive power of macro/financial factors is notable for Brazil, Hungary, India, Mexico, Poland and Thailand. Surprisingly, the factor augmented predictive regressions yield better forecasts for curvature factor in 7 countries out of 10 with a limited number of exceptions. This can be seen from Table 8 by noting that the lowest RMSEs are denoted in bold. However, while the RMSEs of factor type predictions are lower more than 40% compared to those of RW model for Hungary and Poland, their forecast performances are relatively poor in Russia and South Africa particularly for level and slope factors.

Furthermore, it is important to choose appropriate predictors prior to estimation of predictive regressions since the model and parameter uncertainty may adversely affect the explanatory variables' marginal predictive content (see, Bai and Ng (2008), Kuzin et al. (2011), Cepni and Guney (2019), Cepni et al. (2018, 2020), Fraooq et al. (2019), Terui and Li (2019) and Mascio et al. (2020)). In this respect, as an robustness check, we investigate alternative variable selection methods namely, the Elastic-Net, the Least Absolute Shrinkage Operator (LASSO), and the Ridge regression in order to pre-select variables prior to the predictions<sup>13</sup>. Accordingly, for each month, we recursively choose predictors from the set of our four macroeconomic and financial factors, instead of using all of them. As presented in Tables A16-A18 of appendix, machine learning algorithms are useful for selecting predictors when constructing predictions. Put differently, variable selection methods results in predictive gains by providing sparsity for model estimation compared to the predictive regressions utilizing all macroeconomic and financial factors simultaneously for each month. This can be seen from Tables A16-A18 of the appendix by noting that the entries in general are less than unity.

- Insert Table 5 about here. -

<sup>&</sup>lt;sup>13</sup>We give detailed information on how the variables selection algorithms are implemented in the appendix.

#### 5. Conclusion

This paper investigates the relative importance of the local and global factors in driving movement in term structure of interest rates in emerging markets. For this purpose, initially, the yield curve factors are extracted using the NS methodology for the 2006:01- 2019:04 period. Rather than analyzing the effect of macroeconomic variables by using a few empirical proxies for price developments, growth and monetary policy stance, the macroeconomic and financial variables are classified as global variables, economic activity, domestic financial developments and inflation. Then, a panel VAR model is employed to explore the dynamics of the yield curve factors and macroeconomics factors.

Empirical results suggest that the level factor responds positively to the shocks originating from inflation developments as well as financial variables. However, the effect of domestic financial variables on the level factor tends to be larger in size compared to inflationary shocks. Whereas slope factor is affected by shocks in global variables, curvature factor appears to be influenced by domestic financial variables. Besides, utilizing an individual factor augmented predictive regressions and variable selection algorithms also confirm thst macroeconomic/financial factors have predictive power for yield curve factors.

Our findings indicate that macroeconomic and global financial variables are informative in terms of explaining changes in yield curve of emerging markets countries. Given the unconventional monetary policy implementations and low-rate environment in developed countries, the emerging market domestic bond rates tend to be exposed to the swings in global financial conditions, which weakens the monetary policy transmission mechanism in emerging markets. Hence, policymakers should take into account the possible implications of shocks stemming from global financial framework as well as economic activity and local financial variables. Additionally, deciphering the relation among macroeconomic forces and each particular factor of yield curve enables to anticipate the changes in the yield curve through the evolvement in those forces and creates a better environment for producing accurate forecasts. Given the tremendous growth of emerging market bonds, and hence, the importance of accurate yield forecasts in the computation of optimal investment positions, our findings suggest that incorporating local and global factors in forecasting models can help to improve the design of portfolios that include emerging market bonds.

#### **Conflicts of interest**

The authors declare no conflict of interest.

#### **Data Availability Statement**

The data that support the findings of this study are available from Bloomberg terminal. Restrictions apply to the availability of these data, which were used under license for this study. However, we shared the corresponding tickers in Tables A1 - A10 of the online appendix. Hence anyone who has a Bloomberg account can easily download the same data.

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Categories Brazil Hungary India Malaysia Mexico Poland Russia South Africa Thailand Turkey Real economic activity Prices Domestic financial variables 

Table 1: Number of indicators by type for selected emerging markets.

Dependent Variable : Level	(1)	(2)	(3)	(4)	(5)
L.Level	1.133***	1.196***	1.153***	1.178***	1.097***
	(0.064)	(0.063)	(0.054)	(0.059)	(0.068)
L2.Level	-0.288***	-0.313***	-0.272***	-0.300***	-0.277***
	(0.054)	(0.057)	(0.052)	(0.054)	(0.053)
Inflation	0.0794***				0.0642***
	(0.029)				(0.023)
Activity		-0.0114			-0.0173
		(0.016)			(0.013)
Financial			0.0548**		0.0382
			(0.027)		(0.027)
Global				-0.0152	-0.0015
				(0.010)	(0.006)
Observations	1340	1340	1340	1340	1340
Number of country	10	10	10	10	10

Table 2: Dynamic panel estimation results : Level factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Global variables

Total

Dependent Variable : Slope	(1)	(2)	(3)	(4)	(5)
L.Slope	1.186***	1.137***	1.176***	1.177***	1.110***
	(0.052)	(0.044)	(0.062)	(0.047)	(0.051)
L2.Slope	-0.352***	-0.308***	-0.353***	-0.327***	-0.307***
	(0.051)	(0.047)	(0.056)	(0.042)	(0.049)
Inflation	0.005				-0.009
	(0.019)				(0.024)
Activity		0.038***			0.048***
		(0.014)			(0.017)
Financial			0.025		0.045***
			(0.022)		(0.015)
Global				0.014*	-0.005
				(0.008)	(0.009)
Observations	1340	1340	1340	1340	1340
Number of country	10	10	10	10	10

Table 3: Dynamic panel estimation results : Slope factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Dependent Variable : Curvature	(1)	(2)	(3)	(4)	(5)
L.Curvature	1.065***	1.046***	1.050***	1.058***	1.041***
	(0.083)	(0.088)	(0.084)	(0.091)	(0.084)
L2.Curvature	-0.347***	-0.343***	-0.345***	-0.346***	-0.341***
	(0.083)	(0.083)	(0.082)	(0.087)	(0.083)
Inflation	0.007				-0.029
	(0.045)				(0.048)
Activity		0.037			0.022
		(0.030)			(0.019)
Financial			0.087**		0.095**
			(0.037)		(0.040)
Global				0.008	-0.005
				(0.026)	(0.025)
Observations	1340	1340	1340	1340	1340
Number of country	10	10	10	10	10

Table 4: Dynamic panel estimation results : Curvature factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Dependent Variable : Level	(1)	(2)	(3)	(4)
L.Level	1.088***	1.105***	1.101***	1.024***
	(0.044)	(0.048)	(0.041)	(0.033)
L2.Level	-0.227***	-0.236***	-0.229***	-0.215***
	(0.054)	(0.051)	(0.049)	(0.049)
Inflation	0.029***			0.025**
	(0.007)			(0.012)
Activity		-0.027**		-0.015
		(0.011)		(0.011)
Financial			0.002	0.001
			(0.011)	(0.014)
Observations	1340	1340	1340	1340
Number of country	10	10	10	10

Table 5: Dynamic common correlated effects estimation results : Level factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Dependent Variable : Slope	(1)	(2)	(3)	(4)
L.Slope	1.116***	1.124***	1.123***	1.170***
	(0.056)	(0.046)	(0.053)	(0.052)
L2.Slope	-0.244***	-0.267***	-0.246***	-0.256***
	(0.045)	(0.048)	(0.046)	(0.046)
Inflation	0.022***			0.023**
	(0.008)			(0.011)
Activity		0.015***		0.015***
		(0.004)		(0.005)
Financial			0.016***	0.018***
			(0.006)	(0.006)
Observations	1340	1340	1340	1340
Number of country	10	10	10	10

Table 6: Dynamic common correlated effects estimation results : Slope factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Dependent Variable : Curvature	(1)	(2)	(3)	(4)
L.Curvature	1.048***	1.063***	1.124***	1.107***
	(0.050)	(0.047)	(0.100)	(0.099)
L2.Curvature	-0.218***	-0.221***	-0.242**	-0.255**
	(0.054)	(0.055)	(0.111)	(0.110)
Inflation	0.033			0.049**
	(0.021)			(0.021)
Activity		-0.004		0.028
		(0.007)		(0.017)
Financial			0.031**	0.028**
			(0.012)	(0.011)
Observations	1340	1340	1340	1340
Number of country	10	10	10	10

Table 7: Dynamic common correlated effects estimation results : Curvature factor

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table 8: Factor augmented predictive regressions : out-of-sample forecasting results

Brazil	h=1	h=2	h=3	h=4	h=5	h=6
RW	0.0187	0.0190	0.0193	0.0194	0.0195	0.0196
Level	0.817***	0.864**	0.909**	0.951*	0.986*	1.011
Slope	0.798***	0.847***	0.886**	0.913**	0.928**	0.933**
Curvature	0.970*	1.007	1.049	1.094	1.140	1.189
Hungary						
RW	0.0167	0.0169	0.0172	0.0173	0.0175	0.0177
Level	0.732***	0.761***	0.787***	0.815***	0.841***	0.862**
Slope	0.469***	0.480***	0.493***	0.506***	0.517***	0.527**
Curvature	0.527***	0.540***	0.556***	0.566***	0.574***	0.582**
India						
RW	0.0147	0.01473	0.01477	0.01478	0.01461	0.01442
Level	0.778***	0.804***	0.831**	0.850**	0.867**	0.875**
Slope	0.982*	1.011	1.034	1.046	1.054	1.067
Curvature	0.726***	0.751***	0.778***	0.803***	0.825***	0.846**
Malaysia						
RW	0.0040	0.0041	0.0041	0.0041	0.0042	0.0042
Level	0.880**	0.904**	0.917**	0.942**	0.969*	0.993*
Slope	1.432	1.475	1.506	1.547	1.587	1.629
Curvature	1.090	1.133	1.170	1.203	1.225	1.250
Mexico						
RW	0.0116	0.0117	0.0118	0.0119	0.0119	0.0120
Level	0.849***	0.888**	0.919**	0.949**	0.979*	1.022
Slope	0.929**	0.969*	0.995	1.009	1.021	1.034
Curvature	0.873***	0.909**	0.941**	0.960**	0.979*	0.990
Poland						
RW	0.0134	0.0136	0.0137	0.0139	0.0141	0.0142
Level	0.501***	0.521***	0.540***	0.559***	0.572***	0.583**
Slope	1.042	1.068	1.090	1.107	1.123	1.139
Curvature	0.834**	0.883**	0.929*	0.976*	1.018	1.058
Russia						
RW	0.0106	0.0107	0.0109	0.0110	0.0112	0.0112
Level	1.271	1.276	1.275	1.293	1.302	1.298
Slope	1.315	1.361	1.397	1.427	1.454	1.480
Curvature	0.890**	0.921**	0.940*	0.947*	0.939*	0.914**
S.Africa						
RW	0.0065	0.0065	0.0065	0.0066	0.0066	0.0066
Level	1.144	1.161	1.169	1.175	1.179	1.184
Slope	1.079	1.105	1.129	1.149	1.177	1.208
Curvature	0.833***	0.851**	0.872**	0.888**	0.904**	0.919**
Thailand						
RW	0.0097	0.0097	0.0097	0.0098	0.0098	0.0099
Level	0.781***	0.784***	0.788***	0.791***	0.795***	0.797**
Slope	1.144	1.212	1.259	1.296	1.318	1.327
Curvature	0.950**	0.972*	0.990	0.999	1.003	0.999
Turkey						
RW	0.0269	0.0268	0.0268	0.0270	0.0273	0.0279
Level	1 156	1 192	1 227	1 258	1 270	1 284
Slope	0 860***	1.172	1.227	0.004**	0.014**	0.027*
Gumu	1.020	1.050	1.007	1.064	1.054	1.027
Curvature	1.0.58	1.058	1.00/	1.004	1.056	1.057

Entries in the first row of the table are point RMSEs based on the benchmark random walk (RW) model, while the rest are relative RMSEs. Hence, a value of less than unity indicates that a particular model and estimation method is more accurate than that based on the RW model, for a given forecast horizon. Models that yield the lowest MSFE for each forecast horizon are denoted in bold. Entries superscripted with an asterisk (\*\*\* = 1% level; \*\* = 5% level; \* = 10% level) are significantly superior than the RW model, based on the DM predictive accuracy test.



Figure 1: International bond issuances and EM domestic bond markets total size

#### Source:BIS



Source:BIS



Figure 2: Scatterplots of relation between yield curve factors and estimated common components

#### Figure 3: Cumulative orthogonalized impulse-response functions



Figure 4: Accumulated impulse-responses among yield curve factors



## Appendix

### Data List

#### Table A1: Dataset-Brazil

Number	Ticker	Description	Data Classes
1	USDBRL Curncy	USDBRL Spot Exchange Rate - Price of 1 USD in BRL	Domestic Financial
2	EURBRL Curncy	EURBRL Spot Exchange Rate - Price of 1 EUR in BRL	Domestic Financial
3	JPYBRL Curncy	JPYBRL Spot Exchange Rate - Price of 1 JPY in BRL	Domestic Financial
4	USDBRLV1M Index	USDBRL 1 Month ATM Implied Volatility	Domestic Financial
5	USDBRL25R3M Index	USDBRL 3 Month 25 Delta Risk Reversal	Domestic Financial
6	BISBBRR Index	Brazil Real Effective Exchange Rate Broad	Domestic Financial
7	IBOV Index	Ibovespa Brasil Sao Paulo Stock Exchange Index	Domestic Financial
8	WCAUBRAZ Index	Bloomberg Brazil Exchange Market Capitalization USD	Domestic Financial
9	IFNCBV Index	Brazil Financial Index	Domestic Financial
10	BZLIQDTY Index	Bovespa Volume Brazil Settlement	Domestic Financial
11	IBOVIEE Index	Sao Paulo Stock Exchange Electrical Energy Index	Domestic Financial
12	CBRZ1U5 Curncy	Federative Republic of Brazil	Domestic Financial
13	BZSTSETA Index	Brazil Selic Target Rate	Domestic Financial
14	BZTJLP Index	Brazil BNDES Long Term Interest Rate TJLP	Domestic Financial
15	BZAD1Y Index	Anbima Brazil Govt Bond Fixed Rate 1 Year	Domestic Financial
16	BZAD2Y Index	Anbima Brazil Govt Bond Fixed Rate 2 Years	Domestic Financial
17	GEBR5Y Index	Brazil Government Generic Bond 5 Year	Domestic Financial
18	GEBR10Y Index	Brazil Government Generic Bond 10 Year	Domestic Financial
19	GEBU10Y Index	Brazil Government Generic Bond 10 Year USD	Domestic Financial
20	BZLNTOTA Index	Brazil Financial System Loans	Domestic Financial
21	BZLNPTOT Index	Brazil Financial Private System Loans	Domestic Financial
22	BZMBMB Index	Brazil Monetary Base	Domestic Financial
23	BZMS1 Index	Brazil Money Supply M1 Brazil M1	Domestic Financial
24	BZMS2 Index	Brazil Money Supply M2 Brazil M2	Domestic Financial
25	BZMS3 Index	Brazil Money Supply M3 Brazil M3	Domestic Financial
26	BZMS4 Index	Brazil Money Supply M4 Brazil M4	Domestic Financial
27	BRCDDEFT Index	Brazil Personal Loans More Than 90 Days Late	Domestic Financial
28	BZIDINTL Index	Brazil International Daily Reserves	Domestic Financial
29	BRCCVEHB Index	Brazil Consumer Credit Operations for Vehicle Acquisition	Domestic Financial
30	BZPIIPCA Index	Brazil CPI IPCA Dec 1993=100	Inflation
31	BZCILIVE Index	Brazil FIPE CPI Sao Paulo Living	Inflation
32	BZCIFOOD Index	Brazil FIPE CPI Sao Paulo Food Main	Inflation
33	BZCIPERS Index	Brazil FIPE CPI Sao Paulo Personal	Inflation
34	BZCITRAN Index	Brazil CIPE CPI Sao Paulo Transportation	Inflation
35	IPEAEXIN Index	Brazil IPEA Export Price Index	Inflation
36	IPEAIMIN Index	Brazil IPEA Import Price Index	Inflation
37	IBREIPAM Index	FGV Brazil IGP-M Wholesale Prices IPA-M	Inflation
38	IBREIPA1 Index	FGV Brazil Wholesale Prices IPA-10	Inflation
39	IBREINCM Index	FGV Brazil IGP-M Construction Prices INCC-M	Inflation
40	BPPICY Index	Brazil Producer Price Index Manufacturing Industry YoY % Change	Inflation
41	BZCCEXPT Index	Brazil CNI Consumer Confidence Inflation Expectations	Inflation
42	BRFCPC12 Index	Brazil CPI IPCA Median Smooth Market Expectation Next 12 Months YoY	Inflation
43	BZPCDIFF Index	Brazil CPI IPCA IBGE Diffusion Index	Inflation
44	BZCIFYOY Index	Brazil CPI Fipe YoY%	Inflation
45	IBREPCMY Index	FGV Brazil IGP-M CPI IPC-M YoY	Inflation
46	BZICINDX Index	CNI Brazil Industrial Confidence General	Economic Activity
47	BZCCI Index	CNI Brazil Consumer Confidence	Economic Activity
48	OLEDBRAZ Index	OECD Brazil Composite Leading Ind. Total Trend Restored Stck	Economic Activity
49	OEBRI003 Index	OECD Brazil Cons. Opin. Confidence Composite & OECD Indicators SA amp adj	Economic Activity
50	BZTBBALM Index	Brazil Trade Balance FOB Balance NSA	Economic Activity

Number	Ticker	Description	Data Classes
51	BZTBEXPM Index	Brazil Trade Balance FOB Exports	Economic Activity
52	BZTBIMPM Index	Brazil Trade Balance FOB Imports NSA	Economic Activity
53	BZTWBALW Index	Brazil Trade Balance Weekly Balance	Economic Activity
54	BZDPGOD Index	Brazil General Government Net Debt	Economic Activity
55	BZDPNDTL Index	Brazil Public Net Debt	Economic Activity
56	BZPBPRDM Index	Brazil Public Primary Budget Result	Economic Activity
57	BZCACURR Index	Brazil Current Account Monthly	Economic Activity
58	BZEDTLEX Index	Brazil External Debt Brazil External Gross Debt	Economic Activity
59	BZCA%GDP Index	Brazil Current Account % of GDP Last 12 Months Accumulated	Economic Activity
60	BZFDTMON Index	Brazil Foreign Direct Investment Net	Economic Activity
61	BZDPNDT% Index	Brazil Public Net Debt % of GDP	Economic Activity
62	BSRFTOFD Index	Brazil Total Federal Revenue	Economic Activity
63	BZBGEXPN Index	Brazil Central Government Total Expenditures	Economic Activity
64	BZPBNODM Index	Brazil Public Nominal Budget Result	Economic Activity
65	BZBGPRIM Index	Brazil Central Government Primary Budget Surplus/Deficit	Economic Activity
66	BZBGNOMI Index	Brazil Central Government Nominal Budget Surplus/Deficit	Economic Activity
67	BZIPTLSA Index	Brazil Real Industrial Production SA 2012=100	Economic Activity
68	BZIXEXTR Index	Brazil Industrial Production Activity Extractive Industry2012	Economic Activity
69	BZASSUBT Index	Brazil Auto Sales Subtotal	Economic Activity
70	BZCNCNIS Index	CNI Brazil Manufacture Industry Capacity Utilization SA	Economic Activity
71	BZCNSALS Index	CNI Brazil Manufacture Industry Real Sales SA 2006=100	Economic Activity
72	BZCNEMPS Index	CNI Brazil Manufacture Industry Employment SA 2006=100	Economic Activity
73	BZCNHOUS Index	CNI Brazil Manufacture Industry Working Hours SA 2006=100	Economic Activity
74	BZVPTLVH Index	Anfavea Brazil Vehicle Production	Economic Activity
75	BZVLTLVH Index	Anfavea Brazil Vehicle Sales Licensed	Economic Activity
76	BZVXEXTL Index	Anfavea Brazil Vehicle Exports	Economic Activity
77	BZVLTOTL Index	Anfavea Brazil Vehicle Sales Licensed Cars	Economic Activity
78	BZAIRTOT Index	Brazil Earned Real Total Income	Economic Activity
79	BZRTRTSA Index	Brazil Retail Sales Volume SA	Economic Activity
80	BZRTCOSA Index	Brazil Retail Sales Volume Construction Materials Index SA	Economic Activity
81	BZRTFDSA Index	Brazil Retail Sales Volume Supermarket Food Beverages & Tobacco SA	Economic Activity
82	BZRTFURN Index	Brazil Retail Sales Volume Furniture & Domestic Appliance	Economic Activity
83	OEBRV008 Index	OECD Brazil Prod. Manufacturing Total Manufacturing SA 2010=100	Economic Activity
84	BZEASA Index	Economic Activity GDP SA IBC-BR	Economic Activity
85	BZGDCAPX Index	Brazil GDP Qtrly Gross Formation of Fixed Capital SA 1995=100	Economic Activity
86	BZGDFAMX Index	Brazil GDP Qtrly Family Consumption SA 1995=100	Economic Activity
87	BZGDAGRX Index	Brazil GDP Qtrly Agriculture SA 1995=100	Economic Activity
88	BZGDIDTX Index	Brazil GDP Qtrly Industry SA 1990=100	Economic Activity
89	BZGDTRNX Index	Brazil GDP Qtrly Transformation Industry SA 1995=100	Economic Activity
90	BZGDSERX Index	Brazil GDP Qtrly Services SA 1995=100	Economic Activity
91	EHGDBR Index	Brazil Real GDP (Annual YoY %)	Economic Activity
92	2236689 Index	IMF Brazil Unemployment Rate	Economic Activity
93	BZJCYTOT Index	Brazil Government Registered Job Creation Total NSA YTD	Economic Activity
94	BZMEWHSA Index	Brazil Industry Working Hours Seasonally Adjusted Level	Economic Activity
95	BZMW Index	Brazil Minimum Wage	Economic Activity
96	BZMEFPRS Index	Brazil Industry Real Payroll Seasonally Adjusted Level	Economic Activity
97	BZAITOTL Index	Brazil Average Real Income	Economic Activity
98	BZAIPRIV Index	Brazil Average Real Income for Private Sector Employees	Economic Activity
99	BZAIPUBL Index	Brazil Average Real Income for Public Sector Employees	Economic Activity
100	BZAIFULL Index	Brazil Average Real Income for Private Sector Full Time Empoy	Economic Activity
101	BZAINFUL Index	Brazil Average Real Income for Private Sector Non Full Tme Emp	Economic Activity
102	BZAIINDP Index	Brazil Average Real Income for Independent Workers	Economic Activity
103	BRUETTOL Index	Brazil Unemployment Statistic from 10 Year Total NSA from 6 Major Metropol Areas	Economic Activity
104	BZUETOTN Index	IBGE Brazil Unemployment Rate - Six Largest Metropolitan Areas	Economic Activity
105	BZREOFFR Index	Brazil Sao Paulo Secovi Real Estate Units Offered	Economic Activity
106	BZRESTRT Index	Brazil Sao Paulo Secovi Real Estate Units Started	Economic Activity

Table A1 – Continued from previous page

Table A1 –	Table A1 - Continued from previous page       Number     Ticker       Description     Data Classes				
107	BZREPERD Index	Secovi Brazil Real Estate Units Average Sale Time Period	Economic Activity		
108	BZRESOLD Index	Brazil Sao Paulo Secovi Real Estate Units Sold	Economic Activity		

### Table A2: Dataset-Hungary

Number	Ticker	Description	Data Classes
1	HUCPIYY Index	Hungary CPI Yearly YoY	Inflation
2	HUCPIYYF Index	Hungary CPI Food Yearly YoY	Inflation
3	HUCPIYYA Index	Hungary CPI Alcohol & Tobacoo Yearly YoY	Inflation
4	HUCPIYYC Index	Hungary CPI Clothes Yearly YoY	Inflation
5	HUCPIYYD Index	Hungary CPI Durable Goods Yearly YoY	Inflation
6	HUCPIYYH Index	Hungary CPI Household Energy Yearly YoY	Inflation
7	HUCPIYYM Index	Hungary CPI Misc Items Yearly YoY	Inflation
8	HUCPIYYS Index	Hungary CPI Services Yearly YoY	Inflation
9	HUPPIYY Index	Hungary PPI YoY	Inflation
10	HUPPMAQY Index	Hungary PPI Mining & Quarrying YoY	Inflation
11	HUPPMANY Index	Hungary PPI Manufacturing YoY	Inflation
12	HUPPELGY Index	Hungary PPI Electricity & Gas YoY	Inflation
13	HUPPWATY Index	Hungary PPI Water Supply YoY	Inflation
14	HUEMUNR Index	Hungary Unemployment Rate	Economic Activity
15	HUEMUNL Index	Hungary Unemployment Level	Economic Activity
16	HUGWLYOY Index	Hungary Average Gross Wages YoY	Economic Activity
17	HUNWLYOY Index	Hungary Average Net Wages YoY	Economic Activity
18	HUGWPRVY Index	Hungary Average Gross Wages Private YoY	Economic Activity
19	HUGWPUBY Index	Hungary Average Gross Wages Public YoY	Economic Activity
20	HUNWPRVY Index	Hungary Average Net Wages Private YoY	Economic Activity
21	HUNWPUBY Index	Hungary Average Net Wages Public YoY	Economic Activity
22	HURTAYOY Index	Hungary Retail Trade YoY	Economic Activity
23	HURTYFDT Index	Hungary Retail Trade Food Drinks Tobacco YoY	Economic Activity
24	HURTYNFP Index	Hungary Retail Trade Non Food Products Tobacco YoY	Economic Activity
25	HURTYFUE Index	Hungary Retail Trade Automotive Fuel YoY	Economic Activity
26	WCARHUY Index	Europe Hungary New Passanger Car Registrations YoY	Economic Activity
27	HUISIMOM Index	Hungary Industrial Production SWDA YoY	Economic Activity
28	HUISIMOM Index	Hungary Industrial Sales MoM	Economic Activity
29	HUISDOMM Index	Hungary Industrial Sales Domestic MoM	Economic Activity
30	HUISEXPM Index	Hungary Industrial Sales Export MoM	Economic Activity
31	EUPRHU Index	Eurostat Construction Production Hungary SA Index	Economic Activity
32	CSBSHU Index	Eurostat Production in the Construction Sector Buildings Hungary SA Index	Economic Activity
33	CNCSHU Index	Eurostat Production in the Construction Sector Civil Engineering Hungary SA Index	Economic Activity
34	GKIESNDX Index	GKI Hungary Economic Sentiment	Economic Activity
35	HUPMISA Index	Hungary PMI SA	Economic Activity
36	EUICHU Index	European Commision Manufacturing Confidence Hungary Industrial Confidence	Economic Activity
37	EUI6HU Index	European Commision Manufacturing Confidence Hungary Recent Production Trend	Economic Activity
38	EUI2HU Index	European Commision Manufacturing Confidence Hungary Order Books	Economic Activity
39	EUI3HU Index	European Commision Manufacturing Industry Confidence Hungary Export Order Books	Economic Activity
40	EUI4HU Index	European Commision Manufacturing Confidence Hungary Stocks of Finished Products	Economic Activity
41	EUI1HU Index	European Commision Manufacturing Confidence Hungary Production Expectations	Economic Activity
42	EUI5HU Index	European Commision Manufacturing Confidence Hungary Selling Price Expectations	Economic Activity
43	EUI7HU Index	European Commision Manufacturing Confidence Hungary Employment Expectations	Economic Activity
44	EUCOHU Index	European Commission Construction Confidence Indicator Hungary	Economic Activity
45	EUB2HU Index	European Commision Construction Confidence Hungary Assessment of Order Books	Economic Activity
46	EUB3HU Index	European Commission Construction Confidence Hungary Employment Expectations	Economic Activity
47	EUB1HU Index	European Commision Consumer Confidence Hungary Trend of Activity Compared with Past Month	Economic Activity
48	EUB4HU Index	European Commission Construction Confidence Hungary Price Expectations	Economic Activity
49	EURTHU Index	European Commision Retail Trade Confidence Indicator Hungary	Economic Activity

Table A2 –	Continued from	previous	page

Number	Ticker	Description	Data Classes
50	EUR3HU Index	European Commision Retail Trade Confidence Hungary Intentions of Placing Orders	Economic Activity
51	EUR5HU Index	European Commision Retail Trade Confidence Hungary Employment Expectations	Economic Activity
52	EUR6HU Index	European Commision Retail Prices Expected in the Months ahead Hungary	Economic Activity
53	EUSCHU Index	European Commision Services Confidence Indicator Hungary	Economic Activity
54	EUS4HU Index	EU Services Evolution of Employment In Recent Month Hungary	Economic Activity
55	EUS5HU Index	EU Services Evolution of Employment Expected In The Month Ahead Hungary	Economic Activity
56	EUS6HU Index	EC Services Prices Expected In The Month Ahead Hungary	Economic Activity
57	HUCCINDX Index	GKI Hungary Customer Confidence	Economic Activity
58	OEHUKLAF Index	Hungary OECD Leading Indicators CLI Normalised SA Index	Economic Activity
59	HUTREXP Index	Hungary	Economic Activity
60	HUTRIMP Index	Hungary Foreign Trade Imports EUR	Economic Activity
61	HUGLLNGG Index	Hungary Loans to General Government Total	Domestic Financial
62	HUGLLNCG Index	Hungary Loans to Central Government Total	Domestic Financial
63	HUGLLNLG Index	Hungary Loans to Local Government Total	Domestic Financial
64	HUMOM3YY Index	Hungary Money Supply M3 YoY	Domestic Financial
65	HUMOM2YY Index	Hungary Money Supply M2 YoY	Domestic Financial
66	HUMOM1YY Index	Hungary Money Supply M1 YoY	Domestic Financial
67	HUMOM0YY Index	Hungary Money Supply M0 YoY	Domestic Financial
68	OAAGHU Index	Hungary Total Assets & Liabilities Outstanging Amounts	Domestic Financial
69	LONSHUUS Index	Hungary Unspecified Counterpart Sector Outstanding Amounts-Loans to Euro Area Residents	Domestic Financial
70	SOSHHUUS Index	Hungary MFIs Holdings of Securities other than Shares	Domestic Financial
71	SOEQHUUS Index	Hungary Unspecified Counterpart Sector Outstanding Amounts	Domestic Financial
72	EXASHU Index	Hungary External Assets	Domestic Financial
73	FXASHU Index	Hungary Fixed Assets Outstanding Amounts	Domestic Financial
74	DPOSHUUS Index	Hungary Deposits Unspecified Counterpart Sector -Deposits of Euro Area Residents	Domestic Financial
75	DSCIHUTL Index	Hungary Total Outstanding Amounts-Debt Securities	Domestic Financial
76	MFCRHU Index	Hungary Capital & Reserves Outstanding Amounts	Domestic Financial
77	EXLBHU Index	Hungary External Liabilities Outstanding Amounts	Domestic Financial
78	HUCRTOT Index	Hungary Total Reserve Assets	Domestic Financial
79	HUCRGOLD Index	Hungary Resreve Assets Monetary Gold	Domestic Financial
80	HUCRIMF Index	Hungary Reserve Assets Reserve Position in the IMF	Domestic Financial
81	HUCRESRV Index	Hungary Foreign Currency Reserves	Domestic Financial
82	HBBRATE Index	National Bank of Hungary Base Rate	Domestic Financial
83	HFDRC CMPN Curncy	NBH 3m Deposit rate	Domestic Financial
84	GHGB10YR Index	HungaryGovernment 10 Year Note Generic Bid Yield	Domestic Financial
85	BUX Index	Budapest Stock Exchange Index	Domestic Financial
86	USDHUF BGN Curncy	USDHUF Spot Exchange Rate	Domestic Financial
87	EURHUF BGN Curncy	EURHUF Spot Exchange Rate	Domestic Financial
88	BISBHUN Index	Hungary Nominal Effective Exchange Rate Broad	Domestic Financial
89	GSHURFCI Index	GS Hungary Real Financial Conditions Index	Domestic Financial
90	USDHUFV1M BGN Curncy	1 month ATM Implied Volatility	Domestic Financial
91	HUNGARY CDS USD SR 5Y D14	Hungary CDS	Domestic Financial
92	HUHHHPTO Index	Hungary Loans to Households Lending for House Purchase Total	Domestic Financial
93	HUHHHHTO Index	Hungary Loans to Households Total	Domestic Financial
94	HUHHCCTO Index	Hungary Loans to Households Consumer Credit Total	Domestic Financial
95	HUHHC5YH Index	Hungary Loans to Households Consumer Credit Over 1 & up to 5 Years HUF	Domestic Financial
96	HUHHC5OH Index	Hungary Loans to Households Consumer Credit Over 5 Years HUF	Domestic Financial
97	HUHHC5YF Index	Hungary Loans to Households Consumer Credit Over 1 & up to 5 Years FX	Domestic Financial
98	HUHHC5OF Index	Hungary Loans to Households Consumer Credit Over 5 Years FX	Domestic Financial

#### Table A3: Dataset-India

Number	Ticker	Description	Data Classes
1	USDINR Index	USDINR Spot Exchange Rate - Price of 1 USD in INR	Domestic Financial
2	JPYINR Index	JPYINR Spot Exchange Rate - Price of 1 JPY in INR	Domestic Financial

Table A3 –	Continued from previous page	e 1	1
Number	Ticker	Description	Data Classes
3	EURINR Curncy	EURINR Spot Exchange Rate - Price of 1 EUR in INR	Domestic Financial
4	USDINRV1M Index	USDINR 1 Month ATM Implied Volatility	Domestic Financial
5	USDINR25R3M Index	USDINR 3 Month 25 Delta Risk Reversal	Domestic Financial
6	JBMPINR Index	J.P. Morgan India PPI-Based Real Broad Effective Exchange Rate	Domestic Financial
7	BISBINR Index	India Real Effective Exchange Rate Broad	Domestic Financial
8	WCAUINDI Index	Bloomberg India Exchange Market Capitalization USD	Domestic Financial
9	SENSEX Index	S&P BSE SENSEX Index	Domestic Financial
10	NIFTY Index	NSE Nifty 50 Index	Domestic Financial
11	MXIN Index	MSCI India Index	Domestic Financial
12	INRPYLDP Index	Reserve Bank of India Repurchase Rate Policy Announcement	Domestic Financial
13	RBIBKRTE Index	India RBI Bank Rate	Domestic Financial
14	GTINR1YR Corp	India Government Bond	Domestic Financial
15	GTINR5YR Corp	India Government Bond	Domestic Financial
16	GTINR10YR Corp	India Government Bond	Domestic Financial
17	IRSWOF CMPN Curncy	INR SWAP ONSH OIS 6 MO	Domestic Financial
18	IN001M Index	Financial Benchmarks India Interbank 1 Month Rate	Domestic Financial
19	NRIDTOT Index	India NRI Deposits Total	Domestic Financial
20	NRIDFCNR Index	India NRI Deposits FCNR	Domestic Financial
21	NRIDNRE Index	India NRI Deposits NRE	Domestic Financial
22	SBIPRIME Index	PRIME RATE - INDIA SBI PRIME	Domestic Financial
23	INMSM3Y Index	India Money Supply M3 YoY	Domestic Financial
24	INMSM1Y Index	India Money Supply M1 YoY	Domestic Financial
25	INLOLIAB Index	Reserve Bank of India Total Liabilities	Domestic Financial
26	INMORES\$ Index	India Foreign Exchange Reserves USD	Domestic Financial
27	INMORESV Index	India Foreign Exchange Reserves	Domestic Financial
28	RBICSLR Index	India Reserve Bank Statutory Liquidity Ratio Effective Rate	Domestic Financial
29	RSPOAMT Index	Reserve Bank of India Reverse REPO Amount	Domestic Financial
30	INFFFIDE Index	India Govt Finances Fiscal Deficit	Domestic Financial
31	INFFDOFI Index	India Govt Finances Domestic Financing	Domestic Financial
32	INFFEXFI Index	India Govt Finances External Financing	Domestic Financial
33	INHFHDFL Index	India HDFC Bank Indicative Housing Loan Rate Floating	Domestic Financial
34	INFFTOEX Index	India Govt Finances Expenditure	Domestic Financial
35	INECB Index	India External Commercial Borrowings	Domestic Financial
36	INFDCUMU Index	India Cumulative Foreign Direct Investment Inflows since August 1991	Domestic Financial
37	INECFCCB Index	India Foreign Currency Commercial Borrowings	Domestic Financial
38	INFUTOT Index	India CPI Combined	Inflation
39	INFUHOU Index	India CPI Housing	Inflation
40	INCPIINY Index	India CPI Industrial Workers YoY	Inflation
41	INCPAGLY Index	India CPI Agricultural Laborers YoY	Inflation
42	INCPRLBY Index	India CPI Rural Laborers YoY	Inflation
43	INFINFY Index	India Wholesale Price Index All Commodities YoY	Inflation
44	5346629 Index	IMF India PPI/WPI	Inflation
45	INBGAICY Index	India Agriculture Input Cost Inflation	Inflation
46	INBGWPMY Index	India Wholesale Price Monthly Manufacturing YoY	Inflation
47	OEINNDCU Index	OECD India National Accounts Deflators Gross Domestic Product Index SA	Inflation
48	INBGWPIY Index	India Wholesale Price Monthly YoY	Inflation
49	INBFBCI Index	India Business Cycle Indicator	Economics Activity
50	INMTEXUY Index	India Merchandise Exports Including Re exports YoY	Economics Activity
51	INMTIMUY Index	India Merchandise Imports YoY	Economics Activity
52	INIMPETR Index	India Imports of Principal Commodities Petroleum Crude and Products	Economics Activity
53	INOEMS Index	India Exports of Motor Spirit/Petrol	Economics Activity
54	INOEHSD Index	India Exports of High Speed Diesel	Economics Activity
55	INFDTOTS Index	India Monthly Foreign Direct Investment Inflow Tot USD	Economics Activity
56	INFFTORE Index	India Govt Finances Revenue	Economics Activity
57	INVSTOTL Index	India SIAM Vehicle Sales Domestic & Total	Economics Activity
58	INVSDTOT Index	India SIAM Total Vehicle Sales Domestic	Economics Activity

Table A3 -	Continuea from previous page	e	
Number	Ticker	Description	Data Classes
59	INBGIIPY Index	India Industrial Production Monthly YoY	Economics Activity
60	INBGIPMY Index	India Industrial Production Monthly Manufacturing YoY	Economics Activity
61	INPICONS Index	India Industrial Production Consumer Goods Base 2004-05	Economics Activity
62	GSINCAI Index	GS India Current Activity Indicator	Economics Activity
63	OEINKLAR Index	India OECD Leading Indicators CLI Trend Restored SA	Economics Activity
64	OEINKLAF Index	India OECD Leading Indicators CLI Normalised SA	Economics Activity
65	OEINKLAC Index	India OECD Leading Indicators CLI Amplitude Adjusted SA	Economics Activity
66	BDSRINP Index	BIS Debt Service Ratio India Private Non-financial Sector	Economics Activity
67	INMTBAL\$ Index	India Merchandise Trade Balance USD	Economics Activity
68	INFRIDXY Index	India Eight Core Industries Overall Growth rate	Economics Activity
69	INRCCPCL Index	India Refinery Capacity Utilization CPCL	Economics Activity
70	INRCCTBP Index	India Refinery Capacity Utilisation BPCL Total	Economics Activity
71	INRCPUTT Index	India Refinery Capacity Utilisation Public Sector	Economics Activity
72	INRCPSTT Index	India Refinery Capacity Utilisation Private Sector Total	Economics Activity
73	EHGDIN Index	India Real GDP (Annual YoY %)	Economics Activity
74	OEINNGBS Index	Private Final Consumption Expenditure	Economics Activity
75	OEINNGBX Index	Government Final Consumption Expenditure	Economics Activity
76	OEINNGCC Index	Gross Fixed Capital Formation	Economics Activity
77	OEINNGCM Index	Exports of Goods & Services	Economics Activity
78	OEINNGCR Index	Imports of Goods & Services	Economics Activity
79	INFRCEMY Index	India Eight Core Industries Growth of Cement	Economics Activity
80	INIMGOLD Index	India Imports of Principal Commodities Gold	Economics Activity
81	INEXPETR Index	India Exports of Principal Commodities Petroleum Crude and Products	Economics Activity
82	INIMMACH Index	India Imports of Principal Commodities Machinery Ex Electrical & Electronic	Economics Activity
83	INIMCHEP Index	India Imports of Principal Commodities Chemical Materials & Products	Economics Activity
84	INFRCRUY Index	India Eight Core Industries Growth of Crude Oil	Economics Activity
85	INEXELEC Index	India Exports of Principal Commodities Electronic Goods	Economics Activity
86	INGRCEME Index	India Gross Bank Credit to Cement & Cement Products	Economics Activity
87	INPIPF04 Index	India Index of Industrial Production Food Products and Beverages 2004-05	Economics Activity
88	INIMMATL Index	India Imports of Principal Commodities Machine Tools	Economics Activity
89	INPIMA04 Index	India Index of Industrial Production Furniture Manufacturing 2004-05	Economics Activity
90	INGRCONS Index	India Gross Bank Credit to Construction	Economics Activity
91	INPIDI04 Index	India Index of Industrial Production Base 2004-05	Economics Activity
92	INPIMQ04 Index	India Index of Industrial Production Machinery and Equipment 2004-05	Economics Activity
93	INFRCEM5 Index	India Core Industries Cement Index 2004-05	Economics Activity
94	INFRCRP5 Index	India Core Industries Crude Oil Production 2004-05	Economics Activity
95	INFRELP5 Index	India Core Industries Electricity Generation 2004-05	Economics Activity
96	INFRSTY5 Index	India Core Industries Steel Production Growth 2004-05	Economics Activity

### Table A4: Dataset-Malaysia

Number	Ticker	Description	Data Classes
1	MACPIYOY Index	Malaysia CPI YoY 2010=100	Inflation
2	MACPFOOY Index	Malaysia CPI Food & Non Alcoholic Beverages YoY 2010=100	Inflation
3	MACPCLOY Index	Malaysia CPI Clothing & Footwear YoY 2010=100	Inflation
4	MACPRENY Index	Malaysia CPI Housing; Rent Utility & Fuel YoY 2010=100	Inflation
5	MACPFURY Index	Malaysia CPI Furniture & Household Equipment YoY 2010=100	Inflation
6	MACPMEDY Index	Malaysia CPI Medical Care & Health Expenses YoY 2010=100	Inflation
7	MACPTRAY Index	Malaysia CPI Transport YoY 2010=100	Inflation
8	MACPCOMY Index	Malaysia CPI Communication YoY 2010=100	Inflation
9	MACPRECY Index	Malaysia CPI Recreation Entertainment & Cultural Service YoY 2010=100	Inflation
10	MACPEDUY Index	Malaysia CPI Education YoY 2010=100	Inflation
11	MACPRSHY Index	I10989US Index	Inflation
12	MCPITOTY Index	Malaysia Core CPI Ex Fresh Food&Administered Prices-Total YOY	Inflation
13	MPPIITOT Index	Malaysia Producer Price Index Imports 2010=100	Inflation

Number	Ticker	Description	Data Classes
14	MSRYMY Index	Malaysia Misery Index Current Inflation Rate Plus Unemployment Rate	Inflation
15	MACPBEVY Index	Malaysia CPI Alcoholic Beverages & Tobacco YoY 2010=100	Inflation
16	MAETEYOY Index	Malaysia External Trade Gross Exports FOB YoY	Real Economic Activity
17	MAETIYOY Index	Malaysia External Trade Gross Imports CIF YoY	Real Economic Activity
18	MIERCSI Index	MIER Malaysia Consumer Sentiments Index	Real Economic Activity
19	MAMNYOY% Index	Malaysia Manufacturing Sales of Products Ex Factory YoY %	Real Economic Activity
20	MIERBSI Index	MIER Malaysia Business Conditions Index	Real Economic Activity
21	MRSUSTRT Index	Malaysia Residential Property Starts	Real Economic Activity
22	POEXTOTL Index	SGS Malaysia Palm Pdt Bulk Shipment Export Data	Real Economic Activity
23	MAVSTTL Index	Malaysia Vehicle Sales - Total	Real Economic Activity
24	MAEPMUN% Index	Malaysia Monthly Unemployment Rate	Real Economic Activity
25	ASEAMLAY Index	Motor Vehicle Production	Real Economic Activity
26	MIERCSI Index	Consumer Confidence	Real Economic Activity
27	MYEILI Index	Malaysia Economic Indicator - Leading Index 2005=100	Real Economic Activity
28	MYEILGI Index	Malaysia Economic Indicator - Lagging Index 2005=100	Real Economic Activity
29	MYEICI Index	Malaysia Economic Indicator - Coincident Index 2005=100	Real Economic Activity
30	MIUSSTRT Index	Malaysia Industrial Units Starts	Real Economic Activity
31	MACCCBAL Index	Consumer Credit Outstanding (Nonmortgage)	Real Economic Activity
32	MATAGT Index	Malaysia Tourist Arrivals	Real Economic Activity
33	MAVRTOTL Index	Malaysia Vehicle Registration	Real Economic Activity
34	MAVRCARS Index	Malaysia Vehicle Registration Cars	Real Economic Activity
35	MAMNTOTL Index	Malaysia Manufacturing Sales of Products Ex Factory in Mil	Real Economic Activity
36	MAOPRATE Index	Malaysia Overnight Policy Rate	Domestic Financial
37	MRDRC CMPN Curncy	MYR 3 Month Deposit	Domestic Financial
38	MGIY10Y Index	Bank Negara Malaysia 10 Year Govt Securities Indicative YTM	Domestic Financial
39	FBMKLCI Index	FTSE Bursa Malaysia KLCI Index - Kuala Lumpur Composite Index	Domestic Financial
40	USDMYR Curncy	USDMYR	Domestic Financial
41	JPYMYR Curncy	JPYMYR	Domestic Financial
42	MAMSYOY% Index	Malaysia Money Supply M1 YoY	Domestic Financial
43	MAMS2YOY Index	Malaysia Money Supply M2 YoY	Domestic Financial
44	MAMS3YOY Index	Malaysia Money Supply Broad Money M3 YoY	Domestic Financial
45	MAASCBCC Index	Malaysia Central Bank Components of Reserve Money Currency on Circulation	Domestic Financial
46	MAASCBRR Index	Malaysia Central Bank Components of Reserve Money Required Reserves	Domestic Financial
47	MAOR Index	Malaysia Gross External Reserves	Domestic Financial
48	MAALFCR\$ Index	Malaysia Assets & Liabilities Foreign Currency Reserves	Domestic Financial
49	MAOPSRR Index	Malaysia Statutory Reserve Requirement Rate	Domestic Financial
50	MAVLCOMM Index	Malaysia Avg Lending Rate Commercial Banks	Domestic Financial
51	MAVBCOMM Index	Malaysia Monthly Base Lending Rate Commercial Banks	Domestic Financial
52	BISBMYR Index	Malaysia Real Effective Exchange Rate Broad	Domestic Financial
53	MANPTOTL Index	Malaysia Banking System Non-performing Loans	Domestic Financial
54	TLMABS Index	Bank Negara Malaysia Loans by Banking System	Domestic Financial
55	TLMACOMM Index	Bank Negara Malaysia Loans by Commercial Banks	Domestic Financial
56	MALDHOLD Index	Malaysia Loans Disbursed by Sector Household	Domestic Financial
57	MACCLCMA Index	Malaysia Credit Cards Local Cardholder Purchases In Country	Domestic Financial
58	MSCI Malaysia Financials Index	MSCI Malaysia Financials Index	Domestic Financial
59	DBYHFINA Index	Malaysia Islamic Banking System Deposits by Financial Institutions	Domestic Financial
60	USDMYRV1M Curncy	USDMYR 1 Month ATM Implied Volatility	Domestic Financial
61	MALAYS CDS USD SR 5Y D14	Malaysia CDS	Domestic Financial

#### Table A5: Dataset-Mexico

	TICKEI	Description	Data Classes
1	MXBLMORT Index	Mexico Bank Lending Mortgages	Domestic Financial
2	USDMXN Index	USDMXN Spot Exchange Rate - Price of 1 USD in MXN	Domestic Financial
3	JPYMXN Index	JPYMXN Spot Exchange Rate - Price of 1 JPY in MXN	Domestic Financial

Number	Ticker	Description	Data Classes
4	CADMXN Curncy	CADMXN Spot Exchange Rate - Price of 1 CAD in MXN	Domestic Financial
5	USDMXNV1M Index	USDMXN 1 Month ATM Implied Volatility	Domestic Financial
6	USDMXN25R3M Index	USDMXN 3 Month 25 Delta Risk Reversal	Domestic Financial
7	BISBMXR Index	Mexico Real Effective Exchange Rate Broad	Domestic Financial
8	WCAUMEX Index	Bloomberg Mexico Exchange Market Capitalization USD	Domestic Financial
9	MEXBOL Index	Mexican Stock Exchange Mexican Bolsa IPC Index	Domestic Financial
10	MXONBR Index	Bank of Mexico Official Overnight Rate	Domestic Financial
11	MEX CDS USD SR 5Y D14 Corp	United Mexican States	Domestic Financial
12	MXFRCINR Index	BOM Government Funding Rate Closing Interest Rate	Domestic Financial
13	MPTBF CMPN Curncy	MXN T-BILL 6 MO	Domestic Financial
14	MPTB1 CMPN Curncy	MXN T-BILL 1 YR	Domestic Financial
15	GMXN02YR Index	Mexico Generic 2 Year	Domestic Financial
16	GMXN05YR Index	Mexico Generic 5 Year	Domestic Financial
17	MXLCLFCB Index	Mexico Loans from Commercial Banks	Domestic Financial
18	MXLCMOLO Index	Mexico Mortgage Loans	Domestic Financial
19	MXLCCOLO Index	Mexico Consumption Loans	Domestic Financial
20	MXBDNPLR Index	Mexico Non-Performing Loans as % of Total Loans	Domestic Financial
21	MXLCEXSE Index	Mexico External Sector	Domestic Financial
22	MXBLSAOA Index	Mexico Bank Lending Services and Other Activities	Domestic Financial
23	MXDFCONS Index	Mexico Private Sector Direct Financing Total	Domestic Financial
24	MXBLPERF Index	Mexico Bank Lending Performing Loans	Domestic Financial
25	MXBLNONB Index	Mexico Bank Lending Performing Loans for Non Bank Financial	Domestic Financial
26	MXMB Index	Mexico Monetary Base Money Base	Domestic Financial
27	MXMSM1 Index	Mexico Money Supply M1-M4 M1 Total	Domestic Financial
28	MXMSM2 Index	Mexico Money Supply M1-M4 M2 Total	Domestic Financial
29	MXMSM3 Index	Mexico Money Supply M1-M4 M3 Total	Domestic Financial
30	MXMSM4 Index	Mexico Money Supply M1-M4 M4 Total	Domestic Financial
31	MXDEINT Index	Mexico Federal Government Net Domestic Debt in Millions of Mexican Pesos	Domestic Financial
32	MXDEEXT Index	Mexico Public Sector Net External Debt in Millions of U.S. Dollars	Domestic Financial
33	MXERBUDD Index	Mexico Public Rev & Expend Budgetary Deficit YTD	Domestic Financial
34	MXIRINUS Index	Mexico International Reserves in USD	Domestic Financial
35	MXDBPDDV Index	Mexico Development Banks Total Public Demand Deposits Volume	Domestic Financial
36	MXDBPTDV Index	Mexico Development Banks Total Public Time Deposits Volume	Domestic Financial
37	2735E55 Index	IMF Mexico Financial Corp Deposits	Domestic Financial
38	MXPII Index	Mexico Producer Price Index	Inflation
39	MFGSMANU Index	Mexico Fin Gds & Srvs Secondary Sector Manufacturing 2012	Inflation
40	MFGSCONS Index	Mexico Fin Gds & Srvs Secondary Sector Construction 2012	Inflation
41	MXPIIXO Index	Mexico Producer Price Index Ex Oil	Inflation
42	MFGSMINE Index	Mexico Fin Gds & Srvs Primary Sector Mining 2012	Inflation
43	MFGSELGA Index	Mexico Fin Gds & Srvs Tertiary Water Electricity and Gas 2012	Inflation
44	MPPRIMPT Index	Mexico International Trade Import Price NSA 1980=100	Inflation
45	MPPREXPT Index	Mexico International Trade Export Price NSA 1980=100	Inflation
46	MXCPI Index	Mexico CPI	Inflation
47	MXCCCORE Index	Mexico Core CPI	Inflation
48	MXCNFDAT Index	Mexico CPI Index 2010=100 Food Drinks and Tobacco	Inflation
49	MXCNNFGD Index	Mexico CPI Index 2010=100 Non Food Goods	Inflation
50	MXCNSERV Index	Mexico CPI Index 2010=100 Services	Inflation
51	MXCNAGRI Index	Mexico CPI Index 2010=100 Agriculture	Inflation
52	MXCNERAG Index	Mexico CPI Index 2010=100 Energy Rates Auth by Govt	Inflation
53	MXCIHOUS Index	Mexico CPI by Expenditure Housing	Inflation
54	MEXHMEXY Index	Mexico House Price Index YoY	Inflation
55	IMEFMAIN Index	Mexico Manufacturing Index SA	Economic Activity
56	IMEFNMIN Index	Mexico Non Manutacturing Index SA	Economic Activity
50	IMEEMPRO Index	Mexico Manufacturing Index Production SA	Economic Activity
50	SUMAPROI INDEX	Maxico Producer Confidence indicator SA	Economic Activity
59	MAMAAIIR Index	Mexico Manufacturing Aggregate Trend Indicator	Economic Activity

Table A5 – Continued from previous page			
Number	Ticker	Description	Data Classes
60	MXMAEXPT Index	Mexico Manufacturing Aggregate Trend Indicator Exports	Economic Activity
61	MXMAMNOR Index	Mexico Manufacturing Aggregate Orders Indicator Manufacturing Orders SA	Economic Activity
62	CSMXCONU Index	MX Consumer Confidence Index SA	Economic Activity
63	CSMXPOSU Index	Mexico Compared Economic Situation with a Year Ago at Present SA	Economic Activity
64	MXCLYLEA Index	Mexico Leading Indicator YoY	Economic Activity
65	MXCLSALE Index	Mexico Seasonally Adjusted Leading Indicator	Economic Activity
66	MXCLSACO Index	Mexico Seasonally Adjusted Coincident Indicator	Economic Activity
67	MXTBBEXP Index	Mexico Trade Balance Exports Monthly Total USD Million	Economic Activity
68	MXOTAMER Index	Petroleos Mexicanos (Pemex) Crude Oil Mexico Trade Data/Americas	Economic Activity
69	MXOTEURO Index	Petroleos Mexicanos (Pemex) Crude Oil Mexico Trade Data/Europe	Economic Activity
70	MXEXPETR Index	Mexico Nominal Current Account Balance	Economic Activity
71	MXEXNONP Index	Mexico Exports by Sector Non Petroleum Mexico Exports Monthly Total USD Million	Economic Activity
72	MXRETOT\$ Index	Mexican Remittances Money Sent from Workers Outside Mexico	Economic Activity
73	IGAEINDX Index	Mexico Indicator of Economic Activity Index SA	Economic Activity
74	IGAEPADI Index	Mexico Economic Activity Primary Activities Series Index SA	Economic Activity
75	MINVCNST Index	Mexico Capital Investment Construction	Economic Activity
76	MXPSTOTL Index	Mexico Industrial Production Total Seasonally Adjusted	Economic Activity
77	MXPSOGSA Index	Mexico Industrial Production Oil and Gas Extraction Seasonally Adjusted	Economic Activity
78	MXPSELEC Index	Mexico Industrial Production Utilities Seasonally Adjusted	Economic Activity
79	MXPSCONS Index	Mexico Industrial Production Construction Seasonally Adjusted	Economic Activity
80	MXPSMANF Index	Mexico Industrial Production Manufacturing Seasonally Adjusted	Economic Activity
81	MXSATOTL Index	Mexico Antad Same-Store Sales Overall YoY%	Economic Activity
82	MXSLMOGA Index	Mexico Gasoline Sales Monthly	Economic Activity
83	MXSLDIES Index	Mexico Diesel Sales Monthly	Economic Activity
84	MXMNMCEQ Index	Mexico Capacity Utilization Manufacture of Machinery and Equipment	Economic Activity
85	MXMNPECO Index	Mexico Capacity Utilization Manufacture of Petroleum Products and Coal	Economic Activity
86	MXVPTOTL Index	Mexico Vehicle Production Total Production	Economic Activity
87	MXWRTWHO Index	Mexico Wholesale/Retail Sale Totl Whole	Economic Activity
88	MXVHTOTL Index	Mexican Vehicle Sales Auto+truck NSA	Economic Activity
89	MXVETOTL Index	Mexican Vehicle Exports Total	Economic Activity
90	MDPCSAIN Index	Mexico Total Season Adjusted Index Base 2008	Economic Activity
91	MINVTOSA Index	Mexico Gross Fixed Inv Total Seasonally Adjusted	Economic Activity
92	EHGDMX Index	Mexico Real GDP (Annual YoY %)	Economic Activity
93	MXR4TTSA Index	Mexico Real GDP by Industry Total SA	Economic Activity
94	MXR4CNSA Index	Mexico Real GDP by Industry Construction SA	Economic Activity
95	MXR4MFSA Index	Mexico Real GDP by Industry Manufacturing SA	Economic Activity
96	MXR4RESA Index	Mexico Real GDP by Industry Wholesale and Retail Trade SA	Economic Activity
97	MXGNTTAL Index	Mexico Nominal GDP Total SA	Economic Activity
98	MXCACUAC Index	Mexico Nominal Current Account Balance	Economic Activity
99	MXCABCOM Index	Banco de Mexico Commercial Balance	Economic Activity
100	MXSDPRYO Index	Mexico Supply & Demand Private Consumption YoY	Economic Activity
101	MXSDPUYO Index	Mexico Supply & Demand Public Consumption YoY	Economic Activity
102	MXSDGCFY Index	Mexico Supply & Demand Total SA Annual Change 2008 Pesos	Economic Activity
103	MXUEUNSA Index	Mexico Unemployment Rate SA for Workers 15 and Older ENOE	Economic Activity
104	MXWICONS Index	Mexico Formal Job Temporary & Permanent Workers Construction	Economic Activity
105	MXWIRETL Index	Mexico Formal Job Temporary & Permanent Workers Retail	Economic Activity
106	MXWITRCO Index	Mexico Formal Job Temporary & Permanent Workers Transportation & Communication	Economic Activity
107	MXWICOSV Index	Mexico Formal Job Temporary & Permanent Workers Commercial Services	Economic Activity
108	MXWIMANU Index	Mexico Formal Job Temporary & Permanent Workers Manufacturing	Economic Activity
109	MXWITOTL Index	Mexico Formal Job Temporary & Permanent Workers Total	Economic Activity
110	MXUETEPT Index	Mexico Employment Rate	Economic Activity
111	MXMIMITO Index	Mexico Wages by Manufacturing Industry Total	Economic Activity
112	IMEFMNOR Index	Mexico Manufacturing Index New Orders SA	Economic Activity
113	IMEFNMNO Index	Mexico Non Manufacturing Index New Orders SA	Economic Activity
114	MXCSBUIL Index	Mexico Construction Spending Buildings	Economic Activity

#### Table A6: Dataset-Poland

Number	Ticker	Description	Data Classes
1	POCPIYOY Index	Poland CPI All Items YoY	Inflation
2	POCPFAYY Index	Poland CPI Food Beverage & Tobacco YoY	Inflation
3	POCPCFYY Index	Poland CPI Clothing & Footwear YoY	Inflation
4	POCPDWYY Index	Poland CPI Dwellings YoY	Inflation
5	POCPHLYY Index	Poland CPI Health YoY	Inflation
6	POCPTRYY Index	Poland CPI Transport YoY	Inflation
7	POCPCOYY Index	Poland CPI Communication YoY	Inflation
8	POCPREYY Index	Poland CPI Recreation & Culture YoY	Inflation
9	POCPEDYY Index	Poland CPI Education YoY	Inflation
10	POCPRHYY Index	Poland CPI Restaurants & Hotels YoY	Inflation
11	POCPMSYY Index	Poland CPI Misc Goods & Services YoY	Inflation
12	POCPHEYY Index	Poland CPI Housing YoY	Inflation
13	POPPIYOY Index	Poland PPI YoY	Inflation
14	POPPMYOY Index	Poland PPI Mining & Quarrying YoY	Inflation
15	POPPFYOY Index	Poland PPI Manufacturing YoY	Inflation
16	POPPLYOY Index	Poland PPI Electricity & Gas YoY	Inflation
17	POPPWYOY Index	Poland PPI Water Supply YoY	Inflation
18	POIPIYOY Index	Poland Import Prices YoY	Inflation
19	POEPIYOY Index	Poland Export Price YoY	Inflation
20	ECCPPOY Index	Eurostat Poland HICP All Items YoY NSA	Inflation
21	POISCYOY Index	Poland Sold Industrial Output of Goods & Services at Constant Prices YoY	Economic Activity
22	EUESPL Index	European Commission Economic SentiMent Indicator Poland	Economic Activity
23	OEPLKLAP Index	Poland OECD Leading Indicators CLI Trend Restored YoY SA	Economic Activity
24	OEPOW006 Index	OECD Poland Construction Orders Permits Issued Residential Buildings Monthly SA	Economic Activity
25	PORSYOY Index	Poland Retail Sales YoY	Economic Activity
26	EUCCPL Index	European Commission Consumer Confidence Indicator Poland	Economic Activity
27	POMECBGE Index	Poland BoP Current Account Balance on Goods - Export	Economic Activity
28	POMECBGI Index	Poland BoP Current Account Balance on Goods - Import	Economic Activity
29	POEYYOY Index	Poland Average Paid Employment Yearly	Economic Activity
30	POUELYOY Index	Poland Unemployment YoY	Economic Activity
31	POUEJOEM Index	Poland Unemployment Job Offers End of Month	Economic Activity
32	POUEJODM Index	Poland Unemployment Job Offers During Month	Economic Activity
33	PORSVYOY Index	Poland Retail Sales Vehicles YoY	Economic Activity
34	PORSSYOY Index	Poland Retail Sales Food Beverages & Tobacco YoY	Economic Activity
35	PORSOYOY Index	Poland Retail Sales Other Non Specialized Stores YoY	Economic Activity
36	PORSPYOY Index	Poland Retail Sales Pharmaceuticals & Cosmetics YoY	Economic Activity
37	PORSHYOY Index	Poland Retail Sales Furniture & Household Appliances YoY	Economic Activity
38	WCARPOY Index	Europe Poland New Passenger Car Registrations YoY	Economic Activity
39	HCVHPLY Index	New Heavy Commercial Vehicles Poland YoY	Economic Activity
40	POCSBWUK Index	Poland Consumer Confidence Climate	Economic Activity
41	POCSEL12 Index	Poland Consumer Confidence Economic Situation Last 12 Months	Economic Activity
42	POMECBCA Index	Poland BoP Current Account	Economic Activity
43	POMECBGB Index	Poland BoP Current Account Balance on Goods	Economic Activity
44	EUA4PL Index	EC Consumer Confidence Poland General Economic Situation Next 12 Month	Economic Activity
45	EUA3PL Index	EU Consumer Confidence Poland General Economic Situation Last 12 Month	Economic Activity
46	OEPLPEBR Index	OECD Poland Producer Prices Index Economic Activities Manufacturing Growth	Economic Activity
47	POWGYOY Index	Poland Average Monthly Gross Wage YoY%	Economic Activity
48	POOSCYOY Index	Poland - Sales of Construction and Assembly Production YoY	Economic Activity
49	PORERATE Index	Narodowy Bank Polski Reference Rate	Domestic Financial
50	PZDRC CMPN Curncy	PLN 3 Month Deposit	Domestic Financial
51	POGB10YR Index	Poland Government 10 Year Note Generic Bid Yield	Domestic Financial
52	WIG Index	Warsaw Stock Exchange WIG Total Return Index	Domestic Financial
53	PLN Curncy	USDPLN Spot Exchange Rate - Price of 1 USD in PLN	Domestic Financial
54	EURPLN Curney	EURPLN Spot Exchange Rate - Price of 1 EUR in PLN	Domestic Financial
55	POM3LYOY Index	Poland Money Supply M3 YoY	Domestic Financial

Table A6 – Continued from previous page			
Number	Ticker	Description	Data Classes
56	POM2YOY Index	Poland Money Supply M2 ECB Standardized YoY	Domestic Financial
57	POM1ECBY Index	Poland Money Supply M1 ECB Standardized YoY	Domestic Financial
58	PORATOTL Index	Poland Official Reserve Assets Total	Domestic Financial
59	964.064 Index	IMF Poland Total Reserves ex Gold	Domestic Financial
60	PBLIDEPO Index	Poland Central Bank Deposits & Oth Liabilities to Domestic Residents	Domestic Financial
61	PBLIBNOT Index	Poland Central Bank Currency in Circulation	Domestic Financial
62	PBLIEXTN Index	Poland Central Bank External Liabilities	Domestic Financial
63	PBLIDESI Index	Poland Central Bank Debt Securities Issued	Domestic Financial
64	AIOAHPTO Index	Loans to Households & Non-Profit Institutions for House Prch Total (PLN)	Domestic Financial
65	AIOANFTO Index	Loans to Non-Financial Corps Total Ex Overdraft (PLN)	Domestic Financial
66	AIRNNFLT Index	Loans of Non-Financial Corps Total (PLN)	Domestic Financial
67	AIOAHLTO Index	Loans to Households & Non-Profit Institutions Total Ex Overdraft (PLN)	Domestic Financial
68	BISBPLN Index	Poland Nominal Effective Exchange Rate Broad	Domestic Financial
69	GSPLFCI Index	GS Poland Financial Conditions Index	Domestic Financial
70	USDPLNV1M Curncy	USDPLN 1 Month ATM Implied Volatility	Domestic Financial
71	POLAND CDS USD SR 5Y D14	Poland CDS	Domestic Financial
72	GTPLN2YR Corp	POLAND GOVERNMENT BOND 2 Year	Domestic Financial
73	ELIYGLPL Index	J.P. Morgan EMBIG Poland Sovereign Yield	Domestic Financial
74	MXPL Index	MSCI Poland Index	Domestic Financial
75	USDPLNV1Y Curncy	USDPLN 1 Year ATM Implied Volatility	Domestic Financial
76	PLNI3M Curncy	USDPLN 3 Month Forward Implied Yield	Domestic Financial
77	PZSW10 CMPN Curncy	PLN Annual (vs. 6M WIBOR) 10Y	Domestic Financial
78	JPSSGPOL Index	J.P. Morgan EMBIG Poland Sovereign Spread	Domestic Financial
79	GBPPLN Curncy	GBPPLN Spot Exchange Rate - Price of 1 GBP in PLN	Domestic Financial
80	CHFPLN Curncy	CHFPLN Spot Exchange Rate - Price of 1 CHF in PLN	Domestic Financial

#### Table A7: Dataset-Russia

Number	Ticker	Description	Data Classes
1	RUCPIYOY Index	Russia CPI YoY	Inflation
2	RUCPGYOY Index	Russia CPI Goods YoY	Inflation
3	RUCPFWYY Index	Russia CPI Food Excluding Fruit and Vegetables YoY	Inflation
4	RUCPNYOY Index	Russia CPI Non Food YoY	Inflation
5	RUCPSYOY Index	Russia CPI Services YoY	Inflation
6	RUCPTEYY Index	Russia CPI Textile YoY	Inflation
7	RUCPELYY Index	Russia CPI Electric Appliances YoY	Inflation
8	RUCPTVYY Index	Russia CPI TV Radio YoY	Inflation
9	RUCPTRYY Index	Russia CPI Transport Services YoY	Inflation
10	RUCPTLYY Index	Russia CPI Telecommunication Services YoY	Inflation
11	RUCPEDYY Index	Russia CPI Education YoY	Inflation
12	RUCPHSYY Index	Russia COU Housing Services YoY	Inflation
13	RUCPUSYY Index	Russia CPI Utility Services YoY	Inflation
14	RUPPNEWY Index	Russia PPI 2000=100 YoY	Inflation
15	RUPPNMQY Index	Russia PPI Mining and Quarrying YoY	Inflation
16	RUPPMFCY Index	Russia PPI Manufacturing YoY	Inflation
17	RUCPBIYY Index	Russia Core Inflation YoY	Inflation
18	RUIPRNYY Index	Russia Industrial Production 2010=100 YoY	Economic Activity
19	RURSRYOY Index	Russia Retail Sales Real YoY	Economic Activity
20	RUUER Index	Russia Unemployment Rate	Economic Activity
21	RUMEREAL Index	Russia Real Monthly Wages YoY	Economic Activity
22	RUMERDIY Index	Russia Monthly Earnings Real Disposable Income YoY	Economic Activity
23	RUTBAL Index	Russia Merchandise Trade Balance	Economic Activity
24	RUAUTTYY Index	Russia Car Sales YoY	Economic Activity
25	RUCNCNCF Index	Russia Consumer Confidence Overall	Economic Activity
26	RUCICSI Index	Russia Consumer Sentiment Index March 2008=100%	Economic Activity

Table A7 –	Continued from previous page		
Number	Ticker	Description	Data Classes
27	RUTBEX Index	Russia Merchandise Trade Exports	Economic Activity
28	RUCTTRYY Index	Russia Cargo Shipment Monthly YoY	Economic Activity
29	RFBCMANU Index	Russia Business Confidence Manufacturing	Economic Activity
30	RUCCBRYY Index	Russia Construction Contracts Real YoY	Economic Activity
31	RUTBIM Index	Russia Merchandise Trade Imports	Economic Activity
32	RUCISSI Index	Russia Social Sentiment Index March 2008=100%	Economic Activity
33	RUCNCCMP Index	Russia Consumer Confidence Conditions for Major Purchases	Economic Activity
34	RUBPLYOY Index	Russia Residential Construction YoY	Economic Activity
35	RUCNECSP Index	Russia Consumer Confidence Economic Situation Last 12 Months	Economic Activity
36	RUIEECRO Index	Russia Export of Crude Oil in Tons	Economic Activity
37	ECOYERUN Index	Russia Exports (Billion USD) NSA	Economic Activity
38	ECOYMRUN Index	Russia Imports (Billion USD) NSA	Economic Activity
39	RURSFDYY Index	Russia Retail Sales Food YoY	Economic Activity
40	RUWTYOY Index	Russia Wholesale Trade YoY %	Economic Activity
41	RIPDDIET Index	Russian Output Of Diesel Volume	Economic Activity
42	RIPDGAST Index	Russian Output Of Gasoline Volume	Economic Activity
43	BIRTARU Index	Russia Bloomberg Indicator of Real-Time Activity 3 Month Moving Average	Economic Activity
44	OERUKLAC Index	Russia OECD Leading Indicators CLI Amplitude Adjusted SA	Economic Activity
45	RUCCBRYY Index	Russia Construction Contracts Real YoY	Economic Activity
46	RUEMEMDE Index	Russia Demand for Workforce as Registered by Firms with Employment Service	Economic Activity
47	BUIPCRYY Index	Russia Manufacturing Output Cars YoY	Economic Activity
48	RUIPEEYY Index	Russia Manufacturing Output Electric Energy YoY	Economic Activity
49	BISBRUR Index	Russia Real Effective Exchange Rate Broad	Domestic Financial
50	922 055 Index	IME Russian Reserve Foreign Fychange Holdings	Domestic Financial
51	RUFRON Index	Central Bank of Russia Fixed Reno Rate Overnight	Domestic Financial
52	WCAURUSS Index	Bloomberg Russia Exchange Market Capitalization USD	Domestic Financial
53	BISBRUN Index	Russia Nominal Effective Exchange Rate Broad	Domestic Financial
54	CEWSRUB Index	Citi Early Warning Signal Risk Index - Russia	Domestic Financial
55	9226601 Index	IME Russian Denosit Rate	Domestic Financial
56	RUSSIA CDS USD SR 5Y D14 Corp.	Russia CDS	Domestic Financial
57	USDRUB Curney	USDRUB	Domestic Financial
58	RUMSMOYY Index	Russia Money Supply M0 YoY	Domestic Financial
59	RUMSM2YY Index	Russia Money Supply Mo To T	Domestic Financial
60	RUNPBANK Index	Credit Institutions Assets - Banking Sector Assets	Domestic Financial
61	RUNPTI NS Index	Credit Institutions Assets - Total Loans	Domestic Financial
62	RUNPCLED Index	Credit Institutions Liabilities - Client Funds	Domestic Financial
63	BESICCRW Index	Ratio of Core Capital to Risk Weighted Assets	Domestic Financial
64	BFSIBROA Index	Return on Assets	Domestic Financial
65	BESIBROE Index	Return on Equity	Domestic Financial
66	BESILATA Index	Ratio of Liquid Assets to Total Assets	Domestic Financial
67	GTRUB2YR Corp	Russia 2 Year Generic Bond Yield	Domestic Financial
68	GTUSDRU2YR Corp	Russia 2 Year USD Generic Bond Vield	Domestic Financial
69	IMOEX Index	MOEX Russia Index	Domestic Financial
70	USDPUBV1M Curney	USDELE 1 Month ATM Implied Volatility	Domestic Financial
71	USDRUBVIN Curney	USDRUB 1 Year ATM Implied Volatility	Domestic Financial
72	IPVPLIB Currey		Domestic Financial
73	GBPRUB Curney	GBPRUB	Domestic Financial
74	CHERUB Curney	CHERUB	Domestic Financial
75	RRDR1T Curney	RUB Overnight Deposit	Domestic Financial
76	IPSSGRUS Index	I.P. Morgan EMBIG Russia Sovereign Spread	Domestic Financial
77	IPSSEMRU Index	I P Morgan EMBI Plus Russia Sovereign Spread	Domestic Financial
78	RUBLIM CMPN Curney	USDRUB 1 Month Forward Implied Yield	Domestic Financial
79	MXRU0FN Index	MSCI Russia Financials Index	Domestic Financial
80	GSRUECI Index	GS Russia Financial Conditions Index	Domestic Financial
00	CONCI CI IIIUCA	SS Russia Financiai Conditions index	Domestic Financial

#### Table A8: Dataset-South Africa

Number	Ticker	Description	Data Classes
1	ZAR Curncy	USDZAR Spot Exchange Rate - Price of 1 USD in ZAR	Domestic Financial
2	EURZAR Curncy	EURZAR Spot Exchange Rate - Price of 1 EUR in ZAR	Domestic Financial
3	GBPZAR Curncy	GBPZAR Spot Exchange Rate - Price of 1 GBP in ZAR	Domestic Financial
4	JPYZAR Curncy	JPYZAR Spot Exchange Rate - Price of 1 JPY in ZAR	Domestic Financial
5	TRYZAR Curncy	TRYZAR Spot Exchange Rate - Price of 1 TRY in ZAR	Domestic Financial
6	USDZARV1M Index	USDZAR 1 Month ATM Implied Volatility	Domestic Financial
7	USDZAR25R3M Index	USDZAR 3 Month 25 Delta Risk Reversal	Domestic Financial
8	BISBZAR Index	South Africa Real Effective Exchange Rate Broad	Domestic Financial
9	TOP40 Index	FTSE/JSE Africa Top40 Tradeable Index	Domestic Financial
10	JFINX Index	FTSE/JSE Africa Financials Index	Domestic Financial
11	JBIND Index	FTSE/JSE Africa Basic Materials Index	Domestic Financial
12	JGIND Index	FTSE/JSE Africa Industrials Index	Domestic Financial
13	JGOLD Index	FTSE/JSE Africa Gold Mining Index	Domestic Financial
14	WCAUSAF Index	Bloomberg South Africa Exchange Market Capitalization USD	Domestic Financial
15	JALSH Index	FTSE/JSE Africa All Share Index	Domestic Financial
16	REPSOU CDS USD SR 5Y D14 Corp	Republic of South Africa	Domestic Financial
17	SARPRT Index	South Africa Repo Avg Rate	Domestic Financial
18	GSAB2YR Index	South Africa Govt Bonds 2 Year Note Generic Bid Yield	Domestic Financial
19	GSAB3YR Index	South Africa Govt Bonds 3 Year Note Generic Bid Yield	Domestic Financial
20	GSAB5YR Index	South Africa Govt Bonds 5 Year Note Generic Bid Yield	Domestic Financial
21	GSAB10YR Index	South Africa Govt Bonds 10 Year Note Generic Bid Yield	Domestic Financial
22	SALQCMPN Index	South Africa Liquidations Cos	Domestic Financial
23	SACEI Index	South Africa Private Credit Extension	Domestic Financial
24	SACEINV Index	South Africa Private Credit Extension Investments	Domestic Financial
25	SACEMORT Index	South Africa Private Credit Extension Mortgage Advances	Domestic Financial
26	SACELEAS Index	South Africa Private Credit Extension Leasing Finance	Domestic Financial
27	SACELOAN Index	South Africa Private Credit Extension Total Loans and Advances	Domestic Financial
28	SACESALE Index	South Africa Private Credit Extension Installment Sales Credit	Domestic Financial
29	SACEHOUS Index	South Africa Private Credit Extension Of Which To Households	Domestic Financial
30	SAMYSAM3 Index	South Africa Money Supply M3 Seasonally Adjusted	Domestic Financial
31	SAMYM1 Index	South Africa Money Supply M1	Domestic Financial
32	SAMYM2 Index	South Africa Money Supply M2	Domestic Financial
33	SAMYM0 Index	South Africa Money Supply M0	Domestic Financial
34	199.055 Index	IMF South Africa Foreign Exchange Reserves in Millions of USD	Domestic Financial
35	SANOGOL\$ Index	South Africa Gold Reserves	Domestic Financial
36	SANOGR\$ Index	South Africa Gross Reserves	Domestic Financial
37	1995E55 Index	IMF South Africa Deposits in Rand	Domestic Financial
38	SACPI Index	South Africa CPI 2012=100	Inflation
39	SAPMIPP Index	South Africa Barclays PMI Prices NSA	Inflation
40	SCP8COUN Index	South Africa CPI For Total Country NSA	Inflation
41	SCP8EPNY Index	South Africa Ex Food NAB Petrol & Energy YoY	Inflation
42	SCP8EENR Index	South Africa Ex Energy	Inflation
43	SAGPDY Index	South Africa GDP Deflator YoY	Inflation
44	SASGAGR Index	South Africa Agriculture SA Constant Prices	Inflation
45	SASGMINE Index	South Africa Mining SA Constant Prices	Inflation
46	SASGMANU Index	South Africa Manufacturing SA Constant Prices	Inflation
47	SASGELEC Index	South Africa Electricity SA Constant Prices	Inflation
48	SASGCON Index	South Africa Construction sa constant 2000 prices	Inflation
49	SASGWRH Index	South Africa Wholesale Retail Hotels SA Constant Prices	Inflation
50	ZAISA2Y Index	South Africa Inflation Survey Analyst Two Years Ahead	Inflation
51	ZAISA1Y Index	South Africa Inflation Survey Analyst One Years Ahead	Inflation
52	ZAISACY Index	South Africa Inflation Survey Analyst Current Year	Inflation
53	SASWIT10 Curney	ZAR Inflation Zero Coupon 10Y	Inflation
54	SASWIT1 Curney	ZAR Inflation Zero Coupon 1Y	Inflation
55	SACBLI Index	Composite Business Cycle Indicator - Leading Indicator	Economic Activitiv

Table A8 –	Continued from previous page		
Number	Ticker	Description	Data Classes
56	SACBLG Index	Composite Business Cycle Indicator - Lagging Indicator	Economic Activitiy
57	SACBCI Index	Composite Business Cycle Indicator - Coincident Indicator	Economic Activitiy
58	SANOFP\$ Index	South Africa Net Open Foreign Currency Position	Economic Activitiy
59	SABBBAL Index	South Africa Budget Summary National Budget Balance	Economic Activitiy
60	SATBAL Index	South Africa Trade Balance Incl Oil Arms & Bullion	Economic Activitiy
61	SATBEX Index	South Africa Trade Balance Exports Incl Oil Arms & Bullion	Economic Activitiy
62	SATBEOTH Index	South Africa Trade Export Other Gd	Economic Activitiy
63	SATBIM Index	South Africa Trade Balance Imports Incl Oil Arms & Bullion	Economic Activitiy
64	SABBEXP Index	South Africa Budget Summary National Expenditures	Economic Activitiy
65	SABBREV Index	South Africa Budget Summary National Revenue	Economic Activitiy
66	NAAMTTMS Index	NAAMSA South Africa Total Market Sales Level	Economic Activitiy
67	SARSTCSA Index	South Africa Retail Sales Total Sales Constant Prices SA 2012=100	Economic Activitiy
68	SASRGEN Index	South Africa Retail Trade Sales Constant 2012 Prices General	Economic Activitiy
69	SATWCOS Index	South Africa Wholesale Trade Constant 2000 Prices SA	Economic Activitiy
70	SFMPPET Index	South Africa Manufacturing Production SA 2005=100 Petroleum Chemical Prod	Economic Activitiy
71	SFPMI Index	South Africa Manufacturing Production SA 2010=100	Economic Activitiy
72	SFMPFB Index	South Africa Manufacturing Production SA 2005=100 Food & Beverages	Economic Activitiy
73	SFMPTCF Index	South Africa Manufacturing Production SA 2005=100 Textile Leather Footwear	Economic Activitiy
74	SFMPMVP Index	South Africa Manufacturing Production SA 2005=100 Parts & Other Transport Equip	Economic Activitiy
75	SAMSTGSA Index	South Africa Mining Sales Total Including Gold SA	Economic Activitiy
76	SAMPGDSY Index	South Africa Mining Production Volume Gold SA YoY	Economic Activitiy
77	SAMPTTSY Index	South Africa Mining Production Volume Total Inc Gold SA YoY	Economic Activitiy
78	SAPW09Y Index	South Africa Electricity Production Index Year on Year %	Economic Activitiy
79	SAPW08Y Index	South Africa Electricity Consumption Year on Year %	Economic Activitiy
80	EHGDZA Index	South Africa Real GDP (Annual YoY %)	Economic Activitiy
81	SABCI Index	SACCI South Africa Business Confidence	Economic Activitiy
82	SAPMI Index	South Africa Barclays SA	Economic Activitiy
83	SAUEQEMP Index	South Africa Labour- Employed	Economic Activitiy
84	SAUEQABS Index	South Africa Labour - Labor Absorption Rate	Economic Activitiy
85	SAUEQPRT Index	South Africa Labour - Labor Force Participation Rate	Economic Activitiy
86	SAUEQNLF Index	South Africa Labour - Not in the Labor Force	Economic Activitiy
87	EHUPZA Index	South Africa Unemployment Rate (%)	Economic Activitiy
88	SACWC Index	South Africa Consumer Confidence	Economic Activitiy
89	SACWE Index	South Africa Consumer Confidence Economic Position in Next 12m	Economic Activitiy
90	SACWF Index	South Africa Consumer Confidence Financial Position During Next 12m.	Economic Activitiy
91	SACTLVL Index	South Africa Current Account SA	Economic Activitiy
92	SACTMEX Index	South Africa Current Account SA - Merchandise Exports Free on Board	Economic Activitiy
93	SACTGEX Index	South Africa Current Account SA - Net Gold Exports	Economic Activitiy
94	SACTLMI Index	South Africa Current Account SA - Less Merchandise Imports	Economic Activitiy
95	SACTCTR Index	South Africa Current Account SA - Current Transfers Net Receipts	Economic Activitiy
96	SACUI Index	South Africa Utilization of Production Capacity	Economic Activitiy
97	SABTHDIQ Index	South Atrica Household Debt to Disposable Income of Households	Economic Activitiy
98	SAGNDISA Index	South Africa Nominal Household Disposable Income SA	Economic Activitiy
99	SADXFCFR Index	South Africa Real GDP Gross Fixed Capital Formation SA	Economic Activitiy
100	SADXRGSA Index	South Africa Real GDP Expenditure on GDP	Economic Activitiy
101	SATUREM Index	Frade Activity Index Employment	Economic Activitiy
102	SAPME Index	South Africa Barclays PMI Employment SA	Economic Activitiy
103	SATCTERL Index	Trade Activity Index Backlog on Orders	Economic Activitiy
104	SATCTERL INDEX	Trade A stivity Index Naw Orders	Economic Activitiy
105	SATUTENO Index	Trade Europetetions Index New Orders	Economic Activitiy
100	SAICIENU Index	Fraue Expectations index New Orders	Economic Activitiy
107	SACSESTO HILLER	SA Recorded Duilding Plans Desidentual Duildings SA	Economic Activity
108	SACSPSRD Index	SA Recorded Duilding Plans New Desidentual Duildings SA	Economic Activitiy
109	SACSESING INDEX	SA Recorded Duilding Plans Additions and Alteratives SA	Economic Activitiy
110	SACSTSAA INDEX	SA Recorded Duilding Flans Additions and Alterations SA	Economic Activitiy
	SACSUSTO Index	SA Completed Buildings Recorded Total SA	Economic Activitiy

Number	Ticker	Description	Data Classes
112	SACSCSRB Index	SA Completed Buildings Recorded Residentual Buildings SA	Economic Activitiy
113	SACSCSNR Index	SA Completed Buildings Recorded Non-Residentual Buildings SA	Economic Activitiy
114	SACSCSAA Index	SA Completed Buildings Recorded Additions and Alterations SA	Economic Activitiy
115	SACTGDP Index	South Africa Current Account as % of GDP Current Prices	Economic Activitiy

#### Table A9: Dataset-Thailand

Number	Ticker	Description	Data Classes
1	THCPIYOY Index	Thailand CPI All Items YoY	Inflation
2	THCPIFY Index	Thailand CPI Food YoY	Inflation
3	THCGHF1Y Index	Thailand CPI Housing And Furnishing YoY	Inflation
4	THCGPC1Y Index	Thailand CPI Medical And Personal Care YoY	Inflation
5	THCGTC1Y Index	Thailand CPI Transportation And Communication YoY	Inflation
6	THCGRE1Y Index	Thailand CPI Recreation And Education YoY	Inflation
7	THCOPIY Index	Thailand Core Price YoY	Inflation
8	THCGST1Y Index	Thailand CPI Shelter YoY	Inflation
9	THCGPF1Y Index	Thailand CPI Prepared Food YoY	Inflation
10	THCGMP1Y Index	Thailand CPI Meats Poultry And Fish YoY	Inflation
11	THCGTT1Y Index	Thailand CPI Textile - House Furnishing YoY	Inflation
12	THCGMD1Y Index	Thailand CPI Medical Care YoY	Inflation
13	THCGTA1Y Index	Thailand CPI Tobacco And Alcoholic Beverages YoY	Inflation
14	THPPIACY Index	Thailand PPI All Products YoY 2010 = 100	Inflation
15	THCTEXPY Index	Thailand Customs Department Foreign Trade Exports YoY	Economic Activity
16	THCTIMPY Index	Thailand Customs Department Foreign Trade Imports YoY	Economic Activity
17	THCCI Index	Thailand Consumer Confidence	Economic Activity
18	THNFEXPY Index	Thailand Foreign Trade Merchandise Exports YoY	Economic Activity
19	THBSI Index	Thailand Business Sentiment Index	Economic Activity
20	THVHSCAR Index	Thailand Car Sales	Economic Activity
21	THNFIMPY Index	Thailand Foreign Trade Merchandise Imports YoY	Economic Activity
22	THLMUERT Index	Thailand Unemployment Rate	Economic Activity
23	THRSY Index	Thailand Retail Sales YoY	Economic Activity
24	THCCECON Index	Thailand Consumer Confidence Economic	Economic Activity
25	THPIIYOY Index	Thailand Private Investment YoY 2010=100	Economic Activity
26	THNHTOTL Index	Thailand New Housing	Economic Activity
27	THBSORD Index	Thailand Business Sentiment Index Order Book	Economic Activity
28	THBSEMP Index	Thailand Business Sentiment Index Employment	Economic Activity
29	THBSINV Index	Thailand Business Sentiment Index Investment	Economic Activity
30	THPIPDNF Index	TH Private Investment -Permitted by Department Industrial Work-No of Factories	Economic Activity
31	THA CEI Index	Thailand Coincident Economic Index 2000=100	Economic Activity
32	THCRTTCR Index	Thailand Outstanding Credit Amount	Economic Activity
33	THEMIRTL Index	Thailand Labor Home Inward Remittances	Economic Activity
34	THBSPERF Index	Thailand Business Sentiment Index Performance	Economic Activity
35	THBSCOST Index	Thailand Business Sentiment Index Production Cost Invert	Economic Activity
36	THCCPRES Index	Thailand Consumer Confidence Present	Economic Activity
37	THCCFUT Index	Thailand Consumer Confidence Future	Economic Activity
38	THCCEMPL Index	Thailand Consumer Confidence Employment	Economic Activity
39	THCCFUIN Index	Thailand Consumer Confidence Future Income	Economic Activity
40	THLMEMP Index	Thailand Number of Employed Labor Force	Economic Activity
41	THLMTOT Index	Thailand Labor Force	Economic Activity
42	THVPRS Index	Thailand Motor Vehicle Car Registration	Economic Activity
43	ASEATHAI Index	Automotive Production by Thailand	Economic Activity
44	THTATOTA Index	Thailand Tourist Nationality - Grand Total	Economic Activity
45	THFDITTL Index	Thailand FDI - Total	Economic Activity
46	THMMBY Index	Thailand Money Supply Monetary Base YoY	Domestic Financial
47	THMM1Y Index	Thailand Money Supply M1 YoY	Domestic Financial

Number	Ticker	Description	Data Classes
48	THMM2Y Index	Thailand Money Supply M2 YoY	Domestic Financial
49	THFRUS\$ Index	Thailand International Foreign Reserves Total	Domestic Financial
50	BTRR1DAD Index	Bank of Thailand Repurchase Market Rates 1 Day Official Rates Daily	Domestic Financial
51	TBDRC CMPN Curncy	THB 3 Month Deposit	Domestic Financial
52	GVTL10YR Index	Thailand Govt Bond 10 Year Note	Domestic Financial
53	SET Index	Stock Exchange of Thailand SET Index	Domestic Financial
54	USDTHB REGN Curncy	USDTHB Spot Exchange Rate - Price of 1 USD in THB	Domestic Financial
55	EURTHB BGN Curncy	EURTHB Spot Exchange Rate - Price of 1 EUR in THB	Domestic Financial
56	CHFTHB BGN Curncy	CHFTHB Spot Exchange Rate - Price of 1 CHF in THB	Domestic Financial
57	JPYTHB CMPN Curncy	JPYTHB Spot Exchange Rate - Price of 100 JPY in THB	Domestic Financial
58	TAVGMLR Index	Thailand Four Major Banks Avg Minimum Lending Rate	Domestic Financial
59	TAVGMLR5 Index	Thailand Five Major Banks Avg Minimum Lending Rate	Domestic Financial
60	TAVGMRR Index	Thailand Avg Minimum Retail Rate	Domestic Financial
61	THEEREER Index	Thailand Real Effective Exchange Rate Trade Weighted	Domestic Financial
62	THEENEER Index	Thailand Nominal Effective Exchange Rate Trade Weighted	Domestic Financial
63	THLOCOMM Index	Thailand Loan Outstanding Total Commercial Banks	Domestic Financial
64	THLOCMBT Index	Thailand Loan Outstanding Commercial Banks Registered in Thailand	Domestic Financial
65	THLOFORE Index	Thailand Loan Outstanding Foreign Banks (Full Branch)	Domestic Financial
66	THLOCOBZ Index	Thailand Commercial Banks Loan to Businesses	Domestic Financial
67	THCRTTVL Index	Thailand Credit Card Usage Volume	Domestic Financial
68	TLCGTACB Index	Thailand All Commercial Banks Credits to Businesses	Domestic Financial
69	MXTH0FN Index	MSCI Thailand Financials Index	Domestic Financial
70	CIFCTH Index	Citi Thailand Financial Conditions Index	Domestic Financial
71	GSTHFCI Index	GS Thailand Financial Conditions Index	Domestic Financial

Table A9 - Continued from previous page

#### Table A10: Dataset-Turkey

Number	Ticker	Description	Data Classes
1	TUDPPI Index	Turkey Domestic PPI	Prices
2	TUDPC Index	Turkey Domestic PPI Manufactur	Prices
3	TUDPB Index	Turkey Domestic PPI Mining & Q	Prices
4	TUDP6 Index	Turkey Domestic PPI Crude Petr	Prices
5	TUDP10 Index	Turkey Domestic PPI Food Produ	Prices
6	TUDP29 Index	Turkey Domestic PPI Motor Vehi	Prices
7	TUDP25 Index	Turkey Domestic PPI Fabricated	Prices
8	TUCPI Index	Turkey CPI	Prices
9	TUCPF Index	Turkey CPI Food & Non Alcoholi	Prices
10	TUCPH Index	Turkey CPI Housing Water Elect	Prices
11	TUCPHO Index	Turkey CPI Hotels Cafes & Rest	Prices
12	TUCPFH Index	Turkey CPI Furnishings Househo	Prices
13	TUCPR Index	Turkey CPI Recreation & Cultur	Prices
14	TUCXSG Index	Turkey CPI Ex Seasonal Goods	Prices
15	TUCXEF Index	Turkey CPI Ex Energy Food Non	Prices
16	TUCXUF Index	Turkey CPI Ex Unprocessed Food	Prices
17	TULSUR Index	Turkey Labor Statistics Unempl	Real Economics Activity
18	TULSER Index	Turkey Labor Statistics Employ	Real Economics Activity
19	TULSCO Index	Turkey Labor Statistics Employ	Real Economics Activity
20	TULSSER Index	Turkey Labor Statistics Employ	Real Economics Activity
21	TULSIN Index	Turkey Labor Statistics Employ	Real Economics Activity
22	TULSAGRI Index	Turkey Labor Statistics Employ	Real Economics Activity
23	TULSLPAR Index	Turkey Labor Statistics Labor	Real Economics Activity
24	TULSNO Index	Turkey Labor Statistics Non Ag	Real Economics Activity
25	TULSYOU Index	Turkey Labor Statistics Youth	Real Economics Activity
26	TUCOGY2S Index	Turkey Real Sector Confidence	Real Economics Activity
27	TUCOGY3S Index	Turkey Real Sector Confidence	Real Economics Activity
			Continued on next page

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28         TUCOGY7S Index         Turkey Confidence Index Real S conomics Activity           29         TUCORAL Index         Turkey Constamer Confidence         Real Economics Activity           31         TUCOGY1S Index         Turkey Real Sector Confidence         Real Economics Activity           32         TUCOGY1S Index         Turkey Real Sector Confidence         Real Economics Activity           33         TUCALVLP Index         Turkey Balance of Payments Dr         Real Economics Activity           34         TUCATT Index         Turkey Balance of Payments Dr         Real Economics Activity           36         EHBBTR Index         Turkey Balance of Payments Dr         Real Economics Activity           37         EHCATR Index         Turkey Balaget Deficit Revenue         Real Economics Activity           38         TUBTREV Index         Turkey More Vehicle Industry         Real Economics Activity           41         ECOCTRN Index         Turkey More Vehicle Industry         Real Economics Activity           42         TUCSET Index         Turkey More Vehicle Industry         Real Economics Activity           44         ESOBGTR Index         EU Ind Prod Durable Consumer G         Real Economics Activity           45         ESORGTR Index         EU Ind Prod Intermediate Goods         Real Economics Activity	Number	Ticker	Description	Data Classes
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42TUCSET IndexTurkey Motor Vehicle IndustryReal Economics Activity43TUCSEP IndexEU Ind Prod Durable Consumer GReal Economics Activity44E50DGTR IndexEU Ind Prod Inzable Consumer GReal Economics Activity45E50KGTR IndexEU Ind Prod Capital Goods TurkReal Economics Activity46E50KGTR IndexEU Ind Prod Capital Goods TurkReal Economics Activity47TUIONT IndexTurkey Industrial Production MReal Economics Activity48TUINTURN IndexTurkey Industrial Production MReal Economics Activity50TUIOST IndexTurkey Industrial Production EReal Economics Activity51TUCSPT IndexTurkey Motor Vehicle IndustryReal Economics Activity52TYCOLEVS IndexTurkey Motor Vehicle IndustryReal Economics Activity53TUCSMT IndexTurkey Motor Vehicle IndustryReal Economics Activity54TUCSMP IndexTurkey Gorb Vehicle IndustryReal Economics Activity55TUCSMP IndexTurkey GDP bi Spenditure at CReal Economics Activity56TUQARTO IndexTurkey GDP bi Spenditure at CReal Economics Activity57TUQRESY IndexTurkey GDP bi Spenditure at CReal Economics Activity58TUQRGFY IndexTurkey GDP bi Spenditure at CReal Economics Activity59TUQRINGY IndexUSD-TRY X-RATEFinancial Variables61USDTRY IndexUSD-TRY X-RATEFinancial Variables62EURTRY IndexUSD-TRY Y-RATE<	41	ECOCTRN Index	Turkey Current Account Balance	Real Economics Activity
43     TUCSEP Index     Turkey Motor Vehicle Industry     Real Economics Activity       44     E50DGTR Index     EU Ind Prod Durable Consumer G     Real Economics Activity       45     E50IGTR Index     EU Ind Prod Durable Consumer G     Real Economics Activity       46     E50KGTR Index     EU Ind Prod Capital Goods Turk     Real Economics Activity       47     TUIOMT Index     Turkey Industrial Production M     Real Economics Activity       48     TUINTURN Index     Turkey Industrial Production S     Real Economics Activity       50     TUIOST Index     Turkey Industrial Production M     Real Economics Activity       51     TUIOET Index     Turkey Industrial Production M     Real Economics Activity       52     TYCOLEVS Index     Turkey Motor Vehicle Industry     Real Economics Activity       53     TUCSMT Index     Turkey Motor Vehicle Industry     Real Economics Activity       54     TUCSMT Index     Turkey Motor Vehicle Industry     Real Economics Activity       55     TUCSMP Index     Turkey GDP at Constant Prices     Real Economics Activity       56     TUQRINY Index     Turkey GDP Chain Linked YoY     Real Economics Activity       57     TUQRIGPY Index     Turkey GDP Chain Linked YoY     Real Economics Activity       58     TUQRIGPY Index     Turkey GDP Chain Linked YoY     Real Economic	42	TUCSET Index	Turkey Motor Vehicle Industry	Real Economics Activity
44ESODGTR IndexEU Ind Prod Durable Consumer GReal Economics Activity45ESOIGTR IndexEU Ind Prod Intermediate GoodsReal Economics Activity46ESOKGTR IndexEU Ind Prod Capital Goods TurkReal Economics Activity47TUIONT IndexTurkey Industrial Production MReal Economics Activity48TUINTURN IndexTurkey Industrial Production SReal Economics Activity49TUIOST IndexTurkey Industrial Production BReal Economics Activity50TUIOST IndexTurkey Industrial Production BReal Economics Activity51TUIOST IndexTurkey Industrial Production SAReal Economics Activity53TUCSPT IndexTurkey Motor Vehicle IndustryReal Economics Activity54TUCSMT IndexTurkey Motor Vehicle IndustryReal Economics Activity55TUCSMT IndexTurkey GDP bat Constant PricesReal Economics Activity56TUTOARTO IndexTurkey GDP bat Constant PricesReal Economics Activity57TUQRESY IndexTurkey GDP Chain Linked YoYReal Economics Activity58TUQRIMY IndexUSD-TRY X-RATEFinancial Variables61USDTRY IndexUSD-TRY X-RATEFinancial Variables62EURTRY IndexUSD-TRY ARATEFinancial Variables63JPYTRY CurneyJPYTRY X-RATEFinancial Variables64USDTRY IndexUSD-TRY R2D 3MFinancial Variables65USDTRY IndexBIST INDUSTRIALSFinancial Variables66CPIXB	43	TUCSEP Index	Turkey Motor Vehicle Industry	Real Economics Activity
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70WCAUTURK IndexBloomberg Turkey Exchange MarkFinancial Variables71CTURK1U5 CurncyTURKEY CDS USD SR 5Y D14Financial Variables72TUBRONRA IndexTurkey Overnight Lending RateFinancial Variables73TUBROBRA IndexTurkey Overnight Borrowing RatFinancial Variables74IECM1Y IndexTurkish Government Bond 1Y ComFinancial Variables75IECM5Y IndexTurkey Banks Balance Sheet DepFinancial Variables76TUBOL54 IndexTurkey Governiget Interest RateFinancial Variables78WAIRCASH IndexWeighted Average Interest RateFinancial Variables79WAIRHOUS IndexWeighted Average Interest RateFinancial Variables81GTRU2YR IndexUSD Turkey Govt Bond Generic BFinancial Variables82GTRU5YR IndexUSD Turkey Govt Bond Generic BFinancial Variables83GTRU10YR IndexUSD Turkey Govt Bond Generic BFinancial Variables	69	XUSIN Index	BIST INDUSTRIALS	Financial Variables
71       CTURK1U5 Curncy       TURKEY CDS USD SR 5Y D14       Financial Variables         72       TUBRONRA Index       Turkey Overnight Lending Rate       Financial Variables         73       TUBROBRA Index       Turkey Overnight Borrowing Rat       Financial Variables         74       IECM1Y Index       Turkish Government Bond 1Y Com       Financial Variables         75       IECM5Y Index       Turkish Government Bond 5Y Com       Financial Variables         76       TUBOL54 Index       Turkey Banks Balance Sheet Dep       Financial Variables         77       WAIRCASH Index       Weighted Average Interest Rate       Financial Variables         78       WAIRVEHI Index       Weighted Average Interest Rate       Financial Variables         79       WAIRHOUS Index       Weighted Average Interest Rate       Financial Variables         80       WAIRCOMM Index       Weighted Average Interest Rate       Financial Variables         81       GTRU2YR Index       USD Turkey Govt Bond Generic B       Financial Variables         82       GTRU5YR Index       USD Turkey Govt Bond Generic B       Financial Variables         83       GTRU10YR Index       USD Turkey Govt Bond Generic B       Financial Variables	70	WCAUTURK Index	Bloomberg Turkey Exchange Mark	Financial Variables
72     TUBRONRA Index     Turkey Overnight Lending Rate     Financial Variables       73     TUBROBRA Index     Turkey Overnight Borrowing Rat     Financial Variables       74     IECM1Y Index     Turkish Government Bond 1Y Com     Financial Variables       75     IECM5Y Index     Turkish Government Bond 5Y Com     Financial Variables       76     TUBOL54 Index     Turkey Banks Balance Sheet Dep     Financial Variables       77     WAIRCASH Index     Weighted Average Interest Rate     Financial Variables       78     WAIRVEHI Index     Weighted Average Interest Rate     Financial Variables       79     WAIROUS Index     Weighted Average Interest Rate     Financial Variables       80     WAIRCOMM Index     Weighted Average Interest Rate     Financial Variables       81     GTRU2YR Index     USD Turkey Govt Bond Generic B     Financial Variables       82     GTRU5YR Index     USD Turkey Govt Bond Generic B     Financial Variables       83     GTRU10YR Index     USD Turkey Govt Bond Generic B     Financial Variables	71	CTURK1U5 Curncy	TURKEY CDS USD SR 5Y D14	Financial Variables
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82         GTRU5YR Index         USD Turkey Govt Bond Generic B         Financial Variables           83         GTRU10YR Index         USD Turkey Govt Bond Generic B         Financial Variables	81	GTRU2YR Index	USD Turkey Govt Bond Generic B	Financial Variables
83 GTRU10YR Index USD Turkey Govt Bond Generic B Financial Variables	82	GTRU5YR Index	USD Turkey Govt Bond Generic B	Financial Variables
	83	GTRU10YR Index	USD Turkey Govt Bond Generic B	Financial Variables

Continued on next

Table A10	- Continued from	previous pa	ge

Number	Ticker	Description	Data Classes
84	TBRDELT Index	Export Loans - Total	Financial Variables
85	TBRDWCLT Index	Working Capital Loans - Total	Financial Variables
86	TBRDTLTL Index	Total Loans	Financial Variables
87	TUCRTOTL Index	Turkey Consumer Loans Total	Financial Variables
88	DPMLAUTO Index	Deposit Money Banks Loans Priv	Financial Variables
89	DPMLINCC Index	Deposit Money Banks Loans Priv	Financial Variables
90	DPMLHOUS Index	Deposit Money Banks Loans Priv	Financial Variables
91	DPMLCOOT Index	Deposit Money Banks Loans Priv	Financial Variables
92	TUNMM1 Index	Turkey Money Supply M1	Financial Variables
93	TUNMM2 Index	Turkey New Money Supply M2	Financial Variables
94	TUNMM3 Index	Turkey New Money Supply M3	Financial Variables
95	TUNMTDTR Index	Turkey Money Supply Time Depos	Financial Variables
96	TUNMSDFX Index	Turkey Money Supply Sight Depo	Financial Variables
97	TUNMSDTR Index	Turkey Money Supply Sight Depo	Financial Variables
98	TUNMTDFX Index	Turkish Money Supply Time Depo	Financial Variables
99	TBRDLOAN Index	Turkey SME Loans Total	Financial Variables
100	TURWL Index	Turkey Gross Foreign Exchange	Financial Variables

## **Supplementary Tables**

Table A11: Ex	planatory	powers of	f extracted	factors
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Country	Econo	omic Ac	tivity	Dome	estic Fin	ancial		Inflatior	ı		Global	
	F1	F2	F3	F1	F2	F3	F1	F2	F3	F1	F2	F3
Brazil	44.7	12.2	5.5	44.0	19.8	10.9	39.8	20.8	9.8	38.7	15.8	8.7
Hungary	39.1	16.7	8.1	26.0	19.3	14.2	41.0	16.3	12.7	38.7	15.8	8.7
India	27.5	11.3	6.0	24.4	20.0	9.6	53.0	18.0	16.2	38.7	15.8	8.7
Indonesia	21.8	14.0	9.0	37.4	15.4	8.8	30.1	19.0	11.7	38.7	15.8	8.7
Malaysia	47.0	9.2	7.0	25.3	20.0	15.2	40.8	20.4	13.3	38.7	15.8	8.7
Mexico	44.1	10.6	7.2	23.0	20.2	16.9	42.3	19.6	12.8	38.7	15.8	8.7
Poland	36.0	18.7	8.3	31.9	26.4	8.7	51.5	10.7	8.6	38.7	15.8	8.7
Russia	49.5	13.4	5.5	45.3	17.6	8.6	48.2	18.6	8.4	38.7	15.8	8.7
S. Africa	22.1	14.7	8.8	30.6	23.6	11.5	25.9	21.6	14.8	38.7	15.8	8.7
Thailand	42.2	11.7	7.5	24.3	23.0	15.4	29.8	19.7	15.8	38.7	15.8	8.7
Turkey	37.8	11.5	7.6	40.9	19.2	10.4	50.2	13.8	12.3	38.7	15.8	8.7

Table A12: Pesaran (2015) Test for Weak Cross Sectional Dependence

	Level Equation	Slope Equation	Curvature Equation
	(Full Specification)	(Full Specification)	(Full Specification)
CD Test Statistic	22.32	11.71	4.79
P-value	0.00	0.00	0.00

Variables	Level	First Difference
Inflation	-1.425	-6.086***
Activity	-2.469**	-6.100***
Curvature	-3.356***	-6.190***
Slope	-2.303*	-6.190***
Level	-2.578***	-6.190***
Local Financial	-1.986	-6.025***

Table A13: Pesaran (2015) Panel Unit Root Test in the Presence of Cross-Section Dependence

#### Table A14: Panel Unit Root Test Results

		Im-Pesaran-Shin	Test	Levin-Li-Chu Test				
		Level	First Difference		Level	First Difference		
Variables	Constant	Constant&Trend	Constant	Constant	Constant&Trend	Constant		
Inflation	-1.45*	-0.69	-20.38***	-5.76	-6.80	-22.64***		
Activity	-2.57***	-0.13	-29.88***	-6.61	-7.31	-32.30***		
Curvature	-5.76***	-5.49***	-31.31***	-8.44*	-9.32*	-26.21***		
Slope	-4.01***	-3.30***	-25.83***	-5.65	-7.80	-23.94***		
Level	-4.49***	-3.96***	-28.34***	-6.92*	-7.61	-25.82***		
Local Financial	-3.45***	-1.31*	-24.76***	-8.19	-8.55	-21.98***		
Global	-5.71***	-4.03***	-24.78***					

Table A15: Lag Length Selection in Panel VAR

Lag Length	J-statistic	MBIC	MAIC	MQIC
1	305.16	-1439.74	-184.84	-656.81
2	147.92	-1248	-244.08	-621.65
3	75.93	-971.01	-218.07	-501.25
4	36.79	-661.17	-159.21	-347.99
5	14.84	-334.14	-83.16	-177.55

#### Variable Selection Algorithms

#### **Ridge Regression**

The ridge regression employs a form of shrinkage; that is, it shrinkages coefficients that are too large by adding a constraint on the size of the coefficients to the minimization problem based on ordinary least squares estimation. In particular, the ridge coefficients are obtained by solving the following problem:

$$\hat{\beta}^{ridge} = \min_{\beta} \quad ||Y - X\beta|| + \lambda \sum_{i=1}^{M} \beta_i^2$$
(12)

where  $\beta$  is a *M* dimensional vector and  $||Y - X\beta||$  represents the  $L^2$  norm, that is  $||Y - X\beta|| = (Y - X\beta)'(Y - X\beta)$ .

#### Least absolute shrinkage operator (LASSO)

We also utilize the LASSO, which was proposed by Tibshirani (1996), and can be written as a penalized regression problem, just like the well know ridge estimator. In contrast, LASSO imposes an  $\ell_1$ -norm penalty on the regression coefficients. This penalty provides in (possible) shrinkage of coefficients (called  $\hat{\beta}^{lasso}$  below) to zero. The LASSO estimator is given below.

$$\hat{\beta}^{lasso} = \min_{\beta} \quad ||Y - X\beta||_2 + \lambda \sum_{j=1}^{N} |\beta_j|, \tag{13}$$

where  $\lambda$  is a tuning parameter that controls the strength of the  $\ell_1$ -norm penalty. Since the objective function in the LASSO is not differentiable, numerical optimization must be used when constructing  $\hat{\beta}^{lasso}$ . We utilized the efficient iterative algorithm called the "shooting algorithm" is introduced in Fu (1998).

#### Elastic Net (ENET)

In the presence of highly correlated predictors, Tibshirani (1996) shows that the predictive performance of the LASSO is sometimes worse than the forecasts that are obtained using ridge regression. Zou and Hastie (2005) solve this issue by introducing a hybrid form of the LASSO and ridge estimators, called the elastic net (ENET) estimator. The ENET estimator is defined as follows:

$$\hat{\beta}^{EN} = \min_{\beta} ||Y - X\beta||_2 + \lambda_1 \sum_{j=1}^N |\beta_j| + \lambda_2 \sum_{j=1}^N \beta_j^2,$$
(14)

where there are now two tuning parameters,  $\lambda_1$  and  $\lambda_2$  controlling the two penalty functions. The EN estimator also results in possible shrinkage of coefficients to zero, although in cases where N > T, the EN can yield more than *N* non-zero coefficients.

Brazil	h=1	h=2	h=3	h=4	h=5	h=6
Ridge	1.039	1.007	0.986	0.965	0.948	0.936
LASSO	1.025	1.000	0.984	0.972	0.964	0.950
Elastic Net	1.019	0.995	0.980	0.971	0.956	0.944
Hungary						
Ridge	1.020	1.015	1.014	1.013	1.010	1.010
LASSO	1.019	1.019	1.016	1.016	1.016	1.016
Elastic Net	1.028	1.023	1.021	1.021	1.020	1.019
India						
Ridge	0.999	0.996	0.994	0.993	0.994	0.991
LASSO	0.988	0.986	0.982	0.983	0.983	0.983
Elastic Net	0.992	0.990	0.989	0.986	0.985	0.983
Malaysia						
Ridge	0.992	0.975	0.968	0.979	0.965	0.947
LASSO	0.966	0.978	0.997	0.990	0.995	0.986
Elastic Net	0.989	0.978	0.952	0.933	0.931	0.940
Mexico						
Ridge	0.997	0.993	0.992	0.988	0.985	0.984
LASSO	1.002	1.001	1.005	1.000	1.000	1.003
Elastic Net	0.997	0.998	0.999	1.000	1.002	0.999
Poland						
Ridge	1.004	1.008	1.008	1.012	1.011	1.011
LASSO	1.003	1.004	1.004	1.008	1.004	1.001
Elastic Net	1.000	1.001	1.001	1.003	1.000	1.001
Russia						
Ridge	0.920	0.915	0.921	0.921	0.906	0.898
LASSO	0.935	0.923	0.924	0.914	0.906	0.891
Elastic Net	0.929	0.901	0.901	0.901	0.899	0.886
S.Africa						
Ridge	0.995	0.993	0.992	0.992	0.992	0.991
LASSO	0.993	0.996	0.996	0.996	0.995	0.995
Elastic Net	0.992	0.996	0.995	0.996	0.994	0.994
Thailand						
Ridge	1.009	1.011	1.012	1.012	1.010	1.010
LASSO	1.021	1.022	1.021	1.023	1.022	1.020
Elastic Net	1.016	1.018	1.021	1.023	1.015	1.014
Turkey						
Ridge	0.966	0.958	0.952	0.950	0.949	0.943
LASSO	0.989	0.982	0.975	0.970	0.961	0.957
Elastic Net	0.985	0.975	0.965	0.955	0.947	0.938

Table A16: Out-of-sample forecasting exercise based on machine learning algorithms : Level

Dependent variable is level factor. Entries are relative RMSEs based on the model that includes all factors (prices, economic activity, domestic financial) extracted using the dynamic factor model approach of Giannone et al.(2008). Hence, a value of less than unity indicates that a particular variable selection method yields more accurate forecasts than those of the model that do not utilize variable selection methods recursively, for a given forecast horizon. Models that yield the lowest RMSE for each forecast horizon are denoted in bold.

Brazil	h=1	h=2	h=3	h=4	h=5	h=6
Ridge	1.078	1.059	1.066	1.061	1.057	1.040
LASSO	1.124	1.127	1.109	1.081	1.061	1.046
Elastic Net	1.064	1.073	1.070	1.064	1.067	1.067
Hungary						
Ridge	0.995	0.993	0.993	0.992	0.990	0.990
LASSO	0.999	0.998	0.998	0.998	0.998	0.997
Elastic Net	1.001	1.001	1.002	1.002	1.001	1.001
India						
Ridge	0.984	0.975	0.976	0.979	0.983	0.993
LASSO	0.984	0.974	0.973	0.968	0.976	0.982
Elastic Net	1.003	1.008	0.997	0.993	0.980	0.979
Malaysia						
Ridge	0.890	0.910	0.910	0.914	0.923	0.920
LASSO	0.864	0.854	0.868	0.862	0.856	0.859
Elastic Net	0.862	0.843	0.846	0.848	0.858	0.85
Mexico						
Ridge	0.997	0.997	0.994	0.994	0.994	0.992
LASSO	0.988	0.989	0.989	0.990	0.993	0.993
Elastic Net	0.990	0.989	0.987	0.989	0.989	0.990
Poland						
Ridge	0.988	0.991	0.990	0.992	0.992	0.994
LASSO	0.998	0.999	0.999	0.999	1.000	0.998
Elastic Net	0.993	0.997	0.994	0.996	0.995	0.996
Russia						
Ridge	0.947	0.954	0.958	0.960	0.965	0.965
LASSO	0.976	0.976	0.981	0.981	0.984	0.979
Elastic Net	0.970	0.971	0.974	0.972	0.975	0.982
S.Africa						-
Ridge	0.999	0.996	0.996	0.995	0.993	0.991
LASSO	1.001	0.999	1.001	0.999	0.998	1.000
Elastic Net	1.004	1.003	1.002	1.001	0.999	0.998
Thailand						
Ridge	0.986	0.988	0.983	0.975	0.968	0.975
LASSO	0.971	0.954	0.942	0.944	0.946	0.950
Elastic Net	0.979	0.984	0.967	0.956	0.958	0.968
Turkey						
Ridge	1.011	1.000	0.995	0.991	0.984	0.978
LASSO	1.010	1.008	1.000	0.993	0.981	0.975
Elastic Net	1.014	1.008	0.998	0.990	0.981	0.978

Table A17: Out-of-sample forecasting exercise based on machine learning algorithms : Slope

Dependent variable is slope factor. Entries are relative RMSEs based on the model that includes all factors (prices, economic activity, domestic financial) extracted using the dynamic factor model approach of Giannone et al.(2008). Hence, a value of less than unity indicates that a particular variable selection method yields more accurate forecasts than those of the model that do not utilize variable selection methods recursively, for a given forecast horizon. Models that yield the lowest RMSE for each forecast horizon are denoted in bold.

Brazil	h=1	h=2	h=3	h=4	h=5	h=6
Ridge	0.984	0.981	0.976	0.968	0.965	0.959
LASSO	0.986	0.980	0.970	0.969	0.964	0.958
Elastic Net	0.987	0.980	0.972	0.967	0.961	0.958
Hungary						
Ridge	1.009	1.010	1.009	1.007	1.006	1.004
LASSO	1.007	1.005	1.004	1.004	1.004	1.004
Elastic Net	1.003	1.004	1.005	1.004	1.004	1.002
India						
Ridge	0.996	0.994	0.997	0.994	0.997	0.993
LASSO	0.989	0.990	0.988	0.991	0.987	0.980
Elastic Net	0.988	0.988	0.991	0.992	0.990	0.988
Malaysia						
Ridge	0.978	0.973	0.961	0.955	0.959	0.962
LASSO	0.978	0.967	0.958	0.949	0.950	0.94
Elastic Net	0.976	0.967	0.951	0.949	0.948	0.93′
Mexico						
Ridge	0.991	0.990	0.988	0.990	0.990	0.98
LASSO	0.995	0.995	0.997	0.998	0.997	0.994
Elastic Net	0.994	0.993	0.993	0.996	0.995	0.99
Poland						
Ridge	1.012	0.987	0.965	0.952	0.934	0.92
LASSO	1.012	0.997	0.983	0.971	0.960	0.95
Elastic Net	1.013	0.996	0.987	0.973	0.964	0.95
Russia						
Ridge	0.977	0.943	0.933	0.932	0.944	0.96
LASSO	1.002	0.994	1.002	1.014	1.013	1.01
Elastic Net	0.960	0.953	0.955	0.968	0.986	1.002
S.Africa						
Ridge	0.994	0.994	0.992	0.993	0.992	0.992
LASSO	0.996	0.994	0.993	0.993	0.994	0.990
Elastic Net	0.991	0.993	0.994	0.993	0.995	0.99
Thailand						
Ridge	0.967	0.961	0.948	0.939	0.945	0.942
LASSO	0.947	0.939	0.936	0.937	0.929	0.934
Elastic Net	0.959	0.952	0.961	0.958	0.954	0.938
Turkey						
Ridge	0.990	0.983	0.978	0.973	0.972	0.972
LASSO	0.987	0.992	0.993	0.992	0.983	0.981
Elastic Net	0.990	0.988	0.986	0.978	0.972	0.974

Table A18: Out-of-sample forecasting exercise based on machine learning algorithms : Curvature

Dependent variable is curvature factor. Entries are relative RMSEs based on the model that includes all factors (prices, economic activity, domestic financial) extracted using the dynamic factor model approach of Giannone et al.(2008). Hence, a value of less than unity indicates 52 that a particular variable selection method yields more accurate forecasts than those of the model that do not utilize variable selection methods recursively, for a given forecast horizon. Models that yield the lowest RMSE for each forecast horizon are denoted in bold.