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Forecasting Financial Stress and Economic Sensitivity in CEE countries

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Abstract

This paper presents forecasts for the Financial Stress Index (FSI) and the Economic Sensitivity Index (ESI) for the period 2014-2015 for six countries in the region, namely the Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland. It is a continuation of the endeavor to construct synthetic indices measuring financial stress and economic sensitivity for twelve Central and East European countries using the Principal Component Analysis. In order to obtain forecasts of the FSI, we estimated Vector Autoregression (VAR) models on monthly data for the period 2001-2012 separately for all the countries. Using quarterly historical values of ESI and FSI, we estimated Dynamic Panel Data Model for the complete sample of countries. Parameters of the model were later used for forecasting the ESI. Obtained results suggest that the FSI will start to rise in 2014 in the Czech Republic, Lithuania, and Estonia. For Latvia and Hungary, we observed a conversion in the trend, i.e. at the beginning of 2015, when the index should start to fall. According to our forecasts, the ESI will be rising in the next two years, except for Hungary, where we predict a continuous decrease in economic sensitivity.

1. Introduction

In this report we present forecasts of the Financial Stress Index (FSI) and the Economic Sensitivity Index (ESI) for the year 2014 and 2015. Forecasting economic sensitivity and financial stress is a continuation of the endeavor to construct synthetic indices, the FSI and the ESI, for twelve Central and Eastern European countries (CEECs) in the period 2001-2012.

The goal of the previous stage of work was to capture key features of financial and economic vulnerability, and to examine the co-movement of economic turmoil and financial disturbances that strongly affected the CEECs over the last decade. The promising results of the study led us to develop the index further which allows for conducting not only retrospective analyses but also forecasting.

Two unobservable phenomena, financial stress and economic sensitivity, have an important effect on the economic situation of a country. Economic sensitivity is defined as a lack of both balanced economic growth and a lack of stability of public finances. Financial stress is a disruption of the normal functioning of the markets, in that: large shifts in asset prices, an abrupt increase in risk and uncertainty about the value of assets, liquidity droughts, and concerns about the health of the banking system (see [Krzak et al., 2014]).

Using the Principal Component Analysis method, we examined whether the variability of these factors could be explained by the variability of unobservable principal components that could be associated with financial stress and economic sensitivity. To construct the ESI, we used the main macroeconomic variables: a deviation of GDP growth from the long-term trend, the inflation rate, the debt structure (the ratio between external government debt and total government debt), foreign currency reserves (as a ratio to GDP) and the detrended current account balance (in order to estimate financial stress we took financial market and banking sector data into consideration). Model variables consisted of: conditional volatility of the stock market indices, stock market liquidity, long-term interest rates (10 year treasury bond yields), the conditional volatility of the national currencies, the interbank rate spread, long-term financial liabilities in the banking sector, and the world economic climate (WEO published by the IFO Institute).

We expected that the stock market would become more uncertain in a period of financial stress. We computed conditional variance on the time series of the main stock exchange indices using the Auto-Regressive Conditional Heteroscedasticity model with one lag

of error term and one lag of conditional variance (i.e. ARCH(1,1)), as proposed by Engle [1982]. We followed the same approach while quantifying uncertainty on the exchange rate market. We defined illiquid assets as long-term deposits and risky ones as stocks. Thus, the willingness to hold illiquid assets was measured by the change in value of long-term deposits. The willingness to hold risky assets was depicted by the value of main stock exchange indices.

Our analysis confirms that the global financial crisis had a sudden and significantly negative impact on all CEECs. Overall, the constructed indices are evidence that a synthetic measurement that monitors both financial markets and the evolution of economic stability can offer a clear picture of the systems' vulnerabilities.

2. FSI and ESI forecasts

In this section, we report the results of the quarterly forecasts of the FSI and ESI for each of the six countries under review (the Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland) from 1Q2014 to 4Q2015. Moreover, we attempt to draw some comparisons and make conclusions.

2.1 Economic Sensitivity in Central and Eastern Europe 2014-2015

The ESI for each country, with the notable exception of Hungary, is predicted to increase during the forecast time window until the end of 2015 as can be verified by looking at Figure 1.

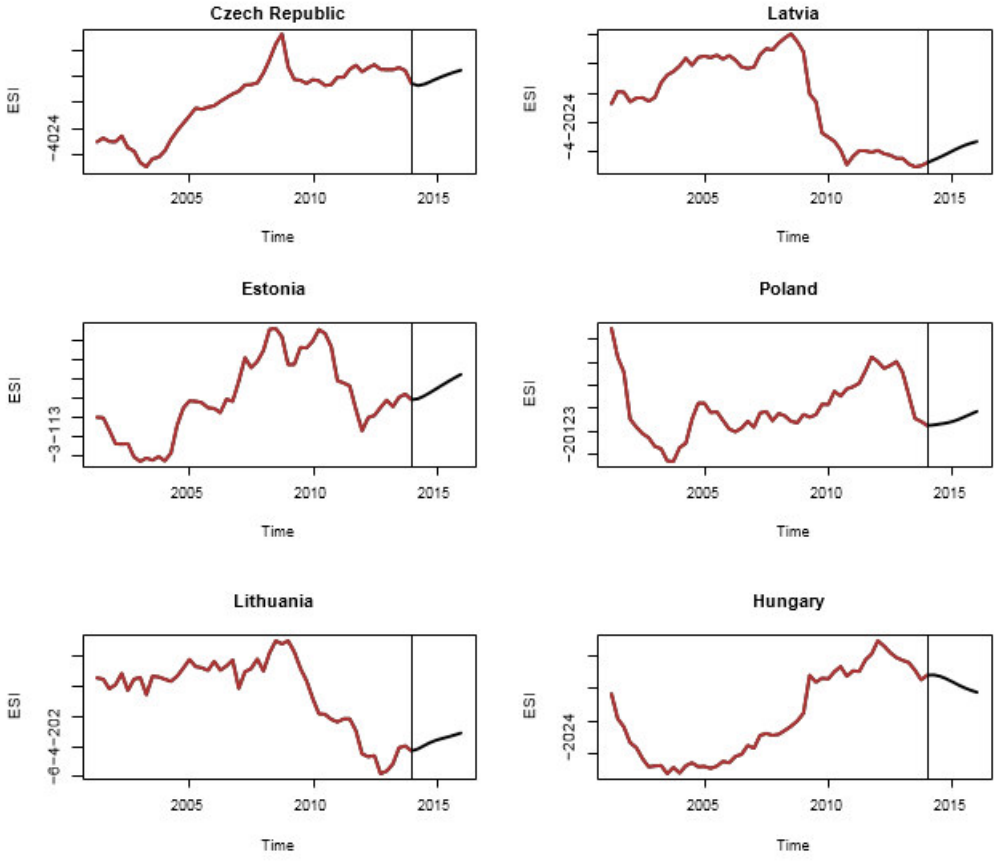
However, according to our forecasts, there is little reason for concern. Despite the upward trend in the majority of countries, stress should remain at low levels with the exception of the Czech Republic and Hungary.

The upward trend starts at a low level everywhere except the Czech Republic. This country experienced six consecutive quarters of negative growth between the 4Q2011 and 1Q2013, as measured by seasonally adjusted quarterly rates of growth (Figure 2). Overall, its GDP growth was negative in both 2012 and 2013, and no other country in the sample performed worse in 2011-2013. Its ESI fell at the end of 2013 due to a rise in GDP growth and a rise in the foreign currency reserves, so at the beginning of 2014 it was near the median of the sample period from 1Q2001 to 4Q2013. An upward trend that is forecasted to start in 1Q2014 will lead to the ESI approaching the lower limit of the fifth (the highest)

quantile of the sample. To get more perspective, a visual inspection of the graph shows that it will be far from the peak reached during the global crisis, i.e. in 3Q2008. Anyhow, this is the only country in our sample in which economic stress will be elevated over the forecast time frame (with respect to the median value).

An increase in economic sensitivity starts at the levels near the historical median in the cases of the Czech Republic, Estonia, and Poland, and at very low levels in Lithuania and Latvia. The ESI in the latter two countries was below the upper limit, or close to the upper limit of the first decile of the sample. Despite the upward trend, the ESI is likely to reach relatively low values at the end of the forecast period. According to our forecast, the ESI in Latvia and Lithuania should be far below the median in 4Q2015, although it will not be in the lowest quantile. In Poland, the ESI should be close to the median at the end of 2015. The value of Estonian ESI will be higher than the median, although it will still be lower than the upper boundary of the fifth quantile by a significant margin. In the case of the Czech Republic, the economic sensitivity will be approaching its median. The bottom line of Figure 1 is that regarding economic sensitivity, the Czech Republic should be carefully followed over the forecast horizon.

Figure 1: ESI forecasts



Hungary is the only country out of the six where the ESI will be downtrending over the forecast period. The ESI in Hungary at the start of the forecast window was elevated, but it is forecasted to be below the lower limit of the fifth quantile at the end of 2015, which we treat as a threshold to flash an alarm signal.

This fall merits a short explanation. In Hungary, economic stress peaked in 2012, as the country was in recession (its second since 2009). Further, inflation peaked, as did the foreign external debt of the general government. Growth resumed in 2013 and inflation started rapidly declining, reaching a historical low of 1.7% in 2013, compared with 5.7% in 2012. The government retired some debt, which helped improve its currency structure. These developments were the main factors of a turnaround in the ESI. Over the forecast period, the deviation of actual growth from potential growth will decrease, and public debt will stabilize. More importantly, though, its currency structure will improve, as running the current account surpluses helps improve the structure of the debt away from the external debt. The vulnerability of the economy due to withdrawals of financing should diminish.

In the case of the Baltic States, the upward trend in the ESI started a few quarters before the beginning of the forecast period. For instance, in Latvia the ESI was quite stable and low; it was in the first decile for five consecutive quarters, reaching a historical low in 3Q2012 (Figure 1, Table 1). Before the ESI dramatically fell, it had hit a historical peak, largely due to the largest collapse in output by far in any European economy in 2009 (-17,7%). Moreover, the same pattern can be observed in the case of the two remaining Baltic countries. With respect to the turnaround of trends, the pattern in the Czech Republic and Poland is similar to Latvia's. In the Czech Republic, it followed a period of relative ESI stability, though at an elevated level.

These results seem unintuitive, as forecasts of the GDP growth call for the strengthening of recovery in 2015 compared with 2014, since stronger growth in the euro area and a pickup in domestic demand is expected to lift activity in most of emerging Europe. GDP growth is expected to accelerate in each of the six countries in 2014. In 2015, it will further accelerate in Poland, Estonia, Latvia and Lithuania. It will be steady in the Czech Republic, and it will fall only slightly in Hungary after a pickup in 2014. Thus, in 2015, the recovery should become entrenched, but it should still not lead to overheating. Since our model captures a deviation of growth from its potential and the gap is going to close rather than rise, this can hardly be accepted as an explanation for rising economic instability.

Closing the output gap may underpin the upward trends in inflation. Inflation rates are going to rise in the forecast period due to cyclical reasons, but the acceleration is mainly forecasted to happen in 2015, while 2014 trends should be divergent.

Another important variable that can lead to an increase in stress is the current account balance. Deficits will widen and surpluses will decrease (Hungary, Lithuania) or even turn into to small deficits, mostly for cyclical reasons. However, these deficits will be at historically low levels, so they should not become a matter of concern for investors. The low level of these deficits will tend to insulate these countries against potential disturbances due to the gradual tapering of bond purchases by the Federal Reserve. Table 1 below shows the descriptive statistics of the past values of the ESI.

Table 1: Summary statistics of the ESI (1Q2001-4Q2013)

Quantile	CZE	EST	HUN	POL	LTU	LVA
0.10	-3.84	-3.095	-2.81	-1.62	-4.58	-4.71
0.20	-2.93	-1.27	-2.69	-0.86	-2.35	-4.07
median	1.26	-0.19	-0.46	-0.28	0.45	-0.09
0.80	2.49	2.05	3.09	1.06	1.37	2.4
0.90	2.73	3.12	3.87	1.98	2.08	2.9
min	-5.05	-3.34	-3.24	-2.32	-5.81	-5.08
max	5.18	3,62	4.94	3.47	2.99	3.93

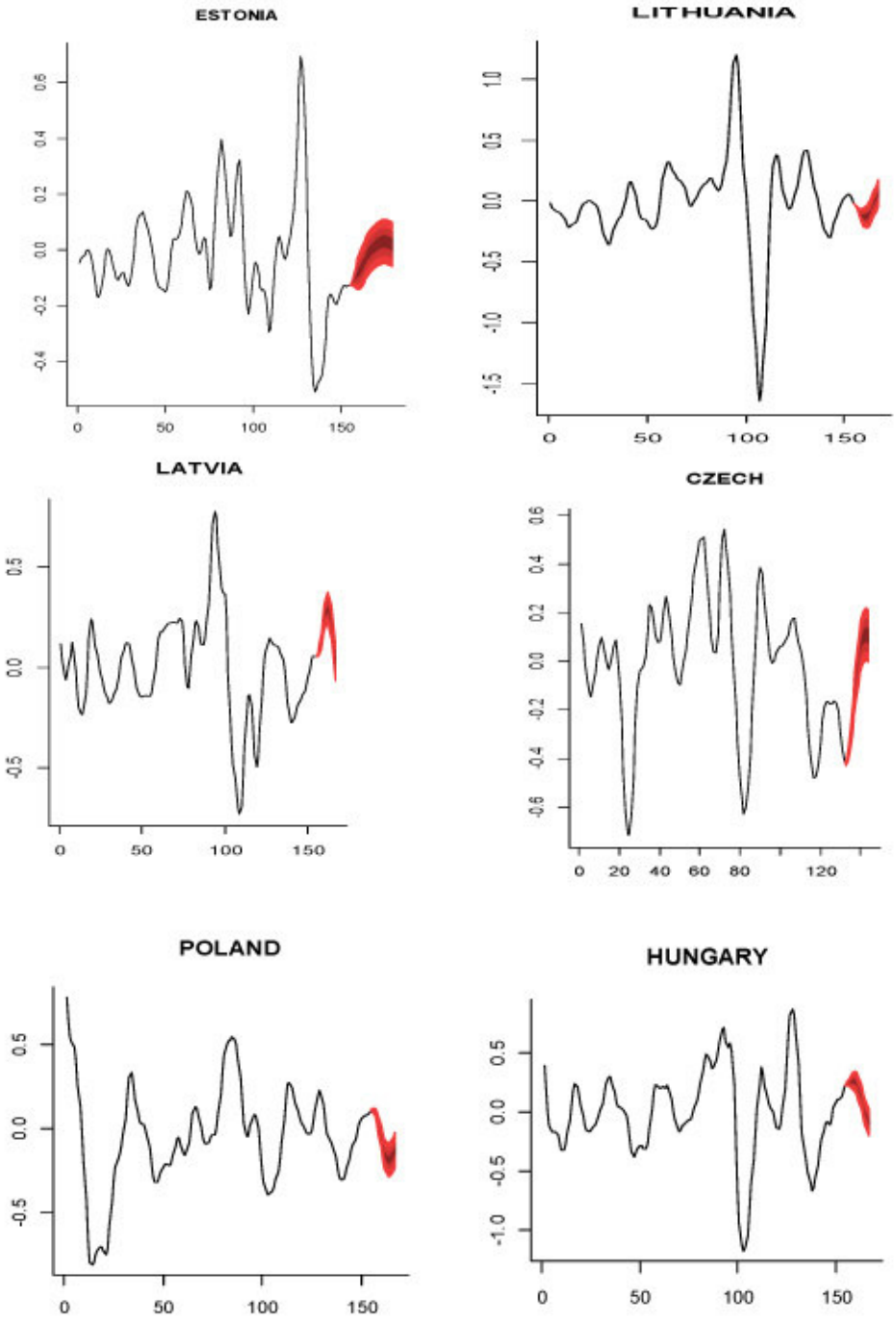
2.2 Financial Stress in Central and Eastern Europe 2014-2015

Levels of financial stress have fallen rapidly in the six countries after the global financial crisis but there are certain modalities. Details can be found in [Krzak et al., 2014]. Here we only summarize the findings. The outburst of the eurozone public debt crisis (2Q2010) and its subsequent waves are easily detected in the FSI fluctuations in each country, e.g. in 4Q2011 and 1Q2012, when the ECB launched LTRO to add liquidity to commercial banks in the euro area. However, the tensions related to the Draghis announcement that the ECB would do whatever is necessary to save the euro and the subsequent announcement of the launch of OMT program at the end of the summer in 2012 did not have such a pronounced impact. Furthermore, this bout of crisis was not able to raise the stress levels to previously recorded heights.

Since the turnpeak in of 2011-2012, financial stress had been downtrending in Hungary, Poland and Latvia. It reached a local trough in the two former countries in 2Q2013, and in the Latvia in 4Q2013. The common event that could have caused a coincident al trough in Poland and Hungary was the turmoil on emerging markets,

due to the Federal Reserve announcement of the upcoming tapering of treasury and mortgage bond purchases. However, the cause cannot be traced in Latvia, which at that time was expecting favorable assessments by the European Commission and the ECB on its readiness to adopt the euro in 2014.
It should be emphasized that Poland and Hungary have floating exchange rates, while Latvia had a fixed exchange rate regime at the time. Furthermore, Poland and Hungary's financial markets are much bigger than Latvia's and more instruments are traded.

Figure 2: ΔFSI forecasts



We detect two patterns in the forecasted indices. The FSI in the Czech Republic, Estonia, and Lithuania should be decreasing in 2014, but increasing in 2015. Latvia, Poland and Hungary should display a different pattern: the FSI, which is projected to be uptrending through most of 2014, peaks before the end of it, and should decrease or stabilize through 2015.

The Czech Republic stands out in the first group of the countries. Interestingly, whereas the ESI in the Czech Republic starts out at a relatively high level, the FSI starts at a low level and continues downtrending into 2014. It reaches its lowest point in 3Q2014, when it fits into the first decile, before it starts sloping upward. Stress levels at the end of the forecast period were compared with the boundary of the fifth quantile (see Table 2). In the case of the Czech Republic, the FSI should belong to the lowest 20% of observations in 4Q2015.

The Lithuanian and the Estonian FSI should fall to their troughs in the same quarter as the Czech index. The financial stress in Lithuania should be slightly above the median at the end of the forecast period. The Estonian FSI is predicted to be below the upper boundary of the first decile, which means that financial stress should be close to the historical minimum.

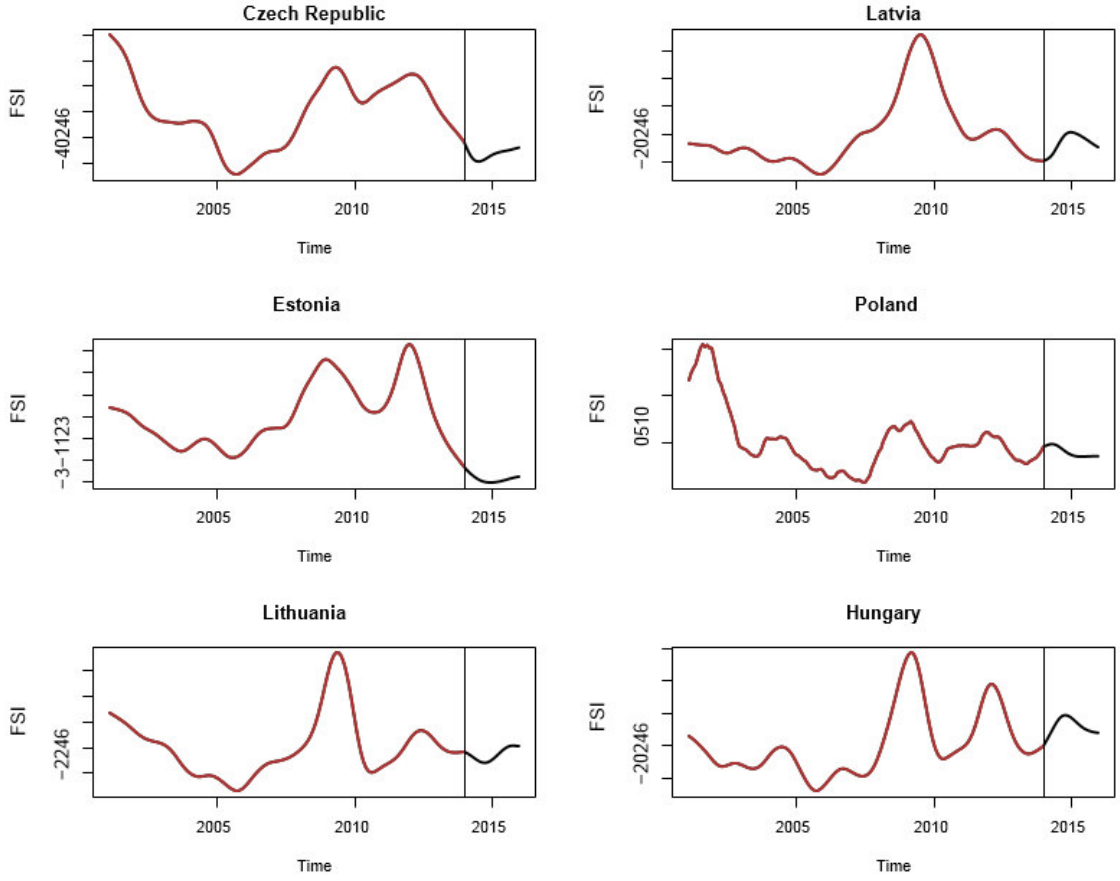
The first group of countries is certainly heterogeneous, so the common patterns in the FSI developments cannot be ascribed to common features of the three economies. The Czech Republic has a floating exchange rate regime, its economy is much larger, and its financial market dwarfs the markets in the remaining two economies. Estonia is a member of the euro area, and Lithuania has a fixed exchange rate against the euro. The country is aspiring to adopt it in 2015.

The remaining three countries also make up a very heterogeneous group. In Hungary, where the FSI started increasing in 3Q2013, it should peak in 4Q2014 and then drop. It is forecasted to peak above the median, i.e. it will fit into the ninth decile. Then it will downtrend to a level that is still above the median but far from the fifth quantile.

In Latvia, the FSI is predicted to reach its peak at the level above the median in 4Q2014, but below the lower limit of the fifth quantile. It should be very close to the median at the end of the forecast horizon. It is hard to explain why the Latvian FSI bottomed out in 4Q2013 and then rose. This may be related to the fact that the country adopted the euro at the beginning of 2014. The forecast may grasp the worsening of high expectations related to the euro adoption after the event happened.

Poland's FSI should peak in 2Q2014 at a level slightly above the median over the period from 1Q2001 to 4Q2013, and resume a declining trend to a level well below the median, yet it will not fit into the 20% of lowest observations at the end of the forecast horizon. Downtrending is predicted to stop in 2Q2015 and then the index is flat with a slight tendency to rise. Due to these developments, Poland seems to be a border case between the two groups, as its FSI shows remarkable stability in 2015 instead of falling like in Latvia and Hungary. However, our models were not able to detect the direct impact of the transfer of financial resources from private pension funds back to state control, which might lead to higher values of stress than those predicted by the model.

Figure 3: FSI general trend forecast



In recent years, the FSI in Hungary has followed dampened oscillations. Whereas other countries displayed more consistent patterns, Hungary's FSI mainly downtrended. The country is an outlier as far as credit risk is concerned. For example, the respective values of the Credit Default Swaps (CDS) are 223 for Hungary, compared with 70 for Poland, 58 for the Czech Republic, 60 for Estonia, and 130 for Latvia and Lithuania. Hungary, like Latvia, had to recourse to the EU and the IMF during the crisis when investors fled both countries. Moreover, the external and total public debt in Hungary are the highest

among the six, as the public debt reached its maximum of 82.2% of GDP in 2010, and it was the only new member state that breached the Maastricht's 60%. In our opinion, the government policy has become an important factor in reverting financial stress to high levels after it had fallen from its peak during the global crisis in 2009 (see Figure 3).

After the financial crisis, the authorities took policy steps that were particularly targeted at the banking sector. They included the introduction of a special tax on bank balance sheets, a financial transactions tax and exchange rate subsidies to early retirement of mortgages.

The bank tax was introduced in 2010, and was originally supposed to be halved in 2012 and abolished in 2013. In 2011, these targets were put back by a year, and the revised promise to halve rates in 2013 was abandoned, which may be one of the factors that raised the forecasted FSI. In order to ease the burden of the mortgage debts for households, the government introduced (in October 2011) a temporary possibility of early repayment for foreign currency (mainly CHF) mortgages at stipulated favorable foreign exchange rates. As a result of these steps, the banking industry was unprofitable in 2011-12, as total loans fell and bad loans rose. Other steps included the nationalization of the private pension funds and the introduction of taxes for selected business sectors.

Table 2: Summary statistics of the FSI (1Q2001-4Q2013)

Quantile	POL	CZE	EST	HUN	LTU	LVA
0.10	-3.56	-3.8	-1.7	-1.92	-2.63	-2.1
0.20	-2.24	-2.36	-1.34	-1.5	-1.98	-1.84
median	-0.53	-0.14	-0.28	-0.5	-0.44	-0.78
0.80	1.29	2.51	1.31	1.49	1.22	0.93
0.90	6.16	3.14	2.36	3.38	3.15	4.45
min	-4.29	-4.9	-2.22	-2.83	-3.45	-2.86
max	10.34	5.8	3.2	5.7	7.36	6.97

Further, the central government made a decision to take over bank debts from municipalities to ease their repayment burden. Under the program, the state consolidated the entire debt load of municipalities with 5,000 inhabitants or less, and partially took over the debt of the rest. The credit risk should fall for banks, as municipalities have problems servicing these debts. The government pledged that banks would not incur any losses due to this operation, however now it wants banks to return 7 percent of the municipal loans assumed by the state. This can definitely have an adverse impact on the FSI.

A rise in stress in the first half of 2014 could also be explained by political factors, such as parliamentary elections. However, once the elections outcome is known, these effects should dissipate. Prospects of debt stabilization and solid economic growth

after years of either recession or stagnation will also exert a positive impact and will dampen the volatility of asset prices. The main domestic risk is related to the possible adoption of a new comprehensive foreign exchange relief scheme for mortgage owners, which may have potential negative effects on the banking sector and investors' sentiment.

To sum up, our forecasts of financial stress in the case of the six countries under review do not give any cause for alarm, as the predicted FSI will be below the fifth quantile. In the countries where the FSI will be increasing over the forecast horizon, it will remain at low levels (the Czech Republic, Estonia) or close to the median (Latvia). In the three countries where the trend of forecasted FSI is down, it will stick around the historical median. The amplitude of changes in the FSI will be much smaller than during previous years, which suggests that these economies are entering a period of a relative calm after the turbulent years marked by the eurozone public debt crisis and recession. In Table 2 the descriptive statistics of the past values of the FSI may be found.

3. Conclusion

Taking all of this into consideration, economic and financial stress should remain at low or median levels in the examined countries through 4Q2015. The only country where economic stress remains at relatively high levels throughout the forecast time window is the Czech Republic. However, the effects of the current crisis and the future developments in Ukraine have not been taken into account, as they are simply impossible to predict. This seems to be the major regional risk factor to the financial and economic stability of these countries over the forecast time span.

In the Czech Republic, Estonia, and Lithuania, the upward trend in the FSI will be accompanied by rising economic stress. However, in Estonia and Lithuania, growth of both indices starts at a low level.

Only Estonia was part of the euro area at the start of the forecast period. However, there is no clear effect of the euro adoption in the FSI development. Latvia adopted the common currency in January 2014 and Lithuania is expected to do so as of 2015, so all the Baltic States will have been in the eurozone by the end of 2015. Nevertheless, there does not seem to be any commonality in FSI trends in these countries. The Czech Republic and Estonia exhibit similar patterns, while Latvia's forecasted FSI will be on a divergent path (Figure 3). ESI should rise in particular in Estonia and Lithuania, but also in Poland and the Czech Republic (as revealed in the graphs). The latter two do not intend to join the eurozone anytime soon, so it is hard to conclude that the euro adoption leads to diminishing or increasing economic vulnerability (Figure 2). The level of financial stress in the Czech Republic and Poland will be low, although they both have a floating exchange rate regime. The FSI in Estonia, which has adopted the euro, follows a similar pattern. Thus it is believed that stress is more related to regional factors than idiosyncratic ones.

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Appendix

In order to estimate the future values of the Financial Stress Index we decided to construct Vector Autoregression (VAR) models. In the first step of our analysis we built monthly FSI in order to obtain a sufficient number of observations. Our sample consisted of 156 monthly values of the FSI for each country. However, we limited the number of the analyzed countries due to the fact that monthly data (starting from 2001) was available for only 6 of them[1]. Our intuition was that the FSI (which is a synthetic index based on data from the banking and financial systems) should be strongly correlated with the main economic variables: inflation and GDP. As a proxy for GDP in a monthly series, we used the monthly data of the Industrial Production Index. In order to obtain stationary variables, we first used differences in the FSI (∆FSI), Industrial Production (∆IP) and/or the Consumer Price Index (∆CPI). Our data were first differenced differentiated and then filtered using the Hodrick-Prescott filter. For the purpose of our analysis, we only used the trend values of our variable. Using the information criteria we chose the number of lags, which varied from 4 to 6 depending on the country. The next step of our analysis was to construct the VAR in three forms as can be seen in Equations (1), (2), (3). For each country, we chose the first best specification in terms of model purposes and postestimation analysis.

$$\begin{bmatrix} \Delta FSI_t \\ \Delta IP_t \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} + \begin{bmatrix} A^1_{1,1} & A^1_{1,2} \\ A^1_{2,1} & A^1_{2,2} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-1} \\ \Delta IP_{t\ 1} \end{bmatrix} + \ldots + \begin{bmatrix} A^p_{1,1} & A^p_{1,2} \\ A^p_{2,1} & A^p_{2,2} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-p} \\ \Delta IP_{t\ p} \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \end{bmatrix} \quad (1)$$

$$\begin{bmatrix} \Delta FSI_t \\ \Delta CPI_t \end{bmatrix} \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} + \begin{bmatrix} A^1_{1,1} & A^1_{1,2} \\ A^1_{2,1} & A^1_{2,2} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-1} \\ \Delta CPI_{t-1} \end{bmatrix} + \ldots + \begin{bmatrix} A^p_{1,1} & A^p_{1,2} \\ A^p_{2,1} & A^p_{2,2} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-p} \\ \Delta CPI_{t-p} \end{bmatrix} + \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} \quad (2)$$

$$\begin{bmatrix} \Delta FSI_t \\ \Delta IP_t \\ \Delta CPI_t \end{bmatrix} = \begin{bmatrix} c_1 \\ c_2 \\ c_3 \end{bmatrix} + \begin{bmatrix} A^1_{1,1} & A^1_{1,2} & A^1_{1,3} \\ A^1_{2,1} & A^1_{2,2} & A^1_{2,3} \\ A^1_{3,1} & A^1_{3,2} & A^1_{3,3} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-1} \\ \Delta IP_{t\ 1} \\ \Delta CPI_{t\ 1} \end{bmatrix} + \ldots + \begin{bmatrix} A^p_{1,1} & A^p_{1,2} & A^p_{1,3} \\ A^p_{2,1} & A^p_{2,2} & A^p_{2,3} \\ A^p_{3,1} & A^p_{3,2} & A^p_{3,3} \end{bmatrix} \begin{bmatrix} \Delta FSI_{t-p} \\ \Delta IP_{t\ p} \\ \Delta CPI_{t-p} \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ e_3 \end{bmatrix} \quad (3)$$

where $p = \{4, 5, 6\}$.

We performed a number of tests to check the purposes of the models. In the BreuschGodfrey test for autocorrelation, we failed to reject the null hypothesis that there was no autocorrelation. Using the CUMSUM test (cumulative sum of recursive residuals) we found our models to be stable over time [Lu¨tkepohl and Kr¨atzig, 2004]. In the next step of our analysis, we used VAR models to forecast ∆FSI. Figure 2 shows the values of ∆FSI for the analyzed countries. As we wanted to observe the general behavior of financial stress over the next 24 months, we took the mean value of the predicted ∆FSI. Based on these estimations, we constructed

[1] Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland

a point forecast of the FSI. As Figure 3 shows, we are able to recognize the overall trend and some turning points of the financial stress in the analyzed countries. The problems that arose during our forecasting procedure are confidence intervals. Although we are aware of the broad confidence intervals in our final estimations, since our main aim was to detect general trends and possible turning points in financial stress, we believe that the models are able to answer our overall questions. To estimate the future trend of the economic sensitivity in CEE countries, we decided to use a different technique. Our timeseries data consisted of 52 observations for each country (quarterly data from 2001 to 2013). In order to obtain sufficient degrees of freedom, we decided to build dynamic panel data using the one-step generalized method of moments (GMM) as proposed in Arellano and Bond [1991]. Our endogenous variable was the value of the ESI, while for exogenous variables we used lagged the ESI and the lagged FSI. In our previous report (see [Krzak et al., 2014]), we detected a correlation between the two indices.

The model we consider takes the following form:

$$ESI_{it} = \beta + \beta_1 ESI_{it-1} + \beta_2 ESI_{it-2} + \beta_3 FSI_{it-1} + u_{it} \quad (4)$$

where: $u_{it} = v_i + e_{it}$.

In the model, parameter v_i is an unobserved individual-level effect and e_{it} is an observation specific error. The procedure for the one-step GMM estimator is as follows. First of all, the model uses lagged values of the variables (ESI and FSI) as instruments (see Roodman [2009]). It solves the problem of endogeneity in our model. In order to solve the problem of fixed effects, GMM transforms Equation 4 using first-differences (Equation 5). The estimated parameters of the model and standard errors are presented in Table 3.

$$\Delta ESI_{it} = \beta_1 \Delta ESI_{it-1} + \beta_2 \Delta ESI_{it-2} + \beta_3 \Delta FSI_{it-1} + \Delta u_{it} \quad (5)$$

Using the likelihood-ratio test, we detected the problem of panel-specific heteroskedasticity of our sample and we decided to use robust estimators. In both the Sargan (with pvalue = 0.633) and the Hansen J test of overidentifying restrictions (with p-value = 1), we failed to reject the null hypothesis that all instruments are valid. In the Arellano-Bond test for autocorrelation in levels AR(2) with p-value = 0.403, we failed to reject the null hypothesis of no autocorrelation.

Table 3: Estimation results: GMM Panel Model

Variable	Coefficient	(std. Err.)
L.esi	1.261**	(0.052)
L2.esi	-0.292**	(0.060)
L.fsi	-0.046**	(0.019)
Intercept	-0.014	(0.024)

In the next step, using parameters from Table 3 and estimated forecasts of the FSI we attempted to define the future values of economic sensitivity in the analyzed countries. As can be seen in Figure 1, we were able to discover a general trend in economic sensitivity. The properties of the model are of course very limited. First of all, we failed to build a separate time-series model for each country. We faced the problem of a very small number of observations in terms of constructing forecasts. Moreover, we faced the problem of very broad confidence intervals. As in the case of the FSI, we were able to discover only a general possible trend in economic sensitivity developments.