EUROPEAN CENTRAL BANK

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EVIDENCE FROM EASTERN EUROPEAN COUNTRIES AND TURKEY

by Christane Nickel, Philipp C. Rother and Jan C. Rülke

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by Christane Nickel, Philipp C. Rother[2]
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In 2009 all ECB publications feature a motif taken from the €200 banknote.

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Abstract

We investigate the impact of fiscal variables on bond yield spreads relative to US Treasury bonds in the Czech Republic, Hungary, Poland, Russia and Turkey from May 1998 to December 2007. To account for the importance of market expectations we use projected values for fiscal and macroeconomic variables generated from Consensus Economics Forecasts. Moreover, we compare results from panel regressions with those from country (seemingly unrelated regression) estimates, and conduct analogous regressions for a control group of Latin American countries. We find that the role of the individual explanatory variables, including the importance of fiscal variables, varies across countries.

Keywords: Budget deficits, determination of interest rates, fiscal policy, Eastern European countries

JEL Classification: C33, E43, E62, H62

Non-technical Summary

This paper assess empirically the link between expected fiscal deficits and bond spreads. It contributes to the literature in the following three directions. First, with regard to the country sample, it looks at five European countries (the Czech Republic, Hungary, Poland, Russia and Turkey) that have developed rapidly over the past decade. With varying pace, they are being integrated in the world economy and international financial markets. Moreover, in absolute terms (Russia) or compared to their neighbours they are large issuers of sovereign debt. As such, the status of these economies is ambiguous. By some indicators, they may still carry the characteristics of emerging economies whereas other indicators, notably with a forward-looking perspective, may suggest their classification as developed economies. From this angle it is interesting to see how the relationship between fiscal and financial market variables for these specific countries compares to the broad findings in the literature for emerging and developed economies. As a control group, we carry out the same regressions for the most important government bond issuers in Latin America, namely Argentina, Brazil, Chile, Mexico and Venezuela.

Second, to check for the robustness of the results regarding the fiscal link to bond spreads, we employ panel estimations for the group of countries as well as country-specific (seemingly unrelated) regressions. From the literature on developed economies, there appears to be a tendency towards finding significant effects of fiscal variables on bond spreads when panel estimations are used. However, tests regarding the assumption on equal slope coefficients are generally not reported and approaches using country-specific equations appear to find less evidence of a direct link from fiscal to financial market variables.

Third, given that the bond spreads investigated reflect market assessments of the projected riskiness of investments in government bonds, capturing market expectations is essential. In line with a nascent strand of the

literature, we therefore include projected fiscal and macroeconomic variables as explanatory factors in our models. We derive the expected values by converting the Consensus Economics Forecast data for the current and next year's outcome into one year ahead projections.

Our major findings are as follows. While the panel estimations point to a strongly significant impact of the fiscal deficit ratio on bond yield spreads for the group of countries as a whole, the country regressions show a different picture: only for Hungary and Russia we find a significant impact of the deficit ratio on the bond yield spread. We find robust panel estimates that if the expected deficit increases by one percentage point, the bond yield spread increases by 4 percent. The effect for Russia is even more pronounced since a one percentage point increase of the expected deficit yields an increase in the bond yield spread of about 13 percent. Hence, there is a significant relationship between the deficit ratio and bond yield spreads. Compared to the analysis of the deficit ratio, our results for the impact of the government debt ratio are mixed and we find no robust impact. Cross-country differences appear to be important also for the other control variables in the regressions as well as with regard to the result of the control group of Latin American countries.

From a policy perspective, the results suggest that policy makers in emerging economies need to be prudent in their management of the fiscal balances. In particular, the considerable degree of cross-country differentiation implies that there is no unique relationship between the level of fiscal imbalances and the risk premium required by investors. Rather, this relationship varies across countries and it may change over time. Consequently, levels of imbalances that could appear tolerable by policy makers judging on cross-country or historical experience may turn out to demand much higher than expected risk premia in the financial market. Specifically, with a higher level of economic development and market integration, financial market participants may become increasingly concerned with the soundness of policy making as reflected in public finances.

1 Introduction

The impact of fiscal variables on bond yield spreads is receiving growing attention. Risk premia on government bonds, that had followed a secular downward trend over the past years, started to increase strongly in 2008. Differentiation of yields of developed country bonds increased markedly, reflecting investor perceptions of upcoming macroeconomic and fiscal risks. Spreads on emerging market government bonds also started to reach levels not seen for many years. This raises the question to what extent domestic policies, notably fiscal policies, and expectations of these can affect the spreads of emerging market government bonds.

Findings in the literature on the link between fiscal variables and government bond spreads are not entirely clear cut. For developing countries, bond spreads are generally found to depend to a large extent on perceptions regarding the economy's external vulnerability in addition to indicators reflecting the global investment climate. Fiscal variables appear to be less important. In developed countries, by contrast, fiscal variables have been shown to have an important impact on government bond spreads in some contributions to the literature. However, the results are not unequivocal and may depend also on country samples and the chosen methodology.

This paper contributes to the literature in the following three directions. First, with regard to the country sample, it looks at five European countries (the Czech Republic, Hungary, Poland, Russia and Turkey) that have developed rapidly over the past decade. With varying pace, they are being integrated in the world economy and international financial markets. Moreover, in absolute terms (Russia) or compared to their neighbours (the other four countries) they are large issuers of sovereign debt. As such, the status of these economies is ambiguous. By some indicators, they may still

carry the characteristics of emerging economies whereas other indicators, notably with a forward-looking perspective, may suggest their classification as developed economies. From this angle it is interesting to see how the relationship between fiscal and financial market variables for these specific countries compares to the broad findings in the literature for emerging and developed economies. As a control group, we carry out the same regressions for the most important government bond issuers in Latin America, namely Argentina, Brazil, Chile, Mexico and Venezuela.

Second, to check for the robustness of the results regarding the fiscal link to bond spreads, we employ panel estimations for the group of countries as well as country-specific (seemingly unrelated) regressions. From the literature on developed economies, there appears to be a tendency towards finding significant effects of fiscal variables on bond spreads when panel estimations are used. However, tests regarding the assumption on equal slope coefficients are generally not reported and approaches using country-specific equations appear to find less evidence of a direct link from fiscal to financial market variables.

Finally, given that the bond spreads investigated in this paper reflect market assessments of the projected riskiness of investments in government bonds, capturing market expectations is essential. In line with a nascent strand of the literature, we therefore include projected fiscal and macroeconomic variables as explanatory factors in our models. We derive the expected values by converting the Consensus Economics Forecast data for the current and next year's outcome into one year ahead projections.

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The next section presents a short survey of the relevant literature. Section 3 discusses the raw data and their transformation, while section 4 lays out the econometric approach. The following section presents the results and section 6 concludes.

2 Literature Survey

Findings in the literature on the impact of fiscal variables on risk premia paid by governments diverge according to the level of development and financial market conditions.

For developed countries, a range of papers have found an impact of fiscal variables on risk premia, in particular with regard to the level of public debt. For the U.S., Goldstein and Woglom (1992) in a seminal paper report evidence that the debt level of U.S. states has a positive impact on their bond yield relative to that of other states. Further evidence in this direction was provided by Bayoumi et al. (1995) and Poterba and Rueben (1999). Regarding the fiscal deficit, Laubach (2009) estimates the effect of the five year ahead projection of the U.S. government deficit provided by the OMB on the level of the five year ahead real Treasury yield. He finds that a one percentage point increase in the projected deficit-to-GDP ratio raises the level of the real 10-year bond rate by about 25 basis points. However, he finds no evidence that yield spreads between corporate and sovereign bonds (as a proxy for changes in the sovereign risk) are systematically related to expected fiscal balances. Finally, for the OECD countries, Alesina et al. (1992) analyse the yield difference between sovereign and corporate bonds and find that it depends positively on the public debt level.

For European and in particular EMU countries several studies tend to point

towards a significant impact of fiscal debt and (not quite unambiguously) deficits for risk spreads across countries. Faini (2006) finds effects of fiscal deficit and debt levels on the aggregate EMU interest rate level as well as on country risk spreads in a model with identical slope coefficients across countries. Bernoth et al. (2004) find an effect of deficits and debt on risk spreads for a pooled estimation of data from 13 EU countries. Similar results are obtained by Hallerberg and Wolff (2008) using fixed effects panel estimations. With a similar econometric approach Bernoth and Wolff (2008) focus on the accuracy of government-reported fiscal data and find a spread-reducing impact of fiscal transparency in addition to a positive impact of deficits but not debt. By contrast, public debt is the only variable included in the explanation of government bond spreads provided by Codogno et al. (2003) using a SURE approach. Moreover, taking into account that it is expected developments rather than past outcomes that matter for investment decisions, Heppke-Falk and Hüfner (2004) analyse whether expected budget deficits derived from Consensus Economics have an impact on interest rate swap spreads in France, Germany and Italy. Using a SURE framework, they find no such evidence.

The respective empirical literature on sovereign risk spreads for emerging markets has tended to find a much more pronounced effect of economic variables reflecting external vulnerability. With a focus on the central and eastern European countries that joined the EU since 2004, Ebner (2009) finds a strong influence of regional financial conditions as reflected in the ECB reference rate and market volatility. Using country-specific regressions, he finds that the impact of domestic variables is less clear and there is considerable variation across countries. In wider studies covering many emerging markets, the role of domestic policy variables, including those for the fiscal sector, is generally smaller and less significant than for developed economies.[1] For ex-

[1]Baldacci et al. (2008) provide a survey of the literature and find a stronger result

ample, in a broad study covering 37 emerging market countries Eichengreen and Mody (1998) find that international interest rates as well as external debt levels and debt servicing obligation contribute importantly to the determination of sovereign bond spreads. By contrast, fiscal deficits have no significant impact. In other studies in this area, fiscal balances are not included as explanatory variables (e.g. Dailami et al., 2008) or they are not found to be significant (e.g. Ferrucci, 2003, Schardax, 2002, Beck, 2001).
In sum, the existing literature agrees that the effect of fiscal variables on bond spreads substantially differs among countries depending on their level of development and financial market conditions. In particular, studies using panel econometrics may vary in their results on the role of fiscal variables on bond spreads, depending on the used time frame and the selected countries. One therefore needs to be cautious when pooling countries and should not stop at this stage because individual country results may differ substantially from the pool.

3 The Data

This paper analyzes the behaviour of bond spreads in four Eastern European countries, namely the Czech Republic, Hungary, Poland, Russia, as well as Turkey. Since the role for expectations in policy making has been discussed extensively in the literature (Clarida et al., 1998) and the forward looking behaviour of financial markets is solidly documented (Heppke-Falk and Hüfner, 2004), this paper looks at the impact of financial markets expectations on bond spreads. The focus is the impact of *fiscal* expectations on bond spreads. To measure expectations, we use survey data published in the Consensus Economics Forecast poll including projections of professional forecasters regarding several financial and real economy variables, such as short-term interest rates, unemployment rates, the real growth rate and the budget deficit.

regarding fiscal deficits when excluding public debt from the regression.

We use disaggregated monthly survey data provided by Consensus Economics Forecasts (CEF) on professional economists' forecasts for for the sample period from May 1998 to December 2007. Since the poll is conducted only six times a year, this covers 59 periods.[2] As a benchmark group, we also analyzed a group of Latin-American countries, namely Argentina, Brazil, Chile Mexico, and Venezuela. They are similar in economic size and development compared to the other European countries in our study. The data set covers the sample period from December 1997 to December 2007, summing up to 101 periods. While the survey is performed for two different forecast horizons, namely, for the end of the current year (current-year), and forecasts for the end of the year ahead (year-ahead), we only include forecasts or the current year in our analysis.[3]

Using Consensus Economics Forecasts has several advantages over other surveys. First, the individual forecasts are published together with the name of the employer of the forecaster.[4] This allows to evaluate the performance of the individual participants and thus should have positive incentive effect for the accuracy of the forecasts.[5] The outlined procedure

[2]Consensus Economics conducts the survey during the first week of each month and publishes the forecasts at the beginning of the second week of the respective month. Its participants are professional economists working for universities and financial institutions such as international economic research institutes, investment and commercial banks. The number of participants varies from country to country with Poland having the highest number of forecasters (36) while Hungary the lowest (29). Further information on how the survey is conduct can be found in the website: www.consensuseconomics.com.

[3]The forecasts provided for the current year exhibit on average a six-month forecast horizon (average between the twelve-month forecast horizon of January and one-month horizon of December). Likewise, forecasts for the next year have on average a forecast-horizon of 18 months.

[4]The survey participants are professional economists working for universities and financial institutions such as international economic research institutes, investment and commercial banks. A complete list of all participants is available upon request. Note that, the survey participants are not necessarily engaged in trading in the bond market.

[5]Batchelor (2001) and Blix et al. (2001) show that Consensus Economics' forecasts are less biased and more accurate in terms of mean absolute error and root mean square error

also prevents a participant to reproduce others' forecasts limiting, therefore, the possibility of herding behaviour.[6] Moreover, since analysts are bound in their survey answers by their recommendations to clients, an analyst may find it hard to justify why she gave a recommendation different to the one in the survey. This all is expected to increase the incentives of the survey participants to submit their best rather than their strategic forecast (Keane and Runkle, 1990). Second, unlike other surveys, forecasters participating in the Consensus Economic Forecast poll do not only take a stance on the direction of the expected change of the macroeconomic variable. Rather, they also forecast the level of a macroeconomic variable. Third, compared to other studies dealing with survey data on fiscal variables,[7] the CEF poll provides a relatively long time period of nearly ten years.

The time period runs from May 1998 through end-2007. This means, the data cover the Asian as well as the Russian financial crisis which likely affected investor behaviour towards the countries in this study. The sample stops before the unfolding of the economic crisis in 2008. Given the particularly large uncertainty regarding the economic outlook in 2008 and the considerable volatility in financial market variables, it appears likely that a model estimated on the historical data will not adequately capture the current events. Thus, the evidence for the overall more quiet past years would be distorted, while it is still too early to gain evidence from the data for the current situation.[8]

compared to OECD's and IMF's forecasts. They also show that there is little information in the OECD's and IMF's forecasts that could be used to reduce significantly the error in the private sector's forecasts. On top of that, Dovern and Weisser (2008) provide evidence that the participants in the Consensus poll provide rational and unbiased inflation and growth forecasts for the G7 countries.

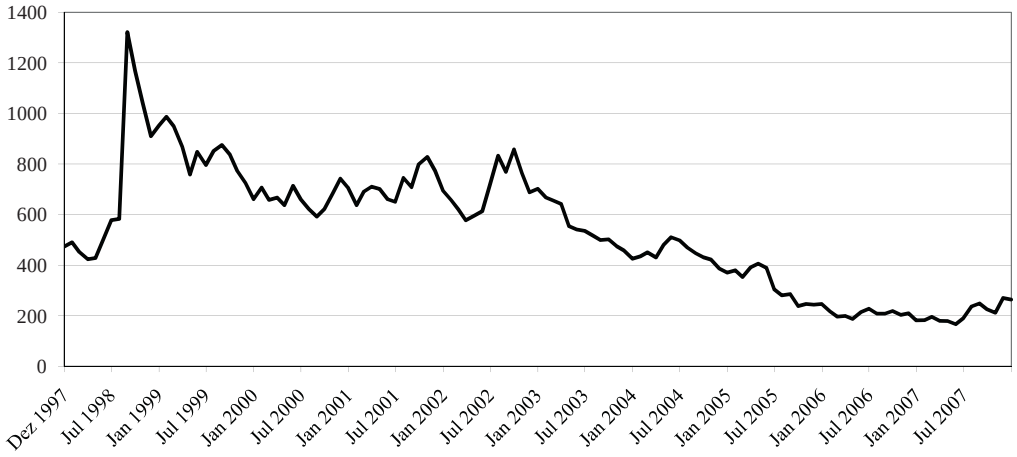
[6]For evidence on herding behaviour among market's participants see Trueman (1994).

[7]Allers et al. (1998) also use survey data to analyze expectations on fiscal variables. They conduct a survey in the Netherlands with newspaper readers on their knowledge of government indebtedness and behaviour in response to the fiscal policy stance. They find no significant evidence of Ricardian Equivalence on their sample.

[8]Though the sample only runs until December 2007, our results are robust for other

Regarding global developments, the sample covers a period of a strong trend decline in the global emerging market risk spread as measured by the EMBI (Emerging Market Bond Index). Figure 1 shows that the index declined from a value of about 1400 basis points at the height of the Asian crisis to around 200 basis points at the end of the sample period with some increased volatility in 2002 and 2003. This reflects the composite impact of two developments, namely a decline in the perceived risk of emerging country investments and a decline in the price that investors required for assuming such risk. The former reflects the impact of economic reforms after the Asian crisis and the better understanding of possible risks in emerging economies. The latter reflects to a large extent the very low interest rates in developed countries leading to a 'hunt for yields' and a decline in returns for assuming additional risk.

Figure 1: Global EMBI spread



The decline in perceived risk is also reflected in the assessment of the

sample periods. For instance, analyzing the period after the euro introduction yield qualitatively similar results which are available upon request.

countries in our sample. Figures 2 and 3 show the average country ratings from the major three rating agencies for the countries in this study. The value on the y-axis is the numerical equivalent of the country rating that is provided in letter code by the agencies. In particular, a AAA rating has the value 16, a AA+ rating the value 15 and so on. Ratings below B- are assigned the value 1. The average for each country represents the unweighted mean of the three agency ratings, rounded to the nearest integer. As can be seen, the average ratings generally improved for the five countries in our study; albeit for Russia only after a sharp dip at the start of the observation period reflecting the financial crisis at the time. By contrast, ratings in the control group generally did not improve with the exception of Mexico which experienced a steady upgrade in the ratings level.

The implication of these developments for relationship between fiscal variables and sovereign bond spreads is ambiguous. On the one hand, the hunt for yields could imply that the specific determinants of country risk were analyzed less extensively and thus reactions to changes in these determinants were more muted. On the other hand, with low overall yield levels, cross-country differentiation could become more important for the performance of investments and induce investors to shift investments more rapidly.

For the five countries of interest the Consensus Economics data are available on a bimonthly basis for the period from May 1998 to May 2007 and on a monthly basis thereafter and, hence, includes 60 periods. For the control group of five Latin-American countries the survey provides monthly data for the period from December 1997 to December 2007, hence our analysis covers 130 periods. The survey provides CPI, real GDP and budget balance (but not public debt) forecasts for the current and next year. In order to equalise the forecast horizon, we generate a synthetic forecast by weighting

Figure 2: Average country ratings

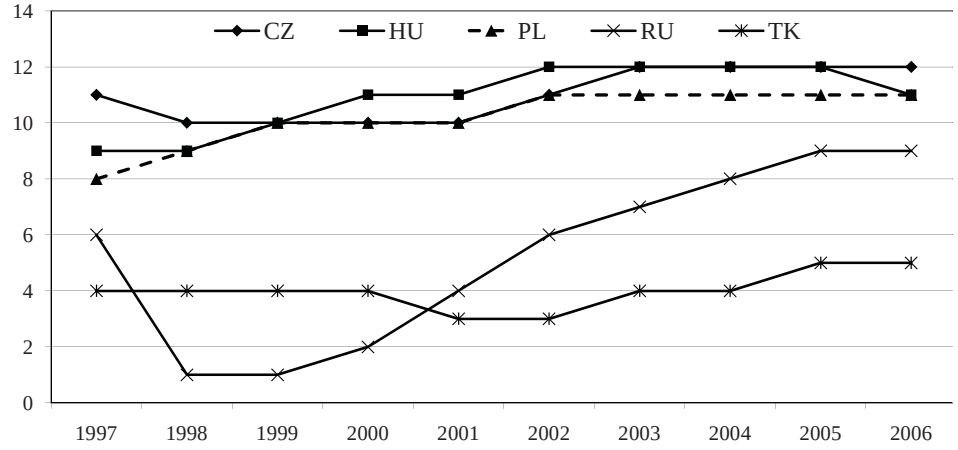
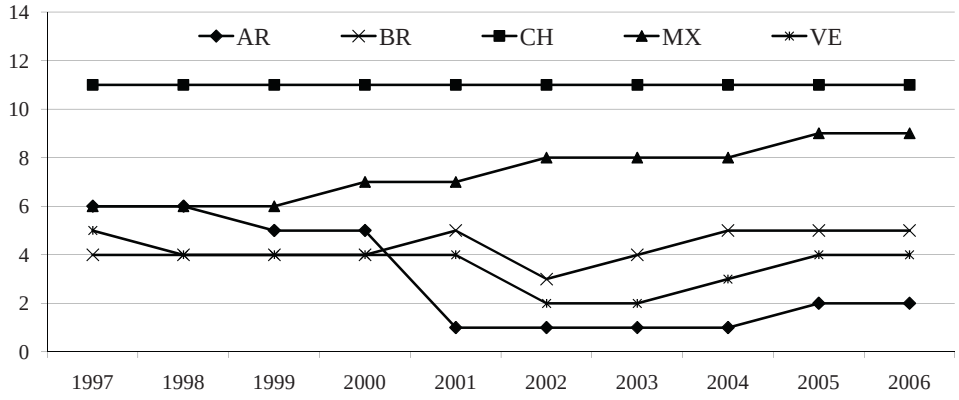


Figure 3: Average country ratings (control group)



the forecast with the remaining months at the time of the forecast, similar to the approach in the literature[9], and come up with a constant one year ahead forecast horizon (see the Appendix for details).

Table 1 presents a summary comparison between projected values and actual outcomes for GDP growth, CPI and the budget balance (in % of GDP) for the five countries of interest. Note that the definition of the budget bal-

[9]See Heppke-Falk and Hüfner (2004) and Beck (2001). A constant forecast horizon is crucial since the forecast performance improves with a shortening of the forecast horizon.

ance varies across countries. For Poland, Hungary and the Czech Republic, Consensus Economic requests to predict the General Government Budget Balance (according to the ESA95 definition). For Russia the projections reflect the Federal Government Budget Balance excluding privatization (as defined by the IMF), while for Turkey the forecasts are on the Consolidated Public Sector Budget Balance including privatization. Table 1 also shows that the expectations on the macroeconomic variables are on average a good predictor of their actual value. For instance, the average GDP growth forecast for Hungary (3.9%) and the Czech Republic (3.4%) are close to the actual outcomes of 3.8% and 3.3%, respectively. However, Table 1 does not provide evidence that the forecasts published in the CEF poll are accurate forecasts which is found in other studies (Batchelor, 2001, Blix et al., 2001, Dovern and Weisser, 2008).

Table 1: Overview of the average forecasts and actual values for the European emerging economies (1998 – 2007)

	Czech Rep.	Hungary	Poland	Russia	Turkey
Period	1998 – 2007	1998 – 2007	1998 – 2007	1998 – 2007	1998 – 200
GDP Growth					
Forecast	3.4	3.9	4.3	4.2	4.2
Actual	3.3	3.8	4.1	4.1	4.0
CPI					
Forecast	3.6	6.3	4.4	18.2	30.0
Actual	3.7	6.8	3.9	18.6	31.5
Budget Balance in % of GDP	General Gov. Budget Balance (ESA95)	General Gov. Budget Balance (ESA95)	General Gov. Budget Balance (ESA95)	Federal Gov. Budget Balance (IMF definition)	Consolidate Public Sect Budget Bala
Forecast	3.9	4.6	3.5	-0.9	7.6
Actual	4.1	4.8	3.9	-1.2	7.9

Notes: Table 1 shows the expected and the actual variables over the sample period 1998 – 2007. The line 'Budget Balance' describes the definition on the published variable in the Consensus Forecast poll.

4 The Econometric Model

There are basically two possibilities to abstract from exchange rate risk that arises in the comparison of bonds issued by national governments in their

national currency. Alesina et. al. (1992), Flandreau et. al (1998), Lemmen and Goodhart (1999) and Afonso and Strauch (2007) compare the returns on government debt and private debt of corresponding maturity denominated in the same currency, thus, analyzing the effect of governmental debt on the relative costs of borrowing compared to the private sector. However, it is not clear that the credit risk of private firms is independent from the credit risk of their national governments since governments in financial crisis might seize private assets or raise taxes and thus, worsen the borrower quality of private firms. Therefore, this study focuses on government bonds denominated in foreign currency.

Our dependent variable is the monthly average[10] country-specific EMBI yield spread for bonds denominated in U.S. dollar.[11] The yield spreads are calculated from the daily Bloomberg data as the absolute difference between the respective bond yield and roughly comparable interest rates on U.S. instruments, notably U.S. treasuries.

Regarding the explanatory variables, our interest is in the performance of the fiscal variables, i.e. fiscal balances and public debt. However, regressions using the public debt variable did not lead to robust results. Similar to Bernoth and Wolff (2008), we see this as evidence that with relatively short time series and a relatively low degree of variation in the debt variable, the major effect of debt levels on risk spreads may be taken up by the country constants. Moreover, as explained above, Consensus Forecast does not provide debt projections so that we used actual values. From an investor perspective, the dominance of the fiscal deficit over the public debt variables seems intuitive. The fiscal deficit is the key variable in the policy making

[10] As we refer to the medium-term analysis this averaging should diminish disturbances arising from potential market overreactions due to short-lived political news.

[11] We use U.S. dollar denominated bonds since data on euro denominated bonds is not available for the full sample period.

process and thus signals the government's intentions which are key to the perceived sovereign risk. Moreover, changes in the debt to GDP ratio are to a large extent (but by no means fully) driven by the deficit as well as real GDP growth and price level changes, which are captured in the regressions below.[12]

Thus, our main variable of interest is the fiscal balance. In particular, we include the fiscal deficit relative to GDP in our analysis of interest rate determination. To operationalise our focus on the forward-looking behaviour of investors, we include expected fiscal variables in our regression model. The expected fiscal deficit is published bimonthly in the Consensus Forecast and provides the deficit of the respective country relative to GDP for the current and following year. In our regression analysis we use the arithmetic mean of the projections across the individual forecasters.[13] An increasing budget deficit is expected to have an increasing effect on a country's credit risk. Thus, we expect a positive relationship between expected fiscal deficits and bonds spreads.

Figures 4 to 8 show the relationship between the expected deficit as defined above and the bond spread for the countries under consideration. While for the Czech Republic, Hungary and Poland, the relationship is characterised by certain clusters which indicate different economic situations in the countries, in the case of Russia and Turkey the positive relationship between expected fiscal deficits and bond spreads is most apparent.

Our set of control variables includes the variables conventionally associated with the behaviour of sovereign creditworthiness and bond spreads. Concerning the domestic macroeconomic situation of the individual countries,

[12] According to standard test shown in the Appendix all variables are panel stationar.

[13] The results do not change qualitatively if we take the median or modus into consideration. Results are available upon request.

Figure 4: Czech Republic: Deficit and bond spread

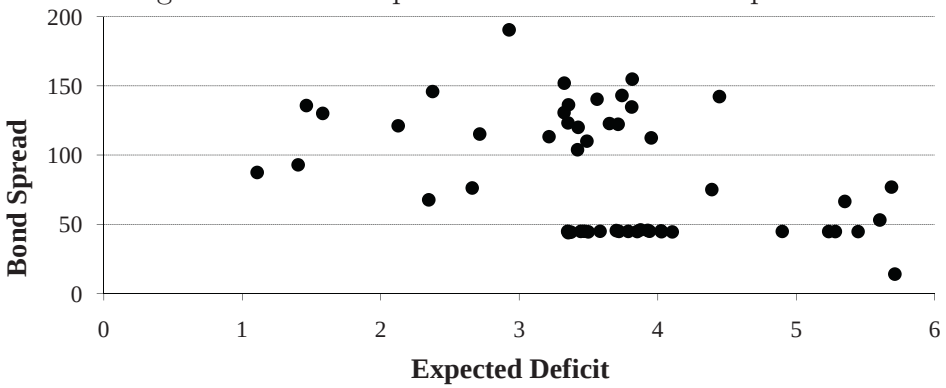


Figure 5: Hungary: Deficit and bond spread

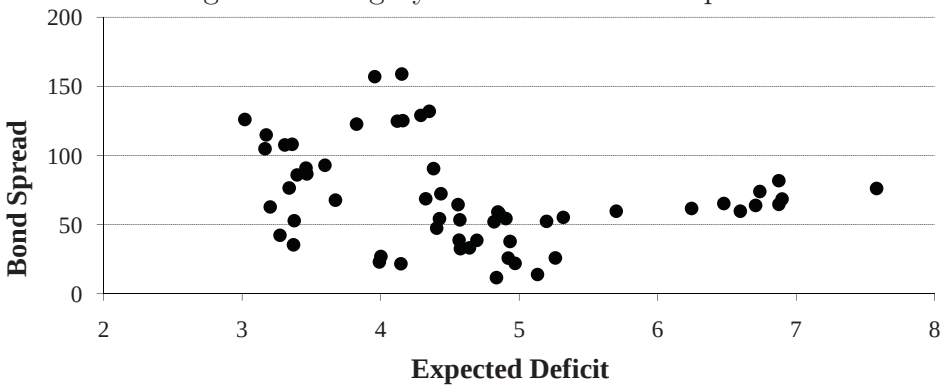


Figure 6: Poland: Deficit and bond spread

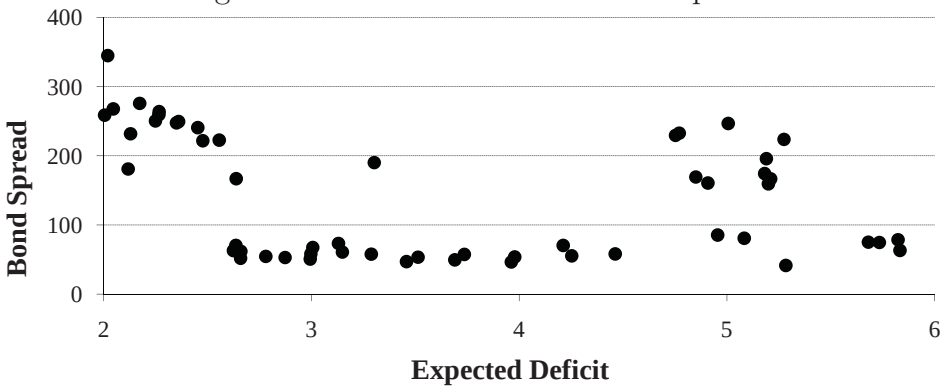


Figure 7: Russia: Deficit and bond spread

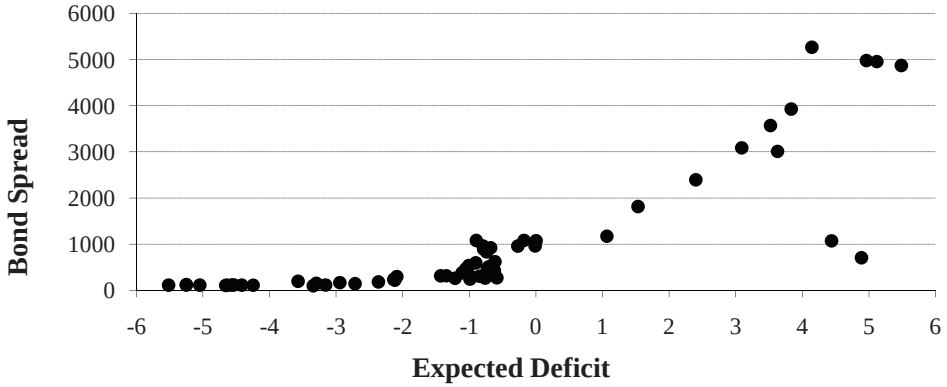
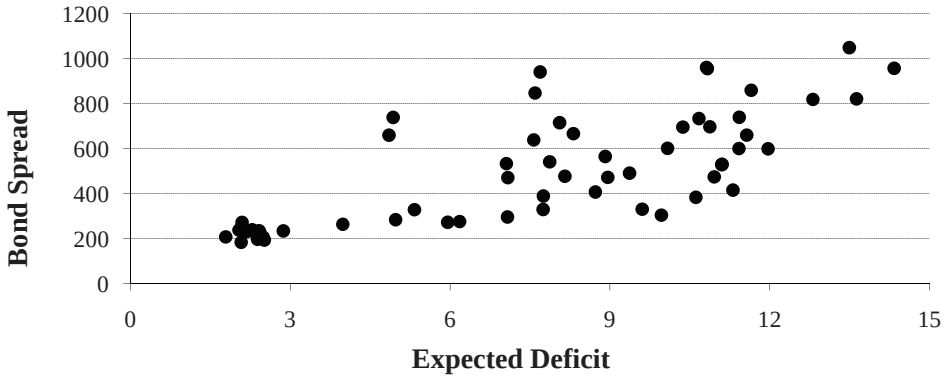


Figure 8: Turkey: Deficit and bond spread



we include expected GDP growth and expected inflation. The expected values are generated in the same way as the fiscal variable. Expected real GDP growth should have a reducing impact on bond spreads as expected higher growth increases the pool of resources that the government can draw on to service its debt. The impact of expected inflation reflects two opposing effects. On the one hand, higher inflation rates raise the tax base for the government and reduce the real value of outstanding debt denominated in domestic currency. This should overall relax the government's financing constraints and result in a reduction of bond spreads also on the foreign currency borrowing. On the other hand, higher expected inflation rates, in particular if in excess of certain thresholds, are associated with increased

macroeconomic instability and would thus likely be harmful to a government's creditworthiness.

Turning to variables related to the external dimension, we include the ratio of countries' foreign currency reserves over imports as well as their external debt over exports. Both variables measure a country's vulnerability to changes in the external environment. In particular, the reserves ratio reflects the fraction (or multiple) of annual imports that could be paid from reserves if no further foreign reserves were accumulated and in the absence of other demands on reserves (such as for interest on foreign currency bonds). While it is a fairly stylised measure, in particular for countries with flexible exchange rate arrangements, the reserves ratio has been shown to have explanatory power with regard to countries' external vulnerability. Similarly, the external debt over exports ratio reflects how many years of export earnings would be needed to cover the outstanding external obligations. Similar to the reserves ratio, this stylised measure has also been shown to possess explanatory power for countries' external vulnerability.

In addition to the variables capturing the external environment, global investors attitudes to country risk are likely to play an important role for the determination of country bond spreads. Consequently, we include the EMBI (Emerging Market Bond Index) spread in the regression. This spread, computed by J.P. Morgan, reflects the premium that a portfolio of global emerging market sovereign bonds is carrying over U.S. bonds.

Finally, we include an EU dummy variable which takes the value one for countries once they have joined the European Union and zero otherwise. In particular, being a member of European Union is assumed to contribute to a country's creditworthiness as membership requires adherence to a certain set of rules which foster the flexible operation of markets as well as prudent

fiscal policies.

From the above, our empirical set-up is based on a seemingly-unrelated regression estimation (SURE) and is based on the equation (1):

$$ln(BS_{t,i}) = \alpha_i + \beta_{1,i} ln(BS_{t-1,i}) + \beta_{2,i} E_{t,i}[Def] + \beta_{3,i} E_{t,i}[GDP] \qquad (1)$$
$$+\beta_{4,i} E_{t,i}[CPI] + \beta_{5,i} EU_{t,i} + \beta_{6,i} EMBI_{t,i} + \beta_{7,i} \frac{Res}{Imp}_{t,i} + \beta_{8,i} \frac{Debt}{Exp}_{t,i} + \epsilon_{t,i}$$

where i denotes the country index, t is the time index and ϵ is the idiosyncratic error term. Furthermore,

$ln(BS_{t,i})$ is the log of the bond spread of country i, i.e. difference the bond yield of country i and the comparable U.S. interest rate

$E_{t,i}[Def]$ is the arithmetic mean of the expected fiscal deficit in terms of GDP of country i at time t.

$E_{t,i}[GDP]$ is the arithmetic mean of the expected real GDP growth of country i at time t.

$E_{t,i}[CPI]$ is the arithmetic mean of the expected inflation rate of country i at time t.

$EU_{t,i}$ reflects a dummy taking the value of one after the respective country entered the European Union and is zero otherwise.[14]

$EMBI_{t,i}$ is the emerging market bonds spread in basis points.

$\frac{Res}{Imp}_{t,i}$ is the international reserves in months of imports of goods and services.

$\frac{Debt}{Exp}_{t,i}$ is the external debt[15] in terms of exports of goods and services.

[14] However, considering the time period before and after the decision on the EU membership does not change our results qualitatively. The results are available upon request.

[15] For a definition of external we refer to WEO (2003).

5 Results

We start our investigation with a panel of eastern European countries plus Turkey. Given that we specify a dynamic regression equation, the use of panel estimators needs to take account of the potential bias induced by the lagged endogenous variable. While the bias diminishes for samples that are large in the time dimension, it may be sizeable for shorter samples.[16] As a consequence, we present in Table 2 conventional OLS estimates and provide as a robustness check the results from the Arellano Bond estimator. The panel is estimated as a random effects model because the fixed effect specification is rejected by the Hausman test. Time dummies account for common shocks affecting all countries in the sample. Models I to III are distinguished by different sets of explanatory variables. In particular, it is interesting to check to what extent the domestic macroeconomic variables and the variables reflecting external vulnerability affect the regression results individually. Therefore, we re-estimate the equation excluding in turns the respective variables. In other words, model II excludes the external variables from the regression model, while model III excludes the domestic macroeconomic variables. Model IV employs the Arellano Bond estimator.

The panel regressions show the expected significant positive impact of projected fiscal deficits on government bond spreads (p-values in parentheses). The effect is stable in size and significant across the alternative model specifications. Moreover, in addition to the constant and the lagged endogenous variable, the EU accession dummy turns out with a significantly negative parameter, indicating that EU membership indeed has a diminishing impact on bond spreads, all else equal. The results for the EMBI spread point to a clear impact of the global investment climate on the bond spreads in the sample. A higher risk premium at the global emerging market level entails a

[16] See Judson and Owen (1999).

higher risk premium for eastern Europe. Results regarding expected inflation and GDP growth are less conclusive. While both variables come out with the expected sign in the alternative specifications, expected GDP growth has a significantly negative impact on bond spreads only if external vulnerability variables are excluded (model II). Of the external variables, the reserves to import ratio is found to have a consistently negative impact on bond spreads in all specifications, whereas the external debt over exports ratio is never significant. Finally, the results from the Arellano Bond estimator are very close to those of the OLS specification (model I), suggesting that the bias due to the lagged endogenous variable is limited.

Table 2: Panel regression with time fixed-effects (July 1998 – December 2007)

Specification Method	I Random Effects	II Random Effects	III Random Effects	IV Arellano Bond
Constant	1.429***	1.272***	1.120***	.004
	(.00)	(.00)	(.00)	(.30)
Spread_{t-1}	.679***	.678***	.746***	.679***
	(.00)	(.00)	(.00)	(.00)
Exp. Deficit	.036**	.040***	.037***	.035**
	(.01)	(.01)	(.00)	(.02)
EU accession	-.203**	-.198**	-.149*	-.203**
	(.02)	(.03)	(.08)	(.04)
Exp. CPI	.001	–	.001	.001
	(.85)	(–)	(.75)	(.83)
Exp. GDP Growth	-.015	–	-.033**	-.016
	(.31)	(–)	(.02)	(.31)
Emer. Market Bond Spread	.058***	.061***	.057***	.074***
	(.00)	(.00)	(.00)	(.00)
Reserve/Imports	-.007***	-.008***	–	-.007***
	(.00)	(.00)	(–)	(.00)
Debt/Exports	.001	-.000	–	.001
	(.58)	(.53)	(–)	(.57)
R^2 (within)	.92	.92	.92	Wald Chi ^{2} =
R^2 (between)	.91	.90	.98	980.01
R^2 (overall)	.90	.89	.94	
Hausman Test	.99	.92	.99	
Time effects	.00	.00	.00	.00
Observations	295	295	295	290
Groups	5	5	5	5

Notes: p-values in parentheses; p-values are based on robust standard errors; following the Hausman test we use the random-effects estimator; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

The panel estimation rests on the assumption of homogeneous slope coefficients across countries. If this assumption is not fulfilled, the results that emerge from the panel regression may be driven by the behaviour of individual countries in the sample and not apply to all of them. To account for this, we estimate separate regressions for each individual country. At the same time the regional proximity of the countries in the sample may influence investor attitudes towards them in the sense that developments in one country affect the equilibrium outcomes in another county in the region. Therefore, we estimate the country regressions in a SURE setting. Technically, we use a GLS estimator instead of OLS since our analysis includes different variables (e.g. the dummy EU) that do not apply for all variables (Heppke-Falk and Hüfner (2004).

Similar to the panel results, we estimate the country specific regressions with time fixed effects and in three different models using alternative sets of explanatory variables. While model I as our baseline model includes all explanatory variables, model II (model III) provide robustness test excluding expected inflation and expected growth ($\frac{Reserves}{Imports}$ and $\frac{Debt}{Exports}$).

Tables 3 to 7 display the results of the analysis for each country separately. Table 3 shows the results for the Czech Republic and confirms that heterogeneity among the countries is relevant. In particular, the expected deficit variable is not significant for explaining variations in the Czech bond spread and it even carries the wrong (negative) sign. Of the other variables that were found significant in the panel approach, the EU dummy remains negative and significant in all specifications, whereas the coefficient on the EMBI spread remains positive but is only just significant in model I and loses significance in the other specifications. Also the other variables do not add significantly to the explanation of the bond spread behaviour.

Table 3: SURE regression, Czech Republic (July 1998 – December 2007)

Specification	I	II	III
Constant	3.866***	3.857***	3.461***
	(.00)	(.00)	(.00)
Spread_{t-1}	.192	.205	.200
	(.32)	(.28)	(.30)
Exp. Deficit	-.078	-.051	-.035
	(.31)	(.39)	(.53)
EU accession	-.448*	-.512*	-.595**
	(.16)	(.10)	(.03)
Exp. CPI	-.020	–	.002
	(.45)	(–)	(.94)
Exp. GDP Growth	.047	–	.045
	(.33)	(–)	(.39)
Emer. Market Bond Spread	.043*	.021	.038
	(.10)	(.24)	(.14)
Reserve/Imports	-.015	-.009	–
	(.42)	(.63)	(–)
Debt/Exports	-.003	-.002	–
	(.34)	(.52)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .73$	Adj. $R^2 = .74$	Adj. $R^2 = .74$
Observations	59	59	59

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 4: SURE regression, Hungary (July 1998 – December 2007)

Specification	I	II	III
Constant	2.791***	1.705***	1.330*
	(.00)	(.00)	(.07)
Spread_{t-1}	.450***	.487***	.677***
	(.00)	(.00)	(.00)
Exp. Deficit	.047*	.085***	.075**
	(.07)	(.00)	(.02)
EU accession	-.838***	-.516***	-.427*
	(.00)	(.00)	(.09)
Exp. CPI	-.058**	–	.000
	(.02)	(–)	(.98)
Exp. GDP Growth	-.161**	–	-.017
	(.03)	(–)	(.78)
Emer. Market Bond Spread	-.033	-.014	-.012
	(.13)	(.49)	(.49)
Reserve/Imports	.032*	.036***	–
	(.05)	(.00)	(–)
Debt/Exports	.003**	.001	–
	(.02)	(.27)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .78$	Adj. $R^2 = .76$	Adj. $R^2 = .71$
Observations	59	59	59

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

The Hungarian results (Table 4) differ substantially from those for the Czech Republic. The expected deficit coefficient comes out positive and significant in all specifications. The coefficient of about .05 reflects that an increase of the expected budget deficit by one percentage point yields an increase of the bond yield spread by about 5 percent. The EU dummy carries the expected negative sign and is significant. Similar to the Czech case, the EMBI spread turns out insignificant. Regarding the macroeconomic and external vulnerability variables, the effects of expected growth and the external debt ratio are as expected, whereas the external reserves ratio comes out with unexpected signs. Interestingly, the coefficient for the expected inflation is negative indicating that higher inflation reduces the bond yield spread. A possible explanation is, that higher expected inflation raises the tax base for the government and reduces the real value of outstanding debt. This should overall relax the government's financing constraints and result in a reduction of bond spreads also on the foreign currency borrowing.

The results for Poland (Table 5) resemble those for the Czech Republic. The expected deficit variable is not significant but the EU dummy is (just) significant. Different from the Czech Republic and Hungary, Poland's bond spread reacts strongly positively to changes in the EMBI spread while for the macroeconomic and control variables no significant explanatory power emerges.

The regression for Russia (Table 6), in turn, resembles that for Hungary with a significantly positive impact of the projected deficit on the bond spread. In fact, the estimated coefficient of about .13 is considerably larger than in the equation for Hungary, reflecting that an increase in the projected deficit by one percentage point leads to an increase of the bond yield spread by 13 percent. For Russia, also the EMBI spread has significantly positive explanatory power, again with a higher coefficient than estimated for the

other countries. The control variables come out as expected except for the reserves ratio.

Finally, turning to Turkey (Table 7), the regression suggests that only global investor sentiment as measured by the EMBI spread and the external debt ratio help to explain the behaviour of bond spreads, while the expected deficit ratio and the remaining control variables do not come out as significant.

The results from the country regressions highlight that interpretation of the results from the panel regressions needs to proceed with a fair amount of caution. While the panel results suggest a clear positive impact of the projected fiscal deficit ratio on the bond spread, this result appears to derive mainly from the relationships holding in Hungary and Russia. Similarly, the result regarding the explanatory power of the EMBI spread seems to be driven to a large extent by the country-specific situation for Poland, Russia and Turkey. At the same time, while some of the country-specific regressions do not support the findings from the panel approach they also do not provide strongly contradictory evidence, either.

From an economic perspective, the differences across the country regressions imply that financial market participants apply different criteria when determining the price of country-specific risks. Of the explanatory variables in our regression equation, the impact of EU accession has the most consistent impact on bond spread across the three countries that joined the EU. But even for this variable, the results for Poland are somewhat more tentative. Projected fiscal deficits matter for Hungary and Russia. The only country whose bond spreads are not related to global investor sentiment as reflected in the EMBI spread is Hungary.

Table 5: SURE regression, Poland (July 1998 – December 2007)

Specification	I	II	III
Constant	1.830*	2.566***	2.006***
	(.10)	(.00)	(.00)
Spread_{t-1}	.52***	.478***	.525***
	(.00)	(.00)	(.00)
Exp. Deficit	.001	-.031	.007
	(.97)	(.19)	(.79)
EU accession	-.39	-.348*	-.419
	(.18)	(.06)	(.13)
Exp. CPI	.01	–	-.002
	(.72)	(–)	(.94)
Exp. GDP Growth	.044	–	.046
	(.54)	(–)	(.44)
Emer. Market Bond Spread	.052***	.047***	.043***
	(.00)	(.00)	(.00)
Reserve/Imports	-.006	-.007	–
	(.37)	(.25)	(–)
Debt/Exports	.001	-.000	–
	(.72)	(.77)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .94$	Adj. $R^2 = .94$	Adj. $R^2 = .94$
Observations	59	59	59

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 6: SURE regression, Russia (July 1998 – December 2007)

Specification	I	II	III
Constant	2.062***	2.054***	2.170***
	(.00)	(.00)	(.00)
Spread_{t-1}	.521***	.505***	.580***
	(.00)	(.00)	(.00)
Exp. Deficit	.135***	.131***	.067***
	(.00)	(.00)	(.00)
EU accession	–	–	–
	(–)	(–)	(–)
Exp. CPI	.003	–	.005**
	(.20)	(–)	(.03)
Exp. GDP Growth	-.032***	–	-.16
	(.00)	(–)	(.39)
Emer. Market Bond Spread	.115***	.137***	.072***
	(.00)	(.00)	(.00)
Reserve/Imports	.011***	.007**	–
	(.00)	(.01)	(–)
Debt/Exports	.001	.001***	–
	(.13)	(.00)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .99$	Adj. $R^2 = .99$	Adj. $R^2 = .98$
Observations	59	59	59

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 7: SURE regression, Turkey (July 1998 – December 2007)

Specification	I	II	III
Constant	1.40***	1.683***	1.721***
	(.00)	(.00)	(.01)
Spread_{t-1}	.611***	.615***	.675***
	(.00)	(.00)	(.00)
Exp. Deficit	-.020	-.007	.008
	(.25)	(.60)	(.60)
EU accession	–	–	–
	(–)	(–)	(–)
Exp. CPI	.003	–	-.001
	(.22)	(–)	(.64)
Exp. GDP Growth	.016	–	-.011
	(.46)	(–)	(.54)
Emer. Market Bond Spread	.059***	.062***	.045***
	(.00)	(.00)	(.00)
Reserve/Imports	-.006	-.006	–
	(.22)	(.13)	(–)
Debt/Exports	.001**	.001*	–
	(.04)	(.09)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. R^2 = .90	Adj. R^2 = .90	Adj. R^2 = .89
Observations	59	59	59

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

6 Robustness checks

The above analysis suggests that investor assessment of what factors are important for the determination of a country's risk premium varies across countries. To check whether this finding is specific to the selected European countries we conduct the analysis for the most important government bond issuers in Latin America, namely Argentina, Brazil, Chile, Mexico and Venezuela. The choice reflects the long history of access to international financial markets by these issuers. Moreover, the varying economic fortunes of the countries in this second group suggest that considerations of sovereign riskiness played a dominant role in the determination of bond spreads. The forecasts for the five Latin-American countries cover the time period between December 1997 and December 2007. While before April 2001 the survey is available on a bimonthly basis, the survey covers monthly data

afterwards yielding considerably more observations than for the Eastern European countries.

In the regressions, the impact of the EMBI spread turns out significantly more important for the Latin American countries than for Eastern Europe (see Tables 8 – 12). The coefficient on the EMBI spread is positive and strongly significant for all countries with the exception of Argentina, where the default history may be the driving factor behind the decoupling from global emerging bond market trends. Also in contrast to the selected European countries, the persistence in the behaviour of the bond spread appears to be higher in Latin America as evidenced by the generally higher coefficient on the lagged endogenous variable.

Turning to the macroeconomic and fiscal variables, the expected fiscal deficit is found to have a positive and significant impact on the bond spread in the case of Mexico and (more tentatively) Venezuela. For the other countries, the impact is generally non-significant and a reverse relationship is found for Chile for some specifications. For the other variables, very little explanatory power is found in addition to the impact of the lagged endogenous variable and the EMBI spread. Parameter estimates are mostly non-significant and there are also some significant coefficient estimates where the sign comes out contrary to our expectations.

The results from this second group of countries lend support to our conclusions in the previous section. The behaviour of bond spreads differs across countries also in this group of geographically close countries with a to some extent common economic history. The expected fiscal deficit matters for a particular country (Mexico). In contrast to Eastern Europe, global investor behaviour is a dominant factor for bond spreads throughout the region.

Table 8: SURE regression, Argentina (December 1997 – December 2007)

Specification	I	II	III
Constant	1.820***	.904	.275**
	(.00)	(.16)	(.02)
Spread_{t-1}	.860***	.916***	.964***
	(.00)	(.00)	(.00)
Exp. Deficit	-.008	.029	.007
	(.73)	(.31)	(.77)
Exp. CPI	-.003	–	-.001
	(.35)	(–)	(.65)
Exp. GDP Growth	-.043**	–	-.013
	(.02)	(–)	(.39)
Emer. Market Bond Spread	.008	.022*	.007
	(.57)	(.10)	(.62)
Reserve/Imports	-.074	-.038	–
	(.09)	(.23)	(–)
Debt/Exports	-.118	-.101	–
	(.10)	(.14)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. R^2 = .97	Adj. R^2 = .96	Adj. R^2 = .96
Observations	101	101	101

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 9: SURE regression, Brazil (December 1997 – December 2007)

Specification	I	II	III
Constant	.647*	.921***	.328
	(.07)	(.00)	(.26)
Spread_{t-1}	.871***	.834***	.905***
	(.00)	(.00)	(.00)
Exp. Deficit	-.051	.016	-.039
	(.13)	(.51)	(.30)
Exp. CPI	-.021*	–	-.016*
	(.06)	(–)	(.09)
Exp. GDP Growth	.032	–	.029
	(.19)	(–)	(.20)
Emer. Market Bond Spread	.027**	.043***	.024*
	(.04)	(.00)	(.08)
Reserve/Imports	-.018**	-.010	–
	(.03)	(.17)	(–)
Debt/Exports	-.003	.004	–
	(.89)	(.83)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. R^2 = .97	Adj. R^2 = .97	Adj. R^2 = .97
Observations	101	101	101

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 10: SURE regression, Chile (December 1997 – December 2007)

Specification	I	II	III
Constant	.198	.301*	.121
	(.49)	(.04)	(.67)
Spread_{t-1}	.901***	.900***	.915***
	(.00)	(.00)	(.00)
Exp. Deficit	-.018	-.023*	-.024***
	(.15)	(.05)	(.00)
Exp. CPI	.018	–	.009
	(.62)	(–)	(.77)
Exp. GDP Growth	.014	–	.016
	(.49)	(–)	(.43)
Emer. Market Bond Spread	.025**	.027**	.028**
	(.03)	(.03)	(.01)
Reserve/Imports	.002	.003	–
	(.74)	(.66)	(–)
Debt/Exports	-.018	-.011	–
	(.45)	(.60)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .95$	Adj. $R^2 = .95$	Adj. $R^2 = .95$
Observations	101	101	101

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 11: SURE regression, Mexico (December 1997 – December 2007)

Specification	I	II	III
Constant	2.837***	2.93***	2.864***
	(.00)	(.00)	(.00)
Spread_{t-1}	.344***	.370***	.343***
	(.00)	(.00)	(.00)
Exp. Deficit	.140*	.258***	.210**
	(.07)	(.00)	(.01)
Exp. CPI	.005	–	.006
	(.47)	(–)	(.37)
Exp. GDP Growth	.050***	–	.046***
	(.00)	(–)	(.00)
Emer. Market Bond Spread	.084***	.069***	.079***
	(.00)	(.00)	(.00)
Reserve/Imports	-.004	-.004	–
	(.27)	(.24)	(–)
Debt/Exports	.030	.023	–
	(.12)	(.22)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. $R^2 = .97$	Adj. $R^2 = .97$	Adj. $R^2 = .97$
Observations	101	101	101

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

Table 12: SURE regression, Venezuela (December 1997 – December 2007)

Specification	I	II	III
Constant	1.215**	1.011***	1.226***
	(.03)	(.06)	(.00)
Spread_{t-1}	.754***	.805***	.758***
	(.00)	(.00)	(.00)
Exp. Deficit	.015	.026**	.018
	(.27)	(.03)	(.18)
Exp. CPI	.006*	–	.004
	(.10)	(–)	(.32)
Exp. GDP Growth	-.003	–	-.005
	(.38)	(–)	(.14)
Emer. Market Bond Spread	.035**	.032*	.033*
	(.04)	(.06)	(.05)
Reserve/Imports	.003	-.005	–
	(.73)	(.62)	(–)
Debt/Exports	-.021	.002	–
	(.27)	(.95)	(–)
Time effects	.00	.00	.00
Model Fit	Adj. R^2 = .95	Adj. R^2 = .95	Adj. R^2 = .95
Observations	101	101	101

Notes: p-values in parentheses; p-values are based on robust standard errors; 'Time effects' indicate the significance value under null hypothesis that all time dummies are equal; *** (**) and * indicate significance at the one (five) and ten percent level, respectively.

7 Conclusions

The results suggest government bond investors assign different weights to macroeconomic and fiscal variables across countries in their investment decisions. This most likely reflects the fact that the factors driving sovereign risks are much wider than the set of variables conventionally employed in empirical analysis, all the more so for emerging market economies. In particular, internal and external political risks are likely to play a role. For policy makers in the respective countries, this puts a premium on prudent policies. Fiscal imbalances that are tolerated by financial markets in some countries (e.g. Czech Republic, Poland and Turkey) may not be accepted in other countries (e.g. Hungary and Russia).

Given the differences in explanatory variables found in the literature that matter for emerging and developed economies, respectively, it would be

interesting to investigate the evolution over time of the importance of the specific variables. The brevity of the available time series prevents investigation of a related conjecture here. This could be an area for future analysis.

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Appendix: Calculation of the Weighted Average of Expected Variables

In order to generate a one year ahead forecast the forecasted variable f_t at time t (= 1,2,.., 59 and 101, respectively) is calculate as a weighted arithmetic average of the forecast for the current year f_t^{cur} and the next year f_t^{next}. We weight the forecast f_t with the remaining number of months m:

$$f_t = \frac{f_t^{cur} \cdot m + (12 - m) \cdot f_t^{next}}{12}$$

with $m \leq 12$. This procedure is also applied by Heppke-Falk and Hüfner (2004) and Beck (2001). Both studies deal with data of the Consensus Economic Forecast poll and construct the arithmetic average as outlined above.

Panel stationarity tests

Variable	Exp. Sign	Definition	Source	LL	IPS	ADF
Exp. Def	+	Arithmetic mean of the budget deficit forecasts for the current year	Consensus Economics Inc.	-1.8* (.05)	-2.0* (.02)	19.2* (.02)
Exp. Def	+	Arithmetic mean of the budget deficit forecasts for the next year	Consensus Economics Inc.	-2.3* (.01)	-1.9* (.02)	20.2* (.02)
EMBI			Datastream	2.3* (.00)	4.6* (.00)	3.5* (.00)
Exp. GDP Growth	-	Arithmetic mean of the GDP forecasts for the current year	Consensus Economics Inc.	-2.4* (.00)	-0.8 (.19)	-2.7* (.00)
Exp. GDP Growth	-	Arithmetic mean of the GDP forecasts for the next year	Consensus Economics Inc.	-2.0* (.00)	-0.4 (.53)	-0.9* (.18)
Exp. CPI	+	Arithmetic mean of the CPI forecasts for the current year	Consensus Economics Inc.	-1.8* (.01)	-3.0* (.00)	-1.7* (.02)
Exp. CPI	+	Arithmetic mean of the CPI forecasts for the next year	Consensus Economics Inc.	-2.5* (.00)	-4.1* (.00)	-2.6* (.00)

Notes: LL refers to the Levin-Lin ρ -statistics; IPS refers to the Im-Pesaran-Shin test (using large sample adjustment values); ADF refers to the augmented Dickey-Fuller test; * indicates significance at the ten percent level rejecting the null hypothesis that the series are non-stationary; p-values in parentheses.

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