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The appropriateness of the macroeconomic imbalance procedure for Central and Eastern European countries

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The Appropriateness of the Macroeconomic Imbalance Procedure for Central and Eastern European Countries

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Editor

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Abstract

The experience of Central and Eastern European countries (CEEC) during the global financial crisis and in the resulting European debt crises has been largely different from that of other European countries. This paper looks at the specifics of the CEEC in recent history and focuses in particular on the appropriateness of the Macroeconomic Imbalances Procedure for this group of countries. In doing so, the macroeconomic situation in the CEEC is highlighted and macroeconomic problems faced by these countries are extracted. The findings are compared to the results of the Macroeconomic Imbalances Procedure of the European Commission. It is shown that while the Macroeconomic Imbalances Procedure correctly identifies some of the problems, it understates or overstates other problems. This is due to the specific construction of the broadened surveillance procedure, which largely disregarded the specifics of catching-up economies.

Keywords: macroeconomic imbalances procedure, Central and Eastern European countries, signals approach, early warning system

JEL Classification: E60, F53, G01

1. Introduction

Through the reform process of European institutions in the follow-up to the outbreak of debt crises in the European Union, the introduction of the Macroeconomic Imbalance Procedure (MIP) has been enacted as part of the so-called six-pack regulations (European Commission 2011a). Its creation emerged from the fact, that macroeconomic imbalances have been observed within the Union prior to the crises. The use of an early warning system is an established tool for other international institutions, such as the International Monetary Fund or national authorities, such as central banks. New features of the scoreboard of the European Commission (EC) compared to other early warning systems include the following: (1) its procedure and results are published; (2) it provides a formal basis for political discussions; and (3) it implies consequences for European Union (EU) member countries that fail to score.¹ The political argument behind the Macroeconomic Imbalance Procedure is that building up imbalances might not only result in vulnerabilities for crisis in single member states, but might also impact other member states negatively, owing to contagion of crises or costly interventions. Thus, the observation of imbalances results in requests for reform and can, if reform proposals are considered to be inadequate, lead to financial sanctions. So far, no fines have been imposed, but several countries underwent in-debt reviews and had to present proposals for economic adjustments to curtail macroeconomic imbalances. Thus, the scoreboard ought to be as precise as possible. It should avoid making false alarms, which can result in costly economic adjustment programmes or in government fines. It should, however, also avoid missing an upcoming crisis and thus creating costs not only for a single member country but also for the remainder of the Union. To this end, economic literature suggests a range of different methods for the calibration of early warning systems; systems that aim to minimize these potential errors of early warning systems. In this paper, the most simple but also most popular approach, the signals approach, is used for the calculation of error minimizing thresholds and for the assessment of the utility of a scoreboard.

In contrast to previous studies, we focus exclusively on Central and Eastern European countries. We believe that the types of crises observed in different regions vary in their causes and expressions as well as in their terms of early warning indicators. In particular we expect that the structural differences of catching-up economies as compared to the rest of the EU are of importance for the accuracy of early warning systems. So far, the Macroeconomic Imbalance Procedure takes a one-size-fits-all approach with regard to the identification of thresholds (differentiating between euro and non-euro countries for a few indicators). The aim of this paper is therefore to derive specific optimal thresholds for Central and Eastern European countries and set them in context to both, a qualitative description of the macroeconomic state of those countries and the outcome of the current analyses of the MIP.

The paper aims to take stock of the usefulness of the scoreboard by measuring its performance in forecasting crisis and non-crisis periods in Central and Eastern European countries. It also proposes adjustments of thresholds and a consideration of further scoreboard indicators to improve its forecasting performance. Our research question is as follows: To what extent would a specific formulation of thresholds on the scoreboard for Central and Eastern European countries generate better results for the early warning system and therefore fewer costs for member states and the EU? We hypothesize that the construction of specific thresholds of early warning systems for Central and Eastern European countries leads to better forecasting results and therefore to the creation of more appropriate policies.

The paper is structured as follows. In Section 2, the methodology employed is described. Section 3 presents the results of the calibration. Section 4 presents the results in line with a descriptive analysis of the economies of the countries examined and of official scoreboard results, and Section 5 concludes.

¹ See also Moschella (2014).

2. Method and data

The empirical literature on early warning systems uses different approaches that vary with respect to techniques employed. Standard approaches are bivariate Logit/Probit-models and signals approaches, as developed by Kaminsky & Reinhart (1999).² Logit/Probit-models use the bivariate variable crisis/no crisis as the endogenous variable, and estimate the impact of different sets of explanatory variables.³ Signals approaches are non-parametric approaches⁴ that examine the behaviours of potential explanatory variables prior to detected crises and that compare these behaviours with those of non-crises periods. When some variables pass a certain threshold, their changes are used as crisis signals.⁵ In addition to these two techniques, further concepts are outlined in the literature. These include artificial neural networks, whose advantage is the reflection of complex interaction between the variables;⁶ value-at-risk models;⁷ restricted VAR models;⁸ and Markov-switching approaches, which do not depend on an a priori definition of crises.⁹

This paper largely follows the signals approach as developed by Kaminsky & Reinhart (1999). The signals approach is used because it is easy to apply and because it has been found to outperform alternatives.¹⁰ The paper deviates from Kaminsky & Reinhart (1999) with regard to the optimization criteria as is discussed below.

Constructing an early warning system using the signals approach involves five steps. The first step involves defining crisis periods. Concerning the scoreboard of the MIP, it is not clearly defined which types of crises are meant to be signalled. EC-Regulation 1176/2011¹¹ sets out the principles and rules governing the MIP. It takes a wide approach and leaves room for judgment. It defines four categories of imbalances: "no imbalances", "imbalances", "excessive imbalances", and "excessive imbalances with Excessive Imbalance Procedure (EIP)". The Regulation states that the Commission should undertake an "economic reading" of the scoreboard indicators, since underlying economic developments need to be considered. The so-called economic reading is considered essential as the nature of the imbalances can vary significantly throughout member states, but it doesn't clarify the procedure. It can, however, be assumed that politicians had in mind the types of crises that the European Union was facing at the time of the scoreboard's introduction. The crises emerged from macroeconomic imbalances led in some cases to financial crises and in other cases resulted in public debt crises. Since the initial scoreboard design was established the Commission has undertaken several adjustments of indicators as well as data revisions and threshold updates (in 2012, 2013 and 2015), but changes never went in the direction this paper is dealing with, namely the consideration of the specificities of Central and Eastern European countries (CEEC).

² For a more detailed survey on Early-Warning Systems, see Abiad (2003) and for a test, see Knedlik & Scheufele (2008).

³ Examples include Berg & Pattillo (1999), Kamin, Schindler & Samuel (2001), and Kumar, Moorthy & Perraudin (2002).

⁴ These are methods that do not depend on specific assumptions about probability distribution and do not include the fitting of parameters.

⁵ See Brüggemann & Linne (2002). Other examples include Berg & Pattillo (1999b), and Edison (2000).

⁶ E.g. Nag & Mitra (1999) Peltonen (2006).

⁷ E.g. Bléjer & Schumacher (1999).

⁸ E.g. Krkoska (2001).

⁹ E.g. Abiad (2003), Knedlik & Scheufele (2008).

¹⁰ Abiad (2003: 3). For the statistical significance of the signals approach see El-Shagi et al. (2013).

¹¹ European Commission (2011b)

A public debt crisis can be referred to as a state in which governments fail or have difficulty in repaying their debts. One obvious empirical definition of public debt crisis might therefore be a government default. This definition might be too narrow, if one considers that a default might just have been avoided as a result of assistance from European or international institutions, or other governments. Thus, a second possibility to define a crisis empirically might be to refer to situations when programmes by the International Monetary Fund or the European Union have been provided to a country in crisis. This approach is, however, also not without its problems. First, these programmes usually start only after a crisis happened. Thus, the dating of the crisis might be too late. Second, the crisis might be stopped by measures other than programmes of international institutions. So, for example, the Central Bank could announce that it will do whatever it takes to avoid defaults. In this case, the crisis might be overcome without any programme in place. Therefore, in this paper, a third type of definition is used. Countries typically default on their debts when refinancing becomes too expensive due to increased risk premiums on government bonds or loans. A high spread of government bond yields is interpreted as a serious doubt in a governments' capacity to service its debt in the future. As the reference in spreads, we use the average of the yields of AAA-rated countries of the EMU. Thus the spread (between government bond yields and a riskless reference rate) is used to identify crises in this paper (see Section 3).¹² As large government bond spreads do not necessarily lead to default, we refer to these events as times of 'fiscal stress' or 'crisis'. Data on 10-year government bond yields are drawn from Eurostat and IMF International Financial Statistics. AAA-rated government bond yields are drawn from Thomson Reuters. For periods for which no spread data are available, we define a crisis period as a period guided under an international adjustment programme. Fiscal stress is present when the spread exceeds the mean of all spreads by more than one standard deviation.

The second step of the signals approach involves identifying potential explanatory variables, which can send signals before a crisis. For the analysis shown in this paper, indicators of the scoreboard of the Macroeconomic Imbalance Procedure are used. The use of official Eurostat data also defines the data frequency (annually). Additionally, we employ two further variables that have been found to signal upcoming fiscal stress well: productivity growth and domestic demand.

The third step involves determining the crisis window, i.e., the time prior to a crisis during which variables are expected to send their signals. The literature uses different crisis windows; most common windows in early warning systems span from 12 months to 24 months.¹³ The idea behind the scoreboard of the EC is that once signals have been sent, politicians in member states should react accordingly to avoid the emergence of a crisis. Due to various time lags resulting from limited timely data availability levels and politician reaction times, we use a rather long crisis window of two years. Since in the aftermath of a crisis necessary adjustment processes sometimes lead to rather volatile macroeconomic conditions, we do not consider the two years following a crisis episode for threshold calibrations.

The fourth step involves calculating individual crisis thresholds for each variable that distinguish tranquil periods from crisis periods. The challenge lies in the fact that the threshold must not be too loose (probably not detecting crises) or too tight (probably creating a false alarm). To solve the trade-off between these two forms of error, a utility function for politicians is used as is presented in Alessi and Detken (2011). That utility function can be expressed as:

$$(1) U(\theta) = \min(\theta, 1 - \theta) - \left(\theta \frac{C}{A+C} + (1 - \theta) \frac{B}{B+D} \right),$$

¹² See Knedlik & von Schweinitz (2012).

¹³ See for example Brüggemann & Linne (2002: 9) and Kaminsky, Lizondo & Reinhart (1998: 17), respectively.

whereby A is the number of months a good signal was sent (a crisis is correctly signalled). B is the number of months a false alarm signal was sent, and in statistical terms this kind of error is called a type II error. C is the number of months in which no signal was sent but a crisis followed, and statistically spoken, this kind of error is called a type I error. D is the number of months in which no signal was sent and no crisis followed (see Table 1).

Table 1: States of the Indicators

	Crisis within the next 2 years	No crisis within the next 2 years
Signal issued	A	B
No signal issued	C	D

The ratio of type I errors to pre-crisis periods is expressed as $\frac{C}{A+C}$, while the ratio of type II errors to tranquil periods is expressed as $\frac{B}{B+D}$. Tight thresholds result in many signals (both correct and incorrect) and may thus lead to a high probability of type II errors, while a loose threshold will result in few signals, potentially missing crisis periods and thus a high type I error probability. Politicians might have different costs associated with both types of errors. They might therefore be willing to accept more of one type of error to further minimize the other type of error.¹⁴ Thus the utility function (1) allows for weights on both error types, with θ being the weight for type I errors and $(1-\theta)$ the weight for type II errors. The expression $\left(\theta \frac{C}{A+C} + (1-\theta) \frac{B}{B+D}\right)$ in equation (1) constitutes the loss to the policymaker owing to errors of the early warning system. The other part of the right-hand side of equation (1), $\min(\theta, 1-\theta)$, defines the secure loss to the policymaker. If the weight θ is smaller than 0.5, the politicians have a relatively high preference for avoiding false alarms, and then it would always be possible to set the threshold so loose that no signal would be sent whatsoever. In this case $\frac{B}{B+D}$ would be equal to zero, because B would be zero, and $\frac{C}{A+C}$ would be equal to one, because A would be zero. This would result in a loss equal to θ . If θ is larger than 0.5, the politicians put a higher weight on not missing a crisis, so it would always be possible to set the threshold so tight that signals are sent in all of the periods. Thus, following the above logic, the resulting loss would be $(1-\theta)$. Therefore, the politicians can always ensure a loss of $\min(\theta, 1-\theta)$ by setting extreme thresholds.

To derive optimal thresholds, we take a set of economically reasonable thresholds and calculate the losses of these thresholds due to both types of errors. We then use the threshold that minimizes losses in the utility function as the “optimal” threshold. Smaller losses lead to higher utility levels. Thus, the greater the utility level, the better the indicator. In this paper it is assumed the politicians have same preferences for avoiding type I and type II errors ($\theta = 0.5$). This means that the utility as calculated by equation (1) can take values between -0.5 and +0.5. Only indicators with utility values of greater than zero have use in predicting a crisis.

The fifth and final step of constructing an early warning system involves the calculation of a composite indicator. To judge the risk of an upcoming crisis occurring in a certain period from just one variable, we draw a composite indicator by calculating the percentage share of indicators that send a signal during that period of time. The value of the composite indicator can then be compared to the average value of composite indicators across time and countries to obtain an indication of

¹⁴ A detailed analysis of political preferences in early warning systems is presented in Knedlik (2014).

whether the current risk level exceeds or falls below normal levels. We consider the composite indicator to have high predictive power when it is above average before crises and below average during tranquil periods.

The method of the EC to derive thresholds, the so-called statistical approach, is to assume a certain quantile for the statistical distribution of a variable to be indicative.¹⁵ This is, in contrast to the economic literature, done without defining a dependent variable – at least no such variable has been published. Thus, there is no optimization procedure of thresholds with regards to error minimization that could be reproduced in this paper. We rely on academic literature to derive our optimal thresholds.

The scoreboard consists of 14 indicators that are meant to denote the presence of macroeconomic imbalances.¹⁶ Indicators of the scoreboard include: the current account balance to GDP, the net international investment position to GDP, the export market share, nominal unit labour costs, the real effective exchange rate, the private sector debt to GDP, the flow of credit to the private sector, house prices, general government sector debt to GDP, the unemployment rate, the total financial sector liabilities, the activity rate, the long-term unemployment rate and the youth unemployment rate. Official thresholds for these indicators are given in Table 2. In the present analysis we use the original annual scoreboard data provided by the EC.

The first indicator is the current account balance. It is expressed as the three-year backward-looking moving average of the ratio of the current account balance to GDP. The threshold defined by the EC is two-sided. Thus, signals are sent if the realization of the current-account-balance-to-GDP ratio is below -4% or above +6% for all countries. The current account balance is probably the most obvious indicator for international macroeconomic imbalances. Continued deficits might indicate a loss of international competitiveness and therefore a risk for crises. Longer lasting surpluses do not constitute risks for the surplus country, but rather for the rest of the countries.

The second indicator is the net international investment position, which accumulates current account balances over time. It indicates whether the short term current account imbalances are levelled over time or accumulate to larger foreign indebtedness. Also this indicator is expressed as ratio to GDP. The threshold is set at -35% for all countries. Thus, if the net international investment position is less than -35% of GDP, the indicator is sending a signal.

The third variable is the change in the export market share over five years. If a country loses more than 6% of its share in export markets, a signal is sent. That threshold is given by the EC for all countries. Also, this variable addresses issues of competitiveness. It only takes the export side of the current account and compares it to the international competitors. Thus it is focused on the balance sheet total instead of its balance.

The fourth indicator is nominal unit labour costs. The EC uses the percentage change of nominal unit labour costs over three years. While the above described indicators can be interpreted as results of losing or gaining competitiveness, unit labour costs can be seen as one cause of the changing competitiveness of economies. Unit labour costs do not only measure changes in wages but combine changes in wages with changes in productivity. If wages increase by more than productivity, unit labour costs increase. If wage increases are less than productivity increases unit labour costs decline. Thus, with this indicator, the threshold depends on belonging to the Eurozone. For euro countries, the threshold is 9%, for non-euro countries a signal is sent if the unit labour costs increase by more than 12% over that period of time.

¹⁵ European Commission (2012a).

¹⁶ For the following descriptions of the Scoreboard see European Commission (2012a, b).

The fifth indicator is the real effective exchange rate. The Commission uses the percentage change of the real effective exchange rate, based on consumer prices over three years and a basket of 41 trading partners. A change in the real effective exchange rate therefore indicates a change in relative consumer prices. It is, as well as the unit labour costs, an indicator of a potential cause of changes in competitiveness. If domestic prices increase relative to foreign prices by more than what a change in the nominal exchange rate compensates for, a country faces a real appreciation. This means that it might face difficulties in selling domestic goods on international markets. Also with this indicator, the EC differentiates between euro countries and non-euro countries, and the threshold is two-sided. So the threshold for Eurozone countries is $-/+5\%$, for non-euro countries $-/+11\%$.

The sixth indicator is private sector debt, which is expressed as a ratio to GDP. The official threshold for all countries is 133%. If the level of private debt exceeds this threshold a signal is sent. With this sixth indicator the scoreboard turns towards domestic imbalances in the European economies. Private sector debt comprises the debt of the private sector excluding banks. The time before the crisis reveals a large increase in private debt, which indicates increased vulnerability to banking crises and might signal the potential for fuelling asset price bubbles.

The seventh indicator is the flow of credit to the private sector. Thus, it is the flow component to the stock of private sector debt. This might indicate credit-fuelled asset price bubbles or vulnerabilities and is expressed as a ratio to GDP. If credit to the private sector exceeds 14% of GDP the indicator sends a signal. The threshold is applicable for all countries.

The eighth indicator is house price index and measures the percentage change of deflated house prices over the previous year relative to the consumption deflator. The threshold is the same for all countries. If the relative increase in house prices lies above 6%, the indicator sends a signal. The house price indicator is included in the scoreboard, because house prices have been observed to increase in some countries, namely Spain and Ireland or Latvia before the crisis. The reversal of asset price bubbles in the property sector leads to credit defaults that contributed to the banking crises.

The ninth indicator is general government sector debt. It follows the definition of the Maastricht criterion and is expressed in relation to GDP. If public debt is above 60% of GDP, a signal is sent. Again, that threshold is used for all countries. The public debt indicator is the only one that has also been used before the debt crises in Europe, but with limited success. While the scoreboard approach aims explicitly to have a wider view of imbalances, the most important indicator of fiscal imbalances is still included.

The tenth indicator is the unemployment rate. The EC uses a three-year backward-looking moving average. The universal threshold for all countries is 10%. The unemployment rate is meant to reflect the efficiency and flexibility of economies to use their scarce resources in the production process. Thus, persistently high levels of unemployment might indicate a limited ability to adjust to economic developments.

The eleventh indicator, introduced after the first application of the scoreboard in the MIP, is that of total financial sector liabilities.¹⁷ The financial sector was ignored by the initial scoreboard, although the recent crisis went out from this sector in many European countries. If the financial sector expands very quickly that might indicate that the banking sector is taking excessive risks, which might enhance the vulnerability of that sector to economic shocks. The scoreboard's threshold for the annual change in the liabilities of the financial sector - the same for all countries of the European Union - lies at 16.5%.

¹⁷ For addition of financial sector indicator see European Commission (2012c).

In the fifth annual round of the MIP in 2015 three employment indicators were added to the main scoreboard.¹⁸ The inclusion of new employment variables should strengthen the analysis of macroeconomic imbalances by the EC. Thus, the twelfth indicator is the activity rate, defined as the number of active population (employed and unemployed) over total population aged 15 – 64 years, expressed in three-year change. The scoreboard's threshold for all European countries is -0.2%. Between 2013 and 2014 an increase of 0.2% and 0.3% was recorded in almost all countries in the euro area and the EU respectively, which can largely be attributed to the structural increase in the participation of women and older workers. It partly reflects the decline of the working age population, in particular in the Baltic States, and, to a lesser extent, in countries hit by the sovereign debt crisis.

The thirteenth indicator is the long-term-unemployment rate of active population aged 15 – 74 years, as percentage change over last three years. The threshold lies by 0.5%. The improvement in unemployment rates is mostly linked to a reduction in dismissal rates while job findings rates remain below pre-crisis levels. Job finding has not been sufficient to avert an increase in long-term-unemployment. The persistence of long-term unemployment has implications for the efficiency of labour market matching and the risk that unemployment becomes entrenched.

The fourteenth indicator is the youth unemployment rate of active population aged 15 – 24 years, as percentage point change over last three years. The threshold lies by 0.2%. From the peak of 2013 substantial reductions were registered accompanied in most countries by a decline in the share of young people that are neither in employment, education nor training. It has declined but remains above pre-crisis levels in several countries. The youth unemployment rate is an early indicator of worsening labour market conditions. It also signals lowered potential output (via a loss of skills formation, scarring effects and foregone earnings in the future) and is associated with a higher level of social exclusion.

Additionally, we include two indicators that have exhibited strong forecasting properties through earlier studies (Knedlik and von Schweinitz, 2012): domestic demand and real productivity per person. Domestic demand depicts the position in the business cycle. A fall of domestic demand below a certain threshold can indicate fiscal stress due to reduced tax income and increased government spending. The change in productivity is a further competitiveness indicator. When productivity is increasing slowly, below a certain rate, this might hint to losses of competitiveness. For an overview of the debate and a contribution to it see Knedlik and von Schweinitz (2013).

The sample period of our data set covers 1999 to 2016. This period is different from what the EC is using. The calculation of EC's scoreboard thresholds in most cases is based on statistical distributions from 1995-2007. We deviate from that sample period because earlier data for Central and Eastern European countries is hardly available and because we consider the inclusion of more recent crisis episodes to be of high importance to evaluate the recent forecasting performance of the indicators.

3. General results

The results of the optimization procedure for the scoreboard are shown in Table 2; indicators are sorted according to their forecasting performance when applied to previous events. The ranking is made with regard to the usefulness at optimal thresholds. It can be seen that some of the indicators are performing much better as compared to others. Two indicators, namely the house price index and unemployment rate - make no positive contributions to forecasts at any threshold. While for the house price index, measuring actual house prices might constitute an explanation, the unemployment rate may simply not adjust well in advance of crises. The two indicators are left out of

¹⁸ For addition of employment indicators see European Commission (2015a, b).

further consideration for our model but are considered for the official threshold model. For the remaining indicators, we find just one, the change in the real effective exchange rate, for which the official threshold is equal to the optimal threshold at a reasonable utility level. For all of the other indicators, the official thresholds are either set too tight or too loose. This worse accuracy of the official threshold setting as compared to optimal threshold setting can be also illustrated by the average utility of indicators. At official thresholds, indicators yield an average utility of 0.05, while the figure is doubled to 0.11 for optimal thresholds. The first group comprises unit labour costs, the net international investment position, the current account, private credit flows, financial sector liabilities, and the activity rate. In line with findings of the literature, these thresholds may have been set at a tight level, as politicians and staff involved in setting thresholds can prioritize avoiding an upcoming crisis over avoiding false alarms (Knedlik, 2014).

Table 2: Thresholds and Utility of the Different Indicators

<i>Performance rank</i>	<i>Indicator</i>	<i>Official threshold</i>	<i>Optimal threshold</i>	<i>Usefulness at official threshold</i>	<i>Usefulness at optimal threshold</i>
1	Unit labour costs	9% or 12%	18%	0.12 or 0.19	0.22
2	Net international investment position	-35%	-70%	0.09	0.20
3	Current account	less -4%/ more +6%	less -6%/ more +9%	0.12	0.18
4	Private debt	133%	100%	0.03	0.18
5	Youth unemployment	2%	0.5%	0.11	0.15
6	Productivity	-	3%	-	0.15
7	Domestic demand	-	-5%	-	0.14
8	Government debt	60%	55%	0.13	0.14
9	Export market share	-6%	-5%	0.08	0.10
10	Long-term unemployment	0.5%	0.3%	0.09	0.09
11	Real effective exchange rate	+/-5% or +/-11%	+/-5%	0.08 or -0.01	0.08
12	Financial sector liabilities	16.5%	23%	0.05	0.08
13	Private credit	14%	10%	0.03	0.05
14	Activity rate	-0.2%	-0.9%	0.03	0.04
15	Unemployment rate	10%	20%	-0.18	0.00
16	House price index	6%	16%	-0.10	0.00

Source: European Commission, own calculations.

The remaining indicators, which have thresholds that are too loose, are more interesting in relation to central and eastern European countries since they exemplify problems related the EC's one-size-fits-all approach to EU member countries. Debt levels, both private and public, are generally lower in central and eastern European countries compared to those of the rest of the EU. Therefore, reaching the levels proposed by the Commission as thresholds is hardly possible immediately prior to an upcoming crisis. Additionally, due to the nature of catching-up economies, the export market shares of most central and eastern European countries have been increasing. Even before crises occur, one would not expect to find a decrease as large as in other countries, where shrinking export market shares have been much more common. The change in the youth unemployment rate shows that this indicator is generally more volatile in central and eastern European countries.

The calculation of optimal thresholds allows for a comparison between early warnings issued by those thresholds and those of the official scoreboard.

4. Country specific results

This section compares the findings of early warnings issued by the scoreboard indicator set at optimal thresholds with outcomes of the Commission's scoreboard in light of the more general economic conditions of the Central and Eastern European member states. The crises predicting performance is evaluated for past events as well as for more recent times. Corresponding results are shown in Figure 1. The comparison gives an idea of the appropriateness of the Macroeconomic Imbalance Procedure for these countries.

4.1 Bulgaria

For Bulgaria, our crisis identification method reveals two crises occurring in 1999 and in 2009. The 1999 crisis had its origins in the banking and exchange rate crisis, which was preceded by hyperinflation in years prior. The situation stabilized somewhat with the introduction of a currency board arrangement in 1997. During the 1998-1999 Kosovo crisis (out of sample), exports deteriorated and macroeconomic imbalances continued to be present in the years leading up to 2001. As is shown in Figure 1, the composite indicator based on official thresholds continues to send signals throughout the tranquil period of 2003 to 2006. This is mainly attributable to signals from unemployment and house price indicators, which are not considered in our optimal threshold model due to poor performance. The crisis of 2009 emerged from the global financial crisis, which hit Bulgaria hard: a decrease in capital inflows has led to a near stagnation of credit growth and a contraction of domestic demand; exports and manufacturing production have declined sharply. The crisis is well signalled for the two years prior by the composite indicator based on optimal thresholds. High levels of external private debt and large foreign currency exposure crisis signals mainly emerged from private credit flows, private debt indicators, the real effective exchange rate and unit labour costs. In contrast, the model based on official thresholds does not show increased risks of crises for the years prior to 2009.¹⁹ Following heavy fluctuations in the composite indicator in the aftermath of the crisis, the indicators recently show a reduced risk of crises. This is basically attributable to macroeconomic improvements. In 2015, real GDP grew faster and mainly due to higher net exports benefitting from the depreciation of the euro, to which the lev is pegged. As a result, the current account balance surplus increased. The fiscal stance improved markedly, decreasing the deficit due to financing expenditures through superior EU-fund absorption. Unemployment has decreased for the first time after the crisis to below 10% due to a decline in the labour force resulting from an ageing population and emigration. Most of Bulgaria's unemployment is long-term as indicated by signals of the long-term unemployment indicator from 2010.

According to the EC's Macroeconomic Imbalance Procedure, Bulgaria belongs to the collection of countries for which imbalances have been identified since 2012 - in 2017 reported excessive imbalances.²⁰ These results are problematic, as the turbulence of 2010-12 led to adjustments in the aftermath of the 2009 crisis; thereafter, the situation improved significantly. Given this, based on 2015 data, only one indicator (the level of private debt) sends a signal and risks of crises in the near future can be considered to be below average.

4.2 Croatia

Croatia is the only country included in our sample for which fiscal stress is identified after 2014, and namely in 2016 due to a high spread in government bond rates. Additionally, our method identifies two crises periods occurring in 2009 and 2011-12. In the period before the first crisis, most of the indicators based on optimal thresholds deteriorated rapidly and sent signals of an impending crisis. In

¹⁹ For a description of diverse crisis impacts, see Dietrich et al. (2011).

²⁰ See European Commission (2016a).

contrast, the composite indicator based on official thresholds signalled an easing of tension for 2008 and 2009. In the years prior to the global financial crisis, Croatia experienced an economic boom with rapid credit growth, large external financing requirements and surging trade deficits.

The second crisis of 2011 and 2012 is well predicted by the composite indicator based on optimal thresholds due to deteriorating private and public debt indicators. For the reasons described above, optimal thresholds are set as tighter than official ones for debt indicators, improving the forecasting performance.

Despite a significant narrowing of the current account balance deficit occurring during the global financial crisis, external vulnerabilities remained high, and rapidly increasing public debt increased the risks of macroeconomic stability. Real GDP contracted from the financial crisis until 2014. Only from 2015 has GDP expanded somewhat as driven by exports, private consumption, and public investments. Several macroeconomic indicators have shown signs of improvement. However, private sector over-indebtedness continues. Furthermore, high levels of public debt, negative international investment positioning, high youth unemployment, and shrinking labour productivity levels signal further risks for fiscal stress. Thus, the composite indicator based on optimal thresholds has not improved recently and reflects no substantial improvement of the macroeconomic situation in Croatia.

Croatia joined the EU in 2013. Since then, the Macroeconomic Imbalance Procedure has identified macroeconomic imbalances for 2015, 2016, excessive imbalances for 2017. Croatia has been under the corrective arm of the Macroeconomic Imbalances Procedure due to risks related to high levels of public, corporate and external debt in a context of high unemployment in 2016. The EC's 2017 report identifies improvements and recommends taking Croatia out of the corrective arm. This judgement is based on the identification of just three signals according to official thresholds (the net international investment position, government debt, and unemployment). In contrast, the optimal threshold model still sends six signals. While the official thresholds often are too tight, here they are set too loose for central and eastern European Countries.

4.3 The Czech Republic

For the Czech Republic, no crisis has been present in the sample as typically correctly indicated by both types of composite indicators. However, various indicators exceed official thresholds for several years: the current account balance, the net international investment position, nominal unit labour costs, and house prices. The official thresholds for these indicators are set tighter than the calculated optimal thresholds. The development of the Czech economy over the last decade shows that net international investment positioning has deteriorated over several years due to sustained deficits in the current account. These deficits are mainly driven by an outflow of dividends on the high stock of foreign direct investments. Risks of external vulnerability are limited because many foreign liabilities are accounted for by foreign direct investment.

Furthermore, competitiveness indicators such as the real effective exchange rate and nominal unit labour costs sometimes exceed or are close to thresholds. According to a more recent perspective, competitiveness appears to be stable with contained growth in nominal unit labour costs. There was a substantial depreciation in the real effective exchange rate in 2014, reflecting the introduction of an exchange rate floor vis-à-vis the euro by the Czech National Bank. These factors contributed to an overall gain in export market shares, reversing the trend of previous years.

Overall, for the Czech Republic crisis identification methods work in an appropriate way. The country belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has correctly identified an absence of macroeconomic imbalances.

4.4 Estonia

For Estonia, both types of composite indicators show signals for the two identified crisis periods. Years leading up to the 1999-2002 crisis, when Estonia experienced an economic boom prior to the Russian and Asian crises of 1997, are left out of the sample. However, before the Russian and Asian crises in 1997 Estonia experienced an economic boom. Domestic demand was buoyed by a run-up in the stock market and by rapid growth in bank lending. During the crises, bank liquidity declined and lending stagnated. The overheating of the economy and the broadening of the current account deficit prompted a tightening of financial policies in the context of the IMF-supported programme.

The composite indicator at optimal thresholds sent crisis signals in 2006 and 2007, predicting the second crisis (2008-09) well. Estonia's economy was contracting sharply, in coincidence with the global financial crisis, and investment slowed already in mid-2007 along with a bursting of the property bubble. This collapse of global external financing and foreign trade exacerbated the downturn.

Still, the composite indicator based on official thresholds decreased prior to the 2008-09 crisis due to private credit flows and unemployment measures decreasing to below the official threshold. In contrast, using optimal thresholds, private credit flows continued to exceed the tighter threshold while the unemployment rate is not considered. Additionally, according to optimal thresholds, private debt levels spurred signalling a crisis before 2008-09; the official threshold was set too loose. Thus, from this indicator, we only find signals before the crisis when using the optimal threshold. Using the official threshold, we also find (false) signals during tranquil periods. This example illustrates the importance of selecting the correct (neither too loose nor too tight) threshold level.

For more recent years, no signs for forthcoming crises are seen for Estonia. Macroeconomic indicators improved during last years. The current account balance recorded a moderate surplus, supported by strong exports of services. More than half of the external liabilities consist of foreign direct investments, which reduce risks. Private sector debt is gradually rising, but government debt is stable and at the lowest levels in the EU. While there have been large accumulated gains in export market shares, we observed substantial losses more recently. Labour productivity and external competitiveness have somewhat weakened with the increase of real wages and the real effective exchange rate. Currently, at optimal thresholds, only two indicators sending signals: private debt and productivity. In contrast, at official thresholds three indicators send signals, and namely the net international investment position, nominal unit labour costs, and house prices. Therefore, the level of the latter composite indicator is higher than that of the optimal one, but the shrinking value of both composite indicators still decreases to below the average value.

Estonia belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has identified an absence of macroeconomic imbalances in line with the findings of this study. However, previous crisis events could have been better anticipated by the use of adjusted indicator thresholds.

4.5 Hungary

With the exception of Romania's economy, only Hungary's economy suffered from internal and external imbalances and policy mismatches for more than ten years. The Hungarian economy remained robust during the Russian crises of 1997, but thereafter vulnerabilities emerged as a result of rising public and external debt ratios and growing currency mismatches. From 1999 onward, almost all indicators sent signals over several years. Both types of composite indicators showed signals of a crisis from the beginning of the sample period to 2012. However, only the composite indicator based on optimal thresholds signalled the crisis in as early as 2003. This was caused by

public debt and youth unemployment levels that exceeded optimal thresholds but that decreased to below official thresholds. From 2001-02, private sector debt levels have grown rapidly and the share of Swiss franc-based loans in foreign currency lending has increased substantially. High wage growth up to 2008 pushed up unit labour costs and was dangerous for monetary and fiscal policy, which became expansive, and inflation targeting proceeded less successful. Hungary adopted inflation targeting in 2001, but a broad exchange rate band did not constrain the pursuit of inflation targeting. The appreciation in the exchange rate and in competitiveness losses resulted in a broadening of the current account balance deficit. In 2008, Hungary switched to a floating exchange rate system. In late 2008, the economy was affected by global financial strain, reflecting high pre-crisis vulnerabilities and close integration into global financial and goods markets. Hungary's considerable external financing needs necessitated the development of an EU-IMF financial assistance programme. The crisis starting in 2008 has been predicted well from both composite indicators.

The current account surplus from 2010 ensured a sustained decrease in the net international investment position. The current account turnaround was mainly the result of a fall in domestic demand; export competitiveness has not changed substantially. Supportive macroeconomic policies along with favourable external conditions and high utilization of EU funds have contributed since 2013 to a strong growth rebound and a decrease in unemployment, but long-term unemployment remains high. In the financial sector, vulnerabilities have been reduced. Private sector deleveraging has continued, but high levels of nonperforming loans allow bank lending to the private sector to contract further. Compensation paid by banks and the conversion of FX-denominated loans contributed to a sharp decline in household indebtedness and their FX risk. Recently, at official and optimal thresholds, four indicators have sent signals. At official thresholds namely the net international investment position, export market share, government gross debt and house prices. At optimal thresholds in difference the real effective exchange rate.

Hungary belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has identified excessive imbalances from 2012. The latest report (2017) did not identify imbalances and abolished specific monitoring.²¹ This judgement can be justified by below average composite indicator values. However, with three signals sent from the composite indicator using optimal thresholds, macroeconomic imbalances are more severe than those for Bulgaria for example, for which the Commission finds excessive imbalances.

4.6 Latvia

For Latvia, our crisis identification method reveals a crisis period running from 2009-10. However, for several years from 2002 onwards, when Latvia's economy grew rapidly and created asset price bubbles, many indicators based on official thresholds sent false signals, and so in 2004, a tranquil period: current account balance, net international investment position, nominal unit labour costs, private credit flows, and unemployment rate. The composite indicator based on optimal thresholds does not signal crises for this year because the unemployment rate is not part of this composite indicator and the unit labour cost indicator comes with a looser threshold. Therefore, optimized thresholds prevented false alarms for this time period in Latvia. While the composite indicator based on optimal thresholds increased to above average from 2005 onward, signalling the crisis of 2009-10, the composite indicator based on official thresholds decreased to below average levels just before the crisis. Our composite indicator depicts well increasing levels of vulnerability leading up to the crisis: a booming economy and rapidly growing private sector debt were key sources of vulnerability. The current account deficit increased to more than 20 percent of GDP in 2006 and 2007. The country's net international investment position deteriorated substantially. In 2008, the economic situation deteriorated markedly. Against the backdrop of the global financial crisis of 2009, economic

²¹ See European Commission (2016a).

imbalances underwent a sharp correction accompanied by an international financial assistance arrangement.

Currently, there are no signals of fiscal stress based on optimal threshold indicators. However, some signals are sent using official thresholds: net international investment positioning, nominal unit labour costs, and the unemployment rate. Overall, the shrinking of the composite indicator to below average levels shows that signs of an upcoming crisis in Latvia are not observed. After a significant adjustment following considerable accumulated real house price increases, the current account deficit narrowed and the negative international investment ratio improved significantly. Domestic demand grew as a result of private consumption and investment. The financial sector remained robust. Public and private debt ratios declined. Lending is now growing after a long period of deleveraging. Unemployment levels have decreased substantially.

Latvia belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has identified no imbalances. This is in line with what would have been suggested from optimal thresholds. However, the absence of macroeconomic imbalances in Latvia can be demonstrated more accurately from optimal thresholds.

4.7 Lithuania

For Lithuania, we find one crisis occurring in 2009. While the composite indicator based on optimal thresholds signals a crisis for the three preceding years, the composite indicator based on official thresholds shows crises for almost all years from 1999. Due to the use of thresholds that are too tight, most of the indicators often send signals. Until 2008, real GDP in Lithuania grew at robust rates, but large current account deficits and losses of price competitiveness reflected the domestic boom. Unsustainable developments in domestic demand coupled with a surge in capital inflows led to extremely strong credit growth. In addition to the hikes in global energy and food prices, sharp wage increases pushed up inflation. The Lithuanian economy exhibited signs of overheating, of an increasingly tight labour market and of rising macroeconomic imbalances. In 2008, macroeconomic conditions weakened abruptly, reflecting a collapse of domestic demand and an unwinding of house prices and credit growth, which were reinforced by the significant deterioration in external conditions and by the global financial crisis. GDP contracted sharply in 2009 owing to the build-up and subsequent correction of significant macroeconomic imbalances and vulnerabilities. These vulnerabilities are reflected in the increase of the composite indicator based on optimal thresholds from 2006 due to the current account, unit labour cost, private credit flow and activity rate indicators that surpass the optimal threshold.

More recently, a few indicators have signalled fiscal stress at official thresholds for Lithuania, and namely the net international investment position, unit labour costs (both with thresholds that are too tight), and the unemployment rate (with low predictability). In contrast, the composite indicator based on optimal thresholds shows no indication for future crises. As a result of the significant adjustment process from the crisis year, the current account is closer to balanced levels. The real effective exchange rate has depreciated, and mostly as a result of nominal wage decline. Taking into account the stability of financing through foreign direct investment, the high net external debt level is much lower now. GDP in recent years has grown at a lower rate. Sanctions imposed by Russia have dampened exports and GDP in the short term. Unemployment levels in the region have been some of the highest and have decreased significantly from peak levels in 2010. Both youth and long-term unemployment rates are declining. Nominal unit labour costs have increased moderately and cost competitiveness indicators are relatively stable. Thus, the results of the composite indicator appear to be reasonable.

Like Latvia, Lithuania belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has identified no imbalances. However, as for Latvia, the scoreboard of the EC

shows indicator values exceeding the threshold, which would not be observed if thresholds were set based on the historical economic experiences of central and eastern European countries.

4.8 Poland

For Poland, we observe only one crisis occurring at the beginning of the sample period. The country did not experience fiscal stress during the global financial crisis due to (an absence of) macroeconomic imbalances occurring during this time. The spreads between ten-year government bond rates of the country and ten-year government bond rates for AAA-rated government bonds has been low - except for the year 2001. Nevertheless, the indicator of the real effective exchange rate sent signals for many years of our sample based on official and optimal thresholds. The other indicator that much of the time signalled upcoming crises is the unemployment rate, which is only considered in the EC's set of indicators. Other indicators that sent signals in various years have tighter official thresholds such as the current account deficit, the net international investment position, and nominal unit labour costs. Consequently, the composite indicator based on official thresholds signalled crises for 2000-01 (correctly), 2004, 2005, 2007 and 2008 (incorrectly). In contrast, the composite indicator based on optimal thresholds signalled the 2001 crisis correctly and showed no false alarms thereafter. From 2000-01, the Polish economy was hit in the aftermath of the Russian financial crisis with high real interest rates, rapidly rising fiscal deficits, rising stocks of bad loans in the banking sector, and a collapse in investment. Poland's net international investment position deteriorated. The current account balance deficit widened, and the exchange rate was exposed to risks against a backdrop of large external deficits and a change to a freely floating exchange rate system. The real effective exchange rate appreciated considerably. Strong zloty and wide interest rate differentials between Poland and the Eurozone promoted a rapid increase in foreign currency household borrowing from domestic banks. Against the backdrop of a slowdown in economic activity, unemployment has increased sharply. On the eve of the global financial crisis, Poland manifested external and internal imbalances, and it experienced spillovers from the crisis through real and financial channels as an abrupt slowdown in capital inflows caused a credit crunch and a sharp decline in investment.²²

Poland is the only EU economy to avoid the 2009 recession. Consumption held up well, and the trade balance contributed positively to growth. Despite withstanding the financial crisis, growth markedly slowed in 2012-13 as the on-going recession in the Eurozone has weighed on exports and confidence. The period leading up to the global financial crisis is characterized by low levels of the composite indicator based on optimal thresholds. By contrast, the composite indicator based on official thresholds showed (falsely) high risks of an upcoming crisis. This was particularly the case for 2008 when seven indicators showed values exceeding the official threshold. This once again illustrates that the EC's official thresholds are in many cases unable to differentiate between tranquil and crisis periods for central and eastern European countries.

Currently, only the indicator of the net international investment position exceeds the threshold at official and none at optimal levels. From 2014 onward, the economy has recovered due to the presence of strong economic fundamentals. Accelerated export growth has been supported by high levels of price competitiveness. This increase in economic growth has been driven by an increase in the contributions of net exports; private consumption has remained as the dominant growth driver. The current account deficit declined and narrowed to balanced levels in 2015.

²² For fears of contagion from the financial crisis in countries with a flexible exchange rate and challenges for the design of convergence policies see Gabrisch, H., Kämpfe, M. (2013).

Poland belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure has identified no macroeconomic imbalances. This is in line with the findings of our analysis. However, too many false alarms have been spurred by official scoreboard thresholds.

4.9. Romania

Romania experienced fiscal stress in almost all years from 1999 to 2012 and various indicators sent strong signals. Consequently, both types of composite indicators showed signals of a crisis.

The Romanian economy has shown excessive internal and external imbalances from the 1990s onwards, which deteriorated further during the 1998-1999 Kosovo crisis. Thereafter, under an IMF stand-by arrangement, macroeconomic conditions improved as a result of fiscal adjustments, the enhanced financial performance of state-owned companies, and privatization. As a response to increased capital inflows, the central bank broadened the exchange rate band in 2004 and achieved substantial disinflation. The currency appreciated substantially against the euro, but imbalances returned as a result of rapid credit and wage growth and FDI-related imports. The deficit of the current account reached double-digit levels until 2008. The emerging imbalances allowed for good predictions of the crisis starting in 2008 from both sets of indicative thresholds. The period running from 2012-13 on both indicator sets reflects an easing of tensions, although to differing extents.

Currently, no crisis is to be seen. The composite indicator based on optimal thresholds has stood at zero from 2014 onward whilst the composite indicator based on official thresholds still shows one crisis signal (net international investment position). Following the global financial crisis, the Romanian economy has largely corrected internal and external imbalances through three successive arrangements with the IMF, EU, and World Bank. Against the backdrop of the sovereign-debt crisis and of the Eurozone's fall into recession, real GDP growth has remained moderate, but in recent years it has been among the highest in the region. With rising external and internal demand, fiscal and current account deficits have improved markedly.

Romania entered the EC's Macroeconomic Imbalance Procedure in 2014 after its completion of international adjustment programmes. Though not in the latest EU report, macroeconomic imbalances have been identified, but only the indicator net international investment position exceeds the official threshold of the EU's Scoreboard; at optimal thresholds, no indicator exceeds thresholds for 2014 onward.

4. 10 Slovakia

For Slovakia, the spreads don't exceed the mean of all spreads by more than one standard deviation. Following this definition, no crisis is found in our sample. Nevertheless, the composite indicator based on official thresholds falsely shows an upcoming crisis for all years between 2000 and 2012. The variables that sent signals and that contributed to this mistake include the current account, the net international investment position, financial sector liabilities, and the activity rate, and in all cases, the thresholds are set too tight. Further indicators with false signals include the house price index and the unemployment rate, which both show poor performance in predicting fiscal stress. At optimal thresholds, only one false alarm is issued.

Slovakia has been one of the fastest to recover from the 2009 recession among EU countries, benefiting from increased investments and from higher levels of competitiveness that have spurred export growth. After economic activity in the Eurozone slowed from 2012-13, the Slovak economy weakened again but recovered at the end of 2013. Given the high openness of this economy and its dependence on exports, external risks materialize with weaker demand from trading partners, especially in Europe. Like some other countries in the region, Slovakia underwent a significant

adjustment period following considerable increases in accumulated real house prices. Unemployment levels were high until 2015. Its strong export sector was complemented by domestic demand, whereby sharp investment and consumption increases reflected higher real wages in a low inflation environment.

Recently, two indicators have exceeded official thresholds (the net international investment position and the unemployment rate) while based on optimal thresholds, no indicator exceeds the threshold. Thus, both composite indicators show a marked easing of tensions. Slovakia has in recent years represented one of Europe's most dynamic economies and largely due to its sizeable foreign investments in the automotive sector, which have led to rising exports. Robust exports and competitiveness have continued to support Slovakia's external position and have provided for additional gains in export market shares, consolidating trade and current account surpluses. The banking sector remains sound, household borrowing continued to grow rapidly, corporate lending turned. Robust net interest margins supported profitability, despite the impact of the bank levy. Although impaired loans to the corporate sector edged up, the ratio of nonperforming loans remains low.

The EC's Macroeconomic Imbalance Procedure has identified no macroeconomic imbalances for Slovakia in line with the findings of this study. However, the large number of false alarms issued by the EC's official scoreboard indicators hints again at inappropriate threshold levels used for central and eastern European countries.

4. 11 Slovenia

For Slovenia, our crisis identification method reveals two crises occurring in 2002 and 2012-13. For the first crisis, two indicators based on optimal thresholds sent signals: the export market share and nominal unit labour costs. However, the number of signals has been too low to signal an exceptional crisis risk. Thus, our dataset was not able to predict the 2002 crisis just as the ECs' scoreboard could not detect the crisis in advance. From 1999-00, economic growth in Slovenia was rapid and stable, inflation spiked, wage growth was high, competitiveness slowed, and government spending increased considerably. Rising levels of uncertainty in terms of inflation and exchange rate developments led to increasing levels of currency substitution. Such uncertainties were primary contributors to the high government bond spreads occurring in 2002.

In the booming years leading up to the global financial crisis, banks accumulated non-performing loans from highly leveraged corporations. Bank losses, credit contraction, and a decline in investment led to a prolonged economic recession exacerbated by the deterioration of international financial markets during the global financial crisis. The recapitalization of major state-owned banks increased total government debts sharply and induced a sovereign debt crisis from 2012-13. The composite indicator based on optimal thresholds increased sharply between 2009 and 2011 due to a deterioration of indebtedness and labour market indicators for which optimal thresholds are tighter, and this signalled the debt crisis well. Indicators based on official thresholds passed exceeded thresholds only after the crisis occurred - also failing to signal the second crisis episode in Slovenia. Thus, in reference to the 2012-13 crisis in Slovenia, we show how a crisis missed by the EC's official scoreboard could have been detected with more appropriate thresholds in place.

Recently, there have only been a few signals at official and optimal thresholds, namely from the international investment position (official thresholds), government gross debt (both thresholds), and long-term unemployment rate (optimal threshold). This shows that actual macroeconomic conditions in Slovenia have improved. Positive growth in GDP returned in 2014 as real exports grew, leading to a significant re-gain in export market shares. Price and cost competitiveness improved further as unit

labour costs declined and they have stabilized as a result of stable nominal wages combined with labour productivity growth. In 2015, exports remained the key growth driver, but increasing levels of private consumption contributed more substantially to GDP growth in addition to public infrastructure investment. The net international investment position while remaining negative has been improving and the general government deficit has fallen. Unemployment has decreased significantly, and mainly due to strong demand for labour in the private sector.

Slovenia belongs to the collection of countries for which the EC's Macroeconomic Imbalance Procedure until now has identified macroeconomic imbalances and has stated a need for specific monitoring and for continued strong policy action. These findings correspond to the results of our analysis. However, the case of Slovenia illustrates that inappropriate thresholds for central and eastern European countries lead not only to false alarms (as is shown for other countries) but also to missed crises.

5. Conclusions

The previous chapter compared the outcome of the Macroeconomic Imbalance Procedure for the Central and Eastern European countries with economic developments of recent years. From this it is clear that all of the countries examined have continued to progress in correcting their external and internal macroeconomic imbalances since the crisis years. Many Central and Eastern European countries were hit hard with crises between 2009 and 2012. Cost competitiveness improvements have slowed in recent years. The real effective exchange rate has depreciated in most countries and movements in the euro's exchange rate and the national inflation rates resulted in appreciation of the real exchange rates. Regarding export market shares and cost competitiveness, improvements following the crises have generally been less significant than declines registered before (especially for Slovenia, Hungary, and Croatia). For debt levels - private and public - the situation is heterogeneous, but most countries with initially very low levels of indebtedness have experienced a sharp increase over a short period relative to their initial points, and deleveraging progress has been mixed. High and unsustainable current account deficits have been reduced in most countries. Some of the Eastern economies have shown a relatively considerable increase in their unit labour costs. Wage growth has outpaced productivity gains in Bulgaria, the Baltic States, and Romania. Labour market indicators have been improving. Increased activity rates are reflecting growth in general employment, resulting in decreasing unemployment rates. Thus, the current outlook with regard to risks of fiscal stress is positive for most Central and Eastern European countries.

The main remaining macroeconomic challenges facing Central and Eastern European countries are captured by indicators of the Macroeconomic Imbalance Procedure scoreboard applied to all EU member states. In general, Central and Eastern European Countries do not differ from other EU member states in regards to such challenges. However, as catching-up economies, they often differ in terms of extents of increasing and reducing macroeconomic imbalances. This is the case due to the existence of varying starting positions and dynamics of systemic adjustment. While this paper does not explain such differences in detail, we can conclude that they are present. The specificities of Central and Eastern European countries in tranquil periods and in the run-up to crises are largely disregarded by the Macroeconomic Imbalance Procedure scoreboard.

Accordingly, the Macroeconomic Imbalance Procedure led to questionable judgement of the presence of risks to crises. In the 2017 report misjudgements can be identified for Croatia and Hungary, where the EC's judgement seems too positive as compared to risks identified by optimal thresholds as well as for Bulgaria, where the judgement seems to be too negative. Those misjudgements might lead turn out to be costly due to missing to identify future risks or due to

unnecessary policy actions. Also for other countries, using optimal thresholds would have helped to identify pre-crisis periods more correctly.

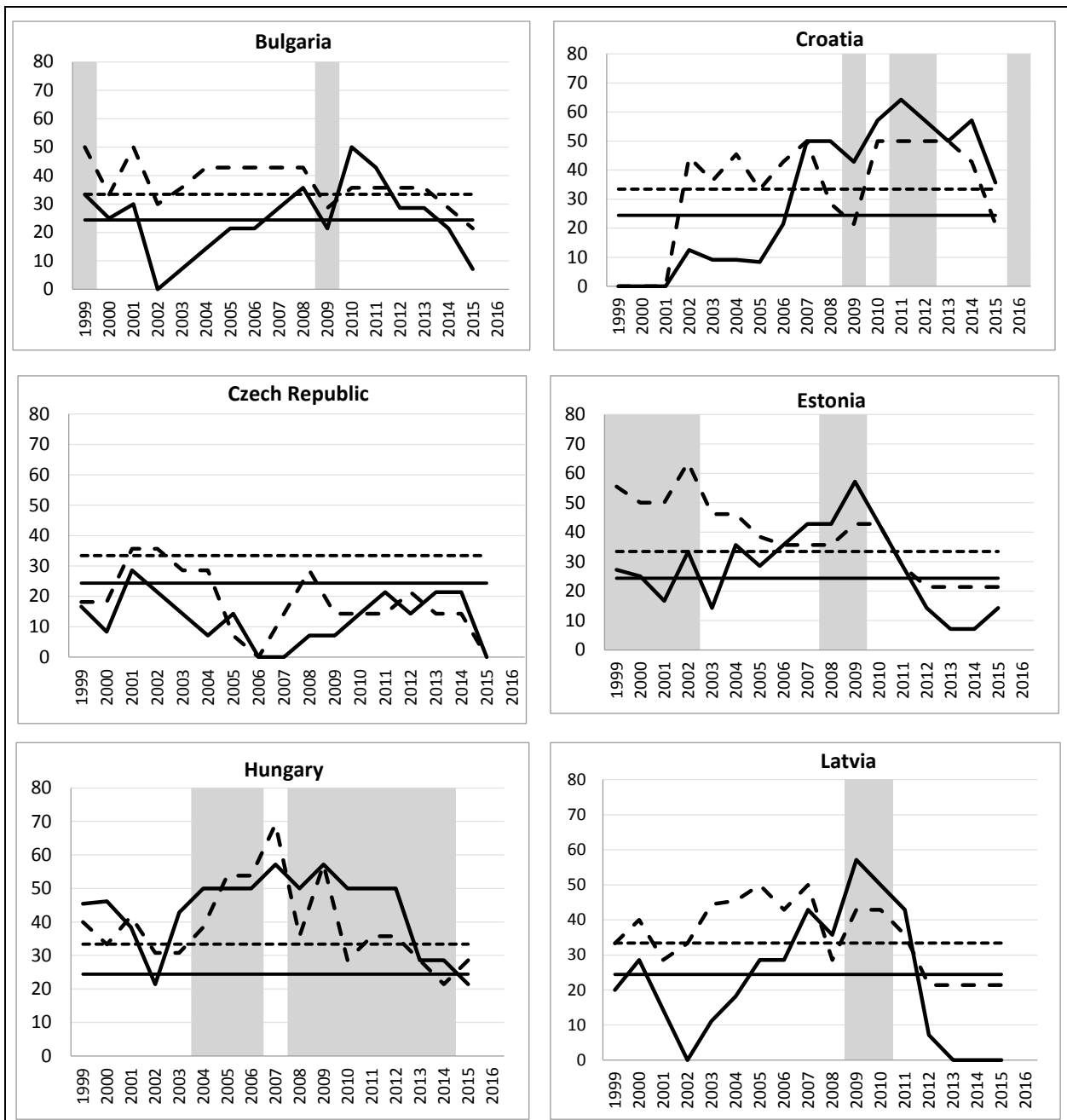
In general, a comparison between official and optimized thresholds shows that for some indicators, the number of signals at optimal thresholds is larger than at official thresholds. This observation applies to indicators for which thresholds have been set as too loose in the Commission's scoreboard: *export market shares, private sector debt, private sector credit flows, government debt, and long-term and youth unemployment*. For export market shares, we can conclude that continued dynamics involved in the international integration of Central and Eastern European economies have led to increases in export market shares while in other EU economies, we observe declining shares as the norm. Thus, slightly shrinking export market shares in the rest of the EU might not be alarming and they may already hint at trouble in Central and Eastern European countries. Regarding debt levels (private and public), we can conclude that they have been historically lower in Central and Eastern European countries than in the rest of the EU. Official thresholds of the scoreboard, which seem to have been constructed with a focus on older member states, are therefore relatively high and can hardly be reached by most Central and Eastern European countries even at the advent of a crisis. In the same vein, more flexible labour markets in the countries observed might lead to lower levels of structural unemployment relative to the rest of the EU. Thus, waiting for unemployment to reach levels found in older EU member states might lead to missed signals of looming crises.

In contrast, regarding indicators for which optimal thresholds are set looser than those of the Commission's scoreboard, the number of signals at optimal thresholds is lower than that at official thresholds. This primarily concerns indicators describing *external positions* but also those on *unit labour costs, house prices, financial sector liabilities, and activity rates*. These indicators are partly characterized in Central and Eastern European countries by typical issues that face transition economies (especially higher volatility). The rather tight thresholds used might also reflect the EC's general aim to avoid missing crises and less attention paid to preventing false alarms.

We have also shown that additional indicators, *productivity growth* and *domestic demand*, should be considered when expanding the range of indicators included in the scoreboard. Other indicators such as the *unemployment rate* and the *house price index* could be dropped due to their poor capacities to predict fiscal stress in Central and Eastern European countries.

Today, the EC follows a one-size-fits-all approach with the exception of differentiating between euro and non-euro countries on two indicators. More important than nominating a currency would be to differentiate between member countries based on historical levels of indicator variables and their differing dynamics. Based on our analysis, we recommend the adjustment of threshold values based on these differences. In particular, we recommend adjusting specific threshold values for Central and Eastern European economies.

Figure 1: Composite Indicators for Central and Eastern European Countries



Sources: European Commission, Eurostat, own calculations.

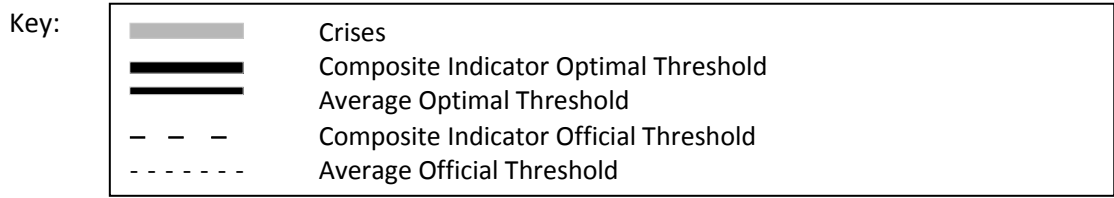
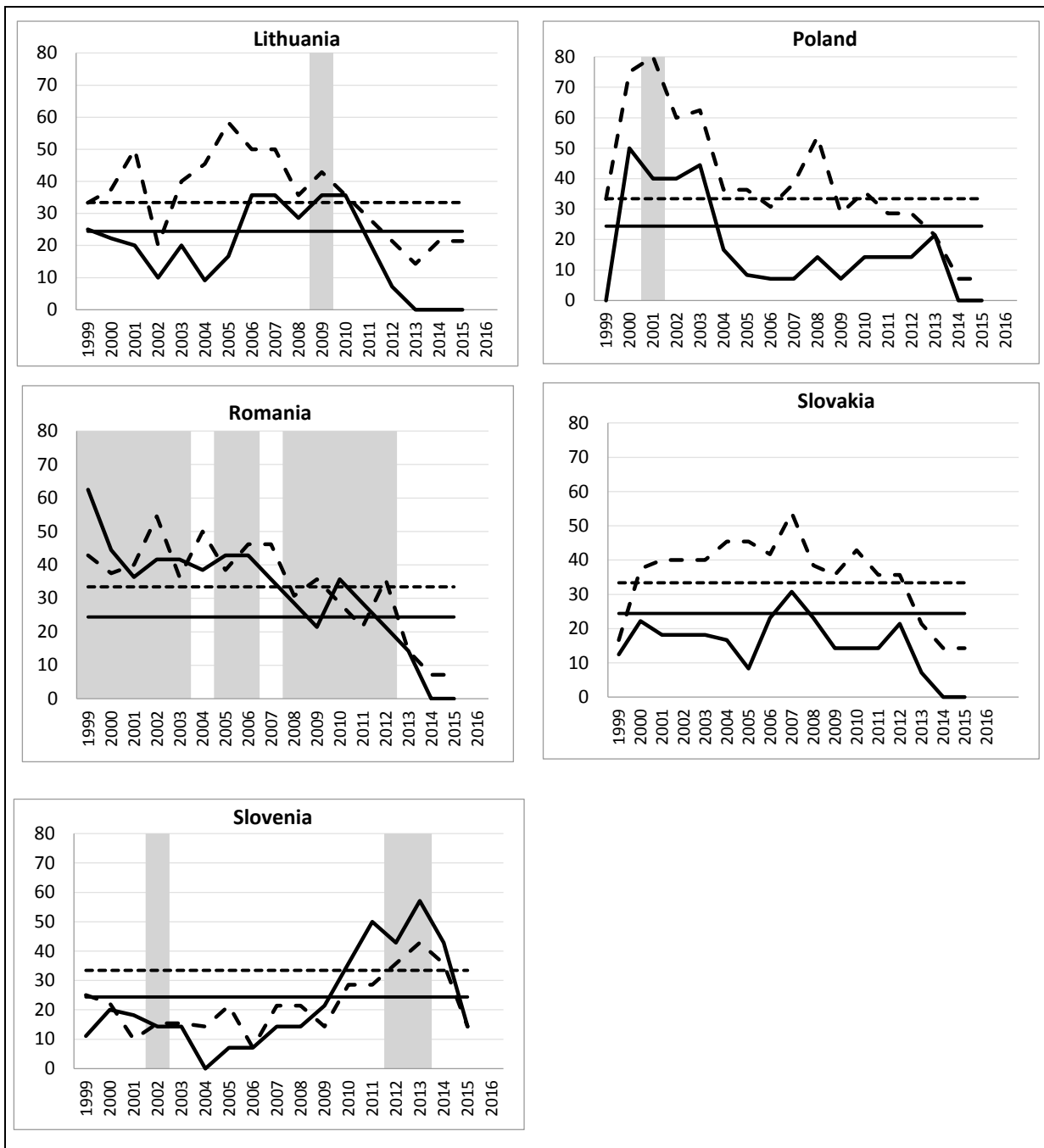
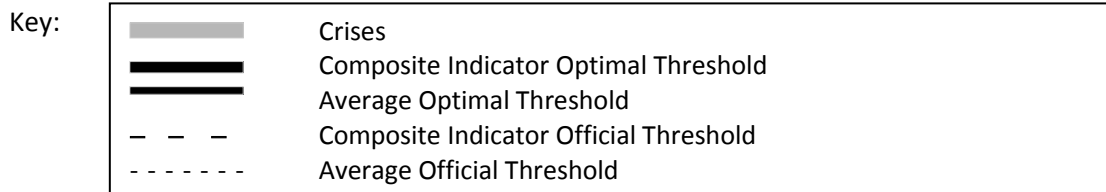


Figure 1(continued): Composite Indicators for Central and Eastern European Countries



Sources: European Commission, Eurostat, own calculations.



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