cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

COST Action CA20112

Evaluation of public policy responses to black swans

www.profeedback.eu

PROFEED *book1*

This publication is based upon work from COST Action CA20112 PROFEEDBACK, supported by COST (European Cooperation in Science and Technology). COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation. Visit www.cost.eu

www.cost.eu

Funded by
the European Union

PROFEEDBACK

CA20112 - PlatfoRm OF policy Evaluation community for improvED EU policies and Better ACKnowledgement

This publication is based upon work from COST Action CA20112 PROFEEDBACK, supported by COST (European Cooperation in Science and Technology). COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation. Visit www.cost.eu

Visit: www.profeedback.eu

PROFEEDBACK

CA20112 - PlatfoRm OF policy Evaluation community for improvED EU policies and Better ACKnowledgement

PUBLISHER

HETFA Research Institute
Grant Holder Institution
www.hetfa.eu

ACTION CONTACTS

Gábor BALÁS
Action Chair, Scientific Representative
profeedback@hetfa.hu

Tarmo KALVET
Action Vice Chair
tarmo.kalvet@ttu.ee

Renata Anna JAKSA
Science Communication Coordinator
rajaksa@hetfa.hu

Dijana ŠTRBAC
Innovation and Exploitation Manager
dijana.strbac@pupin.rs

Noemia Bessa VILELA OPLOTNIK
Grant Awarding Coordinator
nbessavilela@ophiz.org

TABLE OF CONTENTS

Ivan Nikolić

WHY EWSs OF FINANCIAL CRISES FAILED DURING THE COVID PANDEMIC - THE EXAMPLE OF SERBIA

OBJECTIVES: This paper contributes to the large literature on the early warning indicators of currency crisis. Early warning systems (EWSs) are designed to anticipate future crises, giving policymakers optimism that they would be able to make proactive management decisions. The magnitude of the destruction caused by the COVID-19 pandemic cannot be measured or forecasted accurately, as nobody knows how long it will exist in the world. The aim of the paper is to underline the experiences of EWSs in Serbia during the first two years of the pandemic and to suggest alternatives.

METHODOLOGY: Using a non-parametric signal extraction approach similar to Eichengreen et al., 1996, Kaminsky et al., 1998, and Sachs et al., 1996 methodology paper explain this phenomenon analyzing determinants of currency crises episodes of the Republic of Serbia from January 2001 to December 2021. Critical threshold values above which the crisis is more likely to occur are chosen conservatively at 1,5 standard deviations above the mean.

RESULTS: As leading indicators of currency crisis financial variables usually offer strong predictive power. Analytical efforts have generated a wide-ranging debate and uncovered numerous insights into their effectiveness. However, the results in this paper suggest that the pandemic can inflict different economic damages from past global crisis - the Asian financial crisis at the end of the 1990s, the financial crisis of 2007 to 2008, the Great Recession, and the European sovereign debt crisis of 2008 to 2012. The COVID-19 pandemic has resulted in dramatic damage to global economic growth through disrupting worldwide trade and collapsing consumption. But after the initial fears in the financial markets this part of the economy remained spared until the end of 2021. Accordingly, EWS does not offer the clearest signals. Or rather, it failed. The complexity of the current crisis required a change of approach. One of the solutions as reflected by the Statistical Office of the Republic of Serbia is to develop a Decision-Making Support System (DMSS) that accommodates an EWS. The DMSS is designed as a set of tools essential for better understanding the economic position of a country, and therefore to facilitate a high-quality decision-making process in real time. The tool supports the integration of statistics into public policies and connects the knowledge and expertise of official statisticians on one side with political decision makers on the other.

CONCLUSION: EWSs presented here can serve as one of the many inputs in the assessment and identification of financial crises but it would be good to put it under the auspices of the more complex DMSS.

OBJECTIVES

- This paper contributes to the large literature on the early warning indicators of currency crisis. Early warning systems (EWSs) are designed to anticipate future crises, giving policymakers optimism that they would be able to make proactive management decisions.
- The magnitude of the destruction caused by the COVID-19 pandemic cannot be measured or forecasted accurately, as nobody knows how long it will exist in the world.
- The aim of the paper is to underline the experiences of EWSs in Serbia during the first two years of the pandemic and to suggest alternatives.

Background

The vast literature on the EWS models can be divided into three categories

(1) Signals models: This non-parametric models was proposed in the context of currency crises, and involved establishing a threshold above which a crisis is more likely to occur...

- Kaminsky et al. (1998); Eichengreen et al. (1996); Sachs et al. (1996) etc
- Variations of this EWS approach are widely used in the IMF work on crisis vulnerabilities

(2) Probit/Logit approach: These are limited dependent variable regression models, where the probability of a crisis is estimated as a function of a number of variables...

- Eichengreen et al. (1995)
- Frankel and Rose (1996)

(3) Decision trees and machine learning More recent non-parametric approaches...

- Ghosh and Ghosh (2003); Frankel and Wei (2005); Alessi and Detken (2018)...
- Nag and Mitra (1999); Holopainen and Sarlin (2017); Beutel et al. (2019)...
- Cerra and Saxena (2002); Martinez Peria (2002)

OBJECTIVES

- This paper contributes to the large literature on the early warning indicators of currency crisis. Early warning systems (EWSs) are designed to anticipate future crises, giving policymakers optimism that they would be able to make proactive management decisions.
- The magnitude of the destruction caused by the COVID-19 pandemic cannot be measured or forecasted accurately, as nobody knows how long it will exist in the world.
- The aim of the paper is to underline the experiences of EWSs in Serbia during the first two years of the pandemic and to suggest alternatives.

Methodology

In this section, several approaches to testing these signals models are pursued:

(1) Eichengreen B., Rose, A. K., Wyplosz, C. (1996)

$$ERW_{RS,t} = \frac{1}{\sigma_e}\frac{\Delta e_{RS,t}}{e_{RS,t}} - \frac{1}{\sigma_r}\left(\left(\frac{\Delta rm_{RS,t}}{rm_{RS,t}} - \frac{\Delta rm_{EU,t}}{rm_{EU,t}}\right) - \frac{\Delta rm_{EU,t}}{rm_{EU,t}}\right) + \frac{1}{\sigma_i}\Delta(i_{RS,t} - i_{EU,t})$$

where: $e_{RS,t}$ is RSD/EUR exchange rate; $rm_{RS,t}$ coverage of money supply by FX reserves; $i_{RS,t}$ weighted average interest rate on securities used in open market operations by the NBS; $i_{EU,t}$ interest rate in the EU; while: σ_e, σ_r, σ_i are the standard deviation of the relative change in the exchange rate, the standard deviation of the difference between the relative change in the ratio of FX reserves and the money supply M1 in Serbia and the EU, and the standard deviation of the

(2) Kaminsky, Graciela, Lizondo, Saul and Reinhart, Carmen (1998)

$$KLR_t = \frac{\Delta e_t}{e_{t-1}} - w\frac{\Delta R_t}{R_{t-1}}$$

$e_{RS,t}$ is RSD/EUR exchange rate; R_t is FX reserves expressed in euros, and $w = \sigma e/\sigma R$, ie. the ratio of the standard deviation of the exchange rate growth and the standard deviation of the growth of FX reserves.

(3) Sachs, Jeffrey D., Tornell, Aaron and Velasco, Andrés (1996)

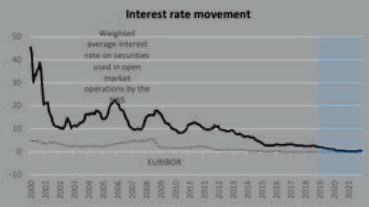
$$STV_{RS,t} = \left(\frac{1/\sigma_e}{\left(\frac{1}{\sigma_e}\right)+\left(\frac{1}{\sigma_r}\right)+\left(\frac{1}{\sigma_i}\right)}\right)\frac{\Delta e_{RS,t}}{e_{RS,t}} - \left(\frac{1/\sigma_r}{\left(\frac{1}{\sigma_e}\right)+\left(\frac{1}{\sigma_r}\right)+\left(\frac{1}{\sigma_i}\right)}\right)\frac{\Delta r_{RS,t}}{r_{RS,t}} + \left(\frac{1/\sigma_i}{\left(\frac{1}{\sigma_e}\right)+\left(\frac{1}{\sigma_r}\right)+\left(\frac{1}{\sigma_i}\right)}\right)\Delta i_{RS,t}$$

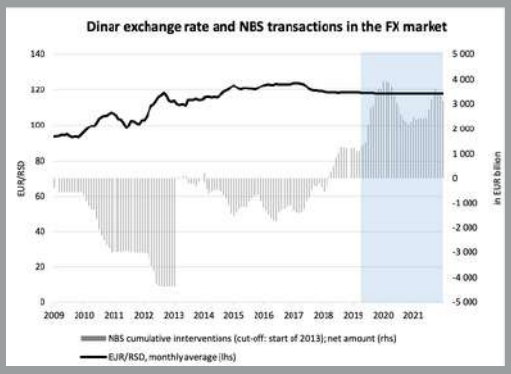
$r_{RS,t}$ is FX reserves of Republic of Serbia, while the description of the other symbols is the same as before.

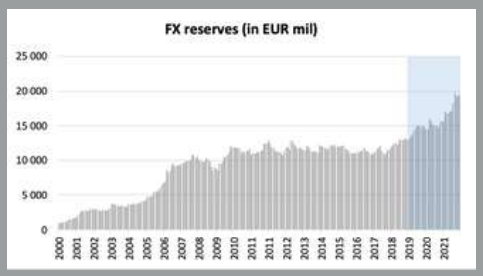
When the value of index exceeds certain threshold value, it means that the country has a currency crisis. The threshold value, in this study, is determined as the mean of the index plus 1.5 standard deviations.

A brief overview of Serbia's macroeconomic position

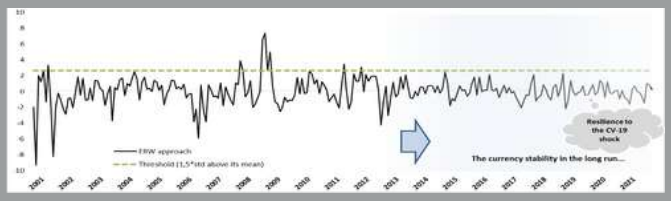
before the previous global economic crisis and the crisis caused by COVID-19

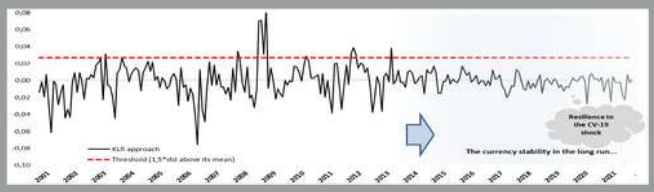


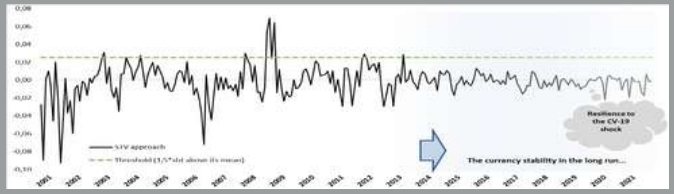




A graphic illustration of the obtained results:



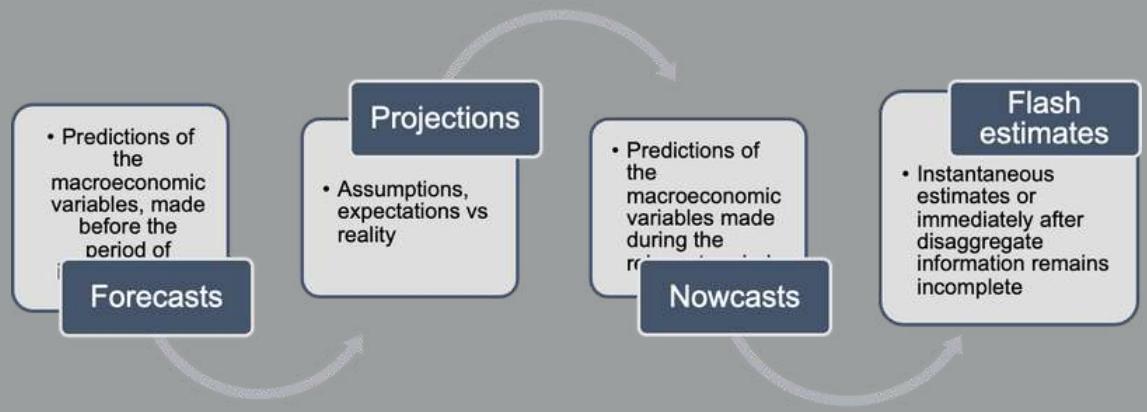




DMSS

- Official statistics are responsible for producing and disseminating official statistical information.
- However, this 'raw' material of data is not directly usable in politics – the statistical system needs to distill, refine and process valuable statistical knowledge from the flood of raw data into digestible information for politics. Hence, the purpose of the statistical system is also to find relevant, but often hidden or unnoticeable relations between different indicators, to extract key information from a large number of data and to define key indicators with the aim of augmenting the efficiency and reliability of the decision-making process.
- In order to provide the users with sufficient, useful and reliable information to identify the situation in the economy including potential imbalances, risks to stability and their possible prevention, Statistical Office of the Republic of Serbia -SORS has created a department dedicated to catalyzing pieces of information and transforming them into simple, reliable and widely usable indicators...
- The DMSS is designed as a set of tools, some already a regular part of the official statistical system and some subsequently introduced and designed to better illustrate and explain a particular phenomenon. These tools aim to statistically clarify the interaction between key economic indicators, to explain the economic position of the country and facilitate high-quality decision-making processes. Examples of these tools are a monthly projection updating system, a system of leading indicators, a system for quarterly GDP nowcasting, forecasts and a system of Economic Sentiment Indicators (ESI).

Key outputs of DMSS



In the process of establishing the DMSS SORS received strong support from Eurostat

Results

- •The results in this paper suggest that the pandemic can inflict different economic damages from past global crisis - the Asian financial crisis at the end of the 1990s, the financial crisis of 2007 to 2008, the Great Recession, and the European sovereign debt crisis of 2008 to 2012.
- •The COVID-19 pandemic has resulted in dramatic damage to global economic growth through disrupting worldwide trade and collapsing consumption. But after the initial fears in the financial markets this part of the economy remained spared until the end of 2021. Accordingly, EWS does not offer the clearest signals. Or rather, it failed.
- •The complexity of the current crisis required a change of approach. One of the solutions as reflected by the Statistical Office of the Republic of Serbia is to develop a Decision-Making Support System (DMSS) that accommodates an EWS.
- •The DMSS is designed as a set of tools essential for better understanding the economic position of a country, and therefore to facilitate a high-quality decision-making process in real time. The tool supports the integration of statistics into public policies and connects the knowledge and expertise of official statisticians on one side with political decision makers on the other.

AUTHORS - Ivan Nikolić

Ivan Nikolić is Senior Research Associate/Director of Scientific Research Development at the Economics Institute in Belgrade. He is also a member of the Council of the Governor of the National Bank of Serbia and editor and co-author of the monthly publication Macroeconomic Analyses and Trends (MAT). His research focuses on Serbia's economic policy, development and economic system, macroeconomic environment and international economy. He has been involved in various national and international scientific projects and during his time at the Economics Institute, he acted as team leader in numerous commercial projects as well.