ECONOMETRIC MODELING IN ECONOMICS AND FINANCE

BOOK OF ABSTRACTS

Editors

Jelena Minović
Vladimir Andrić

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PREFACE

Dear readers,

With great pleasure, we are presenting you the *Book of Abstracts* resulted from our annual 11th International Scientific Conference. Given the importance of econometric modeling for informed and evidence-based public policy-making, the topic of this year's Conference is *Econometric Modeling in Economics and Finance*.

The purpose of the 11th IES Conference is to provide an opportunity for researchers to discuss contemporary issues in the field of econometric modeling with keynote speakers, policy-makers and other leading econometricians from Europe and the United States. To the best of our knowledge, this is the first conference on econometric modeling after political and economic changes that took place in Serbia at the turn of the XXI century. Having in mind the legacy of our Institute in developing, promoting and implementing econometric models and techniques in the countries of the Western Balkans Region, our Conference ensembled a Scientific Board of 37 economists from 14 countries (Italy, Romania, Spain, Germany, Australia, Croatia, Belgium, Switzerland, Bosnia and Herzegovina, Austria, Montenegro, Serbia, Turkey and the United States). The Scientific Board, together with two of our keynote speakers-*Michele Pellizzari*, Geneva School of Economics and Management, and *Sunčica Vujić*, Faculty of Business and Economics, University of Antwerp - selected 32 extended abstracts from applied and theoretical econometricians affiliated with 20 universities and research institutes across Europe.

We are grateful to all authors, reviewers and members of the Scientific and Organizing Committee who contributed in the organization of the 11th IES Conference "*Econometric Modeling in Economics and Finance*" and the publication of this *Book of Abstracts*. We sincerely hope that the findings presented in this *Book* of *Abstracts* will influence public policy-making in the Region in the years to come.

EDITORS

THE DETERMINANTS OF CAPITAL STRUCTURE AND OPTIMIZATION: EVIDENCE FROM THE POWER SECTOR OF REPUBLIKA SRPSKA

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OBJECTIVES

The main objective of the paper is to determine explanatory factors that influence the changes in short-term indebtedness and profitability of 10 companies within the power sector of Republika Srpska that constitute the stock exchange index ERS 10 in the period 2008-2018 on a semiannual basis (a total of 220 observations). The dependent variable is short term debt to total liabilities (STDTL) while independent variables are as follows: current ratio (CR), return on capital employed (ROCE), earnings before interest, taxes and depreciation (EBITDA), return on assets (ROA), return on equity (ROE), the tangibility of assets (TOA), firm size (FS) and GDP growth.

METHODOLOGY

The traditional OLS regression model represents an essential method of identifying and testing specific theories of the capital structure and factors influencing the structure of capital (Rajan & Zingales, 1995). Based on the results of Breusch-Pagan LM test, the paper employs the pooled OLS regression model (FE model) and the random-effects GLS regression model to test the influence, significance and impact of selected independent variables on the determination and anticipation of the dependent variable.

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RESULTS

The results show that firm size (FS), return on assets (ROA) and GDP growth exert the most substantial influence on the short-term debt to total liabilities (STDTL), while current ratio (CR), the tangibility of assets (TOA) and return on equity (ROE) exert much weaker influence. Further research must test selection and inclusion of other independent variables as potential predictors of firms' capital structure within the power sector of Republika Srpska.

IMPLICATIONS

Several companies within the power sector of Republika Srpska use short-term loans and cash to finance the acquisition of fixed assets. The appropriate asset-liability management (ALM) should, hence, direct the use of short-term debt for financing current operations and long-term debt for financing fixed assets in order to maintain long-term profitability.

CONTRIBUTIONS

Several companies within the power industry of Republika Srpska have a stable and growing yield potential, which creates the basis for higher debt capacity through corporate bond issuance and investments in new fixed assets infrastructure. The potential growth of companies within Republika Srpska power industry can also have significant fiscal consequences given the contribution of the power industry to local and state budget revenues.

KEYWORDS

Capital structure, the tangibility of assets, power sector, profitability, regression analysis.

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HOUSING, INEQUALITY AND ECONOMIC GROWTH: EVIDENCE FROM A SAMPLE OF BRAZILIAN STATES

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OBJECTIVES

This paper investigates the inequality-growth nexus using state-level data for Brazil between 2005 and 2013, retrieved from different sources, such as the Institute for Applied Economic Research (IPEA) and the Brazilian Institute of Geography and Statistics (IBGE) that make available census and national accounts data for different states. We consider that the housing deficit better reflects inequality in the Brazilian economy, a highly unequal country. Albeit over the past decade targeted income and social inclusion policies managed to achieve a reduction in inequality, the inequality remains high, and so it is crucial to assess the potential growth benefits from inequality reduction using indicators that enable the design of more precise and effective policies.

METHODOLOGY

The empirical formulation adopted corresponds to a growth regression where the housing deficit is the primary explanatory variable taken alongside other control variables. This indicator measures housing shortages at the state level relative to the total population of a state. In its calculation, the housing deficit considers any housing in which one of the following occurs: precarious housing; different families' cohabitation; excessive rent burden; or the excessive number of dwellers in rented housing. The diagnostic tests point to Pooled OLS as the adequate

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model, but we carry out several robustness checks: considering regional dummies; dividing the sample according to initial income levels; the possibility of a non-linear relationship; and the use, alternatively, of the Gini coefficient of income distribution as an indicator of inequality.

RESULTS

The findings point to the existence of a negative linear association between the housing deficit and the growth rate of real GPD per capita across the 27 Brazilian states, with a higher explanatory power relative to the regressions that use the Gini index. The association is also stronger for the sample of wealthier states. Other statistically significant regressors are initial income and human capital/education. Future robustness checks include controlling better for the possibility of reverse causality.

IMPLICATIONS

Lack of, or inadequate, housing is a threat to social rights and equality of opportunities. Our findings endorse investing in housing as an essential means of fighting inequality and promoting faster economic growth in Brazil. Attention should also be given to broadening access to higher quality utilities, such as electricity and sanitation. The promotion of universal access to education as a means to increase the human capital stock is also a path to achieve faster growth in Brazil.

CONTRIBUTIONS

The present research differs from other studies on the Brazilian case because it uses a novel indicator of inequality, the housing deficit, that seems to perform better in the empirical analysis than the standard Gini coefficient of the income distribution. It thus enables the design of more efficient and effective policies aimed at improving long-run macroeconomic performance.

KEYWORDS

Housing, Inequality, Economic Growth, Brazil, Panel Data

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BASIC REQUIREMENTS AND FDI INFLOWS IN EMERGING AND DEVELOPING EUROPE: EXPLORING THE CONNECTION

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OBJECTIVES

Seeking to contribute to the existing scientific literature, and to enrich the base of empirical studies which examine the link between national competitiveness and FDI, and taking into account the fact that emerging and developing European countries have become very attractive investment destinations in recent decades, the authors choose to investigate precisely this problem. The study aims to examine the link between the basic requirements and FDI inflows in emerging and developing Europe. The basic requirements represent the first group of pillars of competitiveness according to the WEF methodology, and they appear in the empirical literature as FDI determinants.

METHODOLOGY

Research data were collected using a desk method and secondary data sources. The UNCTAD FDI statistics database and annual World Investment Reports (WIR) were used to access FDI inflows. The data on the pillars of competitiveness, as well as the results achieved concerning the basic requirements, are abstracted from the WEF databases, i.e., from the annual Global Competitiveness Reports (GCR). The validity of general and individual research hypotheses was verified by applying the panel random effects model.

RESULTS

The results indicate that basic requirements are determinants of FDI inflows in emerging and developing Europe and that they represent the critical factor in foreign investors' decision on the choice of investment location. The authors had

first determined the existence and nature of the influence of the basic requirements on FDI (positive/negative impact; smaller/higher coefficients of influence; statistically significant/insignificant influence) and then interpreted the identified relations in terms of their dynamics.

IMPLICATIONS

Based on the obtained results, the authors conclude that basic requirements (pillars of competitiveness) determine FDI inflows in emerging and developing Europe. Policymakers can rely on the results of this empirical study to create an attractive investment environment at the local and national level. In addition, this empirical study enriched the existing literature and provided an adequate scientific basis for future empirical research.

ORIGINALITY VALUE

The originality of this study, and its contribution to the empirical literature, is reflected in the specificity of the research sample (emerging and developing European countries) and the type of independent variables (pillars of competitiveness). The results of this empirical study point to some new findings, simultaneously confirming some of the findings of previous empirical studies, and thus providing a quality basis for future research that would examine the impact of pillars of competitiveness, i.e., basic requirements, on FDI inflows in host countries.

KEYWORDS

Pillars of Competitiveness, Basic Requirements, FDI inflows, FDI Determinants, Emerging and Developing Europe, Panel Data Analysis

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A MUTUAL INFORMATION PROCEDURE FOR FINANCIAL TIME SERIES SEGMENTATION

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OBJECTIVES

This paper introduces a new and flexible procedure for the detection of dynamic change points in possible non-linear time series, with an unknown number of breakpoints. The procedure is based on mutual information as a descriptor of possible non-linear autocorrelations in time series. We describe an algorithm associating the minimal levels of mutual information to breaks in auto-dependency structure. A post-processing step is applied in order to eliminate the 'false breaks'.

METHODOLOGY

We propose a method to isolate the significant change points in financial series, based on mutual information. We preliminary assess the robustness of this method for various artificial and real data. We study the characteristics of Standard & Poor's 500 index market, in terms of false nearest neighbours, space-time separation and Lyapunov analyses. Also, we test for non-linearity and independence in data.

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RESULTS

We identify five critical episodes in the evolution of S&P500 between 01.1950 and 07.2014. The TED spread provides evidence supporting some of our detected change points. For instance, TED spread peaks in 10.1987 with the 'Black Monday' crash and remains volatile during 'Friday the 13th mini-crash' and 'October 27, 1997 mini-crash'. Finally, the TED spread evolves to a lower local maximum starting with August 2011. The results are compared to the breakpoints identified by the cross-entropy witness method.

IMPLICATIONS

It appears that the proposed procedure can identify more significant change points in the dynamics of the index and that there are other pieces of evidence supporting this identification. The procedure is tested for some artificial data as well as for two non-financial time series.

CONTRIBUTIONS

The present paper proposes a fast and tractable procedure for detecting change points in a time series, which is not necessarily stationary or linear and does not follow any particular parametric model. The proposed procedure possesses a substantial degree of flexibility, allows 'fine-tuning' settings and, consequently, different 'zoom-in/zoom-out' views of data.

KEYWORDS

Segmentation, mutual information, non-linear financial time series, change points detection, post-processing

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ECONOMETRIC MODELING AND FORECASTING OF INTEREST RATES IN MONTENEGRO

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OBJECTIVES

This paper aims to perform modeling and forecasting of interest rates in Montenegro using two approaches, as well as to perform their comparative analysis in order to determine the optimal econometric specification. Due to the specifics of the Montenegrin economy, the bank-centric nature of the financial market, the pronounced openness of the economy, the euroisation and the small market with a large number of banks, the interest rate is one of the critical factors that determine the level of investments in the economy.

METHODOLOGY

The average nominal interest rate on loans in Montenegro from 2011 to 2018 and the inflation rate, measured by the growth rate of consumer prices in the same period, are published by the CBM, and constitute a data set used in this study. The paper applies Box-Jenkins methodology and vector autoregressive models (VAR) for interest rate modeling and forecasting. The Box-Jenkins approach and VAR models are one of the most commonly used approaches used to predict future values of the time series of interest.

RESULTS

The paper showed that the Box-Jenkins approach and VAR models could be successfully used for interest rate modeling and forecasting. It also recommends the use of the Box-Jenkins approach for forecasting interest rates due to better forecasting performance than the VAR model. Despite numerous limitations, primarily with the inadequate statistical base, the AR representation can find its

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application and help decision-makers in the process of making crucial economic decisions.

IMPLICATIONS

The paper shows how the use of two methodologies can successfully model and forecast the interest rates in Montenegro. The recommendation is to use the Box-Jenkins methodology for specific data and time horizons. The survey benefits the Central Bank, as well as commercial banks and other institutions that forecast interest rates. Future research can expand the database and introduce new variables into the model that can be used for comparative analyses.

CONTRIBUTIONS

The paper uses the same methodology as many econometric studies conducted for developed countries. The adjusted coefficient of determination for estimated models, other model validity parameters and quality measures of the given forecast indicate that all econometric and statistical criteria are met. The results can be compared with the results of studies for other countries.

KEYWORDS

Forecasting, Autoregressive Models, Interest Rate Forecasting, VAR

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THE IMPACT OF THE SOCIO-ECONOMIC FACTORS ON THE YOUTH UNEMPLOYMENT-THE CASE OF THE REPUBLIC OF NORTH MACEDONIA

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OBJECTIVES

The main objective of the paper is to determine the socio-economic factors that influence youth unemployment in the Republic of North Macedonia. The findings are based on the Principal Component Analysis (PCA) of vital socio-economic indicators that influence the problem of youth unemployment. In particular, the goal of the research is to identify the connections of several socio-economic indicators that reflect the situation of youth unemployment in the Republic of North Macedonia.

METHODOLOGY

The research is conducted using both quantitative and qualitative methods. The quantitative methods are centred around PCA analysis in order to determine the link between the selected socio-economic indicators on the youth unemployment in the Republic of North Macedonia. The analysis is conducted for the period between 2009 and 2017.

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RESULTS

The correlations present the relation among a different set of socio-economic indicators and the connection of the socio-economic indicators with the principal component, i.e., the unemployment rate of young people. The most decisive correlated factor with the youth unemployment rate among the socio-economic indicators taken into consideration is the unemployment rate. This result is expected because the youth unemployment rate in the Republic of North Macedonia is a compound of the total unemployment rate of the country.

IMPLICATIONS

Several indices and indicators are related to different aspects of the problem of youth unemployment. However, the most significant ones selected through the PCA are used in the linear regression analysis. All of the indicators presented in this paper have some influence on youth unemployment in the country. The grouping of socio-economic indicators in the Republic of North Macedonia is done following the general division of the United Nations.

CONTRIBUTIONS

Achieving low youth unemployment has been imperative for economic growth. Statistical indicators of real GDP could not demonstrate the real well-being of people. Therefore, in order to determine the current socio-economic conditions in the Republic of North Macedonia, and their impact on youth unemployment, a PCA analysis on 13 selected socio-economic indices has been conducted in order to present the mutual relations among them.

KEYWORDS

Socio-economic indicators, principal component analysis, regression factors, Republic of North Macedonia, youth unemployment

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TOTAL FACTOR PRODUCTIVITY AND ECONOMIC FREEDOM IN FORMER SOCIALISTIC COUNTRIES

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OBJECTIVES

Total Factor Productivity (TFP) is the portion of the country's output not explained by the inputs used in the production process. In this paper, we estimate the TFP levels, and then determine the long-term impact of economic freedom on the TFP in ten former socialistic countries, which are full EU members since 2000. The change in the economic system leads to an increase in economic freedom which fosters economic growth by affecting the effectiveness of resources in use.

METHODOLOGY

To estimate the TFP, we applied the fixed effects panel model on standard Cobb-Douglas production function in per capita terms. In the second iteration, we have used panel ARDL model to estimate the long-term impact of economic freedom on the TFP. The data on investments and GDP are collected from the World Bank, and data on employment are collected from the Total Economy Database. The data on economic freedom are collected from the Heritage Foundation and the Economic Freedom of the World.

RESULTS

Obtained results in this paper reveal the presence of cointegration between the TFP and the composite index of economic freedom. Our result also indicates that

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individual categories of the economic freedom composite index have a different impact on the TFP.

IMPLICATIONS

The obtained results give us an insight which policies are essential for efficiency increase and economic performance. Our finding could be very useful for policymakers, stressing which policies are contributing to efficiency, and which do not, so that policymakers could intervene in the way to increase the quality of institutional framework and economic institutions.

CONTRIBUTIONS

Many studies investigated the link between TFP and growth, or growth and institutional framework for the countries of Central and Eastern Europe. Our research is among the first to investigate the long term impact of the institutional framework and economic institutions on the countries' efficiency in the case of these particular countries. Our survey gives us an insight into the mechanism through which institutions can positively impact the TFP by reducing the uncertainty for CE countries.

KEYWORDS

Growth, Total Factor Productivity, Economic Freedom, Institutional Framework, Cobb-Douglas Production Function

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WHAT IS BEHIND EXTREME NEGATIVE RETURNS CO-MOVEMENT IN THE SOUTH-EASTERN EUROPEAN STOCK MARKETS?[†]

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OBJECTIVES

The goal of this paper is to examine the transmission mechanism that leads to extreme drops of South-Eastern European (SEE) stock markets during the recent global financial crisis. I had divided the SEE stock markets into two groups based on EU integration and tested for four possible effects: persistence, asset class, volatility and liquidity.

METHODOLOGY

Following Christiansen and Ranaldo (2009), I construct a co-exceedance variable that counts the number of extreme negative returns for EU accession countries from SEE on a given day. I use the Bae et al. (2003) method of multinomial logit model to analyze extreme co-movements between stock markets. The multinomial logit model is appropriate for modeling co-exceedance variables, which are discrete choice variables. I conduct univariate analysis and model one co-exceedance variable at the time.

RESULTS

I find evidence in favor of the continuation hypothesis in SEE stock markets. However, the factors associated with the co-exceedances differ between the EU member countries from SEE and EU accession countries from SEE stock markets. The EU member countries are more dependent on the signals in comparison with major EU economies, while the signals from the region mainly influence the accession countries.

IMPLICATIONS

The results of this study may help policymakers to understand the nature of shock transmission in SEE stock markets. Similarly, it may be useful to investment managers for international portfolio diversification.

CONTRIBUTIONS

The global financial crisis emphasized the occurrence of extreme stock market returns. Following Christiansen and Ranaldo (2009) and Markwat et al. (2009), there is an increasing body of literature that model this phenomenon in the stock markets of developed countries. However, the literature about the SEE region is rather scarce. Only Dajčman (2014) examines the extreme returns co-movement between the Croatian and European stock markets. The present study will provide evidence about factors leading to extreme falls of the group of SEE stock markets.

KEYWORDS

Co-movement, contagion, stock markets, emerging markets, South-Eastern Europe

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ECONOMETRIC MODELING OF HOUSEHOLD CONSUMPTION OF ALCOHOLIC BEVERAGES AND TOBACCO BY COMPLETE SYSTEM OF REGRESSION EQUATIONS

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OBJECTIVES

The main objective of this paper is to quantify the impact of prices and income on household spending on alcoholic beverages and tobacco using complete regression equation system in Serbia. Also, one of the objectives is to measure the significance of control variables included in the regression model, most notably the degree of urbanization.

METHODOLOGY

In the study of the impact of household expenditure on alcoholic beverages and tobacco, price and demand elasticities have been calculated based on the complete system of demand equations: Almost Ideal Demand System (AIDS) and Quadratic Almost Ideal Demand System (QUAIDS). The survey was conducted based on data obtained from the Household Budget Survey carried out by the Statistical Office of the Republic of Serbia, according to the methodology of EUROSTAT for 2018.

RESULTS

The results of the analysis are presented in the form of estimated regression models with appropriate explanatory parameters on household expenditures for alcoholic beverages and tobacco, as well as models that include the impact of the

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degree of urbanization by a dummy variable. In order to see the impact of these variables on expenditures more clearly, the results of the research are shown in the form of matrices whose elements are income and direct cross-price elasticities obtained using the AIDS and QUAIDS models.

IMPLICATIONS

Given the large sample size, the obtained results are of particular importance when considering the impact of fiscal policy on changing the volume and structure of consumption on individual products that form a group of alcoholic beverages and tobacco. Also, estimated numerical values of income and price elasticities have special significance for producers and distributors of alcoholic beverages and tobacco when it comes to forecasting future turnovers.

CONTRIBUTIONS

To the best of our knowledge, modeling consumer demand with complete regression equation system has not been analyzed in the case of Serbia so far. In this sense, this paper is pioneering research in the field of econometric consumer demand analysis based on a sophisticated modeling approach for a broadly defined product group that is viewed as a relatively independent subsystem of the household consumption system.

KEYWORDS

Complete system of regression equation, AIDS model, QUAIDS model, income elasticities, direct and cross demand price elasticities

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MODELING WEALTH EFFECT IN CONSUMPTION FUNCTION BASED ON SYSTEM OF NATIONAL ACCOUNTS (SNA) DATA[1]

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OBJECTIVES

The objective of the study is to explore the influence of housing wealth on consumption in three former socialist countries using the model initially developed for advanced economies, most notably Norway and the Netherlands. The paper, based on a compiled data set, uses a complete list of variables and relies on comparative analysis to explain and interpret the obtained results. The results differ from those obtained for other former socialist economies. Also, the paper explains why housing wealth is not part of consumption function in former socialist countries.

METHODOLOGY

Explanatory variables are housing stock, net financial assets (assets minus loans), stock market shares and gross disposable income (SNA definition). Household individual consumption represents the dependent variable. Quarterly data run from Q1 2004 up to Q2 2014. The paper employs cointegration analysis in order to determine the significance of individual wealth components in consumption. Also, the comparative analysis provided an adequate interpretation of particular macroeconomic ratios.

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RESULTS

Housing wealth is not significant in the long run. The effect of stock market shares is most probably captured through the expectations channel. Effect of the housing wealth on consumption goes through mortgage financing and workforce relocation, and their insignificance is explained by the fact that households in former socialist countries fully own relatively high proportion of housing, while in the Netherlands predominant part of housing if financed by mortgage debt.

IMPLICATIONS

Until the mortgage proportion in financing the housing wealth stock is at a relatively low level, quarterly data on housing wealth will not be relevant for modeling consumption in Serbia. Future research could rely on the SORS data, once available, and panel data analysis, but it is not expected that these research avenues will yield relatively different results. Some other research studies based on SORS time series data can confirm, or disapprove, the soundness of compiled data from this study.

CONTRIBUTIONS

This research, starting from models developed for countries like Norway and the Netherlands, added more explanatory variables in the analysis. The paper, hence, contributed to the existing literature in the field of studying wealth effect in former transition countries. By adding variables like net financial assets and stock market shares, a new result, different from those for other panel and individual studies, emerged – housing wealth does not exert significant influence on private consumption in analyzed transition economies (Ciarlone, Sonje et al.).

KEY WORDS

The wealth effect, Johansen's procedure, Consumption, Transition, System of National Accounts

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STOCK MARKET INTEGRATION: MGARCH APPROACH[†]

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OBJECTIVES

This paper aims to examine stock market integration for selected countries of Central (Austria, Czech Republic, Hungary, Poland, Slovakia, and Slovenia) and South-Eastern Europe (Greece, Croatia, Serbia, Bosnia, Bulgaria, and Romania). We follow the methodology presented in Horvath and Petrovski (2013). We used bivariate BEKK model to get time-varying comovements for the period April 15, 2013 - March 29, 2019.

METHODOLOGY

Engle and Kroner (1995) proposed a quadratic formulation for the parameters that ensured positive definiteness of conditional variance-covariance matrix Σ_t and this became known as the BEKK model (Brooks et al. 2003). The BEKK model is in the form:

$$\Sigma_t = C_0 C_0^{'} + \sum_{k=1}^{K}\sum_{i=1}^{q} A_{ki}^{'}\varepsilon_{t-i}\varepsilon_{t-i}^{'}A_{ki} + \sum_{k=1}^{K}\sum_{i=1}^{p} B_{ki}^{'}\Sigma_{t-i}B_{ki}, \qquad (1)$$

where C_0 is a lower triangular matrix, and A_{ki} and B_{ki} are $N \times N$ parameter matrices (Hafner and Herwartz, 2006). Based on the symmetric parameterization of the model, Σ_t is almost surely positive definite provided that $C_0 C_0'$ is positive definite (Tsay, 2005), (Minović, 2009).

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RESULTS

Our results showed that Austria (the correlation coefficient of 0.7) has the highest degree of integration of all countries in Central Europe, followed by Czech Republic (the correlation coefficient is 0.5), Poland and Hungary (the correlation coefficient is 0.4). Additionally, Greece (the correlation coefficient is around 0.4) has the highest degree of integration of all countries in South-Eastern Europe, followed by Romania (the correlation coefficient is around 0.3) and Croatia (the correlation coefficient is around 0.2).

IMPLICATIONS

When we aggregated the correlation coefficients along the whole territory of Central and South-Eastern Europe, we find that the average value of this coefficient for whole Central Europe is around 0.4, while the average value of this coefficient for South-Eastern Europe is about 0.1. We can conclude that stock markets of Central Europe are more integrated then stock markets of South-Eastern Europe. This result coincides with Horvath and Petrovski (2013).

CONTRIBUTIONS

Similar to Horvath and Petrovski (2013), we have used the STOXX Europe 600 index as the benchmark for European stock market movements in Europe. However, Horvath and Petrovski (2013) used data for the period 2006-2011, and instead of Bosnian, they used Macedonian index. Compared to paper by Horvath and Petrovski (2013), we have significantly expanded the scope of countries. While these authors used three countries from Central and three countries from South-Eastern Europe, we have selected twelve countries for the period 2013-2019.

KEYWORDS

Integration, Multivariate GARCH, BEKK model, Stock Markets, Central and South-Eastern Europe

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REALIZED DENSITY ESTIMATION USING INTRADAY PRICES[†]

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OBJECTIVES

Although it is essential to assume the exact probability distribution of underlying asset returns, the true probability distribution remains unknown. Moreover, the assumption that underlying distribution is time-invariant makes traditional forecasting models, especially parametric ones, inappropriate. The objective is to provide the best data-driven proxy of the unknown distribution of returns using high-frequency data (with application to DAX intraday price observations on several trading days).

METHODOLOGY

Availability of high-frequency data, in accordance with IT developments, enabled the use of more information to estimate, not only daily mean and variance (volatility), but also higher moments and entire realized distribution of returns. Kernel estimation technique is used, which balances between the bias and the variance according to the selection of the sampling frequency at a slow-time scale, while the fast-time scale sampling frequency is fixed.

RESULTS

Results show that slow-time scale frequency does not vary much across trading days and that optimal kernel bandwidth depends on the optimal two-time scale estimation of realized variance (standard deviation). Kernel density estimation obtained in this way enables a trade-off between the bias and the variance-all realized moments (mean, variance, kurtosis and skewness) are, thus, free from

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microstructure noise. The most important limitation of this research is that it considers only the developed market.

IMPLICATIONS

The obtained findings offer valuable information to market participants by pinpointing how often high-frequency data should be sampled to obtain an unbiased and consistent estimation of entire probability density function for a given trading day using kernel nonparametric approach. It also gives better insights into issues when dealing with high-frequency data, and supports previous findings that returns are not identically distributed and unlikely Gaussian.

CONTRIBUTIONS

To the best of the author's knowledge, previous studies have not considered finding the appropriate data-driven kernel bandwidth to estimate the real, but unknown, probability density function of DAX returns. This study also enriches the literature by providing an optimal slow-time scale frequency when applying two-time scale estimator.

KEYWORDS

Kernel density estimation, bandwidth selection, optimal slow-time scale, high-frequency

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Kosovka Ognjenović, Dejana Pavlović

ARE THE SELF-EMPLOYED AT A HIGHER POVERTY RISK: EMPIRICAL EVIDENCE FROM SERBIAN SILC DATA[1]

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OBJECTIVES

Self-employment constitutes a significant share of the workforce in Serbia. Due to high poverty and self-employment rates in Serbia, the paper examines if there is any prevalence between the two. Moreover, it also seeks to investigate what detriments exist within self-employment that keep or lead to poverty among those who are self-employed. The drivers of poverty are investigated within three groups of this subpopulation: 1) those who are self-employed; 2) those who are self-employed in their own companies that employ others; and 3) those who are employed through family-owned enterprises.

METHODOLOGY

All data used is obtained from the Survey on Income and Living Conditions – SILC, conducted in Serbia since 2013. Poverty encompasses those whose earnings fall below a threshold defined at 60% of median income for the Republic of Serbia. The dependent variable thereof is defined as an indicator variable identifying an individual at-risk of poverty among the self-employed of three outlined groups. At-risk-of-poverty determinants are tested using a battery of limited dependent variable models.

RESULTS

The main results pointed to higher exposure to poverty for those who are self-employed and those who are employed in family enterprises. Businesses run by men, low skilled individuals and young entrepreneurs are all found to be at a much higher risk of in-work poverty relative to their female counterparts with a higher level of education. Some limitations may arise due to contravening concepts of measuring entrepreneurial earnings. A sensitivity analysis must be conducted to determine more precisely these differences.

IMPLICATIONS

In order to obtain more precise estimates of the relationship between self-employment and poverty, the research shall be based on longitudinal SILC data. This dimension is crucial because evidence-based policies are tailored to target the self-employed who cannot escape in-work poverty and whose entrepreneurial status relies more on an institutional context. Two factors are essential in this examination: self-employment by necessity and entrepreneurial viability within the market.

CONTRIBUTIONS

This paper is the first to provide an in-depth analysis of in-work poverty of the self-employed using SILC data for Serbia. While other studies' results for other European countries show a similar pattern of poverty among the self-employed, the determinants of at-risk-of-poverty differ across countries.

KEYWORDS

Earnings, poverty, self-employment, SILC data.

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OPERATION ALLIED FORCE IN SERBIA: UNINTENDED CONSEQUENCES OF NATO BOMBING ON CHILD DEVELOPMENT AND ACADEMIC PERFORMANCE

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OBJECTIVES

The goal of this paper is to estimate the causal effect of NATO's Operation Allied Force in Serbia on children who were in the womb during the bombing. We examine the so-called "in utero" effect on children both in terms of short-term outcomes such as birth weight, birth height, breastfeeding and medium-term outcomes, such as grades and test scores of 15-year-old pupils.

METHODOLOGY

Our primary identification strategy compares the outcomes between births and children whose mothers were pregnant during the bombing and those whose mothers bore children just before the bombing or became pregnant just after the bombing. We use three different datasets for our analysis: birth records from the Statistical Office of the Republic of Serbia, Multiple Cluster Indicator Survey conducted by UNICEF, and compulsory primary school leavers attainment test dataset of the Ministry of Education.

RESULTS

Our findings for the short term suggest that children who were in utero during bombing had a lower birth weight and were less breastfed than comparable children. In the medium run, we find that affected children had a statistically

significant lower grade in behaviour and mathematics; no effect is found for grades in Serbian language and standardised test scores (Serbian and mathematics).

IMPLICATIONS

This paper is the first to rigorously examine the effect of the NATO bombing on a specific population subgroup affected by this event. It suggests that children who were in utero during the bombing experienced both short- and medium-term adverse effects. One policy implication could be that governments need to intervene and design policies to alleviate the adverse in-utero effects on children in the aftermath of large-scale disasters.

CONTRIBUTIONS

This paper contributes to the literature on short- and long-term effects of conflicts on future generations by shedding light on a conflict which has not been studied so far in the literature.

KEYWORDS

Human capital formation, children, armed conflict, in-utero effect

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APPLICATION OF META-REGRESSION ON THE RELATIONSHIP BETWEEN INCOME INEQUALITY AND ECONOMIC GROWTH

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OBJECTIVES

This research aims to determine the link between income inequality and economic growth, based on research papers dating from 1995 to 2019. The goal is to determine is there a contrast between the results of different studies, and to identify sources of disagreement between them.

METHODOLOGY

Meta-analysis is a scientific method that aims to provide a statistical analysis of a large set of results from individual studies in order to streamline and integrate differing conclusions. Its methods include meta-regression, which examines the extent to which statistical heterogeneity between the results of multiple studies may be related to one or more study characteristics. This analysis is applied to the results on the impact of inequality on economic growth from selected papers dating from 1995 to 2019.

RESULTS

The estimated meta-regression model includes the following variables: number of observations, year of publication, number of included countries, and dummy variables, such as the degree of country development, concept of inequality and structure of data. Some of the results of the estimated meta-regression are high level of heterogeneity and present publication bias in the magnitude of the results.

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IMPLICATIONS

The results show that there exists an insignificant negative relationship between income inequality and economic growth, which can be the consequence of the small sample size. The variability of the dependent variable is not entirely explained by the meta-regression using available data, so future research can concentrate on extending the sample by including more countries and searching for other means of explaining the effect size.

CONTRIBUTIONS

Compared to some other studies in the same field of research, this research shows mostly similar results with slight discrepancies regarding the direction of the effect size estimate and its statistical significance. It confirms the conclusion of a couple of other papers by using a different sample.

KEYWORDS

the meta-analysis, meta-regression, economic growth, income inequality

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AGEING AND PRODUCTIVITY: AN EXPLORATORY ANALYSIS OF THE PORTUGUESE CASE

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OBJECTIVES

We investigate the contribution of workforce ageing to productivity dynamics in Portugal over the period 1971-2017. The Portuguese economy has stagnated in the 21st century, and income levels are diverging from the EU28. Portugal's hourly productivity levels are also well below those of the EU28 (68%; 2000-2017). Simultaneously, demographic ageing proceeds at a faster pace. Between 1997-2017, Portugal recorded the fourth most significant increase of the OADR that stood at 32.5% in 2017 (EU28 - 29.9%).

METHODOLOGY

The empirical approach consists of a VAR model motivated by the Cobb-Douglas aggregate production function in order to distinguish between the effects of workforce ageing (the proportion of the labor force aged 55-64 years) through factor accumulation, physical and human capital and total factor productivity. To determine these impacts, we use impulse-response functions (IRFs) and employ standard Cholesky decompositions. Also, we determine the accumulated impact of workforce ageing on output per worker.

RESULTS

The use of workforce ageing in first differences (not levels) provides a better data fit, so ageing affects the level of output per worker (temporary growth effect).

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Workforce ageing is not statistically significant, however, in other VAR equations. The IRFs are also not significantly different from zero, but the performance of our VAR model may be affected by the omitted variable bias (e.g. the capital stock decline in recent years), requiring more investigation in the future.

IMPLICATIONS

No significant impact on productivity was found, indicating that older workers' negative productivity impact due to the depreciation of knowledge and physical/mental capabilities was precisely offset by the positive impact of their higher experience. Broadening access to better health services, workforce training and lifelong learning can reduce the former, so that it does not surpass the positive effect. The rapid pace of technological development can, however, make the experience less relevant, and a negative impact can emerge from the data.

CONTRIBUTIONS

This paper suggests a methodology (based on Bação et al. 2019; Hall & Jones, 1999; Feyrer 2007, 2008; Aiyar et al. 2016) to quantify and identify the transmission mechanisms from population ageing to macroeconomic performance in country-specific situations. This contribution is vital from the standpoint of more effective policy design that helps fight potential adverse economic consequences of ageing.

KEYWORDS

Ageing workforce; productivity; transmission mechanisms; Portugal; VAR.

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A WAVELET INVESTIGATION OF OKUN'S LAW IN THE US[*]

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OBJECTIVES

The paper aims to investigate the direction of co-movement between cyclical components of unemployment and output in the US by using the wavelet approach. The paper addresses two literature gaps. The first gap is related to the persistence of the Okun's law effect over the whole analyzed period or sub-periods of time, while the second one refers to the opportunity of analysing governmental policy scopes.

METHODOLOGY

The wavelet approach is followed to analyze the Okun's law in the case of the US over the period 1949Q01-2018Q03. Although widely used in digital image processing, medicine, geophysics, acoustics or astronomy, the method has been successfully adapted to economic investigations. Such an approach allows observing not only the intensity and direction of interaction between the cyclical components of unemployment and GDP but also how that link varies across different frequencies over time.

RESULTS

The main results show that the direction of co-movement is idiosyncratic in the short-term. However, some results reveal that the direction of interaction is related to the origins of economic shocks, whether they are internal or external. In medium-term, the Okun's law in the US seems to be valid when the effect goes from output to unemployment, while the opposite direction is characteristic in the long run.

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IMPLICATIONS

Regarding policy implications, the US policymakers should be cautious in short run, since shocks have both internal and external origins. In medium-term, the right policy should follow the incentives for investments to stimulate the GDP, which will further improve the occupation ratio. Persistent combat with unemployment should be the main target of policymakers in the long-run, with labor market policies targeted to improve the occupation rate and, consequently, the output growth.

CONTRIBUTIONS

The contribution of the paper to the existing literature is twofold. First, to the best of our knowledge, the paper represents a pioneering work in the literature related to the Okun's law that follows a time-frequency technique by combining both time and frequency components of a series. Second, the work offers detailed information not only about the direction and intensity of co-movement between unemployment and output in the US but also about the persistence of the effect over sub-periods of time.

KEYWORDS

Unemployment, GDP, Okun's law, Wavelet, US

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Milan Nedeljković

EMERGING FOREIGN EXCHANGE MARKETS AND MONETARY POLICY IN EURO AREA: EVIDENCE FROM THE CRISIS[†]

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OBJECTIVES

Over the past two decades, the degree of trade and financial integration of emerging market economies (EM) has significantly increased. Higher integration increased the potential that the impact of domestic shocks may spill over to other economies, primarily if the shock originates in one of or several key advanced economies (Rey, 2013). This paper, hence, studies empirically the impact of the Euro Area (EA) monetary policy shocks on the European EM exchange rates (FX) by applying a new econometric framework that allows for the estimation of causal asset price reactions to multiple shocks in the presence of market spillovers and confounding factors.

METHODOLOGY

We estimated the augmented vector autoregression for quantiles (QVARX, White et al., 2015; Mody and Nedeljkovic, 2019) of the conditional distribution of FX returns. The QVARX offers several advantages over the standard regression or event study methodology. It delivers measures of both the market's central predictions and uncertainty under weak assumptions on the data generating process (DGP). Also, it allows tracking the potential asymmetry in the market's risk reactions by decomposing the uncertainty measure in two elements – the difference between the upper (lower) conditional tail quantile and the conditional

median.[2] Using the QVARX estimates, we trace the dynamic impact of the monetary policy shocks on the FX markets via simulated impulse-response functions.

RESULTS

Our preliminary results can be summarized in the following way. First, we find that expansionary monetary policy shocks in EA tend to appreciate EM exchange rates, in line with the signaling and risk-taking channels of spillovers. We also observe some heterogeneity between the countries in the magnitude of their responses. Second, we find that EA's expansionary monetary policy shocks also increase uncertainty in the EM FX markets.

IMPLICATIONS

Our empirical results document the importance of monetary policy shocks in advanced economies for the dynamics of EM FX rates. What is more, to the extent that higher uncertainty tends to increase the external finance premium and private borrowing cost in the presence of financial market imperfections, the results highlight an additional channel that may attenuate expansionary effects of the EA policy shocks and magnify business cycle fluctuations in the EM economies.

CONTRIBUTIONS

We contribute to the literature in several ways. We study causal reactions of exchange rates to multiple policy shocks under weaker assumptions on the underlying DGP and controlling for cross-market spillovers and confounding factors. We confirm the presence of spillovers discussed in earlier literature in a more general econometric framework. More importantly, estimated uncertainty reactions provide new evidence on the differences in which the markets interpreted the shocks and new channels through which the shocks can affect the EM economies.

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[2] Furthermore, the framework features common factors and allows for dynamic spillovers between the EM markets without specifying whether they occur at the conditional mean, volatility or at higher moments of the returns' conditional distribution (only at the quantile level).

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KEYWORDS

Monetary Policy, Financial Markets, Uncertainty, Conditional Quantiles, MCMC.

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MERCHANDISE EXPORT SUPPLY FUNCTION FROM CROATIA: TIME VARYING PARAMETERS APPROACH

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OBJECTIVES

Croatian economy has experienced the process of transition towards integration into the European Union (EU) and now faces the challenge of joining the European Monetary Union (EMU). The main aim of the paper is to construct Croatian merchandise export supply function while allowing time variation of its parameters.

METHODOLOGY

The paper employs a state-space model with time-varying parameters on a quarterly data sample from 2000q1 to 2019 q1.

RESULTS

Based on the estimates from the state-space model with time-varying parameters, the paper brings robust results indicating that demand for Croatian merchandise exports has been elastic to changes in the real effective exchange rate and income of the EU. Furthermore, Croatian exports have significantly increased after Croatia joined the EU.

IMPLICATIONS

Standard time series approaches did not reveal meaningful results, while the state-space model with time-varying parameters outperforms conventional

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approaches. The results of this research indicate potential maneuver space to support price competitiveness and increase exporting performance of the Croatian economy. Following research results from this paper, there is no evidence to support the convergence of prices for Croatian exports.

CONTRIBUTIONS

The paper analyzes, given the robust estimates from the state-space model with time-varying parameters, income and price elasticity of merchandise exports in Croatia, and sheds some light on the issue of price convergence within Croatia and EU member states.

KEYWORDS

Time-varying parameters, merchandise exports, Croatia, income and price elasticity

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THE MULTIVARIATE MULTIFRACTAL DETRENDING MOVING AVERAGE ALGORITHM - AN APPLICATION TO FINANCIAL TIME SERIES ANALYSIS

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OBJECTIVES

Time series generated by real-world systems exhibit nonlinear behavior and cannot be described by linear models. A power law best characterizes dynamics of such data, usually denoted as fractal or multifractal. Due to the increasing interest in multivariate time series analysis, there is potential to extend algorithms for exploring fractal behavior of univariate time series to a multivariate case. In this paper, we propose, hence, a method for detecting multifractal properties of multivariate time series.

METHODOLOGY

We generalize the multifractal detrended moving average algorithm to the multivariate case and propose a multivariate MFDMA algorithm (MV-MFDMA). MV-MFDMA is designed to analyze the long-range correlations and multifractal properties of multivariate time series data. The validity of the proposed MV-MFDMA algorithm is performed by conducting numerical simulations on synthetic multivariate monofractal (independent and correlated) time series.

RESULTS

The validity and performance of the proposed algorithm are proven by conducting numerical simulations on synthetic multivariate monofractal time series. The results averaged over 20 realizations for each type of the test series are as

follows: 1) correlation properties of multivariate monofractal time series are in line with the univariate case; 2) the fractal behavior of correlated bivariate time series is independent of its correlation level.

IMPLICATIONS

The MV-MFDMA is applied to analyze the scaling properties and describe the long-term correlation of financial time series. The considered data included daily returns of daily closing levels of four indices from the USA (NASDAQ and SmallCap2000) and Russia (MOEX and RTSI), both before and after the crisis. The analysis reveals that the multivariate daily returns exhibit a multifractal behavior regardless of the market and the crisis period.

CONTRIBUTIONS

In this research, we proposed an algorithm to analyze fractal dynamics in multivariate time series generated by the complex systems. The validity of the proposed method is investigated by conducting numerical simulations on synthetic multivariate series, both independent and correlated. The method is also utilized to investigate the multifractal properties of financial time series. While time series exhibit multifractal properties, persistent long-range correlations are not, however, found.

KEYWORDS

Multivariate detrended moving average, Multifractal properties, Financial time series, returns

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APPLICATION OF CLUSTERING ALGORITHMS TO TRACK THE DEVELOPMENT OF DIGITAL ECONOMY IN THE EUROPEAN UNION

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OBJECTIVES

The digital economy is a multidimensional concept which refers to an economy based on Internet technologies (ex. electronic ordering) (Ahmad & Ribarsky, 2018). Measuring the digital economy is an issue of interest (Giannone & Santaniello, 2018). The European Commission (EC) devised a composite indicator *Digital Economy and Society Index* (DESI). It consists of five indicators and ranks 28 EU member states (EC, 2015). The research goal is to explore the change in the level of the digital economy across the EU.

METHODOLOGY

To explore whether countries improved or worsened their level of the digital economy and society, we observed DESI data for 2014 and 2019. Our approach was two-fold: first, a machine learning algorithm was applied to each data set, and then the results were compared to make conclusions on the changes in the five-year period. We applied k-means clustering algorithm (Hartigan & Wong, 1979) implemented in the R package 'cluster' and the package 'NbClust' to determine the optimal number of clusters (Charrad et al., 2014).

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RESULTS

For the year 2014, two clusters of size 17 and 11 were retained. They were named *Low* and *High* digitalized. The countries in the second cluster had greater values for all indicators. For the year 2019, two clusters of the same size were retained and named the same as in 2014. From 2014 to 2019, countries increased the values of all indicators, while the highest increase was for the indicator *Connectivity.* The cluster comparison showed that Ireland improved to group *High*, while Austria fell behind*.*

IMPLICATIONS

The research results indicate an example of good practice and confirm the effectiveness of imposed policies. The efforts of the EU member states to increase the level of the digital economy are visible since all countries have increased the values of DESI indicators in the five-year period (ICS, 2019). Also, policies and strategies conducted by the Irish government lead to significant improvement of the digital economy in Ireland. Future research could encompass the application of the same approach on DESI sub-indicators.

CONTRIBUTIONS

The results indicate that Ireland improved values of DESI indicators, thus entering group *High*. This entrance could have been expected as the Irish government launched a National Digital Strategy in 2013, which helped Ireland reap the full rewards of a digitally enabled society (DCCAE, 2019). Austria improved its digital economy, in line with the EU average (EC, 2019). The suggested approach might initiate research on the application of machine learning to benchmark and track countries development.

KEYWORDS

Digital performance, European Union, Digital Economy and Society Index, Machine learning, Clustering

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POINT-IN-TIME PROBABILITY OF DEFAULT: A COPULA APPROACH

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OBJECTIVES

The probability of default (PD) for an obligor strongly depends on macroeconomic conditions. Unlike through-the-cycle (TtC) estimates of PD, Point-in-time (PiT) PD refers to a specific moment in time and varies with the macroeconomic cycle. In this paper, we use a copula approach to obtain the PiT PD through a relationship between TtC PD and a set of mutually correlated systemic risk factors.

METHODOLOGY

We model the obligor's payment ability by a latent creditworthiness index, which is driven by a set of systemic factors and an idiosyncratic factor. Given the distribution function for orthogonalized systemic factors and the idiosyncratic factor, we can obtain a closed-form solution for PiT PD given TtC PD in the form of a multifactor copula. We use quarterly data on US retail loans between 1981 Q1 and 2018 Q4 to estimate the model parameters and perform out-of-time model validation.

RESULTS

We identify GDP growth rate, unemployment rate and the Fed Funds Rate as the key drivers of cyclicality. These factors have a robust association with the historical default rates, which we corroborate with three alternative approaches: error correction model, Bayesian model averaging and forward-selection stepwise regression. The out-of-time validation shows that the copula-based PiT PD prediction of future defaults is better when the forward-looking horizon is shorter than the typical length of the cycle.

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IMPLICATIONS

The results may have important applications in the banking industry, as they provide a method for calculation of expected credit losses based on PiT PD. This method allows for an efficient loan loss provisioning, which is not only compliant with IFRS 9, but also allows for various stress tests using different forward-looking scenarios for macroeconomic risk factors.

CONTRIBUTIONS

To the best of the author's knowledge, this is the first empirical study that applies the multifactor copula approach to establish a relationship between macroeconomic factors and the probability of default.

KEYWORDS

Credit risk, probability of default, macroeconomic factors

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THE WAYS IN WHICH BANK SUSPENSIONS AFFECTED OUTPUT DURING THE GREAT DEPRESSION[†]

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OBJECTIVES

The objective of this paper is to identify the various channels by which bank suspensions affected output during the American Great Depression, and to attempt to evaluate their relative importance, which could be of potential relevance in informing the management of any future crises. I attempt to differentiate between effects that proceeded through a reduction in loans, through a spread of uncertainty, same-state effects and effects that spread into the neighboring states and nationwide.

METHODOLOGY

After describing the expected channels based on the available literature, we proceed to verify their existence and estimate their relative size via regressions which use panel data that vary across US states, biannual periods, and manufacturing industries. To differentiate between these channels, we use data on industry-specific financial dependence, the durability of each industry's output, and location of financial centers across the United States.

RESULTS

We find evidence that the real effects of bank suspensions proceeded through a reduction in at least two types of loans and through a rise in uncertainty that halted consumption of durables. Moreover, the effects of bank suspensions spread beyond the borders of the federal states, declining with distance, and being more expressed for suspensions in financial centers, leaving fewer funding

alternatives. The size of each channel is, however, estimated only within a broad confidence interval.

IMPLICATIONS

The findings indicate that government measures to support banks in lending to the real economy need to be accompanied by measures to resolve the uncertainty about the economic future caused by financial frictions and experienced by firms and consumers. Moreover, that attention needs to be dedicated to the variation in the severity of financial frictions across a country's territory. Further research could continue emphasizing the question of how, rather than whether, bank suspensions mattered.

CONTRIBUTIONS

To the best of my knowledge, this is the first paper that documents the co-existence of a multitude of channels by which bank suspensions affected output during the Great Depression, further dissecting their effects beyond a distinction between nationwide (monetary according to Friedman and Schwartz, 1963) and local (non-monetary according to Bernanke, 1983).

KEYWORDS

Great Depression, bank suspensions, real effects, manufacturing, economic growth

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DETERMINANTS OF ECONOMIC GROWTH IN SOUTHEAST ASIAN COUNTRIES: BAYESIAN MODEL AVERAGING APPROACH[†]

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OBJECTIVES

Southeast Asia (SEA) is a region with outstanding growth rates. The Association of Southeast Asian Nations (ASEAN) is a success story since its combined GDP represents the sixth-largest economy of the world. The ASEAN economic influence motivates researchers to study the reasons behind that growth. This study investigates, hence, the robust determinants and the driving forces of the economic growth in Southeast Asian countries.

METHODOLOGY

The growth determinants are estimated by applying the Bayesian model averaging approach with Bayesian multiple linear regression model. We used panel data for ten countries between 1975-2014 in the regression analysis. The data illustrates and classifies growth trends for every country into increasing and declining trends. We, then, estimate growth trends for three different groups of countries: the whole region, upward (CLMV) and downward (ASEAN founder) growth trends.

RESULTS

The results suggest that foreign direct investment (FDI) inflows are the main economic driver for the whole region. While some of the major determinants of

economic growth in less developing countries (population control, savings and school enrollment) have upward growth trend, and are also significant to the overall economic growth rate, the total factor productivity in the ASEAN founder countries, which has downward growth trend, is still critical factor for overall economic growth.

IMPLICATIONS

SEA is notable for cheap labor and high TFP. These stylized facts have convinced foreign firms to use this region as a production hub for a long time. So, FDI is the primary regional determinant of growth. CLMV group has an upward growth trend since it had low initial income, and began to open to trade lately. Hence, population control, savings and education are the primary economic drivers of growth. Because ASEAN founder countries seem to have reached a steady-state, the economic growth in these countries displays a downward trend.

CONTRIBUTIONS

The policy recommendation from lessons of Southeast Asian countries for sustainable economic growth is that lower-middle-income countries like CLMV group must first improve its human capital through education or skill training, followed by public policies and social welfare improvement. Upper-middle income group countries should consider investing more money on R&D. They must move forward to technological inventors, rather than being technological adopters, by becoming government-led technology states.

KEYWORDS

Economic growth, Southeast Asia, Determinants of growth, Bayesian approach

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ACCOUNTING TREATMENT OF DEPRECIATION COSTS AND LONG-TERM PROVISIONS AND ITS INFLUENCE ON THE FINANCIAL RESULTS IN SERBIA[†]

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OBJECTIVES

In this paper, the author examined the accounting treatment of the depreciation costs and long-term provisions by US GAAP and IFRS. One of the objectives is to identify the similarities and differences between these two sets of standards. Moreover, the main objective of this paper is to try to identify whether the depreciation costs, number of employees and long-term provisions can influence the financial result of the companies.

METHODOLOGY

This paper includes qualitative and quantitative analysis. Qualitative analysis is displayed through examination of the relevant literature about the differences and similarities in recognition of the depreciation costs and long-term provisions by both sets of standards. Quantitative analysis is carried out via panel data regression model. Data for the panel specification were collected from the Serbian Business Register Agency. Data set consists of 20 large Serbian companies observed for four periods. The analysis was performed with statistical packages Gretl and SPSS.

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RESULTS

The significant difference between IFRS and US GAAP in depreciation methods lies in the fact that IFRS prohibits the use of revenue-based depreciation method, while it is allowed by the US GAAP. Results of the Hausman test showed that the best model is the fixed effects panel data model. Depreciation costs significantly influence the financial result of the companies observed, while long-term provisions and the number of employees are not significant in the estimated panel data model.

IMPLICATIONS

This paper should be of interest to academics specializing in the fields of accounting and econometrics. This study is relevant because it shows which variables affect the financial result of large companies in Serbia.

CONTRIBUTIONS

The research has shown that the number of employees and the long-term provisions do not influence significantly the financial result of the selected companies. The most significant contribution of this paper lies in panel data analysis which shows that depreciation costs significantly influence the financial result of large Serbian companies. The author explained the difference between alternative panel data models and the use of the Hausman test in choosing the best panel econometric specification.

KEYWORDS

Depreciation, Long-term provisions, Panel data model, Serbia, US GAAP

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INVESTIGATING THE ENVIRONMENT-ECONOMY NEXUS FOR BALKAN COUNTRIES[*]

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OBJECTIVES

The main objective of this paper is to investigate whether there are long-run and short-run relationships between CO_2 emissions, real gross domestic product per capita, energy use and population density for 10 Balkan countries. The observation period in this study is from 1992 to 2014.

METHODOLOGY

Granger causality analysis based on vector error correction model is used to examine the interdependence between the variables. In the first step, it is necessary to test for the presence of unit roots in the panel data. After obtaining results that the variables are non-stationary in levels, but stationary when converted to first differences, the second step implies cointegration testing. If there is cointegration, the final step is to perform Granger causality analysis.

RESULTS

The results show the existence of a bidirectional long-run causal relationship between all the variables, except the long-run causal relationship between CO_2

emissions and energy use based on the error correction term. Short-run causality indicates that GDP in the short run causes changes in CO_2 emissions, and that energy use in the short run causes changes in population density. These are positive unidirectional causal relationship. No other short-run causalities have been detected.

IMPLICATIONS

Balkan countries should create new, and modify existing, environmental and economic policies that will promote economic growth that has no adverse environmental effects. Implementation of existing instruments, such as environmental taxes and emission trading schemes, as well as the creation of new measures and instruments, is undoubtedly something that the Balkan countries will have to tackle in the coming period.

CONTRIBUTIONS

To the best of our knowledge, no previous research has been conducted using this method for this group of countries and these specific variables.

KEYWORDS

CO_2 emissions, economic growth, Granger causality, economy-environment nexus

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IMPLEMENTATION OF TWO – DIMENSIONAL MODEL OF CORPORATE SOCIAL RESPONSIBILITY IN SERBIAN COMPANIES

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OBJECTIVES

The paper aims to point out to the possibilities of measuring the effects of corporate social responsibility (CSR) based on two - dimensional model, developed by Quazi Ali M. and O'Brien D. (2000). The model has been empirically tested on the example of Serbian companies in order to demonstrate its application.

METHODOLOGY

The two – dimensional model belongs to the category of socio-economic models. The empirical research has been conducted on a sample of 33 companies in Serbia. According to Quazi Ali M. and O'Brien D., it was based on a questionnaire consisting of 25 statements that covered significant issues in the field of corporate social responsibility. The respondents were selecting one of the offered answers on a five-point Likert scale. Factor analysis was used as a statistical method in the research.

RESULTS

The survey indicated that the majority of respondents believe that organizations should behave socially responsible. In general, the respondent's opinions are divided between two extremes: companies oriented toward long-term goals show interest in society while companies that focus on short-term, purely profit-oriented goals, take a negative stance on corporate social responsibility.

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IMPLICATIONS

The problem of measuring the effects of CSR occurs since it is difficult to estimate how qualitative factors contribute to competitiveness. The two-dimensional model measures corporate social responsibility from two perspectives. One is the company's approach towards society, while another one represents the cost/benefit ratio. Testing the CSR model in Serbian companies has further accentuated its potential for application in different industries, as well as cultural contexts.

CONTRIBUTIONS

The main advantage of two - dimensional CSR model is the possibility of application in different cultures and industries. Therefore, it has attracted the attention of other researchers, who have continued to test its validity in different socio-cultural contexts, such as Spain (De La Cruz and Suarez, 2005), Brazil (Filgueiras et al. 2012) and Mexico (Ortega et al. 2016). The research indicates that there are great possibilities for using this model in Serbia, as well as in other countries.

KEYWORDS

Corporate social responsibility, two-dimensional CSR model, business and society, stakeholders

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NON-LINEARITIES OF GROWTH IN TRANSITION ECONOMIES-THE CASE OF NORTH MACEDONIA[*]

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OBJECTIVES

The notion that growth during transition is different from smooth linear growth observed in developed economies is investigated in the case of North Macedonia. The stylized patterns of growth confirm that transition growth is characterized by significant interruptions, shifts in growth rates and changes that have not been observed in the developed economies (Balcerowicz, 2001). Hence, this paper aims to create a theoretical and empirical framework that will allow for structural changes during the transition.

METHODOLOGY

Markov Switching Models accommodate the dynamics of the transition process as presented in the stylized facts, characterized primarily by shifts and tremendous uncertainty. Their main characteristic is to allow for multiple structural breaks in a given time series, i.e., to allow for different behavior of the dependent variable y (GDP growth rate) in "different states of nature", estimating simultaneously the timing of the transition from one state to another (Clements & Krolzig, 1997).

RESULTS

The conducted univariate analyses in MS VAR system confirmed the instability as a peculiar characteristic of growth in transition, characterized by various regimes or stages of growth. The switches are statistically significant, suggesting that the economy has transitioned among various stages of growth.

IMPLICATIONS

The core idea conveyed by this research is that drastic changes require radical policy orientation, instead of an incremental approach that is more appropriate for guiding economic growth in mature developed economies. Radical policy orientation should encompass measures that will best enable the shift of the country onto a higher transitional growth pattern, i.e., in terms of model switching, from a negative to a positive "black box" indicator.

ORIGINALITY VALUE

The recent breakthroughs on the instability and volatility of growth are used in order to theoretically and empirically investigate transition as a non-linear process. This approach has not been used before in the case of transition economies, although it offers more possibilities for analyzing non-linearities in growth rates in the transition periods.

KEYWORDS

Economic growth, transition economies, non-linear modeling, Markov Switching econometric models

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THE LIBOR-OIS SPREAD: EVIDENCE FROM CONTINUOUS ERROR CORRECTION APPROACH[*]

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OBJECTIVES

The objective of the paper is to test for cointegration between LIBOR (eng. London Interbank Offered Rate) and OIS (eng. Overnight Index Swap) rates. LIBOR is a benchmark rate at which global banks lend to one another in the interbank market for short-term loans. The OIS rate is the country's central bank rate derived from overnight deposit rates. The paper explores, hence, the pass-through effect from LIBOR to OIS rates, i.e., it tests for the presence of unit root in the LIBOR-OIS spread.

METHODOLOGY

The methodology consists of the following consecutive steps: 1) we show that the bivariate continuous-time system for LIBOR and OIS rates is equivalent to continuous AR (1) process-CAR(1) process; 2) we prove the equivalence between the CAR(1) process and continuous-time error correction model (ECM) for LIBOR and OIS rates; 3) we estimate discrete ECM model, following the results from Phillips (1991); 4) we simulate the process for LIBOR-OIS spread using the estimated parameters from step 3).

RESULTS

First, we test for the presence of unit roots in effective Federal Funds Rate (FRED), Euro Overnight Interbank Average Rate (EONIA) and Sterling Overnight Average Rate (SONIA). Second, we estimate discrete ECMs for the following interest rate spreads: LIBOR-FRED, LIBOR-EONIA and LIBOR-SONIA. Finally, starting from estimated ECM parameters, we simulate, via Monte Carlo techniques, stochastic processes for LIBOR rate, OIS rate and respective interest rate spreads.

IMPLICATIONS

Before the global crisis, banks were using LIBOR as a risk-free proxy, since most of the derivatives' payoffs are dependent on LIBOR. LIBOR rates, however, are not immune to credit and liquidity risk. The OIS rates are less prone to the risks mentioned above due to central banks' tighter regulation. Consequently, banks have switched to OIS rates in discounting derivatives' payoffs. The OIS approach implies, hence, modelling multiple yield curves and their incorporation in derivatives' valuation.

CONTRIBUTIONS

Contemporaneous modelling techniques use complex, time-consuming and challenging to implement numerical procedures for modelling the behaviour of LIBOR-OIS interest rate spread. Building on the contributions of Phillips (1991) and Comte (1999), the paper shows how the ECM representation in continuous time provides a much simpler and straightforward approach for modelling the LIBOR-OIS spread in comparison to existing alternatives from relevant literature.

KEYWORDS

LIBOR-OIS spread, financial crisis, credit risk, liquidity risk, error correction

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ASYMMETRY IN THE OUTPUT GAP-INFLATION NEXUS IN THE WESTERN BALKAN COUNTRIES: A NONLINEAR ARDL APPROACH

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OBJECTIVES

Bearing in mind that the relationships among macroeconomic variables are mainly nonlinear, this study investigates the nexus between the output gap and inflation rate in the case of six Western Balkan countries (Albania, Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, and Serbia). The main objective is to examine the presence of asymmetries (nonlinearities) between these variables, which is an essential input for successful conducting of economic policy and achieving price stability.

METHODOLOGY

This study employs a relatively novel Nonlinear Autoregressive Distributive Lag approach (NARDL), suggested by Shin et al. (2014). The approach allows identification of asymmetry in the changes of the explanatory variable (output gap) on the dependent variable (inflation rate). The preconditions for the application of the NARDL approach are checked using unit root tests, cointegration bounds testing and Granger causality based on the Toda-Yamamoto approach. The dataset contains quarterly data about GDP, output gap (obtained via HP filter) and inflation rate (as CPI), while the period depends on the availability of data for each country.

RESULTS

The results of the NARDL model reveal the long-run asymmetry between output gap and inflation rate in Montenegro, North Macedonia and Serbia, while the cointegration relationship is found only in the case of Serbia. The presence of

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short-run asymmetry is not detected in any country. When the linear ARDL model is applied, the cointegration is revealed in all cases. Hence, the main conclusion is that the ARDL approach outperforms NARDL and that the output gap-inflation nexus is mainly symmetric in the majority of the observed countries in the given period.

IMPLICATIONS

Since the output gap is one of the leading domestic inflation drivers, representing the aggregate demand pressure on inflation, the awareness about the character of its relation to inflation is particularly important for achieving the price stability. Since the results mainly indicate the symmetry in this relation, it follows that economic policy measures of equal intensity should be applied in the case of positive and negative changes in the output gap.

CONTRIBUTIONS

The literature about the output gap and inflation nexus in the Western Balkan countries is very scarce. To the best of our knowledge, this is the first study to investigate the nonlinearity of the relationship in these countries. The conclusions reached in this paper represent a valuable basis for economic policymakers who strive to achieve the relatively low and stable inflation without overly suppressing the aggregate demand.

KEYWORDS

Output gap, inflation, Phillips curve, NARDL model, Western Balkans

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REGRESIVITY OF EXCISE INCREASE: EVIDENCE FROM A PRICE ELASTICITY STUDY[†]

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OBJECTIVES

Serbia is a country with a very high at-risk-of-poverty rate, and while previous research has indicated that increasing tobacco excise is an essential instrument of tobacco control, these policies have been criticized as regressive, i.e., having the most significant impact on the poor. However, these arguments frequently do not include the change in the consumption that occurs after the excises change. In this research, we aim to show how the responses of different income groups affect the assessment that the excise policy increase is regressive.

METHODOLOGY

In order to achieve this goal, we estimate cigarettes price elasticities of different income groups in Serbia. We use Household Budget Survey Data for Serbia for the period 2006-2017. We estimate the total cigarettes price elasticity, by accounting for both prevalence and intensity price elasticity, and estimate them separately for low, middle, and high-income households. We apply the Deaton's (1988)

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model and perform the robustness check by applying the so-called two-part model (Mullahy, 1998).

RESULTS

Estimation of the model indicates that cigarettes price elasticity is negative in all three income groups. The elasticity is the highest in the low-income group, estimated at -1.079, while in middle and high-income group the elasticity is estimated at -0.632 and -0.260, respectively. This result indicates that, in the case that prices increase by 10%, the total consumption will decrease by 11%. On the other hand, income elasticities are positive and estimated at 1.359, 1.236 and 0.739 for low-, middle- and high-income households, respectively.

IMPLICATIONS

Our results indicate that when tobacco prices increase, the consumption decreases the most in low-income households. We further show that the increase of the prices in low-income households, not only lowers their consumption, but it also lowers the budget share these households spend on cigarettes, while this does not apply to middle- and high-income households.

CONTRIBUTIONS

In this research, we showed that while the policies of tobacco excise increase have been criticized for their regressivity, their impact on low-income households is not adverse. On the opposite: increasing the prices lowers the share of the consumption spent on cigarettes. From a broader perspective, increasing excises also lowers the probability of potential effects of cigarettes on their health and furthermore can decrease their medical expenditures.

KEYWORDS

Tobacco consumption, price elasticity, the effect of excises, income inequality, Serbia

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DETERMINANTS OF THE PUBLIC DEBT DYNAMICS IN SELECTED CEE COUNTRIES

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OBJECTIVES

The first objective of the paper is a decomposition of public debt dynamics in eight CEE countries to individual contributions of the fiscal and non-fiscal determinants. The second objective is the econometric estimation of the impact of debt determinants on public debt dynamics using panel data analysis. The sample includes Bulgaria, Croatia, Czech Republic, Hungary, Romania, Serbia, Slovak Republic and Slovenia, and covers quarterly data mainly in the period 2000-2017.

METHODOLOGY

The methodology consists of two building blocks. First, public debt is decomposed to individual contributions of the fiscal and non-fiscal determinants, using the debt accumulation equation. Second, a panel approach is applied to quantify the impact of individual determinants and explanatory power of the model. A procedure of panel analysis covers the issues of stationarity, choice of appropriate estimator, and a presence of endogeneity, cross-sectional dependency, heteroscedasticity, and autocorrelation.

RESULTS

Impact of standard debt determinants (primary balance, interest, exchange, inflation and growth rate) explains around 55% of debt dynamics' variations in the sample. Nevertheless, decomposition of debt reveals sizable contributions of output cyclicality and, especially, debt-deficit adjustments, in addition to standard determinants. After the removal of those two contributions, the explanatory

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power of the model considerably increases, and public indebtedness appears to be most sensitive to primary balance.

IMPLICATIONS

Reliability of fiscal sustainability assessment critically depends on the reliability of the macroeconomic assumptions used to produce forecasts of the principal debt determinants. Identification of the country-specific characteristics of debt dynamics and fiscal policy stance, together with assessment of cross-country patterns between debt determinants, gives the solid ground to policymakers that can be further utilized in the forward-looking analysis of the fiscal sustainability.

CONTRIBUTIONS

This paper contributes to the literature that empirically examines the issues of debt and fiscal sustainability, especially in the emerging and CEE countries. In addition to existing work, it underscores issues of the structural measurement of public indebtedness and econometric issues of time-series cross-section data analysis.

KEYWORDS

Public debt, debt determinants, debt decomposition, CEE countries, panel analysis

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