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THE EFFECTS OF STRUCTURAL REFORMS ON ECONOMIC GROWTH: EVIDENCE FROM SELECTED COUNTRIES WITHIN THE IMF-SUPPORTED PROGRAMS

This study investigates the effects of structural reforms in fiscal, financial, trade, and real sectors on economic growth for 56 countries within the IMF-Supported Program over the 2002-19 period. Using a novel database (IMF Monitoring of Fund Arrangements-MONA), it constructs new structural reform indexes for each sector employing the Z-score approach. The present study highlights that all structural reforms except for real sector reforms in all models, constructed based on the extended Cobb-Douglas production function, have a positive and statistically significant impact on economic growth. The robustness of the models is confirmed by using two different structural reform indexes for each sector and two different estimators considering cross-sectional dependence. Empirical findings point to the structural reforms being potentially key factors that provide strong long-term growth performance for countries. Hence, along with the relevant traditional policies and sufficiently developed institutions, policymakers should extend the structural reforms to lift potential growth and provide lasting economic recovery.

Keywords: *Structural reforms, Economic growth, Panel data analysis.*

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1. INTRODUCTION

Since the global financial crisis of 2008-09, conventional economic policies implemented by governments in most countries have remained incapable of providing a lasting economic recovery. In such a period, structural reforms are highlighted as critical tools for supporting economic recovery (Agnello, Castro, Jalles & Sousa, 2015; International Monetary Fund [IMF], 2016; Bailliu & Hajzler, 2016). It is widely acknowledged that structural reforms improve macroeconomic performance by providing robust and sustainable growth (Ostry, Prati & Spilimbergo, 2009; Babecky & Havranek, 2014; Marrazzo & Terzi, 2017); increasing employment (Bordon, Ebeke & Shirono, 2016; Krebs & Scheffel, 2016; Almeida & Balasundharam, 2018), productivity (Bouis & Duval, 2011) and foreign direct investment (Campos & Kinoshita, 2008); enhancing market efficiency, competition, and trade openness; ensuring low inflation and manageable current account and fiscal balances (Swaroop, 2016); and improving economic resilience (IMF, 2015).

A growing body of literature focused on the growth impact of structural reforms in these four specific sectors. Several studies indicated that *Fiscal reforms* could boost long-term growth (Ormaechea, Komatsuzaki & Correa-Caro, 2017) by providing a higher level of total factor productivity, investment in physical and human capital, and employment (IMF, 2015) and improving the efficiency of resource allocation (Lin & Liu, 2000). There is also a growing consensus among scholars that *financial reforms* have the potential to increase growth (Bekaert, Harvey & Lundblad, 2001; Christiansen, Schindler & Tressel, 2013; Aksoy, 2019) by removing financial restrictions, lowering the cost of capital (Kouamé & Tapsoba, 2019), mobilising savings, and then allocating credit for productive activities, and creating favourable conditions in financial institutions (Hasan, Khan & Ali, 1996). Besides, existing research emphasizes the critical role *trade reforms* play in the growth performances of economies by fostering physical capital accumulation and reducing inefficiency in the production process (Greenaway, Morgan & Wright, 2002; Khan & Qayyum, 2006; Gnangnon, 2018). It has also been observed that *real sector reforms* may help to improve total factor productivity and innovation (Griffith & Harrison, 2004; Amable, Ledezma & Robin, 2016), stimulate employment and investment (Organisation for Economic Co-operation and Development [OECD], 2016), and contribute to sustainable growth and economic recovery (Canton, Grilo, Monteagudo, Pierini & Turrini, 2014; Banerji et al., 2017).

The studies presented thus far mostly indicate evidence that structural reforms matter for economic growth. However, they have generally employed liberalisation indexes (see Bekaert et al., 2001; Christiansen et al., 2013), specific indicators including employment protection legislation, regulation in energy, transport, and communications, and product market regulation (see Égert & Gal, 2016; Amable et al., 2016; Brancaccio, Garbellini & Giametti, 2018), or some proxy variables for structural reforms (see, Khan & Qayyum, 2006; Yu, Hassan, Mamun & Hassan, 2014). While these indicators may be reliable proxies, they are narrow-scoped and do not provide a direct measurement of structural reforms.

A key study considering such shortcomings is that of Kouamé & Tapsoba (2019), in which they constructed structural reform indexes (*SRIs*-identifying the effects of fiscal, financial, trade, and real sector reforms and, therefore, allowing one to determine which reform acts in which direction) using IMF Monitoring of Fund Arrangements (MONA) database. This view has developed our interest in creating new *SRIs* for 56 countries within the IMF arrangement program by employing a comprehensive and easily accessible database (MONA), the only electronic database on economic targets and developments, program design, and compliance. Although the IMF-supported programs are widely regarded as necessary and helpful in achieving their objectives of lowering inflation and improving the current account balance, many studies have mixed results about how the programs affect economic growth[1]. For example, several lines of evidence suggest that the IMF programs have a positive impact on economic growth (Killick, Malik & Manuel, 1992; Dicks-Mireaux, Mecagni & Schadler, 2000; Hutchison, 2004; Bird & Rowlands, 2017), while negative results reported by Bordo & Schwartz (2000), Przeworski & Vreeland (2000), Butkiewicz & Yanikkaya (2005), Barro & Lee (2005) and Dreher (2006).

The present study contributes to the existing literature by constructing reliable indexes for structural reforms and investigating whether these reforms impact the economic growth in 56 countries within the Fund-supported program over the 2002-19 period. The rest of the study is organised as follows: The second section introduces the scope of the study, the dataset, and the approaches to constructing new *SRIs*. The third section defines the methodology and explains the empirical results obtained from the study. The fourth section discusses the research findings and policy implications.

2. DATASETS

This study employs the MONA database and Z-score approach in constructing financial, fiscal, real, and trade *SRIs* for 56 countries under the Fund-supported program. *SRIs*, including aggregate structural reforms, are computed using

[1] For an extensive literature survey on the effects of Fund programs, see (Ul Haque & Kahn, 1998; Bal Gunduz et al., 2013; Bird & Rowlands, 2017).

successful structural benchmarks (Met, Implemented with Delay, and Modified) data from the MONA database. The data for other macroeconomic variables are obtained from two different sources: The World Development Indicators (WDI) and the Total Economy Database (TED). Table (1) reports the variables and their sources.

Table 1.

DEFINITIONS OF VARIABLES

Abbreviations	**Variables**	**Sources**
RGDP	Per Capita Real Gross Domestic Product (2010-USD).	The World Bank (World Development Indicators-WDI-2019).
RGFI	Real Gross Fixed Capital Investments (2010-USD).	
EL	Employed Labour Force	The Conference Board (Total Economy Database-TED, April 2019).
TFP	Total Factor Productivity	
FN-1	Financial Reforms	International Monetary Fund-MONA Database-2019 (Arrangements, 2002-Current). Authors' own calculations
FN-2		
FS-1	Fiscal Reforms	
FS-2		
RE-1	Real Reforms	
RE-2		
TR-1	Trade Reforms	
TR-2		
AR-1	Aggregate Structural Reforms	
AR-2		

2.1. The Mona Database and Construction of SRIs

The MONA database includes comprehensive data or information on the economic targets and outcomes of Fund-supported programs. It monitors the performance of countries in the program concerning quantitative and structural conditionality, scheduled purchases and reviews, and macroeconomic indicators. The database provides the cumulative history of Fund-Supported programs from Executive Board approval through its completion. It also provides cross-country data on specific aspects of such programs and progress made by countries within the program. Data are available for most arrangements from 2002 to the present for 101 countries[2] and are collected at the time of arrangement approval and following each review. Approval and evaluation of *SRIs* in the database are based on the policy commitments agreed upon with country authorities within the program. These commitments can take different forms: Prior Actions (*PAs*), Quantitative Performance Criteria (*QPCs*), Indicative Targets (*ITs*), and Structural Benchmarks (*SBs*). *PAs* are steps the countries in the programs agree to take before the IMF Executive Board approves financing or completes a review, ensuring that a program will have the necessary foundation for success. *QPCs* are certain and measurable conditions that must be met to complete the review. They always relate to macroeconomic variables, including monetary and credit aggregates, fiscal balances, international reserves, and external borrowing. In addition to *QPCs*, *ITs* may be established as quantitative indicators in order to assess the member's progress in meeting a program's objectives. Sometimes, they are set instead of *QPCs* because of uncertainty about economic trends. These targets may turn into *QPCs* with appropriate modifications as uncertainty is reduced. *SBs* are structural reform measures that are (often) non-quantifiable but are critical for achieving program goals and are intended as markers to assess program implementation during a review. Examples of *SBs*[3]: Improving financial sector operations, building up social safety nets, or strengthening public financial management (IMF, 2019; Kouamé & Tapsoba, 2019).

The study employs the Z-score approach to construct *SRIs* for each sector based on Met, Implemented with Delay, and Modified *SBs*. Based on the following equations (Kouamé & Tapsoba, 2019; Nardo et al., 2005), the Z-score approach allows one to transform a given variable (X) characterized by its standard deviation (σ) and mean (μ) into an index.

$$Z = \left(\frac{(X - \mu)}{\sigma} \right) \tag{1}$$

Equation (1) indicates that Z follows a reduced-centered normal distribution with a standard deviation of one and a mean of zero if X is normally distributed. This approach allows one to express all structural reform variables in the same unit and compare them in terms of effects. For each period and structural reform, the normalized reform index can be computed by country based on the following equation.

[2] The sample selection is related to the availability of the data, leading to 45 countries being excluded from the analysis. The list of the 56 sample countries and the number of successful reforms (structural benchmarks) are given in the appendix, table (A).

[3] SBs can be grouped into four specific categories under economic classification according to their identifications and codes (see table (B) in the appendix).

$$\text{Structural Reform Index}_{\text{ct}} = \left(\frac{\left(SB_{ct} - SB_{\mu t} \right)}{SB_{\sigma t}} \right) \quad (2)$$

Here (SB_{ct}) indicates the total number of successful reforms (met or met with delay) during the final review of the board at year (t) in the country (c). ($SB_{\mu t}$) is the average number of successful structural reforms and ($SB_{\sigma t}$) indicate their standard deviation for all countries at year (t). If the average number of successful structural reforms equals the number of structural reforms, the structural reform index will be zero.

In computing *SRIs*, this study uses two different procedures to ensure the consistency of empirical results and the reliability of indexes. The first method considers the data range (Approval Date-Initial End Date) in implementing successful *SB* data. In this method, the indexes are computed by following three steps. In the first step, the data ranges (usually cover three years, but can cover one or two years, too) in the implementation of structural reforms in the selected countries during the sample period are determined, and the number of structural reforms is summed up after they were grouped into four categories as financial, fiscal, real and trade sector reforms. In the second step, these reforms are extended to take the same values from the approval date to the initial end date. These two steps are conducted similarly for all countries, and the number of each country's structural reforms in fiscal, financial, trade, and real sectors is acquired based on the data ranges in the implementation process. In the third step, *SRIs* are respectively computed from equation (2)[4] employing the Z-score approach.

The second method considers the implementation dates (Test Date) of successful *SB* data. It consists of two stages. In the first stage, the implementation dates of structural reforms are determined, and the number of structural reforms on these dates is summed up after they were grouped into four categories according to the years of their implementation. This first stage was conducted for all selected countries similarly, and the number of structural reforms of each country was obtained for the sample period based on the implementation date. In the second stage, using the Z-score approach, *SRIs* are respectively computed from equation (2)[5].

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[4] With this methodology, the study aims to compute the *SRIs* (*FN-1*, *FS-1*, *RE-1*, *TR-1*, and *AR-1*) by considering their effects during the implementation process (within a certain range).

[5] With this methodology, the study aims to compute the SRIs by considering the implementation year–based effects of SRIs (FN-2, FS-2, RE-2, TR-2, and AR-2) and to confirm the robustness of the results obtained from this study.

2.2. Data for Other Macroeconomic Variables

The methods followed in converting the variables into new forms used in this study can be explained as follows. Per capita real GDP presents economic growth, and the data for this variable are collected from the WDI. Data for real gross fixed investment are also obtained from the WDI. Dividing real gross fixed investment series by total population, the variable used in per capita terms. The employed labour force represents human capital, and the data for this variable was obtained from TED. The variable is computed by dividing the employed labour series in the active population by the total population in the middle of the year. Total factor productivity representing the level of technological development is constituted inclusively by taking into account the quantity and quality differences of physical and human capital accumulation and computed in terms of annual growth rates. The data for this variable are collected from the TED. Since total factor productivity is computed in terms of annual growth rates, the annual growth rates of other macroeconomic variables such as per capita real GDP, real gross fixed investment, and employed labour force are also used to ensure compliance. Although technological development level is generally represented by using individual proxy variables such as research and development investments, the number of patents, education level of the active population, trade openness, etc. in the literature, this study aims to measure it through a single variable, which is assumed to contain the effects of these variables. Another reason why this study uses total factor productivity is because at least one of these variables is not available continuously in the sample period for all selected countries in the international databases.

3. METHODOLOGY AND FINDINGS

In estimating the effects of *SRIs* on economic growth, the present study uses level values of SRIs and annual growth rates of other macroeconomic variables. Following the studies related to identifying econometric models based on the extension of the Cobb-Douglas (CD) production function in a way to include potential determinations of economic growth (i.e., Barro, 1991; Levine & Renelt, 1992; Sala-i-Martin, 1997; Rodrik, 2012), this study constructs econometric models extending the CD type of production function that can be written as in the following equation.

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\tau} SR_{it}^{\gamma} e^{\varepsilon_{it}} \tag{3}$$

Here (i) and (t) indicate country and time, respectively. (ε_{it}) is the error term. (Y_{it}), (A_{it}), (K_{it}), (L_{it}), and (SR_{it}) indicate economic growth (RGDP), technological development level (TFP), physical capital (RGFI), human capital (EL), and structural reforms, respectively. Considering growth theories' development process in explaining the level of technological development, one can assume that the technological development level (A_{it}) in the CD production function is composed of increases in the TFP. Under this assumption, technological development level can be formed by increases in TFP as:

$$A_{it} = f(TFP)_{it}^{\partial} \tag{4}$$

By taking the natural logarithm of the variables in equation (3), the extended function can be rewritten as[6]:

$$Y_{it} = \beta_{\mathrm{it}} + \alpha_{it}K_{it} + \tau_{it}L_{it} + \partial_{it}TFP_{it} + \gamma_{it}SR_{it} + \varepsilon_{it} \tag{5}$$

The basic form of the econometric model is shown in equation (6).

$$RGDP_{it} = \alpha_{it} + \beta_1 RGFI_{it} + \beta_2 EL_{it} + \beta_3 TFP_{it} + \beta_4 SR_{it} + \varepsilon_{it} \tag{6}$$

Here (α) and (β) indicate the slope parameters. (ε), (i) and (t) indicate errors, cross-section, and time dimension of the panel, respectively.

In panel data analyses, it is necessary to examine stationary conditions with unit root tests to prevent spurious regression. It is also necessary to determine consecutive tests that should be used in the estimation of models according to the findings from unit root tests (Tatoglu, 2013). The tests that direct the econometric methodology in panel data analyses are grouped as first and second-generation according to the presence of cross-sectional dependence (CSD). In the first-generation tests, it is assumed that all units are equally affected by a certain shock in one of the panel units, whereas in the second-generation tests, each unit is affected at different levels. These assumptions require first investigating the CSD in variables and models and determining the unit root and other consecutive tests to achieve unbiased results (Menyah, Nazlioglu & Wolde-Rufael, 2014).

Considering the time (T) and section (N) dimensions of the panel, CSD can be investigated by CD-LM tests. In case of $T>N$, Breusch ve Pagan (1980) CD-LM1 test can be used. In the case of $T<N$, Pesaran (2004) CD-LM2 can be used,

[6] Since the structural reforms are represented by ten variables as *FN-1*, *FN-2*, *FS-1, FS-2*, *RE-1*, *RE-2*, *TR-1*, *TR-2*, *AR-1*, and *AR-2* in this study, ten different variations of the basic model identified in equation (5) are estimated to avoid multicollinearity problem and to obtain consistent results.

whereas in all alternative circumstances in terms of the *T* and *N*, Peseran, Ullah & Yamagata (2008) CD-LM_{adj} test can be used. CD-LM1 and CD-LM2 tests can be computed by the following equation.

$$\mathrm{CD-LM} = \breve{\rho}_{ji} = \frac{\sum_{t=1}^{T} e_{it}\, e_{jt}}{\left(\sum_{t=1}^{T} e_{it}^{2}\right)^{1/2}\left(\sum_{t=1}^{T} e_{jt}^{2}\right)^{1/2}} \tag{7}$$

For the number of *t* observations, *i=1…n*, where ($\breve{\rho}_{ji}$) and (e_{it}) denote the correlation between error terms and the terms obtained by ordinary least squares (OLS) methodology from units in the panel, respectively. If the group mean is zero and the unit mean is nonzero, CD-LM1 and CD-LM2 may produce biased results. In order to remove biased results of CD-LM1 and CD-LM2 tests, the CD-LM_{adj} test is computed by adding the mean (μ_{Tij}) and the variance (υ_{Tij}) of units to equation (7) as follows.

$$CD-LM_{adj} = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=j}^{n-1}\sum_{j=i+1}^{n}\frac{(\mathrm{T}-\mathrm{K})\breve{\rho}_{ij}^{2}-\mu_{\mathrm{Tij}}}{\upsilon_{\mathrm{Tij}}}\right) \tag{8}$$

The presence of CSD between units is investigated with the null hypothesis referring to "there is no CSD in variable/model" in CD-LM tests that are assumed to have a standard normal distribution (Peseran et al., 2008). The CSD analysis results obtained from the CD-LM2 and CD-LM_{adj} tests are shown in the following table.

Table 2.

CD-LM TEST RESULTS

Variables	Test Statistics (Constant + Trend)			Models	Test Statistics (Constant + Trend)		
	CD-LM2	CD-LM_{adj}	L		CD-LM2	CD-LM_{adj}	L
RGDP	50.25[a] [0.000]	191.46[a] [0.000]	3	-	-	-	-
RGFI	25.93[a] [0.000]	213.07[a] [0.000]	3	-	-	-	-
EL	14.68[a] [0.000]	134.33[a] [0.000]	4	-	-	-	-
TFP	26.67[a] [0.000]	150.96[a] [0.000]	4	-	-	-	-
FN-1	11.62[a] [0.000]	258.85[a] [0.000]	2	Model-1	7.88[a] [0.000]	5.39[a] [0.000]	2
FN-2	13.47[a] [0.000]	127.80[a] [0.000]	4	Model-2	7.57[a] [0.000]	6.82[a] [0.000]	4
FS-1	13.35[a] [0.000]	254.49[a] [0.000]	2	Model-3	7.75[a] [0.000]	7.11[a] [0.000]	2
FS-2	17.31[a] [0.000]	188.43[a] [0.000]	3	Model-4	7.68[a] [0.000]	9.88[a] [0.000]	3
RE-1	27.91[a] [0.000]	265.32[a] [0.000]	2	Model-5	6.68[a] [0.000]	6.69[a] [0.000]	2
RE-2	29.07[a] [0.000]	119.65[a] [0.000]	4	Model-6	7.90[a] [0.000]	4.75[a] [0.000]	4
TR-1	34.98[a] [0.000]	268.66[a] [0.000]	2	Model-7	7.65[a] [0.000]	6.13[a] [0.000]	2
TR-2	46.62[a] [0.000]	338.15[a] [0.000]	1	Model-8	7.78[a] [0.000]	7.36[a] [0.000]	1
AR-1	15.58[a] [0.000]	202.02[a] [0.000]	3	Model-9	7.65[a] [0.000]	8.35[a] [0.000]	3
AR-2	6.82[a] [0.000]	189.65[a] [0.000]	3	Model-10	7.71[a] [0.000]	6.23[a] [0.000]	3

'[a]' shows the presence of CSD at 1% significance level. Column 'L' indicates the optimal lag length determined by Schwartz Information Criterion. Values in '[ ]' indicate the probabilities of test statistics.

Source: Authors' calculations.

The results reported in table (2) indicate that the null hypothesis of no CSD is rejected at 1% level of significance since the probabilities calculated for variables and models are lower than 0.01. This result, which means that the units in the panel depend on each other in terms of variables in models, requires employing an econometric methodology that considers the CSD between the panel units (Baltagi, 2008). In this context, this study examines the stationarity of variables using CADF (Cross-Sectional Augmented Dickey-Fuller) and MPURT (Multifactor Panel Unit Root Test) panel unit root tests that consider the CSD between the panel units developed by Pesaran (2007) and Pesaran, Smith & Yamagata (2013), respectively. By using arithmetic means of calculated CADF values for panel units, the stationarity of variables can be computed with CIPS test statistic by the following equation.

$$CIPS = N^{-1}\sum_{i=1}^{n} t\left(N,T\right) \tag{9}$$

MPURT panel unit root test, which is based on the extension of the Sargan & Bhargava (1983) and Pesaran (2007) unit root tests to include the effects of factors (*m*) arising from economic, technological, fiscal, etc. changes that may cause to CSD in variables, prevents the autocorrelation stemming from errors in these factors. In investigating the stationarity of variables, this study uses RGDP and TFP variables as factors that impact the presence of CSD. The stationarity of variables in the MPURT unit root test can be computed with CIPSm test statistics by the following equation.

$$CIPSm^{*}_{NT} = N^{-1}\sum_{0-1}^{N} t_i^{*}\left(N,T\right) \tag{10}$$

Terms ($t\left(N,T\right)$ and $t_i^{*}\left(N,T\right)$) in equations (9) and (10) indicate the sample distribution of the panel. CIPS and CIPSm test statistics obtained from the equations are compared with critical table values generated by Monte Carlo and Stochastic simulations, respectively. If CIPS and CIPSm test statistics are higher than the critical table values in absolute value, the null hypothesis referring to "series has the unit root" is rejected (Pesaran, 2007; Pesaran et al., 2013). The results of the CADF and MPURT panel unit root tests are shown in table (3).

Table 3.

CADF AND MPURT PANEL UNIT ROOT TEST RESULTS

Test Statistics (Constant + Trend) Variables			**CIPS**			**CIPSm**		
			LV	FD	L	LV	FD	L
RGDP			-2.53	-2.95[a]	3	-2.49	-3.88[a]	1
RGFI			-2.40	-3.69[a]	3	-2.24	-6.32[a]	2
EL			-2.33	-3.27[a]	4	-2.25	-4.05[a]	2
TFP			-2.47	-3.28[a]	4	-2.19	-2.96[a]	2
FN-1			-2.54	-2.82[a]	3	-2.42	-3.56[a]	1
FN-2			-2.57	-3.23[a]	3	-2.45	-3.52[a]	1
FS-1			-2.60	-3.18[a]	4	-2.22	-3.53[a]	1
FS-2			-2.56	-3.20[a]	4	-2.16	-3.51[a]	1
RE-1			-2.59	-3.12[a]	3	-2.70	-3.69[a]	1
RE-2			-2.38	-3.21[a]	3	-2.53	-4.47[a]	1
TR-1			-1.26	-5.87[a]	4	-1.85	-3.30[a]	2
TR-2			-1.43	-4.11[a]	4	-1.94	-3.86[a]	2
AR-1			-2.49	-3.19[a]	4	-2.26	-3.55[a]	1
AR-2			-2.24	-3.44[a]	4	-2.27	-3.50[a]	1
Critical Values	% 1	% 5	-2.76	-2.62		-2.90	-2.72	1
						-2.64	-2.42	2

'LV' and 'FD' columns show the tests statistics calculated for levels and first differences of the variables. '[a]' indicates that variables are stationary at 1% level of significance. Column 'L' indicates the optimal lag length determined by Schwartz Information Criterion. Critical table values of CIPS and CIPSm were obtained from studies conducted by Pesaran (2007) and Pesaran et al. (2013), respectively.

Source: Authors' calculations.

Table (3) indicates that the first differences of the variables are stationary, but their levels are not since the calculated CIPS and CIPSm test statistics for the first differences in the forms of constant and trend are higher than critical table values (in absolute value) at 1% significance level. It means that the effects of short-term shocks that may occur in the variables during the examination period are eliminated. This result requires determining the presence of a long-term equilibrium relationship between the variables (Gujarati & Porter, 2012). In order to investigate the long-term relations between the variables, this study uses Durbin-Hausman (DH) and Error Correction Testing (ECT) panel co-integration tests, which take into account CSD in the panel units, developed by Westerlund (2008) and Gengenbach, Urbain & Westerlund(2016), respectively.

In the DH test, in which the common factors between the panel units are considered, the long-term relationship between the variables is computed by the equation (11) with DH group (DHg) and DH panel (DHp) test statistics, respectively, assuming that the autoregressive parameter is the same and differentiated in the panel units.

$$DH_g = \sum_{i=1}^{n} \hat{S}_i \left(\tilde{\varnothing}_i - \tilde{\varnothing}_i\right)^2 \sum_{t=2}^{T} \hat{e}_{it-1}^2 \quad and \quad DH_p = \hat{S}_n \left(\tilde{\varnothing} - \tilde{\varnothing}\right)^2 \sum_{i=1}^{n} \sum_{t=2}^{T} \hat{e}_{it-1}^2 \qquad (11)$$

Here $(\hat{S}_n = \hat{\omega}_n^2 / \left(\sigma_n^2\right)^2)$ and $(\hat{S}_i = \hat{\omega}_i^2 / \hat{\sigma}_i^4)$ indicate variances of panel and cross-section units, respectively. $(\hat{\omega}_i^2)$ is the consistent estimator of the long-term variance of (ω_i^2), and $(\hat{\sigma}_i^2)$ indicates simultaneous variance estimations corresponding to $(\hat{\omega}_i^2)$ and (ω_i^2).

In the ECT test, in which homogeneity and heterogeneity of the panel units and the effects of common factors between the units are considered, the long-term relationships between the variables are calculated using the test statistics $(\overline{t_c})$ based on the error correction model for panel wide as follows.

$$\overline{t_c} = \frac{1}{N} \sum_{i=1}^{N} t_{c_i} \qquad (12)$$

Here (t_{c_i}) is equal to $(t_{\alpha_{y_i}} = \frac{\hat{\alpha}_{y_i}}{\hat{\sigma}_{\hat{\alpha}_{y_i}}})$ and indicates the ECT test statistics obtained from the error correction model, which is estimated by OLS, for panel units. The ECT test statistics $(\overline{t_c})$ are calculated panel-wide by taking the average of test statistics (t_{c_i}) based on all units in the panel.

Using DH_p, DH_g, and ECT$(\overline{t_c})$ test statistics, the co-integration relations between the variables are investigated with the null hypothesis referring to "variables are not co-integrated". If DHp and DHg test statistics are higher than normally distributed critical table values (2.33) and ECT$(\overline{t_c})$ tests statistics are higher than critical values constituted by Monte Carlo simulation, one can reject the null hypothesis and can conclude that there is a co-integration relationship between the variables (Westerlund, 2008; Gengenbach et al., 2016).

In addition, this study uses the Slope Homogeneity Test (SHP) developed by Pesaran & Yamagata (2008) to examine the homogeneity/heterogeneity of possible co-integration relationships between the variables. In the SHP test, using $(\tilde{\Delta}_{adj})$ test statistics, whether the slope coefficients in the co-integration equation are homogeneous is investigated with the null hypothesis referring to "slope coefficients are homogenous". If probability values of ($\tilde{\Delta}_{adj}$) test statistics are higher than 0.01, one can reject the null hypothesis and conclude that the slope coefficients in the co-integration equation are homogeneously distributed between the panel units (Pesaran& Yamagata, 2008).

As shown in table (4), since the DHp, DH_g, and ECT($\bar{t}_c$) test statistics are higher than critical table values (shown in square brackets), the null hypothesis is rejected at 1% level of significance. It is also seen that the probability values of ($\tilde{\Delta}_{adj}$) test statistics are higher than 0.01; therefore, the null hypothesis cannot be rejected at 1% significance level. These results indicate that there is a long-term equilibrium relationship between the variables, and the slope coefficients in the co-integration equation are homogeneous.

Considering these findings, this study uses Cross-Sectionally Augmented Distributed Lag (CS-DL) and Cross-Sectionally Augmented Auto-Regressive Distributed Lag (CS-ARDL) approaches to investigate the long-term effects of structural reforms on economic growth and confirm the robustness of the models. The CS-DL and CS-ARDL models developed by Chudik, Mohaddes, Pesaran & Raissi (2013, 2016) and Chudik & Peseran (2015) are based on the extension of the ARDL model to consider the horizontal CSD due to unobservable common factors and to directly examine the long-term coefficients (Chudik et al., 2016).

CS-DL model, in which long-term coefficients are calculated by taking the average of the dependant ($\mathcal{Y}$) and independent (X) variables based on cross-sections and using only the lagged values of the independent variable, is based on the following regression equation.

$$\mathcal{Y}_{it} = C_{\mathcal{Y}i} + \theta_i^{'}\mathrm{X}_{it} + \sum_{\ell=0}^{p-1}\delta_{i\ell}\Delta x_{i,t-\ell} + \sum_{\ell=0}^{p_{\bar{y}}}\omega_{\mathcal{Y},i\ell}\bar{\mathcal{Y}}_{t-\ell} + \sum_{\ell=0}^{p_{\bar{x}}}\omega_{x,i\ell}^{'}\bar{\mathrm{X}}_{t-\ell} + e_{it} \tag{13}$$

Here ($\bar{\mathcal{Y}}_t = N^{-1}\sum_{i=1}^{N}\mathcal{Y}_{it}$) and ($\bar{\mathrm{X}}_t = N^{-1}\sum_{i=1}^{N}X_{it}$). ($p_{\bar{x}}$) denotes the lag order of the independent variable determined to equal to the integer value of $\left[T^{1/3}\right]$, while ($p = p_{\bar{x}}$) and ($p_{\bar{y}} = 0$).

The CS-DL model, independent of the lag order required to be determined for dependant variable, does not need information on the number of the unobservable common factors and can provide consistent results even if the presence of serial correlation in the error terms and identification errors in the model. The CS-ARDL model, in which long-term coefficients are calculated by taking the average of the dependant ($\mathcal{Y}$) and independent (X) variables based on cross-sections and using the lagged values both of independent and dependant variables, is based on the following regression equation.

$$\mathcal{Y}_{it} = C^*_{\mathcal{Y}i} + \sum_{\ell=0}^{p_{\mathcal{Y}}} \varphi_{i\ell}\mathcal{Y}_{i,t-\ell} + \sum_{\ell=0}^{p_{\mathcal{X}}} \beta'_{i\ell} X_{i,t-\ell} + \sum_{\ell=0}^{p_{\bar{x}}} \psi'_{i\ell}\bar{Z}_{t-\ell} + e^*_{it} \tag{14}$$

Here $\bar{Z}_t = \left(\bar{\mathcal{Y}}_t, \bar{X}'_t\right)'$ and $p_{\bar{z}} = \left[T^{1/3}\right]$. ($p_{\mathcal{Y}}$) and ($p_{\mathcal{X}}$), respectively, denote the lag order for dependant ($\mathcal{Y}$) and independent (X) variables in the CS-ARDL ($p_{\mathcal{Y}}$,$p_{\mathcal{X}}$) model. It is argued that the CS-ARDL model, in which the lag order required to determine dependant and independent variables is important, is more effective in eliminating exogeneity problems and can provide consistent results when the number of unobservable common factors and the lag order are determined correctly, and the time dimension of the panel is large.

On the other hand, in the estimation of long-term coefficients, the CS-DL model can provide consistent results when the time dimension of the panel is small (Chudik et al., 2016). Results obtained by the Panel CS-DL ($p = 3,\ p_{\bar{x}} = 3$) and CS-ARDL ($p_{\mathcal{Y}} = p_{\mathcal{X}} = 3;\ p_{\bar{z}} = 3$) models, identified to detect the effects of fiscal, financial, trade, and real sector reforms on economic growth, are reported in table (4).

Table 4.

ESTIMATION RESULTS

	CS-DL		**CS-ARDL**		**CS-DL**		**CS-ARDL**	
Variables	**Model-1**				**Model-2**			
	C	**SE.**	**C**	**SE.**	**C**	**SE.**	**C**	**SE.**
RGFCI	0.3225[a]	0.0393	0.3144[a]	0.0364	0.3279[a]	0.0393	0.3296[a]	0.0396
EL	0.1459[a]	0.0500	0.2667[a]	0.0999	0.1825[a]	0.0582	0.1322[b]	0.0661
TFP	0.2777[a]	0.0751	0.3708[a]	0.0904	0.2288[a]	0.0726	0.3391[a]	0.0842
FN-1	0.1104[a]	0.0436	0.0954[b]	0.0420	––	––	––	––
FN-2	––	––	––	––	0.0825[b]	0.0412	0.0928[b]	0.0451
DH$_g$ | DH$_p$	33.92*[0.000]		28.88*[0.000]		23.21*[0.000]		30.07*[0.000]	
ECT($\bar{t}_c$)	-14.39*[-3.61]				-6.93*[-3.61]			
$\tilde{\Delta}_{adj}$	0.253*[0.400]				0.939*[0.174]			
Variables	**Model-3**				**Model-4**			
	C	**SE.**	**C**	**SE.**	**C**	**SE.**	**C**	**SE.**
RGFCI	0.3165[a]	0.0385	0.3320[a]	0.0396	0.3194[a]	0.0412	0.3175[a]	0.0388
EL	0.2158[a]	0.0673	0.1990[a]	0.0690	0.2025[a]	0.0656	0.1409[b]	0.0732
TFP	0.2988[a]	0.0750	0.2423[a]	0.0791	0.2492[a]	0.0715	0.2857[a]	0.0851
FS-1	0.0666[a]	0.0232	0.0705[a]	0.0278	––	––	––	––
FS-2	––	––	––	––	0.0804[a]	0.0329	0.0612[b]	0.0277

DH_g | DH_p	27.22*[0.000]		18.34*[0.000]		17.52*[0.000]		20.40*[0.000]	
ECT($\bar{t}_c$)	-9.82*[-3.39]				-3.61*[-3.39]			
$\tilde{\Delta}_{adj}$	0.261*[0.397]				-0.104*[0.541]			
Variables	**Model-5**				**Model-6**			
	C	**SE.**	**C**	**SE.**	**C**	**SE.**	**C**	**SE.**
RGFCI	0.3152[a]	0.0375	0.3198[a]	0.0389	0.3332[a]	0.0418	0.3949[a]	0.0419
EL	0.2206[a]	0.0658	0.2133[a]	0.0684	0.1579[a]	0.0563	0.1244[b]	0.0565
TFP	0.2985[a]	0.0878	0.3065[a]	0.0921	0.2756[a]	0.0669	0.2559[a]	0.0770
RE-1	0.0372	0.0281	0.0582	0.0313	––	––	––	––
RE-2	––	––	––	––	0.0306	0.0221	0.0102	0.0071
DH_g | DH_p	18.91*[0.000]		29.26*[0.000]		30.06*[0.000]		29.86*[0.000]	
ECT($\bar{t}_c$)	-12.21*[-3.39]				-3.99*[-3.39]			
$\tilde{\Delta}_{adj}$	0.366*[0.357]				0.386*[0.349]			
Variables	**Model-7**				**Model-8**			
	C	**SE.**	**C**	**SE.**	**C**	**SE.**	**C**	**SE.**
RGFCI	0.2105[a]	0.0360	0.3398[a]	0.0409	0.3412[a]	0.0420	0.3464[a]	0.0422
EL	0.3747[a]	0.1053	0.1094[b]	0.0584	0.1353[a]	0.0570	0.1499[b]	0.0682
TFP	0.3532[a]	0.1149	0.3180[a]	0.0952	0.2872[a]	0.0988	0.3027[a]	0.0969
TR-1	0.0697[a]	0.0293	0.0335[a]	0.0141	––	––	––	––
TR-2	––	––	––	––	0.0417[b]	0.0192	0.0324[b]	0.0140
DH_g | DH_p	22.99*[0.000]		31.26*[0.000]		28.57*[0.000]		18.84*[0.000]	
ECT($\bar{t}_c$)	-3.77*[-3.06]				-3.62*[-3.06]			
$\tilde{\Delta}_{adj}$	0.259*[0.398]				-0.028*[0.511]			
Variables	**Model-9**				**Model-10**			
	C	**SE.**	**C**	**SE.**	**C**	**SE.**	**C**	**SE.**
RGFCI	0.3090[a]	0.0360	0.3306[a]	0.0369	0.4025[a]	0.0398	0.3747[a]	0.0396
EL	0.2066[a]	0.0642	0.1946[a]	0.0662	0.1652[a]	0.0668	0.2001[b]	0.0965
TFP	0.3148[a]	0.0763	0.2087[a]	0.0753	0.1833[a]	0.0699	0.3189[a]	0.0888
AR-1	0.1103[a]	0.0384	0.1022[a]	0.0470	––	––	––	––
AR-2	––	––	––	––	0.0365[b]	0.0181	0.0940[b]	0.0443
DH_g | DH_p	17.53*[0.000]		20.41*[0.000]		18.81*[0.000]		30.34*[0.000]	
ECT($\bar{t}_c$)	-3.57*[-3.06]				-3.34*[-3.06]			
$\tilde{\Delta}_{adj}$	0.075*[0.470]				0.243*[0.404]			

'C' denotes coefficients, 'SE' denotes the standard errors of coefficients, and 'a' and 'b' indicate that the variables are significant at 1% and 5% significance levels, respectively. '*' indicates that there is a co-integration relationship among the variables at 1% level of significance. '*' indicates that the slope coefficients in the co-integration equation are homogeneous. Lag length for DH_g, DH_p, ECT($\bar{t}_c$), and $\tilde{\Delta}_{adj}$ test statistics are determined with Schwarz Information Criterion, and critical table values for ECT($\bar{t}_c$) test are obtained from the study of Gengenbach et al. (2016).

Source: Authors' calculations.

As seen in table (4), long-term coefficients in all models are calculated with similar magnitude and significance levels. This shows that the models, at first sight, are consistently constructed, and CS-DL and CS-ARDL estimators produce consistent results. When the results are examined in terms of the traditional determinants of economic growth, it is seen that long-term coefficients of real gross fixed capital investment, employed labour, and total factor productivity are positive and statistically significant. This result is consistent with the theoretical suggestions of CD type of production function; increases in physical-human capital and technological development level positively impact economic growth. It is also seen that the magnitudes of the positive and statistically significant effects of real gross fixed investment, employed labour force, and total factor productivity on economic growth vary across the models. The variables take values between 0,2105-0,4025; 0,1094-0,3747; 0,1833-0,3708, that means a one-point increase in gross fixed investments, employed labour and total factor productivity, respectively, results in an increase in average economic growth by 0,21; 0,11; 0,18-point if all other variables held constant.

In addition, when the results are examined in terms of structural reform variables, it is seen that financial, fiscal, trade, and aggregate structural reform variables (*FN-1*, *FN-2*; *FS-1*, *FS-2*; *TR-1*, *TR*-2; and *AR-1*, *AR-2*) have a positive and statistically significant impact on economic growth in all models according to both two approaches. Surprisingly, the real sector reform variables turn out to be variables with a positive but statistically insignificant impact on economic growth. *FN-1*, *FN-2*; *FS-1*, *FS-2*; and *AR-1*, *AR-2* variables take values between 0,0825-0,1104; 0,0612-0,0804; 0,0324-0,0697, which indicate that a one-point increase in structural reforms in financial, fiscal, and trade sectors, respectively, results in an increase in average economic growth by 0,08; 0,06; 0,03-point if all other variables held constant. Additionally, *AR-1* and *AR-2* variables take values between 0,0365 and 0,1103, which means a one-point increase in aggregate structural reforms is associated with at least about 0,04-point increase in economic growth.

These findings indicate that structural reforms in financial, fiscal, and trade sectors implemented in 56 countries within the IMF-Supported Program during the 2002-19 period can have a key role in enhancing economic growth. In other words, these countries could significantly increase their economic growth rates by implementing: (*i*) financial reforms that can remove financial restrictions and create favourable conditions in financial institutions; (*ii*) fiscal reforms that can improve the efficiency of resource allocation and ensure macroeconomic stability; (*iii*) trade reforms that can reduce trade barriers and inefficiency in the production process.

4. CONCLUSION

The present study has employed a novel database to investigate whether structural reforms in fiscal, financial, trade, and real sectors impact economic growth in 56 countries under the IMF-supported program over the 2002-19 period. Previous studies have mostly tended to focus on certain proxy variables for structural reforms and liberalization indexes, which may not directly measure structural reforms; this study has used a more comprehensive and easily accessible database (MONA) to construct SRIs directly and consistently for four specific sectors employing Z-score approach. The robustness of the models based on the extended type of CD production function is confirmed by using two different SRIs for each sector and two different estimators. According to the CS-DL and CS-ARDL models: (1) magnitudes and significance levels of calculated long-term coefficients of the variables in all models are mainly similar. This confirms that the models, at first sight, are consistently constructed, and CS-DL and CS-ARDL estimators produce consistent results. (2) Gross fixed investment, employed labour force, and total factor productivity have positive and statistically significant impacts on growth. This result is consistent with the theoretical suggestions of CD production function; physical-human capital and technological development are key factors for economic growth. (3) Magnitudes of these effects vary from model to model; among the three variables, physical capital accumulation is more strongly associated with economic growth than human capital and technological development level, respectively. (4) There is a positive association between structural reforms in fiscal, financial, and trade sectors and economic growth. This result is consistent with the studies (Ormaechea et al., 2017; Khan & Qayyum, 2006; Bekaert et al., 2001; Aksoy, 2019; Gnangnon, 2018; Greenaway et al.,2002) reporting that reforms in these sectors can stimulate the growth performances of countries. However, contrary to studies (i.e., Canton et al. 2014) suggesting that real sector reforms matter in boosting economic growth, this study concludes that these reforms have a positive but statistically insignificant impact on growth. The lack of sufficiently developed political institutions and property rights, which were suggested to be a necessary condition for structural reforms to be effective or to enhance economic performance (Acemoglu & Johnson, 2005; Christiansen et al., 2013), would be a possible reason behind this result. (5) Aggregate structural reforms have a positive and statistically significant impact on economic growth. Overall, the findings of this study point to the individual structural reforms in fiscal, financial, and trade sectors and aggregate structural reforms, including real sector reforms being potentially critical factors that provide growth performance of countries. Hence, along with the relevant traditional policies and sufficiently developed institutions, policymakers should implement structural reforms to lift potential growth and provide lasting economic recovery.

Although there are 101 countries under the Fund-supported program, this study examines the impact of structural reforms on the growth performances of 56 countries because of the unavailability of data on variables for other countries during the examination period. This is the main limitation of this study. Another challenge is that the selection bias related to participating in IMF-supported programs arises from systematically different initial macroeconomic and structural conditions for program versus non-program countries. Since countries may request an IMF arrangement when facing severe economic difficulties or the sample countries in the MONA program are treated with reforms, maybe precisely those with inefficient policies/outcomes. Therefore, the results can differ for non-program countries with better economic and structural conditions. In addition, empirical evidence may explain the positive association between structural reforms in four key sectors and economic growth, but more work may be needed to constrain SRIs for specific income group countries (i.e., low-middle-higher income group countries) or some other country groups (i.e., transition economies) in this direction. Finally, this study considers only the economic reforms in four specific sectors; however, understanding better the economic growth impact of various structural reforms in health, education, and other types of institutional areas may be another important question to be addressed.

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APPENDIX

Table A.

LIST OF COUNTRIES AND NUMBER OF SUCCESSFUL REFORMS (STRUCTURAL BENCHMARKS)

Country	SB ID	Approval Year	Initial End Year	FS	FN	TR	RE	AR
Albania	507	06/21/2002	11/20/2005	4	34	5	0	43
	565	01/27/2006	01/31/2009	5	49	2	0	56
	709	02/28/2014	02/27/2017	8	47	10	0	65
Angola	623	11/23/2009	02/22/2012	11	14	1	0	26
	774	12/07/2018	12/06/2021	5	7	1	2	15
Argentina	508	09/20/2003	01/05/2006	7	10	1	0	18
	510	01/24/2003	08/31/2003					
	770	06/20/2018	06/19/2021	5	8	0	0	13
Armenia	557	05/25/2005	05/24/2008	4	18	1	0	23
	602	11/17/2008	11/16/2011	1	5	0	0	6
	611	03/06/2009	07/05/2011	5	11	0	1	17
	649	06/28/2010	06/27/2013	8	16	2	0	26
	710	03/07/2014	05/06/2017	11	18	2	0	31
	778	05/17/2019	05/16/2022	3	7	4	0	14
Bangladesh	511	06/20/2003	06/19/2006	4	5	0	0	9
	682	04/11/2012	04/10/2015	14	8	0	1	23
Barbados	772	10/01/2018	09/30/2022	2	10	8	0	20
Belarus	608	01/12/2009	03/30/2010	6	0	4	0	10
Bolivia	512	04/02/2003	04/01/2004	5	6	2	0	13
Bosnia and Herzegovina	506	08/02/2002	11/01/2003	1	16	0	1	18
	618	07/08/2009	07/07/2012	2	10	1	4	17
	692	09/26/2012	09/25/2014	17	37	4	0	58
	747	09/07/2016	09/06/2019	10	9	5	2	26
Brazil	513	09/06/2002	11/05/2003	10	6	3	0	19
Bulgaria	549	08/06/2004	09/05/2006	3	12	6	0	21
Burkina Faso	514	06/11/2003	06/10/2006	0	15	1	0	16
	578	04/23/2007	04/22/2010	1	14	5	0	20
	645	06/14/2010	06/13/2013	3	19	10	0	32
	708	12/27/2013	12/26/2016	1	26	9	0	36
	767	03/14/2018	03/13/2021	0	20	4	0	24
Cameroon	563	10/24/2005	10/23/2008	3	23	15	1	42
	760	06/26/2017	06/25/2020	9	46	22	1	78

Country	SB ID	Approval Year	Initial End Year	FS	FN	TR	RE	AR
Colombia	503	01/15/2003	01/14/2005	3	14	1	0	18
	555	05/02/2005	11/02/2006	3	4	1	0	8
Congo Democratic (Republic of)	625	12/11/2009	12/10/2012	8	26	0	0	34
Costa Rica	614	04/11/2009	07/10/2010	4	1	0	0	5
Cote D'ivoire	516	03/27/2002	03/28/2005	0	2	2	0	4
	612	03/27/2009	03/26/2012	3	19	0	4	26
	674	11/04/2011	11/03/2014	13	47	19	0	79
	750	12/12/2016	12/11/2019	2	38	9	0	49
Croatia	517	02/03/2003	04/02/2004	4	3	0	0	7
	548	08/04/2004	04/03/2006	4	4	4	0	12
Cyprus	698	05/15/2013	05/14/2016	21	7	1	4	33
Dominican Republic	539	08/29/2003	08/28/2005	8	2	0	1	11
	552	01/31/2005	05/30/2007	12	4	2	0	18
	622	11/09/2009	03/08/2012	8	9	5	0	22
Ecuador	509	03/21/2003	04/20/2004	4	1	0	0	5
	777	03/11/2019	03/10/2022	5	14	0	0	19
	752	11/11/2016	11/10/2019	14	12	13	1	40
Georgia	541	06/04/2004	06/03/2007	7	7	2	0	16
	597	09/15/2008	03/14/2010	3	6	0	0	9
	683	04/11/2012	04/10/2014	1	3	1	0	5
	716	07/30/2014	07/29/2017	3	9	1	0	13
	755	04/12/2017	04/11/2020	20	18	2	0	40
Ghana	521	05/09/2003	05/08/2006	5	9	1	0	15
	619	07/15/2009	07/14/2012	3	18	6	0	27
	725	04/03/2015	04/02/2018	7	15	1	1	24
Greece	638	05/09/2010	05/08/2013	7	16	4	0	27
	680	03/15/2012	03/14/2016	7	13	8	0	28
Guatemala	522	04/01/2002	03/31/2003	3	0	0	0	3
	523	06/18/2003	03/15/2004	6	1	0	0	7
	616	04/22/2009	10/21/2010	3	0	0	0	3
Hungary	600	11/06/2008	04/05/2010	12	1	0	0	13
Iceland	603	11/19/2008	11/18/2010	6	2	1	1	10
Ireland	657	12/16/2010	12/15/2013	24	5	0	0	29
Jamaica	634	02/04/2010	05/03/2012	4	7	3	0	14
	697	05/01/2013	04/30/2017	10	71	3	0	84
	748	11/11/2016	11/10/2019	7	5	11	0	23
Jordan	505	07/03/2002	07/02/2004	2	5	0	0	7
	690	08/03/2012	08/02/2015	4	14	6	0	24
	744	08/24/2016	08/23/2019	7	21	6	0	34

Country	SB ID	Approval Year	Initial End Year	FS	FN	TR	RE	AR
Kenya	524	11/21/2003	11/20/2006	3	8	2	0	13
	661	01/31/2011	01/30/2014	2	4	0	0	6
	722	02/02/2015	02/01/2016	1	6	0	0	7
	734	03/14/2016	03/13/2018	2	7	0	0	9
Kyrgyz Republic	554	02/23/2005	03/14/2008	12	9	3	0	24
	628	12/10/2008	06/09/2010	5	5	0	0	10
	671	06/20/2011	06/19/2014	10	10	2	0	22
	726	04/08/2015	04/07/2018	14	16	3	0	33
Latvia	605	12/23/2008	03/22/2011	20	10	7	0	37
Madagascar	571	07/21/2006	07/20/2009	3	11	1	1	16
	742	07/27/2016	11/26/2019	3	15	6	0	24
Malawi	559	08/05/2005	08/04/2008	5	9	1	0	15
	632	02/19/2010	02/18/2013	4	6	2	2	14
	689	07/23/2012	07/22/2015	17	11	0	0	28
	768	04/30/2018	04/15/2021	2	32	0	0	34
Mali	543	06/23/2004	06/22/2007	1	6	6	0	13
	593	05/28/2008	05/27/2011	2	10	6	0	18
	677	12/27/2011	12/26/2014	0	6	2	0	8
	707	12/18/2013	12/17/2016	1	24	4	0	29
	785	08/28/2019	08/27/2022	0	6	1	0	7
Moldova	567	05/05/2006	05/04/2009	7	8	11	2	28
	630	01/29/2010	01/28/2013	5	11	1	0	17
	749	11/07/2016	11/06/2019	19	4	5	0	28
Mozambique	544	07/06/2004	07/05/2007	4	8	2	1	15
	580	06/18/2007	06/25/2010	5	9	4	0	18
	646	06/14/2010	06/13/2013	4	16	1	0	21
	701	06/24/2013	06/23/2016	9	13	3	0	25
	733	12/18/2015	06/17/2017	2	0	1	0	3
Niger	551	01/31/2005	01/30/2008	1	12	1	2	16
	595	05/28/2008	06/01/2011	0	13	2	0	15
	681	03/16/2012	03/15/2015	2	58	1	0	61
	751	01/23/2017	01/22/2020	3	22	2	0	27
Nigeria	581	10/17/2005	10/16/2007	2	9	10	0	21
North Macedonia (Republic of)	562	08/31/2005	08/30/2008	13	0	12	17	42
	658	01/19/2011	01/18/2013	0	1	0	0	1
Pakistan	604	11/24/2008	10/23/2010	2	9	2	1	14
	703	09/04/2013	09/03/2016	10	19	14	0	43
	781	07/03/2019	10/03/2022	2	2	9	0	13

Country	SB ID	Approval Year	Initial End Year	FS	FN	TR	RE	AR
Peru	545	6/09/2004	08/16/2006	4	6	1	0	11
	576	01/26/2007	02/28/2009	2	6	2	0	10
Portugal	670	05/20/2011	05/19/2014	10	8	18	0	36
Romania	531	07/07/2004	07/06/2006	0	2	13	0	15
	617	05/04/2009	05/03/2011	6	8	0	0	14
	662	03/31/2011	03/30/2013	1	6	5	0	12
	704	09/27/2013	09/26/2015	3	12	6	0	21
Senegal	530	04/28/2003	04/27/2006	0	5	0	0	5
	587	11/02/2007	11/01/2010	3	15	4	1	23
	656	12/03/2010	12/02/2013	2	30	3	0	35
	729	06/27/2015	06/26/2018	1	25	0	0	26
Serbia and Montenegro	537	05/13/2002	05/12/2005	21	14	9	2	46
Sri Lanka	504	04/18/2003	04/17/2006	4	2	2	1	9
	620	07/24/2009	03/23/2011	7	7	5	0	19
	738	06/03/2016	06/02/2019	5	17	9	0	31
Tajikistan	502	12/11/2002	12/10/2005	4	7	4	0	15
	615	04/21/2009	04/20/2012	11	7	3	0	21
Tanzania	533	03/31/2000	03/30/2003	4	25	1	2	32
	534	08/16/2003	08/15/2006	3	24	3	0	30
	582	02/16/2007	02/15/2010	3	15	0	2	20
	642	06/04/2010	06/03/2013	5	13	4	0	22
	687	07/06/2012	01/05/2014	2	2	1	0	5
	714	07/16/2014	07/15/2017	8	10	0	0	18
Tunisia	699	06/07/2013	06/06/2015	22	12	4	2	40
	735	05/20/2016	05/19/2020	10	16	3	0	29
Turkey	556	05/11/2005	05/10/2008	7	11	11	0	29
Uganda	501	09/13/2002	9/12/2005	8	10	0	0	18
	584	02/01/2006	05/31/2007	0	2	0	0	2
	585	12/15/2006	12/14/2009	2	2	1	0	5
	639	05/12/2010	05/11/2013	8	29	0	0	37
	702	06/28/2013	06/27/2016	5	22	1	0	28
Ukraine	546	03/29/2004	03/28/2005	0	3	0	0	3
	599	11/05/2008	11/04/2010	8	1	2	0	11
	652	07/28/2010	12/27/2012	5	5	1	3	14
	711	04/30/2014	04/29/2016	6	8	2	0	16
	724	03/11/2015	03/10/2019	2	17	13	0	32
	776	12/18/2018	02/17/2020	4	3	1	0	8
Uruguay	535	04/01/2002	03/31/2004	10	3	3	0	16
	558	06/08/2005	06/07/2008	2	6	2	0	10

Source: The MONA database.

Table B.

DESCRIPTIONS OF SRS

Reforms	Codes	Description
Financial	2	2. Central bank 2.1. Central bank operations and reforms 2.2. Central bank auditing, transparency, and financial controls.
	6	6. Financial sector 6.1. Financial sector legal reforms, regulation, and supervision 6.2. Restructuring and privatization of financial institutions.
Fiscal	1	1. General government 1.1. Revenue measures, excluding trade policy 1.2. Revenue administration, including customs 1.3. Expenditure measures, including arrears clearance 1.4. Combined expenditure and revenue 1.5. Debt Management 1.6. Expenditure auditing, accounting, and financial controls 1.7. Fiscal transparency (publication, parliamentary oversight) 1.8. Budget preparation (e.g., submission or approval) 1.9. Inter-governmental relations
	4	4. Pension and other social sector reform 4.1. Pension reforms 4.2. Other social sector reforms (e.g., social safety nets, health, and education).
	10	10. Economic statistics (excluding fiscal and central bank transparency and similar measures).
	11	11.4 Anti-corruption legislation/policy.
Real	3	3. Civil service and public employment reforms, and wages.
	5	5. Public enterprise reform and pricing (non-financial sector) 5.1. Public enterprise pricing and subsidies 5.2. Privatization, public enterprise reform and restructuring, other than pricing 5.3. Price controls and marketing restrictions.
	9	9. Labor markets, excluding public sector employment.
	11	11. Other structural measures 11.1. Private sector legal and regulatory environment reform (non-financial sector) 11.2. Natural resource and agricultural policies (excluding public enterprises and pricing) 11.3. PRSP development and implementation.
Trade	7	7. Exchange systems and restrictions (current and capital).
	8	8. International trade policy, excluding customs reforms.

Source: The MONA database.

UČINCI STRUKTURNIH REFORMI NA GOSPODARSKI RAST: DOKAZI IZ ODABRANIH ZEMALJA UNUTAR PROGRAMA KOJI PODRŽAVA MMF

Sažetak

U radu se istražuju učinci strukturnih reformi u fiskalnom, financijskom, trgovinskom i realnom sektoru na gospodarski rast za 56 zemalja unutar programa koji podržava MMF, za razdoblje od 2002. do 2019. godine. Koristeći novu bazu podataka (MMF-ovo praćenje aranžmana fondova – MONA, *engl. IMF Monitoring of Fund Arrangements),* konstruiraju se novi indeksi strukturnih reformi za svaki sektor koristeći pristup Z-score-a. Ovaj rad ističe da sve strukturne reforme, osim reformi realnog sektora, u svim modelima konstruiranim na temelju proširene Cobb-Douglasove proizvodne funkcije, imaju pozitivan i statistički značajan utjecaj na gospodarski rast. Robusnost modela potvrđena je uporabom dva različita indeksa strukturnih reformi za svaki sektor i dva različita procjenitelja uzimajući u obzir prosječnu ovisnost. Empirijski nalazi ukazuju na to da su strukturne reforme potencijalno ključni čimbenici koji osiguravaju snažan dugoročni rast za zemlje. Stoga bi, uz relevantne tradicionalne politike i dovoljno (dostatno) razvijene institucije, kreatori politika trebali proširiti strukturne reforme kako bi podigli potencijalni rast i osigurali trajni gospodarski oporavak.

Ključne riječi: strukturne reforme, gospodarski rast, analiza panel podataka