TECHNOLOGICAL IMPACT, FINANCIAL STABILITY AND POLITICAL STABILITY IN THE ECONOMY OF NORTH MACEDONIA

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Abstract: The main purpose of this paper is to analyze the technological impact, financial impact and political stability on the economic development of the Republic of Northern Macedonia. Based on the analysis of the study, for the period from 2008 to 2019 we notice that there are positive and negative impacts which we have analyzed. Where, a clear picture was provided on the impact of macroeconomic determinants on economic development. Political and financial stability also represent statistically significant variables which means that they have an impact on economic development. Economic science constantly deals with models of economic development, as well as with the factors that influence the acceleration or slowdown of economic growth. The purpose of this research is to gather as much information as possible about the factors that affect economic development, to clarify their importance and to present the results obtained as an integral part of the research. For the same purpose, to measure the importance between economic determinants and economic development in the Republic of Northern Macedonia.
Technological progress can be a study that contributes to economic development, political and financial stability. For this reason as a hypothesis to analyze we have taken the relationship between technological progress and economic development as well as political and financial stability.
The literature focuses more on the relationship between financial and political stability within economic development, on the other hand the studies that are done establish the concept of technological progress as the basis of economic growth. In this context, this study acknowledges that technological progress is a significant impact on economic growth and takes into account the factors with which this relationship interacts in the context of stability.
International trade, at the core of the concept of globalization, is essential to ensure competitive advantage in global markets and to support core capital investments in developing countries where capital is scarce.
Keywords: political stability, financial stability, technological progress, investments

1. INTRODUCTION

Posner, MV (1961), determined that technological progress and production of high-tech products will increase the country's exports also suggests that countries increase their high-tech production, this means that the speed of technological progress increases the potential for the production of new products and thus have a comparative advantage in the market. A process called technological gap, Posner, M. V. (1961) suggests that costs are an important element in the innovation process therefore realized innovation is spreading in the learning process.
Literature research, which has been done in this regard, includes technological progress, innovation, human capital and the relationship between economic development and the relationship of these variables to stability. In the Republic of Northern Macedonia, high technology, financial stability and political stability are presented as follows (Data provided by the World Bank, State Statistical Office and Central Bank):

2. ECONOMETRIC MODEL

The interrelationship between political stability, financial stability and high-tech exports in the economy of the Republic of Northern Macedonia are analyzed through the Vector OE Regression Model (VAR) for the period 2008-2019. The correlation between these variables has been determined by Granger causality analysis, reaction actions and functions, and variance separation methods. In the literature, the high-tech export data used in the analysis are considered as a demonstration of technological progress, which is one of the dynamics of economic growth, and express its relationship with political stability and financial stability as a source of sustainable growth.

3. DATA

The political stability and financial stability data used in the analysis were taken from the National Bank of North Macedonia database and the high-tech export data were obtained from the World Bank database. The variables used in the analysis, their sources and the symbols that represent them are presented in the table below:

Table 1. Variables used in the analysis

Symbol	Variables	Reference
tex	Techexport	World Bank
ps	Political stability	NBNM
fs	Financial stability	NBNM
ecg	Economic growth	World Bank

According to Table 1; tex represents the export of advanced technology, ps represents political stability, ecg represents gross domestic product and fs represents financial stability.

4. METHODOLOGY

In the study we used the autoregressive vector model (VAR) and the Granger causality method to determine the causal relationships between the variables. For the correlation between the variables we analyze the action and reaction functions and the results of the variance division with respect to the model. The VAR model is used to determine the interconnection between the series used at any given time. The VAR model, a dynamic model, takes into account the delayed values of all variables and has a more flexible structure. Therefore, the bivariant VAR model is as follows:

$$y_t = a_1 + \sum_{i=1}^{p} b_{1i} y_{t-1} + \sum_{i=1}^{p} b_{2i} x_{t-1\_} v_{1t} \quad (1)$$

$$x_t = c_1 + \sum_{i=1}^{p} d_{1i} y_{t-1} + \sum_{i=1}^{p} d_{2i} x_{t-1\_} v_{1t} \quad (2)$$

In the model, p represents the duration of the delays; v represents random error terms, of which it means they are zero, covariance with their delayed values are zero, variances are constant, with normal distribution. In the VAR model it is possible to interpret the separation of variances and the action and reaction functions. The divisions of variance, action, and response allow commenting on VAR model errors. The action and reaction function that is not affected by the order of the variables included in the VAR model is used in the action and reaction function that detects the direction and duration of the reaction given by the other variable for the weekly standard shock occurring in a variable. Finally, the Granger causality analysis equations used to determine causality relationships between variables are as follows (Gujarati et al, 1999).

$$X_t = \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{j=1}^{n} \beta_j X_{t-j\_} u_{1t} \quad (3)$$

$$Y_t = \sum_{i=1}^{m} \gamma_i Y_{t-i} + \sum_{j=1}^{m} \delta_j X_{t-j\_} u_{2t} \quad (4)$$

Here, if the predicted values of Y in equation (3) are statistically significant and different from zero and if the predicted values of X in equation (4) are statistically significant and not different from zero then the causality direction is towards Y → X. Conversely, in equation if $\sum_i^n = 1 \;\; \alpha_i = 0$ and $\sum_j^m = 1 \;\; \delta_j \neq 0$ then the direction of causality is towards X → Y.

In both equations, if the coefficients of Y and X are statistically significant and different from zero, there is a reciprocal causal relationship between the variables. In both equations, if the coefficients of the variables Y and X are statistically insignificant, there is no causal relationship between the variables.

If we use equation (1) to identify the root test of the ADF unit used to investigate the stability of time series, the prediction of the equation γ = 0 in the parameter γ in the equation indicates that t Y contains the unit root.

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + u_t \quad (5)$$

The inclusion of additional term changes in the test equation leads to a decrease in the degree of freedom in the ADF test and the loss of power in the testing procedure.

$$H_0; y = 0 \; contains \; unit \; roots$$

$$H_1; y < 0 \; does \; not \; contain \; unit \; roots$$

The PP approach is an alternative test, which takes into account the existence of unknown forms of autocorrelation and the situation of variable variances in the error term and uses non-parametric correction to solve the autocorrelation problem. For both tests, the fact that the statistic t is greater than the critical values leads us to reject the null hypothesis which implies that the corresponding series contains the unit root. The Dickey-Fuller Test (DF) and the Dickey-Fuller Argumented Test assume that the error terms are statistically independent and have a constant variation. In their study, Phillips and Perron (1988) stated that it is necessary to make sure that there is no correlation between the terms error and that they have a constant discrepancy as far as caring for DF and ADF and extend this assumption to error terms. Balan, F. (2016).

Unit root tests with Augmented Dickey Fuller and Phillips Perron models were performed through three options which are intercept, intercept trend and none.

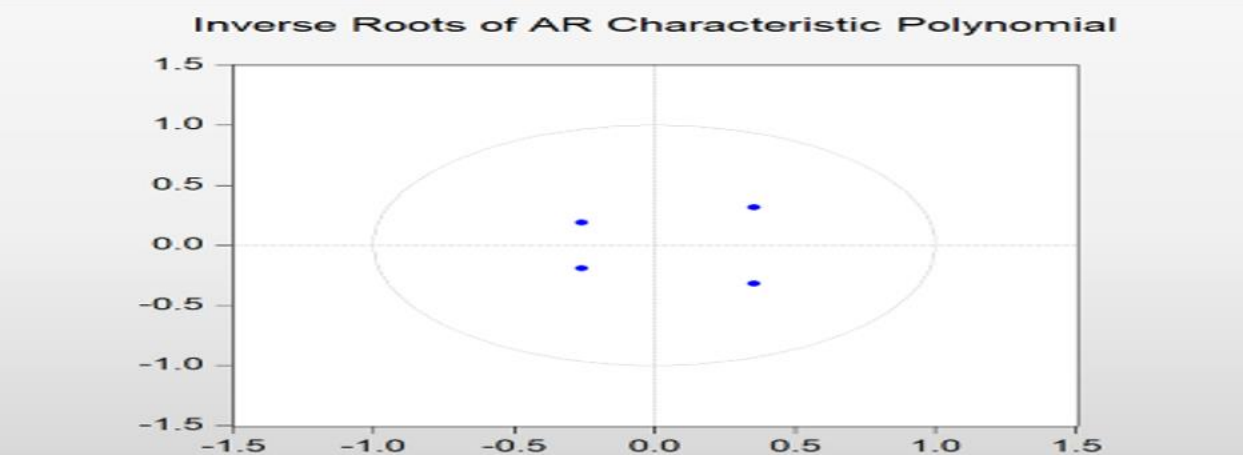
Table 2: Unit root test results

Variable	ADF			PP		
	INTERCEPT	TREND INTERCEPT	NONE	INTERCEPT	TREND INTERCEPT	NONE
Economic growth	-4.877404	-2.591774	-1.979021	-5.223541	-10.47876	-1.979021
Higher education	-3.900255	-3.440133	0.245007	-.3900255	-.3440133	0.329939
Financial stability	-1.618687	-2.899149	-1.579679	-5.322043	-4.549498	-3.979807
Political risk	-2.235826	-2.750651	-1.400141	-2.235826	-3.381308	-1.336384

Authors calculations

In both ADF and PP models all variables were determined that in the first differences of all series no unit roots are included. Another prerequisite of the VAR model is the determination of the time delay for each endogenous variable that is statistically significant. Determining whether the predicted VAR model is dynamically stable or not is seen from the unit root where in our case the model has no unit roots and all roots lie within the circle and indicate that the model is dynamically stable.

Graph 4: Unit roots of the matrix



Dynamic Stability Graph with heteroscedasticity in error terms. Where, the results of the model heteroscedasticity test are shown in Table 3.

Table 3: Heteroscedasticity results

Joint Test Varying Variance Test

Chi-sq	df	Prob.
88.00000	80	0.2531

It

It is clear from the results of the Joint test that we analyzed to examine the issue of heteroscedasticity in the model

with chi-sq squared probability values which is greater than 0.05 which means that there is no heteroscedasticity problem in the model.

Table 4: Results from the Granger causality test

	ecgro			fs			ps			tex		
	fs	ps	tex	ecgro	ps	tex	ecgr	fs	tex	ecgr	fs	ps
c	4.46	0.41	0.89	2.59	6.05	1.06	0.93	14.8	7.9	0.23	0.05	0.07
d	2	2	2	2	2	2	2	2	2	2	2	2
p	0.81	0.10	0.63	0.27	0.04	0.58	0.62	0.00	0.01	0.88	0.97	0.96

Note: Author calculations

According to the results of the analysis of the Granger causality test, we note that in the model of economic growth as an independent variable, there is a causal link of financial stability to economic growth. In the model of financial stability as an independent variable, there is a causal link between political stability and economic growth. In political stability, as an independent variable, financial stability and advanced technology present a causal link to financial stability.

5. CONCULSION

In the current conditions, present in a situation caused by the Covid-19 pandemic, we are witnessing that from this health crisis, the financial crisis has been caused, which has highlighted the harmful effects on living standards from macroeconomic instability.

Using the correlation analysis between 10 years in the RMV, there have been some general upward trends

The main purpose of this study was to determine the relationship between political and financial stability, technological exports and GDP, to contribute to the development of this important factor of the economy.

A successful job guarantee scheme would avoid the ills of unemployment, strengthen the position of ordinary working people, and provide a more widely distributed prosperity in the short and medium term. This would be a much better position from which to debate and judge universal underlying income, allowing it to be formulated as a strategic, long-term solution for the changing job future, rather than simply as a response to the current economic crisis.

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