

THE IMPACT OF MACROECONOMICS CONDITIONS ON INVESTMENTS IN NORTH MACEDONIA

Gazmend DEHARI

^{1}Department of finance, Faculty of Economics, North Macedonia*

**Corresponding Author: e-mail: gazmend.dehari@unite.edu.mk*

Abstract

Knowing the right Macroeconomic conditions is of key importance for enterprises to make well-informed investments decisions. Regardless of the vast empirical studies on the predictability of these conditions, no consensus have emerged, on what is the most likely model to use for such forecasts. The purpose of this paper is to focus on certain macroeconomics indicators that will shape an environment at a degree of stability intended to enable investors i.e. enterprises to enhance their investments. The macroeconomic determinants considered are as following: GDP growth, inflation, unemployment rate, interest rate, trade and housing prices. This studies goal is to examine how the stated macroeconomic indicators fluctuations will affect the level of investment in North Macedonia. The sample includes all the available yearly observations data for the period 2000-2024. All the data come from the World Development Indicators database (World Bank 2025), except for the independent variable of housing price index, which came from the National Bank of the Republic of North Macedonia (NBRNM). The investment variable, depended variable, is measured as a foreign direct investment net inflow as percentage of GDP. The independent variables included in the baseline model are: GDP growth, in terms of annual percentage, Inflation which refers to the consumer prices as annual percentage, Unemployment rate, measured as a percentage of total labor force, modeled according to the International Labor Organization (ILO) and Trade, measured as sum of goods and services imported and exported as a percentage of GDP. The baseline model is constructed as a linear regression model, Ordinary Least Squares model (OLS).

Keywords: investments, growth, enterprises, macroeconomics factors.

1. Introduction

Knowing the right Macroeconomic conditions is of key importance for foreign enterprises to make well-informed investments decisions. Regardless of the vast empirical studies on the predictability of these conditions, no consensus have emerged, on what is the most likely model to use for such forecasts. Various studies indicate a strong relationship between investment and growth rate, (Anderson, 1990) in his paper aimed to estimate the importance of investment in generating growth. According to him investment have a crucial role provided that it is used efficiently in boosting production. (Curwin and Mahutga, 2014) suggest that in the case of post transitional socialistic countries less foreign direct investments in the country is better. Their conclusions point out a skepticism at the relationship between FDI and economic growth. They even indicate a case where if the FDI insertion into a country happens expeditiously it can precipitate an economic contraction. In the case of EU countries inflation has no impact on firm's investment decision until its rate is over 20%, this interaction is more evident among SME's. The research shows that there is a positive correlation between the probability of making an investment decision and passing cost onto customers, especially for the SME's operating in the energy sector

(Schito, Klimavičiūtė and Pál, 2024). The wage structure influence the firm's decision to invest and the labor market institutions have an important role, (Pischke, 2005), provided empirical evidence that firms are incentivized to invest more on the training of their work force particularly the low skilled ones. Considering the labor institutions, the economies where these institutions are important, firms will invest more in low skilled workers. The author furthermore concludes that redistribution of income thanks to minimum wage and unions, lower the profits that subsequently decreases job creation and thus contributing in increasing unemployment. Studing empirically the interest rate sensitivity of investment for the United States of America and four largest European countries, (Baldi, et al 2019), determine that in recent decades interest rates had ambiguous effect on investment. Applying a vector autoregressive model with four variables, real investment, real gross domestic product, inflation and short-term interest rate, the authors point out to a decrease in interest rate sensitivity that is noticeable for the United states and that decline was accompanied by a moderate corporate investment. The purpose of this paper is to focus on certain macroeconomics indicators that will shape an environment at a degree of stability intended to enable investors i.e. enterprises to enhance their investments. The macroeconomic determinants considered are as following: GDP growth, inflation, unemployment rate, trade and housing prices.

Literature review

Abiad, Furceri and Topalova (2015) by examining the impact of public investment concluded that the rise in investment was accompanied by a rise in output in the long and short term. Furthermore, they found that projects financed by debt had larger effect than those financed by taxes or cutting government spending. Ayaydin and Durmus (2016), could not determinant a statistically significant relationship between growth rate and investment, but they found a significant negative correlation between real interest rate and investment. Inessa *et al.* (2019), trying to optimize an investment model with a selected macroeconomics indicator for the polish economy determined that sustainable development creates suitable conditions for enterprises to invest. Furthermore, they concluded that the real GDP growth rate is the main indicator driving the readiness of enterprises to invest. Inflation impact over investment depends on the sectors that are being considered, (EIB, 2024), suggests that the energy and agricultural sector are heavily affected by the rise in prices than other sectors. Duprez and Magerman (2021), conclude that firms can change their prices consequently to their cost structure and changes in other prices in their environment. Hypothetically, inflation can be conferred as a human tax on capital that has a negative impact on growth and interest rates but a positive impact on investment. Shlafman et al. (2017), to assess the investment potential on construction industry they identified three determinants of the impact of investment potential, the growth rate of FDI, growth rate of construction volume and the growth factor of fixed assets of the industry. Hoon, Katsimi and Zoega (2018), estimated the relationship between investment and unemployment in 20 OECD countries by conducting an empirical analysis indicating that the Great Recession had a positive effect on unemployment and it reduced the coefficient of investment, even though it retained its statistical significance. Polat, (2015), adopted panel data for 2001 -2012 period to identify the major determinants of the Foreign Direct Investments inflows in Central and Eastern European Countries. Applying variables such as CR indices of the EU and US in addition to country specific CR indices simultaneously, for better recognizing the FDI configuration, the study concluded by finding no effect of interest rate differentials over FDI in the region. The interest rate has an important role by influencing many other indicators that have an impact in the economic activity as a whole. Studying empirically the causality of intra industry trade and FDI between 15 EU countries and Turkey, Karaçayır (2025),

found that this connection doesn't exist for the base metal industry and transportation tools sectors. Nguyen (2022), aimed to assess the repercussions of trade on investment in the case of Vietnam, by adopting an ARDL model to evaluate their relationship. The author findings demonstrate that the investment inflows are motivated by the trade openness of a country and are significant, especially at 1 and 5 percent levels. Considering the housing prices, the Chinese housing market has been accustomed to a steady rise in prices, Mengkai and Ting (2023), examined the interactions between housing prices, land transfer revenue and infrastructure investment for 35 large and medium sized cities in different regions in China for the period between 2000-2017. According to their results, housing prices are affected by investment infrastructure more on the well-developed regions than in less developed ones.

Methodology

This studies goal is to examine how the stated macroeconomic indicators fluctuations will affect the level of foreign direct investment in North Macedonia. The sample includes all the available yearly observations data for the period 2000-2024. All the data come from the World Development Indicators database (World Bank 2025), except for the independent variable of housing price index, which came from the National Bank of the Republic of North Macedonia (NBRNM). The investment variable, depended variable, is measured as a foreign direct investment net inflow as percentage of GDP. The independent variables included in the baseline model are: GDP growth, in terms of annual percentage, Inflation which refers to the consumer prices as annual percentage, Unemployment rate, measured as a percentage of total labor force, modeled according to the International Labor Organization (ILO) and Trade, measured as sum of goods and services imported and exported as a percentage of GDP. The baseline model will be constructed as a linear regression model, Ordinary Least Squares model (OLS). The general form of the model which is estimated can be written as follows:

$$FDI_t = a_0 + b_1X_t + \varepsilon_t$$

where FDI_t represents Foreign Direct Investment at time t, the dependent variable, X_t represents the vector of independent variables, at time t, stated above and ε_t is the error term.

Table.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	25	-	-	2000	2024
GDP growth	25	2.604	2.57	-4.688	6.473
Inflation	25	2.955	3.529	-.74	14.205
Unemployment	25	27.293	8.152	13.174	37.32
Trade	25	110.124	26.289	71.069	166.147
Foreign Direct Investment	25	4.574	2.589	.062	12.658

The size of the sample as can be noticed in Table 1, includes 25 yearly observations. Of all the independent variables it can be observed that trade has the grater mean of 110 with the GDPs growth being the one with the lowest mean of 2.6. In normally distributed data most of the observations are spread between 3 standard deviation from each side of the mean. Using the

standard deviation to determine the spread out of the data from the mean it can be established that Trade has the highest standard deviation, 26.2, which indicates a grater spread in the data than any other independent variable, by contrast GDP growth has the lowest spread in the data, 2.57. Also, the same conclusion can be confirmed through minimum and maximum values of the observed variables. Trade as explanatory variable has the greater difference between min and max values, 71 and 166 respectively. In, comparison with the least difference, GDPs growth, with -4.6 and 6.4.

Table.2 Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) GDP growth	1.000				
(2) Inflation	0.038	1.000			
(3) Unemployment	0.249	-0.325	1.000		
(4) Trade	0.038	0.402	-0.871	1.000	
(5) Foreign Direct Investment	0.119	0.397	0.048	-0.063	1.000

Table 2 represents the correlations of the variables studied within the model. A moderate, positive linear relationship exists between inflation and trade of 0.40, which is the highest positive correlation among all the variables. A negative linear relationship exists for the following pairs of variables, trade and foreign direct investment -0.063, inflation and unemployment -0.325 and the strongly negatively correlated pair of unemployment and trade, -0.871. The negative relationship indicates that as inflation increases, unemployment decreases moderately, and as unemployment decreases, trade increases significantly.

Table.3 Linear regression

VARIABLES	(1) FDI
GDP growth	0.200 (0.239)
Inflation	0.373** (0.156)
Unemployment	-0.100 (0.154)
Trade	-0.054 (0.0474)
Constant	11.63 (8.795)
Observations	25
R-squared	0.245

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A Breusch-Pagan test is used to determine whether or not heteroscedasticity is present. From the table 4 it can be concluded that p value is 0.1561, greater than 0.05, so the null hypothesis cannot be rejected and the data has no heteroscedasticity

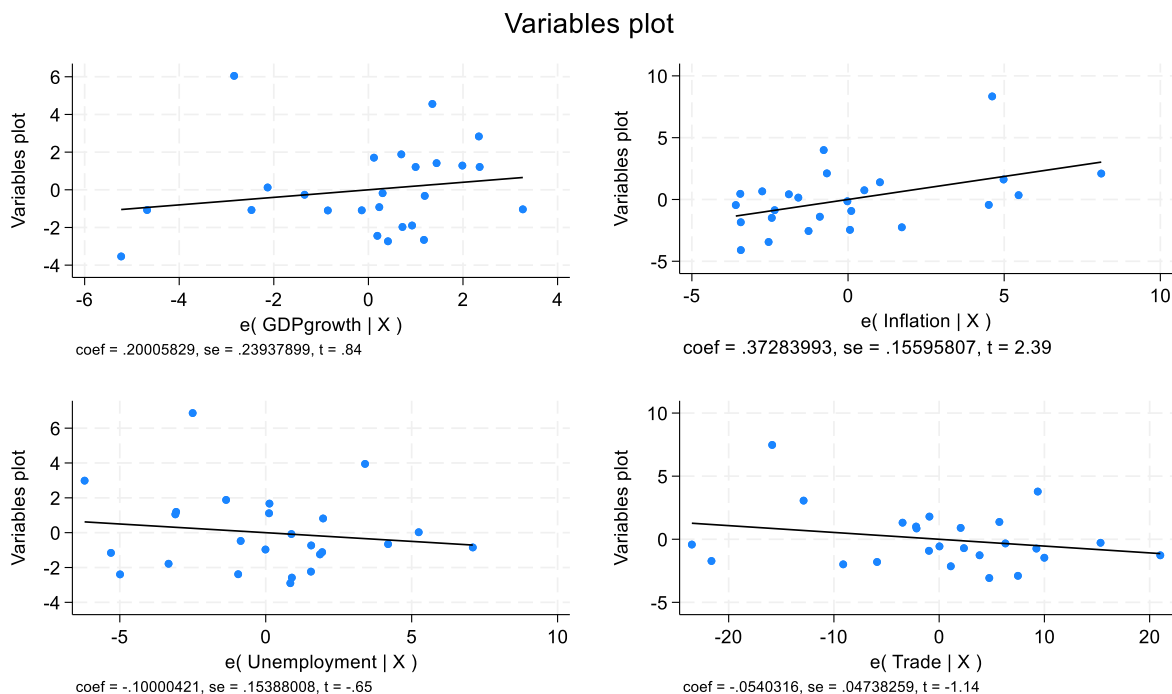
Table.4 Heteroskedasticity

Breusch–Pagan/Cook–Weisberg	test	for
heteroskedasticity		
chi2(1) = 2.01		
Prob > chi2 = 0.1561		

The results of the overall significance of the regression model are shown in Table 3. The linear regression is analyzing the relationship between independent variables, taken as predictor variables and dependent variable, investment as the response variable. With the help of the coefficients in the first column the estimated regression equation can be written as:

$$\text{FDI} = 11.63 + 0.2(\text{GDP growth}) + 0.373(\text{Inflation}) - 0.1(\text{Unemployment}) - 0.054(\text{Trade})$$

Each individual coefficient in the above stated regression equation represents an average increase in the response variable for one unit increase in a given predictor variable. Considering the independent variables, for every increase of one unit of GDP growth, the average expected increase in Foreign direct investment is 0.2 units, for every increase of one unit of Inflation, the average expected increase in FDI is 0.373 units, for every increase of one unit of Unemployment, the average expected decrease in FDI is -0.1 units and for every increase of one unit of Trade, the average expected decrease in FDI is -0.054 units. From all the explanatory variables of the model only inflation is statistically significant at the 5% level. This means that the association between the predictor variable, i.e. inflation, and response variable, i.e. FDI, is statistically significant. For every independent variable it is assumed that the other variables remain constant. The constant of 11.63 represents the expected average level of investments if each independent variable is null. The uncertainty around the estimation of the coefficient of each independent variable, measured by the standard error is 0.239 for GDP growth, 0.156 for Inflation, 0.154 for Unemployment and 0.047 for Trade.



Graph 1 shows the added variable plot, which is a visual representation of the relationship between the response variable, FDI and each individual predictor variable in the regression model. The x - axis displays a single predictor variable and the y – axis displays the response variable. The regression line illustrates the relationship of the two variables, while the values of all other predictor variables remains constant and the points, exhibit their residuals. From the graph it can be noted that the angle of the line for each plot matches the sign of the coefficient for the estimated regression equation stated above, GDP growth 0.2, inflation 0.372, unemployment -0.1 and trade -0.054. Apart from the Unemployment variable which has a fairly distributed residual, the other explanatory variables have outliers far from the main cluster of residuals or the regression line which indicates that they can skew significantly the results of the regression analysis.

Conclusions

The research focused on identifying the macroeconomics factors that have the most consequential impact in stimulating foreign investment in the country of North Macedonia for the last 25 years. The study resulted by creating a model that was used to detect the relationships between the macroeconomic indicators and the independent variable of FDI. The study was conducted by developing a comprehensive descriptive statistic table, identifying the correlations between the determinants and a least square model to assess their significance was created.

It can be observed that the determinant Trade has the highest standard deviation, 26.2, which indicates a greater spread in the data than any other independent variable and the GDP growth has the lowest spread in the data, 2.57. Considering the correlations of the independent variables it can be confirmed a moderate positive correlation between inflation and FDI of 0.4 and a strongly negatively correlation between unemployment and trade of -0.871. The least square model, which shows the significance of the independent variable in determining the dependent variable FDI,

identify that only inflation is significant at 5% level, all the other variables are not important in explaining investment and not significant at any level.

Recommendation

The effects of macroeconomic factors that determine the Foreign direct investment level that a country can attract matters in ensuring economic development and prosperity for a country like North Macedonia. By examining the impact of these factors, above, the following recommendations can be offered to the governing institutions to establish growth:

- As observed in the descriptive statistics table the standard deviation of the data is grater for the Trade variable, which means that this variable represents greater risk in determine the FDI level. Managing this risk, it will make trade less volatile and more stable to foreign investment in North Macedonia.

Limitations of the study

As for this study there are several restraints that should be considered. The study does not include all the macroeconomics factors that can influence FDI, the choice of the factors was done by the author and the prevailing literature. These determinants gave us a model with an R squared with only 0.245, meaning a model that explains only 25% of the investment. The other constraint is related to the period of analyses which is relatively short. Furthermore, the study relies on analysis of macro factors from only one country, to test the model more robustly other countries, especially from the Balkans, should be taken into consideration in order to perform a cross-section analysis.

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