Elizalde Guzmán, Héctor Paulino; Martínez Damián, Miguel Ángel; García Juárez, José de Jesús
Determinants of foreign direct investment in México. An analysis of efficiency factors

Determinants of foreign direct investment in México. An analysis of efficiency factors

Determinantes de la inversión extranjera directa en México. Un análisis de los factores de eficiencia

Héctor Paulino Elizalde Guzmán[*]
Miguel Ángel Martínez Damián[**]
José de Jesús García Juárez[**]

ABSTRACT

Through vector autoregressive (VAR) models, this research aims to evaluate the influence of efficiency variables (gross domestic product, trade openness, income tax, oil price, inflation, and interest rate) on the flows of foreign direct investment (FDI) in Mexico and identify actions that contribute to external financing. The results indicate that the behavior of direct foreign investment in the 1995-2020 period can be explained by an autoregressive factor of the same investment and the variables interest rate, trade openness and income tax. Therefore, the most appropriate measures to attract FDI are those that promote credit availability, better international relations, and regulated tax rates.
Keywords: efficiency; foreign direct investment; autoregressive vectors.
JEL Classification: B22; B23; F21.

RESUMEN

A través de modelos de vectores autorregresivos (VAR), esta investigación tiene como objetivo evaluar la influencia de las variables de eficiencia (producto interno bruto, la apertura comercial, impuesto sobre la renta, precio del petróleo, inflación y tasa de interés) sobre los flujos de la inversión extranjera directa (IED) en México e identificar acciones que contribuyan al financiamiento externo. Los resultados indican que el comportamiento de la inversión extranjera directa en el periodo 1995-2020 puede explicarse mediante un factor autorregresivo de la misma inversión y de las variables tasa de interés, apertura comercial e impuesto sobre la renta. Por tanto, .

---

[*] Department of socioeconomics, statistics and informatics. Colegio de Posgraduados, Montecillos campus. State of Mexico. Email: elizalde.hector@colpos.mx
[**] Department of socioeconomics, statistics and informatics. Colegio de Posgraduados, Montecillos campus. State of Mexico. Email: angel01@colpos.mx
[***] Department of socioeconomics, statistics and informatics. Colegio de Posgraduados, Montecillos campus. State of Mexico. Email: jjgarcia@colpos.mx

las medidas más adecuadas para atraer IED son aquellas que promuevan disponibilidad crediticia, mejores relaciones internacionales y tasas impositivas reguladas.

Palabras clave: eficiencia; inversión extranjera directa; vectores autorregresivos.

Clasificación JEL: B22; B23; F21.

INTRODUCTION

International financial markets, accelerated by the development of technological innovations and the growing competitiveness among its members[1], have evolved to become complex markets that influence the development of economies. In this context, FDI is a key element that helps establish stable and lasting links between countries, fostering relations with multilateral benefits.

In general, FDI promotes the transfer of technological innovations that optimize the production and competitiveness of transnational companies (Borensztein *et al*., 1998; Meltem, 2014). The term FDI refers to business capital that seeks to establish itself locally in other countries and is distinguished from financial investment because it serves as a lever for external financing for companies and industries that seek long-term benefits (Dussel, 2000; Bouchet *et al*., 2003).

Despite the multiple benefits, each company may be motivated by different characteristics of the host country. In Mexico, the variables that promote efficiency have been especially relevant in recent years (Dussel, 2000; Rivas and Puebla, 2016; Elizalde *et al*., 2020). According to Rivas and Puebla (2016), efficiency is one of the most important factors because it is related to the country's internal and external productivity and competitiveness.

Among the macroeconomic and microeconomic variables related to the search for efficiency, trade openness, tax levels, the price and quality of labor, technological levels, interest rates, inflation, wage rates, oil prices, among others, stand out. Several authors have incorporated this type of variables to explain FDI in Mexico. Jordaan (2005), using a linear production function, derived from a Cobb-Douglas production function, analyzes FDI and its relationship with external factors in the Mexican manufacturing industry in 1993. His results show that the technological difference encourages trade openness and the competitive benefits it represents. On the other hand, through an analytical VAR model and a VEC (Vector Error Correction) model, Gomes *et al*. (2013) studied FDI flows in Mexico and Brazil (1990-2010). The results indicate that trade openness, coupled with an autoregressive factor, is the variable with the greatest influence on FDI flows; therefore, it is concluded that the capital invested in Mexico is mainly encouraged by policies that promote trade.

Botello and Dávila (2016) used a Probit Model to explain FDI in Mexico and Chile (2000-2013). According to the authors, the flow of FDI in Mexico is mainly encouraged by skilled labor, cheap labor, natural resources, and fiscal incentives. Likewise, Rivas and Puebla (2016), carried out an empirical analysis of sectoral panel data to learn about the dynamics of FDI in Mexico (2000-2012). The results of the analysis reveal that FDI seeks efficiency in production, and that they are mainly explained by economic growth, labor productivity and international competitiveness. Elizalde *et al*. (2020) presents an investigation on the macroeconomic determinants of FDI in Mexico (2000-2016). Although they include variables of various criteria, the results of the VAR model indicate that FDI in Mexico is explained by the price of oil and the level of foreign debt, together with an autoregressive factor.

Using an econometric panel data model, Tinoco and Guzmán (2020) point out that the regional variables that determine FDI inflows in Mexico (2000-2018) are labor costs, in total number of companies, regional Gross Domestic Product (GDP) and an autoregressive element of the same investment. Finally,

---

[1] Countries, multinational corporations, markets, etc. Are understood as members.

Vega and Armijo (2021) emphasize the importance of foreign trade agreements to boost investment and thus the economy in general. According to the authors, the recently ratified trade agreement between Mexico, the United States and Canada (T-MEC) is favorable for Mexico, however there are measures for the automotive industry[2] that will harm internal competitiveness in that sector, thus limiting the export potential. and projecting a decrease in FDI in Mexico by July 2025, five years after its entry into force.

Although these studies incorporate variables related to efficiency to explain investment, no research focuses on analyzing the efficiency variables that stimulate the flow of FDI in Mexico. It is important to deepen the analysis of the variables that promote efficiency because they are related to productivity, competitiveness and distribution networks that the capital invested in Mexico needs.

The main objective of this research is to evaluate the influence of efficiency variables on FDI flows in Mexico in the period 1995-2020. And generate conclusions oriented to the search for actions to attract greater external financing and take advantage of the commercial relations of this country.

Based on preliminary studies, this study posits that macroeconomic efficiency variables, as well as an autoregressive component of FDI itself, determined FDI flows in Mexico for the period 1995-2020. This hypothesis is tested through a VAR model, after applying the Hodrick and Prescott filter for the decomposition of the variables. In the first section, the role played by the efficiency factor in FDI is explained, in the second section the methodology used is described, followed by section three, where the results are disclosed and a discussion is carried out; finally, the fourth section presents the main conclusions.

I.   THE EFFICIENCY FACTOR IN FDI

The Economic Commission for Latin America, ECLAC classifies FDI according to the specific purposes that these investments pursue. Multiple investigations[3] classify FDI according to criteria such as the search for resources, search for markets, search for efficiency, search for strategic assets and the risk factor.

FDI directed to Mexico, mainly for manufacturing, is in search of regional and global efficiency because it seeks to optimize productivity and form distribution networks that allow lower tariff rates, lower production and distribution costs (Dussel, 2000).

According to García and López (2020), the subsidiaries of multinational corporations that seek to establish themselves in developing countries such as Mexico have advantages over their local competitors because they have more advanced production technologies, labor practices, and marketing processes, which is why they generally have a higher productivity and are better able to bring new products to market. Likewise, they have a geographical diversity in their activities that allows them to have operations and assets in different countries, they can obtain supplies or capital goods from abroad and it is assumed that they have greater access to foreign markets to distribute their products. production. The subsidiaries of multinational corporations focus on efficient productivity and have a greater propensity to import and export than local firms, so they will be looking for markets that allow them to develop in these aspects (García and López, 2020).

In this regard, Alguacil *et al.*, (2002) state that in Mexico there is a link between FDI, economic growth and foreign trade. FDI acts as a force that influences economic growth because it stimulates domestic production, which maintains a positive causal relationship with exports. In other words, economic growth in Mexico and its foreign trade are driven by the export orientation of foreign companies that decide to invest in national territory.

---

[2] Measures such as increased wages in production, mandatory rules of origin, limitations on the amount of imports from Mexico, and the mandatory use of steel from North America in automotive production (Vega and Armijo, 2021).
[3] Among those that stand out: Dussel (2000); Jadhav (2012); Ariel *et al*., (2013); Tang *et al*., (2014); Meltem (2014); Chiatchoua and Sibe (2015); Botello and Dávila (2016); Elizalde *et al*., (2020).

In this sense, the efficiency factor is related precisely to those variables that promote productivity and internal and external competitiveness in investments (Rivas and Puebla, 2016). The formation of distribution networks, low tax rates, training and productivity of human capital, labor and production costs, the degree of commercial openness and international agreements that favor the circulation of goods and people are key in the search for efficiency (Dussel, 2000; Garcia and Lopez, 2020). Therefore, within the macroeconomic variables that promote investment efficiency is the GDP, trade openness, tax rates, interest rates, prices of natural inputs, inflation, costs of cheap and specialized labor, external indebtedness, population growth rate, among others.

GDP is one of the most used variables in empirical studies that seek to explain FDI. In most investigations, this variable is related to the dimensions of the available market; however, Mogrovejo (2005), Jadhav (2012), Tang *et al.*, (2014) and Iamsiraroj (2016) agree that GDP is an indicator of financial development of the host country. In this research, GDP is considered as a variable that promotes efficiency because, according to these authors, a larger financial market represents a greater opportunity for development and profitability. On the other hand, trade openness is represented by the share of foreign trade in GDP; that is, the trade openness index (Bhavan *et al.*, 2011; Jadhav, 2012) and has a positive relationship with FDI flows (Jadhav, 2012; Gomes *et al.*, 2013 and Rivas and Puebla, 2016). In this regard, Rivas and Puebla (2016) state that when exports increase, FDI does too, although to a lesser extent. According to the authors, high levels of exports are related to more competitive and attractive production sectors for new investment capital, while protectionism represents higher transaction costs associated with production costs (Jadhav, 2012). Trade openness also favors the import of capital goods and advanced technologies, which is why it is related to efficiency (Gomes *et al.*, 2013; García and López, 2020).

Among the economic variables that impact the efficiency of invested capital are corporate taxes, these taxes are closely related to the generation of company income; higher tax rates paid by investors affect the profits generated (Meltem, 2014). According to Caballero and López (2012), Meltem (2014) and Tang *et al.*, (2014), taxes maintain an inverse relationship with FDI because they can discourage it, likewise, a low tax rate can improve the competitiveness of the host country. It is important to consider that, in Mexico, those legal entities that are non-residents are obliged to pay taxes when they obtain income from any source of wealth located in Mexican territory (Income Tax and Flat Rate Business Tax). In this regard, Caballero and López (2012) state that in order to stimulate private investment in Mexico, the most appropriate thing is to give investors greater facilities through a controlled Income Tax rate; in México known as ISR.

Another variable to highlight is the interest rate; Schwartz and Torres (2000) mention that the credit channel is the main way of impacting the interest rate because it can affect the capacity for consumption and productive investment. The interest rate is negatively related to FDI through the 28-day TIIE (Meltem, 2014; Varela and Cruz, 2016). An increase in interest rates decreases the demand for credit and with this investment, likewise, if banks consider that investment projects are high risk, they can reduce the credit supply. In this way, the increase in interest rates, coupled with banking uncertainty regarding the quality of investment projects, can lead to a lower availability of credit in the economy (Schwartz and Torres, 2000). In this regard, Varela and Cruz (2016) conclude that multinational corporations not only make capital transfers to invest abroad, but also consider the conditions of the local credit market to make investments in the construction or operation of the plant. Even capital or other goods can be purchased as required by the production process. Given that credit channels can be affected by the evolution of interest rates, their impact on FDI flows is not a minor issue.

Interest rates should make it possible to ease liquidity restrictions, but they should also be a mechanism that avoids serious problems of price instability. To the extent that price stability objectives are met, monetary policy should contribute to achieving more competitive interest rates in the market, so that FDI is favored locally by bank credit channels private (Varela and Cruz, 2016, p. 146).

On the other hand, even though FDI has a direct relationship with the availability of inputs, the price of these maintains an inverse relationship with investment; Oil price increases are related to lower FDI flows. According to Botello and Dávila (2016), low-cost inputs in the host country benefit efficiency by reducing production, transportation, and distribution costs throughout the production chain. A country may be more attractive for investment if, as far as possible, it keeps input costs stable (Jadhav, 2012; Botello and Dávila, 2016).

Likewise, inflation is a determining efficiency variable for FDI because it impacts the purchasing power of consumers, which is related to the demand for goods; inflation maintains an inverse relationship with FDI in the short term (Bittencourt and Domingo, 2002; Bouchet *et al.*, 2003; Mogrovejo, 2005; Madura, 2010). However, a country with low and stable inflationary increases can be attractive, since it reflects macroeconomic stability and the capacity of its government to face expenses and debts in the long term (Cantor and Parcker, 1996; Bittencourt and Domingo, 2002).

On the other hand, even though studies such as Gomes *et al.*, (2013) and Elizalde *et al.*, (2020) catalog cheap labor and skilled labor within the criterion of variables in search of availability of resources, in the present investigation they are considered as variables that promote efficiency, since they are related to the productivity of companies. The resource endowment and trade theory explain that FDI is directed towards countries with low wages and natural resources that provide comparative advantages that contribute to business productivity (Botello and Dávila, 2016). On the other hand, skilled labor can reduce investment uncertainty because it can be seen as an indication of favorable conditions and development in the host country. In areas where there are more skills, there is greater organization, innovation and progress; specialized FDI requires specialized labor for higher productivity (Botello and Dávila, 2016). There is evidence that this variable is important for FDI flows to Mexico[4]. In recent decades, foreign companies in Mexico have required specialized labor to guarantee labor productivity to achieve productive efficiency and international competitiveness (Rivas and Puebla, 2016).

Finally, it is important to mention that external over-indebtedness is a component of government interference that could affect the profitability or stability of invested capital (Morales and Tuesta, 1998; Dans, 2012). The debt overhang could affect FDI flows in two ways. First, seen as a problem of insolvency in the payment of the debt and classified as an economic risk factor, an increase in over-indebtedness increases the probability of default on financial obligations, which can lead to uncertainty in the future performance of the economy. (Feenstra and Taylor, 2014; Topal and Gül, 2016). Second, seen as a structural problem in which the government aims to meet financial obligations, the profitability of FDI is reduced by the imposition of future taxes, what Krugman (1988) calls the investment tax; this last problem is classified under the criterion of efficiency. In any case, as the debt/GDP ratio increases, the risk of insolvency in the country will be greater (Morales and Tuesta, 1998).

II. DATA AND ESTIMATION PROCEDURE

In this research, quarterly time series were used from January 1995 to March 2020. FDI was converted to national currency with the FIX exchange rate[5] (Banxico, 2020), and the values were deflated through of the National Consumer Price Index (INPC) base 2018 (INEGI, 2020). The variable GDP is data in millions of pesos (Banxico, 2020); the variable Trade openness (CO) is the share of foreign trade with respect to GDP, that is, CO = (X + M) / GDP where X represents total exports, and M is total imports (Gomes *et al.*, 2013) (Banxico, 2020). The ITR variable is the Income Tax Rate collection with respect to GDP, that is, ITR =

---

[4] According to Dussel (2000), Cuevas *et al.*, (2005), Mendoza (2011), Botello and Dávila (2016) and Rivas and Puebla, 2016), specialized labor has been a fundamental factor in attracting FDI to this country.

[5] According to Banxico (2020), this exchange rate is used to settle obligations in foreign currency.

TIT / GDP * 100 where TIT represents the Total Income Tax for the period (Caballero and López, 2012) (SHCP, 2020). The OP variable refers to the price of the Mexican oil mix per barrel in dollars (BANXICO, 2021), while INF is the inflation, represented by the National Consumer Price Index with the second half of 2018 as the base (BANXICO, 2021). The IR variable is explained with the reference interest rate in México (28-day TIIE) (Varela and Cruz, 2016) (Banxico, 2021). Finally, it is important to mention that the statistical package used for modeling was SAS version 9.4 (SAS Institute, Inc. 2002-2012).

VAR Model

In the first instance, it seeks to meet the condition of stationarity[6] in each variable. Stationary variables, also known as non-integrated variables, are characterized by not having a unit root, this implies that their mean and variance are constant and the covariance between two periods will depend exclusively on the distance between them, which allows predicting with greater ease their behavior (Gujarati and Porter, 2010).

In order to obtain stationary series, the methodology of Hodrick and Prescott (1997)[7] is used to decompose each variable. It is important to mention that this type of filter allows an original series to be decomposed and a new series to be obtained, the magnitude of which is free from any specific effect that hinders the correct interpretation of its values. Subsequently, unit root tests are applied to the variables without trend to confirm whether they comply with stationarity (Quintana and M., 2016).

With the stationary variables, the VAR methodology is implemented. This methodology was developed by Christopher Sims at the beginning of the eighties, who states that in economic theory and mainly in macroeconomics there is not enough knowledge to strictly classify endogenous and exogenous variables. That is, the original intention was to estimate an analytical tool made up of a "dynamic system of variables without using theoretical perspectives" (Sims, 1980, Gujarati and Porter, 2010 and Quintana *et al.*, 2016).

It is a simultaneous equations model formed by a reduced unrestricted system of equations, whose purpose is to characterize the interactions between a group of variables and identify the effects of any variable on another in the model. The variables can be correlated contemporaneously but not through different periods, in addition, none of the coefficients is assumed to be zero a priori and the specification is unrestricted in that all the variables have the same number of lags "p" (order of the VAR model) (Gujarati and Porter, 2010 and Quintana *et al.*, 2016).

It should be noted that in these models the degrees of freedom are restricted, so twenty combinations of three efficiency variables were made to explain the investment. Equation 1 represents the linear relationship between FDI and the first combination of variables (GDP, CO and ITR). It is important to mention that all the variables are represented at time "t" and the sign represents the expected relationship:

$$lnFDI = c + \alpha_1 * lnGDP_t + \alpha_2 * lnCO_t - \alpha_3 * lnITR_t + \alpha_4 * \varepsilon_t \qquad (1)$$

Where the terms α´s represent the coefficients of the variables (GDP CO ITR), "c" symbolizes the intercept and ε is an error term at time "t". It is worth mentioning that this equation represents only the long-term equilibrium relationship between the variables.

---

[6] Estimates with non-stationary variables are spurious unless they are cointegrated. That is, if the residuals are stationary, the estimates of non-stationary variables are not only not spurious, but they are consistent and there is a long-term equilibrium relationship between them (Montero, 2013).

[7] According to authors such as Pedregal and Young (2001), the Hodrick and Presscot filter can be superior to alternative methods if it is used appropriately.

On the other hand, the general formulation of the VAR model with the first combination of explanatory variables is defined as follows:

$$\begin{bmatrix} FDI \\ GDP \\ CO \\ ITR \end{bmatrix}_t = \begin{bmatrix} \propto_{FDI} \\ \propto_{GDP} \\ \propto_{CO} \\ \propto_{ITR} \end{bmatrix}_t + \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} & \beta_{14} \\ \beta_{21} & \beta_{22} & \beta_{23} & \beta_{24} \\ \beta_{31} & \beta_{32} & \beta_{33} & \beta_{34} \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} \end{bmatrix}_t \begin{bmatrix} \propto_{FDI} \\ \propto_{GDP} \\ \propto_{CO} \\ \propto_{ITR} \end{bmatrix}_{t-1} + \cdots + \begin{bmatrix} \beta_{11} & \beta_{12} & \beta_{13} & \beta_{14} \\ \beta_{21} & \beta_{22} & \beta_{23} & \beta_{24} \\ \beta_{31} & \beta_{32} & \beta_{33} & \beta_{34} \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} \end{bmatrix}_p \begin{bmatrix} \propto_{FDI} \\ \propto_{GDP} \\ \propto_{CO} \\ \propto_{ITR} \end{bmatrix}_{t-p}$$

$$+ \begin{bmatrix} \varepsilon_{FDI} \\ \varepsilon_{GDP} \\ \varepsilon_{CO} \\ \varepsilon_{ITR} \end{bmatrix}_t$$

$$t = 1, \ldots, T$$

Where on the left side we have the vector (4x1) made up of the variables of the system of equations in period t. On the right side is the vector of constant terms α of (4x1), to which is added the matrix of autoregressive coefficients β of (4x11) multiplied by that of lagged variables from t-1 to t-p of (4x1). Finally, the vector of errors ε (innovations or impulses) in period t.

The order of the VAR model is defined according to the Akaike Information Criterion (AIC). Once the order of the model has been defined, the causality of the variables is verified through the Engle-Granger causality test. It is important to carry out this test because in regression analysis the dependence of one variable on others does not necessarily indicate the existence of causality.

Subsequently, statistically significant variables and lags are located in the FDI equation through their calculated t-statistic. Continuing with the example of the first combination of explanatory variables, the independent FDI equation is theoretically expressed as follows:

$$[FDI]_t = [\propto_{FDI}]_t + [\beta_1 \quad \beta_2 \quad \beta_3 \quad \beta_4]_1 \begin{bmatrix} FDI \\ GDP \\ CO \\ ITR \end{bmatrix}_{t-1} + \cdots + [\beta_1 \quad \beta_2 \quad \beta_3 \quad \beta_4]_P \begin{bmatrix} FDI \\ GDP \\ CO \\ ITR \end{bmatrix}_{t-p} + [\varepsilon_{FDI}]_t$$

FDI at time "t" is explained by its constant term α, to which is added the matrix of autoregressive coefficients β of (1x4) multiplied by that of lagged variables from t-1 to tp of (4x1) plus the error term ε (innovation or impulse) in period t.

In the last stage, the model that best adjusts to FDI is identified through the AIC criterion and the absolute mean percentage error (MAPE), the latter is a percentage statistical indicator that allows measuring the accuracy of the model prediction. Likewise, by way of diagnosis, a simple regression of the predicted data is carried out against the observed data, the resulting adjusted R-squared also allows the accuracy of the prediction to be measured. Finally, in order to identify the average impact of each variable in monetary terms, simulations are carried out in the Excel program.

III.   RESULTS AND DISCUSSION

Using the Hodrick and Prescott (1997) methodology, each variable is broken down and the trend component is subtracted. Next, the results of the decomposition models are presented (Table 1) and the graphs represent the trend, irregular and cyclical components of the variables.

Table 1
Descomposición models

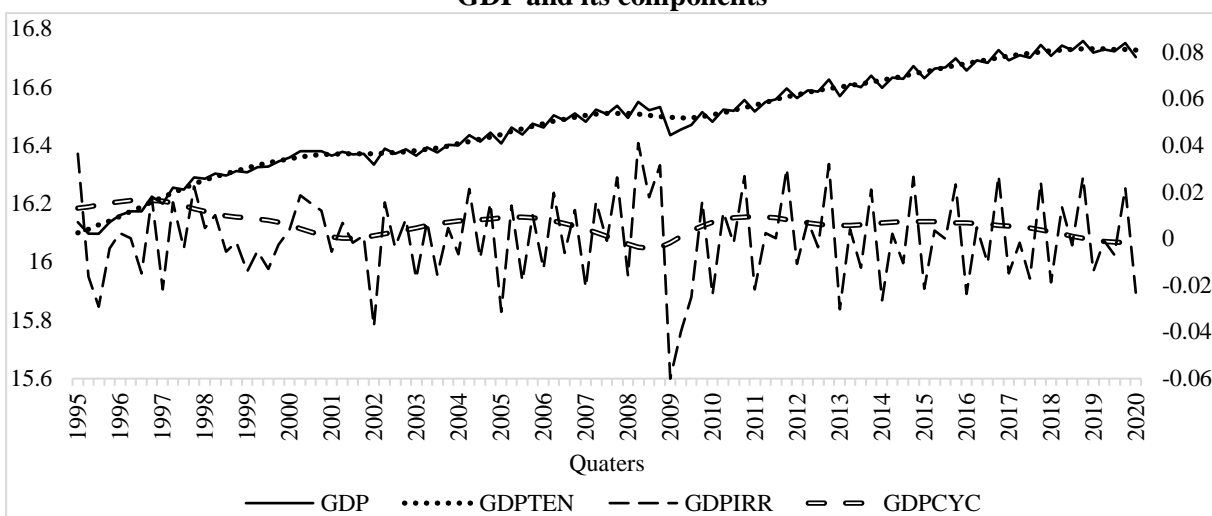| Variable	AIC	Ajusted-R^2
FDI	120.80	0.63016
GDP	-435.80	0.97293
CO	-284.90	0.99088
ITR	-90.09	0.95257
OP	-34.32	0.9122
INF	-560.80	0.9984
IR	-100.50	0.9545

Source: Author's elaboration

Figure 1
FDI and its components.
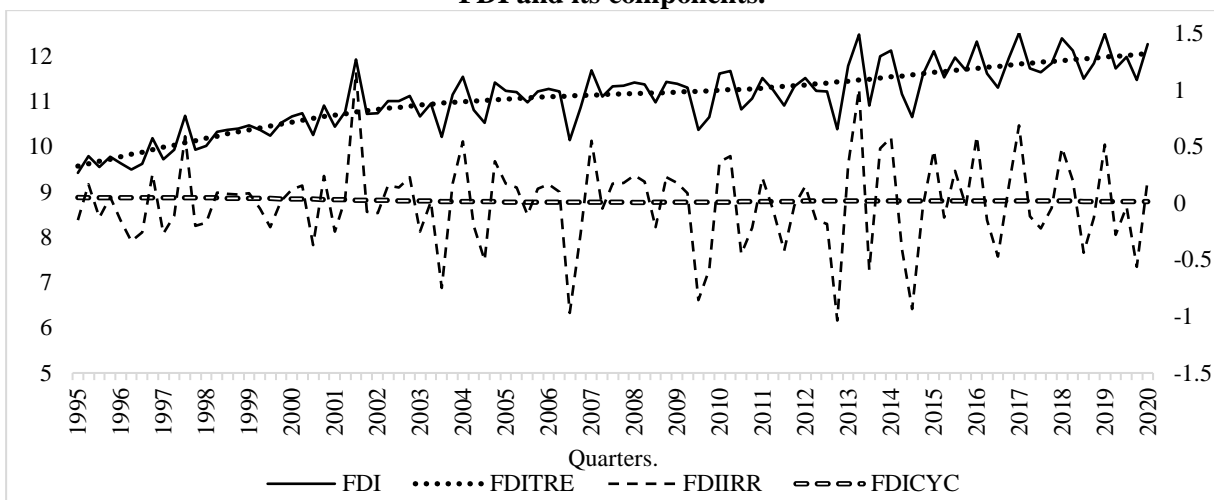
Note: FDI (Foreign Direct Investment), FDITRE (Trend), FDIIRR (Irregular), FDICYC (Cyclical).
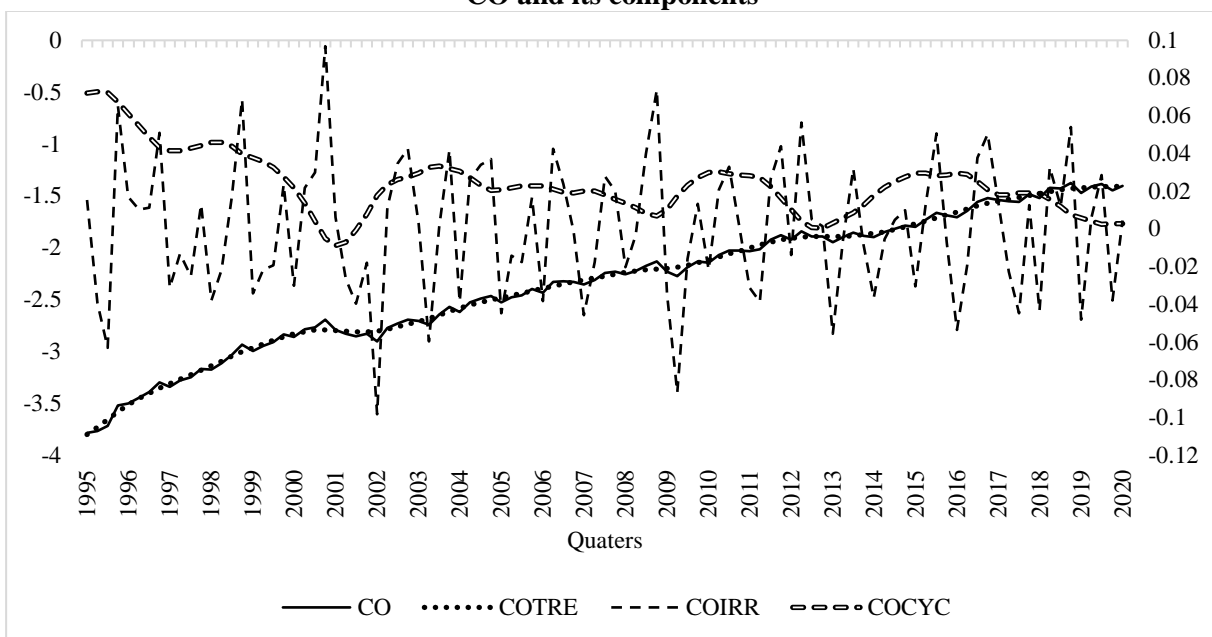Source: Author's elaboration

Figure 2
GDP and its components

Note: GDP (Gross Domestic Product), GDPTRE (Trend), GDPIRR (Irregular), GDPCYC (Cyclical).
Source: Author's elaboration

Figure 3
CO and its components

Note: CO (Trade openness), COTRE (Trend), COIRR (Irregular), COCYC (Cyclical).
Source: Author's elaboration

Figure 4
ITR and its components
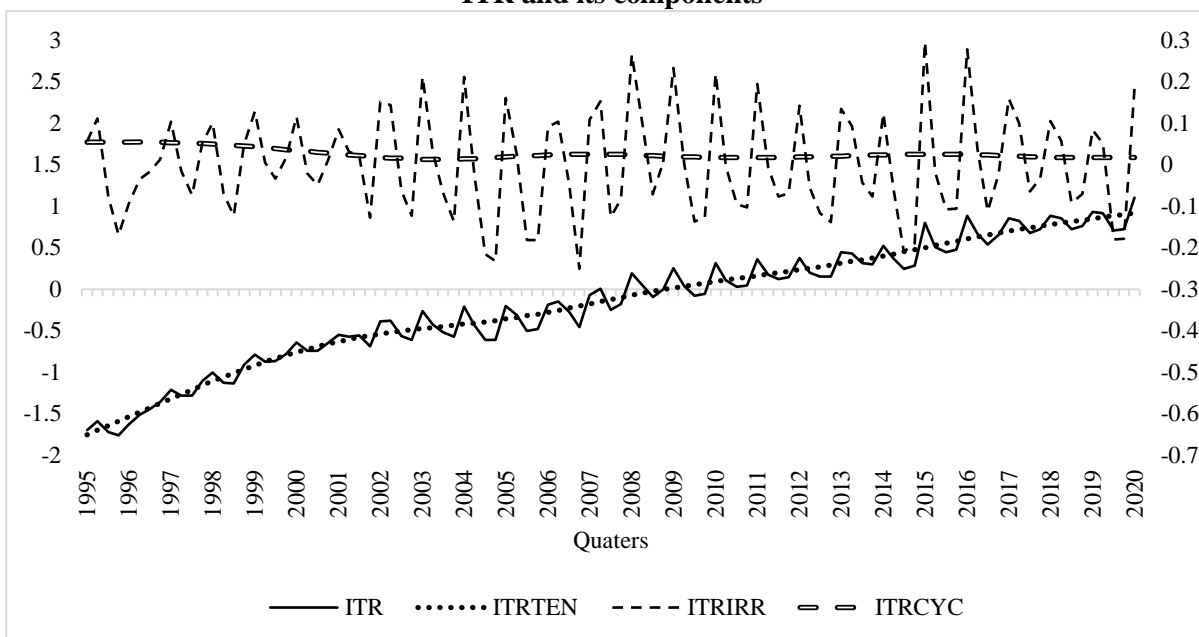
Note: ITR (Income Tax Rate), ITRTRE (Trend), ITRIRR (Irregular), ITRCYC (Cyclical).
Source: Author's elaboration

Figure 5
OP and its components

Note: OP (Price of the Mexican oil mix), OPTRE (Trend), OPIRR (Irregular), OPCYC (Cyclical).
Source: Author's elaboration

Figure 6
INF and its components.

Note: INF (Inflation), INFTRE (Trend), INFIRR (Irregular), INFCYC (Cyclical).
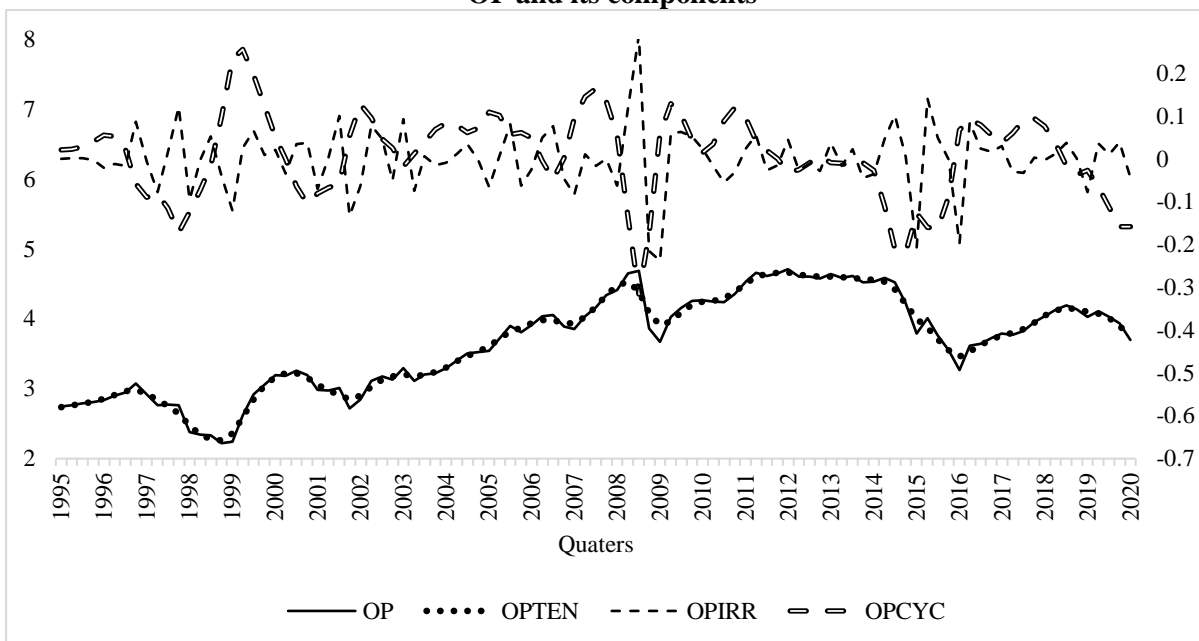Source: Author's elaboration

Figure 7
IR and its components

Note: IR (Interest rate), IRTRE (Trend), IRIRR (Irregular), IRCYC (Cyclical).
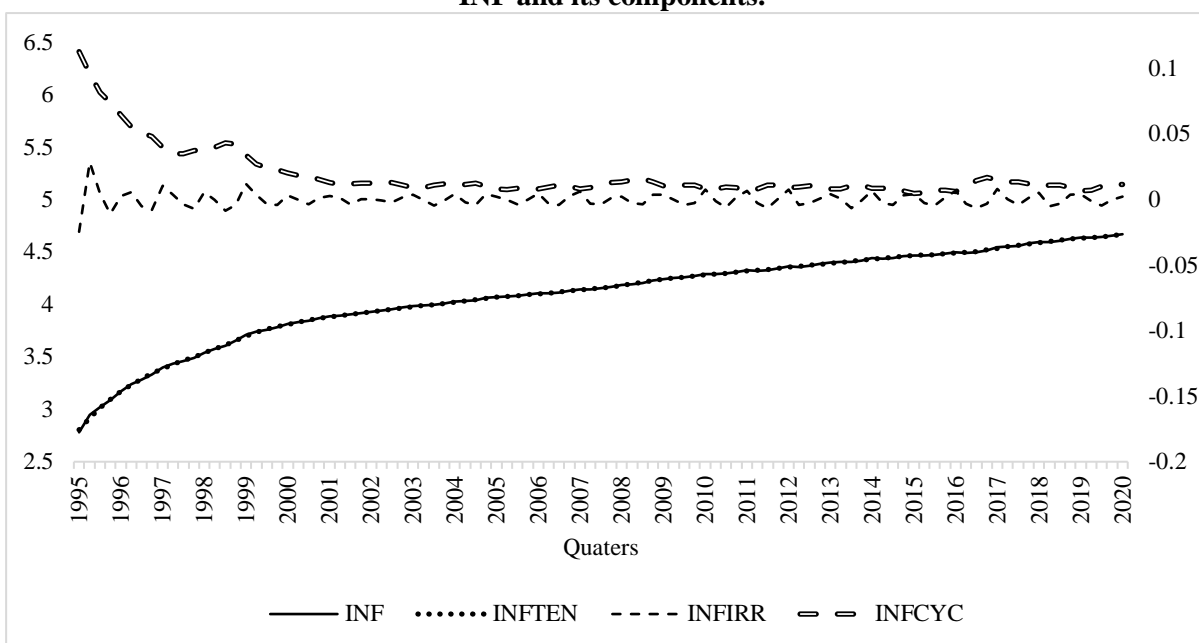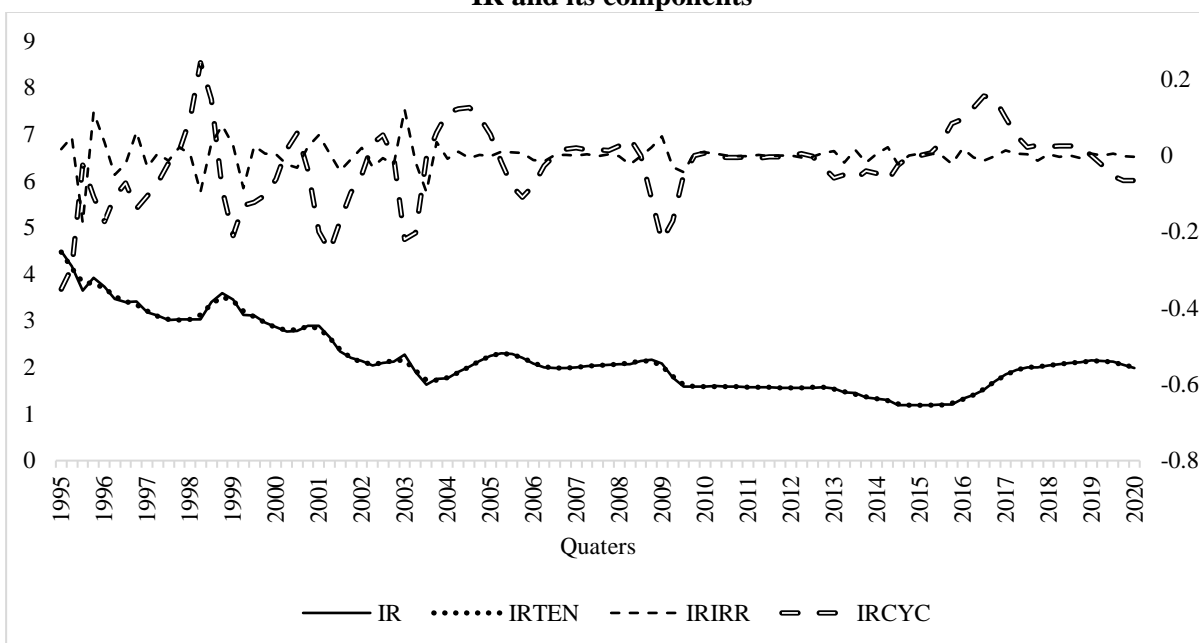Source: Author's elaboration

Subsequently, through the Augmented Dickey Fuller and Phillips Perron unit root tests, it is verified whether the variables without trend (FDI2, GDP2, CO2, ITR2, OP2, INF2 and IR2) present a stationary behavior (Table 2).

Table 2
Unit root tests

Variable	DFA	PP
	Prob<F in tiers	Prob<T in tiers
FDI2	< 0.0001	< 0.0001
GDP2	< 0.0001	< 0.0001
CO2	< 0.0001	< 0.0001
ITR2	< 0.0001	< 0.0001
OP2	< 0.0001	< 0.0001
INF2	< 0.0001	< 0.0001
IR2	< 0.0001	< 0.0001

Ho: Exist unit root.
Source: Author's elaboration

The results indicate that at a significance level of 5%, the existence of a unit root is rejected for all variables; therefore they are integrated variables of order zero I(0).

According to the statistical evidence, the VAR model made up of the variables FDI2, CO2, ITR2 and IR2 is the one that best fits. The AIC information criterion of the lag exclusion test indicates that the optimal lag is six (Table 3).

Table 3
Lag exclusion test

VAR	AICC	HQC	AIC	SBC	FPEC
1	-20.2006	-20.0452	-20.2139	-19.7971	1.66E-09
2	-20.866	-20.5834	-20.9228	-20.084	8.20E-10
3	-21.2784	-20.903	-21.4151	-20.149	5.03E-10

4	-21.6505*	-21.2243	-21.9112	-20.2124*	3.09E-10
5	-21.6194	-21.1942	-22.058	-19.921	2.70E-10
*6	-21.6355	-21.2759*	-22.3187*	-19.7379	2.12E-10
7	-21.2194	-21.0064	-22.2304	-19.2001	2.39E-10

*Optimal lag according to each criterion
Source: Author's elaboration

After establishing the optimal number of VAR lags, the Engle Granger causality test is performed. As can be seen in Table 4, test 1 indicates that the variables CO2, ITR2 and IR2 cause FDI2 in the Granger sense to a significance level of 5% in lag six.

Table 4
Engle Granger causality test

Test	Lags	Tipe	Estadistic	Pr > ChiSq	Contrast
Test 1	6	Wald	57.67	<.0001	CO2, ITR2, IR2 ⟶ FDI2
Test 2	6	Wald	54.14	<.0001	FDI2, ITR2, IR2 ⟶ CO2
Test 3	6	Wald	33.48	0.0146	CO2, FDI2, IR2 ⟶ ITR2
Test 4	6	Wald	73.65	<.0001	CO2, ITR2, FDI2 ⟶ IR2

Source: Author's elaboration

The results of the VAR (6) model indicate an adjusted R squared of 0.3616 and an AIC of -22.3187. Next, the parameters of the VAR (6) for the FDI2 variable are presented (Table 5).

Table 5
FDI2 VAR (6) Parameters

Parameter	Estimate	Standard Error	t Value	Pr > |t|	Variable
AR1_1_1	-0.2543	0.10875	-2.34	0.0222	FDI2(t-1)
AR1_1_2	-0.88542	1.35986	-0.65	0.5171	CO2(t-1)
AR1_1_3	1.16027	0.56279	2.06	0.0429	ITR2(t-1)
AR1_1_4	-0.64289	1.93209	-0.33	0.7403	IR2(t-1)
AR2_1_1	-0.37262	0.10879	-3.43	0.001	FDI2(t-2)
AR2_1_2	-0.08674	1.37204	-0.06	0.9498	CO2(t-2)

AR2_1_3	1.01401	0.53896	1.88	0.064	ITR2(t-2)
AR2_1_4	-4.15316	2.32461	-1.79	0.0783	IR2(t-2)
AR3_1_1	0.00044	0.12112	0	0.9971	FDI2(t-3)
AR3_1_2	1.36061	1.36425	1	0.322	CO2(t-3)
AR3_1_3	-0.01399	0.45044	-0.03	0.9753	ITR2(t-3)
AR3_1_4	-4.96693	2.78557	-1.78	0.0788	IR2(t-3)
AR4_1_1	-0.09248	0.12332	-0.75	0.4558	FDI2(t-4)
AR4_1_2	-1.8241	1.39289	-1.31	0.1946	CO2(t-4)
AR4_1_3	0.16145	0.44615	0.36	0.7185	ITR2(t-4)
AR4_1_4	-5.83239	2.6409	-2.21	0.0304	IR2(t-4)
AR5_1_1	0.00858	0.11694	0.07	0.9417	FDI2(t-5)
AR5_1_2	2.02062	1.52015	1.33	0.188	CO2(t-5)
AR5_1_3	-0.88334	0.51738	-1.71	0.0921	ITR2(t-5)
AR5_1_4	-8.27618	2.26286	-3.66	0.0005	IR2(t-5)
AR6_1_1	-0.02123	0.11697	-0.18	0.8565	FDI2(t-6)
AR6_1_2	5.65457	1.60056	3.53	0.0007	CO2(t-6)
AR6_1_3	-1.10097	0.52654	-2.09	0.0401	ITR2(t-6)
AR6_1_4	-5.27623	1.72396	-3.06	0.0031	IR2(t-6)

Source: Author's elaboration

As can be seen in Table 5, most of the parameters are not statistically significant for the FDI2 variable, therefore, the model is improved by discarding the non-significant parameters through the t-test with a significance level of 10%. (Table 6). As a result, a model for FDI2 with a best adjusted R squared of 0.4142 is obtained:

$$FDI2 = -0.23791 FDI2_{t-1} - 0.34848 FDI2_{t-2} - 1.73006 CO2_{t-4} +$$

$$2.214266 CO2_{t-5} + 5.131248 CO2_{t-6} + 1.167704 ITR2_{t-1} + 0.942447 ITR2_{t-2} -$$

$$0.24974 ITR2_{t-3} - 0.78221 ITR2_{t-5} - 1.17413 ITR2_{t-6} - 3.17106 IR2_{t-2} -$$

$$3.47677 IR2_{t-3} - 5.15277 IR2_{t-4} - 7.76068 IR2_{t-5} - 4.78638 IR2_{t-6}$$

$$(2)$$

Table 6
Fitted model parameters FDI2

| Parameter	Estimate	Approx Std Err	t Value	Approx Pr > |t|
A1	-0.23791	0.0886	-2.68	0.0088
A3	1.167704	0.4711	2.48	0.0153
A5	-0.34848	0.0878	-3.97	0.0002
A7	0.942447	0.4393	2.15	0.0349
A8	-3.17106	1.4519	-2.18	0.0319
A11	-0.24974	0.3288	-0.76	0.4497
A12	-3.47677	1.6257	-2.14	0.0355
A14	-1.73006	0.9979	-1.73	0.0868
A16	-5.15277	1.8803	-2.74	0.0076
A18	2.214266	1.1889	1.86	0.0662
A19	-0.78221	0.4076	-1.92	0.0585
A20	-7.76068	1.7931	-4.33	<.0001
A22	5.131248	1.2007	4.27	<.0001
A23	-1.17413	0.4020	-2.92	0.0045
A24	-4.78638	1.3919	-3.44	0.0009

Source: Author's elaboration

Subsequently, the estimated values of FDI2 are printed and the trend is added to obtain the estimated FDI (FDIf). Figure 8 shows the observed FDI and estimated (FDIf).

Figure 8
FDI-FDIf
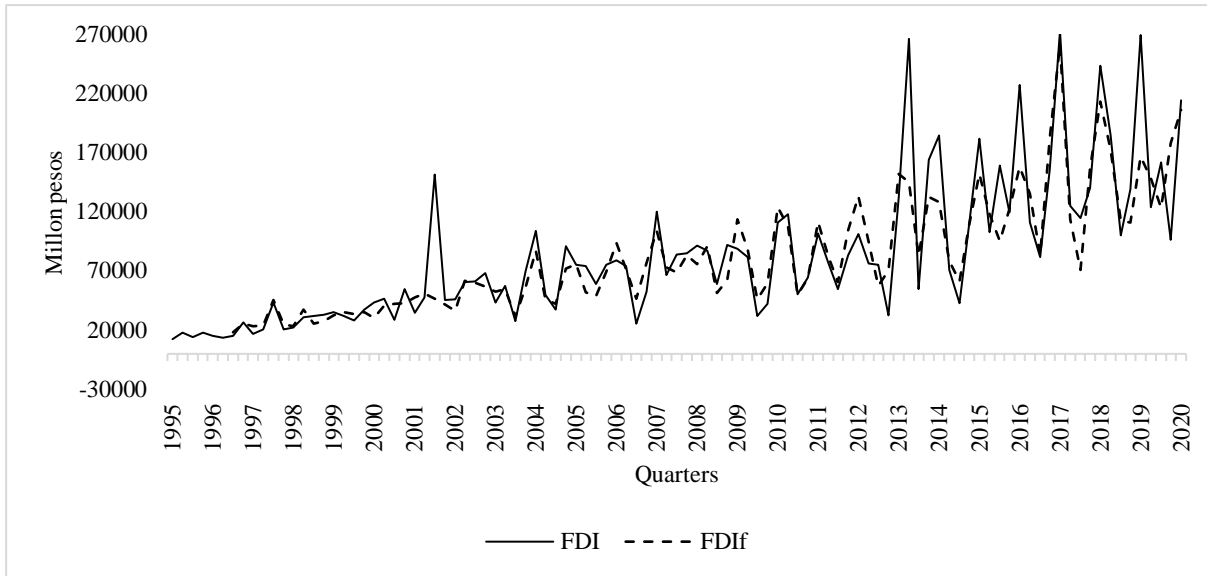
Source: Author's elaboration

According to this adjusted model (Equation 2), the FDI2 in time "t" is inversely related to its previous first and second quarters; likewise, there is an inverse relationship with the lagged fourth quarter of Co2, but positive with the fifth and sixth quarters. On the other hand, the model suggests that there is a positive relationship with the first two lagged quarters of ITR2, but an inverse relationship with its third, fifth and sixth lags. Finally, an inverse relationship can be observed with the second, third, fourth, fifth and sixth lagged quarters of IR2.

As mentioned above, this VAR methodology is applied for each of the twenty combinations of variables. Table 7 presents the optimal lag of each model according to the AIC criterion, as well as the mean absolute percentage error (MAPE) and the adjusted R-squared of each combination.

Table 7
VAR Models

	Combination	Optimal lag	AIC	MAPE	Adj-R^2
1	FDI2, GDP2, CO2, ITR2	6	-23.1724	22.9759	0.3646
2	FDI2, GDP2, CO2, OP2	6	-24.3279	22.4921	0.3834
3	FDI2, GDP2, CO2, INF2	6	-30.5444	23.5534	0.3580
4	FDI2, GDP2 CO2, IR2	6	-25.9696	22.6441	0.3849
5	FDI2, GDP2, ITR2, OP2	6	-22.1526	22.3487	0.3956
6	FDI2, GDP2, ITR2, INF2	6	-28.2819	24.2088	0.3294

7	FDI2, GDP2, ITR2, IR2	6	-23.8619	24.9859	0.3040
8	FDI2, GDP2, OP2, INF2	6	-29.2567	24.8307	0.2348
9	FDI2, GDP2, OP2, IR2	6	-24.7623	24.7801	0.2208
10	FDI2, GDP2, INF2, IR2	6	-310425	24.0869	0.2411
11	FDI2, CO2, ITR2, OP2	6	-19.9174	22.0884	0.3970
12	FDI2, CO2, ITR2, INF2	6	-26.5629	23.8529	0.3342
*13	FDI2, CO2, ITR2, IR2	6	-22.3187	20.5978	0.4142
14	FDI2, CO2, OP2, INF2	6	-27.2160	25.8303	0.2258
15	FDI2, CO2, OP2, IR2	6	-22.0039	21.1440	0.4138
16	FDI2, CO2, INF2, IR2	6	-29.3587	25.0514	0.2370
17	FDI2, ITR2, OP2, INF2	6	-25.1388	23.2788	0.3455
18	FDI2, ITR2, OP2, IR2	6	-20.5827	23.3388	0.3702
19	FDI2, ITR2, INF2, IR2	6	-27.3035	25.1417	0.2546
20	FDI2, OP2, INF2, IR2	6	-27.6072	25.5597	0.2317

*Best combination
Source: Author's elaboration

It is important to mention that the selected model presented a MAPE of 20.6%, this indicates that it predicts the behavior of FDI by 79.4%. Likewise, as a diagnosis, a regression is performed between FDI and the predicted values (FDIf), the result of which is an adjusted R-squared of 0.7714.

To capture the impact of efficiency variables on FDI, simulations are carried out in the period 1995-2020. The results indicate that a 10% increase in the lagging quarters of FDI2 generates an average decrease of 2.87% in FDI, which represents a drop of 2,473.8 million pesos. On the other hand, a 10% increase in the lagging quarters of CO2 generates an average increase 0.47% in FDI, which represents an increase of 347.7 million pesos. Likewise, a 10% increase in the lagging quarters of ITR2 generates an average decrease of 0.09% in FDI, which represents a drop of 3.0 million pesos. Finally, a 10% increase in the lagging quarters of IR2 generates an average decrease of 3.80% in FDI, which represents a drop of 2,229.8 million pesos. This relationship between variables reveals the sensitivity of FDI in Mexico to changes in efficiency variables.

IV. ANALYSIS AND DISCUSSION

According to the results, the interest rate is the efficiency variable with the greatest impact on external productive investment; there is a significant inverse relationship in the period 1995-2020. However, it is important to take into account that, in recent years, the central objective of monetary policy has been

inflationary stability, on many occasions, at the expense of less competitive interest rates in the market[8]. In this regard, León and De la Rosa (2005) agree that monetary policy has managed to control prices in the markets but has not been aimed at favoring private investment locally through bank credit channels. The interest rate impacts credit availability and with it the consumption capacity of the market and investment; therefore, to the extent that inflationary stability allows it, a monetary policy aimed at achieving competitive interest rates would allow greater access to credit, which would benefit consumption and would be an alternative for investors seeking internal financing for construction. acquisition of inputs, and any other activity related to production processes.

The second variable with the greatest impact is the lagged values of FDI itself. It is worth mentioning that this result coincides with other research[9], and indicates that FDI evolves based on its past dynamics due to an adaptive expectation in the short term, or what can be called the reinforcement effect of past flows (Tinoco and Guzmán, 2020). In any case, this result suggests that Multinational Companies make their investment or reinvestment decisions in Mexico considering the dynamics of historical investment flows.

Third, trade openness is a determining variable for attracting FDI in Mexico. The significant positive relationship indicates that greater openness stimulates investment, which suggests that the process of commercial opening initiated in the 1990s, the promotion of trade, the reduction of import tariffs and the ratification of international treaties have benefited the flow of investments[10]. Various investigations[11] agree that greater imports favor the flow of capital goods and technologies that improve transaction costs associated with production costs. Likewise, higher exports are related to more attractive productive sectors for foreign capital because access to international markets favors competitiveness. Therefore, a foreign policy aimed not only at ratifying agreements, but also at reaching agreements that promote a beneficial trade opening for Mexico will be essential.

Finally, Income tax rate is the variable with the least influence on FDI; its significant inverse relationship indicates that high taxes discourage investment due to its close relationship with the profitability of companies. The foregoing suggests that Mexico's tax policy in recent years, focused on maintaining relative stability in income taxes, has benefited the flow of investments[12]. Moderate Income Tax rates represent lower costs in the start-up or operation of investment projects. Likewise, research such as Caballero and López (2012) emphasize the importance of good administration of the resources captured by taxation. According to the authors, public spending oriented towards economic reactivation and expansion, resulting from good resource management, allows better economic benefits because private investment will be stimulated by the infrastructure provided by the State, and by the additional demand resulting from government spending. Therefore, a tax policy aimed at attracting investment through moderate Income tax rates and good management of tax revenues could generate certainty in investors and, in turn, would be contributing to sustained and stable growth rates.

---

[8] As of 1995, in an environment of crisis and insertion into international trade with North America, Banxico adopts a rigid monetary policy, whose main objective is inflation control. Policy that continues to this day (Varela and Cruz, 2016).

[9] Among which Gomes *et al.* (2013); Chiatchoua and Sibe (2015); Varela and Cruz (2016); Elizalde *et al.*, (2020); Tinoco and Guzman (2020).

[10] The entry into force of the 1994 North American Free Trade Agreement (NAFTA) and the modifications to the foreign investment law were the main changes that promoted FDI in Mexico at the end of the 20th century (Dussel, 2000 and Cuevas *et al.*, 2005).

[11] Authors such as Jadhav (2012); Gomes *et al.*, (2013); Rivas and Puebla (2016).

[12] The tax burden in Mexico has been one of the lowest in the world and the second lowest in Latin America. Likewise, policies focused on increases in consumption taxes (value added tax, VAT) have been oriented to the detriment of income taxes (ISR), although the latter is the one that contributes the most to total tax collection (Caballero and López, 2012).

CONCLUSIONS

The hypothesis that macroeconomic efficiency variables and an autoregressive component of FDI itself determined FDI flows in Mexico in the period 1995-2020 is confirmed; however, not all the efficiency variables considered at first were statistically significant.

Likewise, this analysis makes it possible to specify that the implementation of measures in monetary policy, foreign trade and tax policy can be alternatives to favor FDI in Mexico. In the first place, if this country seeks to be more attractive for investment, it should consider, to the extent that inflationary stability allows it, a monetary policy aimed at achieving interest rates that allow greater access to credit, which would benefit the consumption capacity. and they would be an alternative for investors seeking internal financing for their production processes. In the second place, a foreign policy aimed not only at ratifying agreements, but also at achieving agreements that promote a beneficial commercial opening for Mexico will be essential. And finally, a tax policy aimed at attracting investment through moderate income tax rates and good management of tax revenues could improve the profitability and productivity of companies.

These policies are focused on promoting efficiency in FDI because they are closely related to productivity, competitiveness, and distribution networks that capital invested in Mexico needs. Additionally, it is important to mention that these measures can generate the environment of certainty that investors are looking for in a health emergency situation such as the one we are facing. Finally, it is recommended to use the approach of this document in future research; analyzing the efficiency variables in the flow of FDI from other economies or regions can help complement or contrast the results and contribute to the empirical evidence.

REFERENCES

Alguacil, M., Cuadros, A. and Orts, V. (2002). Foreign direct Investment, exports and domestic performance in México: a causality analysis. *Economics latters*, Vol. 77, no. 3, pp. 371-376. https://doi.org/10.1016/S0165-1765(02)00150-7

BANXICO (2020). Componentes de Inversión Extranjera directa en México. *Banco de México.* https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=1&accion=consultarCuadro&idCuadro=CE131&locale=es

Bhavan, T., Xu, Ch. and Zhong, C. (2011). Determinants and Growth Effect of FDI in South Asian Economies: Evidence from a Panel Data Analysis. *International Business Research,* Vol. 4, no. 1, pp. 43-50. https://doi.org/10.5539/ibr.v4n1p43

Bittencourt, G. and Domingo, R. (2002). Los determinantes de la IED y el impacto del Mercosur. *Documentos de trabajo, UDELAR*, pp. 1-52. Documentos de Trabajo (working papers) 0402, Department of Economics - dECON

Borensztein, E., De Gregorio, J. and Lee, J-W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics,* Vol. 45 (1), pp. 115-135. https://doi.org/10.1016/S0022-1996(97)00033-0

Botello, J. and Dávila, M. (2016). How to increase FDI flows: A demonstration of the new determinant creation theory for Mexico and Chile. *Journal of Business and Retail Management Research (JBRMR)*, Vol. 11, no. 1, pp. 76-91. https://jbrmr.com/cdn/article_file/i-25_c-245.pdf

Bouchet, M., Clark, E. and Groslambert, B. (2003). *Country Risk Assessment. A Guide to Global Investment Strategy.* Wiley Finance Series, pp. 1- 288.

Cantor, R. and Packer, F. (1996). Determinants and impact of sovereign credit ratings. *FRBNY Economic Policy Review*, Vol. 2 (2), pp. 37-53.

Caballero, E. and López, J. (2012). Gasto Púbico, Impuesto sobre la Renta e inversión privada en México. *Investigación Económica,* Vol. 71, no. 280, pp. 55-84. http://dx.doi.org/10.22201/fe.01851667p.2012.280.37333

Chiatchoua, C. and Sibe, J. (2015). Foreign Direct Investment in Sub-Saharan Africa (SSA): An Opportunity for New Developed Countries (NDC). *Análisis Económico*, Vol. 30, no. 73, pp. 89-109. http://www.analisiseconomico.azc.uam.mx/index.php/rae/article/view/93

Cuevas, A., Messmacher, M. and Warner, A. (2005). Foreign Direct Investment in México since the Approval of NAFTA. *The world bank economic review*, Vol. 19, no. 3, pp. 473–488. https://doi.org/10.1093/wber/lhi015

Dans, R. (2012). *El riesgo país en la inversión extranjera directa: Concepto y modalidades*. Servicio de publicaciones de la Universidad Complutense, pp. 1-21.

Dussel, P. (2000). La inversión Extranjera en México. *Serie Desarrollo Productivo* 80. Santiago de Chile: CEPAL, pp. 1-103.

Elizalde, H., Arana, J. and Martínez, M. (2020). Determinantes macroeconómicos de la inversión extranjera directa en México 2000-2016. *Análisis Económico*, Vol. 35, no. 89, pp. 117- 142. https://doi.org/10.24275/uam/azc/dcsh/ae/2020v35n89/Elizalde

Feenstra, R. and Taylor, A. (2014). *International macroeconomics*. New York: Worth Publishers, pp. 1-516.

García, P. and López, A. (2020). La inversión Extranjera Directa. Definiciones, determinantes, impactos y políticas públicas. NOTA TÉCNICA N o IDB - TN – 1995. Banco Interamericano de Desarrollo-INTAL*,* pp. 1-48. https://publications.iadb.org/publications/spanish/document/La-inversion-extranjera-directa-Definiciones-determinantes-impactos-y-politicas-publicas.pdf

Gil, E., López, S. and Espinosa, D. (2013). Factores Determinantes de la Inversión Extranjera Directa en América del Sur. *Perfil de Coyuntura Económica*, no. 22, pp. 55-85. http://www.redalyc.org/articulo.oa?id=86131758003

Gomes, P., Aparecida, E. and Carvalho, A. (2013). The determinants of foreign direct investment in Brazil and Mexico: an empirical analysis. *Procedia, Economics and Finance*, Vol. 5, pp. 231-240. https://doi.org/10.1016/S2212-5671(13)00029-4

Gujarati, D. and Porter, D. (2010). *Econometría*. Mc Graw Hill, pp. 1-946.

Hodrick, R. and Prescott, E. (1997). Postwar U.S. Business Cycles: An Empirical Investigation. *Journal of Money, Credit and Banking*, Vol. 29, no. 1, pp. 1-16. https://doi.org/10.2307/2953682

Iamsiraroj, S. (2016). The foreign direct investment–economic growth nexus. *International Review of Economics and Finance*, Vol. 42, pp. 116-133. https://doi.org/10.1016/j.iref.2015.10.044

Jadhav, P. (2012). Determinants of foreign direct investment in BRICS economies: Analysis of economic, institutional and political factor. *Procedia - Social and Behavioral Sciences*, Vol. 37, pp. 5-14. https://doi.org/10.1016/j.sbspro.2012.03.270

Jordaan, J. (2005). Determinants of FDI-Induced Externalities: New Empirical Evidence for Mexican Manufacturing Industries. *World Development,* Vol. 33, no. 2, pp. 2103-2118. https://doi.org/10.1016/j.worlddev.2005.07.007

Krugman, P. (1988). Financing vs Forgiving a debt overhang. *NBER Working paper, The National Bureau of Economic Research*, no. 2486, pp. 1-32. https://www.nber.org/papers/w2486.pdf

León, J. and De la Rosa, J. (2005). Política monetaria, cortos y estabilidad macroeconómica. *Análisis Económico,* Vol. 20, no. 43, pp. 291-326. https://www.redalyc.org/articulo.oa?id=41304313

Madura, J. (2010). *Administración Financiera Internacional*. Cengage Learning, pp.1-673.

Meltem, S. (2014). Panel Data Analysis of Foreign Direct Investment and Poverty from the Perspective of Developing Countries. *Procedia - Social and Behavioral Sciences,* Vol. 109, pp. 1101- 1105. https://doi.org/10.1016/j.sbspro.2013.12.594

Mendoza, J. (2011). Impacto de la Inversión Extranjera Directa en el Crecimiento Manufacturero en México. *Revista Problemas del Desarrollo, Latinoamericana de Economía*, Vol. 42, no. 167, pp. 45-69. https://doi.org/10.22201/iiec.20078951e.2011.167.27720

Mogrovejo, J. (2005). Factores determinantes de la Inversión Extranjera Directa en algunos países de Latinoamérica. *Estudios Económicos de Desarrollo Internacional*, Vol. 5, no. 2, pp. 63-90.

Montero, R. (2013). Variables no estacionarias y cointegración. *Documentos de Trabajo en Economía aplicada.* Universidad de Granada, pp. 1-8.

Morales, J. and Tuesta, P. (1998). Calificaciones de crédito y Riesgo-País. *Revista Estudio Económicos*, no. 3, pp. 1-17.

Pedregal, D. and Young, P. (2001). Some comments on the use and abuse of the Hodrick Prescott filter. *Review on Economic Cycles*, Vol. 2, no. 1, pp. 1-20.

Quintana, L. and Mendoza, M. (2016). *Econometría aplicada utilizando R*. DGAPA, Universidad Nacional Autónoma de México, pp. 1-446.
http://saree.com.mx/econometriaR/sites/default/files/Ebook_econometriaR.pdf

Rivas, A. and Puebla, A. (2016). La Inversión Extranjera Directa y el Crecimiento Económico. *Revista Mexicana de Economía y Finanzas*, Vol. 11, no. 2, pp. 51-75. http://www.scielo.org.mx/pdf/rmef/v11n2/1665-5346-rmef-11-02-00051.pdf

Schwartz, M. and Torres, A. (2000). Expectativas de Inflación, Riesgo País y política monetaria en México. *Documento de Investigación. Banxico*, Vol. 2000, no. 06, pp. 629-658. https://www.banxico.org.mx/publications-and-press/banco-de-mexico-working-papers/%7BFE91F749-243D-11A5-286D-2588932B2F34%7D.pdf

SHCP (2020). Secretaría de Hacienda y Crédito Público. *Estadísticas Oportunas de Finanzas Públicas.* http://www.shcp.gob.mx/POLITICAFINANCIERA/FINANZASPUBLICAS/Estadisticas_Oportunas_ Finanzas_Publicas/Paginas/unica2.aspx

Sims, C. (1980). Macroeconomics and Reality. *Econometrica*, Vol. 48, no.1, pp.1-48. https://doi.org/10.2307/1912017

Tang, C., Yip, C. and Ozturk, I. (2014). The determinants of foreign direct investment in Malaysia: A case for electrical and electronic industry. *Economic Modelling*, Vol. 43, pp. 287-292. https://doi.org/10.1016/j.econmod.2014.08.017

Tinoco, M. and Guzmán, L. (2020). Factores Regionales de Atracción de Inversión Extranjera Directa en México. *Análisis Económico,* Vol. 35, no. 88, pp. 89-117. http://www.analisiseconomico.azc.uam.mx/index.php/rae/article/view/513

Topal, M. and Gül, Ö. (2016). The Effect of Country Risk on Foreign Direct Investment: A Dynamic Panel Data Analysis for Developing Countries. *Journal of Economics Library*, Vol. 3, no. 1, pp. 140-155. http://www.kspjournals.org/index.php/JEL/article/view/771/825

Varela, R. and Cruz, L. (2016). Inversión extranjera directa y tasa de interés en México: un análisis dinámico. *Nóesis, Revista de Ciencias Sociales.* Vol. 25 (50), pp. 128-149. https://doi.org/10.20983/noesis.2016.2.5

Sims, C. (1980). Macroeconomics and Reality. *Econometrica*, Vol. 48, no.1, pp.1-48. https://doi.org/10.2307/1912017

Vega, B. and Armijo, J. (2021). La implementación del T-MEC: Una prueba para América del Norte. *Centro de Estudios Internacionales Gilberto Bosques,* Senado de la República-Secretaría de Economía. pp. 1-267.
https://centrogilbertobosques.senado.gob.mx/docs/La_implementacion_del_T-MEC_una_prueba_para_America_Norte.pdf