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Kaldorian Explanation of Low Economic Growth in Mexico

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Abstract

This paper uses Kaldor's first law to provide an explanation for Mexico's slow economic growth over the last four decades. The starting point for analysis is the hypothesis that the lack of dynamism in total production (non-manufacturing) is due to slow momentum in manufacturing and, in particular, to the fact that the Kaldor coefficient has decreased with trade liberalization. Estimates were made (1980.1-2017.2) using the generalized method of moments (GMM) and rolling regression (recursive estimations). These estimates have been useful in solving the problem of serial correlation and have contributed towards a better statistical evaluation of the evolution of the Kaldor coefficient.

Keywords: Economic growth; Kaldor coefficient; manufacturing industry; enclave economy; structural change.

1. INTRODUCTION

There is a consensus in the specialist literature on the subject that there have been three stages of economic growth during Mexico's recent history: in the first, from 1945 to 1970, the economy experienced rapid growth as a result of a development model in which the State promoted productive activity and which was centered around an active industrialization strategy. The second stage can be seen as a transitional stage and lasted from 1970 until 1981. During this stage, continued and rapid growth of productive activity took place within a context of foreign debt and the creation of important macroeconomic imbalances. The third, although initiated in the mid-1980s with the implementation of a series of structural reforms known as *primera generación* (first generation), was fortified in 1994 with the implementation of the North American Free Trade Agreement (NAFTA), as it was then known. Since then, this third stage has continued to influence the development agenda.

NAFTA became an instrument with which to block all attempts to return to trade protectionism and strong state intervention in the economy. It also became an instrument with which to deepen the trade liberalization that began years before with Mexico's entry into GATT (General Agreement on Tariffs and Trade) in 1985. All of the above, combined with the dismantling of industrial policy, caused many companies to cease existing, while allowing only those companies that managed to adapt to the new competition parameters to survive. In other words, a new phase of industrial development had begun, one that was extremely competitive and in which market laws, rather than state intervention, decided the outcome of this process.[1]

Unlike the process of industrialization that has been taking place in East Asia since the 1950s, no active industrial policy either directed or coordinated by the state was implemented in Mexico during this stage of economic development. On the contrary, industrial policy was virtually eliminated, strengthening the *maquiladora* industry in the outcome. Here, it is worth remembering the famous words of the then Secretary of Commerce Jaime Serra Puche, when he claimed that the best industrial policy was a non-existent one.

The Mexican government then aimed to achieve a higher level of economic integration with United States as, from its point of view, achieving this would prevent repeating the irresponsible policies of the past and would also generate a stronger institutional framework, eventually resulting in convergence. It was thought that the greater integration of trade flows and binational investment that resulted from NAFTA would make the national economy's growth trajectory more stable and dynamic in the long-term. It was also thought these benefits would affect the industrial development driven by the external sector.

The then president of Mexico, Carlos Salinas de Gortari, said during a speech at MIT in 1993 that: "NAFTA is a deal to improve wages. […] It is also a deal to reduce migration, as Mexicans will no longer have to migrate north to find work, they will now be able to find it in [our country]" (Salinas, 1993). This new growth model would be based on competitive international industrialization and was expected to increase the consumer surplus by expanding the range of products available in the country, to lower prices, and to reduce monopoly profits. Doing so would increase savings, funding sources, and access to new technologies. […]

Many of the interim objectives were fully achieved. An increase in foreign direct investment and portfolio from the United States, as well as a spectacular rise in manufacturing exports, were also achieved. In a few years Mexico's exports were far higher than the rest of the Latin American region. Inflation was also kept low and stable and the fiscal deficit was kept low.

Despite all of the above, the results of this shift in economic model have been disappointing in terms of promoting a more robust and egalitarian development. The process of insertion in globalization resulted in a low rate of economic growth and a low rate of quality-employment creation in the country. Between 1970 and 1981, the average annual growth rate of total GDP was 6.9% in real terms. In contrast, between 1982 and 2017 the average annual growth rate was 2.1%. During the first stage, GDP per capita grew by average of 3.6% annually. During the second stage, on the other hand, average annual growth was at 0.04%. When we factor in that, during this lapse, the economically active population grew by an average of 2% annually, this is a very poor outcome. This goes some way to explaining the deterioration in employment quality, the increase in social tension and, perhaps, the increase in crime and violence. In respect to formal employment, the first stage witnessed an annual growth of 4.8%, while during the second stage this figure stood at 1.7%.

The low economic growth in Mexico during the last few decades has persisted in spite of the presence of one of the classic conditions fundamental to establishing a basis for accelerated growth: a dynamic manufacturing export sector. (Balassa, 1978).

The seminal argument of Kaldor's first law echoes this theory (1966). There is an apparent paradox between the manufacturing export sector and a low GDP rate. However, the absence of other sufficient conditions for growth, such as spillovers of development, which have internal effects, does not discredit the theoretical arguments of Kaldor.

In his first law, Kaldor (1966) proposes that:

> [...] the rapid rhythm of economic growth is associated with expansion rates in the "secondary" sector of the economy, principally manufacturing, and this something that is peculiar to an intermediate stage of economic development, it is one of the characteristics of the translation from "immaturity" to "maturity" [...]

However, it is worth remembering that Kaldor himself, using the United Kingdom to illustrate his point, warned that this was not a sufficient condition, as:

> [...] the problem with the British economy is that it has reached a high level of "maturity" before others have, and as a consequence has exhausted its potential for rapid growth before having reached particularly high levels of productivity or actual revenue [...]

In the case of Mexico, the process of economic integration with the United States since the implementation of NAFTA has stimulated trade flows and direct foreign investment. However, it has also reinforced the development of an enclave economy based on industrial businesses dedicated predominantly to manufacture, generating little in the way of local added value and whose competitive advantage is essentially its low wages (Sanchez and Moreno-Brid, 2016).

The central hypothesis of this study is that non-manufacturing product growth has experienced a substantial drop in relation to manufacturing product growth, paradoxically beginning with the implementation of NAFTA. The relationship between non-manufacturing product growth and manufacturing product growth will be referred to from now as the Kaldor coefficient (KC). In order to demonstrate the KC, an estimate was made from the original Kaldor equation (1966), with two important variants. The first estimate was made using the generalized method of moments (GMM). This was done with a view to obtaining robust statistical results, as the model which was estimated using ordinary least squares (OLS) presented significant serial correlation, in spite of the application of serial variables. The second applied a rolling regressions methodology, so that changes in the KC could be observed over time.

Three structural changes were observed during the period of analysis. Each methodological variant is a relevant contribution to the empirical literature on Kaldor's first law, as previous studies had estimated the magnitude of the KC based on the assumption that is invariable over time.

To test the hypothesis, this study is organized as follows: in the second section, the economic growth and manufacture determinants of the Kaldorian theoretical framework are integrated. In the third section, the research which applies Kaldor ´s first law to an economic analysis of Mexico is reviewed. In the fourth section the stylized facts related to the paradox described earlier are presented. The fifth section concentrates on the econometric aspects. The implications for the design of economic policies intended to promote growth based on industrial dynamism are emphasised in the discussion of the results. The final section presents a summary of the results, as well some conclusions on possible economic policies.

2. THEORETICAL FRAME OF REFERENCE

Inherent in this research is the hypothesis that the growth of total productive activity in a developed or semi-industrialized economy can be explained to a large extent by the sectoral structure of the economy, particularly by dynamism in the manufacturing sector (Sánchez and Moreno-Brid, 2016, p 278). This hypothesis is supported by historical evidence on the close positive association between industrialization and the advance of per capita income. An example is East Asian economic growth during the 20th century, which was based on the development of industrial production.

Needless to say, this approach is not new. It was first proposed by Smith and has been revived by Young (1928), Verdoorn (1949), Prebisch (1959), Myrdal (1957), Hirschman (1961), Cornwall, (1976) and Kaldor (1966, 1967). The argument is centered around the idea that the industrial sector has growing returns to scale and that growth in the industrial sector spills over into the rest of the economy. The industrial sector also benefits from higher rates of innovation than other sectors. The agricultural sector, for example, is particularly marked by diminishing returns and a lower capacity to absorb labor.

According to Kaldor (1966), the dynamism of manufacturing is the main driving force for growth in a modern economy. Viewed from a historical perspective, demand from the agricultural sector is what first drives economic expansion, with the growth of exports becoming a factor later.[2]

Kaldor (1970) helped to develop an explanation of the factors behind manufacturing growth. He stressed the importance of demand forces in driving productivity increases by using Verdoorn's law (1949). For Kaldor (1970), manufacturing productivity responds positively to structural change and increases in manufacturing production level. This leads to increases in global GDP, resulting in a virtuous process of cumulative causation.

Kaldor (1966) proposed a very simple macro model consisting of three laws which explain the differences in growth rates between different economies. According to the first law, the growth rate of manufacturing GDP (q_t^{man}) is a determinant of GDP growth of the economy as a whole. Given that manufacturing GDP is a component of global GDP, another way of expressing this law is that manufacturing GDP growth rate is a determinant of non-manufacturing GDP expansion rate (q_t^{nm}).

Kaldor's second law, or Verdoorn's law (1949), states that manufacturing GDP growth rate (q_t^{man}) is a determinant of the labor productivity growth rate in manufacturing (p_t^{man}). An equivalent expression is that the manufacturing employment expansion rate is a crucial explanatory factor of the manufacturing GDP growth rate.

Kaldor's third law states that an economy's total productivity growth rate ((p_t^T)) is determined by the manufacturing GDP growth rate and (negatively) by the non-manufacturing employment growth rate (e_t^{nm}). In other words, Kaldor believed that understanding the type of activities which an economy specializes in is crucial to understanding its dynamism. A country that specializes in manufacturing activities will tend to grow rapidly and diverge from those that specialize in other kinds of economic activities (Sánchez, 2012, p.141).

The Kaldorian model of economic growth is expressed using the following three equations:

Kaldor's First Law

$q_t^{nm} = \alpha + \beta q_t^{man}$, where β is the KC (described and estimated in this paper).

Kaldor's Second law, or Verdoon's Law[3]

$$p_t^{man} = \delta + \lambda q_t^{man}$$

Kaldor's Third Law[4]

$$p_t^T = \alpha + \beta q_t^{man} + \varphi e_t^{nm}, \text{ where } \beta > 0 \text{ , } \varphi < 0$$

A key finding of the model is that a high manufacturing product growth rate will create a cumulative process, or virtuous cycle, of dynamic expansion in the economy as a whole. According to Szirmai (2011), there is an additional series of arguments which highlight the importance of manufacturing to economic growth: *1)* There is evidence of a positive empirical correlation between the degree of industrialization and per capita income in developing countries. *2)* The transfer of resources from agriculture to manufacturing is prone to a structural change leading to greater economic growth, as productivity is higher in the manufacturing sector than in agriculture. *3)* The transfer of resources from manufacturing to the service sector causes a growth-adverse structural change, because as it increases the service sector's share in the economy, the rate of growth of per capita income tends to decrease (with some dynamic services proving to be exceptions, such as I.T., financial, and communication services). *4)* The manufacturing sector offers greater possibilities for capital accumulation when compared with agriculture. *5)* The manufacturing sector is a major source of economies of scale, technological advances, and productive forward and backward linkages for all other sectors of the economy, and *6)* as the per capita income in an economy increases, the total share of spending on agricultural products declines, while the share of spending on manufactured goods increases (Engels law). This in turn strengthens the manufacturing sector (see Moreno-Brid, 2016 and Haraguchi *et al*., 2017).

LITERATURE REVIEW: KALDOR'S LAWS AND THE MEXICAN ECONOMY

Díaz-Bautista (2003) conducted one of the pioneering studies on the validity of Kaldor's first law for Mexico, successfully applying cointegration techniques to quarterly data gathered on total and industrial GDP from 1980 to 2000. The study found cointegration between both variables. These findings indicate that manufacturing is the engine of economic growth. Additionally, Granger's causality test was applied, verifying that industrial product has a causal effect on total product.

Ocegueda (2003) uses data from the states for the period 1980-2000 and estimates Kaldor's law using OLS and panel methods. His study produced a KC of 0.35, with the dependent variable being non-manufacturing GDP and the independent variable being manufacturing GDP. Nevertheless, although the estimated coefficient weakly confirmed the hypothesis, later regression analysis uncovered heteroscedastic errors, making the results unreliable.

Andrés (2007) tested the validity of Kaldor's first law using state data for the period 1971-2003. By employing an estimation technique known as SUR (seemingly unrelated regressions), he found that the cause of the total GDP growth is the service sector, rather than manufacturing. Andrés applied a methodology that allowed for correction via contemporaneous correlation and heteroscedasticity, therefore yielding more reliable results. However, this presents two important problems: 1) he chose manufacturing GDP both as an explanatory variable and as a variable to explain the total GDP, and 2) his estimates cannot be used to draw causal inferences, only correlational inferences. The estimates made using OLS yielded a KC of 0.22.

Loría (2009) concludes that economic growth in Mexico principally depends on manufacturing dynamism and estimates a KC of 0.69. He made these conclusions using OLS. He stated that this estimate presented normality problems and serial correlation, even with the incorporation of a dichotomous variable. In his opinion this suggests omission of relevant variables. In addition, he argues that the Mexican economy's growth trajectory has been slow due to its tertiarization. The data used corresponds to the period 1970-2008. The dependent variable was the total GDP while the independent variable was manufacturing GDP.

With regards to the six entities that make up the northern border of Mexico, Sánchez and Campos (2010) estimated Kaldor's first law using data obtained during the period 1993-2006. The dependant variable was non-manufacturing GDP, while the independent variable was manufacturing GDP. Their OLS-based estimates were not statistically significant, which they attributed to the small number of observations. Additionally, without reporting evidence of unit root or the possibility of cointegration, they also conducted a Granger causality test, which affirmed that manufacturing growth rate does not explain the growth rate of other sectors as a whole in the border region. They conclude that, for the border region, there are not enough elements to determine that manufacturing constitute a driving sector of the economy.

Sánchez (2011) used OLS to confirm the existence of a positive correlation between non-manufacturing product's growth rate and total product rate. The KC was estimated at 0.33 for 1993-2010. This estimate was statistically significant and passed both normality and homoscedasticity tests, as well as displaying correct specification of functional form. Based on these findings, Sanchez insisted that manufacturing's slow growth rate in the Mexican economy is a fundamental explanatory factor for the low expansion rates of economic activity as a whole. While conducting these studies, he used quarterly time series from 1982 to 2009 in order to analyze stationarity, cointegration, and direction of causality. He found that manufacturing GDP was the causal determinant for total GDP. He did not, however, consider the possibility of serial correlation.

Rendón-Rojas and Mejía-Reyes (2015) reformulated Kaldor's first law in order to evaluate the impact that different manufacturing subsectors have on industry as a whole. The subsectors that were taken into consideration were: chemicals, petroleum & coal derivatives, rubber and plastic, fabricated metal products, and machinery and equipment. The data corresponds to two Mexican regions, Toluca-Lerma and Valle de México, for the period 1970-2008. The panel data was analysed using both fixed and random effects models. They interpreted their findings as proof that growth in manufacturing responds positively to growth in the subsectors studied. Regarding the estimated models, they did not report evidence related to residue normality or the absence of either heteroscedasticity or serial correlation.

Quintana *et al.* (2013) estimated Kaldor's first law using spatial econometric methods. They found that the Mexican manufacturing sector has a positive influence on GDP growth (with a KC of 0.59), only when the simplest model of the law is applied. This is not the case when Thirwall's approach is applied, which uses the difference between manufacturing GDP and non-manufacturing GDP as the dependant variable.

They conclude, as do Ocegueda (2003), Loría (2009), and Sánchez & Campos (2010), that the econometric evidence to support the first law is not entirely robust. In addition, the most reliable tests that were carried out indicate that there is no evidence of spatial autocorrelation.

In a more recent study, Sánchez and Moreno-Brid (2016) tested Kaldor's first law using Engle-Granger's cointegration method. In order to do so, they used logarithms for total GDP, manufacturing and non-manufacturing GDP, in real terms from 1982 to 2015. They reported that the series have unit roots in their levels, but they are stationary in their first differences. They conclude that the Engle-Granger cointegration test revealed a long-term causality and that the direction of causality goes from real manufacturing GDP to total GDP. [5]

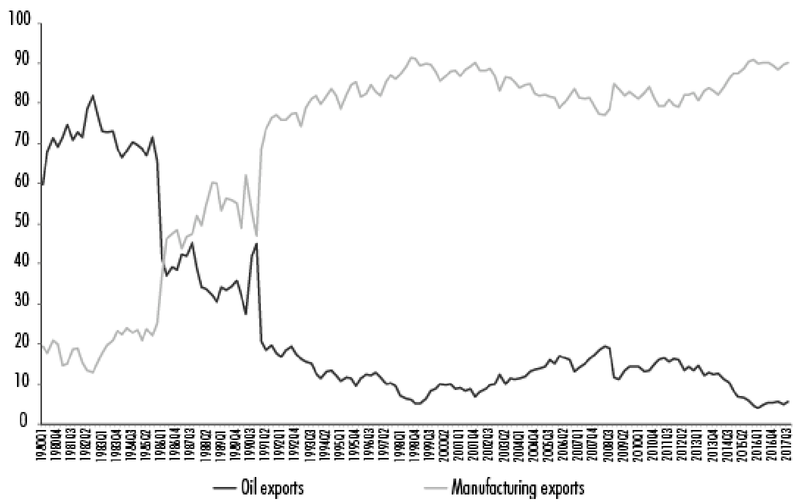
4. STYLIZED FACTS REGARDING THE MEXICAN ECONOMY

As can be seen in Figure 1, since the start of the 1980s, Mexico's economy has been becoming increasingly integrated with the global economy by way of trade. Figure 2 shows the evolution from being an oil-exporting country to a manufacturing country.

Figure 1 Mexico: Trade Openness Coefficient, 1980-2017 (% GDP)

Note: coefficient of commercial openness = (Exports + Imports) /GDP, in percentages.
Source: Based on World Bank data.

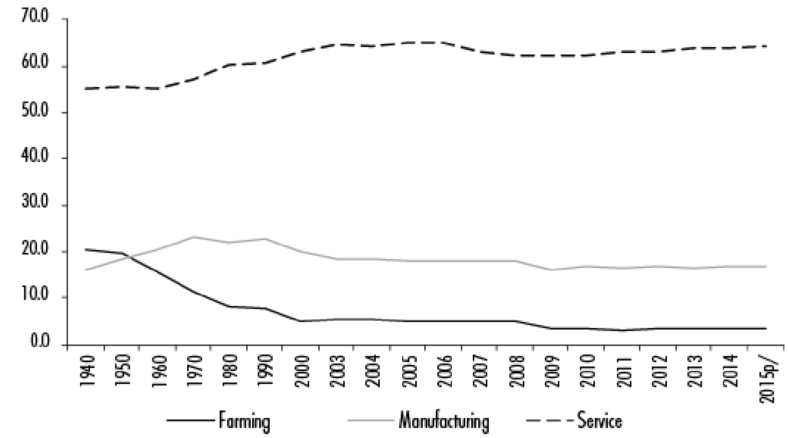
Figure 2 Mexico: Oil and Manufacturing Exports, 1980Q1-2017Q3 (% of Total Exports)



Source: Based on Banxico data (2017)

Despite this boom in manufacturing export, a marked tertiarization of the economy can be observed. Indeed, Figure 3 shows that manufacturing reached its highest percentage contribution to total GDP between 1970 and 1990. Starting from NAFTA's entry into force, its share began to fall persistently, eventually reaching percentages similar to those it had in the 1940s.

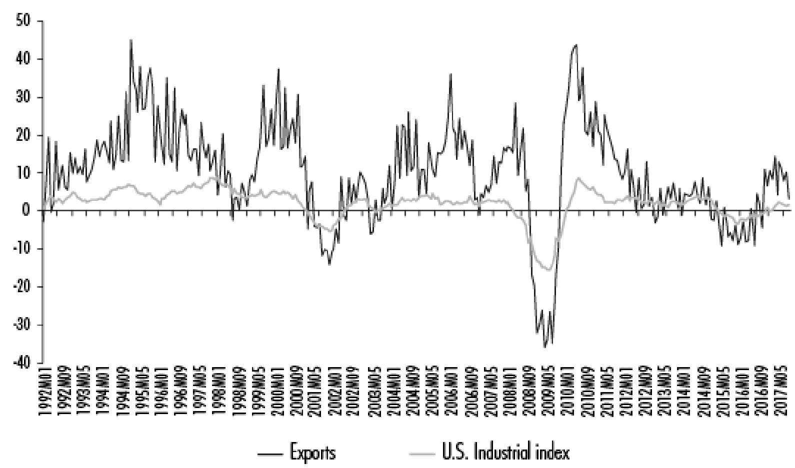
Figure 3 Mexico: GDP Sectoral Composition, 1945-2015 (%)



Source: Based on Loría (2009) and INEGI (2017).

It is noteworthy that, although the composition of exports is clearly explained by the manufacturing sector, its real GDP growth rate was lower than that of the services sector. Additionally, the pace of exports has slowed in recent years. Today, as shown in Figure 4, there are no longer any signs of the dynamic present during the 1990s and the beginning of present century. This outcome can be explained to a large extent by the effects of the recession caused by the 2008-2009 international financial crisis on world trade and industrialized countries' economic activity. Mexico in particular was affected by the slowdown in industrial production in the United States which lasted until 2017, as Mexico's manufacturing exports are intrinsically linked to the United States' market. (For more information on the synchronization between the two economies, see Mejía and Silva, 2014).

Figure 4 Annualized Growth Rates of Mexico's Total Exports and Industrial Activity in the United States of America, 1993.01-2017.09



Source: Based on Fred (2017) and INEGI (2017).

In this sense, the growth of manufacturing exports has not strengthened national value chains. This is due to their significant integration with external suppliers, particularly in the United States. This accentuated the dependence on imports, particularly intermediate goods. Therefore, Mexico's manufacturing sector is decreasing in national content and its exports, which come to large extent from transnational corporations based in Mexico, have very limited integration with the rest of the local economy. According to the reference theory analyzed empirically here, GDP growth rate, as a whole, is low.

There is a vast literature which, supported by Thirlwall's law, explains the long-term deceleration of the Mexican economy as a consequence of a rise in the income elasticity of imports, combined with a tendency for appreciation of the real exchange rate. Some authors, such as Blecker and Ibarra (2013) and Blecker (2016), indicate that this increase in elasticity is significant, especially in the export sector, reflecting fewer linkages between this sector and networks of local suppliers. Moreno-Brid (2016) and Fujii & Loría (1996), among others, suggest that import penetration, while particularly intense in the export sector, is also a reflection of the dismantling of the Mexican industrial fabric as a whole[6] . This applies in particular to the non-residential investment sector, where supply is increasingly dependent on machinery and equipment produced abroad. In any event, the combination of trade liberalization, currency appreciation and the removal of industrial policy, has had an adverse impact on trade balance, to the point of causing the external constraints on Mexico’s long-term economic growth to become more, rather than less, severe.

5. ECONOMETRIC VERIFICATION OF THE HYPOTHESIS

Because the series involved[7] in the equation of Kaldor's first law are stationary, it is appropriate to use OLS (see Table 1 of the statistical appendix).[8] The hypothesis of the current paper is that Mexico's economic growth has fallen systematically since 2000, due to the fact that the KC has also decreased. This is the main difference between this paper and all those contained in the literature review, which assume that the KC is fixed.

$$\begin{aligned} q_t^{nm} &= 0.013 + 0.469 q_t^{man} + e_t \\ t&(7.376) \quad (15.360) \end{aligned} \qquad (1)$$

Equation (1) presents several correct specification problems. In effect, it presents serial correlation, as well as non-linearity and non-normality problems.[9] In order to test the stability of the estimated KC, on the other hand, Bai and Perron’s (2003) recursive structural change test was applied and three valid structural breaks were found at 5%: 1994Q3, 1999Q4 and 2008Q4.[10] This shows that it is not appropriate to analyze Kaldor’s first law from the static estimation using OLS. Instead, it is necessary to use rolling regression.

Porras and Jaramillo (2014) point out that the use of GMM is valid when:

1) It is possible there is endogeneity between the analyzed data,[11] *2)* the constant may be correlated with the independent variables and *3)* when there is heteroscedasticity and autocorrelation.[12] These characteristics are quite common within economic, banking and financial indicators. For this reason, this technique was used to conduct the empirical analysis. The results obtained for the entire study period are as follows:

$$\begin{aligned} q_t^{nm} &= 0.017 + 0.482 q_t^{man} + e_t \\ t&(6.146) \quad (10.053) \\ R^2 &= 0.644582; J = 3.420991 (0.180776) \end{aligned} \qquad (2)$$

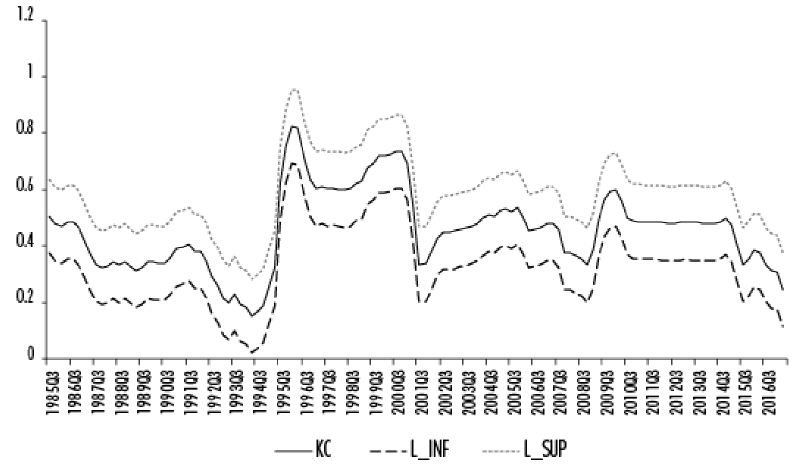
Four instrumental variables were used: the constant, the manufacturing product growth rate lagged for one period, the type of bilateral real exchange with the United States, and the product of bilateral real exchange with the United States. HAC (Newey and West, 1987) was used as a weighting matrix in order to generate efficient estimators. The Cragg-Donald test was used to prove that the instruments are not weak: Cragg-Donald F stat = 53.94, Stock-Yogo TSLS at 10%: 9.08, Stock-Yogo (size) at 10% = 23.3.

The KCs estimated in (1) and (2) are very similar. However, multiple structural changes took place (see Table 2 of the statistical appendix). Because of this, the KC (Kaldor's first law) was estimated recursively using rolling regression.

To determine the size of each of the recurrent regression subsamples, Fernández’s (1990) methodology was used. The findings suggest that trimming should be between 0.15 and 0.85. 15% was chosen because it is the smallest size that allows the largest possible number of estimates to be obtained. In turn, this allows the KC’s dynamic evolution to be observed.[13] For all estimates, a fixed subsample size of 22 observations and a step of one observation (one quarter) was used. The estimates were made with the same sample size and grew higher until reaching the final observation (2017.2).

Figure 5 clearly shows that the KC peaked around 1995. From this point and in spite of the increasing level of trade integration with the United States, the coefficient begins to fall, although not systematically. In fact, it suffers a sharp decrease in 2000. During the first decade of the 2000s it hovers around 0.4, rising to 0.6 towards the end of the decade. After that it begins to contract, dropping to the very low level of 0.2 in 2017.

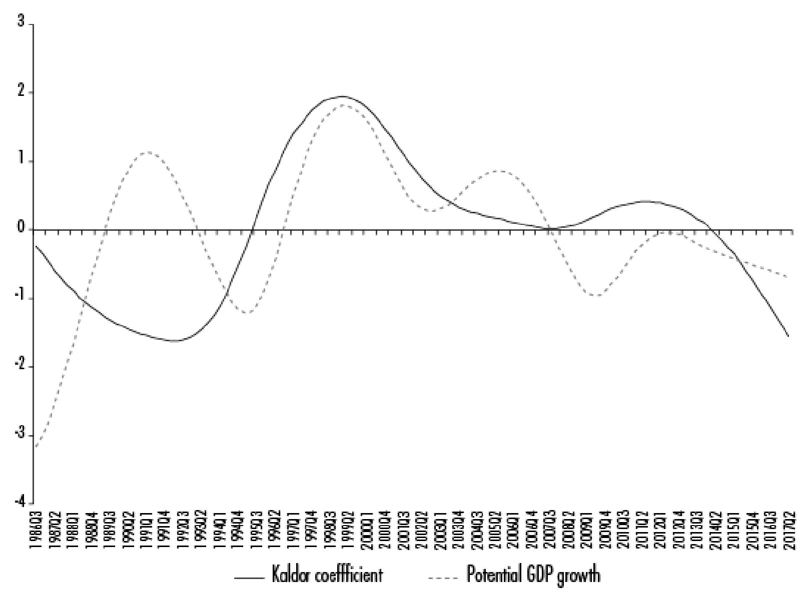
Figure 5. Dynamic of the Kaldor Coefficient in the Mexican Economy



Note: confidence bands were estimated at 95% using the Boostrap method (Singh and Xie, 2008).
Source: Created by the authors

In order to understand the dynamic evolution of the KC more clearly, the trend of the estimated series was extracted from the HP filter and compared with the evolution of the potential product, which was also calculated using the HP filter (see Figure 6).

Figure 6 Kaldor Coefficient and Potential GDP Growth (Non-Manufacturing).
Normalized ranges



Note: Due to the difference of units in which each series is expressed, they were both normalized using the statistical procedure $\frac{x_t - \mu}{\sigma}$ *, in order to make them visually comparable.*
Source: Created by the authors

It is clear that since 1994 there has been a very high and statistically significant direct correlation between both variables (0.76%). This contrasts with the previously predominant negative correlation (-0.96%). Finally, it should be noted that, although since 1994 both series have evolved similarly, the decrease which started in 2013 has affected the KC more severely than it has potential GDP.

6. CONCLUSION

The well-being of the population must always be the goal of any economic development or structural change agenda. The basic conditions for achieving this are that the economy as a whole grows at high and sustained rates in order to generate quality employment, that is, employment with high wages and fitting benefits which dignify the human condition.

In the case of Mexico during the early 1980s and especially during the mid 1990s, the authorities considered it essential to emphasize the role of the market and of economic liberalization. This was done with a view to promoting manufactured products exports and direct foreign investment in industrial sectors without implementing industrial policy. In addition to NAFTA, several commercial agreements were signed which consolidated an assembly manufacturing model with few productive linkages.

All this resulted in a modern economy that was to a large extent an enclave, and one that served the interest of Mexican capital and that of developed countries, particularly the United States. In fact, wage share of income fell consistently and employment composition reflected a greater number of paid occupations where income is less than three times the minimum wage.

As demonstrated in this research, manufacturing is the growth engine of an economy. However, this relationship has been weakened due to a premature deindustrialization which has prompted a high degree of tertiarization, in both formal and informal activities. This process has slowed economic growth. As a result, productivity has fallen, plunging the economy into a trap of slow growth, acute inequality and a devastating incidence of poverty. This process has been aggravated by the application of monetary and fiscal policies designed according to conservative principles. The main goal of these policies is to stabilize financial variables, with insufficient consideration given to the employment performance or productive activity.

Informed by this interpretation, the technical element of the current paper is intended to contribute to the debate by using GMM to estimate Kaldor’s first law. Moreover, by using rolling regression it was possible to obtain the dynamic evolution of the KC and confirm its tendency to decrease. Having done so, it can be confirmed that slow growth in manufacturing is an important explanatory factor of the Mexican economy's chronic slow growth.

The apparent paradox between the rapid export growth and the slow growth of GDP as a whole can be explained by the fact that the bulk of Mexican foreign trade is intra-industry. The economic integration created by NAFTA bolsters this process. This reality connected Mexican manufacturing value chains, particularly their exports, with those from abroad, breaking local linkages and decreasing spillovers to the rest of the economy.

Market reforms, including NAFTA, have benefited trade flows and foreign direct investment, as well as the development of an export economy based on *maquila* industries, whose international competitiveness tends to come from low wages. There are few growth industries with a high content of national value and the tendency for real exchange rate appreciation puts pressure on these industries. On top of this, the 2012-2018 presidential term witnessed the adverse effect of the brutal reduction in public investment, which has fallen to an annual average of 5% in real terms during this six year period.

According to Salama (2013), the Mexican manufacturing export boom, like that of several other Latin American countries, is in some sense an "illusion", in the sense that it exports high-tech products but using *maquiladora* processes. This generates the impression that Mexico leads production of this type of product. In reality, however, few stages of transformation actually take place in Mexico. The most dynamic sector of manufacturing (exports) came to be largely determined by decisions made by multinational companies, including a few very large national companies that also have presence in the world market. Manufacturing’s high share of total exports is not reflected in a similar level of added value generation, technological spillovers or innovation.

In an attempt to shed light on the causes of the decoupling of manufacturing exports from total economic growth, an exercise designed to estimate the multipliers for two historical periods was carried out, and two models were proposed to explain the structural change. The results showed that the variations in these multipliers are useful when attempting to understand why growth was higher in the period when industrialization was led by state intervention (Moreno-Brid, 2016). In fact, this study confirmed that investment was a transformational factor for growth. The second period, on the other hand, was characterized by commercial openness and reforms that favored the market.

The results of this study, as well as those made by other specialized researchers, suggest that the implementation of active productive development policies, particularly an industrial policy that emphasizes manufacturing, will result in positive structural change. This goal of these policies should be to promote industrial, scientific, technological and innovation development. The national productive apparatus needs to be developed, the Mexican entrepreneurial base strengthened and national brands created that are sustainable and competitive in both internal and external markets due to their quality and not because of their low wages.

One path towards the high growth rates that the Mexican economy so badly needs would be a reindustrialization model that is based on a vigorous and prompt strengthening of the domestic market yet does not neglect the external market. Whatever the outcome of the NAFTA renegotiations, realizing this outcome will require the implementation of macro policy, and not only social policy, centered around inequality, combined with an active industrial development policy.

APPENDIX

Table 1 Unit Root Tests

	Product growth rate non-manufacturing	Product growth rate Manufacturing
ADF		
Trend-Intercept	-4.743804	-4.062511
Constant	-4.632758	-4.091907
None	-2.708165	-2.360044
PP		
Trend-Intercept	-3.786486	-3.501862
Constant	-3.844115	-3.513377
None	-3.372468	-3.647656
KPSS		
Trend-Intercept	0.050037	0.068962
Constant	0.072458	0.067756

Note: all series are 95% stationary.

Source: our own calculations.

Table 2 Bai-Perron Structural Change Test

Bai-Perron test of L +1 vs. L changes globally determined. Date: 10/10/17 Time: 14:14

Sample: 1980Q1 2017Q2. Observations: 146. Change variables: C TYM: Evidence of change: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Statistic F consecutive changes 0

Statistic F large consecutive changes 3

Evidence of change	*Statistic F*	*Statistic F scaled*	*Critical values***
0 vs. 1	5.124024	10.24805	11.47
1 vs. 2 *	13.40618	26.81236	12.95
2 vs. 3 *	8.807067	17.61413	14.03
3 vs. 4	7.149190	14.29838	14.85
4 vs. 5	0.000000	0.000000	15.29

* * Significant at the level of 0.05; ** Bai and Perron (2003), critical values.

Estimated dates of change 1) 1999Q3; 2) 1994Q3, 1999Q4; 3) 1994Q3, 1999Q4, 2008Q4; 4) 1989Q2, 1994Q3, 1999Q4, 2008Q4; 5) 1989Q1, 1994Q2, 1999Q3, 2004Q4, 2010Q1.

Source: Created by the authors.

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[1] For further information on the characteristics of growth and economic development in Mexico during the periods discussed here, see Moreno-Brid and Ros (2009) and Cárdenas (2015).

[2] Kaldor (1966) estimated the United Kingdom’s GDP growth as a function of manufacturing product growth and found a KC of 0.614, corroborating his idea that manufacturing serves as a motor for growth in the economy as a whole. [3] For more theoretical information regarding this law, see Sánchez and García (2015).

[4] In Sanchez and Moreno-Brid (2016) the evidence for this third law is summarized.

[5] Other works that have underlined the importance of manufacturing and industrialization for Mexico’s present-day economic growth without

proving the first law of Kaldor, are Ros (2008 and 2015); Calderón and Sánchez (2012); Cruz (2015), Revilla *et al.* (2015) and Trejo (2017).

6 See Moreno-Brid (1998, 1999), Moreno-Brid & Ros (2009), Pacheco-López (2005), Pacheco-López & Thirwall (2007), Blecker & Ibarra (2013), Blecker (2016), Fujii & Loria (1996), and Loría (2009), among others.

7 Source: The Economic Information Bank of INEGI. The figures from 1980 to 2008 are based on the 1993 national accounts. The figures from 2008 to 2017 were obtained using baseline figures for 2008. Growth rates were calculated based on last value of the figures from 1993, allowing the series to be spliced. The non-manufacturing production series is the difference between total production and manufacturing production. The series can be discussed with the authors.

8 Due to the fact that they were managed in quarterly annualized growth rates.

9 R2 = 0.62, DW = 0.55, Ramsey (2) = 5.94(0.003), JB = 27.06(0.000), LM (6) = 33.139(0.00), White TC = 1.11(0.33), White TNC = 0.774(0.38).

10 See Bai Perron's test (Table 2 of the annex).

11 There was a case of Granger's causality: 4.70 (0.00) from q_t^{nm} to q_t^{man} with two lags

12 GMM obtains consistent estimates with relatively low biases in finite samples.

13 128 recursive estimates were made.

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