Article ECORFAN-Ecuador Journal
RURAL June 2015 Vol.2 No. 2 118-131

The impact of agriculture and tourism on mexican GDP

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Received January 22, 2015; Accepted May 29, 2015

Abstract

Economic growth is a central element of economic development. In this regard, the role played by agriculture in poverty alleviation and economic growth in the least developed countries is crucial. Agriculture is still the main source of income for 70.0% of the world's poor living in rural areas. However, agricultural production for domestic and export markets has lagged behind in such countries, due to the poor performance of agriculture (low productivity and rudimentary infrastructure, among other factors). Low-income rural groups are mostly small landholders engaged in producing traditional cash crops, raising livestock and performing low-profit, non-farm tasks. Because the Mexican agricultural sector is not generating enough income for them, rural families are increasingly turning to non-farm income sources, including tourism, to supplement their income. Based on the above, the objective of this study was to analyze the importance of agriculture and tourism in the Mexican economy, from 1980-2013. To this end, we developed a multiple linear regression model in which the Gross Domestic Product (GDP) of Mexico is a function of agricultural GDP and tourism revenues, the unemployment rate, inflation, the minimum wage and the real exchange rate. The main results indicated that the variables that most significantly affected economic growth in Mexico in the period under review were agricultural GDP and tourism revenues.

Economic growth (GDP), agriculture, tourism revenues

Citation: FIGUEROA-HERNÁNDEZ, Esther , PÉREZ-SOTO, Francisco y GODÍNEZ-MONTOYA, Lucila. The impact of agriculture and tourism on mexican GDP. ECORFAN Journal-Ecuador 2015, 2-2: 118-131

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Introduction

Economic growth is a central element of economic development (FAO, 2013). From 1997 to 2002 the international context was marked by economic instability. While the world's overall economic growth rate was satisfactory (3.5%), there were significant fluctuations around this average. First, the growth rate of Gross World Product (GWP) in 1998 fell due to the crisis in Southeast Asia and then Russia. Secondly, it was affected again in 2001 as a result of the recession in the United States (LAIA, 2004).

After a period of significant economic growth in the early 21st century, the world economy contracted in 2009 as a result of the global financial and economic crisis (ILO, 2013). In this regard, in the period 2003-2007 the growth of emerging market economies accelerated, while that of advanced economies was weak, and although in 2009 more than half of the former experienced negative growth, they soon recovered and in 2010 grew at rates equal to or higher than those recorded before the crisis (FMI, 2012), reaching a growth rate of 5.2%, which seemed to signal a definitive end to the 2008 crisis, and 2011 saw a slowdown in overall activity as the growth rate fell to 3.8%, according to estimates by the International Monetary Fund (IMF) (Banco de la República de Colombia, 2012).

Global economic growth further weakened in 2012, so that the prospects for the next few years will be characterized by uncertainty and risk of further slowdown. The economic problems of developed countries (particularly those in the euro area and the U.S.) continue to affect developing countries and economies in transition through reduced demand for their exports and greater volatility in capital flows and commodity prices (Claridades, 2013).

The role played by agriculture in poverty alleviation and sustainable economic growth and development of the least developed countries (LDCs) is crucial. Therefore, agriculture, by consolidating food security, export earnings and rural development, is the foundation of the economies of these countries. However, agricultural production for domestic and export markets has lagged, as their growth in per-capita GDP slowed in the nineties. Slow growth and sharp annual fluctuations in production continued to be chronic problems in such countries, and were the main causes of increased poverty and food insecurity. In regard to trade, the LDCs continued to occupy a marginal place in world agricultural markets, and their contribution to global agricultural exports was only 5.0% in the early seventies, and barely 1.0% in the late nineties (FAO, 2001).

The poor performance of agriculture in the LDCs is related to many internal and external difficulties that hinder their attempts to promote agriculture and achieve the objectives of improving food security and export earnings. Internal problems include low productivity, lack of flexibility in production and trade structures, a shortage of specialized skills, low life expectancy and educational levels, the rudimentary nature of the infrastructure and deficiencies in the institutional and policy frameworks. At the same time, with the increasing integration of markets resulting from globalization and trade liberalization, the economies of those countries face an increasingly competitive external trading environment. They continue to export a limited range of primary products highly vulnerable to volatile demand and deteriorating terms of trade. In addition, their external debt remains high.

ISSN:1390-9959

The inability of these countries to compete in global markets and even their own domestic markets is also reflected in the increased total cost of their food imports (FAO, 2001).

In spite of this situation, it is estimated that agriculture is the main source of income and employment for 86.0% of the world's rural population (World Development Report, 2008), representing 47.0% of the world's total population (FAO, 2013), and for 70.0% of the world's poor living in these areas. Low-income rural groups are wage earners, most of whom are casual and seasonal workers, while others are small landholders engaged in producing traditional cash crops, raising livestock, or performing low-profit, non-farm tasks, and they often combine two or more of these activities. Therefore, crop production will remain essential for reducing poverty and generating rural employment and income (FAO-ILO, 2013). However, the depletion and degradation of land and water seriously affect the ability to grow food and other products needed to sustain livelihoods in these areas and meet the needs of the urban population (FAO, 2013).

In this regard, it is estimated that worldwide there are 450 million wage earners in the agricultural sector, representing 40.0% of the world's agricultural workforce. These workers and their families are among the groups most affected by poverty and food insecurity; in many countries, more than 60.0% live in poverty conditions.

Because the agricultural sector in Mexico and the world as a whole is not generating enough income for rural families, many of them are increasingly turning to non-farm income sources to supplement their income, one of which is tourism.

Tourism at the global level

According to the World Travel and Tourism Council, tourism is the world's largest industry, surpassing the automobile, steel, electronics and agricultural sectors (Castro, 2013), which means it is one of the fastest-growing sectors of the world economy. Tourism development can promote economic growth, both directly and indirectly, by stimulating the growth of other sectors and by increasing household income. This dynamism has led to tourism becoming the key to socio-economic progress. Therefore, tourism's ability to reduce poverty in developing countries has recently been demonstrated and recognized. The economic potential of tourism implies the creation of jobs, which are especially important in rural and remote areas, where according to data from the World Tourism Organization (UNWTO), three-quarters of the two billion people who live under conditions of extreme poverty are found (Ruiz, 2008).

Tourism: an economic and social phenomenon

In view of the increase in household incomes in emerging economies, tourism stimulates leisure activities and the growth of international trade, with the consequent expansion of business travel; demand, moreover, is not expected to wane. Given its size, the sector has considerable potential for economic growth, diversification and structural transformation of economies (UNCTAD, 2013). Today, the business volume of tourism equals or even surpasses that of oil exports, food products or automobiles. This sector has become one of the major players in international trade, and also represents one of the main sources of income for many developing countries. This growth goes hand in hand with increasing diversification and competition among destinations (WTO, 2014).

ISSN:1390-9959

The general expansion of the industrialized and developed countries has been beneficial in economic and employment terms for many related sectors, from construction to agriculture and telecommunications. Tourism's contribution to economic welfare depends on the quality of visitor services offered and the resulting income that can be asked for or expected. The World Tourism Organization (WTO) helps destinations to position themselves, in a sustainable way, in increasingly complex domestic and international markets. As the United Nations agency dedicated to tourism, UNWTO stresses that developing countries will especially benefit from sustainable tourism and acts to do so (WTO, 2014).

Tourism is one of the growing sectors, generating more jobs, more exports, and more revenue for the benefit of the countries involved. Despite the crisis, the number of international travelers continues to increase. It is therefore clear that the positive effects of tourism on the economy, both direct and indirect, are important (WTO, 2014).

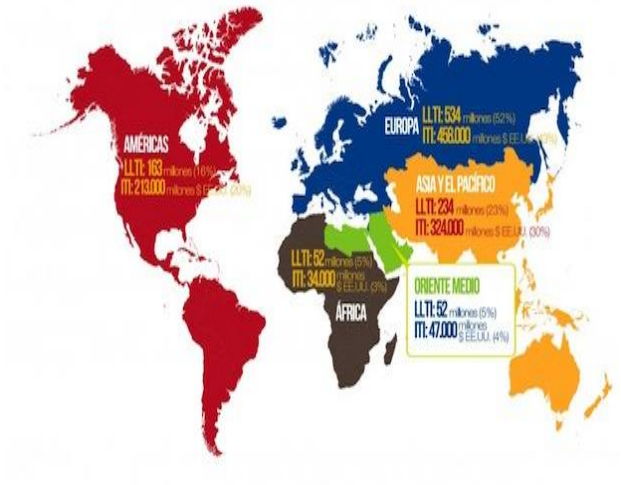

Figure 1 Tourism revenues and international tourist arrivals by region, 2012

Source: WTO, 2013.

International tourist arrivals grew by 5.0% in 2013 to reach 1.087 billion, according to the latest UNWTO World Tourism Barometer. Despite the economic difficulties experienced by the world, international tourism results were well above expectations, and in 2013 about 52 million more international tourists travelled over the previous year. For 2014, UNWTO forecasts growth of between 4.0 and 4.5%, again surpassing existing long-term projections. International tourism demand was higher for destinations in Asia and the Pacific (+ 6.0%), Africa (+ 6.0%) and Europe (+ 5.0%). The most-visited subregions were Southeast Asia (+ 10.0%), Central and Eastern Europe (+ 7.0%), Southern and Mediterranean Europe (+ 6.0%) and North Africa (+ 6.0%). (Figure 1).

Figure 2 Distribution of the effects of tourism on global economy

Source: WTO, 2014.

The importance of tourism in the world can be seen in Figure 2. On the one hand, as can be seen, it represents 9.0% of GWP and 1 in 11 jobs (adding up for both figures the direct, indirect and induced effects). It also accounts for 6.0% of world trade and 6.0% (1.3 billion dollars) of exports from the LCDs (WTO, 2014).

ISSN:1390-9959

Stakeholders in the tourism sector are aware of its economic importance, which lies in generating not only financial but also social mobility, which is necessary for the development of any country. The goal of tourism, approached from different angles, is to meet the needs of travelers who, far from home, require food services, lodging, transportation, fun, possibly suitable working conditions, and, above all else, courteous treatment. The tourism sector is not a passing trend or fashion in modern economies, but has grown into an important activity with global significance. In several countries, it is the most important element in their international trade activities (Castro, 2013).

Importance of tourism in Mexico

In the past 60 years, tourism has been identified as a major driving force behind national development, mainly as a generator of foreign exchange and employment and as a catalyst for regional progress. In regards to tourism as an income generator, we can distinguish three stages: the first one lasted until 1971, when continued growth in that sector resulted in it accounting for 45.0% of current account revenue in that year; a second phase ran from 1972-1982, when its relative contribution to overall revenues began to decline in percentage terms mainly due to surging oil revenues. The third stage was from 1982 to 1992, when tourism's contribution to overall revenues remained almost constant, accounting for about 10.0%, mainly as a result of the contribution of the manufacturing industry. In 1999, tourism revenues accounted for only about 5.0% of current account revenues. Today, tourism in our country faces a number of problems mainly characterized by a strong dependence on visitors from the United States and on the so-called sun and beach segment.

Other problems include: inadequate or unequal promotion of domestic tourism to make better use of the capacity installed during periods of low demand; tourism development that is limited to sun and sand destinations; oversupply in the main destinations that results in negative environmental impacts and urban growth in the surrounding areas that lacks proper public services; and inadequate tourist or customer service levels, among others (Mercado and Palmerín, 2012).

Ministry of Tourism figures show that the industry, as a driving force behind development, contributed 9.0% of GDP in the first quarter of 2013, generating 7.5 million jobs, including 2.5 million direct ones. Ministry figures also show that tourism provides the third largest source of foreign exchange earnings and has over 43,000 companies involved in it. Tourism, then, is an essential activity which helps propel national development, especially in terms of income redistribution, balance of payments, employment, GDP and regional economies. In Mexico and other countries, tourism is an industry of paramount importance both for the foreign exchange earnings it brings in, and for the considerable amount of direct and indirect employment it generates (Castro, 2013).

Rural tourism emerged in Europe as a complementary strategy for rural development. In Mexico, the planning of this activity started in the seventies; however, data show that rural tourism in the country is still in its infancy and therefore has only a marginal status, as evidenced by the fact that it receives little financial support compared with the main tourism segment promoted in Integrally Planned Centers (known by the acronym CIPs in Mexico).

ISSN:1390-9959

Rural tourism can be developed based on biodiversity, the variety of ecosystems, endemic flora and fauna, and the culture of indigenous ethnic groups. Mexico has 57 ethnic groups and 127 officially-declared Protected Natural Areas (PNA), where it is feasible to develop ecotourism, adventure tourism, ethnotourism, rural tourism, hunting, and water sports, attached to management and conservation programs (Juárez and Ramírez, 2007).

The agricultural sector and economic growth in Mexico

Today, Mexico is in a globalized world where the supply and demand for products, goods or services are in constant motion. For this reason, it is necessary to know what resources are absent, abundant, scarce and available in appropriate amounts.

Globally, Mexico is one of the countries that has signed the most free trade agreements, from the North American Free Trade Agreement (NAFTA) signed in 1994, the Treaty with the European Union (EU) to the agreements it has with Central and South American countries; therefore, the buying and selling of items plays a very important role in the economy. A large proportion of the population earns a livelihood from agricultural production and contributes in a very important way to the country's GDP. In addition, food has an intrinsic value for any nation in terms of food autonomy and self-sufficiency. Mexico is a country with great export opportunities, as it is located next to the American economy, which has the largest number of high-income consumers (Guajardo, 2012).

In the last fifteen years the Mexican agricultural sector has experienced a decline in its production levels, which has not been sufficient to meet domestic market demand.

Moreover, variations in agricultural production show greater volatility than those in other sectors of the economy. This indicates the presence of high risk and uncertainty, leading producers to exhibit defensive behaviors such as resistance to change their harvested products or to maintain a certain degree of diversification that may not seem optimal from the point of profitability, but that is explained as a way of diversifying risk, all of which significantly affects the profitability conditions of the Mexican agricultural sector (Escalante and Catalán, 2008).

This situation is related to the agricultural sector's low share of real GDP in Mexico.

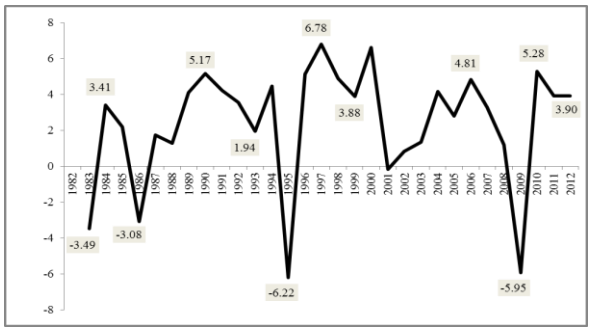

Figure 3 Growth rate of real GDP in Mexico (%)

In its modern economic history, the country has gone through various phases of high and low growth. By plotting the growth rates of Mexico's real GDP, an average annual growth rate of 0.09% for the period 1982-1987 is observed. From 1988-1993, it grew at an average annual rate of 3.1%; for 1994-2000, it grew at 2.9% and finally for 2000-2010 its growth was 1.3% per annum. For the entire period, 1982-2010, the economy managed to grow just 2.1% annually against 6.3% growth achieved between 1940 and 1970 (see Figure 3).

ISSN:1390-9959

As for the evolution of sectorial economic growth, the data reveal that during the period 1982-2009 the agricultural sector had a diminishing share in total GDP, falling from 6.3% in 1982 to 5.4% in 2009; meanwhile the industrial sector (including manufacturing, construction and electricity, gas and water) went from 24.9% to 23.2%, thus contracting by almost two percentage points; manufacturing accounted for 17.0% of GDP in 1982 and 16.0% in 2009; the services sector increased its share, rising from 62.7% to 65.9% (Calderon and Sánchez, 2012).

Based on the above reasons, the aim of this study was to analyze the importance of agriculture and tourism in the Mexican economy during the period from 1980-2013.

Materials and Methods

To carry out this research, various information sources were consulted. These included, among others, the following: the Latin American Integration Association (LAIA), the World Bank (WB), the United Nations Food and Agriculture Organization (FAO), the United Nations International Labour Organization (ILO), the United Nations World Tourism Organization (UNWTO), the United Nations Conference on Trade and Development (UNCTAD), Mexico's National Institute of Statistics and Geography (INEGI), the Bank of Mexico (B of M or BANXICO), the Ministry of Tourism (SECTUR), the Ministry of Finance and Public Credit (SHCP), the Center for the Study of Public Finance of the Chamber of Deputies (CEFP), and the Statistics Division of FAO (FAOSTAT).

From these sources, data was obtained on total GDP, tourism and the agricultural sector's share of GDP, which were deflated based on 2008, the unemployment rate, the inflation rate, the minimum wage and the exchange rate.

With this information a database for the period 1980-2013 was generated for each of the variables.

Based on the theoretical elements a multiple linear regression model was developed with variations in the number of independent variables, establishing functional relationships in linear terms and structural form, using the following notation system.

$$GDP_t = \alpha_0 + \alpha_1 GDP_{agrop} + \alpha_2 Tur_t + \alpha_3 \pi_t + \alpha_4 E_t + \alpha_5 W_t + \alpha_6 U_t + \varepsilon_t \quad (1)$$

$$GDP_t = \beta_0 + \beta_1 GDP_{agrop} + \beta_2 Tur_t + \beta_3 \pi_t + \beta_4 E_t + \beta_5 U_t + \nu_t \quad (2)$$

$$GDP_t = \gamma_0 + \gamma_1 GDP_{agrop} + \gamma_2 Tur_t + \gamma_3 \pi_t + \gamma_4 E_t + u_t \quad (3)$$

Where: $\alpha_{0,\ldots,}\ \alpha_n$, $\beta_{0,\ldots,}\ \beta_n$ and $\gamma_{0,\ldots,}\ \gamma_n$= Are the parameters to be estimated for each of the variables; $\mathcal{E}_t$, ν_t and u_t= Are the terms of the error that are introduced in the models and independently and identically distributed with zero mean and constant variance; GDP_t= Gross Domestic Product (millions of pesos, base= 2003); GDP_{agric}= Agricultural sector's share of Gross Domestic Product (millions of 2008 pesos), Tur_t= Tourism revenues (Millions of dollars); U= Unemployment rate (%), π= Inflation rate (%), W= Minimum wage ($/day), E= Real exchange rate ($/Dollar).

ISSN:1390-9959

The equations were estimated by the ordinary least squares (OLS) method using the Statistical Analysis System (SAS) package, and the elasticities of the model were calculated and analyzed. Conclusions based on this work were also drawn.

Results and Discussion

The results obtained from the proposed model allowed us to statistically and economically analyze the parameters obtained.

Statistical analysis of GDP_t

The statistical analysis was based on the following parameters: the coefficient of determination (R^2), the value of calculated F (F_c), the mean squared error, the value of partial t´s for each of the estimators from analysis of variance for each given equation. Finally, to test the statistical significance of the fitted regression equation, we considered the hypothesis H_0: $\beta_1 = \beta_2 = \ldots = \beta_n = 0$ against Ha: $\beta_i \neq 0$ for $i \geq 1$.

The results in Table 1 indicate, for the three models considered, but especially for equation 1, that at a significance level of 0.01, $F_c = 238.02$ is greater than $F_{t,0.1\ (6,\ 27)} = 2.0$, so Ho is rejected in favor of Ha.

Dependent variable	Independent variables					
Equation 1						
GDP_t	**GDPagrop**	**Tur_t**	**π**	**E**	**U_t**	**W_t**
Coefficient	19.11311	194.53082	3822.25782	-165469	32751	-1937.23583
t_c	4.28	3.21	0.90	-1.33	0.53	-0.38
P	0.0002	0.0034	0.3747	0.1937	0.6005	0.7048
R^2= 0.9814						
F-value = 238.02						
Prob>F = <.0001						
Durbin-Watson D 0.936						
Number of observations 34						
1st autocorrelation order 0.401						
EQUATION 2						
GDP_t	**GDPagrop**	**Tur_t**	**π**	**E**	**U_t**	
Coefficient	19.81793	193.46893	2617.13708	-127291	15162	
t_c	4.94	3.25	0.94	-1.75	0.37	
P	<.0001	0.003	0.3563	0.0915	0.7124	
R^2= 0.9813						
F-value= 294.57						
Prob>F=<.0001						
Durbin-Watson D 0.944						
Number of observations 34						
1st autocorrelation order 0.394						
EQUATION 3						
GDP_t	**GDPagrop**	**Tur_t**	**π**	**E**		
Coefficient	19.94253	192.57009	2701.72664	-123231		
t_c	5.07	3.29	0.99	-1.74		
P	<.0001	0.0027	0.3322	0.093		
R^2= 0.9813						
F-value=379.45						
Prob>F=<.0001						
Durbin Watson D 0.924						
Number of observations 34						
1st autocorrelation order 0.398						
tc: t observed value						
P: significance of t observed value						

Indicating that at least one parameter is different from zero, that is, the regression equations are highly significant, implying a high explanatory power of the estimated models.

On the other hand, the variation in GDPt based on the coefficient of determination (R^2) is 98.14% explained by the variables included in the three equations. Regarding the GDP_t model, the variables that were highly significant were: agricultural GDP (GDP_{agrop}), tourism revenues (Tur_t) and the real exchange rate (E), which had reliability values of 0.0002, 0.0034 and 0.1937 respectively and t values of 4.28>1, 3.21>1 and -1.33>1 for each variable, which are significant values indicating that these variables explain GDP. On the other hand, inflation (π), wage (W_t) and unemployment (U_t) were not significant.

The results in Table 1 indicate that, for equation 2, at a significance level of 0.1, F_c =294.57 is greater than $F_{t,\ 0.1\ (5,\ 28)}$=2.06, so Ho is rejected in favor of Ha, indicating that at least one parameter is different from zero, that is, the regression is highly significant, implying a high explanatory power of the estimated model. In the case of GDP variation based on the coefficient of determination (R^2), it is 98.13% explained by agricultural GDP (GDP_{agrop}), tourism revenues (Tur_t), the inflation rate (π), the real exchange rate (E) and the unemployment rate (U_t). For the GDP_t model, the variables that were highly significant were: GDP_{agrop}, Tur_t and E, which had reliability values of 0.0001, 0.0030 and 0.0915 respectively and t values of .94>1, 3.25>1 and -1.75>1 for each of these variables, which are significant values indicating that these variables explain GDP. As in the previous model, inflation (π) and the unemployment rate (U_t), were not significant.

The results in Table 1, relating to equation 3, show that by removing the variables wage and unemployment rate at a significance level of 0.1, F_c =379.45 is greater than $F_{t,\ 0.1\ (5,\ 28)}$=2.06.

So Ho is rejected in favor of Ha, indicating that at least one parameter is different from zero, that is, the regression is highly significant, implying a high explanatory power of the estimated model. Moreover, the coefficient of determination (R^2) indicates that economic growth is 98.13% explained by agricultural GDP (GDP_{agrop}), tourism revenues (Tur_t), the inflation rate (π), and the real exchange rate (E). The variables that were highly significant were: GDP_{agrop}, Tur_t and E, which had reliability values of 0.0001, 0.0027 and 0.0930 respectively and with t values of 5.07>1, 3.29>1 and -1.74>1 for each variable respectively, which are significant values indicating that these variables explain GDP. The only variable that was not significant was (π), as was the case in the results of the first two models.

Economic Analysis

In this section the economic analysis of the coefficients, based on economic theory, is presented.

Economic interpretation of the equations in their structural form

At this point, it is important to analyze the coefficients of the parameters in their structural form, since they allowed us to recognize the consistency of some of the estimates in relation to the established precepts of economic theory.

The estimated model for Gross Domestic Product (GDP_t) was:

$$GDP_t = 38034 + 19.113\,GDP_{agrop} + 194.53\,Tur_t + 3822.2\,\pi_t - 165469\,E_t - 1937.2\,W_t + 32751\,U_t + \varepsilon_t \quad (1)$$

From Equation 1, by increasing agricultural GDP and tourism revenues, the economy would grow; according to the available information, and the period analyzed in this particular study, the variables π, E, U_t and W_t did not show the expected correlations, based on the established precepts of economic theory.

$$GDP_t = -447652 + 19.8\,GDP_{agrop} + 193.4\,Tur_t + 2617\,\pi_t - 127291\,E_t + 15162\,U_t + u_t \quad (2)$$

For equation 2, estimated for the GDP_t model without considering wage (W_t), similar results to those of equation 1 were obtained in terms of the expected correlations based on economic theory, since only in the case of agricultural GDP and tourism revenues were the expected correlations obtained.

$$\widehat{PIB_t} = -453458 + 19.94253 PIB_{agrop} + 192.57009 Tur_t + 2701.72664 \pi_t - 123231 E + \varepsilon_t$$

$$GDP_t = -453458 + 19.9\,GDP_{agrop} + 192.6\,Tur_t + 2701.7\,\pi_t + 123231\,E_t + v_t \quad (3)$$

Equation 3 estimated for the GDP_t model without considering W_t and U_t indicates that by increasing agricultural GDP and tourism revenues, the economy would grow. As in the above equations, π, E, Ut and Wt did not fulfill expectations.

Economic interpretation of the elasticities of structural form

The economic results of the elasticities of structural form for each of the equations are shown in the following table:

Equation 1		Equation 2		Equation 3
$\varepsilon^{GDP}_{GDPagr}$	$\varepsilon^{GDP}_{E} =$	$\varepsilon^{GDP}_{GDPagrop}$	$\varepsilon^{GDP}_{E} =$	$\varepsilon^{GDP}_{GDPag}$
$\varepsilon^{GDP}_{tur} =$	$\varepsilon^{GDP}_{W} =$	$\varepsilon^{GDP}_{Tur} = 0$		$\varepsilon^{GDP}_{Tur} =$
$\varepsilon^{GDP}_{\pi} =$		$\varepsilon^{GDP}_{\pi} = 0$		$\varepsilon^{GDP}_{\pi} =$
$\varepsilon^{GDP}_{u} =$		$\varepsilon^{GDP}_{U} = 0$		$\varepsilon^{GDP}_{E} =$

Table 2 Elasticities of structural form
Source: Author calculations based on the output of the Statistical Analysis System (SAS) package.

Gross Domestic Product (GDP_t)

The GDP elasticities of equation 1, with respect to agricultural GDP (GDP_{agrop}) and tourism revenues (Tur_t), were 0.92263729 and 0.219489284, respectively, which means that with a 10.0% increase in these variables the economy would grow by an average of 9.22 and 2.19%, respectively. GDP elasticity with respect to inflation, the real exchange rate, the unemployment rate and wage did not show the correlations expected by economic theory (see Table 2).

Gross Domestic Product (GDPt) without W_t

The GDP elasticities of equation 2, with respect to agricultural GDP (GDP_{agrop}) and tourism revenues (Tur_t), were 0.956660701 and 0.218291152, respectively, which means that with a 10.0% increase in these variables the economy would grow by an average of 9.56 and 2.18%, respectively. As with Equation 1, GDP elasticity with respect to inflation (π), the real exchange rate (E), the unemployment rate (Ut) and wage (Wt) did not show the expected correlations (See Table 2).

Gross Domestic Product (GDPt) without W_t and U_t

The GDP elasticities of equation 3, with respect to agricultural GDP (GDP_{agrop}) and tourism revenues (Tur_t), were 0.962675453 and 0.217276991, respectively, which means that with a 10.0% increase in these variables the economy would increase by an average of 9.62 and 2.17%, respectively. On the other hand, GDP elasticity with respect to inflation (π), the real exchange rate (E), the unemployment rate (Ut) and wage (Wt) did not show the expected correlations, as shown in Table 2.

Conclusions

Based on the model results, we conclude the following: For the Gross Domestic Product equation, if agricultural GDP and tourism revenues were increased, the economy would grow.

According to Nadal (2001), if the rates provided for in the corn tariff quota system were charged today, and if a mechanism to ensure higher prices to domestic producers were restored, the price to the end consumer of corn flour (tortillas) would probably retain the increases that have occurred in recent years, but not necessarily skyrocket. There are forces on the supply side that would help keep tortilla prices stable. Productivity and yield increases achieved by domestic corn producers would be associated with an increase in the supply of the grain and help maintain a stable final price. Although there are no reliable studies that measure the price elasticity of the corn supply, shortages of this grain would be less severe in many regions and, as a result, its price would fall.

In the event a policy was implemented to support the agricultural sector as a whole, with emphasis on crop diversification, the fall in per-capita GDP of the agricultural sector and the impact on the food supply in Mexico would be reversed, resulting in a positive effect on price stability.

In Mexico the agricultural sector plays a very important role in generating foreign exchange, employment and income. Despite this fact and the need to meet the population's food needs and generate raw materials for other industries, the agricultural sector is barely competitive because it has had to face numerous adverse situations, including natural disasters such as droughts, hail, torrential rains, atypical frost, floods and cyclones. Droughts, up until November 2011, had had a significant impact on agricultural, livestock and forestry activities, causing the loss of 963,000 hectares (ha) corresponding to 4.0% of the 22 million arable hectares, the death of 450,000 head of cattle equivalent to 1.4% of the cattle herd, extensive forest fire damage and a 60-70% decrease in water availability in dams (SAGARPA, 2011).

In addition to the above, the sector has been beset by other problems, including: low levels of physical and human capitalization; inefficiency in post-production processes that increases costs and contributes to higher prices for consumers; large regional differences in production, productivity and income; high poverty levels in the sector; and overexploitation of aquifers (Fadi, 2011). As a result of all this, Mexico is highly dependent on food imports.

ISSN:1390-9959

We concur with one of the underlying themes of the United Nations Conference on Trade and Development (2013), as do several developing countries, that tourism is important for achieving economic progress and poverty reduction. However, it is also clear that the relationship between tourism and economic growth and poverty reduction is not automatic, but depends on tourism to generate employment opportunities, create linkages (particularly with agriculture and the service provider sectors) and encourage the development of basic infrastructure such as roads and airport and port facilities, and the provision of financial services that benefit the economy as a whole. It also depends on tourism development to be guided by a national strategy that provides general policies and regulatory and institutional frameworks with sufficient incentives to stimulate the development of supply capacity in domestic markets. Equally important is the extent to which the national strategy limits financial losses that hurt the economy, which is the eternal problem of many developing countries, and minimizes the negative effects of tourism on the environment and cultural heritage. While the contribution of tourism to structural economic progress and sustainable development is not a new topic on the international agenda, ensuring that tourism is more sustainable and contributes to the achievement of sustainable development objectives in developing countries remains a challenge that requires urgent attention.

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