Inbound tourism and economic growth in Mexico: Long-run evidence

Turismo receptivo y crecimiento económico en México: evidencia de largo plazo

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Abstract

In this paper, we analyze the relationship between Mexico's real GDP and international tourism by means of an ARDL model estimated with quarterly series for the period 1993Q1 – 2017Q3. The results indicate the existence of a long-run relationship, and provide statistical evidence that international tourism has a positive effect on the GDP; although the GDP is inelastic to the changes in tourist arrivals.

Resumen

En este documento se analiza la relación que tienen el PIB real de México y el turismo internacional a través de un modelo ARDL estimado con series trimestrales para el periodo 1993Q1 – 2017Q3. Los resultados señalan la existencia de una relación de largo plazo, y dan evidencia estadística de que el

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efecto del turismo sobre el PIB es positivo, pero también de que el PIB mexicano es inelástico ante las variaciones en la llegada de turistas internacionales.

Introduction

The tourism industry is presently considered one of the largest and most important in the world. Some estimates even predict that in the coming years, this sector will create one in ten jobs (Chou, 2013). Moreover, for several nations, tourism has become a real engine of sustainable development, economic growth, and currency generation (McCatty and Serju, 2006; Touhami, 2014).

Similarly, the development of the tourism sector impacts foreign direct investment (Ferguson, 2010; Işik, 2015), which is reflected either in large-scale private projects such as luxury hotels and resorts or in alternative tourism and backpacker destinations (Ferguson, 2010).

Due to the above, positive effects have arisen from tourism in the fight against poverty that, according to Ferguson (2010), can be summarized in three crucial points: improving macroeconomic conditions through the diversification of the economy and contributions to the balance of payments, facilitating business expansion in developing countries, and job creation.

Indeed, tourism development is seen as a means for growth and progress in nations with high potential for attracting tourists, such as Nigeria (Ezenagu, 2013). In Mali, several projects have been launched to strengthen the connection between tourism and food security (Richardson, 2010). In nations such as Haiti, tourism has been elevated to a priority level by the government, as it is believed to help the country become less dependent on international aid (Kolbe et al., 2013).

In the case of Mexico, according to Girault (2013), the country has several advantages to exploit its tourism potential—for example, a generally pleasant climate, people are perceived as pleasant and hospitable, despite the risks that are sometimes clearly visible—and many opportunities for recreational or cultural activities; in addition to its properties inscribed as World Heritage, which to date add 34 in total—27 cultural, 6 natural, and one mixed (UNESCO, 2018).

Thus, during 2016, Mexico attracted just over 35 million tourists, placing it as number eight among the countries that receive the most significant number of international visitors.

Furthermore, in the same year, it was placed in the 14th position in the world among the nations that attracted more foreign exchange thanks to the tourism sector (Datatur, 2018).

In order to measure the impact of the arrival of international tourists on the economic growth of Mexico, this paper uses an Autoregressive Distributed Lag (ARDL) model, given that this methodology allows proving the existence of cointegration in the framework of a single equation regardless of whether the variables are , , or a combination of both, provided that the order of integration is less than two. Furthermore, it is possible to determine the optimal number of lags for each variable considered (Nkoro and Uko, 2016).

The model was calculated with quarterly series for the 1993Q1 - 2017Q3 period, placing the real logarithm of the Gross Domestic Product (GDP) of Mexico () as depending variable and the logarithm of the number of international tourists who arrived on Mexican soil () as an explanatory variable. The results provide evidence of the positive impact of tourism on the Mexican economy. Moreover, they provide evidence of the existence of a long-term relationship between the variables under study. However, it is found that real GDP is inelastic to variations in the number of tourists, and, through the error correction model, it is found that convergence to equilibrium is slow.

This study consists of three parts, not including the present introduction. The first corresponds to the literature review; the second has been divided into two sections, first presenting the descriptive analysis of the arrival of international tourists to Mexico, and second presenting some indicators of the relationship between the arrival of travelers and the Mexican economy; the third section shows the econometric results. The last section presents the conclusions.

Literature review

Tourist demand is defined, according to Ascanio (2012), by two factors, the first corresponding to the flows of travelers leaving their habitual residence, and the second corresponding to the distribution of such tourist flows in the receiving sites.

For their part, Panosso and Lohmann (2012) specify that tourism demand is the total number of people participating in tourist activities, which is quantified through the number of arrivals or departures of travelers, the total money spent, or other statistical data. While Cárdenas (1990) points out that tourism demand is the set of goods and services effectively requested by the consumer, and, therefore, covers the entire current market.

Thus, according to Bote (1990) and Tribe (2011), the main items tourists spend on are travel, transportation, lodging and food, and other expenses not fully included in tourist packages, for example, excursions and shopping in general.

One of the most widely used ways to approach the effect of tourism demand in nations is to measure the impact of tourist spending on economic growth, as it is of utmost importance to economic and tourism policymakers (Chou, 2013), given that purchases made by international tourists are equivalent to an export to the receiving nation (Acerenza, 2006).

Any sale to a foreign tourist counts as an export, the difference being that in tourism the consumer turns to the supplier, not the other way around, allowing small businesses to enter the global supply chain (UNCTAD, 2007). Conversely, the expenditure made by tourists once outside their country counts as an import for the issuing nation (Boullón, 2009; Seetaram, 2010), and, according to Sosa (2001), imports are a function of income.

It is in this manner that the tourist demand coming from abroad has, as one of its most important determinants, the income level in the issuing nation (Ascanio, 2012; Boer, 2016; Chevillon and Timbeau, 2006; Dahdá, 2003; Panosso and Lohmann, 2012; Stabler *et al*. 2010), because trips for recreational purposes are usually made once the basic needs have been covered (Ascanio, 2012; Kim *et al*., 2012; Panosso and Lohmann, 2012). Although Ripoll (1986) mentions that a low income inhibits travel only to a certain extent since the potential traveler could obtain a credit.

When analyzing the impact that tourism spending will have on the economy of the receiving nation, it is necessary to consider that the dynamizing effect will depend strongly on how high the import content is (Bote, 1990; Hernández, 2004).

There are several studies with results that provide evidence of co-integration between the profits derived from tourism, or tourist spending, and economic growth for nations such as Colombia (Such *et al*., 2009; Brida *et al*., 2011), Greece (Bayramoğlu and Ari, 2015), Mexico (Brida *et al*., 2008c), Nepal (Paudyal, 2012), Singapore (Lean *et al*., 2014), Spain (Balaguer and Cantavella-Jordá, 2002), South Africa (Phiri, 2016), Sri Lanka (Srinivasan *et al*., 2012), Turkey (Akan *et al*., 2007), and Uruguay (Brida *et al*., 2008a).

In the case of panel data studies, Castro-Nuño *et al*. (2013) find, by reviewing different estimates, that the elasticity between GDP and tourism is positive. However, they comment that when tourism is used as the only explanatory variable, the coefficients tend to be overestimated.

In effect, the estimation by panel data of Shakouri *et al*. (2017), for a selection of Asian countries, shows evidence of cointegration between the income generated by tourism and the growth of per capita GDP.

Inversely, Ekanayake and Long (2012) find that the elasticity of GDP, with respect to the income generated by tourism, is positive but not statistically significant. However, given the positivity of the effect, they suggest that the governments of such nations focus on promoting tourism as a potential engine of economic growth.

Another way to approach the effect of tourism demand on national economies has been to measure the impact of traveler arrivals on growth. Eugenio-Martín *et al*. (2004), Kum *et al*. (2015), Lau *et al*. (2008), Loría *et al*. (2017), and Phiri (2016) have found empirical evidence with favorable results for this approach.

In this regard, Phiri (2016) points out that the arrival of international tourists validates the economic growth hypothesis when using linear co-integration methods, but finds no such evidence when using non-linear methods. While the approach of Loría *et al*. (2017), through Okun's Law, makes it possible to verify that the arrival of total travelers also helps reduce the unemployment rate.

When analyzing the results of the estimates, it is relevant to keep in mind that they are sensitive to the specification of the model, and to the selected econometric methodology, in addition to depending on the level of specialization that the nation in question has in tourism (Pablo-Romero and Molina, 2013).

In the same manner, it is necessary to remember that, in order to achieve economic growth via tourism, it is critical to have a developed tourism sector, as well as an adequate integration of it with the rest of the economic activities (Brida *et al*., 2008b). In particular, productive linkages must be created with the food sector and other service provider branches, as well as ensure that the sector is a real source of employment, as in this way tourism will be linked to the fight against poverty (UNCTAD, 2013).

In this sense, Čerović *et al*. (2015) find that tourism has various levels of impact on economies and that it is strongly linked to the diversity and quality of the offer. It is, therefore, necessary to adapt it to international tourism trends, and, as Altimira and Muñoz (2007) comment, it is vital to promote respect for and conservation of the tourism heritage in order to maintain the competitiveness of the sector.

Furthermore, the not strictly economic factors such as the social stability of the regions that receive visitors must be considered, since authors such as Boer (2016), Sánchez, and Cruz (2015), and Sánchez and Cruz (2017) warn that violence has adverse effects on the entry of foreign travelers. In this sense, Andrés-Rosales *et al*. (2018) find that the fall in tourism generated by violence has a direct impact on the well-being of residents, since it stops the creation of temporary jobs and, with it, complementary income, undermining the beneficial effects of tourism.

Finally, this study analyzes the impact of the arrival of international tourists in the Mexican economy through an ARDL model estimated with quarterly series for the 1993Q1 - 2017Q3 period, which places real GDP as a dependent variable and international tourism as an explanatory variable. The results indicate that the arrival of travelers stimulates economic growth,

although the effect can be considered low; in fact, the results indicate that GDP is inelastic to variations in the reception of tourists from abroad. Likewise, the Error Correction Model shows that convergence to equilibrium is slow.

Descriptive analysis of inbound tourism in Mexico

Arrival of international tourists

Mexico has established itself as one of the main tourist destinations, reaching the eighth position among the most visited countries in the world during 2016. Besides, the only setback in the reception of tourists occurred in 2009 (Datatur, 2018), the year of the international financial crisis.

The National Institute of Statistics and Geography (INEGI for its acronym in Spanish) (2018) divides international tourism into two categories: border tourism and international tourism, with both segments showing positive trends during the last years covered by this study (Figure 1).
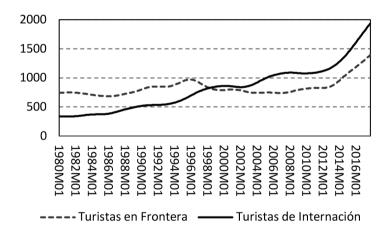

Figure 1. Mexico: trends in border and international tourism in the interior of the country, 1980M1–2017M09

Note: [1]Thousands of people; [2]The trends were obtained by applying the Hodrick-Prescott filter with λ = 14400 as a smoothing parameter to series previously seasonally adjusted with the Census X12 filter

Source: own elaboration with data from INEGI (2018)

Figure 1 shows that in recent years international tourism in the interior of the country has surpassed border tourism, which is extremely important, since, by definition, interna-

tional tourism in the interior of the country is tourism that spends at least one night in some accommodation, and they enter the country either by air or land transportation (Ministry of Tourism, 2008).

For border tourism, it is relevant to note that inflows remained almost stagnant during the past decade, and it is until the first part of the current one that they began to grow, reaching their highest level during the last few months covered by this study (Figure 1). Border tourists access Mexican territory either on foot or by car (INEGI, 2018).

The pronounced rise in the arrival of international tourists in the interior of the country toward the end of the period studied coincides with the exchange instability of the Mexican peso against the U.S. dollar that occurred in those months, which is consistent with what was said by Chevillon and Timbeau (2006).

International growth and tourism

Since 2001 tourism has represented more than 8% of the national GDP for Mexico, reaching its highest participation in the economy during 2008 and 2009, when it represented 8.82% and 8.8% of total real GDP, respectively (Figure 2).
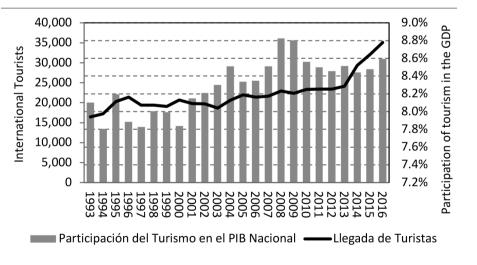

Figure 2. México: tourist arrivals and tourism participation in real GDP, 1993 - 2016

Note: tourists are measured in thousands of people

Source: own elaboration with data from INEGI (2018)

Something that stands out from Figure 2 is that the years of the most significant participation of tourism in the economy have not been those in which the highest number of international tourists have been received, as occurred during 2008 and 2009.

Figure 3 provides evidence of the positive relationship between GDP growth rates and international tourist arrivals.
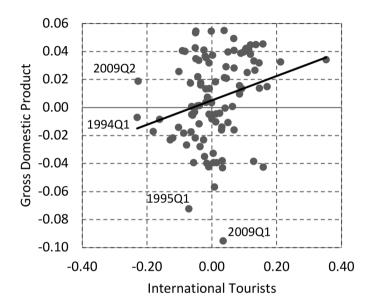

Figure 3. Mexico: growth rates of real GDP and tourist arrivals, 1993Q2 – 2017Q3
Note: the graphic is elaborated with stationary series (Table A1)
Source: own elaboration with data from INEGI (2018)

During the 1995Q1 and 2009Q1 quarters, the Mexican economy suffered sharp declines, both as a result of economic crises. During the second quarter of 2009, there was a sharp drop in inbound tourism that evidences that the sector is susceptible to periods of crisis, as noted by Álvarez (1996).

Another severe fall in the reception of international tourists occurred during the first quarter of 1994, coinciding with the revolt, in the early morning of January 1 of that year, of five municipal seats in the state of Chiapas, among them San Cristóbal de las Casas, by the Zapatista Army of National Liberation. To which the government responded by sending the army to subdue the rebellion, which provoked confrontations that would last for 11 days (Estrada, 2011).

The Granger causality test was applied to support the relationship between tourism growth rates and real GDP presented in Figure 3. Table 1 summarizes the results.

Table 1
Granger causality test

Sample: 1993Q2 2017Q3		
Lags: 1		
Null hypothesis:	F Statistic	P-value
No Granger causes	6.82421	0.0105
No Granger causes	0.70520	0.4032

Note: the test was carried out with stationary series (Table A1)
Source: own elaboration with data from INEGI (2018)

The information in Table 1 indicates that there is a statistically significant relationship between tourist arrivals and economic growth, but not the other way around, which is consistent with what Loría *et al*. (2017) found for the arrival of total international travelers in Mexico.

Econometric Results

In this section, from an ARDL model that has the natural logarithm of the real GDP of Mexico, ln Y, as a dependent variable, and the natural logarithm of the number of international tourists, ln T, as an explanatory variable, the impact of international tourist arrivals on GDP is studied with quarterly series for the 1993Q1 - 2017Q3 period (Figure 4).
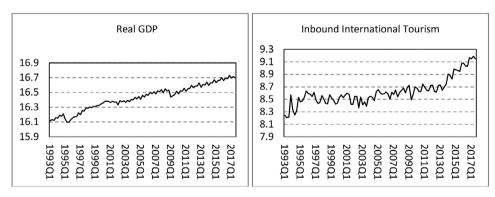

Figure 4. Variables involved in the ARDL model
Note: series in natural logarithms
Source: own elaboration with data from INEGI (2018)

Through the unit root tests: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS), it has been verified that the series In T and In Y are of the integration order one, i.e., I(Table A1).

The model also contains, as static variables, a constant, C, and an intervention variable, d_t, which help correct the structural change in the model and adequately simulate those periods in which the real GDP series presents substantial breaks: 1995Q1, 1995Q2, 1996Q1, 2002Q2, 2008Q2, and 2009Q1.

The Akaike criterion was used to determine the number of retards in the model, allowing a maximum of six laggs in each variable. The criterion indicates that the best estimate is an ARDL(5,2) (Figure A1). Table 2 summarizes the results.

Table 2
ARDL model (5,2)

Dependent variable ln: Y_t		
Variable	Coefficients	P-value
ln Y_{t-1}	0.8298	0.0000***
ln Y_{t-2}	0.2077	0.0096***
ln Y_{t-3}	-0.3137	0.0001***
ln Y_{t-4}	0.6300	0.0000***
ln Y_{t-5}	-0.3922	0.0000***
ln T_t	0.0153	0.4372
ln T_{t-1}	-0.0554	0.0250**
ln T_{t-2}	0.0680	0.0007***
d_t	0.0437	0.0000***
C	0.3949	0.0232**

Note: super-indices ** and *** express significance at 5% and 1%, respectively
Source: own elaboration with data from INEGI (2018)

It was verified that the model properly satisfies the tests of correct specification at the 5% significance level, as well as the tests of goodness of fit.[1] Similarly, the stability of the ARDL was corroborated by the CUSUM and CUSUM Square tests (Figure A2).

The Quandt-Andrews unknown breakpoint test was also performed, finding that in the presence of the intervention variable it is possible to strictly reject the hypothesis of structural

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[1] Jarque-Bera = 1.5718 (0.4557); Breusch-Godfrey LM (12) = 14.6526 (0.2610); White (n. c.) = 5.5156 (0.7872); White (c) = 22.5946 (0.6012); ARCH LM (12) = 18.5517 (0.0999); RESET Ramsey (1) = 0.0167 (0.8973); R^2 = 0.99337; R^2-adjusted = 0.99266; F Statistic = 1399.375 (0.0000)

change, while in the absence of such variable the model suffers from said eventuality (Table A2).

As the last test of the correct specification of the ARDL model, it was verified that it adequately simulated the dependent variable (Figure 5).
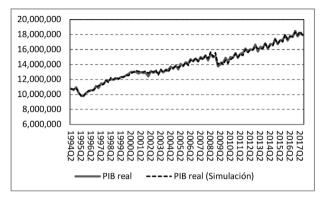

Figure 5. Historical simulation of the ARDL model
Note: the Broyden algorithm was used to simulate real GDP
Source: own elaboration based on the ARDL model (Table 2) and data from INEGI (2018)

As can be seen in Figure 5, the ARDL model adequately captures the main breaks in the real GDP series.

Given that the ARDL model satisfies the correct specification tests, and that the unit root tests indicate that the series used are $I(1)$, the bounds test was applied, which corroborates the existence of a long-term relationship between international tourists and real GDP (Table 3).

Table 3
Limits test

F Statistic = 6.573368	Critical Values	
	Inferior Limit $I(0)$	Superior Limits $I(1)$
Significance level at 10%	3.02	3.51
Significance level at 5%	3.62	4.16
Significance level at 1%	4.94	5.58

Note: null hypothesis: there is no long-term relationship
Source: own elaboration

Table 3 shows that the value of the F statistic exceeds the critical value of limit $I(1)$ at 1% significance, which makes it possible to strictly reject the null hypothesis of the non-existence

of a long-term relationship between the variables under study, thus, it makes sense to estimate the long-term coefficients (Table 4).

Table 4
Long-term coefficients

Dependent Variable: ln Y		
Variable	Coefficients	P-value
C	10.3061	0.0000***
ln T	0.7292	0.0006***
d	1.1418	0.0140**

Note: super-indices ** and *** express the significance at 5% and 1%, respectively
Source: own elaboration based on the ARDL model (Table 2)

The Error Correction Model, ECM, is presented in Table 5, where the error correction term, CE_t, is defined as shown (1):

$$CE_t = \ln Y_t - \left(0.7292 * \ln T_t + 1.1418 * d_t + 10.3061\right) \qquad (1)$$

The ECM indicates that the coefficient associated with CE_{t-1} is negative and statistically significant, as required by the methodology of the ARDL models, given that, according to Nkoro and Uko (2016), such characteristics indicate convergence, so it makes sense to state that there is a long-term relationship.

Thus, the coefficient that corresponds to CE_{t-1} expresses that 4.2% of the real GDP disequilibrium of the previous period is adjusted in the current period (Table 5).

Table 5
Error correction model

Dependent variables: Δln Y_t		
Variable	Coefficients	P-value
Δln Y_{t-1}	-0.1769	0.0339**
Δln Y_{t-2}	0.0495	0.4552
Δln Y_{t-3}	-0.2348	0.0002***
Δln Y_{t-4}	0.3813	0.0000***
Δln Y_t	0.0195	0.3107
Δln T_t	-0.0672	0.0003***
Δln Y_{t-1}	0.0427	0.0000***
CE_{t-1}	-0.0420	0.0000***

Note: super-indices ** and *** express significance at 5% and 1%, respectively
Source: own elaboration from the ARDL model (Table 2)

Based on the results of the correct specifications tests, the bounds tests, and the ECM results, it makes sense to interpret the long-term coefficients (Table 4).

The long-term equation indicates that the effect of international tourist arrivals on real GDP is positive, given that for every 1% growth in tourist arrivals, GDP increases by 0.72%. However, such a result implies that real GDP growth is less than proportional to changes in tourist arrivals, or, in other words, that GDP is inelastic to variations in the number of international tourists.

The above shows that tourist arrivals, while having a positive and statistically significant effect on the economy, also have an impact that can be considered low. Furthermore, the ECM reveals that convergence to equilibrium is slow.

It is important to remark that the variable used to measure tourism demand is the arrival of international tourists, as not all tourist segments generate the same economic impact in the territory where they arrive. Indeed, the people who make up the tourist segments of family and friends, religious tourism, and student tourism, usually make disbursements below the other classifications (Cárdenas, 1990).

Finally, although attracting tourists has a positive effect on the economy, as recommended by Boullón (2009), the aim should be for visitors to feel the desire to spend more, which could be achieved by implementing a strategy to increase the time spent in the country. In the case of inbound tourism, one more day implies at least one extra night and more expenditure on food.

Conclusions

This document has studied the relationship between the real GDP of Mexico and the entry of international tourists, finding, through an ARDL model, estimated with quarterly series for the 1993Q1 - 2017Q3 period, that the arrival of international tourists encourages economic growth. Likewise, using the bounds test, the existence of a long-term relationship between the variables in the study has been found, corroborated with the negative sign of the coefficient of the error correction term.

However, the coefficient associated with international tourists in the long-term equation shows that real GDP growth remains low when tourist arrivals increase. More precisely, the long-term equation shows that real GDP grows by barely 0.72% when tourist arrivals increase by one percentage point.

The above indicates that, during the period of study, Mexican GDP has been inelastic to changes in the arrival on Mexican soil of foreigners and residents from abroad for tourism purposes.

In the same way, in the ECM, the coefficient corresponding to indicates that variables slowly converge to equilibrium. More specifically, it indicates that only 4.2% of the real GDP disequilibrium in the previous period is adjusted in the current period.

By using growth rates, the Granger causality test gives evidence that tourism has a statistically significant impact on real GDP, showing that the variables under study are also related in the short term. Additionally, the slope of the line adjusted by least-squares in the scatter plot indicates that the GDP-inbound tourism ratio is positive (Figure 3).

Thus, while the arrival of international tourists stimulates the economy, strategies must be sought to make it a better promoter of economic growth. In this sense, tourism policy should promote the tourist groups that have the most significant economic impact. In particular, it should encourage the arrival of those travelers who make use of accommodation services, given their higher spending. It is also necessary to promote the desire of visitors to spend more considerable sums during their stay. Of course, this does not mean that segments as crucial as student tourism are neglected, since, through a pleasant experience during their stay, they could become real promoters of the country once they have returned to their nations of residence, as Cárdenas (1990) points out.

Furthermore, efforts should be made to conserve the national tourism heritage and, where appropriate, to update and modernize it since tourism demand responds to the quality and diversity of supply.

Finally, it will be necessary to pay attention to factors such as the security provided in tourist sites, not only to preserve or increase the level of tourist demand, but also for the quality of life of residents, both those whose income depends on tourists, and those who are not dependent on them.

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Annex

Unit root tests and correct specification

Table A1
Unit root tests, 1993Q1 − 2017Q3

Series	ADF			PP			KPSS	
	A	B	C	A	B	C	A	B
ln T	0.285	1.738	1.997	-3.683*	-2.003	2.277	0.230	1.081
ln Y	-3.318	-2.041	3.789	-5.213*	-0.908	4.575	0.147	1.299
Δ ln T	-12.75*	-5.219*	-4.752*	-16.75*	-16.21*	-13.22*	0.139*	0.176*
Δln Y	-4.290*	-4.314*	-3.434*	-20.70*	-20.77*	-18.40*	0.074*	0.104*

Notes: [1/]A.- Tests with constant and trend, B.- Tests with just the constant, C.- Tests without constant or trend [2/]
*The hypothesis of unitary root at a 5% significance is rejected
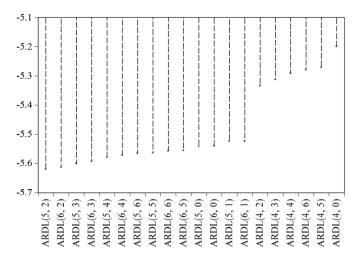Source: own elaboration with data from INEGI (2018)

Figure A1. Akaike Criteria for the selection of ARDL model lags
Note: The figure shows the best 20 models according to Akaike's criteria
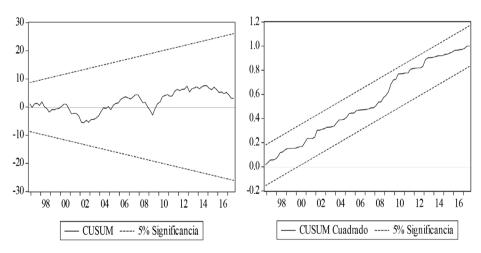Source: own elaboration

Figure A2. CUSUM and CUSUM Square Stability Tests
Source: own elaboration

Structural Change Tests

The Quandt-Andrews unknown breakpoint test is present, which shows that the model suffers from structural change in the absence of the intervention variable, which is corrected by adding the dummy as an exogenous variable in the ARDL model.

Table A2
Quandt-Andrews Unknown Breakpoint Test

Test	Without *dummy*		With *dummy*	
	Statistic	P-value	Statistic	P-value
Maximum LR F-statistic (2009Q3)	2.9659	0.0319	2.3118	0.1478
Maximum Wald F-statistic (2009Q3)	26.6932	0.0319	23.118	0.1478
Exp LR F-statistic	0.7789	0.2275	0.5485	0.6183
Exp Wald F-statistic	10.5697	0.0208	7.6857	0.2292
Ave LR F-statistic	1.4150	0.0999	1.0678	0.3587
Ave Wald F-statistic	12.7356	0.0999	10.6783	0.3587

Note: sample of the equation: 1994Q2-2017Q3; sample of the equation: 1998Q1-2014Q1; 15% of omitted data;
number of breakpoints compared: 65
Source: own elaboration based on the ARDL model