



# Fiscal sustainability, productive investment, and economic growth in Mexico

## *Sostenibilidad fiscal, la inversión productiva y el crecimiento económico en México*

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### Abstract

Higher government spending generates economic expansion, but a growing fiscal deficit could be a risk; since it could generate financial crises. It is necessary to have indexes to determine how sustainable fiscal policy would be in different scenarios of debt, total investment, and GDP growth. Based on estimates from a macroeconomic model, we find that if we compare debt sustainability between a baseline and an alternative scenario, in which productive investment increases and the economic growth and deficit sustainability improve. We conclude that a balance between growth and fiscal sustainability in Mexico is possible.

*JEL Code:* C32, E62, H68

*Keywords:* simultaneous equations model; fiscal policy; debt sustainability; public investment; GDP

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## Resumen

Un mayor gasto gubernamental genera expansión económica, pero un déficit fiscal creciente podría ser un riesgo; ya que podría generar crisis financieras. El concepto de sostenibilidad fiscal, hace referencia a la conducción de las finanzas públicas en la que el gasto público no crezca por encima de los ingresos, de forma que se circunscriba el déficit fiscal para que la deuda pública no progrese más allá de la capacidad de desembolso del país. Es necesario tener índices para determinar qué tan sostenible sería la política fiscal en diferentes escenarios de deuda, inversión total y crecimiento del PIB. Con base en estimaciones de un modelo macroeconómico encontramos que si comparamos la sostenibilidad de la deuda entre una línea basal y un escenario alternativo, en el que la inversión productiva aumenta, el crecimiento económico y la sostenibilidad del déficit mejoran. Concluimos que si es posible encontrar un balance entre crecimiento y sostenibilidad fiscal en México.

Código JEL: C32, E62, H68

Palabras clave: modelo de ecuaciones simultáneas; política fiscal; sostenibilidad de la deuda; inversión pública; PIB

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## Introduction

A country's fiscal sustainability is achieved when public debt as a proportion of GDP remains constant at an estimated adequate level or progressively decreases from an inadequate level. In other words, fiscal sustainability refers to the conduct of public finances in which government spending does not grow above revenues so that public debt does not advance beyond the country's disbursement capacity (Blanchard, 1990; Landolfo, 2012; Talvi & Végh, 1998). Consequently, fiscal authorities in emerging countries must strike a balance between the need to increase their spending on productive public investment and the requirement to maintain a sustainable fiscal deficit. According to Smith, Park, and Liu (2019), subnational fiscal sustainability improves when central governments have clear rules for intergovernmental transfers and more liberal (market) policies, while when subnational governments have greater fiscal capacity and fewer intergovernmental transfers, they can manage their debt more soundly.

The problems of unsustainability in fiscal policy have been most evident in countries such as Costa Rica, El Salvador, Guatemala, and Nicaragua during the 1990s. The response of these countries was to make annual adjustments in the primary fiscal result. Central American countries have reported no difficulties negotiating, contracting, and granting loans with multilateral organizations or governments, which is a positive sign of the rest of the world's view of the region. El Salvador, the Dominican Republic, and, to a lesser extent, Costa Rica and Guatemala have been able to place debt instruments at relatively low-interest rates as a result of a positive perception of international markets (CEMCA, 2002).

In this context, an interesting phenomenon has taken place in Mexico. According to Solís and Villagómez (1999), using the methodology of Uctum and Wickens (1996), fiscal policy was sustainable during 1980-1997. On the other hand, Arellano and Hernández (2006) obtained similar results; however, when including other contingent liabilities, they concluded that fiscal policy was unsustainable for the period 1980-2003. In other words, when there was an opportunity for a higher level of sustainable fiscal deficit due to increased oil revenues, government spending was not allocated to productive investment but to current spending aimed at expanding the bureaucratic apparatus. In fact, on average, current spending has always been higher than capital spending in the last three six-year periods, 19.2% and 4% of GDP, respectively. Thus, Mexico's long experience suggests that, in the current circumstances, the necessary condition for effective fiscal policy is that the deficit must be sustainable and appropriately financed so that it does not generate speculative crises. Using a fiscal reaction function, Catalán (2013) found that fiscal policy is incompatible with the intertemporal budget constraint and that Mexico was in a position of fiscal unsustainability.

A sufficient condition for government spending to be fruitful is that a good part of the expenditure is allocated to public investment in productive infrastructure and supply of public goods (Stiglitz, 2012; Casar, 2020), and not to current spending, while promoting a more equitable income distribution. This is even more justified because productive investment is an engine of the economy that not only drives aggregate demand and boosts private sector investment spending but also increases aggregate supply capacities by strengthening productivity. According to municipal data from the Federal Government in Mexico from 2000 to 2017, there is a large fiscal gap, and besides, more autonomy in financial decision making is required at the local level (Jiménez & Smith, 2019).

Currently, Mexico needs to resolve this situation: it needs to increase public investment significantly in order to increase economic growth and, at the same time, keep the fiscal deficit at a sustainable level. Thus, it is necessary to have quantitative knowledge of the possible scenarios of sustainable deficits that would maximize the level of output, employment, and welfare of the population, without forgetting that the appropriate choice of deficit financing sources is also extremely important. The information from quantitative simulations will allow for better management of fiscal variables without having to take the implementation of restrictive policy to the extreme—such as seeking a fiscal surplus—which could stagnate the economy. Thus, the questions are: What is the level of fiscal deficit that is sustainable and compatible with higher economic growth and that will help reactivate productive investment and future tax collection? What sustainable deficit level would not generate financial instability considering the national and international context?

This document seeks to provide an estimate of the highest possible level of productive investment and economic growth that will ensure the sustainability of Mexico's deficit in the 2008-2023 period, and that will not jeopardize the economic policy strategy in the near future. To achieve the above, a cointegrated simultaneous equations econometric model was used. This model makes it possible to make projections of the impact of government spending on investment on the variables to calculate the measures of fiscal deficit sustainability proposed by Blanchard (1990) and Talvi and Végh (1998). In other words, the basis for sustainability estimates is the figures of a public and private investment scenario resulting from a macro-econometric model. This scenario marks a possible path of robust economic growth that would also generate public revenues to make the fiscal deficit sustainable in the medium and long term.

Empirical findings suggest that if the public and private sectors, in combination, were to invest an amount equivalent to 23% of GDP, economic growth would be close to 4% in 2023 and there would be a sustainable deficit over the entire period, according to typical sustainability indicators. Specifically, this is a likely scenario with no pressure of fiscal unsustainability that would occur if the government were to increase public investment to 5 percent of GDP and if the private sector were to raise its investment spending to 18 percent of GDP. As a result of this simulation, it is inferred that in the Mexican economy, there would be no need to maintain a fiscal surplus and limit the growth of government investment in infrastructure. Rather, a balance could be maintained between achieving a controlled deficit and increasing government spending on productive investment. This, in turn, is a formula that would make it possible to finance—with higher tax revenues—the expansion of social programs aimed at generating welfare among the most disadvantaged population.

The article is structured as follows: the second section briefly presents the theoretical framework. The third section analyzes the evolution of economic growth, investment, and public finances. In the fourth section, the suggested methodologies and methodological adaptation for analyzing the sustainability of fiscal positions are reviewed. The fifth section develops the analysis of sustainability in Mexico. Finally, the sixth section draws a conclusion.

### **Theoretical framework: Fiscal deficit sustainability and economic growth**

In an emerging economy with unemployment, aggregate demand sets the pace for production in the short term. In principle, the government could shape the level of demand and employment by using an expansionary fiscal policy. Nonetheless, in economies with high levels of financial openness and external debt, one of the constraints on government spending policy is the sustainability of the public deficit. In

the medium term, if an economy were to achieve higher economic growth, revenues could increase, and public sector revenues could exceed expenditures and enable a higher level of sustainable fiscal deficit. Nevertheless, in the absence of productive public investment, economic growth and higher tax revenues, the public deficit's future unsustainability could threaten any expansionary economic policy.

In this context, an alternative sustainable fiscal policy path is possible when the increase in government spending is channeled to productive investment, boosting the demand for goods in the short term and productivity growth in the medium and long term. Stronger potential growth would improve tax bases and thus increase longer-term government revenues. This would make it possible to consolidate public debt without major adjustments and, therefore, modify the country's future tax or spending responses.

In the economic literature, the sustainability of the public deficit is determined by past fiscal deficits and debt repayment. The following is a description of the debt sustainability scheme (Landolfo, 2008; Blanchard, 1990; Talvi & Végh, 1998). Public debt  $b_t$  at the beginning of fiscal year  $t$  can be expressed as:

$$b_t = b_{t-1} + r_t b_{t-1} + g_{t-1} - \tau_{t-1} \quad (1)$$

Where  $b_{t-1}$  is the accumulated government debt at the end of period  $t-1$ ,  $r_t$  is the real interest rate adjusted by the GDP growth rate at the beginning of year  $t$ , i.e.,  $r_t = i_t - \pi_t - \rho_t$ ; where  $i_t$ ,  $\pi_t$  and  $\rho_t$  are the nominal interest rate, inflation, and GDP growth rate, respectively.  $r_t b_{t-1}$  is the interest payment at the beginning of fiscal year  $t$ ,  $g_{t-1}$  is the interest-free government expenditure during fiscal year  $t-1$ , and  $\tau_{t-1}$  is the net tax revenue from transfers during fiscal year  $t-1$ . Thus, the equation of the government budget constraint can be written as follows:

$$b_t = d_{t-1} + (1 + r_t)b_{t-1} \quad (2)$$

By rearranging (2), the following expression is obtained:

$$\Delta b_t = d_{t-1} + r_t b_{t-1} \quad (3)$$

Where  $d_{t-1} = g_{t-1} - \tau_{t-1}$  is the percentage of the government's primary balance for the GDP generated during fiscal year  $t-1$ , which can be a surplus or a deficit.

The recursive solution of equation (3) shown in (4) suggests that the change in debt should cover the primary balance (revenues minus expenses) plus debt service payments.

$$b_t = E_t \beta_{t,n} b_{t+n} - E_t \sum_{i=1}^n \beta_{t,i} d_{t-1+i}, \quad (4)$$

Where  $\beta_{t,n}$ , is the time variation of the real discount factor adjusted by the GDP growth rate, which is defined as  $\beta_{t,n} = \prod_{j=1}^n (1 + r_{t+j})^{-1}$ .

In other words, the theory states that fiscal policy is sustainable in the long run if the present value of public debt is equal to the present value of future fiscal surpluses  $b_t = - \lim_{n \rightarrow \infty} E_t \sum_{i=1}^n \beta_{t,i} d_{t-1+i}$ . The necessary condition for sustainability is:  $\lim_{n \rightarrow \infty} E_{t,n} \beta_{t+n} = 0$ , i.e., no new debt must be issued to pay interest on the debt in period  $t-1$ .

When there is a public deficit (revenues less than expenditures), it is necessary to resort to internal or external indebtedness. Thus, the level of indebtedness is related to a fiscal surplus in the future, as there would be pressures of fiscal unsustainability. For debt to be sustainable, revenues and expenditures must evolve jointly. However, higher economic growth, resulting from greater productive investment, would enable higher revenues than expenditures and, therefore, a sustainable level of public deficit in the present that can be paid in the future with greater certainty.

The econometric literature on the subject suggests that statistical tests of stationarity of public debt and cointegration tests between government revenue and government spending (or between public debt and primary deficit) can be performed to determine debt sustainability. Authors such as Hamilton and Flavin (1986) state that in order to have a sustainable debt, both the primary balance and the public debt must be stationary or integrated series of order 1. The stationarity of the time series is a sufficient, but not necessary, condition to ensure sustainability because fiscal policy can be sustainable even when debt is not a stationary process. On the other hand, Trehan and Walsh (1988) suggested that if debt is  $I(1)$  and the real interest rate is constant, a sufficient and necessary condition for sustainability is that debt and the primary fiscal balance ( $d_{t-1}$ ,  $b_{t-1}$ ) cointegrate. Subsequently, the authors found that a sufficient condition for maintaining sustainability is that the deficit is generally stationary. Hakkio and Rush (1991) point out that when government spending and taxes do not cointegrate, fiscal deficits are unsustainable. On the other hand, when there is cointegration and the coefficient is equal to unity ( $b=1$ ), the deficit is considered sustainable; when the coefficient is less than unity ( $b<1$ ), it means that government expenditures are growing at a faster rate than revenues; therefore, the fiscal deficit is unsustainable.

Wilcox (1989) showed that when the transversality condition holds, the present value of public debt is a stationary series and has an unconditional mean of zero.

## Economic growth, productive investment, and public finances in Mexico, 1990-2018

Table 1 shows the growth rate of GDP, debt, private investment, private consumption, and current and capital spending as proportions of GDP, by six-year periods, from 1990 to 2018. The dramatic increase in debt that took place mainly in the last two six-year periods did not generate sustained economic growth in Mexico. In fact, given that the external sector had no net positive impact on GDP growth in this period, it can be inferred that the sources that actually stimulated aggregate demand and growth were private spending and government spending. However, since government spending on productive investment did not grow, private and current spending should have driven growth, but they could not generate a sustained growth path.

Table 1  
 GDP growth rate and fiscal variables by six-year period (1990-2018)

Period	GDP Annual variation rate	Debt (% GDP)	Private investment (% GDP)	Private consumption (% GDP)	Current expense <sup>1</sup> (% GDP)	Capital expenditure <sup>1</sup> (% GDP)
(1990-1994)*	4.0	30.8	18.3	62.2	16.3	3.0
(1995-2000)	3.4	25.2	16.0	62.7	15.6	2.6
(2001-2006)	2.0	20.9	15.2	68.5	17.4	2.8
(2007-2012)	1.8	28.1	16.6	67.8	19.6	4.6
(2013-2018)	2.4	43.5	17.4	66.4	20.6	4.7

Source: created by the author with data from INEGI (2018) and SHCP (2018)

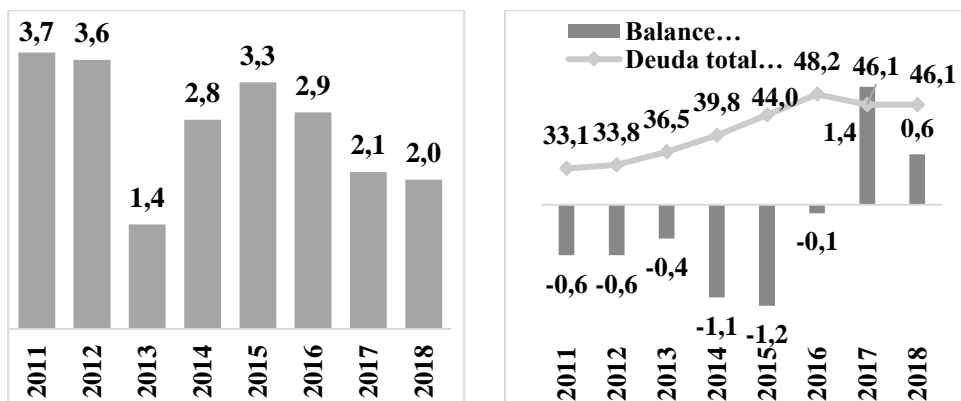
Note: (\*) GDP and Private Investment data are available from 1993 onwards. Information for the other variables is available from 1990 onwards.

(1) Current and Capital Spending add up to Total Public Sector Spending

Moreover, private consumption and investment behaved erratically, increasing in some periods and decreasing in others. Apparently, the only component of aggregate demand that showed sustained growth throughout the period was public sector current spending. In contrast, government productive

capital spending was always an adjustment variable that never increased significantly. For example, in the period 2007-2012, there was higher public indebtedness compared to the previous six-year period, since the debt increased by about 7 percentage points. Nevertheless, current spending grew faster and continued to have a higher level, especially in the context of a fiscal policy against the effects of the 2008 crisis. During the 2013-2018 six-year term, debt increased even more dramatically by around 15 percentage points, and current spending continued to have the greatest weight among government spending items. It is very likely that the increase in autonomous demand based on current spending could explain part of the expansion of gross domestic product in these periods. However, if the government does not spend on capital goods that strengthen the productive apparatus, and if the expansion is based on current spending, such as the expansion of the bureaucratic apparatus, its effect would be very short-term.

Although the public deficit increased consistently over several periods, the necessary foundations were not built to generate sustained growth in the medium and long term. In fact, it only increased exposure to financial crises, as debt levels were higher than 40 percent of GDP, which increased the possibility of greater unsustainability of the public deficit. Thus, Mexico squandered the opportunity to sustain a growing deficit spending in some periods because spending was not directed to strategic sectors, and there was no correction in productive imbalances, undermining the future possibilities of long-term growth. After 2016, the government worked to maintain a surplus primary balance, abruptly curbing government spending that had been a driver of economic growth.



(a) Real Gross Domestic Product  
(Annual variation, % )

(b) Primary balance and total net debt (% of GDP)

Figure 1. Source: created by the author with data from INEGI (2018) and SHCP (2018)



Although the government pursued a policy of spending restraint starting in 2016, the deficit has widened as interest payments on the debt have gradually increased. With low growth and no tax reform, the level of public revenue remains unchanged, and there is no possibility of expansionary fiscal policy (Basilio, 2018). Table 2 suggests that since 1990, taxes on goods and services, income, and others only contribute 9.4% of GDP to the public sector. Oil revenues, which had been the second largest source of public sector financing, only represent about 5.8% of GDP since 1990. Meanwhile, the Federal Electricity Commission, royalties, revenues, and direct budgetary control agencies have only contributed an average of 5.4% of GDP. As can be seen, oil revenues only presented a large variation during 2001 and 2018, given that they depend on the evolution of the international price of crude oil, PEMEX's production level, and exchange rate fluctuations.

Table 2  
 Composition of Income and Expenditure by six-year periods as a percentage of GDP (1990-2018)

Period	Revenues				Expenditures		
	Total	Oil	Tax	Others	Total	Current	Capital
1990-1994	20.1	4.5	8.9	6.8	19.3	16.3	3.0
1995-2000	17.6	4.8	8.1	4.8	18.2	15.6	2.6
2001-2006	19.8	6.1	9.1	4.6	20.2	17.4	2.8
2007-2012	22.4	8.4	8.8	5.3	24.1	19.6	4.6
2013-2018	22.9	5.3	12.0	5.7	25.4	20.6	4.7
Average	20.6	5.8	9.4	5.4	21.4	17.9	3.5

Source: created by the author with data from INEGI (2018) and SHCP (2018).

The government has reduced its dependence on oil revenues and increased revenue generation from collections, for example, during 2012-2018. However, Figure 2 suggests that tax revenues are strongly associated with changes in GDP. As long as there is no economic growth and no fiscal reform, there will be no possibility of reducing the vulnerability of public finances.

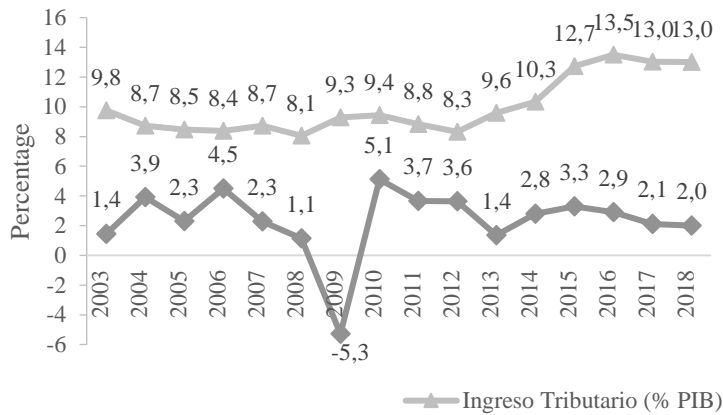


Figure 2. Tax revenues as a share of GDP and GDP Growth  
 Source: created by the author based on data from INEGI (2018) and SHCP (2018).

In short, the public sector has a huge challenge: to spend on productive investment, but with more limited revenues. This implies overcoming fiscal policy strategies that have favored current spending at the expense of public investment. The history of fiscal policy in Mexico suggests that growth has not been sustainable because it has been based on current spending increases that privileged the bureaucratic apparatus's expansion.

The question to be answered is: is there a possibility that the debt/GDP ratio will be sustainable with a higher level of public spending on long-term productive investment? The econometric methodology for projecting fiscal variables and the indicators used to estimate the sustainability of fiscal policy are reviewed below.

## Methodology

### *Macroeconometric model for forecasting fiscal variables*

To calculate the fiscal sustainability indicators, a Cointegrated Simultaneous Equation System (SES) was used to forecast and estimate scenarios of the required variables. The SES model includes the main variables of the Mexican economy and is initially specified as a set of distributed lag models (DLA). If

the series are I(1) and cointegrate, the ADL models are re-specified as error-correcting models (ECM) (Mills, 2019).

The specification of the ADL and ECM models follows the relationships suggested by economic theory. The SES model is composed of 89 endogenous variables with quarterly frequency from 1997 to 2019. It comprises six blocks that specify the relationship between macroeconomic variables and those of monetary, fiscal, and exchange rate policy. The SES blocks are: 1) the real economy block, 2) the price block, 3) the monetary policy block, 4) the fiscal policy block, 5) the employment and real wage block and, finally, 6) the external block. It is important to mention that unit root tests were performed to verify the order of integration of the series and, thereby, to decide the appropriate type of model for each specification. Only those equations where the series were I(1) and cointegrated were specified as ECM models. Tests for correct specifications were also performed. After specifying the equations, the cointegrated multi-equation model is estimated. Finally, the model is validated with the correct model specification test and in-sample and out-of-sample simulation tests are carried out to evaluate the model's predictive capability. The model equations used can be found in the appendix.

### *Main fiscal sustainability indicators*

Different indicators have been constructed in the empirical literature to determine whether the fiscal policy implemented by a government is sustainable based on the theory of the second section. Econometric methods include stationarity tests for revenues, expenditures, and debt as a share of GDP. More complex indicators include calculations based on primary balance information, real interest rate, and GDP growth (Talvi & Végh, 1998; Landolfo, 2008; Blanchard, 1990; CMCA, 2002).

In order to analyze the sustainability of Mexican fiscal policy, the following introduces the basic concepts of fiscal accounting and presents the indicators suggested by the literature. Since econometric tests of cointegration and stationarity are only indicative, authors such as Blanchard (1990) and Talvi and Végh (1998) suggest the construction of fiscal sustainability indicators that follow the theoretical framework described in the second section. These indicators include key economic variables such as interest rates and economic growth. The following is a brief description of the indicators and strategies for estimating the indicators to determine the sustainability of the fiscal deficit.

### *Blanchard's (1990) short-term tax gap*

The short and medium-term tax gap is based on the dynamic government budget constraint proposed by Blanchard (1990):

$$\frac{dB}{ds} = G + H - I + rB = D + r \quad (5)$$

Where  $B$  is real debt,  $G$  is government spending on goods and services,  $H$  is transfers,  $T$  is taxes,  $D$  is the primary deficit ( $G+H-T$ ), and  $r$  is the real interest rate.  $s$  refers to time.

From the above equation, the author derives the following tax gap equation:

$$t_0^* - t = (r - \theta)b_0 - \quad (6)$$

Where  $t_0^*$  is the sustainable tax revenue/GDP,  $t$  the observed tax revenue/GDP,  $d$  the primary fiscal outcome/GDP,  $r$  the real interest rate,  $\theta$  the economic growth rate, and  $b_0$  the initial debt/GDP.

Equation (6) indicates the magnitude of adjustment in tax revenue/GDP necessary to stabilize the previous period's public debt/GDP ratio, given the paths of the primary balance, the real interest rate, and output growth at constant prices. Blanchard (1990) recommends using real interest rates and real GDP growth. The necessary and sufficient condition to state that there is no fiscal unsustainability is obtained when:  $(r - \theta)b_0 \leq d$ .

### *Talvi and Végh (1998) fiscal sustainability indicator*

Talvi and Végh's (1998) fiscal sustainability indicator is based on the following budget constraint:

$$b_t = (1 + i)B_{t-1} + M_{t-1} - M_t + G_t - T_t \quad (7)$$

where  $M_{t-1}$  is the monetary base.

The authors assume a monetary multiplier equal to one and that seigniorage/GDP revenues are negligible or zero. After a series of derivations, they obtain the following expression:

$$I_t^* = \left( \frac{r - \theta}{1 + \theta} \right) \tilde{b}_{t-1} - \tilde{d}_t^* \quad (8)$$

Where  $I_t^*$  is the fiscal sustainability indicator,  $\tilde{b}_{t-1}$  is the debt/GDP in the initial period, and  $\tilde{d}_t^*$  is the permanent primary fiscal outcome/GDP.

A necessary and sufficient condition beyond which there is no unsustainability in fiscal policy is obtained when  $\left( \frac{r - \theta}{1 + \theta} \right) \tilde{b}_{t-1} < \tilde{d}_t^*$ . The criteria for deciding whether there is evidence of fiscal unsustainability are:  $I_t^* \leq 0$ , the planned fiscal policy as of  $t$  is not unsustainable in an ex-ante sense since the permanent primary fiscal outcome is greater than or equal to the effective interest payment on the initial debt. When  $I_t^* > 0$ , the ex-ante planned fiscal policy shows unsustainability problems, as the planned permanent primary fiscal outcome is insufficient to cover the effective interest payment on public debt.

## Results and discussion

For the empirical analysis of the impact of a potential increase in productive investment and its association with debt sustainability<sup>1</sup>, two scenarios were simulated with the Cointegrated Simultaneous Equations model, and, for each scenario, the indicators of Blanchard (1990) and Talvi and Végh (1998) were estimated. Table 3 reports the evidence of fiscal sustainability for the baseline scenario and for an alternative scenario with higher productive investment. The estimates of the sustainability equations (6) and (8) are based on the SES model that allows the required macroeconomic variables to be projected. The series for the baseline were forecast for the period 2020-2023, with data through 2018<sup>2</sup>. The projections for the alternative scenario are generated under the assumption of an increase in total investment from 21% to 23%, as a percentage of GDP, starting in 2020. Specifically, in the alternative scenario, it can be assumed that private investment increases from 17% to 18% of GDP and that public investment increases from 3.5% to 5% of GDP in the period 2020-2023.

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<sup>1</sup>A first method was applied to determine whether the current fiscal policy is sustainable. Unit root tests were performed on the series of public debt, revenues, and expenditures as a proportion of GDP, as suggested by Hamilton and Flavin (1986) and Landolfo (2008). If the series is stationary or zero-order integrated, then the fiscal policy is sustainable. The findings suggest that debt as a share of GDP is an integrated series of order I(1) according to the Augmented Dickey-Fuller and Phillips Perron tests (see Table 1A in the Statistical Appendix). It is important to mention that this test is only indicative of debt sustainability.

<sup>2</sup>These estimates were made without taking into account data from 2019 onwards and without taking into account the COVID-19 crisis, which will certainly affect the estimates.

The simulation result of the alternative scenario suggests that such an increase in total investment would allow GDP to grow steadily to a rate of 3.9 percent in 2023 (see Table 4a in the appendix). Table 3 below reports whether fiscal sustainability exists, according to the two indicators calculated, for the historical debt series and its trend forecast in columns 1 and 2. It shows that the debt was sustainable in the historical period 2010-2017 since it is fulfilled that  $(r - \theta) b_0 \leq d$ . However, if there is no change in the ratio of public to private investment—assuming other demand factors are constant—then debt would not be sustainable in the 2020-2023 baseline forecast. In contrast, columns 3 and 4 show that there would be sustainability in the alternative investment scenario in the 2021-2023 simulation period.

Thus, the comparison of both scenarios provides evidence that there would be growth and debt sustainability at the same time, if public investment in productive infrastructure in the economy is increased. It should be noted that the Blanchard indicator is a more reliable test than the criteria based on stationarity tests of the public debt time series, since it considers the real interest rate, real economic growth, and the debt/GDP ratio of the previous period.

Additionally, the Talvi and Végh indicator confirms the previous results. On the one hand, the fiscal policy conducted by the government in the 2009-2017 period was sustainable, as the condition  $\left(\frac{r-\theta}{1+\theta}\right) \tilde{b}_{t-1} \leq \tilde{d}_t$  was fulfilled. On the other hand, as of 2018, fiscal unsustainability arises. Similarly, the Talvi and Vegh indicator concludes that there would be fiscal sustainability in the simulation scenario with higher productive public investment. In conclusion, both indicators offer the same evidence, and the results can be considered statistically robust.

Table 3  
 Is the fiscal deficit in Mexico sustainable?

Methodology	Baseline		Scenario of investment increasing to 23% of GDP		
	Blanchard (1990) (1)	Talvi and Végh (1998) (2)	Blanchard (1990) (3)	Talvi and Végh (1998) (4)	Végh
2008	No	No			
2009	No	Yes			
2010	Yes	Yes			
2011	Yes	Yes			
2012	Yes	Yes			
2013	Yes	Yes			
2014	Yes	Yes			
2015	Yes	Yes			
2016	Yes	Yes			

2017	Yes	Yes		
2018	No	No		
2019	No	No	No	No
2020	No	No	No	No
2021	No	No	Yes	Yes
2022	No	No	Yes	Yes
2023	No	No	Yes	Yes

Source: created by the author based on SES model and Sustainability indicators

The conclusion in each year is based on the fulfillment of the criteria derived from equations (6) and (8):

$$(r - \theta)b_0 \leq d \text{ and } \left(\frac{r-\theta}{1+\theta}\right) \bar{d}_{t-1} < \bar{d}_t^*$$

It is important to emphasize that both indicators consistently suggest that Mexico's public debt could be considered unsustainable from 2018 through 2023 if economic conditions remain unchanged. This is thought-provoking, as the Mexican government had initiated measures to correct this situation since 2017. In fact, to correct fiscal unsustainability, the fiscal authorities proposed maintaining a fiscal surplus from 2018 onwards. Thus, the deficit became unsustainable in a context in which economic growth deteriorated, spending became more focused on current expenditure, and tax revenues did not grow. It is inferred that an alternative route to promote better fiscal management in Mexico without generating instability and uncertainty would be to increase the share of total productive investment and economic growth. This strategy should consider a public-private plan to increase investment by more than three percentage points over the remainder of the six-year term.

As such, if it is assumed that no fiscal reform will take place in Mexico in the next few years, then a higher deficit as a proportion of GDP can only be maintained with sustained economic growth. As mentioned, the destination of capital spending is extremely important for growth with sustainable fiscal deficits. Investment should be directed to high-value-added sectors that generate short-term economic growth and strengthen long-term productivity and tax revenues.

Investment in public works could be an excellent option, as it attracts private investment. That is, if the limited fiscal space is used to invest in productive investment projects, then it could generate economic growth and, consequently, new tax revenues that would increase the possibility that the deficit would be sustainable and would not generate speculative runs against the Mexican peso. Also, the dependence of Mexican public sector revenues on the oil sector must be reduced. These are major structural changes but necessary for the Mexican economy.

The room for maneuvering to increase the deficit is limited in the short term. It is not possible to further increase indebtedness in order to promote growth without generating more and more financial uncertainty, which is an important factor to consider in an economy with a free flow of capital like Mexico's. Thus, faced with the possibility of a future scenario with an unsustainable debt level, the fiscal

authorities have decided to maintain a primary surplus as the main fiscal policy target, which avoids uncertainty but generates lower economic growth and fewer possibilities for revenue collection. The policy of maintaining a primary surplus for a long time is incompatible with a growing economy and, in the long run, could lead to a weakening of the capacity to generate jobs and growth. Rather, a balance must be found between the fiscal deficit and the need to spend on productive investment. An alternative is to reallocate part of the current expenditure to capital expenditure, which, as the simulations show, would not increase the deficit, and would allow the investment coefficient in the economy to rise, thus moving toward an alternative scenario. All this without abandoning social spending, which allows for greater income redistribution, higher private consumption, and economic growth. In this context, if the government's objective is not to increase its fiscal deficit, then there would be no economic agent to take the lead in promoting growth, which could further deepen a situation of productive stagnation. The state must regain its leadership in generating growth and well-being for the Mexican population.

## **Conclusions**

When comparing public debt sustainability results between an inertial situation and an alternative scenario, it is clear that Mexico requires greater productive public investment to grow and reduce the risks of associated financial crises. If the public and private sectors joined forces and invested an amount equivalent to 23% of GDP, economic growth of 4% would take place, and there would not be severe fiscal pressure in the 2021-2023 period. In fact, maintaining a permanent fiscal surplus and limiting government investment growth to maintain imbalances could be counterproductive, as it would lead to the baseline scenario in which debt would be unsustainable as suggested by the estimates, without an increase in productive investment. However, the implementation of government investment is currently conditional on the existence of a budget constraint. Thus, it is suggested that Mexico must deal with the need to establish a balance between expansionary fiscal policy and deficit sustainability. The proposed investment scenario would make achieving this balance possible and help promote economic growth and increase tax revenues. However, this policy requires generating greater budgetary revenues and, therefore, is limited by the absence of a fiscal reform.



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