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The Effectiveness of Fiscal Policy in Mexico

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Abstract: Using a VAR model with quarterly information for the 1980 to 2008 period, this paper studies the dynamic effects of fiscal policy on Gross Domestic Product in the Mexican economy. We find evidence of non–Keynesian effects of government expenditure on GDP in the short run. Also, we find evidence that government revenue has a significant impact on GDP only in the fourth quarter.

Keywords: Non-Keynesian effects; fiscal policy; fiscal consolidations; Mexico
JEL Classification Number: E21, E62, E63, E65

1. Introduction

During the last two decades there has been an increasing interest in analyzing and measuring the effectiveness of fiscal policy. The evidence so far is inconclusive since while some of the findings reveal that an expansionary fiscal policy can cause a fall in output, other findings show the opposite effect. Our study intends to analyze the effectiveness of fiscal policy for the case of Mexico, through the impact of government revenue and expenditure on GDP. We use a four–lag Vector Autoregressive model (VAR) with quarterly data from 1980 to 2008.

The ability of government's expenditure to affect production, as established by the Keynesian theory, was questioned by the Ricardian Equivalence theorem. This theorem states that, under certain conditions, if the government reduces taxes today, consumers will expect a higher tax rate in the future; inducing an increase in savings and a decrease in current consumption. A reduction in government spending generates rational expectations for a reduction in tax rates, leading to a rise in permanent income and an increase in current consumption and investment (Prammer, 2004). Thus, in contrast with the implications of the Ricardian Equivalence theorem – in which a rise in government expenditure or a tax reduction has a null effect on consumption – in the presence of non–Keynesian effects, consumers' rational expectations will lead to a negative effect on production (Prammer, 2004).

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The existing literature about the effects of fiscal policy focuses mainly on developed countries. However, there are recent investigations that study the effects of fiscal adjustments in developing countries. Cerda et al. (2006), through an SVAR model, find that fiscal policy was inefficient in the case of Chile during the 1833–2000 periods. Neicheva (2006) found mixed effects of Bulgaria's fiscal policy during the 1998–2004 period. Bose et al. (2007) studied the effects of disaggregated government expenditure on economic growth for a panel of 30 developing countries during the 1970's and 1980's. They found that public expenditure on education has a long–lasting effect on economic prosperity.

Cuevas (2009) studied the effects of fiscal policy for Mexico using monthly data from January 1996 to January 2008. He found that a tax cut leads to an increase in interest rates, a depreciation of the domestic currency and a long–lasting positive effect on economic activity. Also for Mexico, Antón (2005) uses a neoclassic model to find that the effects of public expenditures on growth are positive but small. He also found that the effects on welfare are always negative and very high when an increase of government expenditure as a share of GDP is financed with tax increases. The author concludes that an expansionary policy with wasteful government expenditure is costly for social welfare.

2. Empirical Methodology and Results

The present study considers three variables: Gross Domestic Product (GDP), total government expenditure and total government revenue. The series are expressed in billions of real Mexican Pesos (1993=100), on a quarterly basis for the period 1980:1–2008:4. Since the Augmented Dickey–Fuller and Phillips–Perron tests indicated that the series were not stationary, they were transformed to their first–differences, in order to limit the possibility of obtaining spurious findings. After the VAR model is estimated, we obtain the impulse response functions, which show the effect of an endogenous variable shock on itself and on the rest of the variables in the model. Then, we obtain the variance decomposition to determine what proportion of a change in each variable is due to its own innovations and what proportion is due to the shocks caused by the rest of the variables.

Following de Castro (2006), the general equation for the VAR model is:

$$Y_i = C + \sum_{i=1}^{K} B_i Y_{t-i} + U_t \tag{1}$$

where t is time, Y_t is the endogenous variables vector, B_i is the coefficients matrix and U_t is the residuals vector.

According to Caldara and Kamps (2008), the system, which includes GDP, government revenue and government expenditure, can be identified in the following way:

$$
\begin{aligned}
u_t^g &= v_t^g \\
u_t^y &= a_{2,1} u_t^g + v_t^y \\
u_t^{nt} &= a_{3,1} u_t^g + a_{3,2} u^y + v^{nt}
\end{aligned}
\tag{2}
$$

The order of the variables has the following implications: (1) Government spending does not contemporarily react to the shocks of the rest of the variables; (2) GDP does not contemporarily react to the government revenue shocks, but it is affected by the contemporary shocks of government expenditure and, (3) tax income is contemporarily affected by the innovations in government expenditure and GDP (Caldara and Kamps, 2008).

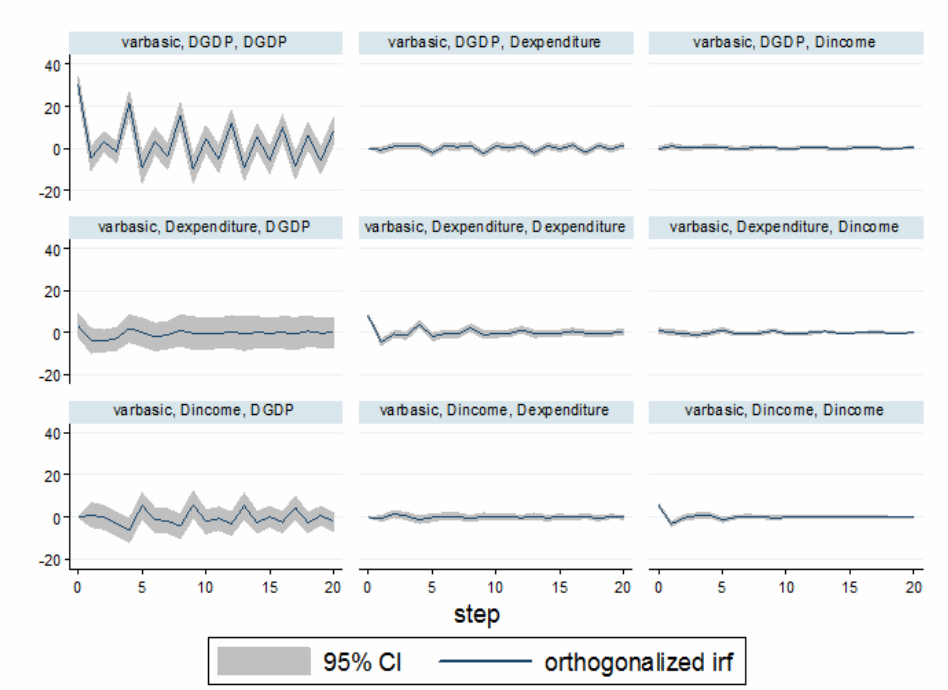
We used the AIC, HQIC, and SBIC tests to determine the optimal lag length, which was found to be equal to four quarters. The results for the VAR model are shown in Table 1, where it can be seen that the coefficients of public expenditure are negative and statistically significant in lags 2 and 3. Thus, the results indicate the presence of non–Keynesian effects on GDP during the short term for the innovations of government expenditure. Table 1 also shows that government revenues are only significant during the 4th period.

Table 1: Coefficients for the First–difference GDP Equation

	Coefficient	Standard Error	z	P>z	[95% Confidence Interval	
First–difference Government Expenditure						
L1.	–0.4247162	0.3863703	–1.1	0.272	–1.181988	0.3325557
L2.	–0.8699312	0.4082328	–2.13	0.033	–1.670053	–0.0698096
L3.	–0.8778046	0.4134222	–2.12	0.034	–1.688097	–0.0675119
L4.	–0.5888374	0.4009795	–1.47	0.142	–1.374743	0.197068
First–difference GDP						
L1.	–0.1607466	0.0964388	–1.67	0.096	–0.3497632	0.0282701
L2.	0.0556443	0.0890658	0.62	0.532	–0.1189215	0.2302101
L3.	–0.0611574	0.0905435	–0.68	0.499	–0.2386194	0.1163047
L4.	0.6894666	0.1010528	6.82	0.000	0.4914067	0.8875264
First–difference Government Revenue						
L1.	0.1726754	0.5000736	0.35	0.730	–0.8074509	1.152802
L2.	0.0628262	0.5682389	0.11	0.912	–1.050902	1.176554
L3.	–0.4933797	0.5729168	–0.86	0.389	–1.616276	0.6295165
L4.	–1.328354	0.5232095	–2.54	0.011	–2.353826	–0.3028824
Constant	3.808844	3.558257	1.07	0.284	–3.165212	10.7829

The impulse response graphs are shown in Figure 1. The first column of the set of graphs shows the effects that each variable has on GDP; the second column displays the effects on public spending and the third column shows the response of the variables to government revenue. The middle graph in the first column shows that the effect of a positive shock in government expenditure upon GDP is negative during the 2nd and 3rd quarters, slightly positive in the 5th quarter and then it stabilizes afterwards.

Figure 1: Impulse Response Functions



The variance decomposition for GDP was obtained for the 40 quarters following the innovation. . Table 2 contains data for quarters 4, 8, 12, 16, 20, and 40. The second section of Table 2 shows the percentage of the GDP variance explained by each variable. In the 4th quarter, public spending explains 4.86% of the variance in GDP. This share decreases during the following quarters and, after ten years, it only explains 1.78% of the changes in GDP.

Table 2: Variance Decomposition

Dexpenditure			
Period	**DExpenditure**	**DGDP**	**DIncome**
4	94.35222	2.724705	2.923076
8	87.72307	8.436720	3.840210
12	81.78522	14.35462	3.860152
16	76.65322	19.34084	4.005935
20	72.48358	23.25684	4.259587
40	61.15127	33.66944	5.179291
DGDP			
4	4.864907	94.06738	1.067718
8	3.503543	91.31860	5.177857
12	2.832007	90.20751	6.960480
16	2.460143	89.72480	7.815053
20	2.240462	89.50855	8.250990
40	1.784857	89.38957	8.825574
DIncome			
4	4.223208	1.848213	93.92858
8	8.478148	2.445126	89.07673
12	10.36044	3.437081	86.20247
16	10.97495	4.319756	84.70530
20	11.13261	4.927697	83.93969
40	11.11834	5.744155	83.13751

3. Conclusions

The results of the VAR model used in this paper show that a positive shock on government expenditure has a negative effect on GDP during the 2nd and 3rd quarters, indicating the presence of non–Keynesian effects. This finding is consistent with the empirical evidence found by other authors for the cases of Australia, Belgium, Netherlands and Ireland (Alesina and Ardagna, 1998); Germany (Lucke, 1999) and Spain (de Castro, 2006). It is also consistent with findings for the case of developing countries, such as Chile (Cerda *et al.,*2006).

Even though we found evidence of non–Keynesian effects of public expenditure on GDP in this study, we cannot rule out the possibility that some types of government expenditure could be efficient, as pointed out by Bose *et al.* (2007) and Anton (2005), who mention that government expenditure in education can have positive effects on economic growth.

Suggestions for further research include the use of disaggregated government expenditure data in order to identify the effect of each type of government expenditure upon output, as well as the need to analyze the effects of fiscal policy on private consumption and investment.

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