

Fiscal policy and private investment. Latin America in a comparative perspective

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The main objective of the paper is to assess the impact of fiscal variables on private investment comparing some Latin-American economies to other advanced ones. For such purposes, the authors carry out an econometric analysis for the period 1990-2008. They make use of two dynamic panel models in which they group countries with similar characteristics and development levels. In one of them, they include Mexico, Brazil, Chile, Colombia and Uruguay; whereas in the second one the countries accounted for are the U.S., Canada, Spain, Korea, Ireland and Japan. They specify in both models an investment function using as arguments a wide range of variables, including those related with fiscal policy. From their results the authors infer that governments can, with higher spending, boost up the economy even when they finance spending with higher taxes. In Latin America, where income concentration is enormous, a proposal to boost up the economy through higher government expenditure financed with a progressive income tax, is even more justified.

Keywords: Latin America; fiscal policy; macroeconomic model.

JEL Classification: E1; E6; H6.

After several decades relegated to the underworld of banned policy instruments, public authorities around the world were finally compelled to use expansionary fiscal policy, and even to monetize the deficit in order to confront the recent world crisis. However, the growth of government expenditure has been carried out with the same feeling of guilt as if they had been using black magic. So much so that, even though the consequences of the crisis have not been as yet overcome, impor-

* The authors acknowledge the financial support received from UNAM-DGAPA, Proyecto Papiit IN-303609. They would also like to thank Elizabeth Martínez, Sofía Malagamba, Pamela Soria and Guillermo Arenas, for their excellent research assistance. E-mail: ecaballe@economia.unam.mx. E-mail: gallardo@unam.mx. Submitted: 30/March/2011; Approved: 7/May/2011.

tant voices among economic authorities and the academia recommend its abandonment. Anyway, at least the debate on the issue is now less tainted with ideological bias than before the crisis.

In this paper we want to offer a contribution to this ongoing debate. Our main goal is to evaluate the impact of fiscal variables on private investment comparing some Latin-American economies to other advanced ones. For such purposes, we carry out an econometric analysis for the period 1990-2008, making use of two dynamic panel models in which we group countries with similar characteristics and development levels. In one of them, we included Latin-American countries such as Mexico, Brazil, Chile, Colombia and Uruguay; whereas in the second one the countries accounted for are the U.S., Canada, Spain, Korea, Ireland and Japan. We specify in both models an investment function using as arguments a wide set of variables, including those which have to do with fiscal policy.

Before carrying out our econometric study, we present two types of information which we consider worth having as background in order to evaluate the Latin-American reality as compared to that of the advanced countries. In the following section we analyze the tax load and the type of taxes predominating in tax collection, in order to contrast it with variables such as per capita GDP, the Gini coefficient and the productive accumulation rate. We do this for a group of countries belonging, on the one hand, to the Organization of Economic Cooperation and Development (OECD), and to the Latin-American region, on the other. In the third section we pick up the evidence provided on the topic and on countries we are interested in, with particular emphasis on Latin-American economies. A group of these studies are of an econometric nature. In the fourth section we carry out our own econometric study, and in the last section we put forward our conclusions.

TAXATION MODELS IN SELECTED COUNTRIES

Let us first of all examine the tax load, understood as the share of taxes on GDP. Table 1 shows information for some OECD countries, including Mexico, which is also part of it.

Table 1: Selected OECD countries: total fiscal load comparison, 2005*

Country	% of GDP
OECD average	36.2
Germany	34.8
Canada	33.4
Spain	35.8
United States	27.3

France	44.1
United Kingdom	36.5
Italy	41.0
Switzerland	29.7
Japan	27.4
Korea	25.5
Mexico	19.9

* Fiscal load is here defined as the share of tax revenue (including income tax plus other contributions for hydrocarbon in the case of Mexico) with respect to GDP

Source: OECD, Revenue Statistics, 1965-2006

As can be seen, most advanced countries included in the Table 1 show a tax load above 30%, and even higher than 40% as in Italy and France¹. Mexico is, in a way, a prototype of what happens in Latin America, though an extreme prototype because it has one of the lowest tax receipts in the world among medium income countries. Table 2 shows information for Latin America.

Table 2: Latin America and the Caribbean: tax load, including social security contributions. (As percentages of GDP)

	2006*
Latin America and the Caribbean	16.9
Argentina	17.5
Bolivia	25.6
Brasil	24.1
Chile	18.5
Colombia	20.6
Costa Rica	13.7
Ecuador	14.2
El Salvador	15.0
Guatemala	12.1
Haiti	9.9
Honduras	19.2
Mexico(a)	11.0
Nicaragua	21.2
Panama	14.7
Paraguay	13.5

¹ In Table 1 we did not include the Nordic countries, in which tax load exceeds 40%.

Peru	16.5
Dominican Republic	14.1
Uruguay	23.6
Venezuela	16.0

*Preliminary data

(a) Does not include oil related income.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), Economic Survey for Latin America and the Caribbean 2006-2007, on the basis of official data. Table A-40

Now, there is widespread consensus among economic authorities and researchers on Latin America that tax collection must be higher than it is nowadays. However, there is a generalized view that new taxes must not imply raising income taxes, because this would distort decisions of economic agents against work, savings and investment and, as a consequence, against the process of productive resources allocation. Moreover, it is argued that taxes on expenditure, particularly VAT, is more neutral, as long as it is levied at the same effective rate to all goods and services consumed because, as it negatively affects consumption decisions in favor of saving, with this it encourages investment and growth. In this context, it is argued that “in the case of the OECD, region in which it can be said to have been found an equilibrium tax load level per tax, in recent years the international evidence shows that it has complemented its taxation relying more on indirect than on direct taxes”².

However, the empirical evidence shows that VAT has not yet substituted income tax as a crux of the tax system. Thus, for instance, in 1990 total income tax (on business and individuals) contributed to tax collection in the OECD countries in average with 13.1% of GDP and consumption taxes with 6.1%; in 2000 the reference shares were 13.6 and 6.9%; and by 2005 income tax represented 12.9% whereas consumption tax was 6.9%. Table 3 shows detailed evidence for the average of the OECD countries, as well as for Mexico, U.S. and Canada, which make up NAFTA.

Table 3: Total Tax Load Structure in the OECD: 1990, 2000 and 2005

Countries	Tax receipts (per cent of GDP in 1990)				
	Income Taxes	Consumption Taxes	Specific Taxes	Other Taxes*	Total
Canada	17.4	5.1	3.7	5.4	31.6
U.S.	12.1	2.1	1.9	3.7	19.8
Mexico	4.5	3.6	6.6	0.5	15.2
OECD Average	13.3	6.1	4.3	3.2	26.9
Tax Collection (per cent of GDP in 2000)					

² See Banco de México, “Comparativo Internacional de Recaudación Tributaria” Mexico, May 21, 2003, p. 40. Our translation.

Canada	17.5	5.2	3	5	30.7
U.S.	15.1	2.2	1.9	3.5	22.7
Mexico	4.7	3.5	6.3	0.9	15.4
OECD Average	13.6	6.9	4.2	3.3	28.0
Tax Collection (per cent of GDP in 2005)					
Canada	15.9	5.0	3.0	4.2	28.1
U.S.	12.7	2.2	1.8	3.1	19.8
Mexico	4.8	3.8	7.3	0.6	16.5
OECD Average	12.9	6.9	3.9	2.5	26.2

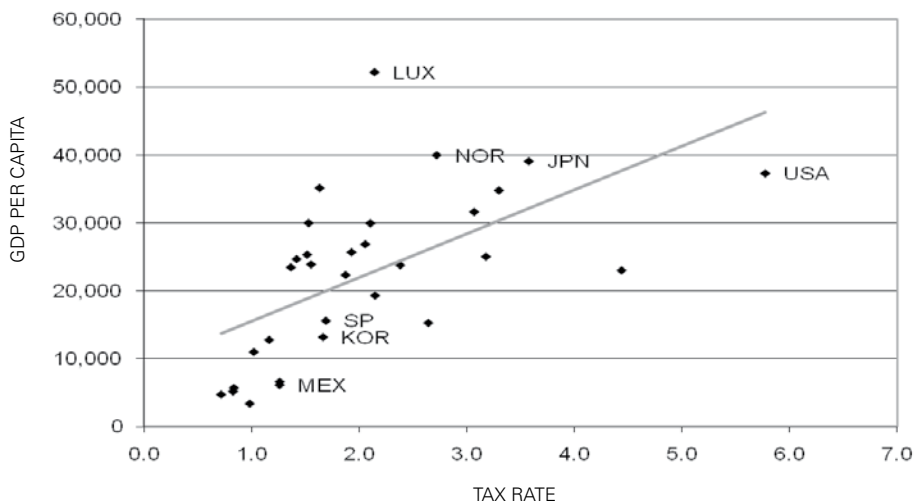
Note: The values reported may differ from other Tables due to different coverage and methodologies from the sources used, as well as due to rounding.

*Includes wage, heritage and other taxes. In Mexico this item covers state wage taxes (0.1% of GDP), property taxes (0.3%) and other taxes and state and local rights (0,1%).

Source: For 1990 and 2000, Banco de México, Comparativo Internacional de Recaudación Tributaria, 2003. For the year 2005, Revenue Statistics 1965-2006, OECD (2006), Table 6, Series 1000 (p. 78), Table 28, Series 5110 (p. 89), Table 30, Series 5120 (p. 90), Table 6, Series 3000, 4000 y 6000 (p. 78).

On the other hand, it can be seen that the higher the degree of development of the country, as measured by per capita GDP, the greater the importance of income tax in tax receipts, with respect to consumption tax. Figure 1 shows such relation.

Figure 1: GDP Per Capita and consumption tax rate.
OECD countries 2005

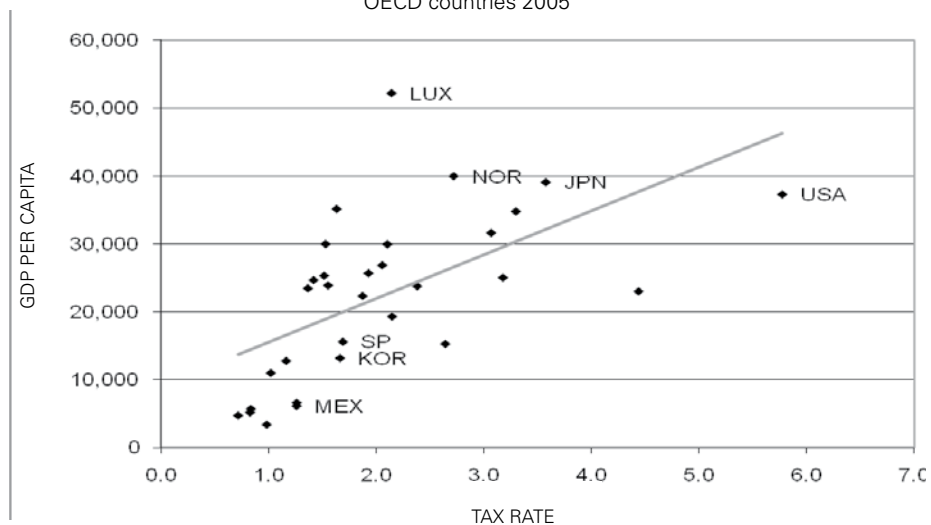


Sources: "Revenue Statistics 1965-2001"; OECD (2002) and "Revenue Statistics 1965-2006"; OECD (2006). Per capita GDP in 2000 U.S. dollars. Note, to avoid clotting the graph, in this and in the following graphs we name only a few of the countries appearing in them.

Another argument often used against raising the income tax, is that in several countries income tax rates have been reduced until reaching very low levels. Such argument is not false, but it does not tell the whole truth. Indeed, some countries belonging to the OECD have diminished their income tax rate for businesses. This has caused that, for 2007 the average income tax rate for businesses in countries inside the organization were 27.6%, despite the fact that countries such as Canada, the U.S. and Spain, among many others, still have much larger rates than this average. However, most OECD countries still have high income tax to individuals; including Ireland which is by far the paradigm of a fiscal paradise.

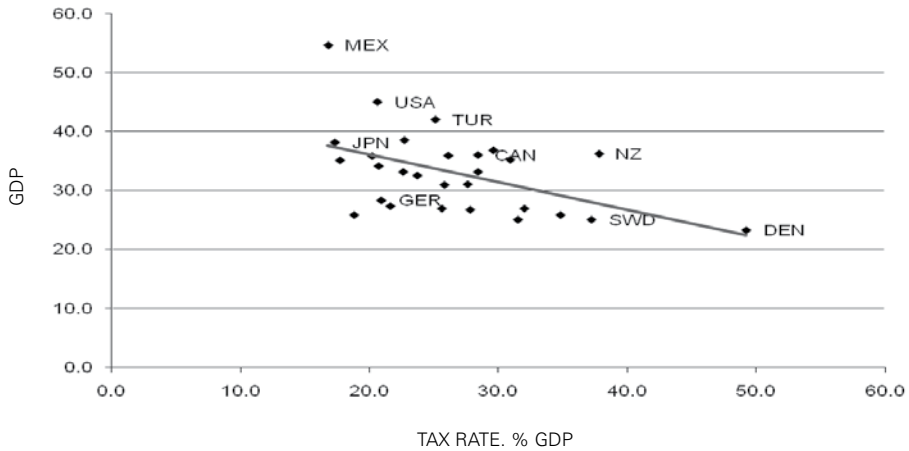
Lastly, the argument that the use of the income tax discourages economic activity, and consequently population's welfare, does not seem to find empirical support in the experience of developed countries. Indeed, as shown in Figures 2 and 3, in the OECD countries where income taxes have a higher share than consumption taxes in overall tax collection, it is observed that with a higher fiscal load the higher per capita income tends to be, and the better its income distribution as measured by the Gini coefficient.

Figure 2: GDP Per Capita and consumption tax rate.
OECD countries 2005



Sources: "Revenue Statistics 1965-2001", OECD (2002) and "Revenue Statistics 1965-2006", OECD (2006). Fiscal load includes all mandatory payments to the Central Government, excluding social security contributions. Per capita GDP is in constant 2000 dollars.

Figure 3: Gini coefficient and tax rate. OECD



Note: Recall that as the Gini coefficient approaches 1, income concentration increases.
 Source: Own elaboration with CIA World Factbook data. 14 June 2007, via NationMaster.

Let us finally consider the relation between income taxes and accumulation. The empirical evidence does not seem to support the argument that a high tax load exerts an adverse effect on private investment. Later on we will examine this point more rigorously, but for now let us just say that, for instance, in 1990, 2000 and 2006 in countries such as Canada, Spain, Korea and Ireland, in which income tax share is higher, also productive accumulation is highest, as measured by the private investment-GDP ratio. In the case of Canada, during the reference period an important reduction in the share of income tax is observed, though at very high levels, so that it remains the country with the largest income tax share. In the cases of Spain, Korea and Ireland, it is observed that a small change of VAT in total tax receipts has left the tax ratio at the same level it was in 1990.

Let us now see in detail the case of the Latin-American countries. As can be seen in Table 4, consumption-related tax receipts (general taxes on goods and services) in average for these countries represented six percentage points of GDP in 2006, whereas income taxes (taxes on revenue and capital earnings) were as high as 4.2% in the same year. However, in some countries income tax has gained room at the expense of taxes on consumption. In Chile, for instance, between 1992 and 2006 income tax raised its share in tax receipts in one percentage point of GDP, and taxes on consumption were reduced in 1.7 points during the same period. In contrast, in Mexico taxes on consumption have augmented their share at the expense of income tax, but the latter is still the one that contributes the most in total tax receipts.

Table 4: Income and consumption taxes
in Latin America: 1992, 2000 and 2006

Países	Taxation on revenue and capital earnings (% of GDP)			Taxation on general goods and services (% of GDP)		
	1992	2000*	2006	1992	2000 a/	2006
Brazil	3.9	5.0	5.9	7.9	9.2	...
Chile	4.2	4.1	5.2	9	8.7	7.3
Mexico	5.2	4.7	4.9	2.7	3.5	4.2
Latin America Average	3.7	3.9	4.2	4	5.5	6.0

* Data for Brazil correspond to 1998.

Source: for 1992 and 2000, Banco de México, *Comparativo internacional de recaudación tributaria*, 2003. For 2006, ECLAC, *Estudio Económico de América Latina y el Caribe, 2006-2007*, on the basis of official data, Table A-41.

In the case of Latin-American countries, in general and at least for 2006, per capita GDP and tax pressure do not show a well-defined association, nor does the income tax-consumption tax ratios show a clear association with per capita GDP. Finally, a clear cut association between income tax and accumulation is not evident. For instance, in 1990, 2000 and 2006 in countries such as Chile and Brazil, which were among those with the lowest tax ratios, in both countries income tax collection has significantly increased through time in relation with VAT without there being an important reduction in their corresponding productive accumulation rates.

SOME PREVIOUS ECONOMETRIC EVIDENCE

We now consider a small sample of econometric works where our topic is studied for the case of Latin America. In the first work we summarize, Lachler and Aschauer (1998) study the effect of different ways of public investment financing above private investment, first for Mexico (time series) then for 46 developing countries (cross-section). Their results for Mexico suggest that public investment crowds-out private investment. Their results for 46 countries show that public investment has positive effects on economic growth if financed with public spending cuts on consumption and not financed with larger indebtedness, because this will translate into higher current or future taxes which allegedly discourage economic growth³.

³ Later on, Ramírez (2004) retakes the question which inspired Lachler and Aschauer's research, and finds that the response of private capital spending to public capital spending in infrastructure is positive.

A second work is that by Hermes and Lensink (2001), who estimate a private investment equation for 33 underdeveloped countries using a panel data methodology. They conclude that the different categories of public spending and public income have different effects on private investment. In particular, government spending in infrastructure has positive effects on private investment, at least above a certain threshold, whereas taxes on business have adverse effects.

In a third study, Cerda (2002) analyzes the effects of taxes on investment decisions of firms for Chile, also using a panel data methodology, though from a sample of firms. He concludes that taxes on current business profits negatively affect investment and, as a consequence, long-term capital stock. He also suggests that taxes on non-distributed benefits by firms do not distort optimal investment decisions.

A fourth work is also for Chile (Vergara, 2004), and it tackles the topic at both macro and microeconomic levels for the period 1975-2003. During this period, income taxes on firms was reduced from 50% at the beginning of the period under study to 10% in the second half of the eighties, and to 0% in 1989, to finally settle at 16.5% and 17% in 2003 and 2004, respectively. At a first level, the author estimated two investment functions with annual data for the period 1980-2002, from a panel of 87 firms. The main conclusion is that the diminution of the income tax rate largely contributed to a spectacular growth of private investment in the economy under study in the period considered.

A fifth work is from one of the authors of the present one (López, 1994), and an empirical estimation of private expenditure and its main determinants was carried out for Mexico for the period 1972-1989. With respect to the effect of public spending on private spending, it is concluded that government spending and public deficit stimulate both private consumption and investment.

Lastly, Castillo and Herrera (2005) studied the effect of public spending on private spending in Mexico for the period 1980-2002. They found that the short-term impact of an increase in public spending induces reductions in private investment. But they find that the long-run impact of public investment is positive.

Definitely, the distinct empirical studies on the effects of income tax on firms yield diverging and even contradictory results. This is so even when such studies analyze the same country and period, or adopt the same theoretical position.

Taking into account the above-mentioned information, we now carry out our own investigation.

PRIVATE INVESTMENT AND FISCAL POLICY. NEW EVIDENCE

With the purpose of measuring the impact of fiscal variables on private investment we now present an econometric analysis, based on two dynamic panel estimations.

The first estimation includes Mexico, Brazil, Chile, Colombia and Uruguay, which can be grouped and jointly analyzed because they belong to the same region

and share similar development levels; so that the risk of introducing structural heterogeneity problems is reduced. The second model includes the U.S., Canada, Spain, Korea, Ireland and Japan, all part of the OECD but with similar characteristics, and development levels different from the first group. In both cases dynamic panel models were estimated, that is, the variables used may depend on lagged values. Moreover, and with the purpose of avoiding potential omitted variable bias, we opted to formulate a general enough specification in which fiscal variables may be nested. For this reason, among the arguments, GDP and the real exchange rate were included. With the former we attempt to consider an accelerator effect, and with the latter we intend, in some way, to take into account the open economy character of the economies under consideration⁴.

a) Latin America

Our model runs from 1990 to 2008. In the specification private investment, *ip* (*Gross fixed capital formation*), is the dependent variable, and the independent variables are *y* (*Gross domestic product*), government consumption *g*, income tax receipts *it*, value added tax receipts *vat*, and the real exchange rate, *rer*⁵.

The selection of the countries was done following several criterions: they are all in the region, their structural characteristics are relatively similar and they all have different tax systems.

The outcome is a panel data of 19 time observations (1990-2008) and five countries, with all variables in constant 2000 dollars.

The estimation of the dynamic model exhibits the short-term results shown in Table 5. Symbol L before a variable indicates that it is the log of the corresponding variable.

Table 5: Short-run elasticities for the private investment equation dependent variable:
Private Investment Period: 1990-2008 countries considered:
Brazil, Chile, Colombia, Mexico and Uruguay

Independent Variables		t-prob
Priv. Investment (-1)	-0.0899	0.455
Income	3.0599	0.000
Income (-2)	-0.3836	0.000
Public Spending (-1)	0.9380	0.069
Public Spending (-8)	0.5688	0.000

⁴ In the econometric exercises we initially included a large enough number of variables. Those which do not appear in the final models we present were statistically insignificant, or else they did not allow us to estimate a statistically well-specified model.

⁵ A precise definition of each of the variables used, according to the corresponding sources, is available in the Appendix 1.

Income Tax	-0.1239	0.031
VAT (-3)	-0.2429	0.009
RER	0.1108	0.000
RER (-1)	-0.3041	0.000
Wald (joint)	9 [0.000]**	
Wald (dummy)	5 [0.000]**	
Sargan (test)	41 [0.993]	
M1	-1.849[0.064]*	
M2	-1.482[0.138]	
No. of obs.	40	

Lags of private investment ($t - 1$), public spending ($it, t - 2, t - 3, t - 4, t - 5, t - 6, t - 7$), income ($it, t - 1, t - 2$), real effective exchange rate ($it, t - 1, t - 4, t - 5$), income tax ($it, t - 1, t - 2, t - 3, t - 4, t - 5, t - 6, t - 10$) and VAT ($it, t - 1, t - 2$) were used. Additionally, in the GMM matrix instruments in differences of the dependent variable were used (1,3).

Notes:

- i) Variables were used in logarithmic form
- ii) Standard errors are robust to heteroskedasticity and reported in parentheses
- iii) Individual dummies were included
- iv) Degrees of freedom for the tests are reported in brackets
- v) The method was estimated in one stage

The long-run equation for private investment may be expressed as:

$$Lip = 2.5 Ly + 1.4 Lg - 0.1 Lit - 0.2 Lvat - 0.2 Lrer$$

As observed in the Table 5, the variables considered are significant, except for lagged private investment. The robust standard errors test indicates that there are no heteroskedasticity problems in the model. The joint Wald test takes into account all dummies except the time ones that indicate that all regressors are significant. The dummy Wald test takes into account all dummies and indicates that all are significant. The Sargan test shows that all instruments are valid. The AR(1) test⁶ shows that there is no first order autocorrelation in the error terms. The AR(2)⁷ test indicates that there is no second order autocorrelation.

The conclusions obtained for the Latin-American economies, from both a short- and a long-run perspective, may be summarized as follows:

- Public spending has a positive effect on private investment, that is, there is a crowding-in effect, with which the crowding-out effect conventional economic theories postulate is rejected. The short-run results, for instance, show that an increase of one percentage point in public spending may translate into an increase of almost one percentage point (0.93%) in private investment after one period and more than half a percentage point (0.57%) after eight periods.

⁶ In the results Table 5 it is reported as M1.

⁷ In the results Table 5 it is reported as M2.

- Both income tax and VAT discourage private investment, although VAT has a more depressive effect. The superiority of VAT is hence rejected, which assumes that this is a neutral tax with respect to investment decisions. Indeed, according to the results in the model, a 1% increase in income tax collection reduces private investment 0.12% in the same period, whereas a 1% increase in VAT reduces it in 0.24%, double the loss the income tax causes.
- The results indicate that there is a positive fiscal balance. As can be seen from the estimated elasticities, the stimulating effect of public spending on private investment more than offsets the discouraging effect taxes jointly have on it. This implies that if tax receipts increased (either from income or from value added) to finance higher government spending, the ultimate result would be an increase in private investment.
- A strong accelerator effect is observed, in that income generates an important increase of private investment. The results indicate that a 1% increase of GDP in one period is translated into a 3.1% increase in investment in the same period, and though there is a reduction of private investment of 0.38% two periods after, the overall balance is by far positive.
- Lastly, the real exchange rate exerts a negative effect on private investment. More concretely, a 1% increase in the *rer* brings about a 0.11% increase in private investment. This may be due to three important consequences associated with a rise in the real exchange rate. On the one hand, an increase in the real exchange rate (consequence of a currency depreciation, for instance) increases the domestic value of the debt denominated in foreign currency. In the second place, such increase also raises the price of capital goods. Lastly, such an increase brings about a shift from wages to profits, which may lead to a fall in effective demand.

b) Advanced OECD countries

We now carry out the estimation for some OECD countries, with a relatively similar specification to the one above. We took a sample that includes the U.S., Canada, Spain, Korea, Ireland and Japan, and the period goes from 1990 to 2008. In the specification⁸, private investment, *ip* (*Gross fixed capital formation*), depends on *y* (*Gross domestic product*), *g* (*General Government Expenditure*), *it* (*income tax*), *vat* (*A-Value added tax, VAT*) and *reer* (*Real Effective Exchange Rate*). Again, we estimated a dynamic panel model. The variables are expressed in 2000 dollars. The model is balanced: all years for all countries were available and all data are from the same source (homogeneity of data is guaranteed).

It is important to take into account two differences in this estimation with respect to the last one. First, when exclusively analyzing the OECD countries it is

⁸ In Appendix 2 we give the precise definition of the variables included in the model.

possible, thanks to the existence of data, to use as a regressor the general government expenditure (which includes transfers)⁹. Second, the concept **real effective exchange rate** is approximately the inverse of the real exchange rate used in the equation for Latin America. An increase in the *reer* implies a loss of competitiveness.

The estimation of the dynamic model resulted in the following specification, shown in Table 6:

Table 6: Short-run elasticities for the private investment equation
 Dependent Variable: Private Investment Period: 1980-2008
 Countries considered: U.S., Canada, Spain, Korea, Ireland and Japan

Independent Variables		t-prob
Private Investment (-1)	0.0706	0.000
Income	2.2110	0.000
Income (-1)	-1.2589	0.000
Gesto Público (-3)	0.2518	0.002
Gesto Público (-4)	0.2323	0.000
Income Tax (-3)	-0.0541	0.000
VAT (-2)	-0.1138	0.000
VAT (-5)	-0.1803	0.000
Índice de Tipo de cambio real (-3)	0.1255	0.005
	Wald (joint)	9 [0.000]**
		16 [0.000]**
		11 [0.000]**
		46 [0.148]
		-1.443 [0.149]*
		-0.7989 [0.424]
		66

Lags of private investment ($t - 1, t - 3, t - 5$), public spending ($t - 2, t - 3, t - 4$), income tax ($t - 3$), income ($it, t - 1, t - 7$), *reer* ($t - 3$) were used. Additionally, in the GMM matrix instruments in differences of the dependent variable were used (2,3) and for public spending (2,3).

Notes

- i) Variables were used in logarithmic form
- ii) Standard errors are robust to heteroskedasticity and reported in parentheses
- iii) Individual and time dummies were included
- iv) Degrees of freedom for the tests are reported in brackets
- v) The method was estimated in one stage

The long-run private investment equation is the following:

$$Lip = 3.2Ly + 1.6Lg - 0.2Lit - 1.0Lvat + 0.4Lreer$$

As seen in the Table 6, the variables considered are significant (t-prob are all less than 0.5).

⁹ In our model for Latin America we had to use the concept of final government consumption expenditure, because data for general government expenditure are not available.

The conclusions obtained for the OECD countries considered in both a short- and long-term perspective are mostly the same as for the Latin-American block, and may be summarized as follows:

- Public spending has a positive effect on private investment, that is, there is a crowding-in effect, which again rejects the crowding-out hypothesis. The short-run results show that an increase in one percentage point of public spending translates into an increase of private investment with a lag of three and four periods of 0.25% and 0.23%, respectively.
- Once again, the VAT superiority hypothesis with respect to investment decisions is rejected. Indeed, both income and value added taxes exert a negative effect on private investment, but VAT has more depressive effects, for a 1% increase in this tax reduces private investment 11% with a two periods lag, and 0.18% with a five periods lag, whereas a 1% increase in income tax reduces private investment only 0.05% with a three periods lag.
- The fiscal balance is positive. The effect of public spending on private investment more than offsets the discouraging effect of both taxes. This also implies that for the case of the OECD countries income and value added taxation to finance government spending has an overall positive effect on private investment.
- Another similar result to those found for the Latin-American countries is the strong accelerator effect. The increase in a percentage point of income in OECD countries leads to an increase of 2.2% increase in the same period and a 1.3% decrease one period after. The net effect is clearly positive.
- On the other hand, and in tandem with the results found for the Latin-American countries, the real effective exchange rate (which we recall is the inverse of the real exchange rate we used for the Latin-American countries) exerts a positive effect on private investment.
- Lastly, for the OECD countries, it is verified that current private investment is slightly stimulated by private investment a period before. The results show that a 1% increase in private investment will translate into a 0.07% of the same variable. This contrasts with the Latin-American case where the relationship is negative but statistically insignificant.

FINAL REMARKS

The results of the analysis of the international experience carried out in our work reject the hypothesis of the conventional theory whereby public spending crowds-out private investment, and that income taxes distort economic agents'

decisions on work, savings and investment and, as a consequence, the optimal allocation of productive resources.

Indeed, among the set of countries analyzed, those which have the highest levels of public spending, highest tax loads and rates, as well as tax systems relying more on income taxes rather than on consumption taxes, also show more equitable income distribution and higher levels of output per head, as an expression of a better level of development and population welfare.

In the same sense, the analysis of the relation between the different taxes and the rate of productive accumulation (private investment/GDP), shows that the countries analyzed with a predominant income tax, their accumulation rate is also higher.

Lastly, the results of the econometric analysis are coherent for both sets of countries, Latin America and OECD, that public spending complements and encourages private investment; it does not crowd it out. It is also observed that for both blocks taxation discourages investment, but the increase in government spending financed in such a way more than offsets this negative effect, yielding as a result a net positive fiscal balance on private investment.

These results imply that public spending is capable of reactivating the economic system in a larger scale if it were financed by tax collection. However, the limit to the reactivating capacity of any given economy will be determined by the existence of idle capacity and external restrictions to growth. That is, the capacity of the country to finance imports which require several sustained and stable economic growth rates.

In countries such as those of Latin America, in which there is a clear pattern of income concentration and a spread-out idea that spending is necessarily financed by taxes (there is a law in certain countries which bans the use of deficit spending), a proposal to reactivate the economy through a progressive tax system, whose main channel would be income tax, is justified.

Finally, the results obtained show that the position held in the last decades where a reduction of State intervention from economic activity in the country and privileging VAT collection against income tax, because of its assumed perverse effects on private investment, lack support.

APPENDIX 1 – SOURCES USED AND DEFINITION OF THE VARIABLES FOR THE LATIN-AMERICAN COUNTRIES AND MEXICO

Sources

ECLAC, National Accounts

Public Finance Statistics, ECLAC

OECD, Statistics, Prices and purchasing power parities

Variables' Definition

Private Investment

Gross fixed capital formation is measured by the total value of a producer's acquisitions, less disposals, of fixed assets during the accounting period plus certain additions to the value of non-produced assets (such as subsoil assets or major improvements in the quantity, quality or productivity of land) realised by the productive activity of institutional units.

Income

Gross domestic product is an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs). The sum of the final uses of goods and services (all uses except intermediate consumption) measured in purchasers' prices, less the value of imports of goods and services, or the sum of primary incomes distributed by resident producer units.

Public Spending

Final consumption spending by the federal government. The classification General Government is used, according to the International Monetary Fund (IMF) this is defined as: spending that includes that executed by the central government (central administration, decentralized entities, social security), plus spending executed by Municipalities (and States in the case of federal countries).

Income Tax

Income tax receipts. According to the IMF the concept direct taxes is used: income taxes and capital earnings.

Value Added Tax

Value added tax receipts. According to the IMF manual, indirect taxes and general goods and services taxes are considered.

Real Exchange Rate

From an indicator of the real exchange rate, an index is constructed where 2000 = 100 [real exchange rate = E (CPIf.U./ CPI LA country)], where E is the nominal exchange rate of the Latin-American country, CPIf.U and CPI LA country, are price indices of the U.S. and the Latin-American economy in question at 2000 prices, respectively; the series CPI for U.S. is originally in base 2005, so a base change was performed. The series CPI for the U.S. is taken from the OECD statistics and for the Latin-American block from ECLAC.

APPENDIX 2 – SOURCES USED AND DEFINITION OF THE VARIABLES FOR OECD COUNTRIES

Sources

- World Bank. Statistics
- OECD Statistics. Dataset: Public Sector, Taxation and Market Regulation: Revenue Statistics — Comparative tables
- OECD: National Accounts of OECD Countries 2009

Variables' Definition

Gross Fixed Capital Formation

Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. Data are in constant 2000 U.S. dollars.

Gross Domestic Product, GDP

Gross Domestic Product (GDP) at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2000 U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2000 official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.

General Government Expenditure

General Government Expenditure is equivalent to expenditures by general government on the following items: intermediate consumption, compensation of employees, subsidies, social benefits and social transfers in kind (via market producers), other current transfers, property income, capital transfers (payable), the adjustment for the net equity of households in pension funds reserves, gross capital formation and net acquisition of non-financial non-produced assets. It also includes taxes on income and wealth any other taxes on production that government may be required to pay. Many of the transactions are better recorded on a consolidated basis (i.e., transactions between general government sub-sectors are netted out) to avoid exaggerating the role of general government. Items that are usually consolidated include: debt interest (part of property income), and capital transfers (except capital taxes payable) and other current transfers. The government sector covers all units producing (all or mostly) non-market goods and services that are publicly

owned. Publicly owned units producing (all or mostly) market goods and services are not in the government sector but are instead recorded as public corporations.

Taxes on Income

Taxes on income consist of taxes on incomes, profits and capital gains; they are assessed on the actual or presumed incomes of individuals, households, non-profit institutions or corporations.

A-value Added Tax, VAT

A value added tax (VAT) is a tax on products collected in stages by enterprises; it is a wide-ranging tax usually designed to cover most or all goods and services but producers are obliged to pay to government only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation, while VAT is not usually charged on sales to non-residents (i.e., exports).

Real Effective Exchange Rate

Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (2005 = 100).

The World Bank adopts the following definition for the REER:

Real Effective Exchange Rate:

A broad summary measure of the prices of one country's goods and services relative to the prices of goods and services in that country's trading partners. It is typically calculated as a weighted average of the ratios of a country's domestic price index to the price indices of its foreign trading partners, where the indices are expressed in the same currency units. (See: International Monetary Fund, Glossary)

REFERENCES

- BANCO DE MÉXICO (2003), "Un Comparativo Internacional de Recaudación Tributaria", México, World Bank Statistics.
- CASTILLO PONCE, Ramón A. and HERRERA, Hernández Jorge (2005), "Efecto del gasto público sobre el gasto privado en México", *Revista Estudios Económicos del Colegio de México*, 20 (2).
- CERDA, Rodrigo (2002), "Taxation and investment: lessons from the microeconomic structure", Pontificia Universidad Católica de Chile, Instituto de Economía, documento de trabajo n. 220.
- HERMES, Niels and LENSINK, Robert (2001), Fiscal Policy and Private Investment in Less Developed Countries. United Nations University UNU-WIDER. World Institute for Development Economic Research. Discussion Paper No 2001/32, July 2001.
- LACHLER U. and D. ASCHAUER (1998), "Public investment and economic growth in Mexico" *Policy Research Working Paper* 1964, World Bank. August.
- LÓPEZ GALLARDO, Julio (1994), Los problemas del ajuste en una economía abierta: una interpreta-

ción de la evolución reciente de la economía mexicana, en México: La Nueva Macroeconomía, Ed. Nuevo Horizonte Editores, México.

RAMIREZ, Miguel D (2004), "Is public infrastructure investment productive in the Mexican case? A vector error correction analysis", *Journal of International Trade and Economic Development*, 13 (2).

VERGARA Rodrigo (2004), "Taxation and private investment: Evidence for Chile", Pontificia Universidad Católica de Chile, Instituto de Economía, documento de trabajo n. 268.