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Stochastic frontier of inefficiency in public expenditure of Mexico 1998-2010

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In the first part of this research demonstrate the existence of technical inefficiency in public spending for the 32 states of the Mexican Republic, First will have to point out the methodology of this research, a form commonly used to measure the technical efficiency of a unit is the stochastic frontier methodology. This technique assumes that for a combination of inputs, the maximum profit attainable by an entity is defined by a parametric function of known inputs that involve unknown parameters and a measure of error, the smaller the distance to the current profit or stochastic frontier best practice, the higher the technical efficiency of the entity, a stochastic frontier profit function can be expressed assuming a Cobb-Douglas. Public spending, with its various funds are focused economic development and reducing inequality in the states but its distribution is not efficient for what their status is reviewed later with the analysis of the results of the regression will a comparison between regions, showing that this inequality leads to malpractice, folow in undevelopment.

Public cost, Economic Development, Technical Efficiency

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Introduction

After reorganizing the world after the Second World War, other theorists in different parts of the world are still wondering why nations with similar characteristics were not developed to the same degree. While the convergence theory explains how the developed countries someday will be matched in technology by countries without development because of the disparity in growth rates, Raúl Prebisch and the dependency theory speak the purest sense of the Hegelian dialectic that among nations and individuals, there is a dependent relationship between rich and poor, that without one, the other can not survive.

Simon Kuznets hypothesis related to economic growth and income distribution. According to this, the growth is sufficient to reduce inequality, although is also associated with the early growth, when there is a need for large investments in infrastructure and capital goods. Then job creation and increased productivity would lead to higher wages and better income distribution. Because this way we find that Mexico is one of the countries where gap between the richest 10% of the population and the rest are older. This largely explains why the high degree of inequality in our country. Miguel Székely in one of his studies, states that among the reasons for the marked degree of inequality in Mexico has the largest variance in education, this statistical indicator measuring the degree of dispersion that exists with respect to an average. Subject that it was a detail below.

The efficiency of public expenditure is an essential aspect of fiscal policy, and a prerequisite for achieving the objectives of economic, social and institutional development in the country. It is referred to the effects it has on the economic and social conditions in the countries, and the daily lives of people in relation to the resources used in this sense, efficiency is distinguished from effectiveness, regardless of the level of expenditure targets are met. Consequently, a policy can be effective and not efficient, but not vice versa. The effects of public expenditure can be assessed indirectly based on products (outputs) generated by the government, which includes aspects of both coverage and quality of goods and services provided by the public sector.

In recent years there has been more emphasis on results (outcomes) in measuring the efficiency of public spending. This is a direct way to measure the effects of public spending on the living conditions of the population. The relationship between public spending and products is much more direct and easier to measure than between spending and results because it is difficult to distinguish between the impact of economic policies and other factors that affect the economic and social conditions.

So on the management of public expenditure differs between allocative efficiency and operational efficiency. The first are public resources allocated according to priority objectives to be achieved as a country.

The second are the resources assigned once, so they are used to achieve the best results and / or to reduce the costs of producing public goods and services (Campos and Pradhan, 1996; Schick, 1998; PEFA, 2005; Machado, 2006).

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Regardless of the approach taken, the analysis of the efficiency of public spending required to link the level of expenditure (the total amount of resources) with the proceeds from it. This would determine whether the government should more given its level of spending, or whether it should spend less given the (outputs / outcomes) they get. So you need to build indicators for outputs and outcomes of the public sector, and relate the categories of relevant public spending.

For the technical efficiency of public spending, there are few studies that address this issue from an international and regional perspective, most research on the subject are rather national, as Public Expenditure Review (PER) developed in recent years by the World Bank in a wide number of countries. In the context of the region in question, the IDB has recently conducted studies on public expenditure in each of the countries. It has long been recognized that the efficient functioning of the public sector is a prerequisite for the economic success of a country. However, the measurement of the efficiency of government and the resulting comparison of the different sectors of public countries have a number of difficulties related to the lack of data available to the public, the poor quality of information, and complicated problems that may arise in the estimation procedure.

Only recently, a small number of studies highlights the need for the calculation of indicators of public sector efficiency. As far as the economies of the OECD, Afonso and Tanzi (2005) use a nonparametric method to estimate the results of the relative efficiency of various parts of the public sector in 23 OECD countries during the 80 `s and 90` s Afonso and St. Aubyn (2005).

They used similar techniques to estimate the efficiency of public spending on education and health. The main problem of nonparametric methods to measure efficiency, has been its inability to distinguish inefficiency attributable to malpractice governmental management inefficiency arising from differences in socio-economic backgrounds or attributable to other factors favoring the factors governing performance. Recent studies analyzing two-and three-stage purge the effect of factors called environmental and noise (Fried, 2002 were made,. Glass et al, 2006;. Simar and Wilson, 2007;. Balaguer-Coll , 2007). Then in the next section the theoretical elements of technical efficiency to be able to do so later estimation is analyzed.

Theoretical elements

In this research the performance of each entity is evaluated through the concept of efficiency. Overall, technical efficiency refers to the ability of the government to produce the maximum benefit for a given (Farrell, 1957) budget. One way commonly used to measure the technical efficiency of a unit is the stochastic frontier methodology. This technique assumes that, for a combination of inputs, the maximum attainable benefit an entity is defined by a parametric function of inputs that involve known and unknown parameters a measure of error.

Smaller the distance between the actual benefit to the stochastic frontier or best practice, greater technical efficiency of the entity.

A stochastic frontier profit function can be expressed as: Assuming a Cobb-Douglas function expressed in logarithms, equation (1) can be expressed as: yit = βxit + (υit - uit).

$$y_{it} = f(x_{it}, t; \beta) e^{\upsilon_{it} - u_{it}} \quad (1)$$

Where y_{it} is the welfare of the *ith counterparty* i=1,2,…,N in the period t=1,2,…,T; $f(x_{it},t;\beta)$ represents the variations in the budget; x_{it} is a vector (1xK) inputs and other factors that influence the well-being associated with the ith counterparty at time t; β is a vector (K × 1) to estimate the unknown parameters that indicate the relative importance of each of the inputs of production; t is a time trend indicator that serves as a proxy for budgetary change. The basic idea of the stochastic frontier is to introduce a non-negative component in the error term of the production function to consider technical inefficiency. The error term in the model is divided into two parts; the traditional random component (υ_{it}) and a new component of inefficiency (u_{it}). The first part, υ_{it}, is a vector of random errors that assumed iid, $N(0,\sigma^2_{\upsilon})$, and independently distributed of u_{it}. The υ_{it}´s captures the random variation in output due to factors beyond the control of the entities (such as variations in the budget, bad governance, corruption, marginalization).

The second part, u_{it}, is a vector of independently distributed random variables and nonnegative ($u_{it} \geq 0$), represents technical inefficiency in public spending and is assumed to be specific to the entity. In particular, u_{it} is the combined welfare of factors unrelated to the budget and other factors that limit the institution to achieve the maximum benefit for a given income and budget. Thus, when an entity reaches a full technical efficiency ($ET=1$), u_{it} takes the value of 0 and when the entity facing problems in this regard ($0<ET<1$), u_{it} takes a value greater than zero.

The magnitude of u_{it}´s determines the efficiency gap, ie, which is so far the benefit of an entity of its potential.

It is assumed that both υ_{it} and u_{it} are independent of the regressors. Thus, the ith entity faces a stochastic frontier equation (1); with a common deterministic part to all entities $f(x_{it},t;\beta)$ and a specific part of the entity, $e^{\upsilon_{it}-u_{it}}$. The technical efficiency of the i-th entity in the t-th time can be expressed as the ratio of actual benefit to the maximum potential benefit:

$$ET_{it}=\frac{f(x_{it},t;\beta)e^{\upsilon_{it}-u_{it}}}{f(x_{it},t;\beta)e^{\upsilon_{it}}}=\frac{y_{it}}{f(x_{it},t;\beta)e^{\upsilon_{it}}}=e^{-u_{it}} \quad (2)$$

Note that the specification of the stochastic frontier (1) allows technical inefficiency of an entity changes over time. Include time as an explanatory variable to measure trends in productivity change. A further aspect is the identification of the sources of technical inefficiency level entities.

In the literature there are generally two models to analyze the differences in efficiency between entities. These models differ according to the specification that give the term that captures the effects of technical inefficiency u_{it}. This document suggested by Battese and Coelli (1995) to determine the variables that generate inefficiency model is followed. This approach allows the estimation of the parameters that influence the level of technical efficiency simultaneously with temporal changes in technical efficiency and budget change. In the exogenous model to explain changes in the performance of the entity influences are incorporated.

Consequently, the effects of technical efficiency are defined in terms of the average model u_{it} as a function of specific characteristics to the entity. In this regard, it is assumed that technical efficiency affects $u_{it}'s$, which have average δz_{it} and variance $\sigma^2{}_u$. This development allows to keep the case that the factors affecting the technical efficiency are distributed independently. Thus, the model of inefficiency can be specified as $u_{it} = g(z_{it}, \delta)$, where $g(\bullet)$ is a functional form, it is generally assumed linear, so that it can be expressed as:

$$u_{it} = \delta z_{it} + \eta_{it} \quad (3)$$

Where z_{it} is a vector (L×1) of explanatory variables related to the specific technical inefficiency to the ith entity that can change over time; δ is a vector (1×L) unknown parameters to be estimated and η_{it} is an error term that is normally distributed $N(0, \sigma^2{}_\omega)$ truncated in $-\delta z_{it}$

In other words, are unobservable random, identically distributed, obtained by the truncation of the normal distribution with zero mean and unknown variance variables, σ^2, eith averages, δz_{it}, $i = 1,2,...,N$; y $t = 1,2,...,T$.

Thus, average will be different for each entity and time periods but thus equations (1), of the stochastic frontier and (3), of technical efficiency, are estimated simultaneously using the maximum likelihood method, obtaining the level technical efficiency (ET_{it}) of the form:

$$ET_{it} = e^{-u_{it}} = e^{(-\delta z_{it} - \eta_{it})} \quad (4)$$

The Models of stochastic frontier production tend to be estimated with panel data methodology and consider technical efficiency varies with time (Friedet al., 1993). This way, you can raise the following panel model:

$$Ln(y_{it}) = f(x_{it}\beta) + \upsilon_{it} - u_{it} = \beta_{0t} + \sum_n \beta_n Lnx_{nit} + \upsilon_{it} - u_{it}$$
$$= \beta_{it} + \sum_n \beta_n Lnx_{nit} + \upsilon_{it}; i = 1,2,...,N; t = 1,2,...,T \quad (5)$$

Where, y_{it} represents the profit of the ith entity in the period *t*; x_{it} denotes a vector with the values for inputs and other relevant variables, and is a vector of parameters to be estimated. β_{0t} is interpreted as the intercept of the production frontier common to all entities in the period *t*; $\beta_{it} = \beta_{0t} - u_{it}$ is the intercept for bank i in period t.

The term υ_{it} corresponding to the noise component u_{it} It is not negative technical component inefficiency time-variant.

υ_{it} means with the same properties identified for (1). In estimating equation (5) the parameters are obtained β of the production function and at the same time, the values of technical efficiency of bank i in period t.

In the next section "empirical application" with an approach of the variables are used for determining the technical efficiency in public spending for each of the entities is studied.

Empirical application

Now the above approach leads us to determine the technical efficiency among the states of Mexico and the possible causes of inefficiency, and classify them according to their levels of technical efficiency.

According to Delgado and Álvarez (2001) on the approach to stochastic frontier analysis of the efficiency of the estimate of the production frontier as a function of various inputs, together with the estimation of technical inefficiency associated. In this regard, the literature uses three functional forms of the production function: Cobb-Douglas, translog and CES. The most commonly used flexible functional form is the translog. While this specification requires more estimated parameters, the Cobb-Douglas function imposes no restrictions and, therefore, is generally preferred unless a hypothesis test to determine the best functional form is Cobb-Douglas, or prevent the availability of data type use a translog function (Coelliet al., 2003).

In this sense, the translog function is a generalization of the Cobb-Douglas, considering cross and square terms as elements. The fact that the partial derivatives are not constant makes the preferable and more flexible translog function as Cobb-Douglas (Shao and Lin, 2001). Additionally, an advantage of the translog function is that it considers the interactions between inputs and at the same time, the elasticities are expressed in terms of the variables themselves, so they vary depending on the level of use of productive factors. In contrast to the Cobb-Douglas function allows the translog relations of complementarity and substitutability between factors in the model. Given the Cobb-Douglas specification is a special case of the translog model, analysis of the translog specification.

Therefore, according to Fan (1991), Karagiannis and Tzouvelekas (2001), the expression (1) or (5) is specified as a translog function, which is represented as:

$$Lny_{it} = \beta_0 + \sum_{k=1}^{K}\beta_k Lnx_{kit} + \sum_{j=1}^{J}\sum_{k=1}^{K}\beta_{jk} Lnx_{kit} Lnx_{jit} + \beta_0 t + \sum_{k=1}^{K}\beta_{Tk} Lnx_{kit} t + e_{it} \quad (6)$$

Where $k, j = 1,...K;1,..., J$ indicate elements that influence the public expenditure budget (G33); If the stochastic frontier is estimated by a Cobb-Douglas would have: $y_t = Ax_1^{\beta 1}x_2^{\beta 2}e^u$, where y is the product, A a positive constant, x_1 and x_2 inputs, β_1 and β_2 parameters to be estimated and u the error term. When linearized holds: $\ln(y_t) = \alpha + \Sigma\beta_1 \ln x_{it} + \xi_t$. $e_{it} = (\upsilon_{it} - u_{it})$, υ_{it} is the random error and u_{it} the inefficiency term.

In this document, y_{it} represents the benefit that approximates the value of the entity with greater efficiency i; $i = 1,2,...,31$ and the time t; $t = 1,2,...,22$, in millions of pesos 2000. x_{it} is a vector (1×21) containing a constant term, income GDP (K), economically active population PEA (L), population density DP (H) and an element (A); a variable representing the implied variations in changes in budget spending pres. Other variables such as the construction of primary schools and normalesc and construction of medical facilities as a proxy for GDP (K), in millions of pesos of 2000 that is constructed with conventional perpetual inventory method are used.

The capital stock at t is given by skt = (1-δ)•skt-1 + It-1, where δ is the depreciation rate and I is the investment in the previous period. The capital stock in t-1 is calculated as sktt-1 = It / (k + d), where k is the average rate of growth of output (GDP) long term and d the depreciation rate.

It is estimated by regressing It = α + βt, with α = Io, and the initial stock of capital as sko = Io / (k + d). PEA (*L)* represents the economically active population in millions; (H) DP is the population density, which is a relationship between the territory and the number of inhabitants in millions of people, and (A) is the change in budget spending, it is assumed that even if this comes from the revenue law of the federation change over time.The variables in the model of stochastic frontier production are expressed in deviations from their respective sample means.

This is only a change in the units of measurement and does not modify the data itself.

However, it has the advantage that the parameters estimated in the first-order translog function can be interpreted directly as estimates of the elasticities of production inputs, evaluated at the sample means (Coelliet al., 2003).

Thus, the model has J = 7, N = 32 and T = 12 and the particular form of the function output translogarithmic each of the 32 states is expressed:

$$y_{it} = \beta_0 + \beta_K K_{it} + \beta_L L_{it} + \beta_H H_{it} + \beta_A A_{it} + \frac{1}{2}\beta_{KK} K_{it}^2 + \frac{1}{2}\beta_{LL} L_{it}^2 + \frac{1}{2}\beta_{HH} H_{it}^2 + \frac{1}{2}\beta_{AA} A_{it}^2 + \beta_{KL} K_{it} L_{it} + \beta_{KH} K_{it} H_{it} + \beta_{KA} K_{it} A_{it} + \beta_{LH} L_{it} H_{it} + \beta_{LA} L_{it} A_{it} + \beta_{HL} H_{it} A_{it} + \beta_T T + \frac{1}{2}\beta_{TT} T^2 + \beta_{KT} K_{it} T + \beta_{LT} L_{it} T + \beta_{HT} H_{it} T + \beta_{AT} A_{it} T - \upsilon_{it} - u_{it} \quad (7)$$

Furthermore, the technical efficiency is specified as a linear function:

$$u_{it} = \sum_{m=1}^{M} \delta z_{mit} + \eta_{it} \quad (8)$$

Where the influence of two factors assumed in the level of inefficiency (u_{it}), one being an independent term (η_{it}). The components included in the vector z_{it} are associated with: GDP (K), PEA (H) PRES (A) and time (T). The series were obtained from different sources including various databases are the (INEGI) National Institute of Statistics and Geography (CONAPO) national population council (BANXICO) bank of Mexico.

(UN) organization of the United Nations (SIMBAD) and Municipal State System Database INEGI (INAFED) National Institute for Federalism and Municipal Development.

The set of data to estimate a model of unbalanced panel data for the period 1998-2010 using annual data.

The maximum likelihood estimates of the model are obtained by Frontier 4.1 program, which allows an estimation of the stochastic frontier model in a single step while the estimated parameters of the variables included in the explanation of inefficiency.

After the estimation, the results below, which tell us that factors involved in both efficiency and inefficiency as well as entities that are more efficient are interpreted.

Regression analysis

Model results of stochastic frontier, equation (7) and the model are shown in Table 1.

A positive sign in the parameters of the first equation implies that inputs tend to increase the level of production; while a negative sign in the second model indicates that an increase in the value of variables results in a reduction of inefficiency.

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Estimation of technical efficiency for all 32 states by fp stochastic frontier, "from 2008 to 2010.

	coeficiente	error standard	t-ratio	
C	0.1452	1.7879	0.0812	
Pres	0.0966	0.1534	0.6296	*
Dp	-0.2519	0.3200	-0.7873	*
Pib	0.1360	0.2801	0.4855	**
Im	-0.0665	0.1353	-0.4916	**
Esc	1.0901	1.0506	1.0376	*
Um	-0.6184	0.8430	-0.7336	*
Pea	-0.3898	0.5746	-0.6783	*
T	0.0376	0.0867	0.4334	**
(presXpres)/2	-0.1715	0.2227	-0.7699	*
(dpXdp)/2	0.0108	0.0228	0.4748	**
(imXim)/2	0.0132	0.0165	0.8021	*
(escXesc)/2	0.0170	0.0357	0.4781	**
(peaXpea)/2	0.1292	0.1325	0.9750	*
(tXt)/2	-0.3204	0.3458	-0.9265	*
presXdp	-0.0402	0.0561	-0.7152	*
presXim	-0.0718	0.0785	-0.9152	*
presXesc	0.3540	0.2831	1.2508	*
presXum	-0.1729	0.2678	-0.6454	*
presXt	0.1677	0.2485	0.6748	*
dpXim	-0.0062	0.0108	-0.5730	*
dpXpea	0.0313	0.0526	0.5940	*
dpXt	0.0465	0.0492	0.9451	*
pibXim	0.0065	0.0138	0.4746	**
pibXesc	0.0313	0.0633	0.4938	**
pibXum	0.0448	0.0829	0.5406	*
pibXt	0.0666	0.1086	0.6130	*
segundo modelo "ineficiencia"				
C	0.1075	0.1489	0.7222	*
Ic	-0.0015	0.0026	-0.5844	*
Tcp	0.0120	0.0190	0.6306	*
Ppp	-0.0338	0.0457	-0.7411	*
T	-0.0330	0.0491	-0.6716	*
SIGMA-2	10.3466	2.5795	4.0111	*
GAMMA	0.8298	0.1557	5.3306	*
log likelihoodfunction = 0.14208897E+03				
LR test of the one-sided error = 0.11073241E+02				

*significativo al 1%
**significativo al 5%

Table 1

Whereas the first-order parameters, βk, tells us that the budget (pres), the (GDP) and the construction of basic schools and normal (esc) positively influence the G33. The budget Variable their small but significant value (0.0966) tells us little influence on the variations of the G33, and this result is justified because the G33 was designed to compensate the poor distribution of budgetary expenditure across states that the most disadvantaged entities will benefit from this sector to its activities regardless of federal participation.

Gross domestic product (GDP) as expected value (0.1360) positively influences the evolution of the G33, every year the budget spending has a small increase because it is considered as a percentage of (GDP), therefore it is natural to find a direct relationship between these.

Like the variable (esc) with a significant value (1.0901) as the FAEB not only includes the construction of schools but also the maintenance of these so that an entity with a greater number of schools, be a creditor of a higher budget.

Distribution of technical efficiency measures for entities of Mexico: 2000-2005 and 2010

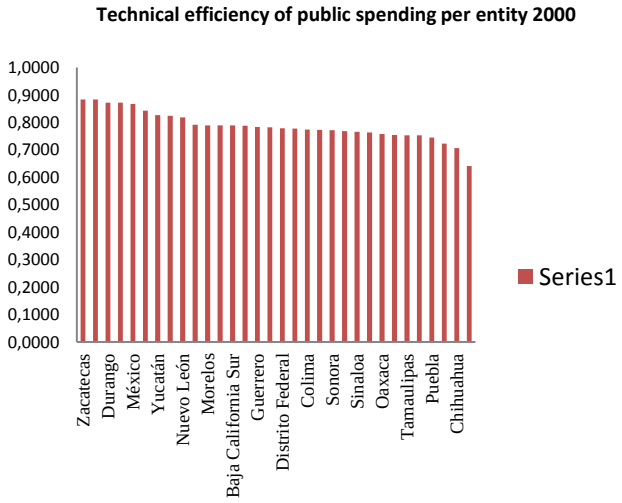
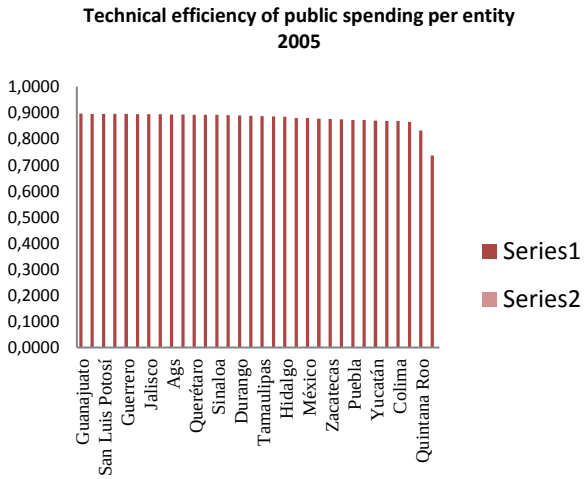


Table 2



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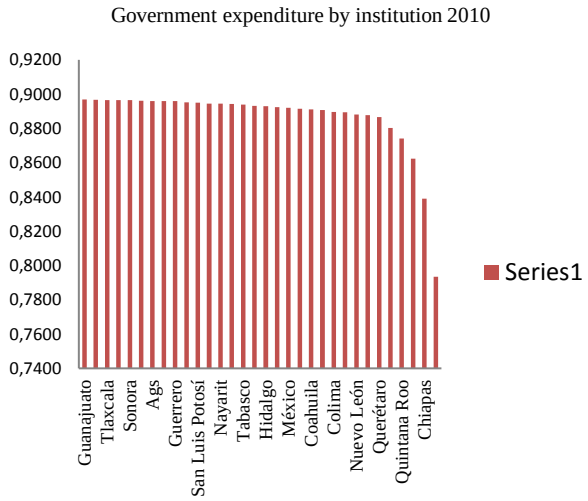


After making the maximum likelihood estimates using the Frontier 4.1 program, were made for the years 2000, 2005 and 2010, which allows an estimation of the stochastic frontier model in a single step while the estimated parameters of the variables included in explaining inefficiency.

While the methodological framework presented to estimate directly the state efficiency from estimating production frontiers, since it provides a framework of relative efficiency, it is essential to be implemented from groups entity with common characteristics.

In order to obtain results unbiased, consistent and interpretable efficiency. This is relevant in a context of state heterogeneity showing varying levels of politeness, population size, unmet basic needs, etc. And that makes it methodologically incorrect to compare the performances of authority with diverse characteristics.

One of the advantages of an analysis of efficiency segmented by groups of authority lies in the ability to control the presence of outliers, anomalous endpoints, which, depending on the variable in question must correspond to groups of company characteristics individuals.

Classification of technical efficiency by the entity and the year.

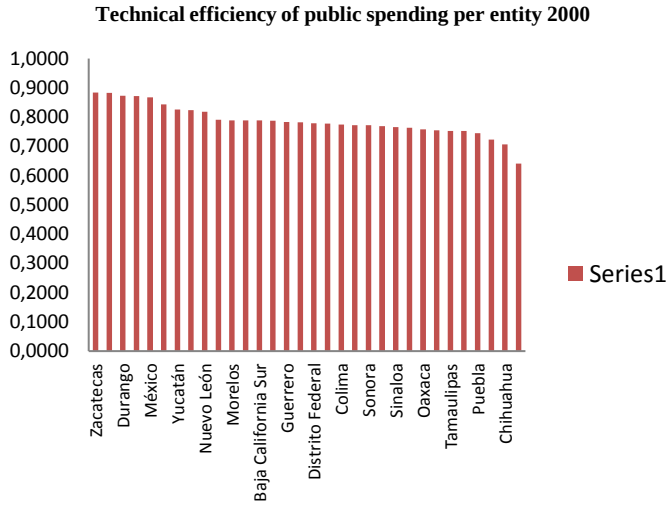
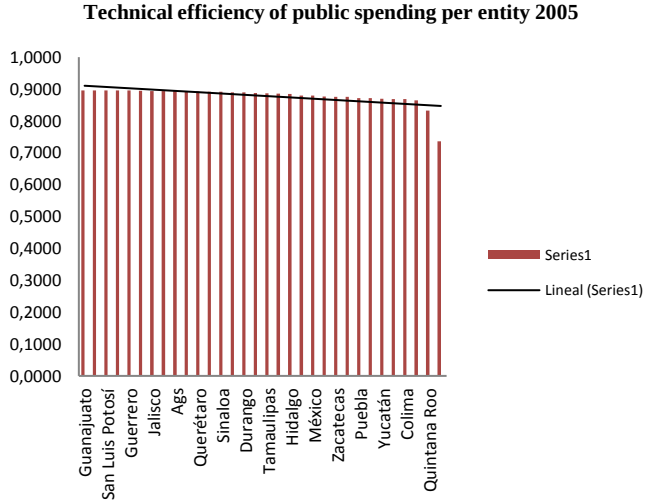


Table 3



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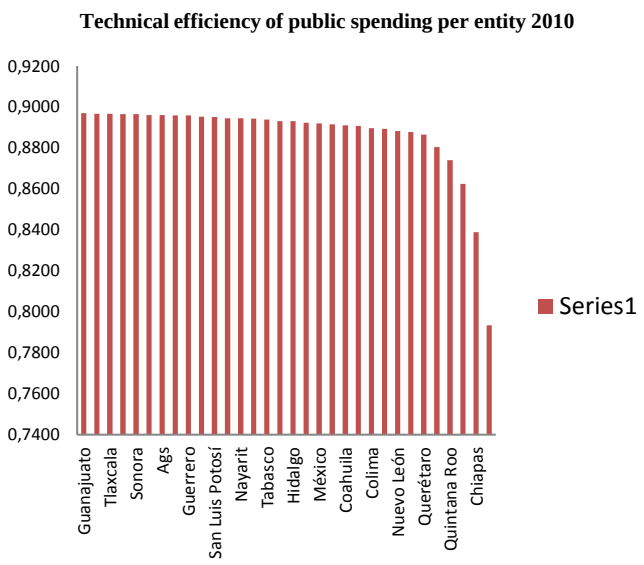

Technical efficiency ranking by institution 2005-2010.

	Grajphic Mexico 2010	
1	Guanajuato	0.8969
2	Morelos	0.8967
3	Tlaxcala	0.8966
4	Jalisco	0.8965
5	Sonora	0.8965
6	Oaxaca	0.8961
7	Ags	0.8960
8	Sinaloa	0.8959
9	Guerrero	0.8959
10	Baja California	0.8952
11	San Luis Potosí	0.8950
12	Veracruz	0.8944
13	Nayarit	0.8944
14	Durango	0.8943
15	Tabasco	0.8939
16	Tamaulipas	0.8931

Table 4

	Mexico 2005	
1	Zacatecas	0.8835
2	Quintana Roo	0.8830
3	Durango	0.8723
4	Hidalgo	0.8716
5	México	0.8673
6	Ags	0.8429
7	Yucatán	0.8261
8	Guanajuato	0.8237
9	Nuevo León	0.8181
10	San Luis Potosí	0.7912
11	Morelos	0.7891
12	Tlaxcala	0.7887
13	Baja California Sur	0.7886
14	Tabasco	0.7873
15	Guerrero	0.7833
16	Michoacán	0.7819
17	Distrito Federal	0.7784
18	Campeche	0.7776
19	Colima	0.7741
20	Jalisco	0.7723
21	Sonora	0.7720
22	Veracruz	0.7686
23	Sinaloa	0.7653
24	Coahuila	0.7632
25	Oaxaca	0.7576
26	Nayarit	0.7546
27	Tamaulipas	0.7528
28	Chiapas	0.7526
29	Puebla	0.7448
30	Querétaro	0.7229
31	Chihuahua	0.7069
32	Baja California	0.6405

Economic inequality between regions in Mexico

Different theorists around the world are still wondering why nations with similar characteristics were not developed to the same degree. While the convergence theory explains how the developed countries someday will be matched in technology by countries without development because of the disparity in growth rates, Raúl Prebisch and the dependency theory we speak the purest sense of the Hegelian dialectic that among nations and individuals, there is a dependent relationship between rich and poor, that without one, the other can not survive.

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Simon Kuznets hypothesis related to economic growth and income distribution. According to this, the growth is sufficient to reduce inequality, although it is also associated with the early growth, when there is a need for large investments in infrastructure and capital goods.

Then job creation and increased productivity would lead to higher wages and better income distribution.

We found that Mexico is one of the countries where the gap between the richest 10% of the population and the rest are older. This largely explains why the high degree of inequality in our country.

Miguel Székely in one of his studies states that among the reasons for the marked degree of inequality in Mexico has the largest variance in education, this statistical indicator measuring the degree of dispersion that exists with respect to an average.

From a comparative exercise among 18-year-old Mexico offers a variance of 14, while the United States for 1996, offers a variance of only 2 years between its young population.

Mexicans aged between 15 to 19 years, set in a mass population of 10.1 million, recorded the largest deviation of years of 14 years schooling, reflecting extreme youth population who do not study or are poorly trained to enter the labor market situation chaining process inequality, low wages and low incomes.

In another significant finding of Székely, and it says closes the explanation of the transmission circle of inequality refers to the number of children and average education of women in the family, where the higher education of women are better, Family pay opportunities, increased labor force participation and minor informality, limited by better-educated children, and fewer children; increased household income and therefore a better distribution of income. Although global data for Mexico have improved by lowering the fertility rate to 2.5 children per woman, due to the higher level of female education and economic incorporation, there are states where poverty is concentrated: Chiapas, Guerrero, Hidalgo, Oaxaca, Puebla and Yucatan Peninsula, and therefore the fertility indicator continues as fifty years ago, 3.5 children per woman.

This regional difference is also a factor that strengthens an even intergenerational transmission of inequality. Between selected 10 countries in Latin America, Mexico ranks fifth in inequality and ranks among the twelve most unequal societies in the world. According to the study by Miguel Székely, Mexico would be among the most unequal countries in Latin America not only because of the disproportionate concentration in 10% of the richest population but also by education inequities, differences in participation women, the number of children per family and the different opportunities offered by different regions of the country.

Also, in an interesting international comparison made by the same investigator, where the Gini index recalculated to Mexico (1994) amputating the tenth decile of extreme concentration, it appears that Mexico occupies the twelfth place (16) in inequality in the region (only have three equal), and has less than United States inequality.

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This comparison introduces a relevant fact and underserved: Mexico's problem has to do only with extreme poverty but mainly with excessive wealth. In other words, the fight against poverty necessarily involves a redistribution of income; deduction is relatively easy: Mexico requires a tax reform that meets criteria of quality and equity.

If the goals of reducing extreme inequalities and achieve greater equity are not registered clearly in the functioning of institutions, existing distortions in the structure of the distribution of wealth, income, power, prestige, the opportunities and decisions, they will only widen the gap between rich and poor, between trained and lacking in skills between men and women, between indigenous and non indigenous. In this research to demonstrate that an increase in public spending an entity not necessarily be reflected in an increase in economic growth($\uparrow GP \neq \uparrow PIB$), this causes unequal relationship between the growth regions of Mexico uneven. To avoid this situation it is necessary to find the technical efficiency of public expenditure so that in the first part begins by defining "technical efficiency" (ET), according to Koopmans, 1951 ET represents the ability and willingness of an economic unit to produce the maximum output possible given level of inputs and technology.

When estimating the efficiency of the resources we are able to quantify the efficiency of the state as provider, and formulator of public policy, and thus will have among other things a control mechanism with which to monitor the performance of decision units identify the sources of inefficiency and, from this, to outline policies or action plans (C. Knox Lovell 1993).

It is said that the efficiency of decision units must be analyzed taking into consideration: the inputs used and results based on products obtained in the production process.

Results are expected on the optimal production or potential; given the amount of inputs used. Or conversely, are expected to use the minimum amount, optimal or potential inputs to produce certain objective result.

Charnes and Cooper (1985) mention "a decision unit is efficient if it meets the following: A) None of the results can be increased without increasing at least one of its inputs or reduce at least one of their other products. And B) None of the inputs can be reduced without reducing the quality of at least one result or raise at least one of the other inputs. "It is appropriate for the objectives of this research using the branch 33 of public expenditure for study . This will be an analysis of technical efficiency in public spending in each of the programs this field with what is expected to find that institutions are more efficient to do this type of investment and which are not.

On the other hand economic inequality is a topic of current interest, the standard of all governments in Latin America's struggle against poverty, there is a more global concept that speaks not only of economic growth but also development and is expressed as the "quality of life "that the inhabitants of a country or region and is known as the Human Development Index (HDI). Using the concept of human development report published in 2009 by the United Nations Programme for Development (UNDP), which ranks countries in three groups:

- Country with high human development (HDI ≥ 0.8).

- Country with medium human development ($0.5 \leq HDI < 0.8$).

- Country with low human development ($HDI < 0.5$).

When the weights expressed by (UNDP) apply to the states of the country we find that organizations like the Federal District, Nuevo León and Baja California, have rates above 0.8 HDI and are classified as high, while the state from Mexico, Guanajuato and San Luis Potosí show medium HDI levels, Oaxaca and Chiapas entities with low HDI.

It is said that the resources available to the state are limited so it is vital to know if it is usied correctly. It is considered that investments made by the state through the various economic programs and budgets are insufficient, each once more and unsatisfied demand exists. Beyond budgeting and resource allocation to the various activities of the state, it is believed that it can improve the efficiency in the use of state resources.

The following will perform research and analysis to estimate the states of the Mexican Republic of the technical efficiency of public spending programmable, more specifically the branch 33 which is within the classification of administrative type of public spending. It is supposed that an efficient use of resources brings us closer to meeting the goals and objectives of growth and economic development in order to achieve the inequality and poverty in Mexico is decreased.

Public spending in the branch 33 is inefficient due to the misuse of state resources, and technical efficiency, is located far from the frontier of production possibilities in each of the programs that compose it.

If the states of the northern region are more technically efficient in the use of public spending Bouquet 33, particularly on those programs, unlike the states included in the other regions of the country; then, economic inequality, as measured by the HDI, would be higher among those regions.

One of the main features is the structure of the state is to provide public services, state intervention covers a wide and diverse aspects such as social security, education, culture, health, infrastructure, internal order, among others.

It is said that beyond that the State does not have the sufficient amount of resources incurs an inefficient provision of public goods (BP). As part of the state, there is only a limited spending on these goods, but also a bad management of state resources, we find here the interests of this research by analyzing the characteristics and forms as the State provides public services.

There are numerous disturbances that can affect the state to fulfill its functions: corruption, insecurity, administrative machinery, economic, political and social order, similar and complementary. It is assumed that increasing the efficiency of public spending can help correct these distortions affecting the fulfillment of the great national objectives, such as, education, health, infrastructure, security, etc. And that within the theory of endogenous growth are key factors for growth and development.

The Human Development Index (HDI) is composed of three dimensions: health, education and income, each dimension is measured from variables set by the UN.

The assessment at the regional level can be considered complete for this research, the information below must be modified so that it is regionally as it seems more convenient to be broader. For funds Bouquet 33 FAEB, Fassa, etc. No need to change any criteria only entities according to a plan proposed by the federal government as opposed to regionalization HDI for example the size of the education attendance rate replaces the enrollment rate by organized school.

The attendance corresponds to the obtained from the population between 6 and 24 years attending school among the population in the same age range. The literacy rate is obtained from the number of people aged 15 and over, who can read and write the number of people aged 15 and older.

In the dimension of per capita GDP is replaced by the per capita annual income average, this income is obtained through a process of recognition of income from the National Household Income and Expenditure Survey (ENlGH) General Census of Population and Housing following the methodology developed by Elbers and Lanjouw.

This methodology Elbers and Lanjouw is based on census data to achieve more disaggregated than those obtained by representative surveys estimates. The work uses household consumption to determine their level of income. Based on per capita household consumption, the average household consumption, the percentage of poor in each region and the Gini inequality index are calculated. The average annual per capita income obtained by this methodology is tight to the country's GDP by applying a homogeneous factor nationwide and subsequently adjusted by conversion factor terms Parity Purchasing Power in U.S. dollars (PPP in USD).

Then the HDI to Mexico is shown in 2009 as the country is divided for purposes of this investigation, which according to the regions of different levels of HDI.

Country with high HDI (HDI $\geq$ 0.8).

Medium HDI country (0.5 $\leq$ HDI <0.8).

Country with low HDI (HDI <0.5).

The above table shows a bias to a higher rate in the northern states except Nayarit, Quintana Roo and Mexico City, the country's regions center shown in the figure below for an intermediate color display an average index still considered high to be greater than 0.8 while the lighter color represents the regions with less than 0.8 index.

As shown on the map, although the economic backwardness revealed most backward entities as Chiapas, Guerrero and Oaxaca, the evaluation of the United Nations in Mexico this year, 2009 is benevolent with an average HR, higher than in other Latin American countries, as their deficiencies in these three areas of education, health and income are alarming for these entities.

Human Development Index by State 2009

Graphic 1

Source: http://www.skyscraperlife.com/mexican-lounge/35549-idh-de-mexico-y-sus-estados-muy-completo.html

- Funds Contributions to the states and municipalities (item 33).

Until 1997, the financing of decentralization was performed by conditional grants from the federation and the states transfers, but the proliferation of these agreements and arrangements and their complexity, it was decided to give this set of transfers a legal basis that would ensure their continuity and permanence.

To the above in LCF reform effective from 1998, Chapter V, where various funds and establishing the figure of the contributions is created as a mechanism for financing decentralized functions and materials is added. Item 33 is included in the Expenditure Budget of the Federation (PEF), where financial decentralization provisions are contained in the same year. For 1998, the following funds are established:

- Contributions Fund for Basic and Normal Education (FAEB)

- Contributions Fund Health Services (Fassa)

- Fund Contributions for Social Infrastructure, with two parts, one state (FISE) and other municipal (FISM)

- Contribution Fund for Strengthening Regional Municipalities and Districts of the Federal District (FORTAMUNDF)

- Multiple Contributions Fund (FAM)

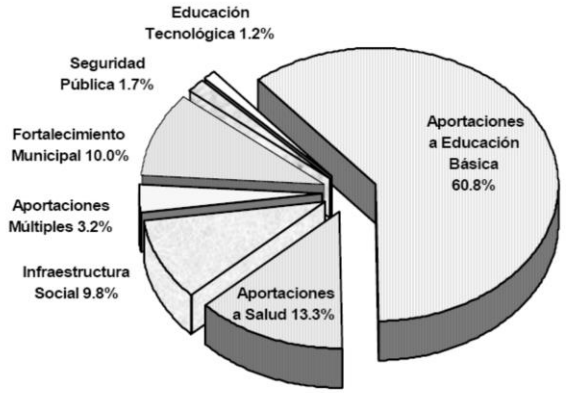
- Contributions Fund for Technological and Adult Education (FAETA)

- Contribution Fund for Public Security of States and the Federal District (FASP)

Originally on the initiative of the Federal Executive considered only the creation of three funds contributions: FAEB the Fassa and municipal FAIS, then in the House of Representatives and the FORTAMUNDF joined FAM.

After some amendments to the Law of Fiscal Coordination two new funds: The FAIS contains some of the above resources to states and municipalities as part of Branch 26 to finance works, basic social actions and investments that directly benefit sectors were allocated of the population living in extreme poverty and social backwardness as water, sewerage, drainage, latrines, rural electrification, basic infrastructure, health and education, improved housing and rural productive infrastructure, among others.

Percentage distribution by branch 33 1998-2010



Graphic 1

Source: Own calculations based on data published by the Ministry of Finance on the Budget Federal Expenditures for different years.

As the distribution criteria already discussed in chapter one. FAEB is the fund which has more resources composes more than 60% of the branch 33, Fassa has a 13% then FAIS FORTAMUNDF are 10% of them.

Resources across seven funds, except FORTAMUNDF already transferred to states and municipalities through various branches, so that the amendments to the Law of Fiscal Coordination and creation of Item 33 is basically a reorganization of these resources, although strengthen their legal and budgetary certainty.

The criteria for allocation of funds for each vary, but overall, the historical FAEB, Fassa, gaps or FAIS poverty, population and needs FORTAMUNDF or FASP compliance programs.

It is very important to mention that the DF was only included in Fassa, FORTAMUNDF and FAM as resources for the education budget gets directly through the bouquet 25. In regarding the amounts, FAEB integrates almost two thirds of the contributions, although their relative share has decreased from 1998 to 2004.

The funds that have grown are the Fassa, the FIES and FORTAMUNDF while the FASP has lowered its allocation both in absolute and relative terms as infrastructure and health education, housing, paving rural roads, drainage, drinking water and electrification.

Distribution bouquet 33 billion and per capita.

México	40,064
Veracruz	28,968
Chiapas	21,997
Jalisco	20,429
Oaxaca	20,122
Puebla	19,126
Guerrero	18,762
Michoacán	17,020
Guanajuato	16,211
Nuevo León	12,296
Tamaulipas	12,213
Hidalgo	11,688
Chihuahua	11,357
San Luis Potosí	10,957
Baja California	10,225
Sinaloa	9,718
Coahuila	9,459
Sonora	9,247
Tabasco	9,023
Distrito Federal	8,063
Durango	7,851
Yucatán	7,516
Zacatecas	7,325
Morelos	6,510
Querétaro	6,212
Nayarit	5,134
Quintana Roo	4,895
Tlaxcala	4,694
Campeche	4,563
Aguascalientes	4,456
Colima	3,129
Baja California Sur	3,055

Table 3

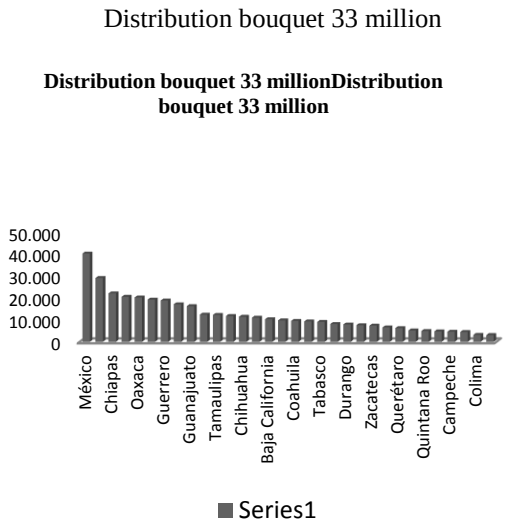
CAMPECHE	6250.15
BAJA CALIFORNIA Sur	6235.61
GUANAJUATO	6233.15
OAXACA	5935.62
CHIHUAHUA	5688.48
NAYARIT	5641.79
ZACATECAS	5549.51
DURANGO	5377.54
COAHUILA	5300.50
GUERRERO	5148.79
SAN LUIS POTOSÍ	4702.38
TABASCO	4699.43
TLAXCALA	4557.04
QUINTANA ROO	4490.50
MICHOACÁN	4432.18
AGUASCALIENTES	4326.57
YUCATÁN	4270.17
VERACRUZ	4210.43
TAMAULIPAS	4182.66
MORELOS	4173.28
QUERÉTARO	4033.72
SONORA	4002.95
CHIAPAS	3924.80
SINALOA	3856.45
BAJA CALIFORNIA	3718.05
PUEBLA	3671.05
COLIMA	3628.44
ESTADO DE MÉXICO	3427.33
HIDALGO	3128.47
NUEVO LEÓN	3028.51
JALISCO	2954.57
DISTRITO FEDERAL	955.34

Table 4 Distribution bouquet 33 per capita

Source: Own calculations based on data published by the Ministry of Finance in the Expenditure Budget of the Federation for different years.

These funds are distributed by the federation to the states, they are required to distribute to municipalities no later than five days after receipt as mentioned by law.

The distribution of item 33 for the year 2009 is presented by ordered high to low which helps us to make a comparison to the states with their level of HDI federal entity.

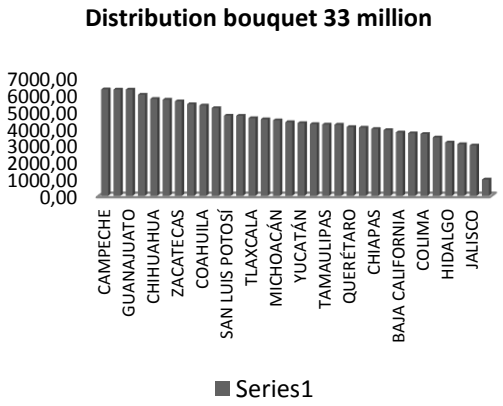


Graphic 2

Source: Own calculations based on data published by the Ministry of Finance in the Expenditure Budget of the Federation for different years.

When the branch 33 is the main idea was created to benefit the less developed entities and not only reimburse entities that contributed most. It was meant to support the institutions with the highest number of people presenting to an HDI below the national average, the chart above shows that the three entities with less developed that have the lowest HDI Chiapas, Guerrero and Oaxaca resources are received in the most money, while Quintana Roo and Campeche are the least receive; the State of Mexico we see on top of the previous graph but consider that it is the most populous entity in the graph below we see what happens when we see the same allocation of resources now in per capita terms.

Distribution bouquet 33 million



Graphic 3

Source: Own calculations based on data published by the Ministry of Finance in the Expenditure Budget of the Federation for different years.

This graph 3 when the analysis is now in per capita terms the situation is very different, Campeche and Baja California Sur are the first two places and the existence of inefficiency in the performance of public expenditure is shown as compared with the level of HDI Baja California has a very high level of development compared to Campeche both receiving more resources in these funds as other entities, Oaxaca now ranks as the fifth entity that receives more resources per capita and say that is the idea assumes that less developed institutions receive more resources through these funds but again conclude that there is technical inefficiency in public spending despite the use of funds is regulated.

Conclusions

Once it has been empirically shown that the existence of technical inefficiency to make public spending on the states of the country, it is concluded that inefficiency is a factor that promotes economic inequality between regions of Mexico. The fact mentioned here apply the methodology to public spending becomes efficient can be stated as one of many solutions to prevent inequality between regions, these positions range from advocating the existence of a minimal state entrusted to perform basic functions such such as public safety and the administration of justice, to positions that support an active state involvement in the economy, including the provision of private goods and services through public enterprises.

Beyond conceptual discussions about the role of the state in the development process, traditionally three areas of competence of the public sector accepted distributional equity, macroeconomic stability and efficiency in the allocation of productive resources, public sector performance in promote equity and stability be measured directly using variables such as the Gini coefficient of income concentration and the rate of inflation, respectively. Another important variable that macroeconomic stability is the coefficient of variation of the rate of output growth. As for the efficient allocation of resources, government action would measure indirectly through indicators related to economic performance.

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