EQUITY AND EFFICIENCY EFFECTS OF INTERGOVERNMENTAL AID: THE CASE OF PORTUGAL*

by

ELCHANAN COHN AND JOSÉ COSTA**

I. INTRODUCTION

Portugal may be characterized as having a very concentrated and centralized public administration. The "Terreire do Paco"[1] has for a long time kept the power to decide on almost every public issue, which contributed to the concentration of resources and reinforced the unequal growth pattern of the Portuguese economy. Table 1 provides information about the relative centralization of public finance in a selected list of countries, indicating that Portugal has been one of the most centralized countries in the Western World.

There are a number of plausible explanations for the relatively minor role played by local governments. First, Portugal is a relatively small country with relative lingual, racial, and religious homogeneity. Second, political and cultural factors, especially under a dictatorial regime, favored centralization. The political upheavals during 1974 brought an end to the dictatorship, ushering in their wake new opportunities for the expression of local demand for public expenditures and local interest for cultural and regional development. Such movement was integrated by the political parties which introduced in their political platforms the goal to promote regionalization. When called to form a government the political parties have not been totally consistent in regard to the decentralization process. In spite of the difficulties some steps have been taken with the approval of new legislation regulating diverse aspects of the regional organization. Among recent legislative acts are the bill establishing a new system of intergovernmental aid and the bill defining the areas of responsibility of the municipalities.

The system of intergovernmental aid operating since 1976 has been determined by principles quite similar to those underlying the new legislation. The bill regulating the intergovernmental aid system was first approved in 1979 and later

revised in 1984. Legislation concerning local government responsibilities was enacted in 1982 but not yet completely implemented.

This paper offers an examination of the equity and efficiency effects of the new intergovernmental aid system in Portugal.

TABLE 1

Relative Centralization of Public Sectors in Selected Countries, 1979

Countries	Central Government Share in General Government Current Disbursements (%)	Central Government Share in General Government Final Consumption Expenditures (%)
Portugal	68.9 (a)	74.0 (a)
Austria	54.8	36.2
Greece	57.8	77.1
Italy	61.2 (c)	67.8 (c)
United Kingdom	76.2 (c)	58.3 (b)
Netherlands	46.7	45.6
Finland	52.2	33.3
W. Germany	64.9	69.9
Ireland	42.7 (b)	48.7 (b)
Spain	48.1 (c)	68.6 (c)
USA	54.8 (b)	41.9 (b)
Switzerland	27.3	23.9
Sweden	49.3	30.5

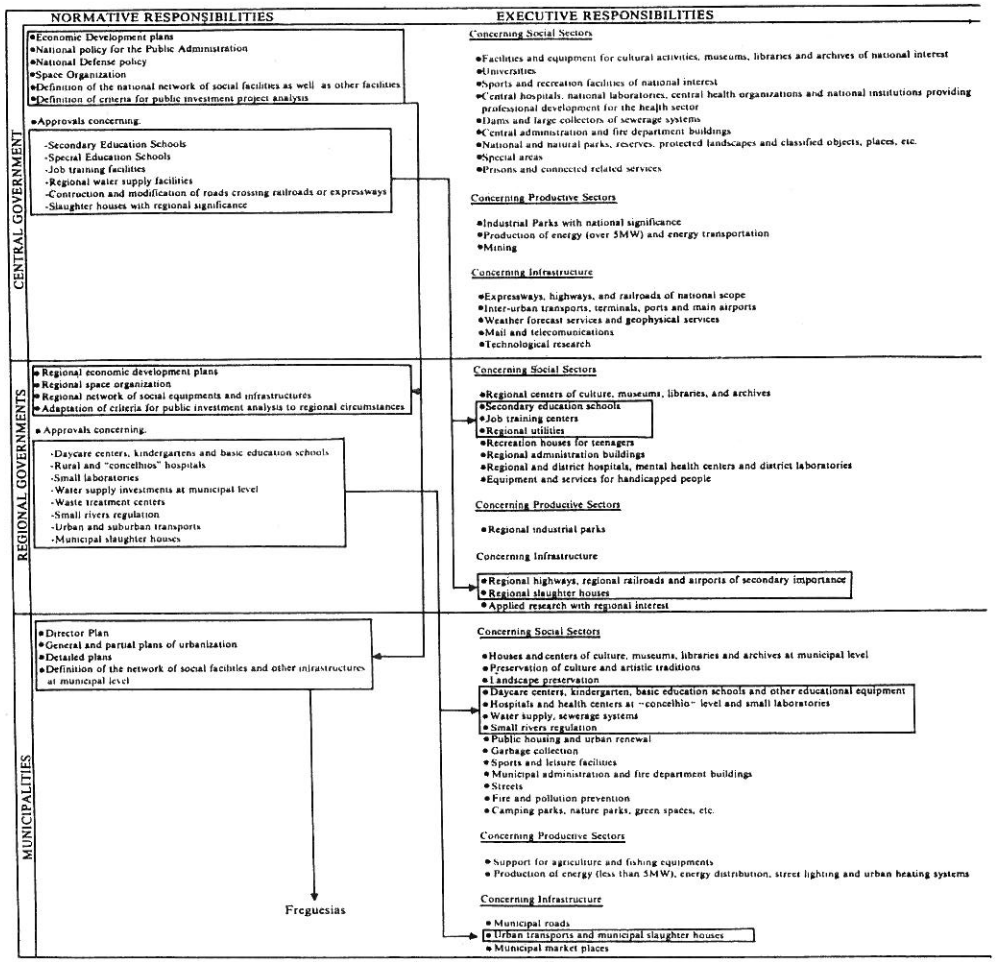
Source: *Yearbook of National Statistics.* United Nations
a) 1976
b) 1978
c) 1977

II. SOME ASPECTS OF THE REGIONAL ORGANIZATION IN PORTUGAL

The new regional organization consists of four types of local governments (Portuguese Constitution, 1976): the autonomous regions of Azores and Madeira, the administrative regions, the municipalities and the "freguesias". The "freguesias" are small areas within municipalities corresponding roughly to a ward in an American city. The administrative regions largely replace the old districts (there were 18 districts in the Continent), which were areas of jurisdiction under the control of the "governador civil" who was appointed by the central government and represented the central government's interest locally. As a political appointee

Figure 1

Responsibilities of Central, Regional and Municipal Government in Portugal



Note: Freguesias play a minor role in the implementation of investments. Bill 77/84, however, allows the freguesias to execute investments under municipal responsibility as long as the municipalities authorized and provided financing and technical assistance.

by the central government the "governador civil" formulated local public expenditure and revenue decisions corresponding to the preference of the central administration, rather than the local constituency. The new regional governments, on the other hand, are expected to be more attuned to the needs of the local and regional population because the regional governments ("juntas regionais") will comprise of elected members and a central government representative. The members representing the region are elected by a Regional Assembly composed of elected regional representatives and representatives of the region's municipalities.

In addition to the four levels of government described earlier, the new (1979, 1984) legislation proposes the formation of municipal associations. The groups of municipalities organized in such associations would be able to deal with investment projects which have significant regional spillovers.

When the transition process is completed, the public administration will be spread through the central government, 2 autonomous regions, 7 administrative regions, 306 municipalities, and 4,500 "freguesias". The municipalities have an average area of 300 km^2 and average population of 33,318 residents,[2] while the "Freguesias" have an average area of 22.6 km^2 and an average population of 2,509 residents. The number of municipalities per district ranges from 10 to 24.

The distribution of responsibilities among the central government, administrative regions, and municipalities is presented in a simplified scheme in Fig. 1.[3] As illustrated in Fig. 1, public investments executed by lower levels of government are subject to approval by a higher level of government or at least cannot contradict the plans made at a higher level. Such an orientation is, on the one hand, a result of an interventionist philosophy quite general in Europe and, on the other hand, is a consequence of the relatively small size of the country.

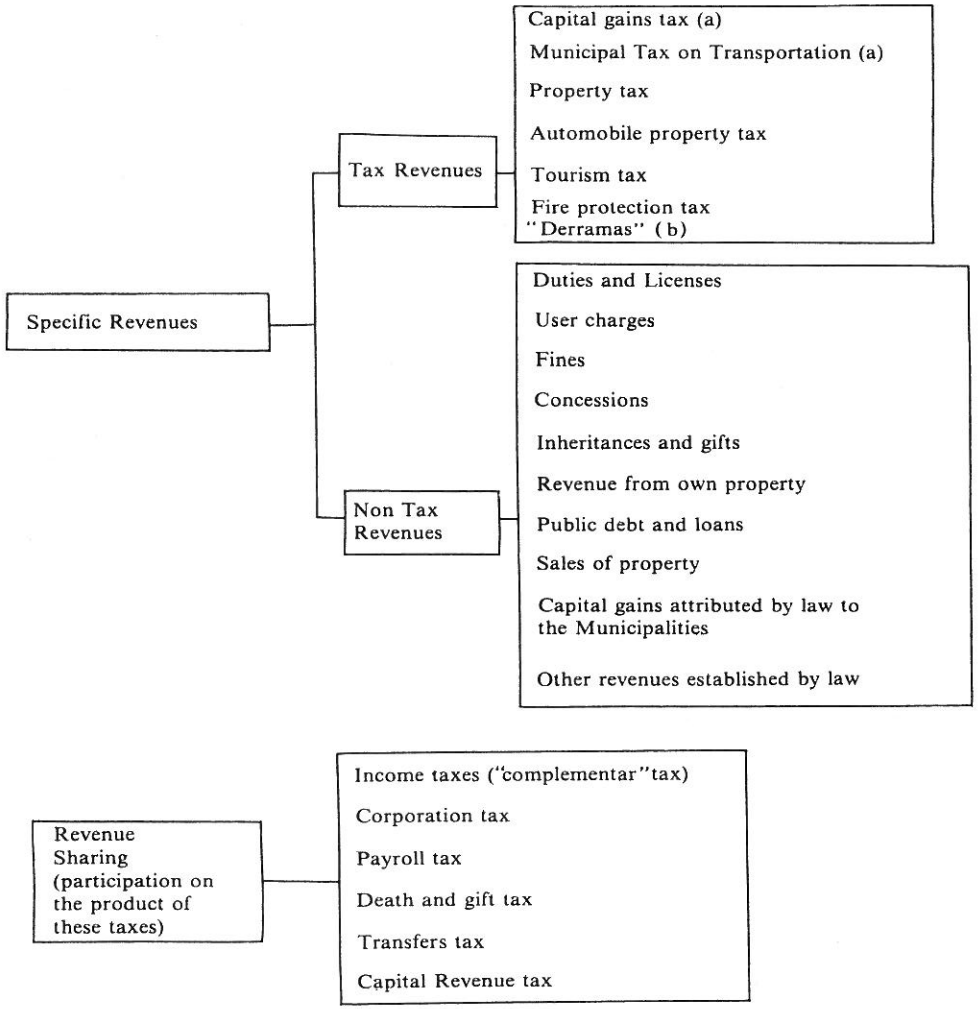
III. SALIENT FEATURES OF THE INTERGOVERNMENTAL TRANSFER SYSTEM IN PORTUGAL

A simplified scheme of the different sources of municipal revenue is described in Fig. 2. As is also the case in the United States, local governments in Portugal are severely restricted in regard to revenue sources because the law clearly delineates the taxes from which local revenues may be obtained. Although there are significant differences among localities in revenues per capita, there are few differences in the types of taxes imposed and the prevailing nominal tax rates.

For the year 1978 (and for the mainland), virtually all of local tax revenues were obtained from the real property tax (78 per cent) and automobile property tax (19.7 per cent). But tax revenues accounted for less than 25 per cent of all local revenues, indicating the strong dependence on intergovernmental transfers and/or local non-

Figure 2

Sources of Revenue for Municipalities in Portugal



(a) Approved by the 1984 Revision of the local governments financing bill.
(b) "Derramas" are surcharges which may be levied at the option of each municipality up to 10 percent of the tax collected on property, corporations and tourism. They can only be collected in order to finance projects considered urgent. Derramas are not considered as tax revenues by Portugese law, but we included them in the tax-revenues category for consistency.

tax revenues. Table 2 provides information about the proportion that local revenues and direct taxes are of total revenues for each of the 18 districts. The table also displays the correlation coefficients between the proportions of revenues accounted by local revenues and direct taxes, respectively, and per capita GDP in each district.

TABLE 2

Proportions of Local Revenues from Own Sources and Direct Taxes, for 18 Districts in Portugal

Local Government Own Revenues as a Percentage of Total Revenues (1978)			Local Government Direct Taxes as a Percentage of Total Revenue (1978)		
1.	Portalegre	11.3	1.	Beja	5.0
2.	Vila Real	16.1	2.	Bragança	6.4
3.	Guarde	18.8	3.	Vila Real	8.1
4.	Evora	19.6	4.	Viseu	8.3
5.	Beja	20.0	5.	Guarda	10.3
6.	Bragança	20.8	6.	Portalegre	10.3
7.	Viana do Castelo	22.0	7.	Viana do Castelo	10.6
8.	Viseu	24.4	8.	Evora	10.8
9.	Faro	26.9	9.	Castelo Branco	11.7
10.	Santarem	26.9	10.	Aveiro	19.0
11.	Braga	30.5	11.	Braga	16.0
12.	Leiria	38.7	12.	Leiria	16.1
13.	Setubal	39.5	13.	Faro	17.5
14.	Aveiro	41.8	14.	Santarem	19.1
15.	Castelo Branco	49.9	15.	Coimbra	25.0
16.	Coimbra	51.9	16.	Setubal	26.3
17.	Porto	53.7	17.	Porto	29.1
18.	Lisbon	54.1	18.	Lisbon	37.8
Correlation with the per capita GDP		0.619			0.804

Source: MAI [1979].
Note: In 1978 the distribution of revenue was influenced by several aspects such as needs, population, and financial capacity, which are parameters retained in the present intergovernmental aid system.

The considerable variation in the degree of dependence on intergovernmental transfers is striking. The ratio of own revenues to total revenues varies from 0.11 in Portalegre to 0.54 in Lisbon, and the ratio of local direct taxes to total revenues varies from 0.05 in Beja to 0.38 in Lisbon. In either case the correlation with per capita GDP is positive, and statistically significant at the 1 per cent level. The

correlation coefficients confirm the hypothesis that fiscal dependence on the central government diminishes with increased economic development.

The share of municipalities in central government tax revenues is subject to annual budgetary review. Before the 1984 revision, intergovernmental transfers had two destinations: Investment Fund and Functioning Fund. The present system does not differentiate between investment and current transfers. In spite of this change, the principles used to defined the share of each municipality were not subject to substantial alterations. Table 3 presents a comparative analysis of these principles before and after March 1984.

TABLE 3

Criteria to Distribute Central Government Transfers to Municipalities

Criteria	Bill 1/1979	Bill 98/1984
Proportional to Population	41.0%	45.0%
Proportional to Area	6.0%	10.0%
Proportional to Per Capita Direct Taxes	16.0%	15.0%
Proportional to Number of Freguesias	13.0%	5.0%
Proportional to Needs	24.0%	20.0%
Flat (Lump Sum) Grant[a]	———	5.0%
	100.0%	100.0%

[a] Grant provided in equal amounts to each concelho (municipality) regardless of population or other variables.

A. *Tax Effort*

An indicator of tax effort is given by the ratio of the percentage of local taxes collected in each region or district to the percentage of the district's or the region's income relative to total income. Mathematically, the indicator of tax effort, Tax Ef_i, is given by the following formula:

$$\text{Tax } Ef_i = (LT_i/LT)/(Y_i/Y)$$

where

LT_i = local taxes collected in district or region i;
LT = total of local taxes collected in all districts or regions (ΣLT_i);
Y_i = income originating in district or region i;
Y = total income in all districts or regions (ΣY_i).

When gross Domestic Product (GDP) for 1970 is used as the measure of income,[4] variations in the index of tax effort range from 1.88 for Faro to 0.112 in Beja (see Table 4).

Two additional measures of "income" were used to derive the index of tax effort for regions: (1) income distributed to the factors of production, and (2) total income.[5] The tax-effort indices for the four regions comprising the traditional groupings of districts, for each of the three income measures, are described in Table 5. The noteworthy aspect of the table is that the relative positions of the regions remain remarkably stable no matter which measure of income is used.

TABLE 4

Indices of Tax Effort for the 18 Districts in Portugal[a]

District	Index	District	Index
Faro	1.880	Vila Real	0.730
Lisbon	1.267	Santarem	0.722
Coimbra	1.261	Castelo Branco	0.722
Porto	1.205	Leiria	0.722
Guarda	0.911	Braga	0.705
Setubal	0.860	Aveiro	0.593
Evora	0.849	Bragança	0.560
Portalegre	0.831	Viseu	0.477
V. Castelo	0.827	Beja	0.112

Source: Calculated from MAI [1980]

[a] The index of tax effort is defined in the test. Tax collections are for 1978, and GDP (the measure of income) is for 1970.

One explanation for the large variation in tax effort, despite a uniform tax code for all municipalities, might be the differences in assessed valuation of property. One of the major problems with assessed valuation, common to many other countries, is the long lag between reassessments. In some cases, assessed values are extremely low because properties were evaluated a long time ago. Also, property values in expanding areas and in urban communities tend to be reassessed more frequently.

One may notice that the rankings of districts vary within Table 2 and also between Tables 2 and 4. In some cases, the differences in ranking are dramatic (e.g., for Guarda, Portalegre, Faro, Braga, Castelo Branco, and Aveiro). Differences in such rankings may be explained, in part, by the differences in assessment ratios and vintage of property described above. Other explanatory factors include differences

in population density, the extent of services provided by municipalities, the average size of property, and degree of reliance on non-tax revenue sources (Fig. 2). Our index of tax effort is limited to the extent that some local governments employ non-tax revenues to finance activities which other local governments support through tax revenues.

IV. EQUITY EFFECTS OF THE NEW INTERGOVERNMENTAL AID SYSTEM

An important aspect of any local government financing scheme is the degree to which redistribution among local governments is considered. The specialized literature generally accepts that the use of benefit taxes (price is equal to marginal

TABLE 5

Indices of Tax Effort for Portugese Regions[a]

Region	1. GDP, 1970	2. Income Attributed to Factors of Production, 1977	3. Total Income, 1977
Lisbon	1.130	1.157	1.066
South	1.021	0.941	0.995
North	0.972	0.931	0.981
Center	0.766	0.788	0.867

Sources: Income data were obtained from Cravinho and Digueiredo [1982]; GDP and tax data from MAI [various years]

[a] The regions considered are: North (Viana do Castelo, Porto, Braga, Vila Real and Bragança), Center (Aveiro, Coimbra, Leiria, Viseu, Guarda, and Castelo Branco), Lisbon (Santarem, Lisbon, and Setubal), and South (all other districts). These regions encompass the entire Portugese continental territory. Note, however, that these regions are *not* coterminus with the administrative regions.

cost of providing the public good) is required such that inefficiency and location distortions would not arise. The problem is that the use of benefit taxes does not take into account existing inequalities. Different solutions may be offered. "The most attractive" solution is to make the central government responsible for the redistribution, and allow local governments to use benefit taxes (Oates [1972], p. 150). If the residents of the locality were subsidized, the use of benefit taxes by the municipality might not be unfair. But there are two main problems with benefit taxes coupled with subsidization of residents: (1) subsidies may be insufficient; and

(2) poor local governments might not be able to implement urgent public services for which benefit taxes are inappropriate. Another solution is to separate the collection of tax revenues from the determination of the amount of public goods to be supplied. It is generally accepted that collection of taxes by the central government is more efficient than by the local governments. The central government could therefore collect the taxes (except those with smaller spatial

TABLE 6

Indices of Formula Equalization (1979) and Tax Equalization (1978), and Gross Domestic Product per Capita (1970)

District	Index of Formula Equalization[a]	Index of Tax Equalization[a]	GDP Per Capita (1,000 Escudos)
Bragança	1.20	2.46	13
Vila Real	1.48	2.02	9
Beja	1.68	2.02	14
Viseu	1.41	1.75	14
V. Castelo	1.07	1.66	8
Portalegre	1.36	1.49	15
Guarda	1.40	1.49	9
Castelo Branco	1.07	1.47	12
Evora	0.88	1.33	15
Braga	0.78	1.10	14
Santarem	0.87	1.00	17
Leiria	0.72	0.91	18
Faro	0.84	0.89	12
Porto	0.50	0.88	19
Coimbra	0.86	0.86	19
Setubal	0.54	0.79	32
Aveiro	0.81	0.72	21
Lisbon	0.55	0.28	32

Sources: MAI [1980]

[a] See text.

shift), and through grants redistribute part of the tax revenue to the local governments. This solution has the disadvantage of separating the decision of provision of public goods from its financing. But the proper use for unconditional grants or revenue sharing formulas can solve the problem. As Oates [1972, p. 151] argues, if only part of local revenues come from the central government, local governments wanting to expand the supply of public goods will still have to finance the marginal units of public goods entirely from their own revenues.

For Portugal the option selected was to centralize the collection of taxes and through a revenue sharing scheme to redistribute to the municipalities part of the revenue collected. Notice that a direct connection exists between the central government and the municipalities in what concerns the financing process.

The local governments' participation in the central government tax revenue takes into account population, direct taxes per capita collected in each municipality, number of "freguesias", area, and basic needs. Population accounts for 45 per cent of the total distribution and basic needs account for 20 per cent. These two factors jointly represent 65 per cent of the total and have a strong redistributive component. The ratio between direct taxes per capita in the mainland and direct taxes per capita in the districts is an index of tax equalization, Tax Eq_i. The index is defined in mathematical terms as follows:

TABLE 7

Zero-order Correlation Coefficients Among the Indices of Formula Equalization, Tax Equalization, and Gross Domestic Product Per Capita

	Index of Formula Equalization[a]	Index of Tax Equalization[a]	GDP
Index of Formula Equalization	1.00	0.83	-0.67
Index of Tax Equalization	0.83	1.00	-0.70
GDP	-0.67	-0.70	1.00

Sources: See Table 6.

[a] Defined in the text.

$$\text{Tax } Eq_i = DT/DT_i$$

where

DT = direct taxes per capita collected in all districts;
DT_i = direct taxes per capita collected in the ith district.

This index provides a measure of the degree of redistribution when the local share of central revenues is proportional to the number of residents. The index of tax equalization is displayed in Table 6.

The portion of the intergovernmental grant that is based on need, and allocated according to "the index of needs,"[6] has two redistributive effects: a redistributive effect through "tax equalization" discussed earlier and a redistributive effect through "formula equalization". In order to isolate the latter we corrected the index of needs for 1979 aggregated by districts. What we did was to divide the value of the index for each district by the ratio of the percentage of people living in each district and the average of these percentages. In essence, the index of formula equalization measures the allocation of central government transfers to the municipalities, taking into account estimated per capita relative need of overhead capital in each municipality. Mathematically, the index of formula equalization (Formula Eq_i) is given as follows:

$$\text{Formula } Eq_i = \text{Index of Needs}_i/[(Pop_i/Pop)/\frac{1}{18}\sum_{i=1}^{18}(Pop_i/Pop)]$$

where

Pop_i = population in district i;
Pop = population in all districts $(\sum_i Pop_i)$.

The results (see Tables 6 and 7) show that the redistributive formula is strongly correlated with the index of tax equalization, suggesting that the distribution according to needs is strongly redistribute.

TABLE 8

Percentage of Central Government Transfers Received by Selected Groups of Municipalities in 1978 and 1983

Municipalities Organized by Increasing Per Capita Needs	1978	1983
First 68 Municipalities (Lowest Needs)	33.7%	45.4%
Second 69 Municipalities	27.1%	23.9%
Third 69 Municipalities	21.3%	17.0%
Fourth 68 Municipalities (Highest Needs)	17.9%	13.7%

Several countries distribute tax revenues according to a simple income variable and population. The option taken in Portugal was to employ an indicator for a set of needs, which has the advantage of allowing for a non-strict relationship between needs and an income index. For example, large metropolitan areas tend to have greater needs (municipal overburden) than those indicated by population and income per capita alone. The use of an index of needs corrects for some of the municipal overburden.

A comparison of the percentage of transfers collected by selected groups of municipalities for 1978 and 1983 shows that the basic features of the new system were implemented prior to its final approval. As a matter of fact, Table 8 indicates that the distribution of funds was more favorable to 'high needs' municipalities in 1978 than in 1983.

Although we note that "low-need" municipalities experienced an increase in their share of transfers between 1978 and 1983 at the expense of "higher-need" municipalities, the intergovernmental transfer system has nevertheless remained quite redistributional in nature. This may be observed from Table 9, where information is provided on the per-capita value of transfers for low- and high-need

TABLE 9

Per Capita Transfers for Selected Groups of Municipalities (in Thousands Escudos)

Municipalities Organized by Increasing Per Capita Needs	1978		1983	
	Nominal Prices	Constant (1975) Prices	Nominal Prices	Constant (1975) Prices
First 68 Municipalities (Lowest Needs)	1.320	0.710	4.810	1.160
Second 69 Municipalities	2.584	1.391	6.342	1.530
Third 69 Municipalities	3.465	1.865	8.044	1.940
Fourth 68 Municipalities (Highest Needs)	4.575	2.462	10.868	2.621

municipalities. A comparison of the ratio of per-capita transfers received by the highest-need municipalities to that received by the lowest-need municipalities for 1978 (3.47) and 1983 (2.26) confirms that the degree of redistribution has decreased between 1978 and 1983, but even in 1983 the transfers received by the highest-need municipalities were more than twice those received by the lowest-need municipalities.

V. EFFICIENCY EFFECTS OF THE PRESENT INTERGOVERNMENTAL AID SYSTEM

Overhead capital expenditures in each concelho (municipality) tend to respond to the level of income and population size rather than to the relative marginal productivity of public capital. Therefore, intergovernmental aid will be considered efficient if the marginal productivity of public capital is higher in lagging concelhos

than in developed concelhos. The redistribution of funds will not only increase the level of equity but also have a positive impact on the value of Gross Domestic Product. To empirically test the efficiency effects of the new legislation regulating the local governments' financing process, a sample of 268 concelhos is used, and a production function with explicit consideration of public capital is estimated. A problem with this empirical test is the lack of precise measures for the stocks of public capital and private capital by concelhos. Our proxy for private capital is the amount of business tax collected in each concelho. A proxy for the stock of public

TABLE 10

OLS Estimates of Equation (1)

	Entire Sample	High Needs Concelhos	Low Needs Concelhos
Intercept	4.442***	5.818***	2.299
	(5.36)	(4.02)	(1.72)
InL	0.499***	0.448***	0.492***
	(5.73)	(3.28)	(4.118)
InBT	0.243***	0.211***	0.232***
	(5.04)	(3.313)	(3.30)
InPK	0.120**	0.080	0.220***
	(2.26)	(1.13)	(2.64)
R^2	0.78	0.46	0.78
F Statistics	306.7	28.7	186.4
N	268	106	162

t statistics in parenthesis.
*** Significant at 1% level, two-tailed test.
** Significant at 5% level, two-tailed test.

Dependent variable is *InGDP*.

capital is derived from the index of needs, which measures the extent to which public capital is needed for the attainment of a given standard of infrastructure and provision of social services. Our specific proxy for public capital per person is the inverse of the per-capita index of need, and the index of the stock of public capital in the *i*th concelho (Pk_i) is given by

$$Pk_i = [1/(Needs_i/Pop_i)]\ Pop_i$$

where Pop_i and $Needs_i$ are, respectively, the population and the index of needs in the *i*th concelho.

Two different specifications are used for the production function. A first alternative considers a Cobb-Douglas functional form:

(1) $$lnGDP_i = a_0 + a_1 lnL_i + a_2 lnBT_i + a_3 lnPK_i.$$

GDP_i, L_i, and BT_i are Gross Domestic Product, civilian employment, and business income tax, respectively. Equation (1) is estimated for the entire sample and two sub-samples representing 'high'- and 'low'-needs concelhos. The first subsample includes concelhos with per-capita transfers above the national average for 1983. The second sub-sample includes all remaining concelhos. The OLS estimates of equation (1) are displayed in Table 10.

The F statistic for a Chow test is 3.9, implying rejection of the null hypothesis of identical regressions. The estimates presented in Table 9 indicate that a change in

TABLE 11

OLS Estimates of Equation (2)

Intercept	22.795***
	(5.25)
lnL	0.367***
	(4.10)
lnBT	0.212***
	(4.49)
lnPK	-1.585***
	(-3.96)
$(lnPK)^2$	0.042***
	(4.30)
R^2	0.79
F Statistic	249.9
N	268

t statistics in parenthesis.
*** Significant at 1% level, two-tailed test.

Dependent variable is *lnGDP*.

the stock of capital has a smaller impact on gross domestic product in 'high needs' than in 'low needs' concelhos. According to Hansen [1965] this result may be a consequence of the fact that these areas have not yet attained a threshold where new infrastructure (especially infrastructure of direct support to the production process) has a significant impact on GDP. The scale elasticities are 0.74 and 0.94 for high- and low-needs concelhos, respectively, confirming that the first subsample may include areas in a stage prior to the take-off stage of economic development.

An alternative specification for the production function is a non-homogeneous functional form. In this case we take into consideration the variation in the elasticity of public capital when the size of the stock of public capital changes:

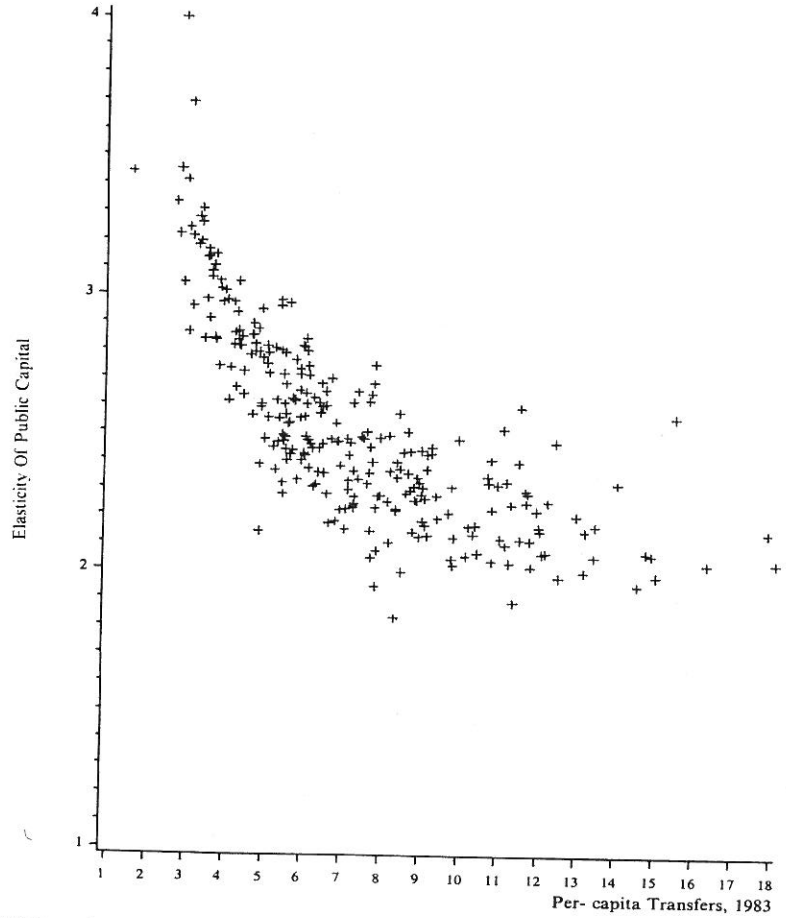
(2) $$lnGDP_i = b_0 + b_1 lnL_i + b_2 lnBT_i + b_3 lnPK_i + b_4 (lnPK_i)^2.$$

The elasticity of public capital *(EPK)* is given by

(3) $$EPK_i = \frac{\partial lnGDP_i}{\partial lnPK_i} = b_3 + 2b_4 (lnPK_i)$$

Figure 3

Relation Between Elasticity of Public Capital and Intergovernmental transfers, 1983



The OLS estimates of equation (2) are displayed in Table 11. The plot of EPK_i against per-capita transfers in 1983 is shown in Fig. 3. Fig. 3 indicates that public capital has a greater impact in more developed areas than in lagging or lesser

developed concelhos. This result is consistent with the existence of agglomeration economies in areas having the highest concentration of economic activity (see, for example, Richardson [1973]). In evaluating the results of Table 10 and 11 one must keep in mind that our measure of per-capita public capital is a proxy (the inverse of the index of needs). It is, of course, possible that this proxy is inappropriate. What our results indicate is that the efficiency aspects of the new regionalization legislation remain unclear, warranting further investigation, which includes the generation of more precise estimates of both public and private capital.[7]

VI. INTERGOVERNMENTAL AID AND THE DEMAND FOR PUBLIC CAPITAL

Finally, we evaluate the impact on the stock of public capital of an increase of 100 per cent in transfers from 'low-needs' to 'high-needs' concelhos. To determine this impact we estimate a demand function for new public capital in these two types of regions. The demand for new public capital is estimated for 1978. The specification of the demand for new public capital uses an adjusted median voter model (see Borcherding and Deacon [1972]). The adjustments are necessary because of data limitations. Median income is replaced by an income index divided by population. The income index is an approximate measure for the relative values of income in each concelho. The tax share is assumed to be proportional to the inverse of the population in each concelho. After several transformations the demand for new public capital can be represented as

$$(4) \qquad lnCExp_i = c_0 + c_1 lnIY_i + c_2 lnPop_i + c_3 lnTR_i$$

where $CExp_i$, IY_i, Pop_i, and TR_i are, respectively, capital outlays of municipalities, per capita index of income, population, and central government transfers. The parameter estimates of equation (4) for the entire sample, high-needs concelhos, and low-needs concelhos are presented in Table 12.

The results shown in Table 12 may be employed to illustrate the redistributional impact on public capital outlays of low- and high-need concelhos. Suppose, for instance, that high-need concelhos are to receive an increase in grants of 100 per cent. Then, using Table 12, the per cent change in public capital outlays would be 31.7. To compute the respective change for low-need concelhos we must adjust the coefficient (0.128) by the ratio of the average value of transfers in high-need concelhos to the average value of transfers in low-need concelhos. That is,

$$\%\Delta CExp \text{ (low needs)} = -0.128\ [(37,265/60,156)\ 100] = -7.92\%.$$

These two percentage changes (+31.7% and -7.92% for high- and low-need concelhos, respectively) must be multiplied by the average public capital outlays in the respective concelhos to derive the absolute change in public capital expenditures. That is.

$$\Delta CExp \text{ (high needs)} = 0.317\ (26,119) = 8,280 \text{ (thousand escudos)}$$

$$\Delta CExp \text{ (low needs)} = -0.792\ (55,138) = -4,637 \text{ (thousand escudos)}$$

The net increase in public capital attributable to the redistribution of transfers is, therefore, +3,913 thousand escudos.

TABLE 12

OLS Estimates of Equation (4)

	Entire Sample	High Needs Concelhos	Low Needs Concelhos
Intercept	8.228***	6.255***	9.859***
	(7.29)	(3.77)	(6.54)
lnIY	0.138***	0.016	0.215***
	(2.81)	(0.25)	(2.89)
lnPop	0.338***	0.308***	0.410***
	(6.51)	(3.04)	(4.96)
lnTR	0.235**	0.317*	0.128
	(2.15)	(1.92)	(0.88)
R^2	0.52	0.22	0.53
F	96.6	9.31	59.8
N	268	106	162

t statistics in parenthesis
F (Chow test) = 2.60
*** Significant at 1% level, 2-tailed test.
** Significant at 5% level, 2-tailed test.
* Significant at 10% level, 2-tailed test.

Dependent variable is *lnCExp*.

Although the foregoing analysis indicates that a redistribution from low-to high-need areas is likely to increase total investment in public capital, the overall impact of redistribution on efficiency (in terms of the effect on GDP) is still negative. The reason for this conclusion is that the increase in public capital outlays of the high-need areas is less than twice the decrease in public capital outlays of the low-need areas, whereas the marginal productivity of public capital, estimated in Table 10, is almost three times as large for low-need areas in comparison to high-need areas.[8] So while the result obtained here in regard to redistributive impact on public capital suggests a positive efficiency impact, the impact is not sufficiently large to offset the negative efficiency impact of redistribution discussed in the preceding section.

The final verdict on the efficiency impact of intergovernment transfers is far from clear, however. In addition to the measurement problems already discussed, one must also consider the likelihood that over a longer time period poorer regions might be able to enter the "take-off" stage of development, when the marginal product of public investment could be much higher. Moreover, redistribution policy must be examined in the context of a "differential impact," that is, by comparing the efficiency impacts of alternative redistributional policies. It is quite plausible that intergovernmental grants might have a lesser negative impact on efficiency than, say, incomes policies, especially in the long run.

VII. CONCLUDING COMMENTS

Although any empirical analysis of government policy, especially in developing countries, is bound to be imperfect — and this study is no exception — the findings presented in the foregoing pages suggest that the new legislation in Portugal has led to improvements in equity. In contrast, the efficiency impact seems to be negative, although of a relatively small size. It is necessary to emphasize, however, that the efficiency impact must be considered preliminary, and additional research is needed to examine it over time. Central to further research initiatives is the collection of data not available for this study, including more recent estimates of GDP and public and private capital by region and locality.

NOTES

* The authors thank B.F. Kiker, Richard Ellson, Randy Martin, Blaine Roberts, Alberto Castro, and an anonymous referee for valuable comments on an earlier draft of this paper, and Carlos Costa for making available some of the unpublished data. The usual caveats hold.

** The authors are Professor of Economics, College of Business Administration University of South Carolina, Columbia, S.C., USA, and Assistant Professor of Economics, Faculdade de Economia, Universidade do Porto, Portugal, respectively.

[1] Historic Lisbon's square whose name is used to represent the old centralized administration.

[2] There are significant variations in the size of the municipalities. For example, in 1978 45.6 per cent of the municipalities had less than 10,000 voters, 45.6 per cent had between 10,000 and 49,999 voters, and the remainder (8.8 per cent) has 50,000 or more voters.

[3] The implementation of the administrative regions has not yet been completed, primarily because of major political concerns. Although the implementation of the administrative regions has broad political support, the major issue is the spatial definition of each region.

[4] GDP estimates *by region* are available only for 1970.

[5] Income data were obtained from Cravinho and Figueiredo [1982].

[6] The 1981 index of needs was obtained by the geometric average of the relative position of each municipality on the following indicators: — Inverse of non-industrial consumption of electricity, — Inverse of water consumption per capita, — Percentage of houses without a bathroom, — Houses projected to be built, — Indicator concerning the roads network, — Children under 5 years old, — People over 65 years old, — Difference between target and actual physician/population ratio. The weights for each element of the indicator were determined by the average (1977 and 1979) of the relative weight of investments, respectively, in electricity, water supply, sewerage systems, housing, rural roads, facilities and equipments for children, facilities and equipment for the aged, and health. Note that the revenue-sharing scheme is discussed only for municipalities. The financing mechanisms of the administrative regions have not yet been defined.

[7] It should be noted that two alternative measures of public capital were employed (the inverse of the index of per capita needs and the log of public capital outlays). The relationship between intergovernmental transfers and the elasticity of public capital shown above remains stable when any of the alternative measures of public capital are used.

[8] If the ratio of public capital expenditures to the stock of public capital is higher in high-needs concelhos than in the low-needs concelhos, the negative efficiency effect will be even smaller. In this case, the percentage change in the stock of capital in high-needs areas would be more than twice the percentage decrease in the stock of capital in low-needs concelhos.

REFERENCES

Borcherding, Thomas E., and Deacon, Robert, (1972), "Private Demand for the Services of Non-Federal Government", *American Economic Review*, Vol. 62, No. 5, pp. 891-901.

C.C.R.N., (1982), *Proposta de Lei-Autarquias Locais*, Comissão Coordenadora da Região Norte, Fevereiro.

Cravinho, João, and Figueiredo, Carlos, (1982), *Assimetrias Regionais dos Rendimentos das Familias e Efeitos Globais da Dominação na Economia Portuguesa* (Lisbon, Instituto de Analise da Conjuntura e Estudos de Planeamento, Março).

Hansen, Niles M., (1965), "Unbalanced Growth and Regional Development", *Western Economic Journal*, Vol. 4, No. 1, pp. 3-14.

M.A.I., (1980), *Administração Local em Números* (Lisbon: Ministério da Administração Interna).

M.A.I., (1977, 1978, 1979), *Critérios de Distribuição das Transfèrencias de Capital Realizadas pelo MAI em 1977, 1978 e 1979* (Lisbon: Ministério da Administração Interna).

M.A.I., (1982), *Lei das Finanças Locais, Aplicação em 1982. Indicadores Municipais/3*, Direcção-Geral da Acção Regional e Local (Lisbon: Ministério da Administração Interna).

M.A.I., (1982), *Propostas de Divisão Regional Apresentadas ate' 1980* (Lisbon: Ministério da Administração Interna, Março).

M.A.I., (1980), *Relatório Anual da Administração Local – 1979* (Lisbon: Ministério da Administração Interna).

Oates, Wallace E., (1972), *Fiscal Federalism* (New York: Harcourt Brace Jovanovich).

Richardson, Harry W., (1973), *Regional Growth Theory* (London: Macmillan).

Summary: *Equity and Efficiency Effects of Intergovernmental Aid: The Case of Portugal.* — Following a brief description of major legislative change in Portugal concerning regionalization and intergovernmental aid, the study explores equity and efficiency impacts of the new scheme. Results indicate that the new intergovernmental system promotes equity by distributing relatively more funds to high-need than to low-need areas, although the degree of redistribution appears to have lessened somewhat 1979 and 1983. In contrast, the redistributional policy appears to have a negative effect on

efficiency, at least in the short run, which is offset to some extent by the positive impact redistribution is estimated to exert on investment in public capital.

Résumé: *Effets d'équité et d'efficience de l'aide intergouvernementale: le cas du Portugal.* — Après une brève description des principaux changements de la législation au Portugal à propos de l'aide intergouvernementale et de la régionalisation, notre étude analyse les impacts sur l'efficience et l'équité de ce nouveau schéma. Les résultats montrent que le nouveau système intergouvernemental favorise l'équité en distribuant relativement plus de fonds aux régions aux besoins importants qu'aux régions moins nécessiteuses, bien que le degré de redistribution semble avoir diminué quelque peu entre 1979 et 1983. Par contre, la politique de redistribution semble avoir un effet négatif, du moins à court terme, sur l'efficience qui est annulée, dans une certaine mesure, par l'impact positif que la redistribution exercerait sur l'investissement en capital public.

Zusammenfassung: *Gerechtigkeits- und Effizienzeffekte von Finanzausgleichsregelungen, dargestellt am Beispiel Portugals.* — Nach einer kurzen Beschreibung wichtiger legislativer Änderungen hinsichtlich der Regionalisierung und des Finanzausgleichs in Portugal untersucht der Artikel daraus resultierende Verteilungs- und Allokationswirkungen. Die Ergebnisse zeigen, daß das neue Finanzausgleichssystem verteilungsgerechter ist, indem es mehr Zuweisungen an Regionen mit höherem Finanzbedarf als an Regionen mit niedrigerem Finanzbedarf leistet, auch wenn das Ausmaß der Umverteilung in den Jahren 1979 bis 1983 nachgelassen zu haben scheint. Demgegenüber scheint sich diese Umverteilungspolitik zumindest kurzfristig negativ auf die Effizienz auszuwirken, auch wenn dies zu einem gewissen Grad durch den positiven Effekt ausgeglichen wird, den diese Umverteilung auf Investitionen in öffentliches Kapital schätzungsweise ausübt.