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Analysing the determinants of social services expenditure in France's *départements*

- France's *départements* spent an average of €913.4 per inhabitant in 2006, with social services amounting to a total of €27 billion accounting for nearly 50% of this spending.

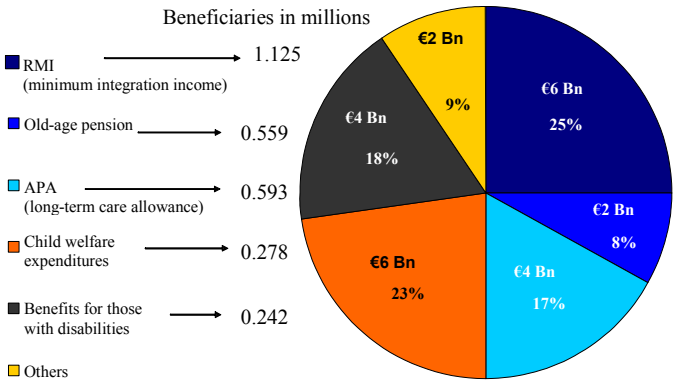
- Two periods can be distinguished within the general trend of social services expenditure between 1992 and 2006, namely a period of stability, from 1992 to 1999, during which there was no change in scope of the *départements*' powers with regard to "social services provision" not any transfer of powers; this was followed by a more unstable period, from 2000 to 2006, during which the scope of the *départements*' powers with regard to the provision of social services underwent considerable change.

- The descriptive analysis also reveals sizeable disparities between *départements* in per capita expenditure on social services. However, these observed disparities are largely attributable to the normally expected determinants of social services expenditure, e.g. the relative proportions of elderly and young people in the total population, number of beneficiaries of the *revenu minimum d'insertion* (RMI-minimum integration income), etc., and thus appear very closely correlated with *départements*' socio-demographic and economic characteristics. This is clearly confirmed by econometric analysis, since the estimated expenditure equation explains 84% of the variance in social services expenditure by the *départements*.

- The residual portion of the variance in expenditure, i.e. the portion not explained by identified determinants, can be interpreted as reflecting a discretionary component of a *département's* social services expenditure. Yet this appears to be distributed not in a random fashion across France, but on the contrary in a "regionalised" manner. This can be interpreted as the fact that neighbouring départements resemble each other more than those further apart. This "regionalisation" (with neighbouring *départements* implicitly forming "regions" with similar characteristics) qualifies the notion that the *départements*' social services expenditures are not entirely pre-determined.

Source: DREES, beneficiaries; DGCL, expenditures.

Social services expenditure and beneficiaries by type of benefit in 2006



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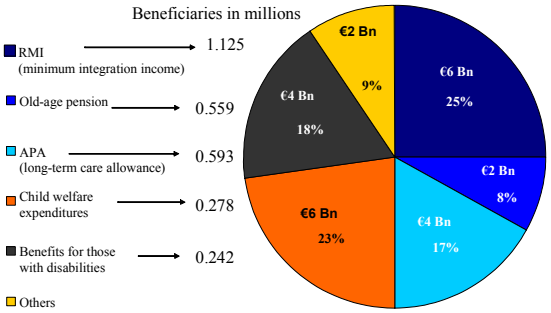
1. Social services expenditure accounts for a very large slice of the départements' budget

Social services accounted for nearly half of total expenditure by the départements, of €27 billion, in 2006[1]. This spending comes under four main headings, namely the minimum integration income (RMI - €6 billion with one million beneficiaries), the old-age pension (ASPA - €6 billion), the long-term care allowance (APA - €6 billion) and benefits for those with disabilities (ASPH - €4 billion) (Chart 1).

Chart 1: Social services expenditure and beneficiaries by type of benefit[2]



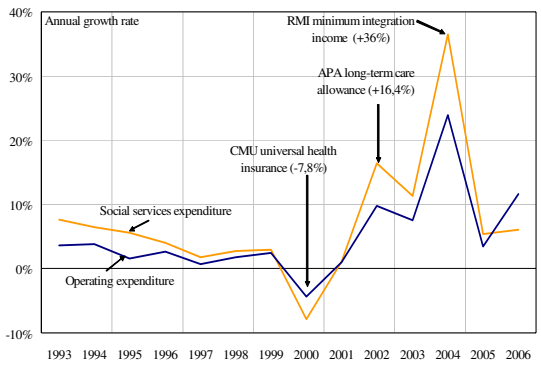
Source: DREES, beneficiaries; DGCL, expenditures

The powers of the *départements* in social service provision have expanded over time, especially as a result of "acts" I and II of the decentralisation process (respectively the "Deferre" Act of 2 March 1982, and the Decentralisation Act of 13 August 2004); the latter act transferred RMI expenditures, hitherto paid for out of the central government budget, to the *départements*[3].

Additionally, administration of the APA was transferred to the *départements* in 2002, and likewise the ASPH in 2005, both mechanisms now being partially financed by the départements.

Trends in the annual rate of growth in social services expenditures clearly reveal two sub-periods. First, a period of "stability" from 1992 to 1999 during which there was no change in the scope of powers with regard to social services provision. This was followed by a period of "instability", from 2000 to 2006, during which this scope underwent a number of changes (see Chart 2).

Chart 2: Annual change in expenditure[4]



Sources: DGCL.

This study seeks to analyse the determinants of social services spending by the *départements* from a descriptive and econometric standpoint.

2. Economic and demographic characteristics explain much, but not all, of the observed disparities between *départements*

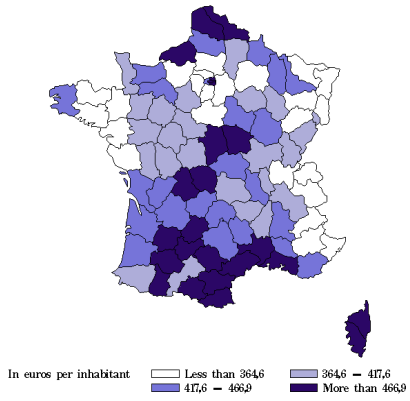
Per capita spending on social services at the *départemental* level varies widely, as can been seen in Chart 3 presenting spending on social services by *département* for 2006, when it ranged from a low of €278 per inhabitant to a high of €616.

However, a descriptive analysis shows that these *départemental* disparities in social services expenditure can largely be accounted for by economic and demographic factors such as the proportion of elderly or young people in a département, together with the proportion of RMI (minimum integration income) recipients.

(1) For the whole of France.
(2) Excluding French overseas departments and territories (DOM-TOM), 2006.
(3) To compensate for this, a fraction of the TIPP (domestic tax on petroleum products) was transferred to the *départements*.
(4) Figures for the growth in operating expenditure are based on data in current euros for the whole of France, whereas those for growth in social services provision are based on data in current euros for Metropolitan France.

- For instance, the number of over-60s, reflecting potential beneficiaries of the old-age pension, is relatively greater in south western France. And indeed per capita spending on social services in the southwestern *départements* does tend to rank among the highest (at >€466 per in habitant[5]);
- The high level of spending registered in several départements in Northern France and the *départements* of the Côte d'Azur can be accounted for by a large number of RMI recipients (nearly 2% of the population receiving the RMI, compared with a national average of 1.5%).

Chart 3: Per capita spending on social services in 2006



Source : DGCL.

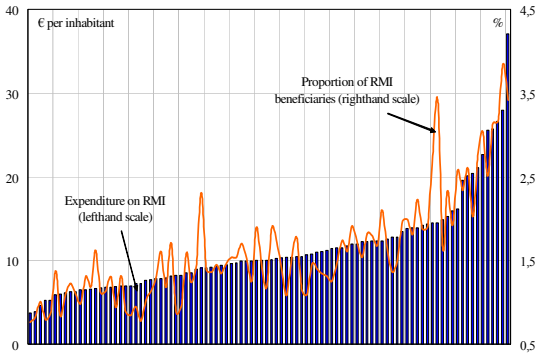
Tableau 1 : coefficients of correlation (2004 figures)

Proportions Expenditure	RMI beneficiaries	+ 60 years old	–19 years old
RMI	0.86		
Elderly		0.74	
Child benefits			0.31

In general, the various categories of social services spending are firmly linked to the characteristics of the potential beneficiaries: for example, and almost trivially, there is a positive relationship between spending on the RMI and the number of RMI beneficiaries (Chart 4 and Table 1). There is also a strong correlation between the number of people aged over 60 and spending on old-age pensions.

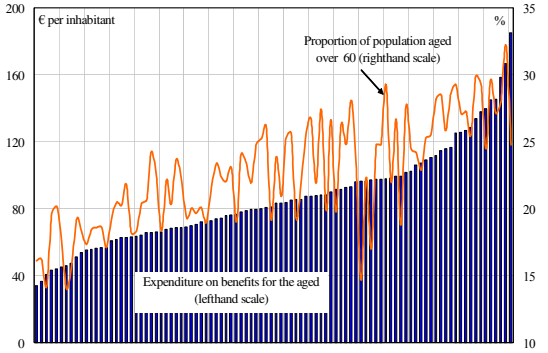
However, disparities in spending persist between the *départements*. Thus for a given number of beneficiaries, social spending on the aged can vary by a factor of 1 to 2 depending on the département. These disparities are also wide in the case of the child social expenditures. But these differences can partly be accounted for by differences in the incomes of beneficiaries, their degree of dependence, or in their need for employment.

Chart 4: Distribution of RMI spending



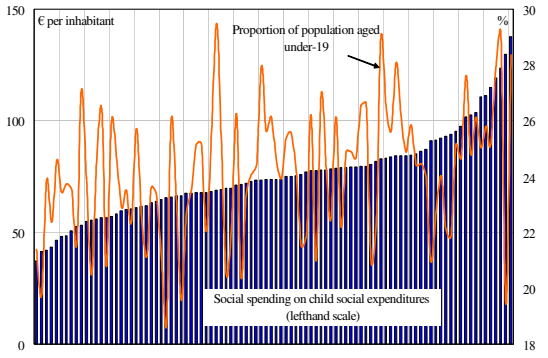
Source: DREES.

Chart 5: Distribution of spending on benefits for the aged



Source: DREES.

Chart 6: Distribution spending on child welfare benefit



Source: DRESS.

(5) The series have been rendered discrete by splitting them into quartiles for mapping purposes, meaning that they have been broken down into four groups, each comprising 25% of all observations.

This initial descriptive analysis of the simple correlations between socio-demographic characteristics and spending on social services is completed here by an econometric analysis that serves to measure the effects of each determinant on spending.

3. A model for determining expenditure on social services

To complete the foregoing descriptive analysis, we propose here to compare our data with an econometric model designed to establish a link between the *départements*' social services expenditure and a series of explanatory variables.

The theoretical model used is based on so-called "demand" models[6], in which the "demand for the public good" function (z) depends on disposable income (y) and on the "fiscal price" (p) (see Box 1). The "fiscal price" is a measure of the tax charge on households needed to finance the public good.

Because only the expenditure is observable, the demand function is converted into an "expenditure" function, knowing that $d = z * p$. We therefore estimate an "expenditure" equation, which includes the traditional determinants, i.e. income and price, along with a series of socio-demographic characteristics listed in Box 1.

The estimates are based on data from a panel of 93 d*épar-tements*[7] and for the 15-year period between 1992 and 2006. The model is first estimated for the totality of the panel, then for the period 1992-1999, and finally for the period 2000-2006 in order to detect a change of regime between the first period ("stable", from 1992 to 1999, during which there was no new transfer of powers), and the second ("unstable", from 2000 to 2006, when substantial transfers took place). The results are presented in Table 2.

The estimated model explains a high proportion of the variance in spending on social services between départements: 84% for the totality of the panel, 70% from 1992 to 1999, and 81% from 2000 to 2006. Although this comparison needs to be interpreted with caution, the explanatory power is greater for the second period, possibly due to the strengthening of the "mandatory" nature of the APA and RMI benefits[8].

The explanatory variables have the expected effects, in the sense that the proportion of over-60s and under-19s, the unemployment rate, subsidies (transfer from central government to local governments), and income, have a positive impact on spending; the "fiscal price", meanwhile, has a negative impact. The values for the income and price elasticities for expenditure call for some additional comment.

Income elasticity is between 0 and 1 in the three panels reviewed; social services therefore appear to be what are known as "normal" goods, in the sense that demand rises as income increases, albeit to a lesser extent[9].

(6) In these models, the local decision-maker maximises the utility of a representative agent such that the supply of a public good is equal to the demand for it.

(7) The analysis concerns the Metropolitan *départements*, excluding Paris and Corsica. The results obtained with the Jarque-Bera test justify this choice, since the residua do not obey a normal law when the *départements* of Corsica and Paris are included.

(8) This spending is highly regulated by the Government, leaving the *départements* little or no room for manoeuvre.

(9) Since income is a criterion for the granting of social benefits, this can have a negative impact on expenditure. However, this effect operates on the margin and the positive impact reflects increased demand for the public good.

Box 1: **The econometric model**

We assume that the functional form of the demand function z=z (pr, yr) is of the Cobb-Douglas type (Box 3), such that by using the logarithmic transformation, we obtain the following spending equationa:[a]

$$\ln d = \alpha_y \ln y + \alpha_p \ln p + \alpha_g \ln g + \sum_{j=1}^{H} \alpha_{cj}$$

DIn this equation, y is the agent's available income approximated by average taxable income in the *département*. Depending on whether income elasticity (y) is <0, between 0 and 1 or >1, the public good is respectively classified as "inferior", "normal" or "superior".

***p* represents the "fiscal price"**[b], it reflects the tax charge on households and must have a negative impact on spending. Central government transfers (g) are broken down into "general operating grants", "general decentralisation grants", and other grants received..

Finally, spending by the *département* depends on a series of factors specific to it (H=specific factors). We thus introduce here: population density (a factor reflecting the size of the *département's* population and hence the size of demand), spending on social services is a rising function of the number of individuals within a given territory; the respective percentages of the different age groups allows us to approximate the number of beneficiaries. More precisely, we will utilise the percentage of over-60s in the *département's* population together with the proportion of under-19s[c]; the unemployment rate reflects demand for measures to help job-seekers and, since 2004, potential beneficiaries of the RMI..

Finally we add three dummy variables to this econometric model in order to capture the one-time shocks of decentralisation. The creation of the *couverture maladie universelle* (CMU-universal health insurance) in 2000 cut spending by the départements. This variable[d] ought therefore to have a negative impact on social expenditure. The introduction of the *aide personnalisée à l'autonomie* (APA- long-term care allowance for the elderly) in 2002 led to an increase in social expenditure. This variable ought therefore to have a positive impact. In 2004, responsibility for payment of the RMI minimum integration income was transferred to the *départements*, thereby sharply raising their outgoings. This variable ought therefore to have a positive impact on social expenditure.

To avoid problems of colinearity, only those variables showing a coefficient of correlation of less than 0.85 have been retained. Consequently, in the exogenous variables presented here, only those variables concerning the proportions of over-60s and under-19s are strongly correlated; excluding either of these variables would not fundamentally alter the results.

a. The terms α are the elasticities corresponding to each of the variables introduced into the demand function.
b. Since the fiscal price reflects the tax charge on households required in order to finance the public good, it is traditionally defined by the ratio of "household" tax receipts to total tax receipts.
c. Child social expenditures are related to households with children under 21. In the absence of a breakdown by age group providing this variable, we have used the under-19s to approximate it.
d. The dummy variables are built as follows: this variable is equal to 1 for the year in question, and equal to 0 otherwise.

However, because the value of the coefficient is greater than that generally obtained in the case of France[10], new estimates have been made in order to limit the bias of the omitted variables[11]: even in this case the coefficient is equal to 0.7 over the totality of the panel. In terms of absolute variation, this means that a €200 rise in average taxable income (which is the average increase observed over the period 1992-2006) entails a per capita increase in expenditure on social services of €5.

When the fiscal price of the public good rises, this can affect demand for this good in two ways:

- **a substitution effect,** reflecting the rise in the price of the public good relative to the private good; the public good being dearer, demand for this good will fall while that for the private good will rise;
- **an income effect,** reflected in a decline in demand for both goods (Box 3).

(10) Guengant and Leprince (2007): "Évaluation des effets des régimes de coopération intercommunales sur les dépenses publiques locales" (Evaluation of the effects of intercommunal cooperation mechanisms on local public expenditure), *Économie et Prévision, No. 175* for municipalities, and Gibert and Guengant (2004): "Évaluation des effets péréquateurs des concours de l'état aux collectivités locales" (Evaluation of the equalisation effects of central government transfers to local authorities), *Commissariat Général du Plan for départements on total expenditures.*

(11) Individual and time fixed effects are introduced for that purpose, allowing us respectively to take account of (unobservable) characteristics that vary between individuals but not over time, and ones that varying over time but not between individuals. This specification has not been retained, since individual effects can capture those of variables that vary little over time, such as the proportion of over-60s and under-19s.

Table 2: Results of estimations for the three panels considered

	1992-2006	1992-1999	2000-2006
Constant	−6.974***	−6.912***	−3.37***
	(−9.97)	(−7.66)	(−2.64)
Density	0.08***	0.08***	0.08***
	(14.59)	(10.61)	(8.85)
Income	0.71***	0.74***	0.43***
	(17.62)	(15.05)	(5.42)
"Aggregate operating grant"	0.42***	0.34***	0.41***
	(52.4)	(17.55)	(22.25)
Other grants	0.25***	0.29***	0.23***
	(24.10)	(15.38)	(15.57)
"General decentralisation grant"	0.03***	0.04***	0.005
	(10.45)	(11.48)	(0.45)
Unemployment rate	0.30***	0.29***	0.26***
	(17.37)	(13.32)	(9.01)
Proportion >60s	0.28***	0.27***	0.19*
	(4.71)	(3.59)	(1.91)
Proportion <19s	0.40***	0.36***	0.24
	(4.21)	(3.01)	(1.44)
Fiscal price	−0.14***	−0.15***	−0.05
	(−5.57)	(−5.40)	(−1.11)
Ajusted R^2	0.84	0.70	0.81

(*), (**), (***) significant parameters at the respective thresholds of 10%, 5% and 1%. The figure in parentheses designates the statistical t associated with the coefficient. All variables are logarithmic, which means that the coefficients are elasticities. Thus for the first period a 1% rise in income entails a 0.7% rise in expenditure on social services.

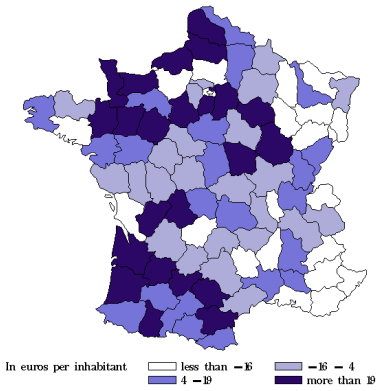
These two effects point in the same direction for the good whose price has risen, namely a decline in the quantity demanded (the fiscal price elasticity of the public good should therefore be negative, except for a "Giffen good"[12]). Even so, the impact on expenditure is indeterminate and depends on the value of the fiscal price elasticity of the public good. That is because a rise in the fiscal price leads to a decrease/increase in expenditure depending on whether demand for the public good is highly price elastic or inelastic (respectively <−1 or between −1 and 0).

The elasticity of expenditure to fiscal price is equal to −0.14 over the period as a whole, which means that a rise in the fiscal price reduces expenditure. What is more, the impact of the fiscal price is not significant over the period 2000-2006. One possible explanation may be the drop in the share of tax receipts in total receipts over this period.

Next, we have analysed the share of the variance in social expenditure that is not explained by the model (around 20%). The residuals (equal to observed expenditure, from which we have deducted the expenditures simulated by the model) can to a certain extent be interpreted as the "discretionary" component of the *département's* social expenditure.

Its geographic distribution (Chart 5) shows that this has been "regionalised" (in the sense of neighbouring *départements* implicitly forming "regions" with like characteristics), this observation being confirmed by the Moran test (Box 2 and Table 3). This allows us to test the presence of spatial autocorrelation, i.e. here, to test whether a *département's* "residual expenditure" is correlated with that of neighbouring *départements*. The test's results show that this correlation exists and that it is positive. **More precisely, *départements* that are close to each other resemble each other more than they do distant *départements*** (with respect to the residual), as if there existed a kind of local pattern when it comes to the local provision of social services.

Chart 7: Distribution of residual over the period 1992-2006



Source: DGCL, DGTPE calculations.

Overall, decentralisation has consolidated the role of the départements as the lead provider of social services at the local level. The modelling of their spending behaviour shows that although the disparities are clearly explained by the expected determinants, there remains a "regionalised" residual proportion, no doubt reflecting the fact that they have truly made the transferred powers their own. A new modelling ought therefore to include a spatial dependence, as other available studies show[13].

(12) A "Giffen good" (identified by Robert Giffen) is a good whose consumption rises when its price increases, either because it is an inferior good, or because there is no other substitute good.

(13) Fréret S. (2007): "Comportement mimétique des *départements* français sur la dépense publique d'aide sociale" (Mimetic behaviour of French *départements* with regard to public expenditure on social services) *Revue d'Économie Régionale et Urbaine No. 5* or Fréret S. 2008): "Essais empiriques sur les interactions horizontales en termes de dépenses publiques" (Empirical essays on horizontal interactions in terms of public spending), *Doctoral thesis, University of Rennes 1.*

Box 2: **The Moran test.**

The Moran test is used in particular in spatial econometrics to test the dependence between neighbouring spatial units;

$$M = \frac{N \sum_i^N \sum_j^N w_{ij} z_i z_j}{\sum_i^N \sum_j^N w_{ij} \sum_i^N z_i^2}$$

Where $z_i = y_i - \mu$, y_i is the variable considered, μ the average, w_{ij} the associated weight when comparing localities *i* and *j* (the closer localities *i* and *j* are to each other, the greater the weight of w_{ij})

Spatial autocorrelation can be either negative or positive. More precisely, the presence of positive spatial autocorrelation shows that places close to each other resemble each other more than distant ones. Symmetrically, negative autocorrelation shows that places close to each other differ more from each other than distant places. The standardised Moran statistic (centred and reduced) follows a normal law such that if it is greater than 1.96, we would reject the H0 hypothesis of an absence of spatial autocorrelation. This statistic is equal to 7.46 for the local government administration and is less than 1.96 for the central government administration.

The Moran diagram represents spatial dependence graphically. On this chart, the variables (administration ratios) have been centred and reduced, which accounts for the occurrence of negative values. The Moran diagram consists of four quadrants, each reflecting the relationship between a *département's* administration ratio and those of its neighbours. For instance, the upper righthand quadrant corresponds to a high-high relationship, the upper lefthand quadrant to a low-high relationship, the lower lefthand quadrant reflects the weak-weak relationship, and the lower righthand quadrant the high-low relationship.

Table 3: Standardised Moran statistic on residuals

Year	Moran statistic	Year	Moran statistic	Year	Moran statistic
1992	4.41	1997	3.37	2002	4.01
1993	3.55	1998	2.89	2003	5.48
1994	2.75	1999	3.38	2004	1.78
1995	3.53	2000	3.36	2005	1.93
1996	3.06	2001	4.82	2006	2.94

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Box 3: **The theoretical model**

So-called "demand" models (Borcherding and Deacon, 1972, and Bergstrom and Goodman, 1973) for a local public good assume that the local decision maker is benevolent (i.e. maximises utility for agents living in his locality). I.e. N agents living in a locality where r is the representative agent. The utility of this, written U^r depends on the quantity of the private good consumed, written x^r, and of the public good consumed, written z, such that $U^r = U^r(x^r, z)$ *) (the utility function is assumed to be rising in each of these arguments, and the marginal utilities to be declining). The expenditure generated in producing the public good is financed with the aid of a proportional tax, written t, on the local tax base, written B (where B = Nb, b the local per capita tax base). Thus the budgetary constraint of the representative agent with an income y^r is written:*

$$y^r = x^r + tb^r$$

where the private good is a cash good and b^r the tax base of the representative agent. The local public decision maker maximises the utility function of the representative agent by taking account of the cost of producing Z quantity of public goods (we assume that the public good is perfectly divisible: $Z = Nz$, without loss of generality). The local authority's budgetary constraint is thus written:

$$C(Z) = tB$$

where $C(Z)$ corresponds to the cost of producing Z public goods. The local public decision maker thus faces the following maximisation problem:

$$\underset{x^r, z}{Max}\left(U^r\left(x^r, z\right)\right)$$

under constraints:

$$y^r = x^r + C(Z)\frac{b^r}{B}$$

and $Z=Nz$

Resolution of this programme reveals the following condition for optimality:

$$\frac{\partial U^r / \partial z}{\partial U^r / \partial x^r} = C_z' \frac{b^r}{b}$$

at optimum the marginal rate of substitution of the public good for the private good is equal to the marginal cost of production of the public good weighted by the share of taxation. Since the private good here is a cash good the expression to the right of the equal sign is none other than the price of the public good, commonly referred to as the fiscal price, which we write p^r. This condition for optimality coupled with the budgetary constraint allows us to obtain a demand function for the public good as a function of the income of the representative agent and of the fiscal price such that $z=z(p^r, y^r)$.

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