The Flypaper Effect:
Evidence from the Italian National Health System[°]

by

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ABSTRACT

Public expenditure reduction in Italy is achieved through a revision of social security and health care programmes. In particular, public health expenditure control has been implemented through a reform that imposes more stringent budget rules at local level and a considerable reduction in the grants-in-aid from central government. The response to a decrease in categorical lump-sum grants from the central to local governments might result in an asymmetrical response to intergovernmental grants: local spending is highly responsive to increases in grants, but it is relatively insensitive to grants reduction [Stine, 1994; Gramkhar and Oates, 1996].

In our paper we have estimated this hypothesis using a sample of cross-sectional and time- observations covering the 20 Italian regions over the period 1989-1993. Two different models have been estimated based on different budget balance rules. The empirical results of our model show the existence of a standard and a super flypaper effect in both models. The introduction of the soft-budget constraint hypothesis results in a stronger effect of grants and a lower response of own resources which shows that before reducing expenditure regional governments prefer to incur some deficit.

JEL: H51, H72, H77.

Key Words: flypaper effect; health care; Italy; soft-budget constraint.

1   Introduction

The reduction of expenditure at any government level is of paramount importance in states where de...cit and debt have considerably risen in recent years. For some states such as Italy the rules are even more stringent due to the necessity to comply with international agreements relating to the creation of the European Union[1].

In Italy, public expenditure control has followed two main directions: the review of social security and health expenditure programmes and more stringent budget rules at local level.

In recent years in fact local governments have faced an increasing ...scal pressure due to the reduction in categorical lump-sum transfers from central to local governments and these changes have direct implications for local ...nancing decisions. A typical ...nding in the empirical literature on this topic is the tendency for expenditure response to a decrease in categorical lump-sum grants from the central to local governments to be lower than an equivalent decrease in local private income, the so-called ‡ypaper e¤ect [Gramlich, 1977]. Furthermore, this ...nding may be generalised to include the asymmetry in the response to intergovernmental grants: local spending is highly responsive to increases in grants, but it is relatively insensitive to grants reduction [Stine, 1994; Gramkhar and Oates, 1996].

The purpose of this paper is to analyse whether regional health care spending is highly responsive to these cuts in intergovernmental grants, both in magni-

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[1] Italy has agreed to the Maastricht which ...xes the ceiling for the debt/GDP ratio at 60% and at 3% the ratio of de...cit to GDP.

tude [Gramlich, 1989] and in sign [Stine, 1994]. To do this, a sample of cross-sectional and time observations covering the 20 Italian regions over the period 1989-1993 has been used. The model has been speci...cally applied to regional health care expenditure which represents a large amount of total expenditure at local level.

The issue is particularly important from a policy point of view because of the reforms that have a¤ected health care in Italy and of the new rules to allocate equalisation relating to public expenditure control, e¢ciency and equity in providing health care at local level. Health care provision in Italy is a right granted by the Constitution; public provision has to be kept above a minimum level and the central government is always responsible if the regions cannot supply an adequate service.

The remain of the paper is organised as follows. Section 2 presents the health care system in Italy; Section 3 gives a brief description of the model and the hypotheses employed to empirically investigate the ‡ypaper e¤ect; Section 4 discusses the econometric speci...cation of the model, the dataset and the estimating procedure; Section 5 outlines the results of the econometric estimation and ...nally Section 6 o¤ers some concluding comments.

2 The Italian Health Care System

The SSN (Servizio Sanitario Nazionale) in Italy was ...rst reformed in 1978 to provide comprehensive health insurance coverage and uniform health bene...ts for all citizens and legal residents.

The system was organised on three levels: the Ministry of Health, which is responsible for planning, budgeting and general administration, 20 Regional Health Authorities, and 200 local health agencies. Regional governments become responsible for delivering services and ensuring the provision of health care to all the citizens in their jurisdiction. The reform of 1978 delegated the operational side of the delivery to USL (Unità Sanitarie Locali) which were responsible for all aspects of health care from prevention to food control to hospital care. The SSN was funded from three main sources: a earmarked payroll tax, a grant from general taxation and copayments. Each regional government received a share of the national current expenditure budget and distributed it to their USLs following a complicated formula based on population and past expenditure levels. These revenue resources, however, did not exhaust the ways in which regions may ...nanced public health care. In fact, soft-budget constraints [Kornai, 1980, 1986] allowed regions to spend more than what they received from the central government, without any credible punishment.

The need to reduce and rationalise public expenditure has driven Central Government to reform health care provision once more. From 1992 a series of reforms have a¤ected the SSN. For our analysis, the most important points are:

- ² The function of purchasing and providing are separated through the creation of ASL (Aziende Sanitarie Locali, the purchasers) and Aziende Ospedale (the providers);

- ² Hospitals are reimbured with a prospective payment system which used

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the DRG (Diagnosis Related Groups) methodology to de...ne the product;

² Regional governments enjoy more autonomy since the payroll tax has been substituted by IRAP (Imposta Regionale Attività Produttive), a tax on value added produced at regional level;

² Regions can decide the quantity and the mix of services to be provided. The only constraint is to secure a minimum level of coverage to their population.

From a policy point of view the new season of local autonomy will have important consequences on the level of health care produced at regional level. While ...scal autonomy and expenditure determination are important, it is also of paramount importance to study the e¤ect on equity, and in particular on horizontal equity of these reforms. The Italian government has already taken some measures in this direction with the introduction of an equalisation grant to regional government whose rules are under discussion at present.

Given the importance of the regional government in this decisions process it is of particular interest to study their expenditure decisions in order to evaluate the e¤ects of this reform. The funding system foresees a considerable shift from grants-in-aid to local resources. These sources of ...nance have a di¤erent impact on expenditure growth as noted in the introduction.

In the following section we present a model that can be implemented to study these issues.

3 The model

The aim of this paper is to test regional public health care expenditure responses to different sources of finance and whether asymmetric responses to decreases in intergovernmental grants exist. Our analysis builds on Stine (1994) and Gamkhar and Oates (1996) and extends these approaches in two directions: first, we focus our attention on the public provision of only one good: health care; secondly, we take account of the Italian SSN characteristics by introducing the hypothesis of the soft-budget constraint.

The model is based on the decision of a utility maximising median voter; a majority voting process exists and politicians, in order to be elected, have to appeal to the median voter. The decisive voter selects the quantities of a composite private good, X, and of public health care, H, in order to maximise a twice differentiable and quasi-concave utility function, $U = U(X; H)$, subject to his budget constraint. Denoting the prices of the private good and the publicly provided health care respectively by P_X and P_H, the median voter's budget constraint is equal to:

$$Y = P_X X + P_H H N^{-d} \tag{1}$$

where Y is total private income; N is population; and d is the congestion factor which measures the 'degree of publicness' of the publicly provided good.

Up to 1998, the greater share of public health care in Italy was financed from central government grants. Furthermore, during the relevant period regions were characterised by a soft-budget constraint, S, which allowed them to spend more than what they received from the central government, without any credible punishment. Hence, the individual's budget constraint could be redefined as:

$$Y = P_X X + (P_H H - G - S) N^{-d} \tag{2}$$

that is, central government block-grant to the regional authority, G, and the soft-budget constraint reduced the individual's required tax payment.

These assumptions allow us to derive the demand for public health care expenditure[2]. We assume that when faced with the linear budget constraint (2), the decisive voter's utility maximising quantity of public health care expenditure depends on his income, on intergovernmental grants[3], and on a vector of other socio-economic determinants. In particular, population older than 65 is used as a factor which increases health spending: as people get older the amount of health care delivered to them is expected to increase Furthermore, since public and private health care can be shown not to be perfect substitutes [Gouveia, 1996, 1997], we include private expenditure as an independent variable to investigate whether larger private spending causes lower public health care expenditure.

In linear form the expenditure function for publicly provided health care may be written as:

$$H = \beta_1 + \beta_2 I + \beta_3 A + \beta_4 P + \beta_5 G \qquad (3)$$

where H is per capita health care expenditure; I is the median voter's income; A is the percentage of population aged 65 and over; P is private health care expenditure; and G is intergovernmental grants.

3.1   Asymmetrical response

The literature on the flypaper effect suggests that a number of reasons might cause lead to an asymmetric response to changes in intergovernmental grants.

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[2] See, for example, Gouveia (1996, 1997).

[3] The latter variable reduces the tax burden for the median voter.

Gramlich (1987), for example, suggests that public expenditure is often related to clientele behaviour that makes its reduction problematic. Stine (1994) studies the response of own source revenue and concludes that ...scal illusion, ‡ypaper e¤ects and interest groups might determine an asymmetric response to a change in intergovernmental grants. Finally, Goodspeed (1998) ...nds that a decrease in aid has a less pronounced e¤ect on expenditure. Gamkhar and Oates (1996) instead argue that an asymmetric response is not supported by the empirical ...ndings.

These authors suggest to test for the existence of an asymmetric response by using a model that in our case can be written as:

$$H = \text{\textregistered}_1 + \text{\textregistered}_2 I + \text{\textregistered}_3 A + \text{\textregistered}_4 P + \text{\textregistered}_5 G + \text{\textregistered}_6 D \left(G_{t \; i} \; G_{t_i \; 1} \right) \qquad (4)$$

where D is a dummy which takes on a value of zero if grants are non-decreasing and a value of one otherwise. Under the null hypothesis of asymmetrical response to increases and cuts in grants, the parameter $\text{\textregistered}_6$ will be zero.

3.2   Soft budget constraint

In Italy, regional health expenditures are ...nanced by contributions from workers and health tax, by patient co-payment, and by grant-in-aid from the central government. A further source of funding is represented by regional soft-budget constraints [Kornai, 1980, 1986]. These occur whenever regions are expected to be bailed out in the case they spend more than their own budget constraint would allow.

Although Kornai's original description of the soft-budget constraint involved government bailouts of loss-making ...rms, this has been extended to analyse ...nancial system srtucture [Dewatripont-Maskin, 1995], corporate governance

[Povel, 1997], and federalism [Qian and Roland, 1998], but to our concern there is no application to the e¤ects of the soft-budget constraint on the composition of public expenditure. This is expected to be modi…ed when regions are allowed to spend more than what they received from the central government, without any credible punishment.

In order to take account of both this e¤ect on public health care expenditure and of the existence of an asymmetric response, the model to be estimated can be written as:

$$H = \beta_1 + \beta_2 I + \beta_3 A + \beta_4 P + \beta_5 G + \beta_6 D \left(G_t - G_{t-1} \right) + \beta_7 S \qquad (5)$$

where S is the amount of regional de…cit.

4 Data and Methodology

The data used are from several sources and cover public expenditure and other main indicators at regional level for the period 1989-1993. In our estimation we use data for the period 1990-1993 since one year is needed to create the relevant dummy for grants-in-aid. The database comprises the 20 administrative regions of Italy with the exception of Valle d'Aosta and Trentino-Alto Adige. These two regions have a special administrative regime and the rules to allocate funds have changed in 1993. In order to keep a balanced pool of data we have not included them in the sample. The repeated changes in budget and grant setting rules did not allow us to use longer series.

For our analysis we have collected other indicators of need and output at regional level, but in a preliminary analysis they did not prove to be signi...cant in explaining expenditure.

Most variables are expressed in real per capita terms. The only variable that cannot be expressed in these terms is POP_{65}, i.e. the ratio of population which is over 65. Our dependent variable, EXP, measures the number of units of expenditure in public health services per capita at the regional level. It represents the sum of the main components, namely

- ² Labour costs (LAB)

- ² Cost for services (SER)

- ² Cost for pharmaceuticals (FAR)

- ² Cost for medical services (MED)

- ² Cost for out-patient treatments (INT)

- ² Cost for hospital services (HOS)

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² Cost for out-patiens (EXT)

² Other costs (OTH)

such that:

$$EXP_t = LAB_t + SER_t + FAR_t + MED_t + INT_t + HOS_t + EXT_t + OTH_t$$

Grants-in-aid, FSN, are represented by the amount of the Fondo Sanitario Nazionale which is allocated to each region each year, GDP is the estimation of per capita GDP at regional level and is used here as a proxy for income, $CSAN$ is the amount spent by consumers for the purchase of private health, and DEF is the di¤erence between expenditure and resources. Since regions in Italy, in the period considered received funds for health only through grants-in-aid, we can write that:

$$DEF_t = EXP_t ¡ FSN_t$$

We use the accounting convention of de...ning de...cit as a positive variable and surplus as a negative quantity. Data are shown in Table 1

[TABLE 1 HERE]

The model presented in the previous section is now tested empirically using a sample of cross-sectional and time- observations covering the 20 Italian regions over the period 1989-1993. To test for the existence of an asymmetric response and for the presence of a soft budget constraint the following two equations are estimated:

$$EXP = \textregistered_1 + \textregistered_2 GDP_{it} + \textregistered_3 POP_{65it} + \textregistered_4 CSAN_{it} + \textregistered_5 FSN_{it} +$$
$$\textregistered_6 D_{it} (FSN_{it} ¡ FSN_{it¡1}) + u_{it} \qquad (6)$$

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where u_{it} is the disturbance term and:

$$EXP = \beta_1 + \beta_2 GDP_{it} + \beta_3 POP_{65it} + \beta_4 CSAN_{it} + \beta_5 FSN_{it} +$$
$$\beta_6 D_{it}(FSN_{it} - FSN_{it-1}) + \beta_7 DEF_{it} + u_{it} \qquad (7)$$

which takes account of the soft budget constraint hypothesis.

5 Empirical Results

Estimation of equations (6) and (7) is undertaken for each year individually and in panels by pooling time series for each region. To test the hypothesis that data can be pooled, we cannot use the cointegration procedures suggested by the most recent literature since our panel has a prevalent cross-section extension. For this reason, we perform F-tests on the null hypothesis that the coe¢cients for each variable in equations (6) and (7) are the same for each year. Table 2 shows the results of the tests; the null hypothesis of equal coe¢cients could not be rejected in either case, therefore we can pool the data.

[TABLE 2 HERE]

Becker (1996) suggests that the estimation of the ‡ypaper e¤ect is sensitive to functional form; in order to avoid misspeci...cation biases, it is important to test for the functional form.

Previous research in public expenditure often used a log linear functional form; however this speci...cation violates the adding up constraint [Anderton et. al.,1992], i.e. to have expenditure consistent with the budget all components should be expressed in logarithmic terms. Since the studies on other types of expenditure assume a linear form there is no reason to assume a di¤erent functional form for health care. In any case, we have performed the Box-Cox test for the OLS and the pooled model which shows that the correct form is linear. The results of these tests are presented in Table 2. The RESET test performed on the OLS model shows the presence of heteroschedasticity; for this reason we have used the estimation procedure proposed by Greene (1993) which employs a set of assumptions on the disturbance covariance matrix appropriate for our estimation. The model used assumes the following structure for the residuals:

$$\bullet \quad E(\varepsilon_{it}) = \sigma_i^2$$

$$\bullet \quad E(\varepsilon_{it}; \varepsilon_{jt}) = 0$$

$$\bullet \quad \varepsilon_{it} = \rho_i \varepsilon_{i;t_{-1}}$$

The ...rst assumption corresponds to the hypothesis of heteroschedasticity among our residuals; the second assumption corresponds to cross section independence of the residuals while the third assumption corresponds to autocorrelation of the residuals[4].

[TABLE 3 HERE]

Table 3 show the results for the model in which regional governments are assumed to be faced with a hard budget constraint. The Buse R^2 shows that 52% of the variance is explained; this is the most appropriate test to use for a goodness of ...t with our estimation procedure. All the variables are statistically signi...cant; only POP_{65} and CSAN have a degree of signi...cance below 5%; however tests for their inclusion show that they are important variables. Other socio-economic indicators were not included in the regression because an exploratory analysis showed that their contribution to explaining health care expenditure was marginal.

The sign of POP_{65} is negative; in this respect our estimation is in line with Gouveia (1996) who argues that the negative correlation between this variable and expenditure is due to the relationship between the median voter and ageing population. According to Gouveia, vote participation declines with age; hence the state is less prone to make the interests of older people. In our sample this sign might be due to a certain degree of multicollinearity with GDP. In fact,

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[4] The autocorrelation in the residuals is a typical assumption in estimating public expenditure because of the incremental budgeting decisions implied by choices in the public sector.

the regions in the North of Italy are characterised by high level of income, but they are also the areas where the population is more aged.

The elasticity of health care to GDP is 0.24 which is about half the elasticity of expenditure to grants-in-aid. This result is in line with standard ‡ypaper theory which suggests that lump-sum grants-in-aid have a greater marginal impact on expenditure than private local income.

The asymmetric e¤ect (super ‡ypaper e¤ect in Stine's terminology) is con-...rmed by the sign and signi...cance of a_6. The sign of the variable is positive, but the e¤ect is correctly negative since the variable is expressed in negative values. However, the elasticity of this variable is not very high, something that might suggest that the variable is statistically signi...cant, but its economic impact is rather low.

Finally, it is interesting to note that private health care consumption has a negative sign; this variable has an anticyclical response to public health care since it satis...es all the demand that the public sector cannot meet.

Let us now turn to the model which allows local authorities to incur in some de...cit. The results are presented in Table 4.

[TABLE 4 HERE]

The goodness of ...t of this model is better than for the hard budget speci-...cation. For this estimation, all the variables have the expected sign; CSAN increases its signi...cance while POP_{65} is signi...cant at 90%. The elasticity to grants-in-aid is now much higher and is about ...ve times income elasticity. This con...rms that before reducing expenditure regional government prefers to incur some de...cit. The asymmetric response is con...rmed from a statistical point of view, but the economic signi...cance of the variable is very marginal (the elas-ticity is 0.009). In general, the dependent variable seems to be more sensitive

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to other source of ...nance while it is less responsive to socio-economic variables.

6 Conclusions

The reduction of expenditure at any government level is of paramount importance in countries such as Italy where public de...cits and debt have a considerable weight and impose a sever burden on economic development. In Italy, public health expenditure control has been implemented through a reform that imposes more stringent budget rules at the local level.

Regional authorities have then faced an increasing ...scal pressure due to the reduction in categorical lump-sum grants from the central government. Changes in grants from higher levels of government have direct implications for local ...nancing decisions. However, the usual response to a decrease in categorical lump-sum grants from the central to local governments is lower than the response to an equivalent decrease in local private income [Gramlich, 1977]. Furthermore, this ...nding is generalised to include the asymmetry in the response to intergovernmental grants: local spending is highly responsive to increases in grants, but it is relatively insensitive to grants reduction [Stine, 1994; Gramkhar and Oates, 1996].

In our paper we have estimated this hypothesis using a sample of cross-sectional and time- observations covering the 20 Italian regions over the period 1989-1993. Two di¤erent models have been estimated based on di¤erent budget balance rules. The ...rst one assumes the presence of a stringent budget constraint (hard-budget hypothesis); the second one allows regions to incur in some de...cit.

The empirical results of our model show the existence of a standard and a super ‡ypaper e¤ect in both models. The introduction of the soft-budget constraint hypothesis results in a stronger e¤ect of grants and a lower response of own resources which shows that before reducing expenditure regional gov-

ernments prefer to incur in some de...cit.

A word of caution should be spent for the sign and signi...cance of the private health care expenditure which palys a residual role in the model. The possibility for regional government to decrease expenditure in real terms depends on the presence of a well developed private market which can satisfy the demand that the public sector cannot meet. The regional di¤erences in health outlays make this assumption rather unreasonable for the Italian case. A two speed health care system might develop as a result of the reform proposed and avoiding this problem might prove to be an important priority for the years to come.

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Table 1: Definition of the variable used in the study

Variable used	Definition	Source	MEAN	ST. DEV	MINIMUM	MAXIMUM
EXP	Total current per capita public health care expenditure in real terms (1990) at regional level	Ministry of Treasury, Relazione Generale sulla Situazione Economica del Paese	1446600	252280	986540	2328700
GDP	GDP per capita in real terms at regional level	ISTAT, Regional Accounts	21074000	5301300	12587000	29820000
FSN	Grants from Central Government per capita in real terms		1201600	162040	857300	1559900
CSAN	Private consumption of health care services per capita in real terms	ISTAT, Regional Accounts	935730	114920	742230	1272600
POP65	Ratio of population aged 65 and over	ISTAT, Regional Accounts	16,44	3,13	10,70	25,00
DUM	if $FSN_t - FSN_{t-1} \geq O$, O if $FSN_t - FSN_{t-1} < O$, $FSN_t - FSN_{t-1}$		-64587	75398	-420600	0
DEF	Current deficit per capita in real terms for each region		169310	94069	42953	434370

Table 2. F-tests for pooling the data

Variable (dummies)	F-test equation (6)	F-test equation (7)
GDP	0.322	0.939
FSN	1.575	0.594
CSAN	1.680	0.898
POP65	0.270	0.228
DUM	0.461	0.516
DEF		1.019
RESET (OLS)	5.53	4.85
RESET (POOL)	0.024	0.241
BOX COX (OLS)	12.782	16.78
Best functional form	linear	linear
BOX COX (POOL)	1.308	4.217
Best functional form	inconclusive	linear

Table 3: Estimation of the asymmetric effect: 'hard-budget constraint'

Variable Name	Estimated coefficients	Standard Error	t-ratio	Elasticity at means
α_1 (constant)	658690	128100	5.140	0.455
α_2 (GDP)	0.0169	0.0031	5.512	0.246
α_3 (FSN)	0.5630	0.1214	4.637	0.468
α_4 (CSAN)	-0.1593	0.0975	-1.634	-0.103
α_5 (POP65)	-42.8990	24.4610	-1.754	-0.049
α_6 (DUM)	0.6545	0.1706	3.836	-0.029
LL	-922.236			
BUSE R^2	0,5295			
R^2	0.9712			

Table 4: Estimation of the asymmetric effect: 'soft-budget constraint'

Variable Name	Estimated coefficients	Standard Error	t-ratio	Elasticity at means
α_1 (constant)	272850	92930	2,9360	0,1886
α_2 (GDP)	0,0099	0,0021	4,7520	0,1443
α_3 (FSN)	0,8375	0,0883	9,4890	0,6957
α_4 (CSAN)	-0,1403	0,0467	-3,0070	-0,0908
α_5 (POP65)	-20,8990	17,0500	-1,2257	-0,0237
α_6 (DUM)	0,2035	0,0962	2,1160	-0,0091
α_7 (DEF)	0,6737	0,0793	8,4990	0,0788
LL	-906.967			
BUSE R^2	0.8982			
R^2	0.9958			