MENTAL ACCOUNTING IN LOCAL PUBLIC SECTOR BUDGETING:

AN EMPIRICAL ANALYSIS FOR THE FLEMISH MUNICIPALITIES

Bruno Heyndels
Vrije Universiteit Brussel

and

Frank Van Driessche
Vrije Universiteit Brussel

INTRODUCTION

Governments typically collect revenues from three major sources: taxes, debt and own-source, non-tax revenues. In addition, in most decentralized countries, local governments obtain revenue from grants. The conventional economic approach suggests that the source of revenue should not affect how it is used. This follows from the assumption that money is fungible. Still, there is strong evidence that local governments violate this assumption. A prominent example is the so-called flypaper effect. This refers to the empirical observation that government expenditures are more responsive to changes in revenue from unconditional grants than to equivalent changes in private income. The empirical support for this anomaly is overwhelming. There also exists some evidence of non-fungibility for taxes and debt.

Different theoretical models explain part of the observed anomalies.[1] Still, there is no general consensus. Therefore, the suggestion by Hines and Thaler [1995] to explain the flypaper effect in terms of *mental accounting* is appealing if only because of its generality, which also explains the related anomalies in taxation and debt financing. The central idea of the mental accounting framework is that money from different sources is treated differently. The framework is part of the literature on anomalies in economics, and as such is directly related to Kahneman and Tversky's [1979] prospect theory.

The purpose of this paper is to present an empirical analysis of mental accounting in the local public sector. More precisely, we analyze the responses of Flemish municipalities to budgetary windfalls from three different sources. Municipalities experienced important windfalls of grant and tax revenue in recent years [Heyndels and Van Driessche, 1998]. Moreover, a more stringent budgetary policy since the beginning of the eighties resulted in a general decline in debt finance requirements. This provides a unique opportunity to analyze public sector responsiveness.

MENTAL ACCOUNTING IN THE PUBLIC SECTOR

To keep track of where their money goes and to control spending, firms use formal accounting rules and methods. The concept of mental accounting refers to a similar process at the individual or household level. More precisely, it refers to the way in which individuals and households record, summarize, analyze and report the results of transactions and other financial events [Thaler, 1998, 2]. A crucial component of mental accounting involves categorization: expenditures and funds are grouped into categories that are not perfect substitutes, thus violating the fungibility assumption which underlies conventional rational choice theory. Depending on its origin, income is spent more or less easily (on given goods).

Like firms and individuals, governments typically obtain revenue from different sources. Application of the concept of mental accounting suggests that the nature of the source affects its use. Government is expected to treat grants, tax, debt, and own-source revenues differently.

Mental Accounting

The rational choice framework constitutes a powerful normative starting point. Still, as a descriptive tool, the framework has severe shortcomings. Over the last two decades, an enormous amount of evidence has been presented that shows how cognitive limitations lead in the most diverse circumstances to irrational behavior. Systematic violation of the fungibility assumption is a clear example. Fungibility refers to the fact that wealth is treated equivalently irrespective of origin. Empirical and experimental evidence shows that this is not always the case. People appear to divide their wealth over separate mental accounts and treat the monies in each of them differently.

The "classic" illustration of the impact of mental accounting on spending decisions is Tversky and Kahneman's [1981] theater ticket experiment. Subjects are asked whether they would still attend a theatre performance when — on their way to the theatre — they lost their ticket, worth $10. The same question was then asked with the assumption that no ticket was bought in advance and that a $10 bill was lost. Tversky and Kahneman find clear evidence that subjects who lost their tickets are less likely to attend the performance. This suggests that money in an "entertainment account" or a "theatre account" is not fungible with money in a "general expenses account".

Many other examples of the lack of fungibility of incomes in separate mental accounts can be found. In his recent survey of the literature, Thaler [1998] offers a number of examples from the literature: Kooreman [1997] has shown that changes in child allowances affect spending on children's clothing more than equivalent changes in other income sources. O'Curry [1997] finds that people tend to match the "seriousness" of the source of income with the use to which it is put (for example, an income tax refund is more serious than winning in an office football pool). Finally, the "mailbox effect" refers to the observation that stockholders' consumption is more responsive to cash receipts originating from takeovers than to equivalent capital gains.

Mental Accounting in Public Sector Budgeting

The fact that economic agents obtain revenue from different sources is not unique to the private sector. Public sector entities also rely on several revenue sources. Therefore, the mental accounting framework can be used to analyze government's reactions to different kinds of budgetary windfalls [Hines and Thaler, 1995]. Such windfalls are defined here as automatic changes in revenue, where "automatic" means that the change in revenue does not follow from an explicit decision by the government that experiences the windfall.

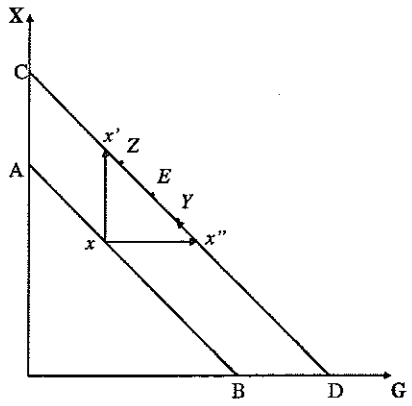
In what follows, we consider how grant, tax and debt windfalls lead to different framing of choices between private and public expenditures. Our analysis is demand-oriented, assuming that collective choices reflect the preferences and framing of the electorate. Formally, our exposition follows the lines of a simple community preference model [Wildasin, 1986].[2] This implies a deliberate disregard of supply-side effects. This is not because we think that such effects are irrelevant. We feel, however, that integrating them from the outset would obscure the central argument. Where relevant, we will illustrate how supply effects can affect the analysis. As will become clear, such effects can be considerable [Frey and Eichenberger, 1991; Ashworth and Heyndels, 1997].

The starting point of the community preference model is that a collective decision is to be taken with regard to the allocation of funds between public and private expenditures. The conventional approach treats the community as if it were an individual. Assuming identifiable community preferences, the optimization corresponds to choosing that combination of public and private expenditures at which the community budget line is tangent to a community indifference curve. In the simplest situation, the community's budget equals the sum of all private incomes. Spending on public expenditures implies that part of these incomes is transferred from the private to the public sector in the form of taxation. In a more general situation, the community's budget is augmented by the grants received. Finally, in a dynamic framework, present values of both revenue sources make up the budget.

The very nature of the community budget line suggests that different mental accounts may be used as a starting point for the private/public trade-off. Most generally, a private and a public account can be distinguished. Taxation is, then, an institutional means to transfer money from the private to the public account. In what follows, we analyze how the presence of different mental accounts can affect the allocation of funds between the private and the public sector. More precisely, we analyze the effects of changes in unconditional grants, taxes and public debt.

Grant Windfalls. Automatic changes in unconditional[3] grants occur when the grantor government changes the way in which the grant is calculated or some indicator on the basis of which the grant is allocated changes. From a conventional economic perspective, such a windfall is equivalent to a change in private incomes of the population. Both changes lead to an identical shift in the government's budget curve. This is illustrated in Figure 1 which depicts the budget curve summarizing choices between private (X) and public (G) expenditures. Starting from a budget line AB on

FIGURE 1
Grant Windfalls



which the local government chooses a point x, a shift to CD can be attributed to rising private incomes of the local population or to higher grant revenues. The flypaper effect refers to the empirical observation that, coming from a point like x, the government moves to Y if the shift of the budget line is induced by grants, whereas it moves to Z when the shift follows from rising private incomes. The flypaper effect indicates that public expenditures (G) are more responsive to changes in grants than in private income.

A mental accounting explanation for the flypaper effect is given in Figure 1. It gives a graphical presentation of the analysis in Hines and Thaler [1995]. They explain flypaper effects as a consequence of loss aversion and lack of fungibility. The latter effect suggests that grant revenues and personal income are held in separate mental accounts. This affects the way in which decision processes are framed. More precisely, mental accounting determines points of reference from which decisions are taken. When a jurisdiction with budget line AB receives additional personal income, this income enters in the private account. In Figure 1 this corresponds with a vertical upward shift of point x to x' (shown by the plain vertical arrow). An additional grant enters in the public account. It induces a horizontal shift from x to x". It should be noted that these are *mental* shifts. They define the points of reference (x' or x") from which decisions are made on how much to spend on private and public goods.

The mere fact that revenue is classified in different mental accounts is not sufficient to explain different behavior. Differences in reference points are irrelevant if agents treat gains and losses symmetrically. Conventional marginal analysis does just this. It suggests that starting from x" the community moves to the left on the budget line if the gain from doing so exceeds the loss. The gain corresponds with the utility from additional private consumption, the loss with the utility of the forgone public consumption. The movement to the left continues until marginal gains equal marginal losses (which is the case when the marginal rate of substitution equals the slope of the budget curve). In Figure 1, we assume this leads to an optimum at E,

which is the predicted equilibrium outcome in conventional economic analysis. Starting from x', the conventional analysis — following the same cost-benefit logic — will also predict E as the equilibrium outcome. The symmetric treatment of gains and losses reflects the fungibility assumption underlying the conventional approach.

Lack of fungibility in the mental accounting framework follows from the fact that outcomes are framed in terms of a topical account [Kahneman and Tversky, 1984] and from the presence of loss aversion. Topical accounts they relate the consequences of possible choices to a *reference level* that depends on the context [Thaler, 1998, 5].[4] The effect of reference points on economic decisions is formally analyzed in prospect theory [Kahneman and Tversky, 1979]. Apart from the prominent role given to reference points, a central characteristic of the prospect theoretical analysis is that it assumes *loss aversion*: a loss of a given amount hurts more than an identical gain gives pleasure. Loss aversion is the crucial characteristic that explains the lack of fungibility.

Loss aversion implies that people are more sensitive to decreases in their welfare than to increases. The effect of loss aversion is to inflate the losses. Moving to the left on a budget line corresponds with "winning" on X and "losing" on G. Starting from x" in Figure 1 — and assuming for ease of exposition that gains associated with additional private consumption are unaffected — losses equal gains "more rapidly" while moving along CD than in the conventional analysis. The community will thus choose a point like Y which lies to the right of E. In other words, loss aversion introduces a kind of psychological inertia in the decision process. It explains why "money sticks where it hits." More generally, loss aversion introduces a bias in any tradeoff in favour of the reference point.[5]

Possible supply-side effects may interfere with the "pure" framing situation of Figure 1. More precisely, the institutional context can be organized such that voters do not perceive the rise in private income as completely private. If tax revenues are coupled to the level of economic activity, part of a rise in private income will be taxed away "automatically". If voters consider this part as "belonging" on a public account, their reference point will shift from x to a point along CD which lies to the right of x'.[6] If taxes grow in proportion to income, the reference point will shift to a point where a ray from the origin through x intersects CD. If the tax system is progressive, tax revenues will grow faster than the tax base (private incomes). This situation, which is known as the revenue-elasticity hypothesis of fiscal illusion [Buchanan, 1967; Oates, 1979; Oates, 1988] corresponds to a situation where the voters' reference point is shifted to a point to the right of the point where the ray from the origin intersects CD, leading to a relative growth of government.

Tax Windfalls. The term "tax windfall" is used to denote a situation where, in a system of overlapping governments, an exogenous decision of the central government affects the tax revenues of local governments [Marshall, 1991]. Such windfalls occur because the local tax system is in some technical way related to the central government's tax code. A prominent example of tax windfalls followed from the U.S. Federal Tax Reform Act of 1986. This reform directly affected state revenues from personal income taxes. The reason for this was that some states use the federal

definitions of gross income to tax their citizens, other states use a number of provisions from the federal code, and still others use federal tax liability as the basis for their state tax [Marshall, 1991; Ladd, 1993]. In all cases the federal change affected state revenues directly. The effect was positive or negative, depending on the nature of the interrelationship between state and federal tax codes. Another example is discussed in Olmsted, Denzau and Roberts [1993] for Missouri school districts: state legislated changes in property assessment led to automatic changes in districts' revenue from property taxation in 1975. A state law limited the windfalls: in counties where the assessment values rose more than 10 percent, districts were obliged to reduce their nominal rates to keep their effective rates from rising [Olmsted, Denzau and Roberts, 1993, 365]. This, however, applied for only one year: in 1976 districts were allowed to raise nominal rates to their initial levels without the formal voter approval typically required in Missouri districts. Thus, the district budgets could benefit from the windfall created by the reassessment.

Tax windfalls differ fundamentally from the grant windfalls discussed in the previous section. The crucial difference is that the community budget line is not shifted. The tax windfall only induces a shift *along* an initial budget line.[7] In Figure 1, this would mean that a "positive" tax windfall — that is, an exogenous shock that induces tax revenue to rise — corresponds with a shift from x to a point on AB to the right of x and to an exogenous shift from the private to the public account. The tax windfall induces a mental shift to this "new" point. From there, the community will decide on how much to spend on public and private goods. Again, loss aversion will induce a bias towards the reference point: although the community's budget curve and indifference map are unaffected, the "optimal" allocation of the budget among private and public expenditures changes.

An interesting illustration of this type of "budgetary hysteresis" through mental accounting is Peacock and Wiseman's [1961] analysis of the growth of government. Their analysis presents empirical evidence of asymmetric responses of government expenditures to exogenous shocks. More precisely, it is well established that public expenditures rise sharply during wars but do not return to their initial level once the war is over (taking into account long-term effects on public debt). A mental account interpretation of this empirical observation would suggest that the war induces a mental shift to a point on the budget line with more public expenditures. The typical inertia then explains why the public sector stays large, even after the war.

Debt Windfalls. Debt windfalls occur when, as a consequence of debt retirement or falling interest rates, a community's disposable income rises. To our knowledge, the only empirical study of debt windfalls is by Olmsted, Denzau and Roberts [1993]. These authors analyze responses of Missouri districts to reductions in debt service rates. They find evidence that when debt service rates fall, districts increase their operating rate (which is the rate for all purposes except debt service) by at least the same amount.[8] This reveals a kind of flypaper effect since the change in operating rates are much larger than could be expected from the rise in disposable income which followed from the falling debt service rates. Interestingly, the increases in operating rates where realized with the formal voter approval needed for all property tax increases in Missouri districts. This suggests a demand explanation as presented in this paper: it was the public, not the politicians or bureaucrats who decided that the windfall "belonged" in the public budget.

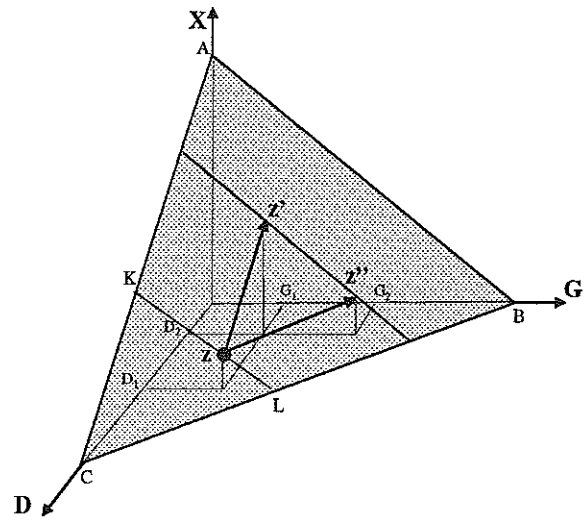
Debt financing implies the possibility of intertemporal trade-offs. The simplest representation starts from a three-dimensional decision space in which two periods are considered: period 1 (the past) and period 2 (the present). The decision maker allocates his budget over present consumption on private goods (X), present consumption on public goods (G) and past consumption on private or public goods (D).[9] The situation is depicted in Figure 2. The community's budget corresponds with the triangular plane ABC. In point A (B), the total budget is spent on private (public) goods in period 2. Point C indicates the maximum level of past consumption if period 2 consumption is zero. In that case, all present incomes are used to pay off the debt accumulated in period 1.

The effect of an exogenous cutback in (private or public) debt expenditures corresponds with a shift from an initial equilibrium point Z on the budget plane. In Z, present private consumption equals X_1 (corresponding to the vertical distance from Z to the GD-plane), present public consumption is G_1, and D_1 are debt expenditures. The straight line KL gives the budget constraint for current consumption for a level of debt equal to D_1. A debt windfall of $D_1 - D_2$, induces a shift of this current-budget line. Depending on whether the windfall applies to private or public debt, the corresponding mental shifts are expected to differ. If the windfall follows from a drop in private debt, we hypothesize that it will be considered as a private gain. In Figure 2, this corresponds with a mental shift on the budget plane from Z to Z' (the plain arrow is parallel to AC). In both points the amount of public consumption equals G_1. The additional means from the debt windfall is fully used ("mentally") for private consumption. Alternatively, when the windfall applies to public debt (as in the situation discussed at the beginning of this section), a mental shift from Z leads to Z''. Here the amount of private consumption is constant, while the public consumption rises with the amount of the windfall.

While in a conventional analysis debt windfalls are expected to have similar effects irrespective of their private or public nature, the mental accounting framework again suggests the presence of budgetary inertia: the stimulative effect on public expenditures will be stronger when public debt expenditures fall than when private debt expenditures fall.

Possible supply-side effects may interfere with the demand-oriented model. For debt windfalls, however, there is no institutional instrument as in the case of changes in private income (where the structure of the tax system can lead to automatic shifts in reference point as discussed earlier). Still, politicians can use informal means to convince citizens that a debt windfall "belongs" on the public and not the private account. Olmsted, Denzau and Roberts illustrate the point: when the debt service rate falls and politicians propose a rise in operating rates "(t)he school board usually refers to the proposal as a 'transfer' from the debt service fund to the operating funds. It says that 'no tax increase is necessary'; it does not note that the total tax rate would fall if voters rejected the transfer" [1993, 367]. As Frey and Eichenberger [1991, 79]

FIGURE 2
Debt Windfalls



illustrate, such strategic framing effects may be omnipresent in democratic decision making.

MENTAL ACCOUNTING IN FLEMISH MUNICIPALITIES

In what follows, we present an empirical analysis of Flemish municipal reactions to changes in three major revenue sources. More precisely, we investigate how responsive municipal non-debt expenditures are to changes in the unconditional grants, local income tax revenue, and debt servicing. First, we comment briefly on the institutional context and discuss the empirical model and estimation technique. The analysis is based on a panel data set for 308 Flemish municipalities from 1989 to 1996.

The Institutional Context

Belgium has four overlapping, and geographically organized, levels of government. Apart from the federal level, the country has 3 regions (Brussels, Flanders and Wallonia), 10 provinces, and 589 municipalities. Municipalities have considerable discretionary power with respect to both their expenditures and revenues. The most important municipal activities are in such fields as education, culture, police and refuse collection. As in most decentralized countries, the (308) Flemish municipalities rely heavily on grants from higher level (in this case, regional) governments. *Grants*, both conditional and unconditional, account for about half of the municipal revenues. Important grant windfalls occurred in 1991 and 1992, with the introduction of a new allocation mechanism for unconditional grants. In each year one out of six municipalities experienced windfall gains of more than 5 percent [Heyndels and Van Driessche, 1998]. Local taxes account for 46 percent of current revenues. Although the average municipality uses as many as 20 different tax sources, about 80

percent of the municipal tax revenue comes from only two sources: local income tax and local property tax. Both taxes are surcharges. The local income tax is a surcharge on the federal income tax. The local property tax is a surcharge on the regional property tax (regions can set the tax rate, but the federal government is responsible for the definition of the tax base). Changes in the federal and regional tax codes create (positive or negative) windfalls. Tax windfalls can also have an administrative origin: the municipal tax revenues are collected by the central tax administration. The fact that important administrative lags occur (often covering several years) is a controversial issue between federal and local governments. The administrative process is held responsible for heavily fluctuating municipal revenues: in four years within the period 1989-96, more than 60 percent of the municipalities experienced windfalls of 5 percent or more [Heyndels and Van Driessche, 1998]. Debt financing takes a central place too. Flemish municipalities are now required to balance their budgets. This requirement was one of the measures taken to stop the strong accumulation of municipal debt in the first half of the eighties. In addition the regional government agreed to pay off part of the debt of selected large cities. The results are clear: as a percentage of current expenditures, debt servicing fell from 36.6 in 1986 to 23.1 percent in 1996.

Empirical Model and Estimation Technique

We consider municipal reactions in terms of per capita non-debt expenditures. Thereto, we start from a general empirical specification which is in line with the recent literature [Wildasin, 1986]:

$$E_{i,t} = a_{0,i} + a_1 Y_{i,t} + a_2 G_{i,t} + a_3 D_{i,t} + a_4 TC_{i,t} + a_5 X_{i,t} + u_{i,t}.$$

where $E_{i,t}$ is municipality i's real per capita non-debt expenditures in year t expressed in Belgian francs (*BEF*). $Y_{i,t}$ is per capita income (in *BEF*). $G_{i,t}$ gives the per capita revenue coming from unconditional grants (in *BEF*). As such, $a_2 > a_1$ indicates the presence of a flypaper effect. $D_{i,t}$ gives the level of debt expenditures (inclusive of interest payments, in *BEF*). $TC_{i,t}$ is an indicator of the revenue raising capacity of the local income tax. More precisely, it gives the per capita revenue (in *BEF*) that can be raised by a 1 percent surcharge on the federal income tax. Variation in this indicator, not explained by changes in average income or the distribution of incomes (see further), is used as an indicator for tax windfalls. These follow from administrative lags or from changes in the federal tax code (a major change in this code occurred in 1988, affecting municipal revenues from 1990 onwards).[10] $\mathbf{X}_{i,t}$ is a vector consisting of other explanatory variables ("taste variables"). More precisely, **X** is composed of the municipality's population size and density, the percentages of young and old people, the percentage unemployed and a measure of the income dispersion within the municipality.[11] Finally, $u_{1,t}$ is the disturbance term.

For the municipality specific term $a_{0,i}$ we maintain two different assumptions, relating to the panel characteristic of the data. Methods for analysing panel data sets of this kind are well developed [Greene, 1993]. Two kinds of models are distinguished:

fixed effects and random effects models. First, in the fixed effects model, it is assumed that the $a_{0,i}$'s vary across municipalities, but that they remain constant for each individual municipality. This implies that local expenditures are determined by some (unknown) variables that are specific to the respective municipalities and that remain constant over time. In the random effects model it is assumed that the $a_{0,i}$'s are municipality specific error terms drawn from a common distribution. As such.$a_{0,i}$ equals $a_0 + e_i$, where e_i is the random disturbance characterizing the i-th observation and is constant through time. This implies that municipality-specific variables are not only constant over time, but they also have a unique (unknown) distribution.

Results

Table 1 summarizes the estimation results. The explanatory power of both models is very good (with R^2 of 93 - 94 percent). Still, the test statistics clearly indicate that the fixed effects model outperforms the random effects model.[12] This indicates that the data can best be explained by a model which allows for a municipality-specific intercept. We concentrate our discussion on the latter. (Note, however, that the results for the "mental accounting variables" is not qualitatively different in the random effects model.)

We are mainly interested in the coefficients which relate to the municipality's budget constraint. Among these, the coefficients of "income" and "grants" refer to the position of the budget constraint in a static framework (not considering debt payments). As expected, per capita income has a positive and significant effect on expenditures. This reveals that public facilities are normal goods: a 1-franc change in income leads for the average municipality to a 0.02 franc change in public expenditures. We find strong evidence of a flypaper effect: the coefficient for "grants" is significantly larger than the coefficient of the income term, indicating that the source of the municipal revenue matters. The value of the coefficient suggests that in the average municipality three quarters of an additional franc of unconditional grants is spent in the public sector. This reflect a large but not uncommon flypaper effect [Hines and Thaler, 1995, 219].

We find no evidence that changes in debt payments are mentally categorized on a separate (public) account. Our results indicate the existence of a tradeoff: larger debt expenditures lead to lower non-debt expenditures. However, this effect is not significantly different from zero or from the coefficient for income. Finally, shifts *along* the budget line induced by a tax windfall have a positive and significant effect on non-debt expenditures: when an average municipality's revenue from a 1 percent surcharge on the federal income tax rises by 1 franc, its expenditures rises by 0.29 francs.[13]

We now turn to a brief discussion of the other variables. The age variables are both significant and suggest that per capita expenditures are positively related to the population's age. The presence of an older population has stimulative effects on expenditures for health care and public safety [Bastiaens et al., 1997], two prominent responsibilities of Flemish municipalities. Table 1 indicates that municipalities with many unemployed spend significantly less. We have no unambiguous explanation for this.[14] Still, it may be the case that the presence of unemployment creates a sociological heterogeneity that hinders political agreement on public expenditures. Finally, a

TABLE 1
Estimation results

Dependent variable : per capita non-debt expenditures.

	Fixed effects	Random effects
Constant		2727.5
		(1.28)
Income (Y)	0.020	0.028
	(5.50)	(9.07)
Grants (G)	0.742	0.917
	(5.26)	(7.38)
Debt (D)	-0.038	-0.032
	(-1.26)	(-1.15)
Tax base (TC)	1.945	2.375
	(4.10)	(5.16)
Population	0.056	0.039
	(0.59)	(4.07)
Density	2.990	-0.337
	(0.75)	(-0.61)
Young	-304.1	-294.5
	(-5.40)	(-5.70)
Old	1055.0	560.4
	(13.50)	(9.53)
Unemployed	-327.8	118.5
	(-4.38)	(1.74)
Income dispersion	0.302	-0.062
	(2.13)	(-0.48)
R^2	0.94	0.93
N	308	308
T	8	8

t-values appear in parentheses

significant positive coefficient is found for income dispersion: more income inequality enhances per capita expenditures. The coefficient summarizes the net effect of two offsetting effects. First, more income dispersion means that the income tax — because of its progressive nature — will produce a larger revenue for any given level of the local tax and average income. This suggests a positive effect of dispersion on public expenditures. Second, a large income dispersion may indicate heterogeneity in the municipality's population. This may make consensus on collective decisions more difficult. The positive coefficient found in Table 1 suggests that the effect of the progressive nature of the income taxes outweighs possible barriers to collective decision-making resulting from intra-municipal heterogeneity.

We find no significant effects of the population related variables on public expenditures. Population size has a positive but insignificant effect on per capita expenditures. The positive sign may indicate the presence of scale diseconomies or crowding effects in the provision of public facilities. Alternatively a positive sign could result from the fact that larger municipalities provide a wider range of services [Oates, 1988]. We find no significant influences from the population density. Controlling for

population, the density in fact measures the inverse of the area of the municipality. The positive coefficient suggests that smaller municipalities (in terms of area) spend more than larger ones.

CONCLUSION

The mental accounting framework suggests that the source of revenue affects how it is spent. Over the last years, a lot of evidence has been found on mental accounting in private decision making. People use money differently, depending on where it comes from. Mental accounting attributes this to the role of reference points in decision making and to the existence of loss aversion.

The fact that revenue comes from different sources is not unique to the private sector. Multiple revenue sources coexist also in the public sector. Voters may classify different revenue sources in a private or public account. Private income is likely to be classified in the former. Unconditional grants and public debts will more likely be classified as public. Finally, tax windfalls (resulting from the technical interrelationship of tax codes of different governments) may be seen as reclassifying sources between public and private accounts.

These classifications define reference points: decision will be taken from there. Loss aversion then introduces a kind of psychological inertia or bias in favor of the reference point. Money in the private (public) account is more likely to be spent there. Thus, we expect that public expenditures are more responsive to grant and debt windfalls than to equivalent changes in private income. Also, tax windfalls which transfer revenue from the private (public) to the public (private) account will result in larger public (private) expenditures, despite the fact that the municipal budget curve (or plane) is unaffected.

An empirical analysis using a panel of data on 308 Flemish municipalities and covering the period 1989-1996 gives mixed evidence on mental accounting effects in public budgeting. Local non-debt expenditures are significantly more responsive to grant windfalls, thus supporting the "classical" flypaper result in the literature. We also find evidence of tax windfalls: fluctuations in tax revenue which follow from administrative lags at the federal level (where the local income tax is collected) or from changes in the federal tax code have important positive effects on local expenditures. For changes in debt payments, however, we find no evidence that mental accounting matters.

NOTES

1. Courant, Gramlich and Rubinfeld [1979] and Oates [1979] explain flypaper effects for grants in terms of fiscal illusion, that is voters' systematic misperception of the tax-prices they confront. Alternative explanations refer to bureaucratic discretion [Romer and Rosenthal, 1979], interest group behavior [Dougan and Kenyon, 1988], or informational externalities [Boarnet and Glazer, 1996]. Explanations of anomalous reactions to tax [Ladd, 1993 ; Marshall, 1991] and debt windfalls [Olmsted, Denzau and Roberts, 1993] typically refer to fiscal illusion.
2. An exposition in terms of a median voter model would be similar.

3. Mental accounting effects with regard to conditional grants are mentioned in Thaler [1998, 24, ftn 22].
4. Alternatively, accounts may be minimal (people only consider the differences between options) or comprehensive ("everything" is considered, as is assumed in conventional economics) [Thaler, 1998, 5].
5. If a point like E in Figure 1 (where conventional indifference curves are tangent to the budget curve) has a normative value, then it should be noted that the mental accounting framework suggests that a point like Z is also sub-optimal. A movement from x (assuming one ever gets there) to E may be realized "by chance" in a case where the shift in the budget curve follows, for example, from a growth in population size. To the extent that the unconditional grant received is positively related to the number of inhabitants, such a population growth will enhance grant revenues. At the same time, if the growth is a consequence of immigration the sum of private incomes within the jurisdiction may rise too. The combination of the rise in private incomes and grant revenues may lead to a reference point in E.
6. An institutional reason for such a shift in reference point may be the existence of a withholding provision that prevents all additional private income from ever arriving in the private budget.
7. Of course, actual tax reforms are likely to combine different effects. For instance, federal tax reforms have a direct effect on taxpayers' incomes. A federal cutback in taxes will shift the "local" budget constraint outward. Analytically it is possible to differentiate between the effect of this and the consequences of technical effects that relate to the interdependency of the tax codes.
8. In fact, the Tobit estimation reveals that a fall in the debt service rate by 1 percent corresponds with an increase in the operating rate of 1.51 percent. The latter effect is, however, not significantly different from 1.
9. It is assumed that no constraints (apart from budgetary) exist on lending or borrowing and that the interest rates equals zero. This implies that no distinction has to be made between present and past incomes. An extension to a situation with positive interest rates does not affect our results substantially.
10. An alternative argument for introducing *TC* as a separate variable is that the richness of the tax base is an important determinant of the political cost of taxation [Hettich and Winer, 1984].
11. The dispersion is measured starting from income data as the difference between the third and the first quartile, divided by the median income. It should be noted that the dispersion is expected to have a double impact on public expenditures. As a taste variable, we expect that the dispersion reflects heterogeneity in the municipality which may make collective decisions more difficult (thus restraining public expenditures) or it may stimulate redistribution (thus stimulating public expenditures). The dispersion of income has, however, also a separate effect through the tax base: the progressive nature of the (surcharges on) income taxes implies that tax revenues for any given level of average income will be larger the more unequal are incomes.
12. Testing the fixed effects model against the alternative of a constant slope version is rejected: the corresponding F (307,2146) statistic equals 51.7. Comparison of the fixed and random effects models (by the Hausman test) rejects the latter: we find a χ^2 (10) of 320.3.
13. The average local income tax rate equals 6.7 percent. Remember that TC gives the revenue in BEF from a 1 percent surcharge. Thus, if *TC* changes 1 *BEF* (for each percent), this corresponds with a change in revenue of 6.7 BEF on average. Table 1 indicates that this leads to a 1.94 change in non-debt expenditures. Thus, for each franc of tax windfall, expenditures rise with 1.94 / 6.7 = 0.29 francs.
14. We would rather expect a positive effect if unemployment is a proxy for poverty. Responsibilities for welfare payments are organized at the municipal level. "Independent" agencies are responsible, but municipalities are obliged to finance their deficits. Therefore we would expect that the presence of many unemployed increases municipal expenditures (note that this effect is conditional on the assumption that the number of unemployed is a proxy for more general poverty as unemployment benefits are paid by the federal government).

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