Fiscal illusion and the Australian local government grants process: How sticky is the flypaper effect?[*]

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Abstract It has been argued that evidence supporting the widely documented flypaper effect is a statistical artefact; more specifically that previous studies are compromised by the use of inappropriate functional forms and the endogeneity of intergovernmental grant programs. Whilst the first issue may be resolved with careful econometric testing, the second requires the incorporation of institutional constraints into governmental expenditure equations. Combining Australian local government expenditure equations and intergovernmental grant parameters, the flypaper controversy is analysed. Empirical results confirm the sensitivity of the flypaper effect to specification, and tests of fit unambiguously favour one functional form. That specification yields no evidence of a flypaper effect in the Australian institutional milieu.

1. Introduction

The postulate of rational maximising behaviour by economic agents has served economic analysis well over a wide range of activities, including the behaviour of national and sub-national governments. Notwithstanding the success of this *homo economicus* postulate and the apparent pervasiveness of its application, an ostensible anomaly has long been evident in the empirical analysis of fiscal illusion. More specifically, the well-known flypaper effect, which refers to the tendency for categorical lump-sum grants from federal to state and local governments to increase public expenditure by more than an equivalent increase in income from other sources, appears to represent irrational behaviour on the part of recipient governments.[1]

Analysis of the flypaper effect has led to three distinct lines of empirical research[2]. Firstly, some researchers have incorporated the expenditure distortions generated by intergovernmental grants into studies directed at other forms of fiscal illusion, especially the revenue-complexity and revenue-elasticity hypotheses [see, for example, Oates (1975), Wagner (1976), Goetz (1977), Munley and Greene (1978),

Craig and Heins (1980), DiLorenzo (1982) and Breeden and Hunter (1985)]. Broadly speaking, the results have indicated that intergovernmental grants are indeed an important determinant of the level of public expenditure. Secondly, some researchers investigated the flypaper effect directly by hypothesising that voters view intergovernmental grants as transferring their perceived tax burden to other jurisdictions thus biasing public expenditure upwards. Working in this tradition, Winer (1983), Logan (1986), Hammes and Wills (1987), and Dollery and Worthington (1995) have all found evidence supportive of the flypaper effect. Finally, some writers have argued that intergovernmental grants reduce the average price of recipient public goods, and since voters base their decisions on this price, rather than the marginal tax price, grants stimulate public expenditures. Evidence gathered by Courant, Gramlich and Rubinfeld (1979), Oates (1979) and Grossman (1990) favoured the existence of a flypaper effect.

However, despite this ostensibly strong empirical support for the flypaper effect, several alternative or at least qualifying hypotheses have been developed. Firstly, an essentially theoretical literature has argued that evidence of an upward bias in the level of public expenditures attendant upon grants need not imply any systematic illusion symptomatic of a flypaper effect. For instance, Romer and Rosenthal (1979) show that where the public budgetary agenda is dominated by political agents, the outcome may be determined by threat tactics. Similarly, Dougan and Kenyon (1988) contend that the stimulatory effect of grants derives from lobbying by local pressure groups and accordingly need not be the outcome of tax price illusion but instead simply reflects changes in the relative wealth positions of various interest groups. In much the same vein, Oates (1988) has employed both Romer and Rosenthal (1979) and Dougan and Kenyon (1988) to argue that standard political forces in the budgetary process may fulfil the theoretical role of fiscal illusion in biasing expenditures upwards, and that the stimulatory effect of grants is incorrectly identified as being the result of the flypaper effect. Finally, Brennan and Pincus (1996; 1993: 2) observe that if state incomes rise on average due to intergovernmental grants then a flypaper effect is not necessarily anomalous; or conversely "...if there is no increase in state income on average associated with increased federal grants, we should on the standard analysis expect no increase in state public spending; therefore

any increase at all that is detected empirically represents a challenge to prevailing orthodoxy."

Secondly, an empirical literature has developed on the premise that "fiscal illusion may be simply an econometric illusion resulting from several biases introduced through model misspecification" (Becker 1996: 86). Various possibilities have been identified (Becker 1996: 98): failure to distinguish matching grants from unconditional aid (Inman, 1979; Follain, 1979); failure to consider the simultaneous determination of grants and local spending (Chernick, 1979; Islam and Choudhury, 1990); omission of relevant independent variables (Hamilton, 1983); and inappropriate use of piece-wise linear budget constraints (Moffitt, 1986; Megdal, 1987).

Whilst increasingly sophisticated empirical work on the flypaper effect has recognised the need to distinguish categorical (or matching) grants from general (or unconditional) grants and the importance of including relevant independent variables, two main areas of concern remain unresolved. Firstly, the perceived sensitivity of the flypaper effect to the specification of sub-jurisdictional expenditure requires investigation (Zampelli, 1986; Becker, 1996). And secondly, the apparent failure to correct for potential endogeneity in the state/local government grants nexus needs further attention (Becker, 1996). Whilst the present paper is focused mainly on the question of the appropriate specification for an empirical model testing for this type of fiscal illusion, we nevertheless do attempt to deal with the problem of endogeneity by selecting an institutional environment with no *prima facie* evidence of endogeneity in the grants process and testing econometrically for the existence of endogeneity.

Certainly, the problem of model specification may be diminished by careful econometric analysis. In essence, we are able to establish that specification bias arises when a linear form of the model is used to estimate the effect of grants on local government expenditures. By contrast, we find the logarithmic form of the model to be unbiased. This enables us to conclude that grants do not have a greater impact on expenditures than local income (adjusted for a variety of demographic and other factors).

The question of grant endogeneity, however, is more problematic. Indeed, a surfeit of evidence exists, largely with a North American institutional focus, which supports "...the simultaneity of local spending and federal grant-making decisions" (Becker,

1996:91). More specifically, since some empirical work [see, for instance, Chernick (1979) and Islam and Choudhury (1990)] establishes that sub-jurisdictional federal aid depends on a localities' own tax effort and expenditure levels, we may hypothesise that "...failure to control for the endogeneity of grants yields an overestimate of the marginal expenditure effect of grants" (Becker, 1996: 91). Even more importantly, where studies have either utilised strictly exogenous receipts (Marshall, 1991) or have taken account of the presumed simultaneity of federal grants and local government fiscal behaviour (Becker, 1996), empirical support for the flypaper effect has not been forthcoming. Moreover, Becker (1996:91) has argued that given "...some researchers continue to assert that grants are exogenous [see, for instance, Wyckoff (1991)]...their results are subject to the criticism that the estimated effect of federal aid on local spending is in part capturing the federal government's own reaction to local spending". Further, "while the results of this investigation [Becker, 1996] are not a direct refutation of every previous study reporting a flypaper effect they were powerful enough to cast a shadow of suspicion on the results of studies that fail to explicitly justify their chosen functional form or that ignore the endogeneity of local spending and federal grant-making" (Becker, 1996:97).

It is thus clear that future research must seek to identify under what circumstances and conditions empirical work on the flypaper effect is compromised by the presumed endogeneity of the grants process. Whilst studies focusing on US intergovernmental grants appear to support Becker's (1996) contention that they have been compromised, other institutional arrangements exist where more precise statements are permissible on the actual relationships between federal grants and state/local expenditure. Rigorous empirical analysis conducted in a more clearly defined institutional milieu would facilitate greater certainty on the empirical status of the flypaper effect in federal systems of government.

We adopt a two-pronged approach to the problems of endogeneity in this paper. Firstly, we have selected the local government grants system in the Australian state of New South Wales (NSW) over the period 1992 – 1993 as an appropriate institutional milieu in which to test for the flypaper effect. As we seek to demonstrate in Section 2, sound *a priori* grounds exist for the view that the institutional characteristics of the current NSW local governments grants process rule out the possibility of endogeneity. And secondly, we nevertheless conducted specific econometric tests for endogeneity,

the results of which allowed us to conclude that statistically significant endogeneity was not present.

The paper itself is divided into four main parts. Section 2 outlines the nature and characteristics of the local government grants system in NSW, Australia. Section 3 examines the models and hypotheses employed in the empirical analysis of the flypaper effect within this institutional setting, and the results of these procedures are discussed in Section 4. The papers ends with some brief concluding remarks in Section 5.

2. The Australian local government grants process

The local government grants system in Australia has four distinctive features. Firstly, and in common with its US counterpart, the existence of vertical fiscal imbalance provides the underlying rationale for intergovernmental grants[3]. In Australia local government raises around seventy per cent of its own expenditure requirements whereas US municipalities gather about sixty-five per cent of their expenditures. However, unlike the US, where most of the funding derives from state governments, in Australia the Commonwealth (federal) government provides the requisite finance.

Secondly, despite the fact that the Commonwealth government provides the funding, the actual allocation and distribution of monies to local governments is made through state-based Local Government Grants Commissions (LGGCs)[4]. The principles applied by these LGGCs to grant allocation are largely based upon a common legislative core: (i) allocation of funds on a full horizontal equalisation basis; (ii) the functioning of each local government at a standard not lower than the average standard of other local governing bodies in the state; (iii) the assessment of revenue and expenditure needs and disabilities; and (iv) effort neutrality[5]. The most important consideration here is that the allocation of grants is based on the LGGCs *objective* assessment of local government needs and disabilities: both expenditure – the differential costs, relative to standard, that a council needs to provide a standard level of services – and revenue – the differential revenues a council would raise if the standardised revenue effort was applied to its revenue base. In the case of expenditure disabilities, factors taken into account include socioeconomic, demographic and geographic attributes, whilst revenue disabilities are proxied by variance in rateable property value.[6] It is important to note that the horizontal equalisation principles

under which these assessments are made generates "...equalisation of the capacity to provide services, but not the equalisation of outcomes" (AURDR, 1994a: 25).

Thirdly, the vast quantum of grants made to Australian local governments come in the form of general financial assistance grants, which is in marked contrast to US local government grants which are predominately earmarked or hypothecated.[7] Moreover, the major portion of specific purpose (or categorical) financial assistance is directed towards roads-related uses – an item clearly delineated in local government financial statements. All other things being equal, the trend in Australian grants has been towards greater autonomy at the local level.[8] Indeed, by Australian standards the reliance of US local governments on 'categorical grants' (some 83 per cent of federal funding) and the extensive use of federal 'mandates' "...would be regarded as very intrusive" (AURDR 1994a: 18).

Finally, not only is the assessment of grants by the LGGCs taken at arm's length remove from sub-jurisdictional expenditure decisions, but the ability of these councils to affect this process is extremely attenuated. Given it is part of the Commonwealth's intention that "individual councils should not be able to act in a manner which influences their grant, complexity in LGGC methodology is of little concern to the Commonwealth (aside from its administrative cost)" (AURDR 1994a: 13). Even when local governments are given information about their revenue and expenditure positions and the disability factors applied to them, "it is difficult for any one council to assess where they stand in terms of application of disability factors relative to another" (AURDR 1994a: 24).[9]

From the above discussion it would appear that little *prima facie* evidence exists in Australia supporting an argument for local government grant endogeneity.[10] It would thus seem that the principle of horizontal fiscal equalisation, and the concurrent existence of independent authorities in the form of the LGGCs, has produced a system almost wholly based upon the objective assessment of local government capacity, rather than activity[11]. Moreover, the stated objective of keeping local governments at "arm's length remove" from this process, and the dominance of general, rather than categorical grants, limits the validity of arguments of either implicit or explicit grant-matching. In this regard, Australian institutional factors unequivocally support the exogeneity of super-jurisdictional decisions on grants and sub-jurisdictional decisions on spending.

3. Empirical methodology

Applying these concepts to actual expenditure data for 176 NSW local government areas (LGAs) over the period 1992 – 1993 makes it necessary to proxy institutional constraints. All data employed is sourced from the NSW Local Government Grants Commission (1994) and the NSW Department of Local Government (1995). The expenditure function for publicly provided goods may be expressed as:

$$Q = f(Y, P, I) \tag{1}$$

where Q is the level of expenditures on publicly provided goods, Y is the total amount of fungible resources available for such expenditure, P is the relative tax-price of Q, and I is a vector of institutional and environmental variables that determine local government outcomes.

In the case of NSW LGAs, total fungible resources Y is made up of two components. First, there are those local or own-source resources available for expenditure on the publicly provided goods. These include property rates, fees and charges, and interest and public utility income. The variable L is accordingly defined as per capita revenue derived from local sources in the i-th LGA. The second component of local government revenue is the intergovernmental grants provided under the principle of horizontal fiscal equalisation with due deference for the level of vertical fiscal imbalance in the Australian federal system. This variable G is defined as the level of intergovernmental revenue per capita received by the i-th LGA. Local resources and grants are now simply two components of total income: $Y = L + G$. Positive coefficients are inferred for both L and G. The posited flypaper effect is the existence of a relatively larger response in Q to G as against L or $\partial Q/\partial G > \partial Q/\partial L$.

The first of the remaining two variables is intended to proxy the implicit tax-price P of own-source revenues L. Here it is the assessed revenue need of the i-th LGA as calculated by the local government authorities. This measure reflects the ability of the LGA to derive further revenues from local sources, and accordingly a negative coefficient is hypothesised. The second variable I reflects the ability of the LGA to produce publicly provided goods, and the demands placed upon it by its constituents. The measure is calculated using the assessed expenditure need of the i-th LGA. Any socio-economic or geographic factors – such as household income, the aged as a proportion of the population, recreation areas, urban growth, etc. – likely to affect the

capacity of the LGA to provide publicly provided goods to the state standard are included in this measure. A positive coefficient is hypothesised. In the linear form the estimating equation now becomes:

$$Q_i = \alpha_0 + \alpha_1 L_i + \alpha_2 G_i + \alpha_3 P_i + \alpha_4 I_i \tag{2}$$

The logarithmic form of equation (2) is:

$$Q_i = e^{\beta_0} L_i^{\beta_1} G_i^{\beta_2} P_i^{\beta_3} I_i^{\beta_4} \tag{3}$$

4. Results

The estimated coefficients and standard errors of the parameters detailed in (2) and (3) are presented in Table 1. To facilitate comparability elasticities calculated at the means are also included. For the linear formulation embodied in (2) the coefficients are all significant, though only I and L conform to their hypothesised signs. Various tests for heteroskedasticity reject the null hypothesis of homoskedasticity. The recursive residuals from the linear estimation are all negative, suggesting a concave function. Likewise, a RESET test also indicates nonlinearity, so that the null hypothesis of no functional misspecification is rejected.

Table 1
Regression estimates

Variable	*Linear*		*Logarithmic*	
	Estimate	Calculated $\partial Q/\partial X$	Estimate	Calculated $\partial Q/\partial X$
CONSTANT	358.830*** (35.934)	0.300	1.669*** (0.325)	0.241
P	163.390*** (32.262)	0.048	-0.002 (0.016)	0.0002
I	268.880*** (52.096)	0.225	0.245*** (0.039)	-0.008
G	-0.832*** (0.194)	-0.280	-0.041 (0.062)	-0.034
L	0.991*** (0.079)	0.705	0.843*** (0.049)	0.801

Figures in parentheses are the corresponding standard errors. Elasticities calculated at the means. Asterisks (*) denote level of significance: * - 90%, ** - 95%, *** - 99%.

A Hausman test is used to verify the exogeneity of the grant parameter to local expenditure, with P, I and L used as instrumental variables. The Hausman specification test statistic is computed and compared to a Chi-square distribution. Under the null hypothesis (G is exogenous), the estimates obtained using the efficient

estimator (OLS) will be consistent with those derived with the consistent estimator (IV). Under the alternate hypothesis (G is endogenous), the estimates of the former will still be consistent, whilst those for the later will be inconsistent. The null hypothesis fails to be rejected and we may conclude that grants are determined exogeneously with respect to the level of sub-jurisdictional expenditure, consistent with the institutionally based *a priori* reasoning.

The estimates for the logarithmic regression are also presented in Table 1. The coefficients on L, I and P conform to *a priori* expectations, though P is insignificant. The estimate for the short-run elasticity on local income L is 0.843, which converts to a marginal expenditure effect of 0.801. The figures for the grant elasticity are -0.041 and -0.034, respectively. A test on the equality of these parameters is rejected at the 99 percent level. Tests on the joint insignificance of revenue, and institutional and tax-price effects are also rejected. Contrary to the predictions of the flypaper effect, the elasticity of local expenditure to grants is not greater than that to local income. In fact, our evidence suggests that intergovernmental grants exert an insignificant negative influence on sub-jurisdictional per capita expenditures. Tests for heteroskedasticity fail to reject the null hypothesis of homoskedasticity.

Tests for model misspecification support the use of a logarithmic formulation. The null hypothesis of no functional misspecification is not rejected using a RESET test; likewise a test for homoskedasticity fails to reject the null hypothesis. Finally, a test for the joint-significance of the expenditure parameters using the Wald Chi-square statistic rejects the null hypothesis of joint insignificance.

The preceding analysis indicates that tests of fit unambiguously support a logarithmic formulation in modelling local government expenditure functions. Moreover, the selection of a linear formulation is likely to significantly overestimate the effect of grants on local expenditure, and hence the purported effect. A comparison of estimates from the logarithmic and linear regressions reveals the sensitivity of the flypaper effect to functional form. The data set employed suggests that the marginal effect of grants on expenditure is likely to be inflated more than eight times when an incorrect functional form is selected. The results are supportive of Becker's (1996: 95) proposition that "improper specification of the local expenditure equation is a source of the flypaper effect".

However, putting this to one side, correctly modelling the institutional factors found in grant parameters, also yields no evidence of the flypaper effect in the Australian institutional setting. In terms of NSW local governments, the most influential determinants of expenditure would appear to be the non-discretionary environmental and socioeconomic disabilities of the area, and the level of locally derived income. The level of grants appears to provide no systematic upward bias on the level of local expenditure – or that which would be consistent with the posited flypaper effect – regardless of functional form.

5. Concluding remarks

A number of points emerge form the present study. Firstly, as we have seen, recent criticisms of the flypaper effect have argued that existing studies fail to recognise the complexity of sub-jurisdictional decision-making. That is, the simultaneity of the grants process, for both the donor and grantor bodies, and the disparate influence of categorical and general purpose grants, are likely create a *statistical illusion* supporting this hypothesis. Secondly, it has also been argued that a somewhat more prosaic source of illusion is likely to result from mere empirical convenience, in addition to errors in *a priori* reasoning. The current analysis of the NSW local government grants process supports these criticisms.

Our analysis of the flypaper effect in the context of the NSW local government grants process for the period 1992 – 1993 indicates that specification bias does indeed exist when the linear form (2) of our model is used. Our results also show that the logarithmic form (3) of the model generates unbiased estimates. Certainly, this has significant implications for future empirical research on the flypaper effect. However, whilst the putative flypaper effect is certainly sensitive to the specification of the expenditure equations themselves, a far more influential source of misspecification would appear to reside in ignoring the institutional framework in the grant donor/recipient nexus. That is, the question of the most appropriate specification for the empirical analysis of the flypaper effect cannot be divorced from the problem of endogeneity in the grants process arising from potential interaction between donor and recipient jurisdictions.

We have sought to establish the most appropriate specification of our model in an institutional environment free of this interaction. Both *a priori* evaluation of the actual characteristics of the NSW local government grants process and auxiliary econometric

tests appear to indicate that no endogeneity was present for the period 1992 – 1993. However, it should be noted that the NSW local government grants process has undergone considerable change in recent years. In comparison with previous years, for the time period of this analysis NSW local governments enjoyed a substantially greater degree of autonomy. Future research could thus examine the question of endogeneity further by comparing coefficients from the present test with those from earlier periods with less autonomy. Problems with data comparability prevented us from conducting such an investigation.

In terms of collateral research outcomes, a number of additional points may also be made. In the first place, it would appear that the Australian trend towards greater autonomy at the local level does not bring with it any discernible problems. It would appear that sub-jurisdictional governments, like individuals, are willing to substitute at the margin when receiving financial assistance. Second, it would also appear that absolute differentials in local revenue substantially alter the per capita expenditure decisions made by NSW local governments, more than that suggested by the expenditure needs of these same bodies. However, the ability of LGAs to source local revenue at the margin is somewhat less powerful. This immediately suggests that the assessment of revenue capacity should remain secondary to expenditure capacity as a policy issue in the local government grants process.

Notes

1   The term 'flypaper effect' itself is attributed by Courant, Gramlich and Rubinfeld (1979) to Arthur Okun's remark that "money sticks where it hits".

2   Surveys of fiscal illusion can be found in Oates (1988) and Dollery and Worthington (1996). For specific discussion of the US grants process and the flypaper effect, see Gramlich (1977) and Fisher (1982).

3   Whilst Australia has a federal system of government similar to the US, there is a greater diversity in the distribution of expenditure responsibilities and revenue sources between the three levels of government. In the case of NSW local government, the (i) sources of revenue and (ii) uses of expenditure are (% in brackets): (i) property rates (42), licenses, fees, and charges (27), financial assistance grants (16), other (15); and (ii) roads (30), recreation (12), general public service (14), public order and safety (2), education and health (5), housing and community amenities (13), and other (24).

4   Under Section 9(2) of the Local Government (Financial Assistance) Act 1986:

[Each state] shall have regard to the objective of ensuring that the allocation of funds for local government purposes is made, as far on a full horizontal equalisation basis, being a basis that ensures that each local governing body in the State is able to function, by reasonable effort, at a standard not lower than the average standard of other local governing bodies in the State, and that takes account of differences in the expenditure required by those local governing bodies in the performance of their functions and in the capacity of those local governing bodies to raise revenue.

[5] The assessment of a financial assistance grant is effort neutral when it neither rewards nor penalises a council where expenditure or revenue raising patterns vary from the state average because of policy differences, differences in efficiency, or levels of self-help.

[6] At the present time only property rate revenue "needs" are assessed.

[7] In 1992/93 of the total Commonwealth dollar payments to local government, 53 percent were made via the state LGGCs, 25 percent directly to local government, and 22 percent through the states themselves.

[8] On this matter, the AURDR (1994b:22) observed two possible implications of the grant mechanism for local autonomy. First, a higher level of untied grants gives councils significant autonomy with the composition of local expenditure. Secondly, grants which are not effort neutral may subvert local revenue raising effort, and entail a fall in the level of service - thereby reducing local autonomy. Together, these highlight the need to engage in horizontal equalisation on both the expenditure and revenue sides.

[9] It could be argued that local governments in Australia may operate informally "as if" their spending decisions affected grant funding, despite institutional evidence to the contrary. The National Survey of Councils conducted by the AURDR indicated that 96 per cent of senior management were aware of the methodology used in allocating grants (AURDR 1994b:25).

[10] The underlying principles by which the state and territory LGGCs make their decisions are based on Commonwealth legislation. Some differences amongst states do exist, but are largely a reflection of factors such as geography and stages of development in the Commissions themselves (AURDR 1994b:23).

[11] Whilst the state LGGCs have a common set of legislative principles, some differences do exist. First, two models, not one, of horizontal fiscal equalisation are followed - in Western Australia and Queensland an increasing share of funds have gone to councils with stable or declining populations, whilst in New South Wales, Victoria, South Australia, Tasmania, and the Northern Territory, an increasing share of funds has gone to areas with increasing populations. Secondly, and all other things being equal, in most states an increasing share of funds has been directed to councils with the highest index of socio-economic disadvantage, though the reverse appears to hold in Victoria (AURDR 1994b: xii). Recent efforts at local government reform have been pronounced in both Victoria and Queensland.

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