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Program Arranged by Gerard Debreu

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Inflation was perhaps the major problem facing state and local government finances as the 1980s began. Double-digit inflation rates throughout much of the late 1970s had driven up the unit cost of providing government services, and because tax bases had not kept pace, an increase in nominal tax rates and cutbacks in public service levels were alleged to have resulted. This paper gives some structure to the discussion of inflation impact on government budgets by formulating a general economic model that separates automatic from discretionary responses, and identifies the relative price, income, and budget effects of inflation. We also estimate the impact of these three components on the real expenditures of U.S. state and local governments during the past two decades.

I. Conceptual and Measurement Issues

Several strands of the public finance literature have picked up on the importance of inflation as a determinant of the growth in government but none, we argue, have asked the most important question: "What is the mechanism by which inflation affects the real demand for state and local government expenditures?"

How does one measure the inflation to which a government will respond? Different deflators are called for depending on whether the purchaser is viewed as a government unit or as a taxpayer (Peter Heller, 1981). There is also the choice between an implicit price deflator or a fixed-weight deflator. The first overestimates the effects of price changes on government purchases and the second underestimates them. Neither is an appropriate deflator for transfer payments.

Most studies of the determinants of state and local government expenditures have used cross-section data, ignoring the inflation issue (Thomas Borcherding and Robert Deacon, 1972). Research on the determinants of long-run changes in government expenditures takes inflation explicitly into account, but these studies have been straightforward empirical testing. Studies for Canada (Richard Bird, 1979) and the United States (Morris Beck, 1985) show that when the government expenditure-GNP ratio is "appropriately" deflated, a smaller real expansion in the public sector is observed. This provides some evidence of a relative price effect, but because no underlying theoretical structure is presented, and because automatic and discretionary changes are not separated, it is difficult to understand how inflation induces changes in government behavior.

Only a few studies have taken on the more explicit objective of comparing the impact of inflation on the revenue and expenditure sides of state and local government budgets. David Greytak and Bernard Jump (1975) measured the potential expenditure and revenue responses to inflation in the 1970s, but under the assumptions that the level and mix of inputs would remain constant, that tax bases would fully respond, and that no discretionary changes would take place. They
found that the purchasing power of state and local government revenues eroded by about 10 percent. Attiat Ott (1983) included discretionary as well as automatic changes, adjusted purchases and revenues by “appropriate” deflators, and concluded that inflation, during the 1969-79 period, appeared to generate “tax dividends.”

Other studies have analyzed the narrower question of the impact of nominal income growth on state and local government revenues and found an elasticity greater than unity (Daniel Feenberg and Harvey Rosen, 1986). John Ross and Richard Reeder (1979) estimated the relationship between revenues and the implicit price deflator, holding constant the nominal GNP gap, and found that revenues were 6-16 percent higher than they would have been in a noninflation world during the 1973-76 period.

Where this research has found, and left, the state of what we know about inflation impacts can be summarized as follows: (a) inflation may induce increases in the relative price of government goods and services, but since government revenues will also be driven up, it is not clear whether the revenue or expenditure stimulation will dominate; and (b) there is some uncertainty about whether (and how) discretionary tax rate changes, and borrowing and expenditure retrenchment should be counted as an impact of inflation.

II. The Model

A stylized model of the local and state subsector is developed here to explore the different ways in which inflation may impact real expenditure growth. We assume two types of agents, voters and bureaucrats. Voters are assumed to be sovereign in that they determine the level of public goods, and, with some time lags, the composition of taxes. Bureaucrats are assumed to minimize the production costs of public goods, and they administer the jurisdiction’s debt that is issued to purchase capital goods. Bureaucrats can only deviate temporarily from voters’ wishes by, for example, spending rather than rebating federal government transfers. Over the longer run, for given prices and disposable incomes, voter preferences are the only determinant of the jurisdiction’s expenditures. This fairly standard median voter model treats grants as a lump sum addition to personal income, and total disposable income is expressed net of federal income taxes.1

Given the desired level of public goods, the tax rates are set by the jurisdiction’s managers to generate either a balanced budget or a surplus. Because adjustment in tax rates may take place with a lag, and because of the balanced budget constraint and the prohibition against financing current expenditures with debt, it may be necessary for the jurisdiction to supply a disequilibrium level of public goods until tax rates can be adjusted. Such a disequilibrium situation is less likely to occur when the reserve position of the local jurisdiction is strong.

We assume that in production the elasticity of substitution of capital for labor, capital intensity, and the rate of technological change are all smaller for the public good than for the private good and housing (William Baumol, 1967). The initial equilibrium in public and private goods will not be disturbed if all prices and nominal values (incomes, transfers and debt, etc.) continue to increase period after period at the same rate, if the federal income tax is indexed to inflation, and if the real level of grants is held constant. It is highly improbable, of course, that all rates of change in nominal values will be the same in a generalized inflation environment. More likely, inflation is accompanied by changes in the relative price of factors of production and therefore of public vs. private goods (Beck; Bird). The interest in this paper is in this more general condition, and in particular with three effects: (a) an automatic real income effect that comes about because of the progressivity of the federal income tax and the inflow of federal grants; (b) an automatic relative price effect that is due to differential inflation rates for state and local government sector goods and

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1A full specification of the model (which includes public goods, private goods and housing) is available upon request from the authors.
services vis-à-vis housing and other private goods; and (c) the discretionary changes that the income and price effects call forth. Our goal is to disentangle these three effects.

Even if a taxpayer’s nominal income keeps up with inflation, his real purchasing power can be decreased by a progressive federal income tax that is not fully indexed. Since state and local public services are not inferior goods, this will cause a reduction in the real demand for government revenues. The other component of the real income effect is federal grants, which can partially offset the effects of income tax bracket creep. This model assumes that such offsets occur on a dollar-for-dollar basis and there are no “flypaper” effects associated with grants.

In a generalized inflation environment, it is almost certain that some prices will increase faster than others. In particular, inflationary expectations can lead to wage increases in excess of the general inflation rate. Relatively larger labor shares, lower rates of labor productivity improvement, and lower elasticities of substitution of capital for labor make it much harder for the state and local sector to absorb labor cost inflation. We assume in this model that inflation drives up wages by more than the general rate of price increase, hence the marginal cost of providing government goods increases by more than that for private goods. This increase in the relative price will lead to a decrease in the demand for government goods and services. Whether this will be accompanied by an increase in desired expenditures depends on the price elasticity of demand.

The third effect is the impact of discretionary actions and institutional constraints on the actual level of public services provided. One view is that government units are able to adjust optimally via a combination of automatic and discretionary responses, to the relative price and real income effects induced by inflation. Here, taxes are a veil and rates simply adjust as needed. Another view is that institutional frictions constrain taxes from fully adjusting in the short run and that the actual real expenditure levels observed at any moment in time may not be equilibrium levels. A “budget effect” can be defined as the difference between the optimal quantity of public services demanded and that which is finally provided. Examples of friction are provided by lagged property value reassessment or the omission of services from the sales tax base. Together with a balanced budget requirement, and the political or legal limits to discretionary rate changes, the jurisdiction will have to settle (temporarily) for a quantity of the public good that is smaller than that desired.

The size of the budget effect will be influenced by two factors. The first is the income elasticity of the tax bases, ceteris paribus, a greater effect might be expected from communities relying more heavily on the property tax. The second is the size of the net indebtedness of the community. The budget effect will be smaller if, for example, the community is holding a surplus on which they may draw to reach desired expenditure levels.

III. Empirical Results

Annual data from the National Income and Product Accounts are used here to test for the presence of these three effects over the 1972–88 period. To capture the behavior of real expenditures over the sample period, we consider two definitions of the dependent variable. The first includes all expenditures on goods and services, transfers to individuals and interest payments. The second includes only government purchases. Both measures are deflated by the fixed-weight price index of state and local governments.

Changes in real expenditures over the sample period reflect the impact of inflation, but they also reflect changes in the determinants of real demand which take place independent of inflation. The determinants we take into account here are population and personal income. We control for population growth by measuring the dependent variable, and where appropriate, the explanatory variables, in per capita terms. To control for income changes, we use per capita personal income deflated by the fixed-weight price index for personal consumption as an independent variable.

The explanatory variable for relative prices is measured as the ratio of the fixed-weight
price indices for state and local government purchases and for GNP. The real income effect of inflation due to federal income taxes and grants is represented in the regression equations by two separate explanatory variables: per capita federal income taxes deflated by the fixed-weight price index for personal consumption expenditures, and per capita federal grants-in-aid deflated by the fixed-weighted price index for state and local government purchases. The hypothesis is that inflation will erode increases in nominal income because of bracket creep and the federal income tax variable will therefore be negatively related to real expenditures, but that increases in federal grants will stimulate real demand.

To capture the presence of the budget effect, we use the net liability position of the state and local government sector lagged by one year. The variable is measured in per capita terms and deflated by the fixed-weight price index for state and local government purchases of goods and services. Net liability of state and local governments is defined as total debt outstanding minus financial asset holdings in the Flow of Funds Accounts, and in this analysis excludes assets or liabilities of the pension and retirement funds. The hypothesis here is that the budget effect, ceteris paribus, will be weaker to the extent the financial asset position is stronger. Because this variable is specified as net liabilities, the coefficient should be negatively signed.

Since the explanatory variables include the relative price, estimation is by two-stage least squares (2SLS) using the state and local government compensation of employees fixed-weight price index and the AAA municipal bond rate as additional instruments. From the different specifications we tried, the log-linear specification performed best, and is reported in Table 1. The Durbin-Watson coefficients do not suggest a serious problem with autocorrelated errors, and a Cochrane-Orcutt adjustment left the estimated equations practically unchanged.

All coefficients take the expected sign and are statistically significant at the 5 percent level. After controlling for population and real personal income changes, the three effects that potentially are caused by inflation, and developed in our model, appear to have played a significant role in the determination of real growth in the state and local government sector in the 1972–88 period.

The coefficients for the relative price effect indicate the existence of an elastic response of per capita real expenditures. Previous estimates of price elasticities in the literature have been in the inelastic range, but these estimates were obtained from cross-section, disaggregated data, with nominal (as opposed to real) measures of expenditure, and considered the own-price rather than the relative price effect. The coefficient for personal income shows real demand to be income inelastic although the elasticities are near unity.

The real income effect is as expected in that federal tax liabilities take on a negative sign, and grants are directly related to the level of expenditure. Given the presence of bracket creep and the declining level of real grants over much of the period under study, the real income effect dampened the demand

| Table 1—2SLS Regression Equations: Real Per Capita Expenditures for the State and Local Sector, 1972–88* |
|---|---|---|---|
| | Total | Purchases |
| **Explanatory Variables** | (1) | (2) | (1) | (2) |
| Relative Price | -1.83 | -2.22 | (3.08)b | (3.17)b |
| Per capita real personal income | 0.95 | 0.89 | (2.68)c | (2.14)c |
| Per capita real federal income tax | -0.44 | -0.40 | (4.27)b | (3.32)b |
| Per capita real federal aid | 0.23 | 0.30 | (2.84)c | (3.19)b |
| Per capita real net liabilities, lagged one year | -0.21 | -0.22 | (3.15)b | (2.79)c |
| Constant | 12.12 | 11.61 | (2.92)c | (2.86)c |
| Adjusted $R^2$ | 0.886 | 0.703 | 2.14 | 2.12 |
| $F$-Statistic | 25.93 | 8.57 |

*a* All variables in logarithms. Absolute value of $t$-statistics in parentheses. Dependent variable: Per capita real expenditures.

*b* Significant at the 0.01 level by a two-tail test.

*c* Significant at the 0.05 level by a two-tail test.
for state and local government expenditures. However, taken at mean values, the estimated marginal propensity to spend on state and local government services is higher for federal grants-in-aid than for personal income. This finding is more consistent with the flypaper effect than the fungibility model assumed here.

The net liability variable has the expected negative sign. When the financial position of the sector is weaker, the observed level of real expenditures is lower. This finding is consistent with our hypothesis about the existence of a "budget effect," due to frictions that slow the adjustment process. It is also consistent with the argument that there is a "wealth effect" that will cause the median voter to demand a higher level of expenditures.

IV. Summary and Conclusions

While the previous literature on role of the inflation in determining the real growth of state and local government budgets has contributed to our understanding of several measurement issues, it has failed to provide an adequate framework to sort out the state and local government response to inflation. Analysts and policymakers alike seem to be confused over whether inflation should be viewed as a fiscal bonus with dominating revenue effects, or as primarily a cost matter and an important contribution to fiscal distress. In this paper we develop a stylized model of state and local behavior and identify three effects of inflation on the real demand for state and local government services: a relative price effect, a real income effect, and a budget effect. The budget effect measures disequilibrium between actual and demanded levels of expenditure, and it should be present only when necessary discretionary adjustments do not take place. In these situations, the budget process is not a veil and has a real impact on demand. Tests for the presence of the three effects, using annual data for state and local governments for 1972–88, give results that are consistent with the model developed here.

REFERENCES


