



# State government response to income fluctuations: Consumption, insurance, and capital expenditures

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## ABSTRACT

This paper analyzes state government response to changes in the underlying economy with a view to determining whether, and to what extent, state governments respond to economic fluctuations. Specifically, we build impulse response functions from a panel of US states to examine how states cope with changes in economic conditions. We examine current expenditures, as well as Unemployment Insurance, welfare, and capital spending. Further, we examine how both short and long term debt and state government taxes vary with GSP. Our examination of average state government behavior indicates that states respond slowly to changes in the economy, and that they do not utilize some of the institutional features that are purportedly designed to cushion budgetary impacts. Finally, we find that welfare and UI spending follow separate distinct time paths, but not ones seemingly constrained by institutional barriers.

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## 1. Introduction<sup>1</sup>

The Great Recession of 2008–10 resulting from the housing and related credit bust has intensified interest in how governments respond to economic fluctuations. Among the steps the US federal government has taken in an effort to stabilize the economy is to provide \$280 billion in state government administered grants, with the expectation that states will use the resources consistent with stabilization efforts. Very little is known, however, about how state governments respond to economic cycles, which makes it unclear how states might use federal funds designated as ‘stimulus.’ Our paper finds, in contrast to apparent expectations by the federal government, that state governments typically neither follow smooth consumption paths over time, nor do they expend resources in a counter-cyclical fashion. Rather, states tend to reduce expenditures when tax revenue falls and vice versa, and state governments do so not only for general spending, but in categories of expenditure where the institutional arrangements would make it relatively easy to follow alternative time paths.

There has been little consideration of the relative importance of the time path of state government expenditures in response to temporary variation in state revenue. For example, that residential control over government expenditures may be more important than

stabilization is suggested by the fact that 49 states have balanced budget requirements of some kind.<sup>2</sup> Nonetheless, the stabilization objective may impact the design of public policy, so therefore we look at the reduced form response of state taxes and expenditure resulting from changes in economic activity. Our examination takes into account and combines the implicit results of changed income, such as tax revenue responses to changes in the tax base holding tax rates constant, and explicit policy changes such as changes in the tax rates themselves. Similar differentiation is possible on the expenditure side, the level of private activity itself may change expenditures, or state governments may enact explicit policy responses. Even the implicit responses of tax and expenditures, however, may reflect how state governments have designed their policies to respond to variation in economic activity, thus our assumption is that public sector responses are intentional. Our objective here is to capture the nature of the overall total response, while recognizing we are not able to identify whether the implicit responses are designed into public policy, or whether explicit changes are adopted.

The contribution of our work, therefore, is to empirically examine how state government taxes and expenditure have varied in the face of changing economic fortunes for the average state, using time series econometric techniques on a panel of 50 US states from 1963 to 2006. Since we will take a reduced form approach as to the objectives of state governments, a panel vector autoregression (VAR) approach is

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<sup>2</sup> Vermont is the only state without a constitutional provision for a balanced budget for at least some part of the state budget. Poterba (1995), however, has documented that the constitutional balanced budget requirements are incomplete for virtually all states (for example state governments often are permitted to borrow for capital expenditures).

appropriate to examine how state governments adjust both their expenditures and own source revenues in response to shocks to Gross State Product (GSP).<sup>3</sup> While we are unable to identify whether policy design is undertaken with a long run perspective, we can use our panel VAR estimates on a variety of tax and expenditure categories to be sensitive to some of the institutional constraints that may shape government behavior. The programs we investigate in addition to total current expenditures include capital spending, low income assistance, and unemployment insurance. Capital spending is interesting because in most states this category is not subject to contemporaneous budget constraints, there is extensive use of capital markets that theoretically could be used to smooth expenditures over the business cycle. Low income assistance programs typically see changes in usage in response to economic activity, though often with a lag. Unemployment Insurance (UI) is, of course, a program explicitly designed to smooth incomes for recipients that face unemployment, and there is an explicit savings component since all states maintain a UI savings account (trust fund).<sup>4</sup> We use our panel VAR estimates to develop impulse response functions (IRFs) for each of these expenditure categories, as well for a variety of revenue sources, including taxes, total revenues, long and short term debt, and federal aid to state governments.

Our time series approach to this problem is fundamentally different than, for example, looking at the impact of per capita income in a demand equation for publicly provided goods, such as was initiated in models like [Borcherding and Deacon \(1972\)](#) or [Bergstrom and Goodman \(1973\)](#), and widely followed since. In the demand analysis, it would seem the usual question presumed a long run permanent income approach, whereas our use of impulse response functions looks instead at the response to temporary changes (“shocks”). The question the time series work addresses is whether variation in output within the state has an effect on the public fisc in a way that may differ from standard demand analysis.<sup>5</sup> This is inherently an empirical question, because the pattern of responses to an economic downturn by state governments is certainly subject to several different forces pushing in different directions.

One hypothesis of how state governments might respond to an economic downturn is the “follow the revenue” theory, analogous to the “rule of thumb” consumers of [Campbell and Mankiw \(1989\)](#).<sup>6</sup> This theory states that state governments spend all of their current income each period, so if current income falls then expenditure falls, and vice versa. If this holds, we would expect to see revenue and expenditure track GSP closely.

A more sophisticated alternative, however, is that state governments understand they are agents of their individual residents. If residents follow the consumption path indicated by the permanent income hypothesis (PIH) as proposed by [Hall \(1978\)](#), then states should maintain their expenditures, and only revise very slightly downward their expenditure path to the extent that the estimate of permanent income falls with a negative economic shock. If states

<sup>3</sup> There is of course a large macroeconomic literature on whether tax and expenditure changes by governments, including even states, can affect incomes (see e.g. [Blanchard and Perotti, 2002](#); or [Engemann et al., 2008](#)). The reduced form we present here has as its purpose to discern the pattern of response to changes in economic activity irrespective of the source of policy motivation, and irrespective of the effectiveness of that policy.

<sup>4</sup> [Poterba \(1994\)](#) provides evidence that state fiscal institutions limit the response of state governments to changes in the economic environment. [Sorensen et al. \(2001\)](#) show that the ability of state governments to accumulate savings is affected by state balanced budget rules.

<sup>5</sup> It could be easily argued that income in a public demand equation (whether or not motivated by the median voter model) should be permanent, not transitory income. Several researchers have attempted to study the effect of decreases, rather than increases, in income such as through grants-in-aid.

<sup>6</sup> [Mankiw \(2000\)](#) argues that rule of thumb consumers are an important feature in any macroeconomic model attempting to explain consumer behavior. In the context of our paper, it is important to allow for the possibility that state governments mirror some aspects of consumer behavior.

attempt to behave according to the PIH theory in this way, some of the same questions arise as when examining individual consumption, such as whether states have access to tools that would allow them to smooth their consumption in the face of a current income shortfall.<sup>7</sup> This concern in part motivates our examination of the separate expenditure categories.

A third hypothesis is that the objective of state governments is to maximize its own expenditure, and thus to “let no crisis go unexploited,” governments would view an economic downturn as a chance to enact permanent tax and expenditure increases that residents would otherwise resist. If this idea is correct, we would see that despite how current expenditures fluctuate during a temporary income reduction, government expenditure would grow relative to state income in periods immediately following an economic downturn.

A final hypothesis is that state governments segment the policy arena to focus on specific public good problems. This hypothesis would suggest, for example, that state governments design specific policies to respond to economic fluctuations, without necessarily altering other categories of expenditure.<sup>8</sup> The most natural of these policies is Unemployment Insurance (UI), which directly provides income insurance to residents who lose their jobs due to “inadequate demand.” Low income assistance expenditures (welfare), and potentially even capital goods spending, however, might also be categories that state governments could use to address fluctuations in economic activity. Especially after the reform in 1996, welfare expenditures could be viewed as a type of income insurance, as reciprocity is now designed to be temporary. As such, whether the time path relative to GSP shocks follows UI is in part a test of whether the savings component that exists due to the dedicated trust fund is potentially important. Capital goods expenditures are primarily financed out of long term debt, and so are not generally subject to the contemporaneous budget constraint that affects current expenditure. Thus capital spending could follow a very different path than current spending, combining both the lack of a contemporaneous budget constraint with the possibility that capital spending may be altered to make up shortfalls that the current budget constraint might inflict on current expenditure.

Our approach to examining the details of how state governments respond to economic fluctuations is to estimate panel vector autoregressions (VARs) for 1963–2006 for the 50 US states. This is a reduced form procedure that traces how state governments alter their budgets over time. We impose structure by using a Cholesky decomposition to construct the IRFs, which assumes that the shock to GSP is orthogonal to all other shocks. Thus our analysis illustrates the governmental budgetary response to changes in economic activity, which we present using impulse response functions (IRFs). The reduced form VARs are not making assumptions about causality, which precludes an explicit ability to separate the underlying tastes of state governments compared to the institutional constraints, and which precludes any judgment as to state policy effectiveness at altering incomes. What we do see, however, by our examination of the IRFs from separate categories, is whether the institutional differences affect the time series pattern of governmental responses.

Section 2 of the paper briefly presents the institutional framework of how state governments might respond to fluctuations in income. Section 3 presents the panel data of US states, and how the variable choice reflects the institutional constraints. Section 4 of the paper presents the IRFs that result from estimating VARs for two groups of variables, the expenditure set of variables and the revenue set of variables. In general, we find that state governments have been weak

<sup>7</sup> This argument has more force to the extent that the goods financed by state governments out of the general fund are not necessarily consumption, such as education, prisons, and roads, all of which could be called investment in some sense.

<sup>8</sup> This policy design would be consistent with the [Tinbergen \(1952\)](#) hypothesis that a separate policy needs to be designed to address each separate problem.

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