# The Effectiveness of Fiscal Policy as Stabilization Policy

Alan J. Auerbach
University of California, Berkeley

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## I. Introduction

Perspectives among economists on the usefulness of fiscal policy as a device for macroeconomic management have moved back and forth over the years. Belief in the active use of the tools of fiscal policy may have reached a relative peak sometime during the 1960s or early 1970s, and practice followed theory. In the United States, perhaps the best illustration of the evolution of theory and practice comes from the investment tax credit (ITC), which, when it was in effect, provided businesses with a strong incentive for equipment investment.

The ITC, first introduced during the Kennedy administration in 1962, at a rate of 7 percent, was adjusted frequently in response to changes in economic conditions. It was strengthened in 1964, the same year in which major income tax reductions were introduced, suspended in 1966 during a boom associated with the Vietnam War, reinstated in 1967, "permanently" repealed in 1969 during a period of inflationary pressure, reinstated again in 1971, just after the trough of the first recession since early 1961, and increased to a rate of 10 percent in 1974, toward the end of the next recession. Although not necessarily conceived originally as a tool for stabilization policy, the ITC clearly became one during this period. Yet, skepticism about the usefulness of such activism soon appeared.

In an early evaluation of the effectiveness of the credit, Gordon and Jorgenson (1976) concluded that the actual variations in the ITC just described had destabilized the economy. They argued that some of the policy changes were timed poorly, and that others were simply in the wrong direction. Using the large-scale Data Resources, Inc. (DRI) quarterly econometric model of the U.S. economy, a benchmark model at the time, they calculated an optimal historical path for the ITC, the path of switching the credit on and off that would have

minimized the fluctuations in the gap between actual and potential GDP. Under the unrealistic assumption of no policy lags, their optimal policy was superior not only to actual policy, but also to a constant-rate ITC policy. With policy lags, though, the performance of the optimal activist policy deteriorated, to the point that, with an assumed lag of 10 quarters, the optimal activist policy was no better, and under some assumptions worse, than a constant-rate policy. Thus, Gordon and Jorgenson concluded, a realistic policy environment made activist use of the ITC much less attractive.

Although policy lags were not a newly-identified problem in the 1970s, it was not until then that researchers had a period of activist fiscal policy practice sufficient to study. One might have come away from the analysis of Gordon and Jorgenson and others with the view that activist policy was more difficult that its designers had realized but not necessarily bad. But the intellectual assault on activist fiscal policy – indeed, in the specific form of the investment tax credit – soon took a much stronger turn, in celebrated papers by Lucas (1976) and Kydland and Prescott (1977).

Lucas argued that one couldn't use models like the DRI model to determine the optimal path of the ITC, because the model's parameters were not exogenous parameters of preferences and technology, and hence were dependent on the actual policy environment; a change in policy would induce a change in the model's parameters, and so one could not evaluate the performance of counterfactual policies. Kydland and Prescott emphasized the dynamic inconsistency of optimal government plans. The path for the ITC that would be optimal as of one date would no longer be optimal in the future; so, under the assumption of rational expectations, investors would not find the initial announcement credible. For example, one might wish to announce that the ITC would be eliminated in the future, to spur investment today, but once the future arrived, and today's investment had already taken place,

it might no longer be optimal to repeal the credit. Hence, in addition to the policy lags that made the implementation of policy difficult, one was confronted with two major additional obstacles: first, to figure out how to evaluate potential policies and, second, to recognize that agents react not to policies that are announced, but to policies that are expected.

To these three hurdles, policy lags, model instability, and dynamic inconsistency, the literature added several others. There was, of course, the problem that estimates of behavioral responses to fiscal policy were just that – estimates of parameters, not the parameters themselves. Even with a stable model, i.e., one based on exogenous taste and technology parameters, uncertainty about model parameters militated against activism, as shown by Brainard (1967).

Moreover, determining the "right" behavioral model is a difficult task, given that all models involve simplifying assumptions, and some models of household and firm decisions suggested that fiscal policy changes would be ineffective. For example, there has been a long debate in the investment literature about the importance of the user cost of capital as a determinant of investment, relating to such factors as the elasticity of substitution between capital and labor and the irreversibility and adjustment costs of investment. In another major policy area, the efficacy of tax cuts and increased transfer payments to households depends on household horizons. The long horizons of the life-cycle/permanent income hypothesis undercut the strength of immediate responses to such policies, and the infinite horizon envisioned under the Ricardian equivalence proposition (as exposited by Barro 1974) eliminate responses entirely, at least for simple policies.

Finally, a growing body of the economics literature questioned whether government should wish to counteract economic fluctuations, even if it were able to do so. Coalescing as the "real business cycle" approach to economic fluctuations, this view, as exposited in an

early piece by Kydland and Prescott (1982), suggested that fluctuations in preferences and technology could explain observed business-cycle fluctuations. An important implication of this conclusion was that observed economic fluctuations were optimal, reflecting the responses of markets to taste and technology shocks. Thus, any attempt by government to offset these fluctuations would be welfare-reducing. Simply put, if a temporary drop in production and rise in unemployment were voluntary, given exogenous economic events, then attempts to intervene would be inadvisable.

In an oft-cited quote in 1971, President Nixon, a participant in the ITC manipulation described above, is said to have observed that "We are all Keynesians now." From a perspective just a few years later, this statement, like the fiscal policy activism it embraced, would have seemed quite poorly timed, occurring just as the economics profession was turning toward rules and away from discretion, and placing more focus on the role of another traditional element of fiscal policy, automatic stabilizers, which are less subject to some of the critiques of activist fiscal initiatives.

Politicians perhaps never experienced the same loss of enthusiasm for activist fiscal policy that economists did. In the United States, the investment tax credit was repealed as part of the Tax Reform Act of 1986, and has not resurfaced. But a close relative with similar incentive and revenue effects, partial first-year investment expensing, was introduced in 2002 and expanded in 2003 as an explicitly temporary measure (and did, in fact, expire at the end of 2004) to spur equipment investment, which had fallen sharply in the years immediately before.

Perhaps politicians have not learned anything about the practice of fiscal policy since the 1970s; or perhaps economists have. The purpose of this paper is to review what we have learned, in theory and in practice, about the use of fiscal policy as an element of stabilization

policy, focusing on some of the criticisms given above and taking into account changes in the policy environment that have occurred since the 1970s, in particular, the fact that most developed countries currently find themselves on unsustainable fiscal trajectories as generous old-age transfer programs collide with rapidly aging populations.

## II. Policy Activism and Timing

A logical approach to considering what we've learned in recent decades would be to address each of the critiques of activist fiscal policy one by one. For example, how poorly timed have policy changes been? How credible have government announcements been? To what extent have responses to policy changes followed predictions? To what extent have policy changes been ineffectual? While each of these questions is well-posed, they are difficult to answer separately. Behavioral responses may vary from predictions because we are using the wrong parameters in our behavioral equations, but they may also vary because a policy is seen as less credible than the model assumes. What dates should we use to mark policy changes: when actual taxes or expenditures change, when a law is passed indicating that they will change, or perhaps when agents become convinced of the change? The very problems that give rise to some of the criticisms also make clean analysis difficult, a problem not always noted in the literature. For example, there have been a number of papers analyzing the properties of fiscal policy changes – their timing, magnitude, etc. – but with relatively little attention given to how the policy changes are defined.

The most common approach is to equate changes in fiscal policy with changes in an adjusted measure of the government budget surplus, or perhaps with the separate tax and spending components of the surplus, from one period – typically one quarter – to the next. The standard adjustment undertaken is for the state of the economy, either through the formal

calculation of a full-employment surplus or through a regression on output to control for the level of aggregate economic activity. The intuition is that, but for a change in policy, the adjusted surplus would be constant, say, as a share of GDP. This approach isn't adequate to deal with structural policy changes that might change composition of taxes or expenditures but not their level, but this shortcoming is evident in the aggregate nature of the variables. Perhaps more subtle a problem is that a change in taxes or spending, even adjusted for the state of the economy, doesn't necessarily indicate a change in policy. First, these measures may change for reasons unrelated to policy. Second, they may change in relation to policy, but the policy change needn't be contemporaneous.

The behavior of fiscal aggregates in the United States around September 11, 2001 provides a good case study to illustrate these points. As we now know, the economy had gone into recession several months prior to September 11, and the weakening economy contributed to the declining budget surplus. As Figure 1 shows, the full-employment surplus was relatively stable through the second quarter of 2001, while the unadjusted surplus was declining. However, the sharp drop in the surplus during the third quarter of 2001 is only slightly weakened by the full-employment adjustment, suggesting that a major expansionary policy change occurred during this quarter, either just before or just after September 11.

But what was this "policy" change? Was there are rapid response to the unexpected events of September 11, which occurred near the quarter's end? There were few changes in spending programs during the period, but there were two factors, other than the economic slowdown, contributing to a decline in revenues. One was the phase-in of the Economic Growth and Tax Relief Reconciliation Act (EGTRRA), enacted in spring, 2001. The other was the sharp decline in revenues attributable neither to legislation nor to the economic slowdown, and hence categorized by Congressional Budget Office (CBO) as "technical"

changes. Due to such causes as the decline in the stock market and the resulting drop in taxes on capital gains and compensation options, CBO (2002) revised downward its annual revenue forecasts by about $50 billion from those reported during the summer of 2001.

Thus, the large apparent change in discretionary policy that occurred during the third quarter of 2001 derives largely from two sources; one was a policy change adopted earlier in the year, another was not a policy change at all. Clearly, the second source should not be counted as a change in policy; a collapse in the stock market is not an expansionary fiscal policy! As to the first, some of the effects of policy might have been delayed until tax payments actually were reduced, but we would typically not expect all responses to have been delayed; moreover, if we are considering the timing of policy *decisions*, we would like to know when these decisions occurred.

It is difficult to know how typical this case is. Major, unannounced policy changes may still dominate the series being considered, but one should consider the resulting analysis with some caution. With this caveat in mind, we note what the literature has found regarding the responsiveness of policy to the state of the economy, at a quarterly frequency.

For the United States, I found, in Auerbach (2002, 2003), that the full-employment surplus falls in response to the previous quarter's output gap, suggesting a rapid response to economic conditions, and – assuming that cuts in the surplus are expansionary – one that moves in the right direction, at least concerning short-run stabilization (i.e., without taking into account how current policy changes might affect future expectations and behavior). Thus, the view that discretionary policy is so poorly timed that it cannot be an effective tool for stabilization is not supported. As to the degree of policy activism, this actually appears to have increased over the years, with the period since the mid-1980s showing more than twice the responsiveness of the full period since the 1950s, and the period since the first year of the

Clinton Administration, 1993, showing a responsiveness again more than double that of the period since the mid-1980s (Auerbach 2003, Table 1). These changes appear to go against the trend in economic thinking away from activist policy, and are all the more remarkable in the United States, given the introduction beginning in the 1970s of various budget rules viewed as making revenue and spending changes more difficult.

Moreover, this general pattern does not appear unique to the United States, as Galí and Perotti (2003) have found a similar recent increase in cyclical responsiveness in the European Union, *following* the adoption of the Growth and Stability Pact imposing restrictions on deficit-oriented fiscal policies. One can conclude, it appears, that policy changes *can* be countercyclical, and that they *have* become more so, in spite of professional skepticism and the apparent constraints of budget rules.

To address the two caveats mentioned above with respect to using changes in the full-employment surplus as a measure of fiscal policy changes, in Auerbach (2002, 2003) I construct an alternative measure, based on explicit policy changes as reported over the years by the Congressional Budget Office. As explained in more detail in these earlier papers, the resulting semi-annual measure excludes changes in the surplus not attributable to policy changes (such as declines in revenues due to the stock market drop of 2001), and its dating convention is based on the timing of legislation, recording changes immediately upon announcement, rather than when the revenue or spending changes occur. This measure, it must be admitted, suffers from other problems of interpretation, for example that it treats announced future policy as certain to occur, even when this is not viewed as likely.[1] But it

[1] A case in point is the recent use of "sunset" provisions to side-step budget restrictions. Sunset provisions call for policy changes – such as the large Bush tax cuts of 2001 – to apply only for a certain number of years, even when the stated policy objective is that they be permanent.

provides an alternative to the full-employment surplus that allows us to check conclusions regarding the cyclical responsiveness of discretionary policy.[2]

Indeed, unlike the measure based on full-employment surplus, this measure does not show increased responsiveness during the 1990s[3] (it is not available before the mid-1980s), although this difference could also be due to the difference in frequency of the two measures (semi-annual vs. quarterly). Nevertheless, the alternative measure of discretionary fiscal policy, like the full-employment surplus, exhibits significant responsiveness to the output gap, with both expenditures and revenues moving in the right direction, appearing to confirm the previous finding that recent discretionary fiscal policy in the United States, in the aggregate, has at least pointed in the countercyclical direction.

Thus far, I have considered changes in fiscal policy as measured by expenditures, tax revenues, and the budget surplus, but one wouldn't expect all current changes in tax revenues to have the same effect on output. Perhaps the most important illustration of these differences in tax policy effects concerns investment. How should we measure the policy changes affecting investment incentives? The challenge of doing so once again brings together different strands of the critique of activist fiscal policy. The effects of policy changes depend not only on the timing of policy actions, but also on what these actions portend regarding future policy actions.

To begin, consider the standard Hall-Jorgenson user of cost of capital, which provides a measure of the required gross, before-tax return to capital and hence a measure of the

[2] Asako et al. (1991) adopt a related approach to analyze Japanese fiscal policy, examining the responses of planned deficits, based on budget plans, rather than actual, ex post deficits. They find that Japan practiced countercyclical fiscal policy during the period 1976-89.

[3] See Auerbach (2003), Table 3.

incentive to use capital in production, under the assumption of instantaneous adjustment. For a constant tax system, the user cost is:

$$c = \frac{q}{p}\left(\rho + \delta - \frac{\Delta q}{q}\right)\frac{1 - k - \tau z}{1 - \tau} \tag{1}$$

where $p$ is the price of output, $q$ is the price of new capital goods, $\rho$ is the nominal discount rate, $\delta$ is the exponential rate at which capital actually depreciates, $k$ is the investment tax credit, $\tau$ is the corporate tax rate, and $z$ is the present value of depreciation allowances per dollar of capital purchased. If one modifies the assumptions to incorporate changes in tax policy, the user cost of capital becomes (see Auerbach 1983):

$$c = \frac{q}{p}\left(\rho + \delta - \frac{\Delta q}{q}\right)\frac{1 - \Gamma}{1 - \tau} + \frac{q}{p}\frac{\Delta \Gamma}{1 - \tau} \tag{2}$$

where $\Gamma$ equals the sum of the investment tax credit and the present value of tax savings from depreciation deductions. The presence of the additional term on the right-hand side of (2) means that there is now a second way in which tax policy may affect investment. Indeed, a change such as the expected elimination of an investment tax credit has a powerful effect on the user cost as computed from expression (2), for it induces a huge capital gain at the time of the credit's elimination. But expression (2) applies only under the assumption of instantaneous capital stock adjustment. As shown in Auerbach (1989), optimal investment behavior in the presence of convex adjustment costs, which gives rise to Tobin's $q$ theory of investment, may also be characterized by a partial adjustment investment process in which the

desired capital stock at date $t$ varies inversely with the weighted average of the current and expected future user costs of capital based on expression (2):

$$(3) \qquad c_t^* = E_t \sum_{s \geq t} w_{s-t} c_s$$

where the weights, $w_i$, sum to unity and decline exponentially, at a rate that is inversely related to the size of adjustment costs; the more sluggish the investment response, the more the future matters.

In Auerbach (2003), I used this framework to measure the determinants of U.S. tax policy aimed at influencing investment. I constructed time series for tax-related changes in the user cost of capital for equipment investment under two extreme assumptions about expected tax law changes, either that investors are myopic and expect the tax law to be constant in the future (expression 1) or that investors have perfect foresight with respect to changes (expressions 2 and 3). I then estimated ordered probit models (the three states being a substantial reduction in the user cost, no substantial change in the user cost, and a substantial increase in the user cost.) The results for the myopic user cost indicate that investment incentives have been responsive to the GDP gap, as well as to the lagged change in investment, with the correct signs for policy to be countercyclical. But this does not necessarily imply that the *incentive* to invest behaves this way, because forward-looking investors should also be concerned with future values of the user cost, and with possible changes in tax rules.

In the extreme, if investors had perfect foresight historically, then the forward-looking user costs discussed above would characterize the incentive to invest. An ordered probit model for changes in *this* user cost yields quite different results than those just

discussed, with none of the coefficients significant. This suggests that policy actions may not have influenced the incentive to invest in a countercyclical manner, even if the changes were timed to be countercyclical. But without knowing what investors expected, and how their expectations were affected by policy changes, we can't say more.

To summarize the results in this section, government policy actions appear capable of responding in a countercyclical manner to fluctuations in output and its components. There are fundamental ambiguities, however, in the identification of policy actions and their timing, because actions can take many forms (e.g., announcements, legislation, inferences based on previous actions), and can vary in strength and even direction according to what they imply about future behavior.

## III. The Strength of Behavioral Responses

The previous section dealt with what might be viewed as a necessary condition for activist stabilization policy – that lags and other constraints on effecting policy do not prevent policy actions from being taken in a countercyclical manner. The evidence suggests that the answer is a qualified "yes." But what can policy, even well-timed policy, accomplish? There are both positive and normative aspects to this question. From the positive perspective, how large an impact can fiscal polices have on output and its composition? From the normative perspective, to what extent does this type of intervention, even if it succeeds in altering the course and composition of output, improve welfare?

These two questions are related, in that different models of the economy imply both different responses and different welfare effects of intervention. For example, a model with sticky prices may imply larger multiplier effects for demand-stimulus policies than a model with flexible prices, and also larger welfare gains from such policies. But policy can have

effects even in models that interpret output fluctuations as efficient. For example, if technology shocks induce intertemporal variations in employment, variations in income tax rates may alter the time path of employment, even though this alteration would be welfare-reducing. On the other hand, policy may be relatively ineffective even when deviations from full employment are not efficient. For example, even with sticky prices, households with long horizons may exhibit a very small consumption response to a temporary tax cut.

When we consider the effects of fiscal policies on private behavior, then, we are really seeking to answer two questions in the affirmative. First, do policy changes have a sizable impact on private and ultimately aggregate activity? Second, if these effects are present, are they welfare improving? Empirically, it is not always easy to answer the first question; it is typically much harder to answer the second. But we should try to keep both questions in mind.

Perhaps the most studied behavioral response is that of private consumption to changes in household taxes or transfer payments. Through a variety of strategies, it is possible to separate the effects of announcement from those of actual receipt, to measure how the strength of response varies by household type and by the size and permanence of the policy change. We would expect, of course, that rational households not facing liquidity constraints would respond immediately upon credible announcement, but that the response would be small relative to the policy change unless the change were perceived to be permanent.

For the United States, there is fairly strong evidence that households respond to contemporaneous changes in tax payments far more than the theory of rational, unconstrained households predicts. The evidence ranges from findings from simple time-series equations showing a strong response to current disposable income, purged of the income's information

content (Campbell and Mankiw 1989) to studies of responses to predictable changes in social security taxes and tax refunds (Parker 1999 and Souleles 1999, respectively). Indeed, some of these estimated responses are extremely high. For example, Souleles (2002) estimates a consumption response as high as 90 percent in response to the phased-in Reagan tax cuts of the early 1980s. Evaluating responses based on the timing of the tax rebates sent to U.S. taxpayers pursuant to the Bush tax cuts in 2001, Johnson *et al.* (2004) estimate that households spent about two-thirds of their rebates on consumption of nondurable goods and services. Note that, in all of these papers, the responses are to predictable changes in disposable income, for which the theory of rational, unconstrained households would predict no response at all.

Some of this response appears due to liquidity constraints, as households with lower wealth exhibit a larger response (Zeldes 1989, Johnson *et al.* 2004). Some of the response may also be due to the costliness of information acquisition. While optimal consumption smoothing would eliminate the dependence of consumption on predictable fluctuations in receipts, the household's welfare loss from not smoothing may be very small if these income fluctuations are small. Hence, even a small cost of acquiring information might make it rational for the household simply to wait for the receipts to arrive before setting its consumption level. This hypothesis is consistent with the finding (Hsieh 2003) that Alaskans respond less to their rebates from oil revenues than to their federal tax refunds, the latter being much smaller in magnitude than the former. It is also consistent with the finding for Japan, by Watanabe *et al.* (2001), who estimated that, even though taxpayers responded differently to temporary and permanent tax changes – inconsistent with liquidity constraints or myopia – most of the consumption response occurred upon implementation of the tax changes, not at the time of policy announcements.

Thus, although there appears to be considerable "excess sensitivity" to short-term fluctuations in disposable income, it is difficult to know how much of this is invariant to the policy experiment. Responses might be smaller to larger changes, in which case they might also be more sensitive to the tax change's durability. At least some of the excess sensitivity does appear due to liquidity constraints, an important consideration should potential fiscal changes have very different distributional impacts than those on which historical analyses have been based.

The paper by Watanabe *et al.* also relates to the issue of expectations, in finding that policy changes that, based on announcements, may be classified as permanent, have a larger impact on consumption than those that may be classified as temporary. This suggests that, for the period studied, the policy announcements were credible. But, would this be the case if Japan, in its current fiscal condition of rapidly accumulating national debt, announced a large, permanent tax cut? The applicability of historical estimates depends not only on the shape of polices adopted, but also on the circumstances of their adoption, a point discussed further below. Still, the evidence that consumption responds to tax policy is quite convincing.

The other major private activity that fiscal policy might influence is investment behavior, especially business fixed investment. Given the volatility of fixed investment, influencing it has been a major consideration in past discussions of stabilization policy. As noted in the introduction above, the power to influence investment is not necessarily the power to stabilize it. But to what extent can fiscal policy influence investment?

This has turned out to be a more difficult question to answer than the impact of fiscal policy on consumption, because, unlike most consumption, investment involves durable goods and, also unlike consumption, investment is typically subject to an array of complex tax provisions, the effects of which are more difficult to quantify and depend heavily on

expectations. The neoclassical investment literature pioneered by Jorgenson (1963), and utilized in the Gordon-Jorgenson paper discussed above, used lagged values of the constant-policy user cost of capital to explain investment; it has given way to specifications that account for the relevance of future policy for current investment decisions. But estimation of such models has left uncertain the extent to which tax policy affects investment decisions.

Traditional estimates of forward-looking models based on Tobin's $q$ (e.g., Summers 1981) traditionally find very high implied costs of adjustment and hence a very sluggish implied response to policy changes. Although some time series estimates (e.g., Auerbach and Hassett 1992) have found significant effects of expected tax policy and the projected user cost of capital, generally small user cost effects in the literature have been attributed to supply constraints (i.e., external adjustment costs), taking the form of increased supply prices for capital goods (Goolsbee 1998). Thus, the power of tax incentives to stabilize investment has been challenged. Further, evidence (e.g., Fazzari *et al.* 1988) suggests that, like households, many firms are liquidity constrained, so that variations in cash flow, rather than traditional investment incentives, might have more impact on investment behavior.

On the other hand, some research (e.g., Cummins *et al.* 1999) has attributed both the importance of cash flow and the apparently high costs of adjustment to measurement error. Further, cross-section patterns of investment around major tax reforms – when, as discussed shortly, measurement error should be relatively less important – suggest quite sizable behavioral responses (Auerbach and Hassett 1991, Cummins *et al.* 1994), although it is also possible that the cross-section variation exhibits greater sensitivity because supply constraints are less relevant for shifts among different types of investment than for variations in the aggregate level of investment.

A key potential source of measurement error, at least in specifications in which tax parameters enter equations explicitly, is the tax parameters themselves. What should affect investment are the policies that investors expect to apply, and variations in expected tax policy are difficult to measure, except perhaps just after major policy changes, when the signal-noise ratio should be very high. Thus, the Tax Reform Act of 1986 should have had a major impact on investor expectations, but smaller, year-to-year changes in expected policy are much more difficult to measure.

We may conclude that business fixed investment does appear responsive to changes in tax policy, although the strength and speed of this response, as well as the relative importance of user-cost effects and cash-flow effects, is still subject to debate. It is also unclear how important a role is played by expectations of future policy actions, as changes in these expectations are extremely difficult to measure. Although methods have changed and evidence has accumulated over the past three decades, the conclusions of Gordon and Jorgenson, that we can affect investment but should not necessarily attempt to do so for purposes of stabilization, still seem to apply.

## IV. Putting Things Together

The preceding two sections have dealt with building blocks, necessary conditions for fiscal policy to play an effective role as an element of stabilization policy. I have argued that policy lags and other restrictions on policy actions have not precluded policy responsiveness, and that the reactions to fiscal policy of private agents, through consumption and investment responses, are evident enough that one can imagine changes in fiscal policies having a significant impact on economic activity.

But it remains to be determined how effective and powerful fiscal policy can be as a stabilization device, because the reactions of consumption or investment do not equate to overall changes in economic activity. There are potential multiplier effects associated with the initial private-sector responses, effects that might be positive or negative and are likely to be subject to additional lags. Accounting for this added layer of activity makes it even less clear how a particular policy change aimed at influencing a particular component of output at a particular time will affect the path of aggregate economic activity.

Tracing through the effects of policy changes requires a dynamic model of the economy that incorporates the interdependence of different sectors. This is necessary not only for the induced private sector consumption and investment responses that I have focused on thus far, but also on direct changes in government purchases, changes that, unlike adjustments in taxes or transfer payments, have an immediate and direct impact on aggregate activity as measured by GDP.

As a reaction to the difficulty of developing large-scale structural macroeconomic models, researchers have come to rely much more in evaluating the effects of policy on parsimonious models with less structure imposed, exemplified by the vector autoregression (VAR), in which a handful of variables are related to lagged values of the same variables, including both policy variables, say **F**, and other variables of interest (output, interest rates, etc.), **Z**:

$$\mathbf{X}_t = \mathbf{G}(\mathbf{X}_{t-1}) + \boldsymbol{\varepsilon}_t , \tag{4}$$

where $\mathbf{X} = [\mathbf{Z}, \mathbf{F}]$ and $\boldsymbol{\varepsilon}_t$ is the vector of shocks to **X** at date *t*. Using expression (4), we can trace out the impact of a shock at date *t* to an element of the policy vector, **F**, on future values of **Z**, taking into account induced changes in future values of the policy vector as well.

In exchange for its simplicity and lack of structural restrictions, the VAR imposes strong limitations on our ability to draw inferences about certain types of policies. Perhaps most importantly, it does not allow us to assess the effects of automatic stabilizers or predictable policy rules. That is, one can think of fiscal policy as having three components: (1) automatic stabilizers, which are components of the fiscal system that react to output and other macroeconomic variables without explicit policy actions; (2) discretionary policy *rules*, reflecting how fiscal policy responds to changes in the economic environment; these would be characterized by the types of equations discussed above in Section II; and (3) changes in policy that are not dependent on observable economic conditions, i.e., unpredictable policy shifts. The effects of the first two of these components of fiscal policy are embedded in the VAR coefficients, but cannot be separately identified.

For example, the dependence of output on lagged values of output will reflect not only inertia in the underlying economy, but also the extent to which fiscal policy reacts to and mitigates output disturbances. The dependence of output on lagged values of policy variables will depend on the process that generated these variables, for this will have affected the information provided historically by policy innovations. Thus, one *cannot* use the VAR methodology to address questions regarding the effects of automatic stabilizers or discretionary policy rules on output levels or output stability. Attempting to do so, simply by assuming a different historical path of policy variables but holding fixed the VAR's coefficients, is not a valid exercise, because the coefficients would be different in the different policy environment. This VAR coefficient instability is simply an illustration of the Lucas critique.

Thus, what we can learn from the VAR methodology is how the third component of fiscal policy – policy "shocks" – affects the economy. But even this restricted investigation

requires more structure of the VAR, to permit identification of the fiscal shocks in the disturbance vector, $\boldsymbol{\varepsilon}$. When we observe contemporaneous, correlated shocks to various elements of the policy vector **F** and the vector of aggregate variables **Z**, how can we identify the underlying sources of these shocks? Did a shock to fiscal policy occur that also affected contemporaneous output, did a shock to output start the process, or did some common shock hit both? Sorting this out requires that we impose *some* structure, and this has given rise to a generation of VAR models referred to as "structural" VARs, or SVARs.

Two particular approaches to identification are noteworthy. One, as developed by Ramey and Shapiro (1998), is to assume that certain large policy changes in response to external events, notably military build-ups, are both unanticipated and exogenous with respect to concurrent output. Thus, for these observations, shocks to government purchases are treated as policy shocks, and their subsequent impact on the economy can be traced out. A second method, proposed and implemented by Blanchard and Perotti (2002), is to assume that discretionary policy does not react to contemporaneous news about output, and to use auxiliary information about the automatic response of policy to output to identify policy shocks, the effects of which can then be traced out.

Based on evidence from three postwar defense build-ups, Ramey and Shapiro (1998, Figure 6A) estimated significant short-run effects on GDP of increased military spending, but with the largest effects occurring several quarters out – not what one would be looking for in a potential stabilization policy, given that postwar U.S. recessions have lasted less than a year, on average. Blanchard and Perotti (2002), on the other hand, found in one specification that the response of GDP to government spending shocks peaked after one quarter, with a multiplier of just under 1.0 (Table IV). But, for another specification, they found a much longer lag in the response of GDP to a government spending shock, with the difference

apparently due, at least in part, to the estimated persistence of the spending shock in latter specification.

This ambiguity highlights a problem in applying the results of the VAR to policy design – the results depend very much on how policy was practiced during the period of estimation. We can estimate the effects of policy shocks, given their average permanence during the estimation period. But these effects will not apply to new shocks, should they have a different time profile; nor, as already discussed, will they apply to predictable policy changes, i.e. to changes in policy rules or in automatic stabilizers. A similar ambiguity arises in the Blanchard-Perotti findings regarding the impact of tax shocks (their Table III), which had a strong negative multiplier, around -0.7, after one quarter, but with a peak impact occurring at different dates for different specifications. Again, also, these results tell us only the effects of the typical sample-period policy. We cannot use them to predict the impacts of policies of different durations. On the other hand, these tax multipliers seem reasonable, given the large estimated consumption responses discussed in Section III, and the rapid estimated responses of GDP to both spending and tax shocks indicate that policy can exert powerful short-run effects, thus discrediting two of the criticisms of activist policy, that it cannot influence the economy significantly or, if it can, that it cannot do so quickly enough. It is far less clear, though, whether these effects are likely to be stabilizing.

What, then, can be said about the success of fiscal policy as stabilization policy? Recall, again, that working within the SVAR context severely limits our capacity to engage in counterfactual exercises. We can estimate the multipliers only of policy shocks, not of discretionary policy rules or automatic stabilizers, and even the multipliers of the shocks depend on the actual pattern of the shocks. Thus, without imposing more structure on the

model, we cannot even ask how a different pattern of shocks, say a different variance of the shocks, would affect the variance of output, or some other measure of economic stability.

Perhaps the closest we can come to such analysis is the use of cross-country relationships between the activism of policy shocks and the stability of output. If we can successfully control for other factors that might influence the stability of output, the relationship between output variance and the variance of SVAR fiscal policy shocks will tell us whether more active policy (defined in terms of the variance of the policy shocks) has been successful at output stabilization. Such an exercise, by Fatás and Mihov (2003), has given us a quite negative answer. Studying a sample of 91 countries, they found that a greater variance of government spending contributed to a greater variance of output, holding constant other factors that might be expected to influence the variance of output (such as the size of government and GDP per capita). The same paper reported that this induced output volatility also reduced economic growth, suggesting yet another negative consequence of activist fiscal policy.

As with any cross-country analysis, care must be exercised in interpreting these results. Consider Figure 2, taken from Fatás and Mihov (2003), and documenting quite clearly the positive relationship between the variance of government spending shocks and the variance of output. Clustered at one end of the fitted line is a group of advanced countries exhibiting low volatility in both dimensions: Australia, Austria, Belgium, Great Britain, Canada, Denmark, France, Germany, Italy, the Netherlands, Norway, Sweden, Switzerland, and the United States. Clustered at the other end – with high volatility of output and government spending – are far less developed countries such as Malawi, the Democratic Republic of Congo, and Nicaragua.

Recognizing the pitfalls of inferences drawn from such a heterogeneous sample, Fatás and Mihov redo their results for subsets of countries. While they still find a negative relationship between volatility and growth in samples limited to rich or OECD countries, the relationship is weaker and no longer significant. These results, then, are more suggestive than they are conclusive, but the suggestion certainly isn't one that favors policy activism in the form of unpredictable shocks to government spending. It should be stressed once again, though, that this exercise applies only to unpredictable fluctuations in government spending; it has nothing to say regarding the effects of tax policy or of fiscal policy that is more responsive to lagged economic conditions, whether taking the form of discretionary policy rules or automatic stabilizers. It could well be that policy shocks, precisely because they are unpredictable, are less likely to represent sensible policy actions, and therefore that such policy "innovations" are counterproductive even if more predictable policy changes are not.

## V. More on Automatic Stabilizers

In reaction to the belief that discretionary policy is a difficult tool to use for stabilizing output, many researchers in recent years have focused on the potential benefits of automatic stabilizers, the components of the tax and transfer systems that have built-in responses to output and employment fluctuations. For example, Romer and Romer (1994) suggested that, for the United States, automatic stabilizers have played a more important role than discretionary policy in the stabilization of output.

In addition to their potential to respond more quickly and predictably to output fluctuations, some automatic stabilizers typically possess another advantage over other types of discretionary policy, in being targeted toward individuals with a high behavioral response. In the United States, for example, the main automatic stabilizer on the expenditure side is

unemployment compensation, outlays for which increase automatically with increases in unemployment. As the unemployed appear to have a high propensity to consume these increments to disposable income (Gruber, 1997), such expenditures may be particularly effective at cushioning output fluctuations.

But the most significant automatic stabilizers are typically provided through the tax system, as the result of marginal tax rates on income, sales, and other indicators of aggregate economic activity, and marginal tax rates have other, first-order effects on economic activity. In recent years, there has been a growing attention to the potential efficiency costs of high marginal tax rates (e.g., Feldstein 1995). While the significance of such distortions remains subject to debate, tax policy in many countries has moved toward lower marginal tax rates, a process that has weakened the strength of automatic stabilizers (Kniesner and Ziliak 2002).

To the extent that the most significant consumption responses to disposable income occur at the low end of the income distribution, though, reductions in top marginal tax rates may be less important than changes in provisions that affect lower income individuals. As some of these provisions, such as the Earned Income Tax Credit (EITC; a work-subsidy that is phased out as income rises), may be consistent both with efficient tax design (Saez 2002) and the enhancement of automatic stabilizers (Kniesner and Ziliak 2002), it may be possible to structure the fiscal system to satisfy both objectives. But the automatic stabilizers in such a system are likely to rely more on components such as unemployment compensation and the EITC than on the high marginal tax rates we have traditionally associated with automatic stabilization.

## VI. Maneuvering Within the Fiscal Straitjacket

Many countries currently face long-run fiscal imbalances that are very large relative to the sizes of their respective economies. There are various ways of expressing these imbalances, either in present value, as "fiscal gaps" – the required permanent increase in the primary surplus as a share of GDP[4], or as generational imbalances (e.g., Auerbach *et al.* 1999), but however they are measured, these imbalances imply that the need for massive fiscal adjustments is prevalent around the world, particularly among advanced countries with generous old-age transfers systems and aging populations, but also among countries like Korea, for which these issues have recently received attention (Auerbach and Chun 2005).

As discussed above, restrictions like the European Union's Stability and Growth Pact, which focuses on explicit liabilities and current deficits, do not appear to have dampened countries' ability to engage in discretionary countercyclical policy. But, as also discussed, the credibility of commitments to long-term tax cuts is suspect when governments face significant fiscal balances, and this can undercut the effectiveness of these policies, even if they can be implemented initially. Moreover, the severity of the long-term "demographic time bombs" dwarfs currently measured official government deficits.[5] As governments and private citizens begin to face the infeasibility of current fiscal trajectories, the ability to implement credible tax cuts in recession may be compromised even further. In these circumstances, what can governments seeking to use fiscal policy as a stabilization tool to do? This is a question that has particularly haunted Japan in recent years, as it struggled to find a way out of its prolonged economic doldrums in the face of rapidly accumulating deficits. Korea, too, has

[4] Auerbach *et al*. (2004) present recent estimates of these two measures for the United States.

[5] Auerbach (2002, 2003), for example, shows that the accruing liabilities of the U.S. Social Security system have, in recent years, been much larger than the official U.S. budget deficits that have been criticized as being fiscally irresponsible.

recently faced the question of how to introduce an effective fiscal stimulus under budget pressure.

The trick here, it would seem, is to pursue policies for which the inability to sustain tax cuts works in favor of the policies being pursued, rather than against them. Whereas the greatest attention regarding spurring private demand has been on the wealth and liquidity effects of tax cuts or increased transfer payments, current demand can be encouraged through the use of intertemporal substitution effects as well. For example, a temporary reduction in consumption taxes would have weaker wealth effects than a permanent reduction, but would also encourage current consumption through the impact on the relative prices of current and future consumption. The impact would be much stronger, of course, on the demand for durable goods, just as temporary investment incentives would generally be expected to have a larger impact on the demand for capital goods than permanent investment incentives.

The recent U.S experience with temporary investment incentives fits in well in this context. Unlike other recent U.S. tax cuts, which were much larger in magnitude, the bonus depreciation provision for business fixed investment, introduced in 2002, was intended as a stabilization measure, was explicitly temporary when introduced, and indeed was allowed to expire at the end of 2004. Thanks in part to the other tax cuts, the bonus depreciation provisions took effect during a period of strong and increasing budget pressure. Not only did these investment incentives appear to have had a significant impact on purchases of qualifying equipment, but the pattern of the increased investment, strongest among the most durable qualifying assets, is consistent with the temporary nature of the tax benefit being credible (House and Shapiro 2005).

In summary, increasing budget pressure is likely to be present in the coming years, as governments contemplate the use of fiscal policy as an as element of stabilization policy.

While this pressure will weaken the ability to use certain types of policies, it may actually enhance the strength and credibility of others. Thus, fiscal imbalances, alone, do not push fiscal stabilization policy out of the picture. But they may alter its direction, toward attempts to alter the timing of durable goods purchases, an activity that, since the days of the investment tax credit, has been viewed with skepticism.

## VII. Conclusions

Is fiscal policy an effective tool for economic stabilization? Recent research suggests a number of conclusions.

(1) Fiscal policy can be active and responsive to economic conditions; policy lags do not appear to preclude the use of discretionary policy for the purpose of stabilization.

(2) Governments have not lost their taste for using fiscal policy aimed at short-term objectives, even when facing budget restrictions that might be expected to make such intervention more difficult.

(3) Behavioral responses to fiscal policy do not leave fiscal policy impotent. The direct effects of fiscal policy on consumption, investment and government spending, as well as the overall effects on output, suggest that fiscal policy can have a large, rapid impact on economic activity.

(4) It is very difficult to judge whether fiscal policy *has* been successful at economic stabilization. Cross-country evidence suggests that activist policy has been counterproductive, but this evidence applies only to a part of fiscal activity, and, as is typical in cross-country analysis, relies heavily on strong identifying restrictions.

(5) The role of automatic stabilizers may be important, but high marginal tax rates that may enhance automatic stabilization come at the cost of longer-run economic distortions. In the

future, the focus for automatic stabilizers may turn to taxes and transfers that affect individuals lower in the income distribution, where demand effects may be larger and where economic distortions may not be as serious.

(6) Increasing budget pressures may weaken the effectiveness of tax cuts and other fiscal policies that depend on expectations of policy durability. But tax cuts that work through the mechanism of intertemporal substitution may be enhanced by the same forces. The latter types of policies, though, are most closely associated with purchases of durable goods, where there may be a greater danger of exacerbating rather than moderating economic fluctuations.

Thus, fiscal policy has the potential to be used for economic stabilization, and likely will be formulated in part with this purpose in mind, although the instruments of discretionary and automatic fiscal stabilization policy may be different than in the past. But whether such policies will succeed, and indeed whether they should be attempted with such frequency as they have in the past, remain open questions, based on the state of theory and evidence.

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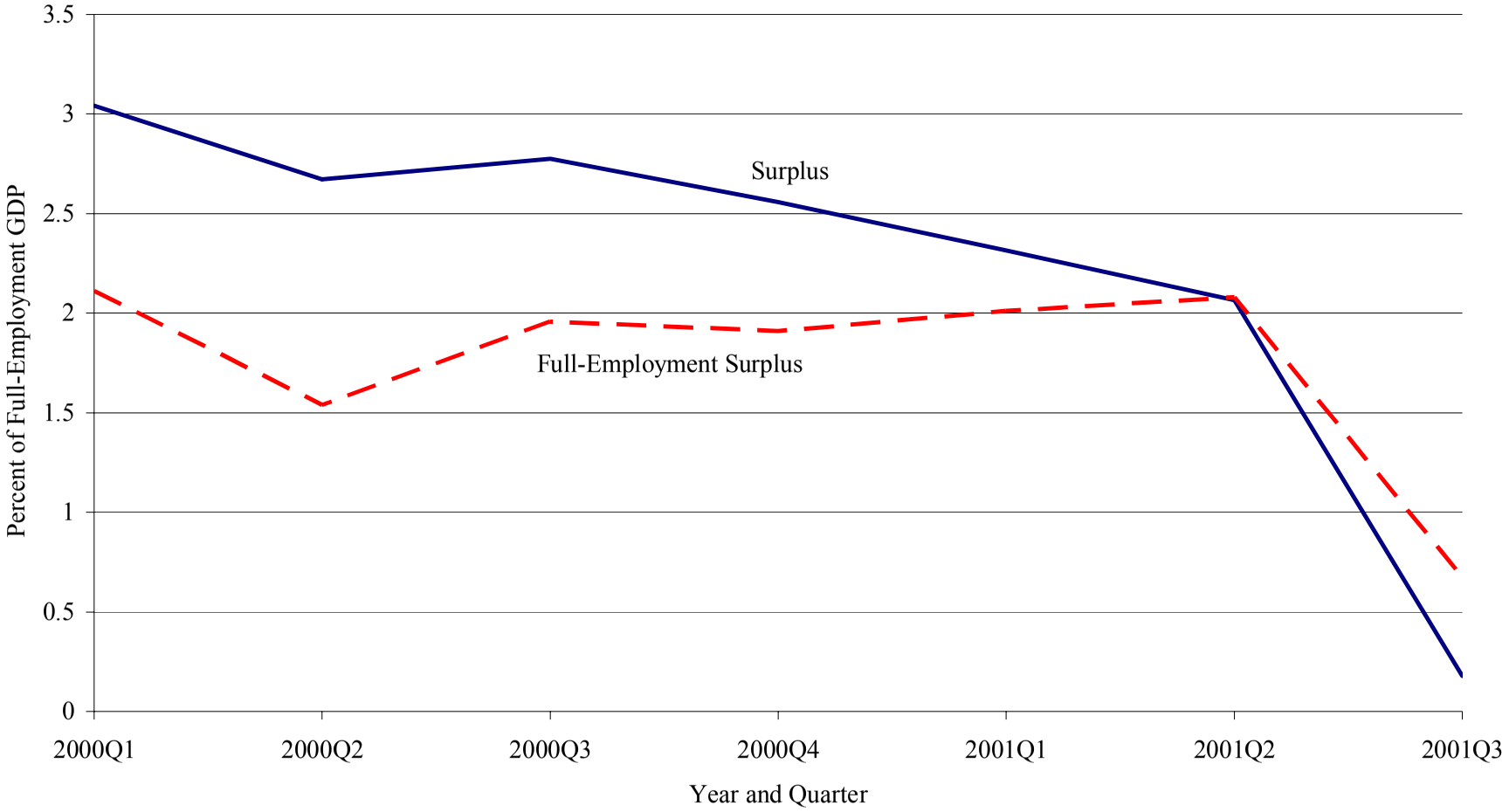
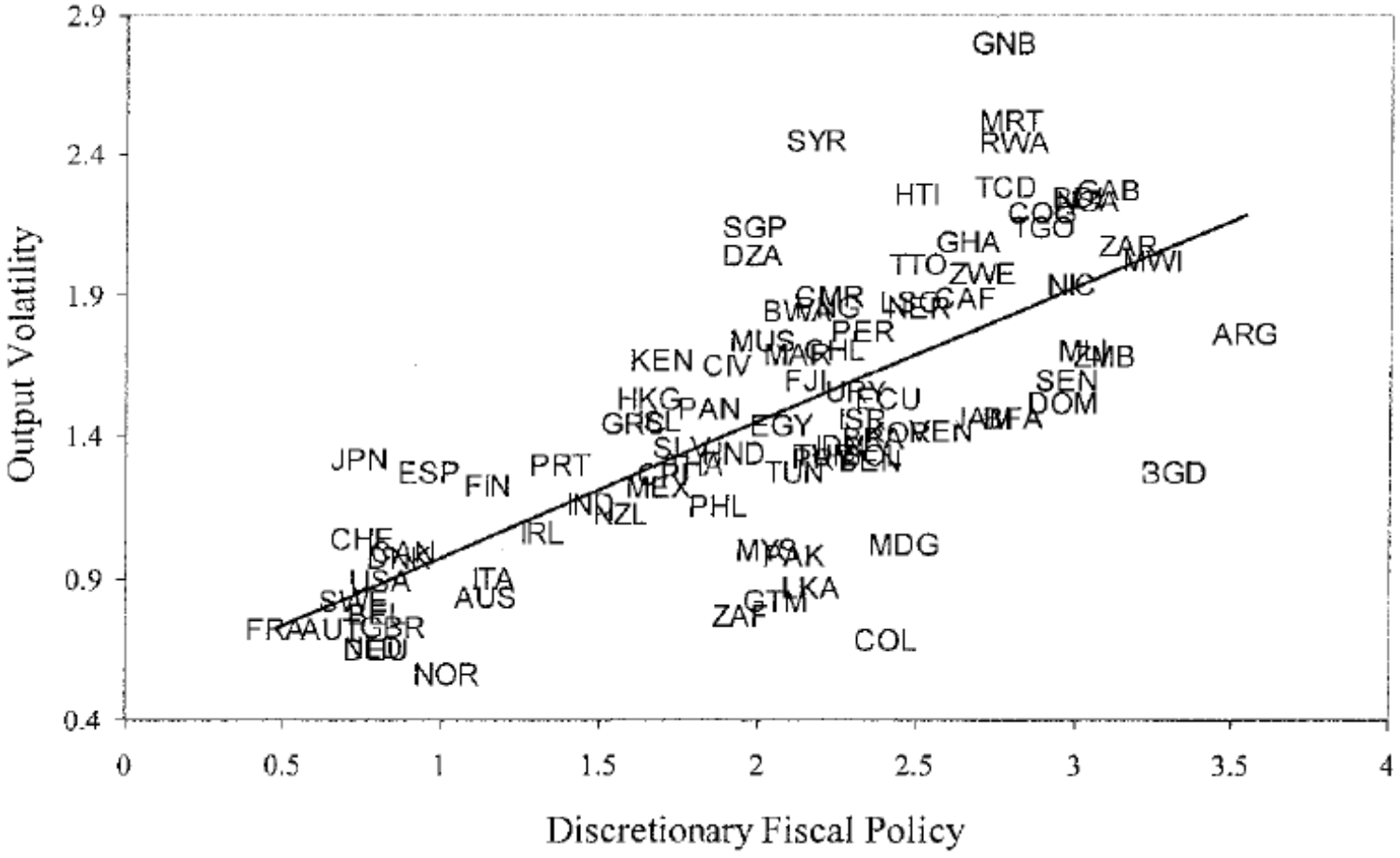
**Figure 1. The U.S. Federal Budget Surplus around September 11, 2001**




Source: Congressional Budget Office

**Figure 2. Policy Variability and Output Variability**




Source: Fátas and Mihov (2003), Figure I