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A Neoclassical Perspective on Budget Deficits

B. Douglas Bernheim

In the 1988 presidential campaign, virtually every serious candidate spoke of the urgent need to trim government budget deficits. Public opinion polls have identified federal deficits as a key economic issue, second only to unemployment.[1] While many economists are relieved by what they perceive to be a long overdue political response to a critical economic problem, others regard the fuss as much ado about nothing. It is indeed remarkable that economists can disagree so severely over an issue which commands such a uniform reaction from laymen of widely different ideologies and political affiliations.

Generally speaking, there are three schools of thought concerning the economic effects of budget deficits: Neoclassical, Keynesian, and Ricardian. Before proceeding further, it is useful to review the basic structure and implications of each paradigm.

The Neoclassical paradigm envisions farsighted individuals planning consumption over their own life cycles. Budget deficits raise total lifetime consumption by shifting taxes to subsequent generations. If economic resources are fully employed, increased consumption necessarily implies decreased saving. Interest rates must then rise to bring capital markets into balance. Thus, persistent deficits "crowd out" private capital accumulation. In the current economic environment, most economists would agree that these consequences would be highly detrimental.

[1]The San Francisco Chronicle (11/6/87, p. 1) recently reported the results of a Los Angeles Times poll, in which respondents were asked to name the "most serious threat to the nation's economy." 23 percent listed unemployment, while 18 percent named the budget deficit. All other problems (including the stock market decline, inflation, and higher taxes, among others) were listed by fewer than 18 percent of respondents.

■ *B. Douglas Bernheim is the Harold J. Hines, Jr., Distinguished Professor of Risk Management in the J. L. Kellogg Graduate School of Management at Northwestern University, Evanston, IL, and Research Associate of the National Bureau of Economic Research, Cambridge, MA.*

Under the Keynesian view, a significant fraction of the population is thought of as either myopic or liquidity constrained. These individuals have very high propensities to consume out of current disposable income. A temporary tax reduction therefore has an immediate and quantitatively significant impact on aggregate demand.[2] If the economy's resources are initially underemployed, national income rises, thereby generating second round effects and the well-known Keynesian multiplier. Since deficits stimulate both consumption and national income, saving and capital accumulation need not be adversely affected. Thus, appropriately timed deficits have beneficial consequences.

Under the Ricardian view, successive generations are linked through voluntary, altruistically motivated resource transfers. Under certain conditions, this implies that consumption is determined as a function of dynastic resources (that is, the total resources of a taxpayer and all of his descendants). Since deficits merely shift the payment of taxes to future generations (the present discounted values of taxes and expenditures must match), they leave dynastic resources unaffected. Thus, deficit policy is a matter of indifference.

It is remarkable that from among these three schools of thought, one can find support for every conceivable normative position. Whether one thinks of deficits as good, bad, or irrelevant therefore depends fundamentally on one's choice of a paradigm. Certainly, no single paradigm corresponds exactly to reality. Nevertheless, it is my view that the Neoclassical framework offers the most relevant insights into the economic effects of deficits.

I dismiss the Ricardian paradigm on both theoretical and empirical grounds. While the Ricardian exercise is an interesting thought experiment, it is predicated upon extreme and unrealistic assumptions. Those who recommend this framework as a guide to actual policy formulation offer a prescription for disaster.

In assessing Neoclassicism and Keynesianism, I emphasize that these paradigms concern two distinct aspects of fiscal policy. Often, one hears the view that Keynesian analysis concerns the short run, while Neoclassical analysis concerns the long run. While this characterization comes close to the truth, it is unfortunately misleading. Moreover, it allows Keynesians to condemn Neoclassicism with glib one-liners, such as "the long run is just a sequence of short runs," and "in the long run we're all dead."

In this paper, I argue that the deficit should be decomposed into "permanent" (long run average) and "temporary" (deviation from long run average) components. By selecting the permanent deficit or surplus, we essentially determine the level of national saving in some "full employment" equilibrium. Over time, the economy will be drawn to (but, due to macroeconomic shocks, may never actually achieve) this equilibrium. By manipulating the temporary deficit, it may be possible to stabilize fluctuations around this full employment equilibrium. Thus, Neoclassical analysis sheds light on the effects of the permanent deficit, while Keynesian analysis concerns

[2]This contrasts with a Neoclassical world, in which individuals respond only to changes in lifetime resources (i.e. they alter their consumption only if they do not expect to bear the burden of the deferred taxes in the future). Moreover, a Neoclassical consumer spreads additional resources over his remaining lifetime, so that the immediate (e.g. first year) impact of resources on consumption is small.

the impact of temporary deficits. As a Neoclassicist, I would rather see the government attempt to stabilize fluctuations around an equilibrium with high national saving (one in which the government is, on average, a significant net saver), than around and equilibrium with low national saving.

Although the Neoclassical and Keynesian paradigms are (as argued above) compatible, I tend to be skeptical about the value of fiscal policy as a tool for macroeconomic stabilization. I argue in this paper that the immediate impact of deficits on aggregate demand is probably much smaller than that envisioned by most Keynesians. Moreover, I question the ability of policy makers to "fine tune" fiscal policy, and I note that inappropriate management of aggregate demand is, contrary to the assertion of most Keynesians, likely to have significant detrimental consequences. Finally, I argue that the empirical evidence on the historical link between national income and deficits is extremely weak, and essentially uninformative.

This is not to say that deficits cannot stimulate economic activity during periods of unemployment. Indeed, my interpretation of events during the 1980s is consistent with both the Keynesian and Neoclassical views. However, these arguments do suggest that policy makers should primarily concern themselves with the permanent component of deficits, and should manipulate this component with an eye to stimulating saving. Thus, I conclude that the Neoclassical paradigm offers the most relevant insights for public policy.

I now turn to a more detailed theoretical discussion of the three alternative frameworks.

The Neoclassical Paradigm

The standard Neoclassical model has three central features. First, the consumption of each individual is determined as the solution to an intertemporal optimization problem, where both borrowing and lending are permitted at the market rate of interest. Second, individuals have finite lifespans. Each consumer belongs to a specific cohort or generation, and the lifespans of successive generations overlap. Third, market clearing is generally assumed in all periods.

Diamond's (1965) seminal paper was the first effort to study formally the effects of budget deficits in the context of such models. Diamond argued that a permanent increase in the ratio of domestically held debt to national income depresses the steady state capital-labor ratio. At the original rate of interest, consumers are unwilling to hold the original volume of physical capital and bonds, plus the new bonds. Rising interest rates stimulate additional saving and reduce investment until capital market equilibrium is reestablished. Thus, persistent government deficits crowd out private capital accumulation.

Diamond's analysis focuses on permanent changes in deficits, and does not shed light on the effects of temporary changes. Recently, Auerbach and Kotlikoff (1986) have conducted policy simulations in a much more complex Neoclassical model. Their analysis emphasizes that the immediate impact of a temporary budget deficit may be

extremely small, and possibly perverse (a temporary deficit might stimulate saving in the short run). This result reflects several considerations. To begin with, economic lives are quite long, so that the impact of an increment to lifetime wealth on current consumption (the "wealth effect") is small—perhaps a few cents on the dollar. In addition, if one holds government spending constant, then temporary deficits reflect tax reductions. Typically, this implies lower marginal tax rates. Reduced capital income tax rates stimulate saving directly by raising the after tax rate of return. Temporarily lower labor income tax rates induce intertemporal substitution, raising current income, and hence saving. For reasonable parameter values, these effects may dominate the wealth effect. Thus, the Neoclassical paradigm implies that temporary deficits should have very little effect, or even a perverse effect on economic variables in the short run.

Even so, Auerbach and Kotlikoff are quick to point out that wealth effects cumulate over time, so that even temporary deficits eventually crowd out private capital formation. For example, they find that temporarily reducing income tax rates by one-third for a period of 5 years would *increase* saving by roughly 20 percent in the first year. However, in the new steady state, per capita capital would fall by 7.8 percent.

At the beginning of this section, I listed three features that characterize the standard Neoclassical model. Each of these features plays an important role in determining the impact of budget deficits.

There is now a large literature that investigates the empirical validity of the first feature—that consumers behave as though they solve an intertemporal optimization problem, with access to perfect capital markets (see the excellent surveys by King, 1983 and Hayashi, 1985). Much of this literature builds upon Hall's (1978) formulation of the stochastic permanent income hypothesis. Despite numerous problems with estimation and interpretation, the evidence on balance supports the view that a sizable minority (roughly 20 percent) of individuals fails to behave in a way that is consistent with unconstrained intertemporal optimization. This view is buttressed by experimental evidence, which suggests "a widespread inability to make coherent and consistent consumption decisions" in the context of life cycle planning (Johnson, Kotlikoff, and Samuelson, 1987). Indeed, some have gone so far as to suggest that intertemporal utility maximization should be supplanted by theories that are more thoroughly rooted in psychological principles (for example, Shefrin and Thaler, 1985).

In light of these findings, one might wonder how the introduction of some liquidity constrained or myopic consumers would alter the Neoclassical results described above. One strategy (pursued by Hubbard and Judd, 1986) would be to introduce an exogenous constraint on borrowing, which would be binding for some fraction of the population. This would not alter the conclusion that a permanent increase in the ratio of debt to national income depresses capital accumulation. As in Diamond's model, unconstrained consumers would not be willing to hold the original volume of capital and bonds, plus the new bonds, at the original rate of interest. As one increases the fraction of consumers who are liquidity constrained, the interest sensitivity of saving falls, and larger increases in interest rates are required to

equilibrate capital markets. Accordingly, the introduction of liquidity constrained consumers might well strengthen the conclusion that permanent deficits depress capital accumulation.

On the other hand, this amendment to the Neoclassical model leads to substantially different predictions concerning the impact of temporary deficits. For constrained individuals, the marginal propensity to consume out of liquid resources is unity. If there are enough constrained consumers, then this consideration will swamp the short run effects described above, and temporary deficits will have immediate and substantial negative effects on saving.

While one can rationalize exogenous liquidity constraints in a number of ways (see Hubbard and Judd's discussion on this point), some models of credit rationing imply that these constraints should respond endogenously to fiscal policy. Using models in which liquidity constraints result from problems of adverse selection, Hayashi (1985) and Yotsuzuka (1986) have argued that consumption should be insensitive to the distribution of taxes over an individual's lifetime, even if that individual is apparently constrained in certain periods.[3] Their analyses suggest that the introduction of liquidity constraints would not significantly alter the short-run effects of temporary deficits in Neoclassical models. Elsewhere (Bernheim, 1987a), I have pointed out that the Hayashi/Yotsuzuka result is extremely sensitive to the counterfactual assumption that taxes are independent of income. If future taxes are positively related to future income, then the short run effect of temporary budget deficits should be to stimulate consumption, as when these constraints are specified exogenously. Furthermore, the Hayashi/Yotsuzuka result effectively depends upon the ability of consumers to use future after-tax income as collateral against loans. This assumption strikes me as highly unrealistic. I am therefore inclined to believe that, in the current context, one can safely ignore the potential endogeneity of liquidity constraints.

The remaining two features of the standard Neoclassical model are essential. Indeed, the second characteristic (finite lifetimes) defines the central difference between the Neoclassical and Ricardian frameworks, while the third characteristic (full employment) is the primary distinction between the Neoclassical and Keynesian paradigms. In the following sections, I consider the Keynesian and Ricardian views in greater detail.

Before beginning these discussions, it is useful to summarize the main empirical implications of Neoclassicism. If consumers are rational, farsighted, and have access to perfect capital markets, then permanent deficits significantly depress capital accumulation, and temporary deficits have either a negligible or perverse effect on most economic variables (including consumption, saving, and interest rates). If many consumers are either liquidity constrained or myopic, the impact of permanent deficits remains qualitatively unchanged. However, temporary deficits should depress saving

[3]Both Hayashi and Yotsuzuka make this point by arguing that the Ricardian equivalence result may be insensitive to the introduction of liquidity constraints. However, their point carries equal force in the context of the Neoclassical paradigm, where temporary deficits may simply redistribute taxes over individuals' lifetimes.

and raise interest rates in the short run. Thus, the Neoclassical paradigm does not tie down the effects of temporary deficits, and evidence that bears on the effects of temporary deficits is not useful for testing this paradigm. The fundamental lessons of the Neoclassical framework concern the effects of permanent deficits.

The Keynesian Paradigm

The traditional Keynesian view differs from the standard Neoclassical paradigm in two fundamental ways. First, it allows for the possibility that some economic resources are unemployed. Second, it presupposes the existence of a large number of myopic or liquidity constrained individuals. This second assumption guarantees that aggregate consumption is very sensitive to changes in disposable income.

In the simplest and most naive Keynesian model, increasing the budget deficit by $1 causes output to expand by the inverse of the marginal propensity to save. In the standard IS-LM analysis of monetary economies, this expansion of output raises the demand for money. If the money supply is fixed (that is, the deficit is bond-financed), interest rates must rise, and private investment falls. This in turn reduces output and partially offsets the Keynesian multiplier effect.

Many traditional Keynesians argue that deficits need not crowd out private investment. In this journal, Eisner suggests that increased aggregate demand enhances the profitability of private investments, and leads to a higher level of investment at any given rate of interest. Thus, deficits may actually stimulate aggregate saving and investment, despite the fact that they raise interest rates. In Eisner's view, increased consumption is supplied from otherwise unutilized resources.

I have three central objections to the Keynesian theory of budget deficits (a discussion of empirical evidence follows in subsequent sections). First, while Keynesians are to be applauded for recognizing the importance of unemployed resources, after more than five decades they still have not arrived at a fully satisfactory theory that accounts for the presence of unemployment. Shifting the explanation to old fashioned wage-price stickiness simply begs the question. While a variety of authors have recently proposed more complete theories of unemployment (for example, Shapiro and Stiglitz, 1984), none of these has as yet been widely accepted.

Keynesians' poor understanding of the unemployment phenomenon is quite troubling. When a market failure exists, it is potentially very misleading to analyze the effects of government policies on the assumption that the manifestations of that failure will remain fixed (I take this to be a central point of Lucas' (1973) seminal analysis). There are numerous examples in the literature of environments in which government policy inadvertently interacts with the factors that generate the failure, with surprising consequences (Hayashi and Yotsuzuka's analyses are good examples of this). Without a more complete theory of unemployment, Keynesian analysis is an exercise in blind faith.

Second, the Keynesian outlook on budget deficits presupposes that the government can and will "fine tune" fiscal policy. If we grant that deficits stimulate aggregate demand, then it follows that there are circumstances in which this stimulation may be detrimental. Even the most steadfast Keynesian is willing to concede that, at full employment, real deficits crowd out private investment and raise the rate of inflation.

Recognizing the real costs of crowding out, many Keynesians (such as Eisner) argue for a policy of "nominal" deficits, which would preclude real deficits from rising once the economy achieved full employment. This policy would channel all the effects of inappropriately timed deficits into inflation. Advocates of this strategy apparently adopt the purist view that inflation is costless. The experience of the 1970s strongly suggests otherwise. Inflation interacts with the tax system to produce significant distortions of behavior. It often redistributes resources in capricious and undesirable directions. In addition, higher rates of inflation are associated with greater price variability, and formal models of price adjustment suggests a causal relationship. Thus, inflation adds significant randomness and uncertainty to the economic environment.

If Keynesian analysis implies that deficits can have either positive or detrimental effects, then the proper management of fiscal policy becomes critical. We would be well-advised to recall that budget policy is determined by Congress, and not by a Keynesian philosopher king. Recent experience underscores the political realities: once deficits are established, they are hard to reduce. The notion that the political system could ever fine tune fiscal policy is quite simply far-fetched. Indeed, if one is to believe Eisner, the level of deficits has, as often as not, been entirely inappropriate.

My third reservation concerning the Keynesian paradigm is that it primarily describes the effects of temporary deficits. Indeed, I argue below that it is essentially compatible with the Neoclassical paradigm, which primarily concerns the effects of permanent deficits. In failing to distinguish between temporary and permanent deficits, Keynesians provide misleading advice to policy makers.

To illustrate these points, assume for simplicity that unemployment results from wage stickiness, and that wages adjust over time towards their Walrasian equilibrium levels. Since the economy is subjected to continual exogenous aggregate demand shocks, full employment is never actually achieved, but, given sufficient time, the economy eventually operates in a neighborhood of the Walrasian equilibrium.

Now consider two distinct deficit policies, A and B. In Policy A, we hold the ratio of the full employment deficit to full employment national income constant over time. For Policy B, we do the same except that we hold the ratio constant at a lower level. How do the effects of these two policies compare?

The answer to this question depends in part on the economy's initial state. Leaving initial conditions aside, we can compare stationary states. Since prices cannot adjust to shocks instantaneously, both stationary states will exhibit unemployment. However, in both cases, the economy gravitates towards a full employment equilibrium. This equilibrium entails a higher rate of national saving, and higher capital

accumulation with policy *B* than with policy *A*. Neither equilibrium is ever actually achieved. Yet there is absolutely no reason to believe that the shocks to aggregate demand should result in larger deviations from full employment in the stationary state for policy *B* than for policy *A*.

It is, of course, possible to modify these two policies by allowing for macroeconomic stabilization. When exogenous factors cause aggregate demand to be low, one would want to increase the deficit beyond its permanent level. When these factors cause aggregate demand to be high, the deficit should be set below its permanent level. In this way, the distribution of realized outcomes in the stationary state could be compressed towards the full employment outcome.

Yet stabilization could be accomplished regardless of whether one pursues policy *A* or policy *B*. The central difference is that, in the first case, the economy gravitates toward an equilibrium with low saving and investment, while in the second case it gravitates toward an equilibrium with high saving and investment. Thus, it is natural to distinguish between permanent deficits, which define a target equilibrium and rate of capital accumulation for the economy, and temporary deficits, which facilitate macroeconomic stabilization. Neoclassical analysis tells us about the first, and the Keynesian paradigm describes the second.

A Neoclassicist would therefore tend to focus on average deficits over a period of years, rather than on year-to-year changes in deficits. Thus, the total outstanding government debt may be a much more informative measure of the impact of fiscal policy on capital accumulation than is the current deficit. By superimposing countercyclical fiscal policy (i.e. temporary deficits) over a lower permanent deficit, the government could have achieved the same degree of stabilization without accumulating significant debt. As a Neoclassicist, I would prefer, *ceteris paribus*, to see the government attempt to stabilize the economy around an equilibrium with a lower permanent deficit, and higher average national saving.

Unfortunately, in the hybrid paradigm described above, one cannot change the permanent deficit with impunity. Life cycles considerations imply that a reduction in the deficit will cause aggregate demand to fall by a greater amount if consumers believe that the reduction is permanent, than if they believe it is temporary. Thus, changes in permanent deficits have significant temporary effects. Any attempt to move the economy towards an equilibrium with higher saving may induce a recession. Whether such a move is worthwhile depends upon the speed with which the economy adjusts towards the new stationary state, and the severity of the resulting recession. A preannounced policy of gradually adjusting the deficit downward (as with the Gramm-Rudman deficit reduction targets) may allow economic agents to incorporate these changes into expectations, thereby minimizing the costs of transition.

The preceding discussion points to an important fallacy in the deficit debate, which has been propagated primarily by Keynesians. The fallacy is that "0"—a balanced budget—has some special significance. Keynesians write as if deficits are expansionary, and surpluses are contractionary. Indeed, Eisner devotes a substantial portion of his paper to the task of convincing the reader that in certain years the government has actually run a surplus, despite the appearance of a deficit. Yet this is

a non-issue. As Kotlikoff (1986) has argued, the definition of balance is inherently arbitrary. Moreover, to judge whether a given deficit is expansionary or contractionary, one must determine its temporary component. A balanced budget may be highly contractionary if the government has been running a deficit equal to 3 percent of national income for a substantial period of time, and highly expansionary if the government has maintained a budget surplus equal to 3 percent of national income for a substantial period of time. Finally, there is no presumption that the permanent deficit should be of any particular sign. If private saving is insufficient to achieve a socially desirable level of capital accumulation, then the government should run a permanent surplus. Expansionary fiscal policy (temporary deficits) would then consist of reducing the surplus below its permanent level, and contractionary policy would entail running a larger-than-normal surplus.

The Ricardian Paradigm

The central Ricardian observation is that deficits merely postpone taxes. A rational individual should be able to see through the intertemporal veil and realize that the present discounted value of taxes depends only upon real government spending—not on the timing of taxes. This foresight gives rise to a "Say's law" for deficits: the demand for bonds always rises to match government borrowing. Since the timing of taxes does not affect an individual's lifetime budget constraint, it cannot alter his consumption decisions. As a result, budget deficits (both temporary and permanent) have no real effects. Note that this logic does not in any way depend upon full employment of resources.

The relevance of the Ricardian observation depends upon the length of consumers' planning horizons. If fiscal policy postpones tax collections until after current taxpayers have died, then it may well alter real economic decisions. Barro's (1974) central insight was that intergenerational altruism may act to extend the planning horizons of individuals, thereby reinstating strong versions of Ricardian equivalence. Thus, the modern Ricardian paradigm envisions families as "dynastic" units, in the sense that each family is thought of as a single, infinite-lived agent.

The strict irrelevance of fiscal policy ("Ricardian equivalence") depends upon a variety of strong assumptions. These include: 1) successive generations are linked by altruistically motivated transfers; 2) capital markets are either perfect, or fail in specific ways; 3) consumers are rational and farsighted; 4) the postponement of taxes does not redistribute resources across families with systematically different marginal propensities to consume; 5) taxes are non-distortionary; 6) the use of deficits cannot create value (not even through bubbles); and 7) the availability of deficit financing as a fiscal instrument does not alter the political process. One can certainly make a strong case against the Ricardian result by weighing the validity of each of these assumptions in isolation (I have already discussed the second and third assumptions; see Bernheim (1987a, b) for a detailed discussion of the others). Yet in my view, the most compelling argument against Ricardianism is that these assumptions, taken

together, have a variety of absurd conclusions, of which Ricardian equivalence is by far the most innocuous.

The collective implications of the Ricardian assumptions were explored by Bernheim and Bagwell (1988). They noted that the structure of families in Barro's analysis is highly unrealistic. Implicitly, Barro takes each dynastic family to be an independent, self-contained unit. Future generations of economists will no doubt benefit from recent advances in sex education. For the human species, propagation normally requires the participation of two unrelated individuals. Thus, family linkages form complex networks, in which each individual belongs to many dynastic groupings, and in which unrelated individuals share common descendents. Due to the linkages between families, it is in general impossible to represent any particular family (or set of families) as a single, utility-maximizing agent, even when the well-being of each individual is assumed to depend only on his own consumption and the well-being of his children.[4]

Bernheim and Bagwell go on to demonstrate that Barro's central result—which essentially establishes the insensitivity of consumption to the distribution of endowments over family members—depends only upon the existence of altruistically motivated transfers (sometimes called "operative linkages") between family members, and not upon the particular structure of the family tree. But then the proliferation of linkages *between* families gives rise to incomparably stronger neutrality properties under *weaker* conditions than those imposed by Barro. In particular, all government transfers (including those between seemingly unrelated members of the same generation) are irrelevant, since they simply redistribute resources among individuals who are related—albeit distantly. Furthermore, all tax instruments (including so-called "distortionary" taxes) are equivalent to lump-sum taxes. This follows from the fact that, with fixed government spending, taxes are merely transfers conditioned upon specific actions. Since each contingent transfer is irrelevant, the whole package must be irrelevant. Finally, under dynastic assumptions, prices would play no role in the resource allocation process (prices are simply action-contingent transfers between distantly related parties).

It is important to emphasize that these "superneutrality" results do not require each individual to care directly or indirectly about all of his distant relatives. Indeed, the conclusions hold up even when each individual cares only about his own consumption, and that of his children. What matters is simply that distant relatives are connected by some chain of altruistically motivated private transfers. In equilibrium, the flow of resources through these chains offsets government policy.

These results imply that the Ricardian paradigm does not provide an acceptable approximation to reality. In particular, they cast serious doubt on the usefulness of the dynastic framework as an analytic tool for studying public policy issues. If we agree that taxes, transfers, and prices are not even close to being irrelevant, then we must

[4]An example may help to illustrate this point. Consider two couples, each of which has a child. Neither couple cares about the other, but each cares about its own child. The children marry, forming a new household. From the point of view of the original couples, the consumption of this household is a public good. In the absence of explicit cooperation, the resulting allocation of resources will be Pareto inefficient.

also agree that in some important, policy-relevant sense the world is not even close to being dynastic. Accordingly, one must regard any conclusions derived within this framework, including the Ricardian equivalence proposition, with considerable skepticism. One cannot simply assert that the model holds as a good approximation in one context, but not in another. Furthermore, in practice it is extremely difficult to modify the model in a plausible way that preserves Ricardian equivalence (at least as an approximation) while eliminating the untenable neutrality results, without introducing new and equally troubling difficulties (for discussion, see Bernheim and Bagwell, 1988; Abel and Bernheim, 1987).

My object in this paper is not merely to disparage the Ricardian paradigm, but also to suggest that the Neoclassical approach is more appropriate for policy analysis. It is therefore important to discuss at some length the central feature that distinguishes Ricardianism from Neoclassicism. This feature concerns the effective length of consumers' planning horizons (that is, do taxpayers act as though they are finite-lived, or infinite-lived?).

The Ricardian paradigm embraces two assumptions concerning intergenerational transfers: that the vast majority of individuals either voluntarily makes or receives intentional transfers (as opposed to accidental transfers, which result from uncertainty about date of death), and that these transfers are motivated by altruism. From this, it follows that consumers act as though they have infinite horizons. I consider the two assumptions in turn.

A number of authors have noted that restrictive conditions are required to guarantee that successive generations will be linked through voluntary transfers. If the economy grows slowly, then parents may well bequeath wealth to their children, and if it grows rapidly, children may make gifts to their parents. However, there is in general a range of growth rates for which transfers flow in neither direction (for example, Abel, 1985; and the references cited therein). Moreover, the ratio of parent's wealth to child's wealth differs widely across the population, so that one would normally expect some fraction of families to fall into the intermediate "no transfer" range. In such cases, redistributions of resources across family members (through deficits) would not be offset by private transfers. Finally, if individuals are uncertain about future income (hence uncertain about whether they will make or receive a transfer), then redistributions between generations will in general have real effects.

Ricardians generally dismiss these arguments on the grounds that the theory does not establish quantitative importance—consumers may or may not make transfers, and that is an empirical issue. It is therefore important to emphasize that there are two theoretical reasons for believing that a very large number of individuals would in equilibrium ordinarily find themselves at corner solutions (allocations in which nonnegativity constraints on transfers bind), neither making transfers, nor receiving gifts.

The first reason follows from Bernheim and Bagwell's analysis. Since ubiquitous altruistic parent-child linkages would embed nearly all individuals in a single interconnected network, the consumption of each individual would depend only upon aggregate wealth (recall the nature of the central result: with altruistic linkages,

consumption is independent of the distribution of resources). Any increment to aggregate wealth is then simply divided among the entire population. When an individual forgoes consumption in order to make a bequest to his child, he in essence increases the aggregate wealth of all individuals other than himself. By the preceding reasoning, his bequest will in equilibrium be divided equally between all of these individuals; if the economy is large, there will be a negligible effect on his child's consumption. Unless the prospective donor cares greatly about many individuals other than his child, he would prefer to make no bequest at all. In equilibrium, large numbers of altruistic donors *must* therefore be driven to corners.

A second reason is that rational government behavior will generally entail driving vast numbers of individuals to corner solutions (Bernheim, 1989). The reason is simple: when transfers are positive, each donor is indifferent on the margin between his own consumption and that of the corresponding recipient. Suppose that the government maximizes a social welfare function which attaches weight to the well-being of both donors and recipients (several generations live and even vote at each point in time). Then when the donor is indifferent, the government must prefer additional transfers (the government "double counts" the preferences of the recipient —once directly, and once through the utility of the donor). The social welfare function is maximized only when nonnegativity constraints on transfers bind. In a first-best world, the government would drive all individuals to corner solutions. Even when fiscal instruments are distortionary, the government always has the option of levying a non-discriminatory head tax. The preceding argument suggests that the government would use head taxes to drive some substantial fraction of the population to corner solutions.

Overall, theoretical arguments do not rule out the possibility that many individuals make altruistically motivated transfers. However, they do suggest that the Ricardian paradigm—which assumes that *nearly all* individuals are parties to such transfers—is extremely implausible. The existing empirical evidence is consistent with this judgment.

Studies by Kotlikoff and Summers (1981) and Darby (1979) are often cited to document the empirical importance of intergenerational transfers. However, these studies do not establish that transfers are intentional, rather than accidental (accidental bequests result from uncertainty about length of life, coupled with incomplete annuity markets). In addition, they tell us nothing about the distribution of transfers across the population. They are, for example, completely consistent with the very non-Ricardian view that gifts and bequests are concentrated among the very wealthy. While some other behavioral evidence suggests that bequest motives are also present in other segments of the population, no one has yet succeeded in estimating the fraction of the population for which voluntary transfers are important. In addition, some aspects of behavior, such as the fact that elderly couples with children dissave as rapidly as elderly couples without children, pose serious puzzles for those who would claim that altruistically motivated bequests are extremely common (Hurd, 1987a). Finally, several authors (e.g. Diamond and Hausman, 1984) have found that roughly 20 percent of the population arrives at retirement with essentially no bequeathable

assets. Other evidence indicates that the receipt of gifts from children is relatively uncommon (Hurd, 1987b).

I turn next to the assumption that intergenerational transfers are motivated by altruism. I have already mentioned the possibility that many bequests are accidental. Various authors have suggested alternative motivations, including intrafamily exchange and tastes for generosity. Each could potentially undo the central Ricardian results. Unfortunately, it is very difficult to distinguish between different formulations of preferences on the basis of theoretical reasoning alone.

Nevertheless, Bernheim, Schleifer, and Summers (1985) make an *a priori* case for the presence of exchange motives. They argue that Barro's dynastic specification, which portrays families as perfectly harmonious units, is extremely restrictive. More generally, even in the presence of altruism, the preferences of distinct family members will conflict, and the distribution of family resources will affect the resolution of these conflicts. Despite the existence of operative transfers, behavior will then conform more closely to the predictions of the life cycle model, than to those of the dynastic model.

Even in the presence of conflict, it is possible that altruism determines behavior on the margin, so that the Ricardian conclusions remain intact. Bernheim, Shleifer and Summers address this issue by providing evidence linking the behavior of children to the bequeathable assets of parents. Alternative explanations for this relationship, including the obvious possibility of income effects, are tested and rejected. These results strongly support the view that, as an empirical matter, exchange actually motivates a great deal of behavior at the margin. This finding has been corroborated by several other studies.

Thus, the existing body of theory and evidence on intergenerational transfers casts very serious doubt on the validity of the Ricardian assumptions. It is quite likely that a large fraction of the population neither makes nor receives transfers, and that many existing transfers are motivated by considerations other than altruism. I conclude that the Neoclassical assumption of finite lifetimes is entirely appropriate.

Direct Empirical Evidence

While the selection of an appropriate paradigm provides us with some clue as to the likely effects of budget deficits, the issue is ultimately an empirical one. There now exists a vast body of research that examines the relationship between budget deficits and a host of economic variables. Before reviewing this evidence, a number of general comments are in order.

With very few exceptions, existing studies do not attempt to distinguish between the effects of temporary and permanent deficits. Since the literature generally studies the relationships between annual or monthly movements in deficits and other economic variables, it seems extremely likely that, to the extent they are at all informative, estimates reflect the impact of temporary deficits. If we find that temporary deficits have a significant impact on economic activity, this would argue for rejection of the Ricardian view. On the other hand, the absence of significant effects would

argue against the Keynesian view. On this basis, Ricardians have often adopted the misleading practice of setting up the Keynesian paradigm as a straw man, and have interpreted evidence against Keynesianism as favoring Ricardianism. Yet I know of no existing macroeconomic evidence that could reasonably be interpreted as favoring Ricardianism over Neoclassicism. Since the Neoclassical framework (modified to allow for the existence of some liquidity constrained or myopic consumers) does not have a strong prediction concerning the effects of temporary deficits, the existing macroeconomic evidence sheds practically no light at all on its validity.

It is also important to bear in mind that the predictions of any particular paradigm might vary substantially with changes in ancillary assumptions. For example, the Keynesian model would predict that deficits would have little or no effect on interest rates if either the wealth elasticity of demand for money was sufficiently high, or the economy under consideration was open and small relative to the rest of the world. Thus, failure to find a significant short run relationship between deficits and interest rates does not establish that the Keynesian approach is fundamentally wrong-headed.

Macroeconomic estimates of the relationships between deficits and other economic variables also suffer from a large number of econometric problems. Measurement of deficits is problematic (see Eisner's paper, or Boskin, 1986), and results are very sensitive to the adjustments that one actually makes. Endogeneity of economic variables always poses severe difficulties—deficits, government spending, consumption, income, and interest rates are all determined as part of the same equilibrium. Empirical models of aggregate variables are generally unsatisfactory (see for example Hayashi's discussion of aggregate consumption relationships), and misspecification of these relationships may produce spurious results. Many empirical macroeconomic models are highly parsimonious—it is hard to believe that movements in interest rates, consumption, or GNP can be adequately captured by a few economic variables. Finally, econometric identification is usually tenuous at best.

This last point merits some elaboration. Economic activity depends critically on expectations, but these are not generally observable. Government policy may have very different effects, depending upon whether it is anticipated or unanticipated. Moreover, expectations are generally correlated with current activity and government policy, so that explanatory variables typically contain spurious information. For example, current deficits may tend to precede future cuts in government spending. Short of making heroic assumptions (like imposing a highly specific, parametrized model of expectations), there is no way to control for this problem.

In light of these considerations, one should be reluctant to condemn any paradigm solely on the grounds of macro-econometric evidence. Nevertheless, robust macroeconomic patterns, taken in conjunction with theory and microeconomic evidence, may provide an additional piece of the overall puzzle. The evidence on the relationships between deficits and most other variables is mixed. To conserve space, I focus on the three most studied variables: consumption, interest rates, and national income.

Consumption

More than a dozen authors have analyzed the relationship between budget deficits and aggregate consumption (for a review of this literature, see Bernheim, 1987a, b).[5] A cursory reading of these papers suggests that various authors have reached markedly different conclusions through essentially similar analyses of U.S. time series data. In fact, these differences are largely illusory.

Apparent differences in results can in most cases be traced to different formulations of the null hypothesis. A number of authors regress consumption on budget deficits and net-of-tax income, along with a variety of other variables. The natural null hypothesis for this specification is the most naive version of the Keynesian paradigm—given disposable income, deficits have no effect on consumption. The null is generally rejected. A number of other authors regress consumption on budget deficits and gross income, again along with a variety of other variables. The natural null hypothesis for this specification is the Ricardian paradigm—given gross income, the timing of taxes does not affect consumption. This null is also generally rejected. While these results are usually taken to be conflicting, they are easily reconciled: both null hypotheses represent very extreme cases, and in fact an intermediate hypothesis is supported. Indeed, almost all of these studies consistently estimate the marginal propensity to consume out of deficit-induced tax increases to be between 0.2 and 0.5.[6] While this relationship may be spurious, at a minimum there is some evidence here against the Ricardian paradigm. Moreover, I have argued in Bernheim (1987a, b) that the direction of any bias is likely to be pro-Ricardian.[7]

Two specific studies merit further comment. Bernheim (1987a, b) used cross-country data to relate average consumption to average deficits over six year and twelve year periods. Reid (1985) also used multiple year averages in a study of the U.S. experience. These papers are notable, in that they represent attempts to measure the impact of permanent, as opposed to transitory deficits. Both Bernheim and Reid found that permanent deficits significantly raise consumption as a fraction of national income. These results are consistent with the Neoclassical paradigm.

[5]Most of these papers estimate aggregate consumption functions. A few estimate consumption Euler equations, with conflicting results. Since the Euler equation restrictions are generally rejected, estimates of fiscal effects are unreliable (the aggregate consumption relationship is misspecified). In Bernheim (1987a, b), I offer some additional criticisms of these studies.

[6]Only Kormendi's (1983) estimates are inconsistent with this range. It is noteworthy that other aspects of his results are extremely peculiar (for example, he finds that the long-run marginal propensity to consume out of income is around 0.3), and indicative of potentially severe misspecification. Furthermore, his findings do not appear to be very robust (Barth, Iden and Russek, 1986; Modigliani and Sterling, 1986).

[7]Briefly, the argument is as follows. Suppose that we estimate an aggregate consumption function, relating consumption to national income, deficits, government spending, and other variables. The naive Keynesian view suggests that the coefficients of deficits and national income should be the same, while the Ricardian hypothesis implies that the coefficient of deficits should be zero. Suppose further than the population contains a large number of life cycle consumers, whose behavior is more sensitive to permanent changes in variables than to transitory changes. Since government deficits are more volatile than national income, one will tend to find that the coefficient of deficits is smaller than that of national income, even if the true coefficients are equal. Thus, there is a bias toward Ricardianism.

Interest Rates

The Congressional Budget Office (1987) has recently summarized the methods and results of some two dozen studies that analyze the relationships between budget deficits and interest rates. The evidence is extremely mixed, and it is easy to cite a large number of studies that support any conceivable position.

Most of the existing studies estimate unrestricted reduced form relationships between interest rates and budget deficits. Others impose very restrictive models of interest rate determination (Plosser, 1986). The latter class of studies typically finds no relationship between deficits and interest rates, or a perverse one. It is therefore important to bear in mind that these studies test the alternative paradigms jointly with some very strong maintained hypotheses, and that the results may say very little about the effects of deficits. For example, while Plosser finds that deficits depress interest rates, he also finds that these rates are essentially independent of government spending and monetary policy. Such results strike me as less plausible than the possibility that the relationship of interest is misspecified.

It is also important to emphasize that when estimating consumption functions, one has both a pure Ricardian and pure Keynesian benchmark. But in the case of interest rate equations, we have only a Ricardian benchmark: deficits do not alter interest rates. Since the empirical model is intended to represent a reduced form rather than a behavioral relationship, one cannot, in the absence of extensive information about various elasticities, construct a natural Keynesian benchmark. Thus, studies which do not reject the Ricardian implication may also fail to reject any other hypothesis of interest.

National Income

The relationship between deficits and national income has been studied most extensively by Eisner, and I refer the reader to his paper for the relevant citations. In Eisner's view, the data strongly support the Keynesian view that deficits significantly stimulate aggregate economic activity. Despite his rhetoric, I find the evidence to be extraordinarily weak. Few economists ought to be persuaded by univariate regressions of subsequent national income growth on the full employment deficit. During recessions, national income is low, and subsequently tends to grow. During booms, national income is high, and subsequently tends to fall. Thus, any variable that is negatively correlated with national income will also exhibit the pattern illustrated in Eisner's tables. Full employment deficits might move countercyclically for a variety of reasons: policy makers might respond to political pressure for tax cuts when income is low, they might be especially concerned about tax distortions during recessions, or they might even have been persuaded (correctly or incorrectly) by the Keynesian argument. Thus, Eisner's results might well be spurious. No doubt, those who are sympathetic with his evidence will also agree that policy makers should endeavor to reduce national income, in that national income is negatively correlated with future growth of national income.

In other work, Eisner has estimated the same type of relationships using a larger number of explanatory variables. While he does not claim to estimate structural

relationships, he also eschews the vector autoregressive approach. Thus, his specifications are neither structural equations, nor unrestricted reduced forms. His implicit practice of excluding variables from reduced form equations is highly suspect, since each reduced form coefficient typically reflects a blend of coefficients from all of the structural equations. His results are therefore very difficult to interpret, and I am not at all convinced that he successfully controls for the kinds of spurious relationships that render his univariate results uninformative.

Conclusions

The existing evidence on fiscal effects is difficult to interpret. Empirical measurement of the effects of temporary budget deficits is not very reliable, and no strong conclusions are justified. In contrast, evidence on the effects of permanent deficits is almost nonexistent. The Reagan deficits of the 1980s provided a more direct test of the three paradigms. Yet a reading of the other papers in this symposium suggests that recent experience is consistent with many interpretations.

Fortunately, the outlook is not altogether agnostic. The Ricardian paradigm should be dismissed on theoretical grounds, as well as on the basis of indirect behavioral evidence. Much of the existing macroeconomic evidence—although weak—also supports the view that deficits have real effects.

I have argued that, for analytical purposes, deficits should be decomposed into permanent and transitory components. The Neoclassical paradigm provides a good theory of the permanent component, while the Keynesian framework describes the effects of the temporary component. For a variety of reasons, I am skeptical about the benefits of using temporary deficits as tools for macroeconomic stabilization. Accordingly, I conclude that the Neoclassical paradigm offers the most relevant insights for public policy. The new Administration would do well to focus on the goals of stimulating saving and capital accumulation, and to formulate a policy for gradually reducing permanent deficits.

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