CHAPTER 7

On the General Relativity of Fiscal Language

JERRY GREEN

LAURENCE J. KOTLIKOFF

For David

We are deeply honored to contribute to this volume in recognition of David Bradford. David was our very dear friend and mentor. He was also our steadfast enthusiast, filling us full of encouragement and lauding us with overly generous praise. David was a seeker of core truth, and his marvelous research contributions are replete with fundamental insights that separate economic science from popular perception.

David's research interests overlapped with ours on a wide range of topics, none less than the issue considered here; namely, how to discuss and measure fiscal policy in economically meaningful ways. David was particularly supportive of generational accounting, whose goal is to compare the fiscal treatment of current and future generations. Indeed, David was a driving force behind the development of the first set of generational accounts.

David's laugh, spirit, spark, insight, and support continue to sustain us. He has moved from the physical to the metaphysical, but his presence is no less real in our hearts, souls, and minds and will always be treasured.

1. Introduction

In this chapter we provide a general proof that standard fiscal measures, including the deficit, taxes, and transfer payments, are economically ill defined. Instead these measures reflect the arbitrary labeling of underlying fiscal conditions. Analyses based on these and derivative measures, such as disposable income, private assets, and personal saving, constitute the perusal of nomenclature, not the application of economics.

The argument that any underlying fiscal policy can be reported as entailing any time path of deficit, taxes, and transfer payments and that these measures are, economically speaking, content-free was originally advanced by Kotlikoff (1986). Auerbach and Kotlikoff (1987) and Kotlikoff (2002) provide formal treatments of the point, but neither provides a general proof of the proposition. This chapter fills this gap. It posits a competitive, contingent claims economy that can accommodate uncertainty, information asymmetries, distortions, externalities, public goods, time inconsistent policy, imperfect credit markets, and incomplete/segmented markets.

2. The Model

In this section we demonstrate the proposition described above. Specifically, we show that one can report any time path whatsoever of government deficits independent of the general equilibrium of the economy. The reported time path of deficits requires mutually consistent reports of the time paths of taxes and transfer payments. This consistency requirement means that the time paths of reported fiscal variables are determined relative to each other, rather than being determined independently. That is, what deficits one reports has implications for what taxes and transfer payments one reports.

Our method of demonstrating this proposition is to articulate the equilibrium of a fully general neoclassical model. In presenting this model, we make no reference to "deficits," "taxes," or "transfer payments." This, in and of itself, proves that these measures are arbitrary descriptive constructs, which have no more scientific bearing than does the choice of whether to use French or English as the language in which to discuss the model.

Our model differs from the classical private ownership model only in that it includes a government sector. Government policy is unconstrained in real terms. What we show, therefore, is that for any real policy there are an infinite number of ways that it can be reported making the measured path of deficits in all future periods completely arbitrary.

In what follows, there are K agents, N states, M goods, V firms, and H endowments. Goods include leisure. Endowments include time, various types of physical capital, and natural resources. As in Arrow (1964), a state of the world is defined by a particular date, a particular resolution of uncertainty, and a specification of all economically relevant variables. The terms p_s and q_s reference pre-policy producer and endowment price vectors in state s.

2.1. *Profit Maximization*

There are V firms, which may be operated by private agents, the government, or both. Firm j's profit is

$$\pi_j \equiv \max_{y_{js}} \left(\sum_s p_s Y_{js} - \sum_s q_s \phi_{js} + m_j \right), \tag{7.1}$$

where y_{js} is firm j's $1 \times M$ vector of net goods supply in state s, ϕ_{js} is firm j's $1 \times H$ vector of endowment demands, and m_j is a function determining the government's net payment to firm j. Producers are atomistic and take producer prices, endowment prices, and their net payment functions as given.

Firm j's constant returns production function is given by

$$f_j(y_{j1}, \ldots, y_{jN}, \phi_{j1}, \ldots, \phi_{jN}; Y_{-jl}, \ldots, Y_{-jN}, \phi_{-j1}, \phi_{-jN}, X_1, \ldots, X_N, Z_1, \ldots, Z_N, \omega_1, \ldots, \omega_N) = 0 \tag{7.2}$$

where Y_{-js} is a $1 \times M \times (V-1)$ vector of net supplies of firms other than j in state s, ϕ_{-js} is a $1 \times H \times (V-1)$ vector of state $-s$ endowment demands of firms other than j, X_s references the $1 \times M \times K$ vector of goods demanded by agents 1 through K in state s, Z_s references the $1 \times M$ vector of goods demanded by the government in state s, and ω_s references the $1 \times H$ vector of economy-wide endowments in state s. For future reference we denote by Y_s the $1 \times M \times V$ vector of net supplies of firms 1 through V in state s, and by $Y\phi_s$ the $1 \times H \times V$ vector of endowment demands of firms 1 through V.

Including the Y_{-js}'s, ϕ_{-js}'s, X_s's, Z_s's, ϕ_s's, and ω_s's in equation (7.2) entertains the possibility of production externalities, consumption externalities, externalities from the use of economy-wide endowments, as well as externalities arising from the levels of economy-wide endowments.

Firm j's net payment function, m_j, may depend on its own state-specific net supplies of goods and demands for endowments. But it may also depend on the state-specific net supplies and demands of other firms, the constellation of agents' state-specific demands, the constellation of government state-specific demands for goods and endowments, and the economy's overall endowments. In other words, the firm's net payment function may depend on any real variable in the economy. This potential dependency, which may be highly nonlinear, is expressed in

$$m_j = m_j\,(y_{j1}, \ldots, y_{jN}, \phi_{j1}, \ldots, \phi_{jN}; Y_{-j1}, \ldots, Y_{-jN}, \phi_{-j1}, \ldots, \phi_{-jN}, X_1, \ldots, X_N, Z_1, \ldots, Z_N, \omega_1, \ldots, \omega_N) \tag{7.3}$$

2.2. Preferences

Let x_{is} reference the $1 \times M$ vector of goods demanded by agent i in state s, X_{-is} reference the $1 \times M \times (K-1)$ vector of goods consumed by agents other than i in state s, and Z_s reference the $1 \times M$ vector of goods consumed by the government in state s. The utility of agent i is given by

$$U_i = U(x_{i1}, \ldots, x_{iN}; X_{-i1}, \ldots, X_{-1N}, Z_1, \ldots, Z_N, Y_1, \ldots, Y_N, \phi_1, \ldots, \phi_N, \omega_1, \ldots, \omega_N) \tag{7.4}$$

The arguments of these preferences accommodate consumer and producer externalities as well as externalities/public goods generated by producers' and government demands. These arguments can also determine commodity characteristics, like average quality, that can be important determinants of demand and welfare in economies characterized by asymmetric information.

2.3. Private Budgets

The budget constraint of agent i is given by

$$\sum_s p_s x_{is} = e_i, \tag{7.5}$$

where e_i is the net resource function of agent i. The net resource function references the amount of resources the government arranges for agent i to be able to spend on state-specific claims. As indicated in (7.6), this function may depend not only on the agent's own demand for claims in states of nature, but also on the claims of other agents, the production of each firm, the government's state-specific goods demands, and the economy's state-specific overall endowments. This dependency may also be highly nonlinear.

$$e_i = e_i(x_{i1}, x_{i2}, \ldots, x_{iN}; X_{-i1}, X_{-i2}, \ldots, X_{-iN}, Z_1, Z_2, \ldots, Z_N, Y_1, Y_2, \ldots, Y_N, \omega_1, \omega_2, \ldots, \omega_N), \tag{7.6}$$

In addition to (7.5), agent i's demands are constrained by

$$x_{is} \in \psi(X_1, X_2, \ldots, X_N, Z_1, Z_2, \ldots, Z_N, Y_1, Y_2, \ldots, Y_N, \omega_1, \omega_2, \ldots, \omega_N). \tag{7.7}$$

Equation (7.7) can accommodate a variety of important restrictions on trade, including those arising because of incomplete/segmented markets and borrowing constraints.

2.4. Market Clearing

In equilibrium, firms' supplies of goods in each state s must cover agents' and government demands and the economy-wide supplies of endowments must cover firms' endowment demands.

$$\sum_j y_{js} = \sum_i x_{is} + Z_s. \tag{7.8}$$

$$\omega_s = \sum_j \phi_{js}. \tag{7.9}$$

2.5. The Government's Budget

Equations (7.1), (7.5), (7.8), and (7.9) imply

$$\sum_s p_s Z_s = \sum_s q_s \omega_s + \sum_j \pi_j - \sum_i e_i \sum_j m_j. \tag{7.10}$$

The economy's overall resources consist of the value of its overall endowments plus the value of pure profits. These overall resources less the amount of net resources that the government provides to agents and firms must finance the government's demand for goods.

2.6. Government Policy

Government policy consists of a set of $e_i(^2)$ and $m_j(^2)$ functions as well as state-specific government product demand functions given by

$$Z_s = Z_s(X_1, X_2, \ldots, X_N, Z_1, Z_2, \ldots, Z_N, Y_1, Y_2, \ldots, Y_N, \omega_1, \omega_2, \ldots, \omega_N). \tag{7.11}$$

As equation (7.10) indicates, these four sets of policy functions are not mutually independent.

2.7. *Equilibrium*

In equilibrium, households maximize equation (7.4) subject to (7.5) and (7.7); firms maximize (7.1) subject to (7.2); the government jointly chooses its $m_j(^2)$, $e_i(^2)$, and $Z_s(^2)$ functions consistent with (7.10); and the market clearing conditions (7.8) and (7.9) are satisfied.

2.7.1. Reporting Policy

Agent i's net resources, e_i, can be reported as reflecting the market value of a $1 \times H$ vector of state-specific private endowments, a_{is}, proportionate holdings of firm j of θ_{ij}, less a $1 \times K$ vector of state- and good-specific net tax functions, τ_{is}; that is,

$$e_i = \sum_s q_s a_{is} + \sum_i \theta_{ij}\pi_j - \sum_s p_s \tau_{is} \tag{7.12}$$

Since the elements a_{is} and agent i's reported share of firm profits will be described as constants, the T_{is} functions must contain the same arguments as the e_i function; for examble,

$$\tau_{is} = \tau_{is}(x_{i1}, x_{i2}, \ldots, x_{iN}; X_{-i1}, X_{-i2}, \ldots, X_{-iN}, Z_1, Z_2, \ldots, Z_N, Y_1, Y_2, \ldots, Y_N, \omega_1, \omega_2, \ldots, \omega_N). \tag{7.13}$$

Note that in equilibrium, endowment and producer price vectors depend on the same arguments as τ_{is}, namely $X_1, \ldots, X_N$, $Z_1, \ldots, Z_N$, $Y_1, \ldots, Y_N$, $\omega_1, \ldots, \omega_1$, so there is no need to list them in (7.13) as separate arguments.

Let Ω_s reference a $1 \times H$ vector of reported government endowments in state s. Since endowments are held either by agents or the government, reporting, for agent i, endowments of a_{is} in state s also requires, for consistency, announcing a government net endowment vector Ω_s satisfying

$$\Omega_2 = \omega_s - \sum_i a_{is}. \tag{7.14}$$

Combining equations (7.10), (4.12), and (7.14) yields the more conventional expression for the government's budget, namely

$$\sum_s p_s Z_s + \sum_s \sum_j m_{js} = \sum_s q_s \Omega_s + \sum_j \theta_{gi}\pi_j + \sum_s \sum_i p_s \tau_{is}, \tag{7.15}$$

where references the government's reported ownership share of firm j. Equation (7.15) can be described as the government financing its goods and

its net subsidies payments to firms from its net worth (the sum of the first two terms on the right-hand side of (7.15)) plus its net taxation of agents.

$$\theta_{gi} = 1 - \sum_i \theta_{ij} \tag{7.16}$$

Given an equilibrium, any party, be it a private agent or government official, is free to report any constellation of private endowments and corresponding government endowments he or she wants. Assume, for example, that there is a single endowment, capital, and that agent k reports private asset values of $\hat{a}_{is}$ for $i = 1, \ldots, K$ and $s = 1, \ldots, N$ and private firm ownership shares θ_{ij}. The corresponding announcement of government net tax payments by agent i in state s—denoted by $\hat{\tau}_{is}$, and government assets in state $s, \hat{\Omega}_{is}$, must satisfy equation (7.17) and (7.18).

$$e_i = \sum_s q_s \hat{a}_{is} + \sum_i \hat{\theta}_{ij}\pi_j - \sum_s p_s \hat{\tau}_{is}. \tag{7.17}$$

$$\hat{\Omega}_s = \omega_s - \sum_i \hat{a}_{is}. \tag{7.18}$$

If agent k is a fiscal conservative (liberal) and is reassured by contemplating a large government surplus (debt) and low (high) taxes, agent k can simply declare very low (high) values of private assets, $_{is}$, which will lead, according equation to (7.17) and (7.18), to high (low) reported values of $\hat{\Omega}_s$ and low (high) reported values of $\sum_s p_s \hat{\tau}_{is}$. Thus the reported levels of these fiscal variables are completely undetermined as individual magnitudes, but they are linked to each other by (7.17) and (7.18). In this sense these variables are mutually determined, but not individually determined. As we discuss below, however, many economic analyses in macroeconomics and public finance have used the levels of taxes or deficits as measurable, identifiable variables, as if these levels had an unambiguous, independent meaning.

Equations (7.17) and (7.18) complete the demonstration of the proposition that is our main objective, as stated at the beginning of this section. One can see from these equations that a change in $\sum_i \hat{a}_{is}$ and a corresponding change in $\hat{\Omega}_s$ and $\sum_s p_s \hat{\tau}_{is}$ leaves the real value of each i's net resources constant while changing the reported government assets to any desired level. Of course, taxes and private assets need to be restated consistently. But there no an intrinsic meaning to the level of the deficit, the level of taxes paid, transfer payments received, or private assets held. Stated differently, there is are an infinite number of mutually consistent sets of fiscal labels that one can attach to any neoclassical model without providing the slightest economic insight concerning the model's true underlying fiscal policy, including the impact of that policy on the welfare of current and future economic agents.

2.8. Deficits

Time is one of many characteristics of our model's states of nature. If we consider two states, s' and s'', that differ with respect to their measure of time, the difference in government net debt (the negative of government assets) between the two states constitutes their intervening deficit. Since one can report any size debt or surplus for states s' and s'', one is free to report any size deficit (reduction in net assets) across those two states and, indeed, across any two states that one wants. Hence, each agent is free to concoct whatever deficit and associated net tax payment times series, past or present, that one wants.

2.9. Tax and Transfer Payments

Net taxes are defined as gross taxes minus transfer payments. Given one's reported level of net taxes, one can report any level of gross taxes minus a corresponding level of transfer payment. Hence, gross taxes and transfer payments are just as ill defined as net taxes. The same holds for any measures that rely on gross taxes and gross transfer payments such as average tax rates, the unfunded liabilities of transfer programs, disposable income, or personal private/saving.

2.10. Intuition

There is an old joke in which a husband claims to be in charge of his household. As he puts it to his friends, "I make the important decisions—I determine our household's foreign policy and let my wife handle everything else." Knowing who is really in charge in a marriage is tough business, and determining who owns what can be even harder. Indeed, if the household resides in a community property state, it is impossible to allocate ownership. The husband and wife may have "separate" bank and other accounts, but neither can withhold the corpus of "their" accounts from the other. Indeed, a variant of the quoted joke is "I own the money and my wife spends it."

The private sector and the government are no different from a couple living under community property law. They jointly own everything and jointly determine how to spend it. Whether the government says (a) "It's all mine, but I'll let you [the private sector] have some"; (b) "It's all yours, but I'll take whatever I'd like"; or (c) "It's partly mine and partly yours, but I'll determine how much of mine to give you and how much of yours to keep" does not make an iota of economic difference.

3. Illustrating the Model

The canonical model of government debt is Diamond's (1965) two period life-cycle formulation. We now show how the above general formulation accommodates this model. Agents are assumed to consume a single good and leisure when young and old. Labor supplied by young and old is homogeneous. Output of the good, call it corn, is produced via constant returns to scale with capital and labor. There is neither population nor productivity growth. We normalize each cohort's population to unity. The endowment of time that can be used for work or leisure is one per generation per period. For simplicity, we assume the government makes no net payments to firms, but does have a demand for consumption of the economy's single good.

Let c_{yt}, l_{yt}, c_{ot+1}, and l_{ot+1} stand, respectively, for consumption and leisure when young and old of the generation born at time t. The lifetime utility of the generation born at time t is given by

$$u_t = u_t(C_{y,t}, l_{yt}, C_{ot+1}, l_{ot+1}). \tag{7.19}$$

Consider the economy as of time $t = 0$. The budget constraint facing the old at time 0 is given by

$$C_{o0} + W_0 l_{o0} = e_{o0}. \tag{7.20}$$

For generations born at time $t \geq 0$, the budget constraint is given by

$$C_{yt} + \frac{c_{ot+1}}{1+r_{t+1}} + W_t l_{yt} + \frac{W_{t+1} l_{ot+1}}{1+r_{t+1}} = e_t. \tag{7.21}$$

In equations (7.20) and (7.21) $e_{o,0}$ stands for the remaining lifetime net resource function of the old at time 0, and e_t is the lifetime net resource function of the generation born at time t. Each generation's net resource function can depend freely and in a highly nonlinear way on its consumption and leisure decisions. And, since each generation will consider how its consumption and leisure decisions affect its net resources both inframarginally and at the margin, this formulation fully accommodates distortionary policy.

The production function is

$$Y_t = F(K_t, L_t). \tag{7.22}$$

The government's demand for corn at time t is g_t. The economy's endowment of capital evolves according to

$$K_{t+1} - K_t = Y_t - C_{yt} - C_{ot} - g_t. \tag{7.23}$$

Labor supply is determined by

$$L_t = 2 - l_{yt} - l_{ot}. \tag{7.24}$$

Using (7.22) and (7.24), rewrite (7.23) as

$$K_{t+1} - K_t = F(K_t, 2 - l_{yt} - l_{ot}) - C_{yt} - C_{ot} - g_t. \tag{7.25}$$

In hiring capital and labor, firms equate marginal factor products to pre-policy factor prices; that is,

$$F_k(K_t, 2 - 1_{yt} - l_{ot}) = r_t$$
$$F_L(K_t, 2 - l_{yt} - l_{ot}) = W_t \tag{7.26}$$

3.1. Policy

In equilibrium, the government announces a time path of net resource functions—the terms e_{o0} and e_t—and a time path of corn demand, g_t, that satisfy (7.25) in each period given utility maximization subject to (7.19) and (7.20), and given the determination via (7.26) of pre-policy factor prices.

3.2. Labeling

Suppose the economy is in dynamic equilibrium given government policy as determined by its net resource and spending functions. Denote by an upper bar this equilibrium's variables. Now consider announcing/reporting any time path of official debt, $\hat{D}_t$ starting at time 0. If one reports $\hat{D}_0$ as the amount of government debt prevailing at time 0, the corresponding report of private assets at time 0, $\hat{a}_0$, is determined by (7.27) for $t=0$. The consistent report of net taxes facing the elderly at time 0, $\hat{\tau}_{o0}$, is determined by (7.28). The reported debt for time $t>0$ determines $\hat{a}_t$ from (7.27). This determines $\hat{\tau}_{yt}$ from (7.29), and, given $\hat{\tau}_{yt}$, the reported value of $\hat{\tau}_{t+1}$ is determined by (7.30).

$$\hat{a}_t = \hat{D}_t + \bar{K}_t. \tag{7.27}$$

$$\bar{e}_{o0} = \hat{a}_0(1+\bar{r}_0) + \bar{w}_0 - \hat{\tau}_{o0}. \tag{7.28}$$

$$\hat{a}_{t+1} = \bar{w}_t(1 - l_{yt}) - \bar{C}_{yt} - \hat{\tau}_{yt}. \tag{7.29}$$

$$\bar{e}_t = \bar{w}_t + \frac{\bar{W}_{t+1}}{1+\bar{r}_{t+1}} - \hat{\tau}_{yt} - \frac{\hat{\tau}_{ot+1}}{1+\bar{r}_{t+1}}. \tag{7.30}$$

3.3. Relationship to the General Formulation

In the above example, equation (7.20) and (7.21) are specific cases of (7.5), (7.24) is a specific case of (7.8), and the equation of economy-wide capital and time endowments with firm demands for these endowments in (7.26) is a specific case of (7.9).

Although we have presented this example assuming that all cohort members are identical, the example can readily be modified to include cohort-specific heterogeneity. One need simply apply an individual-specific subscript to each of the cohort-specific variables. Doing so does not rule out anonymous net resource functions. Subscripting net resources by an agent's identity does not imply that the function determining those resources (as opposed to the arguments of the function) is agent-specific. Hence, Mirrlees' (1971) optimal income tax can be relabeled as freely as any other tax, with no alteration in his underlying optimal net resource function.

3.4. A Second Illustration with Adverse Selection, and Credit Constraints

Our second example, informed by Jaffee and Russel (1976) and Hayashi (1987), shows that the relativity of fiscal language is not compromised by incomplete information, adverse selection, or credit constraints.

Agents again live for two periods. But each cohort now features two types of agents—A and B. An agent's type is private information. Type B agents are honest. They always repay what they owe, whether they owe payments to private parties or the government. In contrast, type A agents are dishonest.

Define C^*_{Ay} by

$$V_A = u(c^*_{Ay}, 0), \tag{7.31}$$

where for $i = A, B$,

$$V_i \equiv \max_{C_{iy}, C_{io}} (C_{iy}, C_{io}) \text{ such that } C_{iy} + \frac{c_{io}}{1+r} = e_i. \tag{7.32}$$

Note that for standard concave utility functions, $C^*_{Ay} > e_A$.

If type A agents are permitted to consume more than C^*_{Ay} when young, the present value of their consumption will exceed their lifetime net resources.

Denote by the utility maximizing value of c_{iy} and c_{io}. Consider a separating equilibrium in which

$$\hat{C}_{By} > C^*_{Ay} \tag{7.33}$$

and "financial" and "fiscal" institutions permit agents to set their consumption when young as high as C^*_{Ay}, but no higher.[1] Since type A agents are indifferent between X, consuming C^*_{Ay} when young and zero when old and Y, consuming less than C^*_{Ay} when young and a positive amount when old, we assume they choose option i. In contrast, given (7.33 the consumption of type B agents is given by

$$C_{By} = C^*_{Ay} \quad \text{and} \quad C_{Bo} = (e_B - C^*_{Ay})(1+r). \tag{7.34}$$

The consumption of type A agents is given by $\hat{c}_{Ay}$ and $^{\circ}c_{Ao}$.

Note that we have described this economy with no reference to the terms "borrowing," "taxes," or "transfer payments." The budget constraint in (7.32) is a specific case of (7.5), and the constraint on agent B's consumption when young and old in (7.34) is a specific case of (7.7).

If we want, we can describe type B agents as "facing high taxes when young, but being able to borrow large amounts" or as "facing low taxes, but being able to borrow small amounts." A "policy" of "raising current taxes" and "cutting future taxes" that leaves lifetime net resources unchanged can be described as engendering an increase in "private lending" that leaves type B agents with the same first and second period consumption values.

4. Research and Policy Implications

The fact that one can construct an infinite number of equally meaningless time series of government debt, deficits, taxes, transfer payments, private

assets, private saving, and disposable income vitiates a vast number of economic analyses predicated on these measures. Recent examples include Gale and Orszag's (2004) and Engen and Hubbard's (2005) studies of the effects of budget deficits on interest rates; Bell and Bosworth's (2005) study of the decline in personal saving; Banks, Blundell, and Smith's (2001) study of financial wealth inequality; Slemrod's (1994) study of tax progressivity and income inequality; the Organization for Economic Cooperation and Development's (OECD) (1997) analysis of inequality in disposable income; the International Monetary Foundation's (IMF) study of fiscal policy and financial development (Hauner 2006); and the World Bank's study of fiscal sustainability (Burnside, 2005).

The failure to distinguish economics from linguistics also undermines theoretical research. Consider, for example, Barsky, Mankiw, and Zeldes' (1986) paper on Keynesian tax cuts. Their policy entails a short-run across-the-board "tax cut" coupled with a long-run progressive "tax hike," which is present value neutral in terms of the government's net receipts. The policy provides earnings insurance, which leads to more current consumption. The authors suggest that this provides a neoclassical basis for the Keynesian view that tax cuts expand aggregate demand.

In fact, it does no such thing since the policy could equally well be run/described/labeled as entailing a tax hike. No doubt someone will someday write a paper arguing, from the perspective of this model, that a tax hike policy and a tax cut policy are equivalent. This projected essay will add to the long list of papers purporting to identify "equivalent policies"—policies that can be run/implemented differently, but that generate the same economic outcomes. Such papers miss a central point. There are no equivalent policies in neoclassical economics. Policies are unique. What is different is simply the words we use to describe the same underlying policy.

Fischer's (1980) famous paper on the time inconsistency provides yet another example of the confusion of economics and language. In Fischer's two-period model agents fail to save out of fear of *ex post* efficient, but *ex ante* inefficient capital levies. But from the perspective of the second period, Fischer's capital levy is no different, apart from labeling, from a second-period inframarginal labor income tax. Were Fischer's agents to adopt such a nondistortionary labor tax in their second period and also in their first, they'd achieve a first-best equilibrium.

So why does Fischer conclude that his economy ends up in a third-best equilibrium in which no one saves for fear of a capital levy? The answer is his assumption that only proportional labor income taxes may be levied/announced. But this assumption is not based on any economic feature of his model. Instead it boils down to a noneconomic restriction on language since, from the perspective of the second period, a "capital levy" could just as well be called "an inframarginal labor income tax." Fischer's rational agents will surely realize this and also realize that if they can infra-marginally tax labor in the second period, they can do so in the first. Having figured this out, they will end up in the first-best.[2]

A third example of theoretical confusion over real policy and labels is the ubiquitous invocation of transversality conditions requiring that government debt grow, in the long run, no faster than the economy's return on capital,[3] and the presumption that economies that violate such conditions are dynamically inefficient. As indicated here, there is no limit to the growth in reported debt, nor is there any economic association between the growth rate of reported debt and what matters for dynamic efficiency—namely, the deviation between the growth rate of the economy and its return to capital.

To see this in a less abstract framework, consider a dynamically efficient two period life-cycle model with a zero intrinsic growth rate. Assume the economy is sitting in a stationary state with a positive return to capital of r. Also assume the economy's government consumes nothing and takes, on net, nothing from any generation either when it is young or when it is old. Now, starting at time 1, let us label this policy as the government's "borrowing $m^t h$ from each agent born at time t, making inframarginal transfer payments of $m^t h$ to each agent born at time t, repaying principal plus interest of $m^t h(1 + r)$ at time $t + 1$ to each agent born at time t, and inframarginally taxing at time $t + 1$ each agent born at time t in the amount $m^t h(1 + r)$." This economy's reported debt at the beginning of time $t + 1$ is $m^t h$. If $m > 1$, the economy's debt and deficit will head to infinity with no affect whatsoever on the economy or any agent in the economy.[4]

Turning to actual policy, one need only consider the Maastricht Treaty limiting members of the European Union to 3 percent deficits, the Stability and Growth Pact that sanctions EU members with deficits above 3 percent, the IMF's enduring use of the deficit to assess fiscal prudence, the Gramm-Rudman-Hollings Act to limit U.S. deficits, or the ongoing movement for a U.S. balanced budget amendment to realize that official reports of deficits are (a) dramatically influencing policy decisions and (b) diverting attention from fundamental and meaningful measures of fiscal policy.

5. Conclusion

A century ago, everyone thought that *time* and *distance* were well-defined physical concepts. But neither proved absolute. Instead, measures/reports of time and distance were found to depend on one's direction and speed of travel making our apparent physical reality, in Einstein's words, "merely an illusion."

Like time and distance, standard fiscal measures, including deficits, taxes, and transfer payments, depend on one's reference point/reporting procedure/language/labels. As such, they too represent numbers in search of concepts that provide the illusion of meaning where none exists. Economists must accept this fact and acknowledge that much of what they have been writing and saying about fiscal policy has been an exercise in linguistics, not economics.

NOTES

We thank Alan Auerbach, Daniel Shaviro, Kent Smetters, and other participants at the New York University Law School's conference, "Key Issues in Public Finance: A Conference in Memory of David Bradford" for very helpful comments.

1. Condition (7.32) could arise because type-B agents have higher net lifetime resources than type-A agents or because type-B agents have relatively strong preferences for consuming when young.
2. Kotlikoff (2002) discusses both Barsky, Mankiw, and Zeldes (1986) and Fischer (1980).
3. See, for example, Blanchard (1985).
4. If $m < -1$, the government's surplus heads to infinity. If $-1 < m < 1$, the governments reports a declining debt or surplus through time.

REFERENCES

Arrow, Kenneth J. 1964. "The Role of Securities in the Optimal Allocation of Risk-Bearing." *Review of Economic Studies* 31; 91–96.

Auerbach, Alan J., and Laurence J. Kotlikoff. 1987. *Dynamic Fiscal Policy.* Cambridge Cambridge University Press.

Banks, James, Richard Blundell, and James P. Smith. 2001. *Financial Wealth Inequality in the United States and Britain.* Los Angeles: The Rand Institute.

Barsky, Robert B., Gregory Mankiw, and Steven P. Zeldes. 1986. "Richardian Consumers with Keynesian Propensities." *The American Economic Review* 76(4): 676–691.

Bell, Linda, and Barry Bosworth. 2005. "The Decline in Household Saving: What Can We Learn from Survey Data." Mimeo, The Brookings Institution.

Blanchard, Olivier. 1985. "Debts, Deficits, and Finite Horizons." *Journal of Political Economy* 93(2); 223–247.

Burnside, Craig (ed.). 2005. *Fiscal Sustainability in Theory and Practice*. Washington, DC: The World Bank.

Diamond, Peter A. 1965. "National Debt in a Neoclassical Growth Model." *American Economic Review* 55: 1126–1150.

Engen, Eric M., and R. Glenn Hubbard. 2005. "Federal Government Debt and Interest Rates." in Mark Gertler and Ken Rogoff (eds.), *NBER Macroeconomics Annual 2004* Cambridge, MA: MIT Press (pp. 83–138).

Fischer, Stanley. 1980. "Dynamic Inconsistency, Cooperation, and the Benevolent Dissembling Government." *Journal of Economic Dynamics and Control* 2; 93–107.

Gale, William and Peter R. Orszag. 2004. "Budget Deficits, National Saving, and Interest Rates." *Brookings Papers on Economic Activity* 2: 101–210.

Hauner, David. 2006. "Fiscal Policy and Financial Development." IMF Working Paper, WP/06/26, January.

Hayashi, Fumio. 1987. "Tests for Liquidity Constraints: A Critical Survey." In T. Bewley (ed.), *Advances in Econometrics II: Fifth World Congress* (pp. 91–120). Cambridge: Cambridge University Press.

Engen, Eric, and glenn Hubbard. 2005. "Government Debt and Interest Rates." in M. Gertler and K. Rogoff, (eds.) *NBER Macroeconomics Annual 2004*. Cambridge: MIT Press.

Jaffee, D. M., and T. Russel. 1976. "Imperfect Information, Uncertainty, and Credit Rationing." *Quarterly Journal of Economics* 90: 651–666.

Kotlikoff, Laurence J. 1986. "Deficit Delusion." *The Public Interest* 84 (Summer): 53–65.

Kotlikoff, Laurence J. 2002. *Generational Policy*. Cambridge, MA: MIT Press.

Mirrlees, James A. 1971. "An Exploration in the Theory of Optimal Income Taxation." *Review of Economic Studies* 38: 175–208.

OECD. 1997. "Income Distribution and Poverty in Selected OECD Countries." *OECD Economic Outlook*. Paris: OECD.

Slemrod, Joel. (ed.). 1994. *Tax Progressivity and Income Inequality*. Cambridge: Cambridge University Press.