Back to the Future: Monetary Policy and the Twin Deficits

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Abstract

The hypothesis of debt neutrality has been attacked on many grounds since the issue resurfaced in 1974. The recent analysis of endogenous tax policy represents the most far-reaching of these assaults. This paper explores several new implications of endogenous tax determination for Ricardian neutrality. When the economy is open to foreign trade, the budget and trade deficits are shown to move together. Furthermore, the effect of endogenous tax policy on intergenerational welfare is addressed, as well as the optimal monetary policy resulting from these welfare concerns.

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Over the last 15 years the ability of lump sum tax policy to affect any real economic variables has been exhaustively debated. The original conclusion of debt neutrality which Barro extended in his seminal 1974 paper has been carefully qualified by Buiter (1979), Buiter and Carmichael (1984), Burbidge (1983), Drazen (1978), Weil (1987a), and a host of others. This paper re-examines fiscal policy in an overlapping generations open economy framework, carefully avoiding the obstacles to neutrality highlighted in the above literature. While paralleling the basic structure of the Ricardian equivalence model, this model also examines another explanation for the failure of debt neutrality. As in Cukierman and Meltzer (1989) (CM), the endogeneity of tax policy is emphasized. This paper, however, differs from CM in several important respects. Specifically, Ricardian equivalence is shown to fail when random shocks perturb the degree of parental concern for their children. Furthermore, the implications of endogenous tax policy for the distribution of intergenerational welfare, the optimal monetary policy, and the balance of trade are explored.

In the Ricardian equivalence work, the divine right of kings to tax assures that tax policy is exogenously thrust upon consumers. Citizens react to changes in taxes; they do not instigate them. Here, as in CM, the level of taxes is a choice variable of the citizenry. Since democratically elected officials generally enact the fiscal policies desired by current voters, modeling consumers as if they were indifferent to alterations in the path of taxes exogenously set by the government ignores the variations in consumer preferences often revealed by such tax changes. Why would the citizens who control government spending and taxes make adjustments in the timing of taxes to which they were indifferent?

CM emphasize the growth of income over time and the distribution of current income and wealth as determinants of the timing of tax payments; alternatively, this paper examines the effect of changes in the degree of intergenerational altruism on the path of taxes. In a model with endogenous tax formation, stochastic movements of the concern that one generation of parents has for the utility of its children can generate random changes in the trajectories of taxes and consumption. The historical path of intergenerational discount rates could, therefore, help explain the movement of per capita public debt over time. Furthermore, in an open economy the variables examined in this paper, or in CM, can explain co-movements in the current account and the budget deficit.

Investigating the role of intergenerational altruism in the determination of tax policy also helps explain the welfare effects of the incomplete market intrinsic to models with overlapping generations. Since the as yet unborn, and thus non-voting, population is not perfectly represented by its parents in the market today, social inefficiencies can develop; society could be made better off by transferring income between generations. To examine these welfare effects, a simple model is constructed, where the central bank is independent of the current voters and optimally concerned about all generations. A monetary policy that attempts to minimize deviations from the socially preferred path of consumption is then derived.

The basic model is constructed in Section I. An example illustrating the effect of a shock to the current generation's concern for the utility of their children is examined in Section II. In an open economy framework, such a taste disturbance results in co-movements in the trade and the budget deficits. Section III solves for the monetary authority's optimal response to

such a disturbance given its concern for the consumption of all generations. The variables that determine the central bank's behavior are examined in detail in Section IV. The potential clash between the current generation's concern for the future voters and the socially optimum level of altruism is shown to be an important determinant of monetary policy in this model. Section V provides a conclusion.

I. The Model

The model closely resembles the traditional overlapping generations format found in Samuelson (1958), Diamond (1965), Drazen (1978), and Weil (1987a). Each generation lives two periods, while society as a whole continues infinitely. Unlike Diamond (1965), but as in Barro (1974), Drazen (1978), Weil (1987a), and most of the current literature, consumers derive benefit from the utility of their offspring. All taxes are lump sum, and population grows at rate n. Each consumer is endowed with a set level of output. Alternatively, it could be assumed that labor is supplied inelastically, and the real wage is fixed since the capital stock is constant.[1] These assumptions are intended to make the economy as neutral as possible in order to highlight the source of the non-neutrality examined in this paper.

Money is modeled in this economy so that monetary policy can be examined in Sections III and IV. To motivate the existence of money in an endowment economy it is assumed that there is a continuum of goods which all individuals

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[1] Since this is a small open economy model, the interest rate is exogenously set at the world rate, r^*. The capital-labor ratio would then have to remain constant where $\partial f(k)/\partial k = r^*$. This paper's model would then simply require that the capital stock be held by someone, domestic or foreign.

wish to consume, while they are endowed with less than this spectrum. Cash is required for all domestic purchases. The results in parts I and II of this paper are independent of the existence of money, so a complete description of money's role in the model will wait until the final two sections of the paper.

The economy is open and small in comparison to the rest of the world. Purchasing power parity holds, capital is perfectly mobile, and the exchange rate is flexible. The assumption of a small, open, endowment economy eliminates the general equilibrium effects on factor returns caused by movements in the capital stock when national saving changes, which is analyzed in CM; this simplification highlights the open economy and welfare implications of endogenous tax policy. Domestically, wealth is held in the form of money and, to make the economy as immune to monetary disturbances as possible, indexed foreign and domestic bonds. In this model, foreigners are assumed to contract ahead for domestic goods and, thus, will not hold domestic money as it is dominated by the indexed domestic bonds.[2] The net stock of foreign bonds represents the total accumulated savings, or borrowing, of the country up to that period.

Current fiscal policy is determined solely by the two generations alive today. A simplifying assumption is made, which is later dropped, that children cannot change their parents' taxes; thus, consumers take their two-

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[2] International transactions are assumed to be contracted for in advance. Although these contracts introduce a fixed transaction cost, they allow more elaborate transaction mechanisms such as payment in bonds. Money is assumed to alleviate the need for these contracts, and thus all domestic purchases are made using money. The difference in the purchasing technology between foreigners and domestics derives from the different agents doing the buying. Domestics are individuals, foreign importers are firms; domestics consume, foreigner importers invest.

year tax profile as given.[3] Because this paper analyzes Ricardian equivalence, only tax changes with constant government spending will be examined. For convenience, it is assumed that the country starts from internal and external balance.

The representative consumer in each generation maximizes his or her utility,

$$(1) \quad U_t = U(c_t^1, c_t^2, U_{t+1}^*)$$

where c_t^i is the consumption of a generation t individual in the i^{th} period of life, and U^*_{t+1} is the utility attained by that consumer's children. Thus, parents derive benefits from the consumption of their heirs. Although the utility function is identical for all individuals in a given generation, tastes can change between generations. Specifically, the utility generation t derives from the consumption of its offspring is stochastic and can be greater than, less than, or equal to that which an objective social planner may assign to future generations.

The consumer's utility maximization is constrained by several budget equations. Primary is the individual's intertemporal budget constraint,

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[3] This assumption can be justified on the grounds that expectations are static, that the old are not taxed, or that the old can muster the political power necessary to prevent an increase in their second-period taxes. The importance of this assumption becomes clear in the optimal policy section. For example, it prevents the young from taxing an older, profligate generation to make up for their earlier tax cuts. By ruling this fiscal action out, monetary policy can be examined more clearly, as well as the issue of the long-term effect of debt.

$$(2) \qquad [(1+n)/(1+r^*)]b_t = b_{t-1}+y_t^1-c_t^1-\tau_t^1+(y_t^2-c_t^2-\tau_t^2)/(1+r^*),$$

where r^* is the fixed world interest rate, y_t^i is the endowment received by a member of generation t in the i^{th} period of life, t_t^i is the tax paid by a generation t consumer in the i^{th} period of life, and b_t is the bequest left by that individual to each of his or her children. Total bequests are essentially the net bond position of the country, and all bequests are delivered as bonds, since no reason remains to hold money after all one's second- period consumption is complete.[4] Bequests are transferred after the children have set their own taxes, in the beginning of the second period of the parent's life.

Two other important budget constraints face the consumer. Over time the government budget must balance. And, in an open economy, a solvency restriction must hold:

$$(3) \qquad \sum_{t=1}^{\infty} B_t^{D*} = 0,$$

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[4] Note that these are really planned bequests, as consumers at time t must make assumptions concerning the consumption of their children. Their heirs' consumption is uncertain, as the realization of the generation t+1 stochastic discount factor is unknown to their parents while they set their own tax profile. The assumption of fixed second-period taxes is also made to simplify this expectation. Although the per capita bequests in equation 2 are essential to the determination of the tax policy generation t institutes when it is young, the actual realized bequests are not important for the policy or the conclusions of this paper. This issue is discussed in detail later in the paper.

where B^{D*}_i is the foreign holding of per capita domestic debt. The current account budget constraint indicates the unwillingness of foreigners to pay for a domestic "free lunch." The amount the current generation can borrow from abroad depends on the present discounted value of the country's future income.

Maximizing the consumer's utility produces the first-order conditions with respect to intertemporal allocations,

$$(4) \qquad (\partial U/\partial c_t^1) / (\partial U/\partial c_t^2) = 1+r^*,$$

and intergenerational allocations,

$$(5) \qquad (\partial U_t/\partial U_{t+1}^*) = (\partial U_t/\partial c_t^2) [1/(\partial U_{t+1}^*/\partial b_t)] (1+n).$$

The LHS of (5) represents the relative concern of the current generation for the future consumers. Essentially, it is the rate at which those currently alive discount the consumption of their children; as the LHS of (5) rises, this discount rate falls. For brevity this variable will be represented by δ^P_t. The t subscript indicates that tastes may change over generations, while the superscript distinguishes it from the discount rate of the social planner.

Generally, equation 5 is written as an inequality; the LHS of (5) must be less than or equal to the RHS, as it is assumed that the current generation can leave only positive bequests. The requirement that bequests be positive, or "operative," is one of the qualifications of Ricardian equivalence found

in, for example, Drazen (1978). In this model, however, generation t's control of tax policy allows those currently living to force gifts from the future generations by incurring budget deficits. The government budget constraint need not balance every two periods. The present generation passes on a negative bequest by increasing the debt to which its children are liable. Since bequests are no longer bound by zero, and equation (5) holds by equality, Ricardian equivalence should always hold in this model. However, even though the ability to force gifts through the ballot box invalidates the operative bequests caveat concerning Ricardian equivalence, tax changes can be related to movements in consumption and the current account in this model. A stochastic δ undoes the Ricardian neutrality prediction of zero correlation between the two deficits.

Finally, substituting the intertemporal allocation condition into the intergenerational one,

$$(6) \qquad \partial U_t/\partial U^*_{t+1} = [(1+n)/(1+r^*)]\,[1/(\partial U^*_{t+1}/\partial b_{t+1})]\,(\partial U_t/c^1_t),$$

produces an expression emphasizing the importance of intergenerational altruism when taxes are endogenous. If $\partial U_t/\partial U^*_{t+1} = 0$ then $\partial U_t/\partial c_t$ will be driven towards zero in equilibrium. Concern over the chain of utilities of one's descendants is necessary to prevent the current generation from consuming all the country's wealth. It is the knowledge that its children, or someone its children care about, must pay the tax bill in the future that restrains the current generation from consuming everything. What prevents the tax cut from having any effect on current consumption in a traditional

overlapping generations model with bequests also prevents the system from exploding when the public controls tax policy.

II. A Shock To Tastes

The effect of a shock to a generation's bequest motive on the trade and budget deficits can be clearly illustrated when it is assumed that only one generation lives at a time. At an initial zero bequest equilibrium, to simplify the example, generation t suddenly cares less about the utility of its heirs; $\partial U_t/\partial U^*_{t+1}$ on the LHS of (5) falls, and δ_t^P rises. Given the initial zero bequests equilibrium, generation t equilibrates this first-order condition by raising its consumption and reducing the consumption of its descendants. Since they initially had no savings, the current voters must decrease taxes in order to force gifts from their offspring. The decrease in taxes raises net income for those in generation t and allows their consumption to increase.

In an endowment economy, this rise in current consumption can only occur through a worsening of the trade balance; either imports must increase or exports must decline. The current generation pays for these goods by selling foreigners the debt produced by the tax cut. Perfect capital mobility and the small country assumption allow the new supply of bonds to be effortlessly absorbed. The change in tastes produces a positive correlation between the budget and trade deficits. This positive relationship is not simply an artifact of an endowment economy; as long as labor supply is not infinitely elastic with respect to the real interest rate, and the country is relatively small, some positive correlation will still exist.

If, however, bequests are greater than zero before the disturbance to the intergenerational discount rate, and remain positive afterwards, an increase in δ_t^P might only reduce generation t's private assets. In this case, consumption would rise and the current account worsen but without a concurrent decrease in taxes and increase in the budget deficit. Positive post-shock holdings allow the current generation to decrease bequests by either reducing its savings or cutting taxes; the correlation between budget and trade deficits would, in this case, be indeterminate.[5] If consumers reduce their private savings, the budget deficit does not rise with the trade deficit; if they decrease public savings, the two deficits move in tandem.

The issue is slightly more complicated when more than one generation is assumed to live at one time. With overlapping generations, the relationship between the supply of domestic bonds, B_t, and total foreign demand for these domestic bonds, B^{D*}_t, depends on an additional assumption about the political environment and the exact way in which taxes are determined. It can be assumed either that the δ is identical for all those currently living or that the discount rate is the same only for those in a given generation. The former assumption would be relevant if tastes were endogenous in a broader model, and past experience had no effect on tastes, so that both generations' δ is identically determined. If a generation's altruism depends on the path of these broader exogenous variables through its own lifetime, however,

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[5] If citizens hold a positive net asset position versus the rest of the world when δ_t^P increases, they can either sell off their bond holdings or decrease their taxes to increase consumption. In the latter case both the budget deficit and the current account deteriorate. The nature of the political consensus-building might solve this indeterminacy by biasing the economy towards the tax cut solution. The opportunity for politicians to please their constituents, and increase the likelihood of getting reelected, raises the probability that savings would be decreased through the tax cuts.

generations could possess different discount rates. The two cases are briefly examined.

Identical Tastes for Young and Old

The benefits of this assumption are twofold. The attainment of a political decision is trivial when all citizens agree with the optimal fiscal policy, and it is immediately clear that aggregate consumption rises with a tax cut.

As an example, assume all those currently alive suddenly more heavily discount the consumption of their children. For ease of exposition, also assume that bequests and the budget and trade deficits are initially equal to zero.[6] For both generations, the increase in the discount rate decreases the LHS of (5). As a result, the young reduce the RHS of (5) by increasing c_t^2 and decreasing c^1_{t+1}. Consumption of generation t voters rises in both periods of their lives as required by the intertemporal first order condition in (4). For the old, generation t-1, the LHS of their intergenerational first order condition has decreased and the RHS has increased with the rise in their children's consumption. Thus, c^2_{t-1} must increase. Both generations would, therefore, force the government to load taxes further into the future. The old would not save the tax cut for their children as this would only aggravate the initial inequality in (5). As a result, the consumption of both the young and old rises with the current tax reduction. This higher consumption is accomplished by borrowing abroad. The current account goes into deficit as aggregate consumption rises, and the capital account runs an equal surplus, maintaining balance of payments.

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[6] To make the model simple, and assure that the current account is always in balance, assume that $r^*=n$.

Divergent Tastes between Young and Old

A more complicated, although interesting, result occurs when the shock to altruism affects only the younger generation. In this case it is assumed that the young win the political struggle, as they should with the assumed positive population growth.[7] The young, therefore, dictate tax policy, and as their δ^P declines, their consumption rises. As noted earlier, in order to examine monetary policy reactions alone, it is assumed that the old can only be taxed less, not more, than the t^2_{t-1} they provided for when they were young.

When the δ^P of generation t-1 remains unchanged, but their taxes decrease, the old better represent consumers in the traditional Ricardian equivalence literature, although their behavior differs significantly. As taxes for the old are reduced, their second period net income will increase. Under the traditional assumptions of Ricardian equivalence, that c^2_{t-1} remains constant and that the old save their entire tax cut, the RHS of (5) would increase. If the cross-derivative of utility with respect to U^*_t and c_t is positive, the first term on the RHS of (5) increases as the marginal utility of consumption for the old rises. Regardless of the size of this cross-derivative, however, the second term on the RHS of (5) increases because the higher level of consumption of the young reduces the marginal gain for the young of an additional dollar in bequests.[8] Since the δ^P of the old did not change, the old will increase their second period consumption and decrease

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[7] The domination of the political process by the young would occur even in a continuous time model such as in Blanchard (1985). The stochastic nature of the discount rate in that framework could be modeled as either an increase in the consumer's rate of time preference or an increase in the probability of death.

[8] Note that the young's utility for consumption does not increase, which could lead to a decrease in the second term on the RHS of (5), but it is the rate at which they are concerned for the utility of their children that changes.

their bequests away from the Ricardian equivalence solution. Although the old resemble consumers in the traditional, Ricardian paradigm, where tax cuts are thrust upon the citizens, tax cuts increase their consumption since their children are not neutral to these changes.

In fact, the old may purchase some of the newly issued domestic debt. How much depends on the extent to which the increased consumption of their children decreases their desire to hand down bequests. Heterogeneity between the generations helps explain the holding of some domestic debt by citizens, even while the country as a whole borrows from abroad.[9] This model also highlights that the increased tax bill faced by generation t-1's grandchildren is not motivating them to increase their savings. They care about their grandchildren only because their children care about them; there is a contagium of greed in this economy. In fact, if their offspring ceased caring about these grandchildren altogether, then both generations would be motivated to consume all the economy's wealth.

Regardless of whether the old experience a simultaneous discount rate shock with the young or not, aggregate consumption increases with a taste-induced decline in current taxes. The resulting deterioration in the government surplus correlates with a worsening in the trade deficit. The assumptions, that people care about the utility of their children and are not bound by positive bequests, are not sufficient to ensure that movements in budgetary deficits do not coincide with changes in current consumption or the

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[9] If discount rates vary within a generation so that, for example, a minority of the young opposed the tax cut, some of the young would also hold domestic bonds. If $r^{*}=n$, the increased per capita taxes faced by the children of the young minority equal the tax cut received by these individuals. Thus, within the young generation, there would be a minority of the population which displayed Ricardian neutral behavior and a majority behaving as the young in the paper.

current account. Democratically controlled fiscal policy and random changes in the concern consumers feel for the welfare of their children can produce a correlation between the twin deficits.

This model, so far, fulfills two functions. Even with the operative bequest caveat removed, budget deficits and trade deficits may move together. Further, this paradigm helps to explain why, in a democracy, tax policy is so variable. With endogenous tax policy, shocks to the intergenerational discount rate can help explain both changes in per capita debt and the increased consumption that tends to go along with them. The next section explores the potential suboptimality of these random consumption patterns. An optimal monetary reaction to this inefficiency is, therefore, derived.

III. Monetary Policy with Time-Variant Tastes

While the government regulates tax and debt policy, the central bank is assumed to control the money supply. Since it is not the purpose of this paper to discuss the existence of money, it is merely assumed that money is a prerequisite to purchasing the diverse goods. The monetary authority's welfare function optimally weighs the utilities of current and future generations; its independence from the currently elected budget-setters requires the central bank's optimal monetary reaction to random shocks to bequests to close the model. The rate at which the current citizens discount the consumption of their descendants could be quite different from that of the

monetary authority.[10] It is this potential conflict that is at the heart of the optimal monetary policy derived in this paper.

The monetary authority is assumed to minimize a loss function similar to that found in Kydland and Prescott (1977) and Barro and Gordon (1983),

$$(7) \qquad \underset{\pi}{Min} \quad \alpha[\log(c_t^P) - \log(c_t^{MA})]^2 + \Gamma[\pi_t]^2,$$

where deviations away from both the central bank's optimal per capita consumption stream,

$$(8) \qquad c_t^{MA} = c(\delta^*, D_{t-1}, T_{t-1}, Y_t),$$

and zero inflation are costly. c_t^{MA} represents the monetary authority's desired trajectory of consumption if it controlled all savings decisions from time t on. This optimal path of consumption depends on history, as past realizations of the intergenerational discount rate affect the current net wealth of the country. Thus, national wealth at time t depends on the accumulation of past savings or debt, where $D_{t-1} \equiv \sum_{i=0}^{t} B^{D*}_i$, the present discounted value of future income, Y_t, and total tax payments as of time t,

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[10] The discount rate of the monetary authority could be some weighted average of the stochastic process that occurs over time, or it could derive from a divine vision, as in the modified golden rule; all that is essential to this paper is that $\delta^P_{low} < \delta^* < \delta^P_{high}$.

$T_{t-1} = \sum_{i=0}^{t-1} \tau_i$. With a given level of government spending, higher accumulated tax payments loosen the bind on the government budget constraint. Finally, because of the possible divergence between the central bank's discount rate, δ^*, and the current generation's actual rate, δ^P_t, consumption today, c_t^P, can differ from the monetary authority's desired level.

The central bank is also sensitive to the costs of inflation. Specifically, shoe-leather or menu costs waste resources and lessen the net real wealth of the consumer. The monetary authority uses inflation to attempt to maximize social welfare by readjusting consumption levels between generations. As will be illustrated shortly, the central bank's control of inflation is achieved through debt monetization, which produces price level changes via exchange rate movements. The costs of inflation induce the monetary authority to trade off the losses due to price level changes with the costs due to suboptimal consumption by the current generation.

A general form of the public's current consumption demand can be derived from the Euler equations of the representative consumer.

$$c_t^P = c(\delta_t^P, D_{t-1}, T_{t-1}, Y_t, \pi) \tag{9}$$

Generation t's demand for goods is a function of the rate at which it discounts the utility of its heirs, as well as the three wealth variables faced by generation t. As shown in the first section, current consumption demand is dependent on the discounted net wealth of the economy and the relative altruism of living consumers.

Inflation also affects present consumption as it directly wastes resources and decreases net wealth. The seignorage tax is distortionary because of its shoe leather and menu costs. These distortions hinder the current generation's ability to purchase goods, limiting the usefulness, and increasing the price, of any wealth they can bring forward. If the seignorage revenue only transferred wealth between generations, then current voters, aware of the central bank's objective function, would simply alter fiscal policy to undo any transfers produced by the monetary policy. Current inflation, however, also raises the real cost of purchasing goods, as menu costs increase current goods prices relative to those in the future. The resulting distortionary swing in intertemporal prices, even with r^* constant, encourages substitution away from current consumption and toward the consumption of their heirs.[11] The central bank discourages current consumption by worsening the terms of trade between current and future consumption.

The central bank controls π by monetizing the debt. The monetary authority can affect the ability to borrow abroad. For example, if a tax cut

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[11] Because seignorage transfers by the central bank would be effortlessly reversed through fiscal policy changes, distortions from inflation are necessary to affect current consumption in this simple model. Since the distortion, not the seignorage itself, is important, the seignorage need not be explicitly modeled. Inflation is assumed to increase the costs of conducting any transactions, and therefore distort the relative real prices in inflationary versus non-inflationary times. For this type of distortion to decrease consumption today and increase consumption in the non-inflationary future, the substitution effects of the price change must dominate the income effects. Finally, note that inflation is guaranteed to drive current and future consumption in the central bank's desired direction only when individuals wish to consume more than the central bank desires. If they wish to consume less than the monetary authority wishes, the central bank can increase current consumption only if the equilibrium inflation in the economy is nonzero, which is possible in models of time inconsistency or optimal taxation with distortionary fiscal taxes.

were entirely bond financed, no inflation would occur. Domestic residents increase the supply of domestic currency on the foreign exchange market, but this supply is completely offset by the increased foreign demand for that currency needed to buy the newly issued bonds. Balance of payments is maintained, and the exchange rate is stable. Essentially, domestic citizens pay for the increased consumption of foreign goods with domestic bonds, as foreigners will not hold domestic money. On the other hand, if the deficit is partially monetized, there will be an excess supply of domestic money on the foreign exchange market, and the exchange rate will depreciate. Assuming purchasing power parity and given the small country assumption of a fixed foreign price level, the domestic price level rises.[12] Thus, the higher the rate of monetization, the higher the rate of inflation and the larger the distortions from the seignorage tax, and the smaller is the desired increase in current consumption. As a result, the central bank equilibrates the marginal cost of diverging from the optimal consumption path with the marginal cost of increasing the distortion from inflation.

To produce a concrete solution to the monetary rule, it will be assumed that each generation's demand for consumption and the monetary authority's optimal consumption function are linear in logs.[13] The log of consumption demand can, then, be written as

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[12] Essentially the monetization produces an excess supply of money to counterbalance the excess demand for goods. As the real r is set from the rest of the world, the excess supply of money must be reduced by decreasing the excess demand for goods. This task is accomplished by depreciating the exchange rate and increasing the price of goods today relative to consumption for future generations. The exact procedure is unimportant; only the increase in the price level when monetization occurs is vital to the solution of this model.

[13] This generally entails an assumption of homotheticity of the utility functions. Linearity in logs is used only to simplify the exposition of the effects; it should not alter the thrust of the results.

$$(10)\quad Log(c_t^P) = c_1 \log(\delta_t^P) + c_2 Log(D_{t-1}) + c_3 Log(T_{t-1}) + c_4 Log(Y_t) + c_5 \pi,$$

and the log of the central bank's desired level of consumption as

$$(11)\quad Log(c_t^{MA}) = c_1^* Log(\delta^*) + c_2^* Log(D_{t-1}) + c_3^* Log(T_{t-1}) + c_4^* Log(Y_t),$$

where $c_1, c^*_1 > 0$, $c_2, c^*_2 < 0$, $c_3, c^*_3 > 0$, $c_4, c^*_4 > 0$, and $c_5 < 0$. The coefficients on these parameters are merely the elasticities of consumption demand with respect to the arguments in the consumption function. For ease of exposition, it will be assumed that the taste change affects all those alive today, not merely the young generation. Consumers know the central bank's objective function and realize the central bank will inflate when consumption rises. These log linear consumption demand expressions are substituted into the monetary authority's loss function to solve for the optimal inflation rule of the central bank. Minimizing (7) with respect to π produces the reaction function for inflation,

$$(12)\quad \pi = [c_5(c_1^* Log\delta^* - c_1 Log\delta_t^P) + c_5(c_2^* - c_2) LogD_{t-1}]/A + [c_5(c_3^* - c_3) LogT_{t-1} + c_5(c_4^* - c_4) LogY]/A,$$

where $A \equiv \{(\Gamma/\alpha) + c_5^2 b_1^2\}$. This inflation rule can then be substituted into the consumption demand function of the current generation to derive the actual level of consumption.

IV. The Determinants of Inflation

This simple expression for inflation reveals the relationship between increases in the debt of the current generation and the optimal monetary policy. When $\delta_t^P > \delta^*$, taxes fall, consumption rises, and debt is offered to foreigners for their goods. The desire to increase consumption will increase inflation by

$$\partial\pi/\partial Log\delta_t^P = - c_5 c_1/A, \tag{13}$$

which is greater than zero. In equilibrium, the result of one generation's movement above the central bank's discount rate is a higher inflation rate and a higher level of current consumption.

The size of the inflationary response by the monetary authority is a function of its distaste for price level changes relative to intertemporal consumption inefficiencies. Given a deviation in the public's discount rate from the $\delta_t^P = \delta^*$ path, inflation will respond much less when α is small and Γ is large. This makes perfect sense; if the cost to the central bank of price level changes is high (Γ is large) the monetary authority does not tend to inflate to offset the consumption allocation problem. Conversely, if the costs to the central bank of inflation are low, then any attempt by the current generation to expand its consumption beyond the monetary authority's optimal level will result mostly in increases in inflation and very little in

increases in current consumption.[14] On the other hand, if the costs to the intertemporal misallocations are large (α is high) the monetary authority will care less about the inflation needed to decrease the current overconsumption. The optimal π rule clearly depends on the tastes of the monetary authority.

This reaction is also a complicated function of the costs to the citizens of π. For a given Γ, as the cost of inflation declines to zero, c_5 approaches zero from the left, the optimal π falls to zero. Yet, as c_5 becomes more negative, π at first increases, then decreases toward zero. Thus, if the consumers are unaffected by inflation, it is worthless for the monetary authority to attempt to discipline the current generation with positive inflation. Alternatively, as citizens' distaste for π increases, for a c_5 negative enough, the central bank will need to inflate less given an increase in δ^P_t. The more consumers dislike inflation, the lower the π necessary to discipline the less altruistic consumers.

Finally, the inflation rate is an ambiguous function of the total net future income stream. This ambiguity arises because the higher wealth raises both the central bank's and the current generation's preferred current consumption levels. The total effect depends on the relative size of each partial effect, $c^*_4-c_4$. As in most of the literature, an asymmetric increase in the net wealth of future generations does produce an increase in current consumption and debt, without any reaction from the central bank. In fact, at a positive equilibrium inflation rate, an increase in the income of future generations would induce the central bank to reduce inflation in order to increase current consumption, if no fiscal action were taken.

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[14] Note that this relationship between realized inflation and consumption holds when Γ is assumed to equal $-c_5$, the resource loss to society from the distortionary cost.

V. Conclusion

This paper has analyzed the current government deficit in a rather reduced form of the OLG models. Yet the foundation for Ricardian equivalence is still allowed to hold, as either gifts or bequests are possible. Assuming a Barro-Ricardian framework, movements in the current account should have no correlation with tax changes. This paper provides another explanation for the positive correlation that is often observed. A shock to the current generation's concern for its descendants would set the causal transmission, through popular elections, from the taste disturbances to the increase in debt, current consumption, and foreign borrowing. While the qualifications to the Ricardian equivalence literature run the causation from changes in debt and deficits to increases in consumption, they ignore the endogeneity of public policy.

Although intergenerational reallocations can be optimal, this model highlights that tax cuts can also represent suboptimal reallocations of consumption over time. The independent central bank can minimize this misallocation by giving back to the future generations. This paper's policy prescription of increasing inflation is a reaction to the real costs incurred from the misallocation of society's wealth along its consumption path. This misallocation represents not only large inefficiencies, but potentially tremendous inequities. Changes in tax policy are relatively frequent, but rarely is the argument made that these changes occur to optimize intergenerational utility. Can the argument always be that wars or altered expectations of income streams justify these changes in the path of taxes? If a policy of higher inflation does reduce this misallocation, the policy should be, and historically has been, considered more seriously.

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