NBER WORKING PAPER SERIES

INTERGENERATIONAL AND INTERNATIONAL TRADE

Rudiger Dornbusch

Working Paper No. 792

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge MA 02138

October 1981

Financial support was provided by a grant from the National Science Foundation. I wish to acknowledge helpful comments from Eliana Cardoso, Alberto Giovannini, Jean Tirole and David Hsieh. The research reported here is part of the NBER's research program in International Studies. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working Paper #792
October 1981

Intergenerational and International Trade

ABSTRACT

The paper sets out an overlapping generations model in an open economy context. In the absence of productive capital a real consol is the vehicle for intertemporal consumption smoothing. The presence of a longterm asset implies that the anticipated future path of the economy, through the term structure of interest, affects current generations.

The model is applied to issues in the closed and open economy. These include the effects of debt issue on asset prices and welfare, the effect of present or anticipated future income growth, permanent or transitory. In the open economy context we investigate the welfare and current account effects of income changes on debt issue. The role of international differences in risk aversion is studied.

Professor Rudiger Dornbusch
Department of Economics
Room E52-357
Massachusetts Institute of Technology
Cambridge, MA 02139

(617) 253-3648

Revised, October 1981

INTERGENERATIONAL AND INTERNATIONAL TRADE*

Rudiger Dornbusch

Massachusetts Institute of Technology

Interest in intertemporal economics of consumption and investment under perfect foresight has grown both in the area of macroeconomics and in the literature on international trade. Particularly in the open economy there has been an interest in reviewing received current account theory to bring it more in line with modern investment theory and life-cycle saving behavior. This has been the focus of recent work by Furstenberg (1980) and Sachs (1981). It has been central to the restatement of the Metzler effect in Obstfeld (1981) and Svensson and Razin (1981), and to papers by Kareken and Wallace (1981) and Hsieh (1981) on money in open economy consumption loan models.

The present paper is in the tradition of that literature. It sets out a simple overlapping Samuelson-Diamond model in an open economy context. The model abstracts from production and focusses on differences in incomes, public debt and tastes as the determinants of international lending. The presence of a longterm debt--real consols--lends an intertemporal structure to the model which makes it possible to investigate the effects of present and anticipated future disturbances. Thus even though the model is one without productive capital and though people only receive incomes in their first period of life the longterm debt ties current generations to events in the future. In this respect the analysis links up with the discussion of

*Financial support was provided by a grant from the National Science Foundation. I wish to acknowledge helpful comments from Eliana Cardoso, Alberto Giovannini, Jean Tirole and David Hsieh.

the volatility of asset prices [see Lucas (1978), Fischer (1981) and Grossman and Shiller (1981)], although in a much simpler context.

The intergenerational model turns out to be a very sturdy work-horse for open economy issues: debt issue must worsen the current account and deteriorate steady state welfare for the issuing country. Current, permanent income growth raises welfare and deteriorates the longrun trade balance. Of particular interest are results regarding future events or transitory disturbances. Here we show that a transitory rise has the same effect on the current account as a permanent change, although asset prices change more than in the permanent case if the coefficient of risk aversion is larger than unity. International taste differences, once they are introduced, imply that disturbances that change interest rates affect differentially saving and current accounts in the two countries. Interestingly this effect does not reverse some of the results noted above.

Parts 1 and 2 set out the basic intergenerational model of consumption and saving for the closed economy. In part 3 the open economy equilibrium is introduced and some comparative static results are derived. Part 4 concludes with a discussion of international taste differences.

1. Saving and Consumption

Consumers receive a given wage income in the first period of their life and save to provide resources for consumption during their second period retirement. This is, of course, the standard overlapping generations setting. We assume that there is no time preference. Accordingly the consumer's problem is to maxime the life-time utility function:

$$(1) \qquad U = V(c_1) + V(c_2) \quad ; \quad V'>0, V'' \leq 0$$

subject to the lifetime budget constraint:

$$c_1 + qc_2 = w \tag{2}$$

where $q = 1/(1+r)$ is the relative price of future goods in terms of current goods or the present value of second period consumption and w is first period disposable income.

Utility maximisation subject to the budget constraint gives rise to demand functions for consumption in both periods and to a saving function:

$$c_1 = c_1(q,w) \ , \ c_2 = c_2(q,w) \ , \ s = s(q,w) \ . \tag{3}$$

The utility function in (1) implies unit income elasticities of demand for consumption in both periods. The effect of interest rate changes on current consumptions and saving however, as is well known, is ambiguous. A rise in interest rates raises real income of the currently young, since their terms of trade as net lenders are improved, and thereby raises consumption in both periods. But the substitution effect of higher interest rates shifts consumption toward the future as the relative price of future consumption, q, declines. The net effect depends on the extent of concavity of the utility function.

In Figure 1 we show the lifetime indifference curve U_o which is homothetic and by the assumption of no time preference symmetric around at 45^o line. Initial equilibrium obtains at point A with the ray OR_o indicating relative consumption in the two periods. Assuming now the case of constant relative risk aversion the elasticity of current consumption and of saving

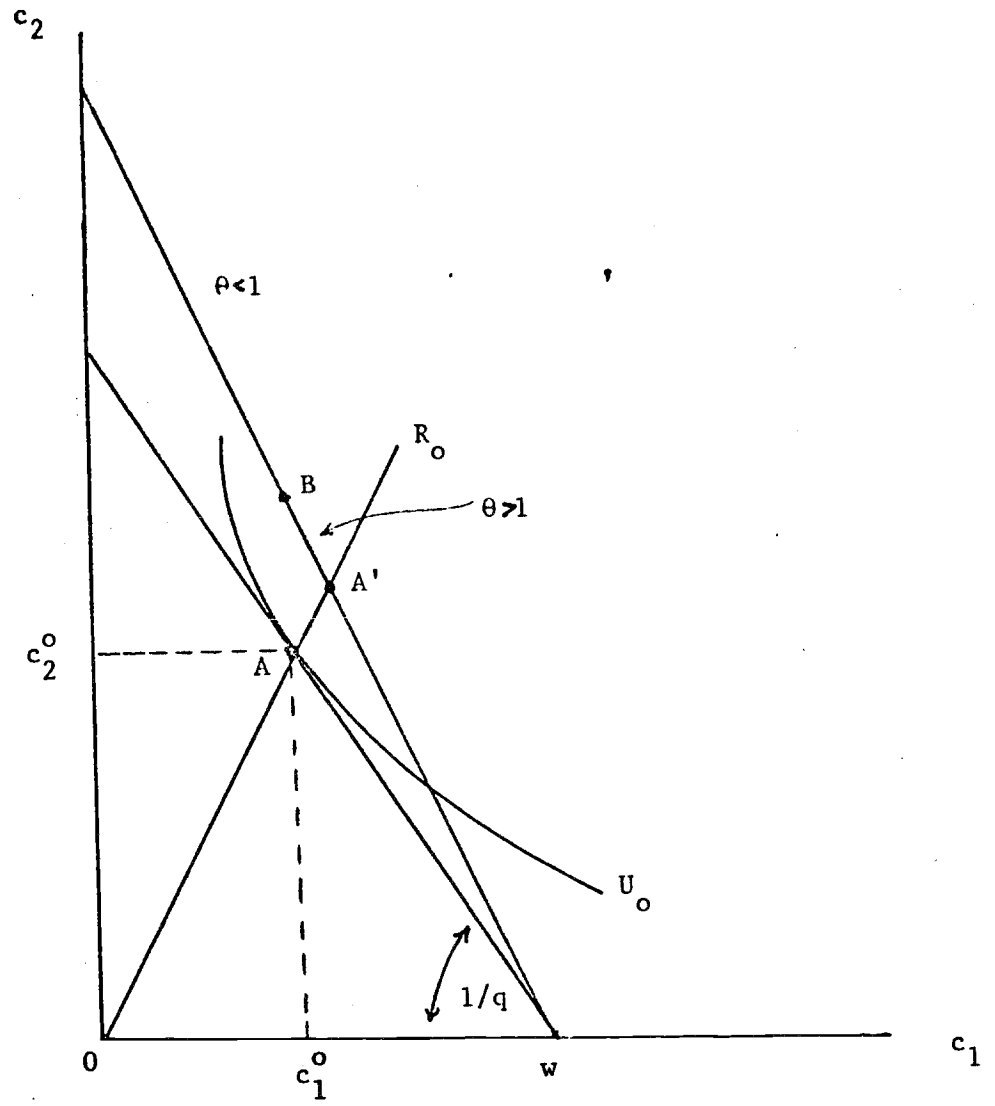

FIGURE 1

with respect to the relative price are given by:[1]

$$(3) \qquad \partial \ln c_1 / \partial \ln q = -a(1-1/\theta) \quad , \quad a \equiv qc_2/w \quad , \theta \equiv -V''c/V' \gtrless 0$$

and

$$(3)' \qquad \partial \ln s / \partial \ln q = (1-a)\ (1-1/\theta) \equiv \beta$$

where θ is the coefficient of risk aversion, a is the average propensity to consume in the second period or to save and β is the saving elasticity with respect to the relative price. The sign of β depends on the coefficient of risk aversion but we already note that there is an upper bound of (1-a) as risk aversion approaches infinity. This property will be important for some comparative static applications.

In Figure 1 a rise in the interest rate rotates the budget line upward and leads to a new optimal point in the range above and to the left of the ray OR_o in the segment A'B extended. With a unit coefficient of risk aversion the new equilibirum is at B, vertically above A. If risk aversion is larger than unity current consumption will lie in the range A'B, and if it is less than unity it will lie to the northwest of B. Since the coefficient of risk aversion is a measure of the concavity of the utility function there is a simple interpretation of these results. With a high coefficient of relative risk aversion there are strong diminishing returns and the lifetime consumption smoothing objective dominates over substitution. Conversely, when the coefficient of risk aversion is small the elasticity of substitution between

---

[1] The first order condition is $qV'(c_1)=V'(c_2)$. Differentiating the first order condition and the budget constraint allows to solve for the demand functions.

present and future consumption, $1/\theta$, is large and lifetime consumption smoothing is dominated by substitution effects.

2. Debt and the Closed Economy Equilibrium

The conventional overlapping generations model is stated in terms of a public debt that is rolled over every period. We prefer here a formulation that links the current and all future states of the economy. This is achieved by assuming that the debt is a consol. There is a given stock of consols outstanding, $\bar{b}$ in number, each paying one unit of real output per period, indefinitely. The value of consols outstanding, $p\bar{b}$, will depend on all present and future short term interest rates. It is this emphasis on the term structure of interest that we want to exploit in our formulation.

The consumer's budget constraint is restated in (5) in terms of the borrowing and lending on consols rather than the short term interest rate as in (2). In the first peirod of life the individual receives a wage income, consumes and purchases a value of consols equal to:

$$p_t b = w - c_1(w, q_t) \tag{5}$$

where b is the number of bonds purchased. Second period consumption is financed by the coupon payment on bond holdings plus the resale value of the bonds:

$$c_2 = b(1 + p_{t+1}) \tag{6}$$

periods are related by the equation:

$$p_t = q_t(1 + p_{t+1}) \tag{7}$$

so that the current price of a consol is the present value of next years coupon plus the resale value.

We assume that the coupon payments on the debt are financed by taxes levied on the young. With a stationary population and a debt service equal to $\bar{b}$, disposable income of the young is $w = \tilde{w}-\bar{b}$ per capita, where $\tilde{w}$ is the given income endowment.

Equilibrium

Closed economy equilibrium requires that the market for current goods clear. The supply of output is given by the income endowment and this has to equal consumption by the young and old:

$$\tilde{w} = c_1(w, q_t) + \bar{b}(1+p_t) \tag{8}$$

In (8) that consumption of the young depends on the short term interest rate, q_t, and disposable income w. Consumption of the second generation depends on the prevailing price of consols. It is apparent from (8) that the solution to market equilibrium involves not only the current short term interest rate but also the long term interest rate implicit in the consol price.

Using the definition of saving, $s \equiv \tilde{w}-\bar{b}-c_1$, as well as (7), we can rewrite the equilibrium condition in a manner that focusses on present and future asset prices:

$$s\,(w_t, p_t/(1+p_{t+1})) = p_t\bar{b}_t \tag{8}'$$

A relatively simple case arises if disposable income and debt are expected to be constant indefinitely. In that case (8)' defines implicitly a difference equation in the consol price.

A Special Case

For the case of logarithmic utility functions V(c), or unit relative risk aversion, the solution to (8)' is:[2]

$$(9) \qquad p_t = w_t/2\bar{b}_t$$

Consol prices are proportional to current disposable income and inversely proportional to the current debt outstanding. The future is of no consequence because consumption and saving of the currently young does not respond to the rate of interest while the old consume all their wealth.[3]

Equation (9) implies that the long term interest rate is always positive in this consumption loan model. The short term interest rate is determined by the relative values of real income and debt in adjacent periods. Using (7) and (9) we have:

$$(10) \qquad r_t = \frac{2+(w/\bar{b})_{t+1}-(w/\bar{b})_t}{(w/\bar{b})_t}$$

The short term interest rate, r_t, can be negative provided the present income/debt ratio is sufficiently large relative to the future income/debt ratio.

---

[2]For the logarithmic case $c_1=qc_2$ and $s = w-c_1 = w/2$.

[3]Fischer (1981) has discussed this case in a stochastic setting in interpreting some results of Lucas (1978).

The More General Case

In general (8)' is a non-linear difference equation which, for the case of constant relative risk aversion, is given by:[4]

$$(11) \qquad p_{t+1} = [p_t^{-1/\theta}(w/\bar{b} - p_t)]^{\frac{-\theta}{1-\theta}} - 1$$

There is no assurance of the stability of the adjustment process for any arbitrary initial conditions. The matter is complicated by the fact that, unlike in physical systems, the prices cannot be treated as predetermined state variables. Accordingly, as is already familiar from models of perfect foresight, there is a multiplicity of paths. Some of these may fail to converge to a stationary solution.

We sidestep these problems by assuming that a unique steady state does exist and that, for given $\bar{b}$ and w that remain constant, the economy immediately jumps to the steady state. Accordingly, there will be an equilibrium price of consols:

$$(11)' \qquad p = p(w/\bar{b} \; ; \; \theta)$$

The equilibrium price depends on the ratio of disposable income to debt outstanding, $w/\bar{b}$, as well as on the degree of risk aversion. The higher the degree of risk aversion the lower the equilibrium asset price.

In this more general case the equilibrium price of consols depends again on real income and on debt outstanding. The proportional change (across stead

---

[4] From the first order condition $qV'(c_1) = V'(c_2)$ and $V(c_i) = \frac{1}{1-\theta} c_i^{1-\theta}$ we have $c_1 = c_2 q^{1/\theta}$ and, using the budget constraint, $s = w[q/(q+q^{1/\theta})]$. Substitution of the saving function in (8)' yields (11).

states) induced by permanent changes in income or debt is:

$$(12) \qquad \hat{p} = \frac{\hat{w} - \hat{b}}{1 - \phi} \quad ; \quad \phi \equiv (1-q)(1-\beta)$$

The term $1-\phi$ is a positive fraction. Accordingly, whether the coefficient of risk aversion is larger or smaller than unity, a rise in income raises equilibrium asset prices or lowers interest rates while a rise in debt outstanding reduces asset prices.[5]

Welfare

The effect of permanent disturbances on steady state welfare are derived by differentiating the lifetime utility function in (1), using the budget constraint and the first order conditions:

$$(13) \qquad dU/V'(c_1) = dc_1 + qdc_2$$
$$= dw - c_2 dq$$

The change in lifetime utility, measured in terms of current goods, is equal to the present value of the change in consumption. By the budget constraint this is equal to the change in disposable income, dw, plus the income effect of a change in the relative price of future goods, $-c_2 dq$.

Using (12) in (13) it can be shown that an increase in debt outstanding must reduce steady state welfare. The reduction in disposable income due to debt service more than outweighs the increase in welfare due to higher interest rates. Of course, the decline in welfare of the young has a counterpart in the increased welfare of the old who receive the windfall distribution of bonds.

---

[5]The term (1-q) is a positive fraction and hence with $1/\theta$ larger than unity ϕ is negative and the denominator of (12) is positive. When $1/\theta$ is less than unity it is readily seen that $(1-q)(1-a)(1-1/\theta) \equiv \phi$ is a product of positive fractions and thus is positive and less than unity.

The Term Structure of Interest

So far we have assumed a flat path of output and debt over time. We now investigate the impact of a future, transitory increase in output on the structure of interest rates over time. We will show that an anticipated, one-period increase in income that occurs next period will raise the current short term rate, lower the short term rate next period and lower the long term interest rate or raise the consol price today.

We start with interest rate determination in the period where income transitorily rises. Figure 2 shows the saving function as well as the value of bonds outstanding. Point A is the initial steady state equilibrium. We take the case where saving responds positively to the rate of interest as shown by the schedule ss drawn for the given income endowment. The downward sloping schedule $\bar{b}/r$ shows the value of consols as a function of the interest rate assumed to be constant in perpetuity. At A saving by the young equals the value of consols and thus the goods market (or the capital market) clears.

The schedule labelled $\bar{b}[1+1/\bar{r}]/(1+r_{t+1})$ shows the value of consols as a function of the short term rate r_{t+1} given a subsequent return of the interest rate to the steady state level $\bar{r}$. It must cross point A and lie to the left of the b/r schedule for $r_{t+1}<r$ since the latter schedule corresponds to a flat term structure while the former only considers a transitory deviation of interest rate from the level $\bar{r}$. Now consider the increase in income that raises saving as shown by the rightward shift of ss to s's'. The excess supply of goods or excess demand for bonds leads to a decline in the interest rate to point A'. Equilibrium saving rises and the value of consols outstanding increases. It is readily shown that, the fall in interest rates notwithstanding, welfare must rise for the generation that experiences the increase in income.[6]

---

[6]The interest rate results hold independently of the slope of the saving schedule. If the saving schedule is negatively sloped, it will be steeper than the schedule depicting the value of consols. This is ensured by the fact that $(1-q)(1-\beta)$ is at most a positive fraction. Therefore, next period's interest rate must fall and the present rate must rise.

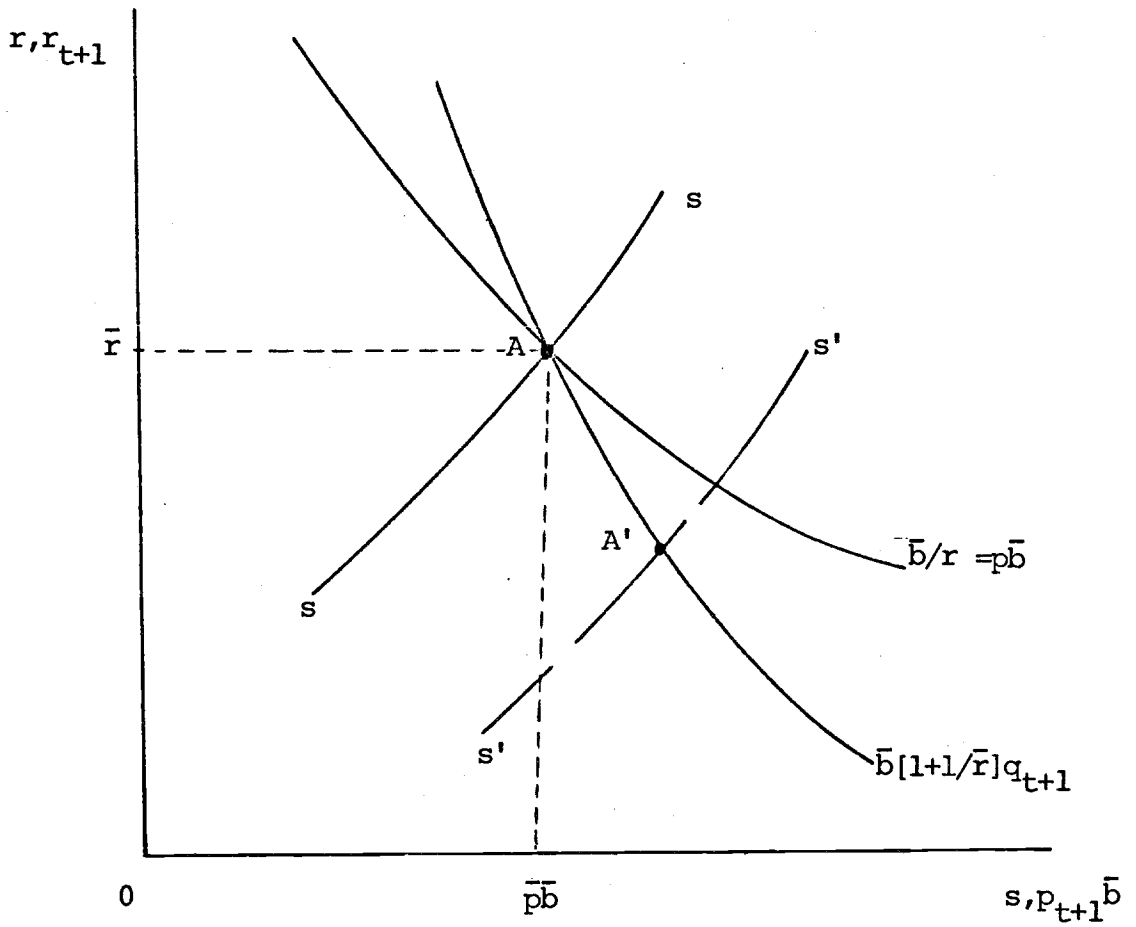

Figure 2

Consider next the effects of the transitory income increase in the period preceding the actual occurrence. The anticipation of the transitory future decline in interest rates raises at all levels of the current short rate, r_t, the value of consols and therefore creates an excess demand for goods. In the present period the equilibrium interest rate must, therefore, rise. The rise in current interest rates, by (3) implies that the young experience an improvement in their terms of trade and thus share in the benefits of the future rise in income. In fact they buy their consols cheap and sell them high and their lifetime utility increase arises from this capital gain.

The welfare of the currently old is also affected by next periods rise in output. The change in asset prices in adjacent periods, from (8)', is given by:

$$\hat{p}_t = \frac{-q\beta}{1-\beta}\,\hat{p}_{t+1} \tag{14}$$

In Figure 2, we already saw that asset prices in period t+1 increases. Therefore, current asset prices rise or fall depending on the extent of risk aversion. If risk aversion is large or saving responds negatively to the interest rate then the current asset price will fall and the currently old lose as a consequence of future income growth. Conversely, if risk aversion is less than unity asset prices in the present period rise and thus make the currently old share in the future income growth.

The results have an easy interpretation in terms of the importance of the consumption smoothing objective. If the currently young have a strong preference for consumption smoothing than the excess demand for goods, and the ensueing rise in interest rates, reduces saving. Therefore, interest rates

rise presently more than in the future. The young gain not only by selling future consols high, but also by buying them cheap today. The only way all generation can gain is for each of them to delay consumption, but that only occurs if consumption smoothing is dominated by substitution in response to changes in the interest rate.

What can be said about the term structure of interest rates if an output disturbance is anticiapted with more than a period lead? We can directly use (14) to infer that for the case of risk aversion larger than one asset price rise in every period. Moreover, since $q\beta/(1-\beta)$ is, in this case, the product of two fractions it is the case that asset prices rise less the more distant the period from the time of the disturbance. Thus consol prices gradually rise peaking in the year where output increases.[7]

3. The Open Economy

We now assume two countries identical in respect to tastes and population, but with potentially different incomes and debt outstanding. We are interested in determining the equilibrium asset price in the world as well as patterns of lending. Throughout we look at the case of one good and one asset. A bar denotes stocks outstanding so that $\bar{b}^*$ is the existing stock of foreign-issued consols.

Equilibrium in the Open Economy

Equilibrium in the world goods market requires the balance of world income ($\tilde{w}+\tilde{w}^*$) and world consumption by the two generations in each country:

$$(15) \qquad \tilde{w}+\tilde{w}^* = c_1 + c_1^* + (\bar{b}+\bar{b}^*)\ (1+p)$$

An alternative interpretation, focussing on external indebtedness, $b-\bar{b}$, is

[7] Fischer (1979) has shown similar results in a model of money, inflation and capital formation.

derived by rewriting the equation in the form:

(15)' $\quad s(q,w)-p\bar{b} = p\bar{b}^*-s^*(q,w^*)$

In this form we focus on the capital market. The excess of home saving over the value of out debt outstanding equals net external assets.

Table 1

Current Accounts

	Home	Foreign	Net
Young	s	s*	s+s*
Old	-pb	-pb*	-p(b+b*)
Net	s-pb	s*-pb*	0

Table 2

Trade Balances

	Home	Foreign	Net
Young	$\tilde{w}-c_1$	$\tilde{w}^*-c^*_1$	$\tilde{w}+\tilde{w}^*-(c_1+c_1^*)$
Old	-(1+p)b	-(1+p)b*	-(1+p)(b+b*)
Net	s-pb+($\bar{b}$-b)	s*-pb*+($\bar{b}$*-b*)	0

Each generation's balance of payments as well as national aggregate balances are shown in Tables 1 and 2. In each country the old run a trade deficit. Their trade deficit is matched in part by service income on their

holdings of debt in part by a capital inflow equal to their sale of debt. The young in each country have a trade balance and current account surplus, purchasing debt from the old. The home aggregate current, in the steady state, is balanced. Every period the old sell to the young and unchanging amount of debt. The home aggregate trade balance is in surplus or deficit as the home country is a net external lender or borrower, $b-\bar{b} \gtrless 0$.

For later reference we define the net rate of capital outflow or the aggregate current account surplus of the home country as K:

$$K = s(q,w) - pb \tag{16}$$

The current account equals the excess of saving or lending by the young generation over bond sales--the excess of consumption over income from debt for the older generation--by the old. Here b denotes the actual bond holdings and sales of the old generation.

Some Comparative Statics

In this section we study the effects of permanent, current changes in income and in debt on equilibrium interest rates, the current account and welfare. We start with the case of a permanent rise in home income.

From the goods market equilibrium condition in (15)' we find that a rise in home income raises the equilibrium price of goods or lowers the interest rate just as it does in the closed economy:

$$\hat{p} = \frac{x}{1-\phi}\hat{w} \quad ; \quad x \equiv \frac{s}{s+s^*} \tag{17}$$

The result is readily understood in terms of Figure 3. The righthand panel

shows the case where saving is inversely related to the interest rate. Since the saving elasticity now is a positive fraction the aggregate saving schedule, $s+s^*$, is steeper than the schedule $p(b+b^*)$ which shows the value of bonds outstanding. (This schedule with $p=1/r$ has, of course, a unit elasticity.) A rise in income raises home and world saving and must lower the equilibrium interest rate. In this case the interest rate will fall more than if the saving schedule were positively sloped.

Figure 3 also shows the current account effect of the increase in home income. In the lefthand panel we show the foreign value of bonds held, pb^*, as well as the foreign saving schedule. Initial steady state equilibrium prevails at A with saving abroad equal to the value of bonds sold by the old generation. The lower the equilibrium interest rate r' raises the value of foreign bond sales by the old beyond the increase in saving by the young. Thus the foreign country runs a current account deficit, pb^*-s^* and the home country shows a corresponding surplus. With positively sloped saving functions, the foreign country would likewise run a current account deficit.

Using the definition of the current account in (16), we can calculate the magnitude of the improvement:

$$\frac{dK}{dw} = \frac{ds}{dw} - b\frac{dp}{dw} = a(1-x) \tag{18}$$

The result in (18) is of interest because it shows that the magnitude of the current account change depends only on relative size and on the average propensity to save and not directly on the degree of risk aversion.[8] The larger the home country the smaller the current account effect of income growth.

[8]The degree of risk aversion does, though, affect the average propensity to save. See footnote on page 9 above.

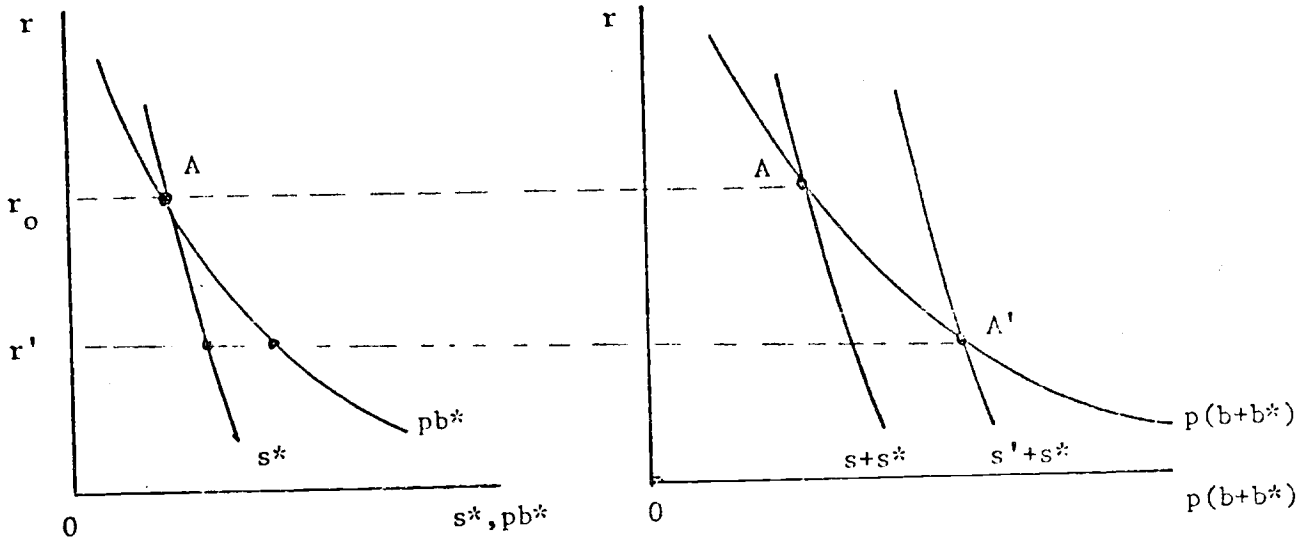

FIGURE 3

Conversely, the higher the propensity to save the higher the current balance effect.

The current account surplus of the home country is only transitory, leading to an increased home net lending position and, therefore, to a steady state deterioration in the home country's trade balance. Here is an interesting result in that higher income induces a steady state deterioration in the trade balance. The trade balance deterioration reflects the fact that the initial current account surplus has increased home debt holdings and with that has raised income relative to output. Since in the new steady state aggregate disposable income is equal to expenditure, expenditure exceeds output and thus there is a trade deficit financed by income from net external assets.

Consider now the welfare effect of higher home income. The higher bond prices imply increased welfare for the old since they realize higher prices for the bonds they sell. Furthermore, abroad steady state welfare declines since the fall in interest rates worsens the terms of trade of the young who are net lenders. At home the higher income raises welfare, but this is dampened by the adverse rise in the relative price of future goods. The net effect, however, is a welfare improvement. Accordingly, the possibility of Edgeworth-like damnifying growth does not arise in this model.

The analysis of changes in debt is straightforward. From (15)' we calculate the effect of home debt issue on steady state asset prices as:

$$(18) \qquad \hat{p} = - \frac{(a+p)}{p(\bar{b}+\bar{b}^*)(1-\phi)} \, d\bar{b}$$

Thus, home debt issue must lead to a decline in asset prices or a rise in the equilibrium interest rate. This in turn implies that steady state welfare abroad must rise. This is the case since lifetime utility as shown in (13) rises if asset prices decline, the young being net lenders. In the home country debt issue, just as in the closed economy, exerts offsetting effects through the reduction in disposable income due to higher taxes and the change in interest rates. Just as in the closed economy case, it can be shown that the net effect is a reduction in lifetime utility both for the currently young and in the steady state.

The effect of home debt issue on the long run trade balance and external indebtedness can be definitely established: Home debt issue reduces net external assets, $b-\bar{b}$, and therefore, leads to an improvement in the long run trade balance. This result is to be expected since abroad real income increases via the rise in interest rates thereby leading, through substitution and income effects, to higher second period consumption. With bond prices falling $c_2^* = (1+p)b^*$ implies that foreign bond holdings increase. The long run trade balance improvement for the home country thus reflects the counterpart of the differential foreign increase in real income and welfare.

Future Income Increases

We studied for the closed economy the case of currently anticipated, future income growth. In that case the equilibrium present interest rate rises while it falls once the increase in income occurs. Exactly the same result will, of course, arise in the world economy. The only question is whether future income disturbances have effects on today's current account.

From the definition of the current account in (16), the relation in (14) for price changes in adjacent periods (equally valid in the open economy

with identical consumers) and from (15)' we have:

$$(19) \qquad dK_t = -K_t \frac{q\beta}{1-\beta} \hat{p}_{t+1}$$

As we noted above, in the steady state the current account is zero and, therefore, a presently anticipated disturbance will have no impact on the current account. The reason for the absence of a current account effect is the complete symmetry of this one-good, one-asset model, with identical consumers who in the steady state have zero capital flows. To have an impact on the current account disturbances must affect the two countries' net saving differentially. This is the case of current disturbances but it does not arise for future disturbances.

4. International Taste Differences

The analysis so far assumed internationally identical tastes. There are two obvious directions in which to extend the model: Differences in rates of time preference or differences in the degree of risk aversion. We consider here the possibility that risk aversion differs. Specifically, we assume that the coefficients of risk aversion are on different sides of unity so that the saving response to changes in interest rates differs between countries.

The earlier analysis of price changes induced by changes in income or debt remains unchanged, except that now the relevant aggregate saving elasticity is:

$$(19) \qquad \bar{\phi} \equiv x\phi + (1-x)\phi^*$$

which reaches as a maximum the value of a positive fraction. The interesting question now concerns current accounts. Does a rise in income still improve the home country's current account even if home saving responds negatively to the interest rate? Does a home debt issue still deteriorate the current account even if home saving responds positively to the rate of interest? The answer in both cases turns out to be affirmative.

Consider first the home country current account as it is affected by a current rise in home income:

$$(20) \qquad \frac{dK}{dw} = a(1-x)\,\frac{1-\phi^*}{1-\bar{\phi}}$$

From the equation it is apparent that the difference in tastes ($\phi^* \neq \bar{\phi}$) affects the magnitude but not the sign of the current account. The home country's current account will be larger relative to the common preference case, if $\phi > \phi^*$, that is if home saving responds positively, and more than abroad, to the fall in interest rates. Conversely, in the case of debt issue the current account will deteriorate less if the home country responds more positively to the rise in interest rates.

While in the case of current disturbances the direction of the current account is unaffected by differences in tastes, this is not the case for future disturbances. For example, a rise in future income has no effect on the current account when tastes are identical. Now, with differences in tastes, there will be an effect. The current account of the home country will improve or worsen as $\phi^* \gtrless \phi$. We remember that future income increases raise the current short term interest rate. If the home country has a relatively

stronger, positive saving response to the interest rate, the home current account will improve already in the present period. Conversely, if the home country has the relatively smaller saving response the current account presently deteriorates although, of course, in the second period there is an improvement.

5. Concluding Remarks

The intergenerational exchange model sets a minimal framework for addressing intertemporal issues in trade theory. The introduction of long term debt, and hence the term structure of interest, makes current accounts depend not only on relative present incomes but also on future events. The model is a minimal framework and for that reason cannot go much further. But it is immediately obvious that extensions to a multiple commodity setting open up interesting questions as does the possibility of stretching the life cycle or making labor supply endogenous. Another range of questions is concerned with taxation of international lending and with an optimal external debt. These issues are left for further work.