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Political Economy Aspects of Trade and Financial Liberalization: Implications for Sequencing

Prepared by Rina Bhattacharya[1]

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Abstract

This paper integrates a two-period overlapping generations model with a standard two-sector Hecksher-Ohlin trade model and analyzes the impact of uncertainty on domestic investment in the exportable and importable sectors, the political economy linkages between trade and financial liberalization, and the implications for sequencing. Under certain assumptions financial liberalization leads to a movement of resources in the opposite direction to that implied by trade liberalization, thus defeating one of the objectives of tariff reform. When political economy linkages are taken into account, however, the indirect effects of financial liberalization may offset the direct effects and encourage a movement of resources in the desired direction.

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Author's E-Mail Address: rbhattacharya@imf.org

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Contents

I. INTRODUCTION

In many developing economies interest rates have been strongly influenced, if not controlled, by the government. This in turn has often resulted in a wide gap between deposit and lending rates of interest as a result of measures such as high reserve requirements and other forms of taxes on the commercial banking sector.[2] Such 'taxing' of the domestic financial market (effectively on domestic savings) is motivated by a number of factors, but most important among them is usually the need to raise revenue to finance government spending. Another motive has often been to raise the level of domestic investment, while at the same time promoting the growth of 'priority' sectors through the rationing of credit based on criteria set by the government. Other important factors behind the wide spread between deposit and lending rates of interest in many developing countries are a shortage of viable investment projects with low or moderate risks, and/or an inefficient, largely uncompetitive domestic banking sector. In most cases both administrative and structural factors are important in explaining the lack of financial intermediation and its high cost, but in practice it is difficult to ascertain the relative importance of these two sets of factors.

During the 1980s 'financially repressive' policies of the type mentioned above generated a lot of controversy and research among economists and policy-makers (see Arrieta (1988) and Gibson and Tsakalatos (1994)) which resulted in a growing consensus on the need for financial reform. This in turn has led a large number of financially repressed economies to liberalize their domestic financial markets and to let interest rates be market-determined. More generally, the period since the mid-1980s has seen a large and growing number of developing and transition economies move away from inward-oriented development strategies and instead embrace more market-oriented policies, with varying degrees of commitment to the reform process (see Papageorgiou, Michaely and Choksi (1991)). The experiences of these countries over the past decade or so have highlighted the importance of paying attention to the revenue consequences of trade liberalization. Thus many countries that are liberalizing their trade regime at the present time (such as Lebanon and Jordan) are linking the pace of tariff reform to the speed with which additional domestic tax revenue can be raised to compensate for the tariff revenue loss.

There has been a lot of policy discussion and debate in the academic literature on the 'sequencing' issue relating to trade liberalization and opening of the capital account—should they go hand in hand, or should one precede the other (see Bhattacharya (1997), Edwards (1984, 1989), Falvey and Kim (1992), Funke (1993), McKinnon (1982, 1991)). Bhattacharya (1999), Engel and Kletzer (1991), Rodrik (1989, 1991) and van Wijnbergen (1985)) among

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[2]For example, in Bolivia in November 1998 the average deposit rate (domestic currency) was 11.9 percent, compared with an average lending rate (domestic currency) of 33.4 percent. Another example is Kenya, where the average deposit rate in September 1998 was 18.3 percent while the average lending rate was 29.8 percent. To mention a few cases from the so-called transition economies, in Bulgaria the average deposit rate in November 1998 was 3.3 percent while the average lending rate was 13.3 percent; in the Kyrgyz Republic the respective rates were 44.9 percent and 73.7 percent.

others have also looked at the issue of credibility of trade reform, and in particular at the impact of uncertainty regarding trade policy on domestic investment and capital flight. However, almost all these studies assume a well-functioning domestic financial market. By contrast, despite the vast literature on financial repression / liberalization and its implications for growth (for example Cho and Khatkhate (1989), Collier and Mayer (1989), Eastwood and Durski (1992), Fry (1988, 1989) Gelb (1989), Gibson and Tsakalotos (1994), McKinnon (1973, 1981a, 1981b, 1988, 1989), Shaw (1973), van Winjbergen (1983)), there has been relatively little discussion in the academic literature on the issue of the appropriate sequencing of trade liberalization and domestic financial market reform. Indeed, there are very few theoretical models analyzing how trade liberalization and domestic financial market reforms interact with each other in a general equilibrium setting, particularly when there is uncertainty regarding tariff reform.

The main exception to this is Kahkonen (1987), which looks at the welfare effects of three types of structural reforms—financial deregulation, relaxation of capital controls, and trade liberalization—in an intertemporal general equilibrium setting with two traded goods. There is no element of uncertainty in Kahkonen's model—issues regarding credibility of government policy are not discussed. The main policy conclusions are that tariff reductions increase welfare unambiguously only if the domestic financial market is unregulated, while financial liberalization unambiguously causes welfare gains only under free trade. Kahkonen tentatively concludes that simultaneous liberalization of trade and domestic financial markets would be beneficial in a financially repressed economy, whether capital movements are regulated or not.

This paper integrates a two-period overlapping generations model with a standard two-sector Hecksher-Ohlin trade model and analyzes how trade liberalization and financial sector reform might interact with each other in general equilibrium[3]. The model presented here is quite similar to Kahkonen's. However, it introduces uncertainty about trade reform and analyses its effects on domestic savings, investment and resource allocation. Moreover, the emphasis here is on resource allocation across sectors, whereas the emphasis in Kahkonen (1987) is on intertemporal resource allocation.

Section 2 presents the basic model. The economy produces two goods, a labor-intensive exportable good and a capital-intensive importable good. The exportable good is used for consumption and the importable good for investment. Households are assumed to live for two periods and to work and save when young, and consume the return on their savings when old. The representative firm (which produces both goods) borrows from the 'young' household in each period and decides on how much to invest in each sector for production in the next period. However, the return to the household on its savings is less than the return on investment by the firm because of a tax on household savings (or, equivalently,

[3]As explained in the text, an overlapping generations model is used instead of a standard representative agent model because the latter introduces unnecessary complications while detracting from the main points made in this paper.

a tax on borrowing). The importable sector is subject to a tax in the first period but there is uncertainty about tariff reform in the following period.

In the second period of this two-period model the government has to pay off the interest and principal on its external debt. Part of the revenue for this comes from the proceeds of the tax on household savings. If a "Workers' Government" comes to power it will raise the additional revenue through a tariff on imports. By contrast, if a "Capitalist Government" comes to power it will remove the tariff on the importable good and any revenue shortfall will be met out of a tax on wage income. The tax on wage income is a non-distortionary lump-sum tax since labor supply is taken to be exogenous in this model. However it is assumed that there are political constraints on the amount of the revenue that can be raised through lump-sum taxes on workers. Hence the government has to seek additional sources of revenue to finance its external debt. This is because the primary focus of this paper is not the issue of optimal taxation. Instead, the focus is on how uncertainty about alternative distortionary sources of financing of government spending affects the general equilibrium of the economy in a second-best setting.

Section 2 looks at how investment in each sector is affected by the probability of tariff reform and by the tax on household savings. Section 3 analyses how the results are affected when the probability of tariff reform is itself a function of the tax rate on borrowing. The next section goes on to discuss the implications for the 'sequencing' issue—that is, whether the domestic financial market should be liberalized before the current account or vice versa (or perhaps both simultaneously). The final section draws together the main conclusions.

The interesting policy results arise when the probability of tariff reform is assumed to be a function of the tax rate on domestic savings. This function could be positive if a high tax rate on savings leads to strong lobbying by firms for protection against imports on the grounds that they face 'unfair' competition from abroad due to the fact that domestic producers have to pay a higher cost for capital. Conversely, the function could be negative if a low tax on savings means that more revenue must be raised through either a tax or a tariff and this raises the required tax rate on wage income to politically infeasible levels and makes the tariff more politically attractive. One of the main objectives of trade liberalization is to shift resources away from protected sectors subject to high tariffs and instead encourage investment in the exportable sectors. If the probability of tariff reform is a positive function of the tax rate on household savings it is shown that the indirect effects of financial liberalization may in fact serve to frustrate this objective, at least in part. Conversely if the probability of trade reform is a negative function of the tax rate on borrowing—that is, when a lower tax rate implies a greater probability that the tariff will not be removed in the next period. Here the indirect effects of financial liberalization will tend to offset the direct effects and encourage a movement of resources in the desired direction. To the best of the author's knowledge these aspects of the political economy linkages between trade liberalization and financial market reforms have not been discussed in the existing academic literature.

II. TRADE LIBERALIZATION, UNCERTAINTY AND TAXATION OF THE DOMESTIC CAPITAL MARKET—THE BASIC MODEL

A. The Model

I consider here the case of a small open economy producing two types of goods—a labor-intensive exportable good, Good X, and a capital-intensive importable good, Good M. The representative firm makes all the production/investment decisions and allocates labor and capital between the two sectors so as to maximize the present discounted value of its expected profit stream. Good X is used for consumption and Good M for investment. The price of the exportable good is taken as numeraire.

The household in this economy is assumed to live for two periods. When 'young' the household inelastically supplies one unit of labor to the representative firm, earning a wage income ω_t. The household consumes part of this wage income and lends the rest to the representative firm, earning a rate of return $(1+r^D_{t+1})$ in the next period. In other words, r^D_{t+1} is the deposit rate of interest for household savers in period t. When 'old' the household consumes the return from its savings. However, because there is a tax on savings (or, alternatively, a tax on borrowing), the rate of return to the household is $(1+r^D) = (1-\gamma)*(1+r^L)$ where γ is the tax rate on household savings (on borrowing). The interest rate r^L is the cost of borrowing from the viewpoint of the firm and adjusts to equate savings and investment in each period.

The government enters period t with a certain amount of external debt, D^*_t. There is a positive tariff T_1 on the importable good which, together with the proceeds from the tax on savings, raises just enough revenue to pay the interest on the debt, $r^*D^*_t$, where r^* is the world rate of interest (assumed to be exogenous).

In period (t+1) the government has to pay back to foreign debtors the principal and the interest on its external debt, $(1+r^*)D^*_t$. There is a certain (known) probability π that a "Workers' Government" will come to power in period (t+1) and raise the necessary revenue through a tariff on the importable good set at a rate T_2 and the proceeds from the tax on household savings. Otherwise, with probability $(1 - \pi)$, a "Capitalist Government" will come to power in period (t+1) and remove the tariff on the importable good (T_2=0). In this case any revenue shortfall will be met out of a tax on wage income at a rate τ. T_1 and γ are determined historically, while T_2 and τ are set so as to meet the government's budget constraint in period (t+1) and are known in advance. Note that the tax on wage income τ is a non-distortionary lump-sum tax since labor supply is taken to be exogenous in this model. However it is assumed that, whichever government is in power, there are political constraints on the amount of the revenue that it can raise through lump-sum taxes on workers. Hence the government has to seek additional sources of revenue to finance its external debt.

Households

The young cohort in period t solves

$$\text{Max} \quad U(C^Y_t) + (1+\theta)^{-1}U(C^O_{t+1}) \tag{1}$$

subject to

$$C^Y_t + S_t = \omega_t \tag{2}$$

$$C^O_{t+1} = (1-\gamma)(1+r^L_{t+1})S_t = (1+r^D_{t+1})S_t \tag{3}$$

where θ is the discount rate (assumed to be the same for households and firms).[4]

The old cohort in period t merely consumes the return from its savings in the previous period:

$$C^O_t = (1-\gamma)(1+r^L_t)S_{t-1} = (1+r^D_t)S_{t-1} \tag{4}$$

Firms

On the production side of the economy it is assumed that the importable sector good is the capital good for both sectors. Capital is sector-specific in the short run but labor is fully mobile between sectors in both periods. Both sectors are competitive with constant returns to scale Cobb-Douglas production functions:

$$Q_X = F(K_X,L_X) = aK_X^{\alpha}L_X^{1-\alpha} \tag{5}$$

$$Q_M = G(K_M,L_M) = bK_M^{\beta}L_M^{1-\beta}, \beta > \alpha \tag{6}$$

$$L_X + L_M = 1 \tag{7}$$

where

Q_j is the output of the j^{th} sector, j = X,M; and
K_j (L_j) is input of capital (labor) in the j^{th} sector.

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[4]To make the analysis tractable the model in this paper focuses on the impact of political uncertainty on the investment behavior of firms and detracts from looking at its impact on the savings behavior of households. An interesting extension of the model would be to introduce more complex household savings functions where there are income and substitution effects from trade liberalization and financial sector reform.

The assumption that labor is fully mobile across sectors implies that the wage rate is equalized across the two sectors in every period. The wage rate ω in turn is determined by the equilibrium condition that

$$\omega = F_L(K_X,L_X) = p_M G_L(K_M,1-L_X) \quad (8)$$

where p_M is the domestic price of the importable good (inclusive of any tariffs).

Thus $p_{Mt} = p^*(1+T_1)$ and $p_{Mt+1} = p^*(1+T_2)$, where p^* is the world price of the importable good M and T_1, T_2 are the domestic tariff rates on the importable good in periods 1 and 2 respectively.

The firm finances its investment by borrowing from the 'young' household at a given rate of interest r^L, which it repays in the following period. Since r^L adjusts to equate investment and savings in each period, this implies that in general equilibrium r^L is the (expected) rate of return on investment. In period t the firm (assumed to be risk-neutral) allocates its capital between the two sectors such that the expected rate of return on investment in each sector is r^L_{t+1}.

Define ψ_{Xt} and ψ_{Mt} as the marginal revenue product of capital functions in the exportable and importable sectors respectively in period t, and ψ_{Xt+1} and ψ_{Mt+1} as the (expected) marginal revenue products of capital functions in the two sectors in period (t+1). The functions are given by

$$\psi_{Xt} = F_K(K_{X1},L_{Xt}) = r^L_t \quad (9)$$

$$\psi_{Mt} = p^*(1+T_1)G_K(K_{Mt},1-L_{Xt}) = r^L_t \quad (10)$$

$$\psi_{Xt+1} = \pi F_K(K_{Xt+1},L_{Xt+1}^T) + (1-\pi)F_K(K_{Xt+1},L_{Xt+1}^{NT}) = r^L_{t+1} \quad (11)$$

$$\psi_{Mt+1} = \pi p^*(1+T_2)G_K(K_{Mt+1},1-L_{Xt+1}^T) + (1-\pi)p^* G_K(K_{Mt+1},1-L_{Xt+1}^{NT}) = r^L_{t+1} \quad (12)$$

where the superscripts T, NT refer to the fact that the wage rate and labor allocation in period (t+1) will differ depending on whether or not there is a tariff in that period. T_1, T_2, π, ω_t, ω_{t+1}^T, ω_{t+1}^{NT}, and r^L_{t+1} are all taken as given by the firm.

The firm's maximization problem in period t is given by

$$\underset{L_{xt},K_{Xt+1},K_{Mt+1}}{\text{Max}} \quad \psi_{Xt}K_{Xt} + \psi_{Mt}K_{Mt} + (1+\theta)^{-1} * [\psi_{Xt+1}K_{Xt+1} + \psi_{Mt+1}K_{Mt+1}] \quad (13)$$

subject to

$$p^*(1+T_1)(K_{Xt+1}+K_{Mt+1}) = S_t \quad (14)$$

Note that, ex ante, the firm allocates capital in period t between the two sectors so as to equalize the expected rates of return in each sector at r^{L}_{t+1}. However, the ex post rates of return will differ across sectors and the realized sectoral rates of return will depend on whether or not there is a tariff on the importable good in period (t+1).

Government and market equilibrium

In period t the government pays the interest on its external debt using the proceeds from the tax on savings and a tariff on imports. Thus the government's period t budget constraint can be written as

$$\gamma(1+r^{L}_{t})S_{t-1} + p^{*}T_{1}\,[K_{Xt+1} + K_{Mt+1} - G(K_{Mt},1-L_{Xt})] = r^{*}D^{*}_{t} \qquad (15)$$

In period (t+1) the government is obliged to pay off the interest and principal on its external debt. If the "Workers' Government" comes to power it will raise the necessary revenue from the tax on household savings and a tariff on imports of the capital good. In this case the government's period (t+1) budget constraint is given by

$$\gamma(1 + r^{L}_{t+1})S_{t} + p^{*}T_{2}\,[K_{Xt+2} + K_{Mt+2} - G(K_{Mt+1},1-L_{Xt+1}{}^{T})] = (1 + r^{*})D^{*}_{t} \qquad (16a)$$

If instead the "Capitalist Government" comes to power in period (t+1), its revenue requirements to pay off its external debt obligations will be met from the tax on household savings and a tax on wage income. The period (t+1) government budget constraint in this case is given by

$$\gamma(1 + r^{L}_{t+1})S_{t} + \tau(\omega_{t+1}{}^{NT}) = (1 + r^{*})D^{*}_{t} \qquad (16b)$$

Since the capital account is assumed to be closed the balance-of-trade conditions are given by

$$F(K_{Xt},L_{Xt}) - C^{Y}_{t} - C^{O}_{t} - p^{*}\,[K_{Xt+1} + K_{Mt+1} - G(K_{Mt},1-L_{Xt})] = r^{*}D^{*}_{t} \qquad (17)$$

$$F(K_{Xt+1},L_{Xt+1}) - C^{Y}_{t+1} - C^{O}_{t+1} - p^{*}\,[K_{Xt+2} + K_{Mt+2} - G(K_{Mt+1},1-L_{Xt+1})] = (1+r^{*})D^{*}_{t} \qquad (18)$$

The balance-of-trade condition for period t is that the balance of trade surplus—the value of exports less the value of imports, all measured at world prices—must equal the interest payment on the external debt. The balance-of-trade condition for period (t+1) is that the balance-of-trade surplus must equal the principal plus interest payment on the external debt.

Substituting into the first order conditions the balance-of-trade conditions, and noting that in general equilibrium r^{L}_{t+1} is a positive function of K_{Xt+1} and K_{Mt+1} (in the absence of any shift in the domestic savings function), we can use the implicit function theorem to analyze the general equilibrium effects of a change in π. I assume throughout that there are no 'Laffer Curve' type effects, so that the revenue obtained from the tax on savings and from a tariff in period (t+1) increases as γ and T_2 respectively increases.

B. The Results

Solving the firm's optimization problem for period t using the implicit function theorem it can be shown that:

Proposition 1:

If the importable sector is the capital-intensive sector then in general equilibrium

$\delta K_{Xt+1}/\delta\pi < 0$
$\delta K_{Mt+1}/\delta\pi > 0$

In other words, an increase in the probability of there being a tariff in period (t+1) will lead to more investment in the importable sector, and to less investment in the exportable sector, in period t in general equilibrium (see Appendix 1 for further details).

This result can be shown diagrammatically. An increase in the probability of a tariff in period (t+1) from π_1 to π_2 ($\pi_2 > \pi_1$) will shift the investment demand function in Figure 1 from $I(r^L)$ to $I'(r^L)$. This follows from the Stolper-Samuelson theorem, by which a tariff on the importable good will increase the return to domestic capital in terms of either good in general equilibrium (if the importable sector is the capital-intensive sector). With a given tax rate on savings, γ_1, the equilibrium interest rate rises to $r^{L'}_{t+1}$ and the level of investment rises from I_1 to I_2.

Note that the savings function does not shift since π does not enter the optimization problem of the young cohort in period t. If instead we have a representative agent model where the agent consumes the importable sector good subject to the tariff, and/or where the return on the agent's savings in period t is affected by the policy uncertainty parameter π, the savings function will shift as well and the overall general equilibrium impact on domestic savings and investment is ambiguous. This unnecessarily complicates the model while detracting from the main points made in this paper. Hence an OLG framework is used instead of a representative agent model to analyze the issues addressed in this paper.

In Figure 2 ψ_{Xt+1} and ψ_{Mt+1} are, as defined earlier, the (expected) marginal revenue product of capital functions in the exportable and importable sectors respectively in period t. By the Stolper-Samuelson theorem an increase in π will shift both functions to the right, to ψ_{Xt+1}' and ψ_{Mt+1}' respectively. At the same time, in general equilibrium the equilibrium rate of interest rises from r^L_{t+1} to $r^{L'}_{t+1}$. The final result is an increase in investment in the importable sector, and a fall in investment in the exportable sector.

FIGURE 1

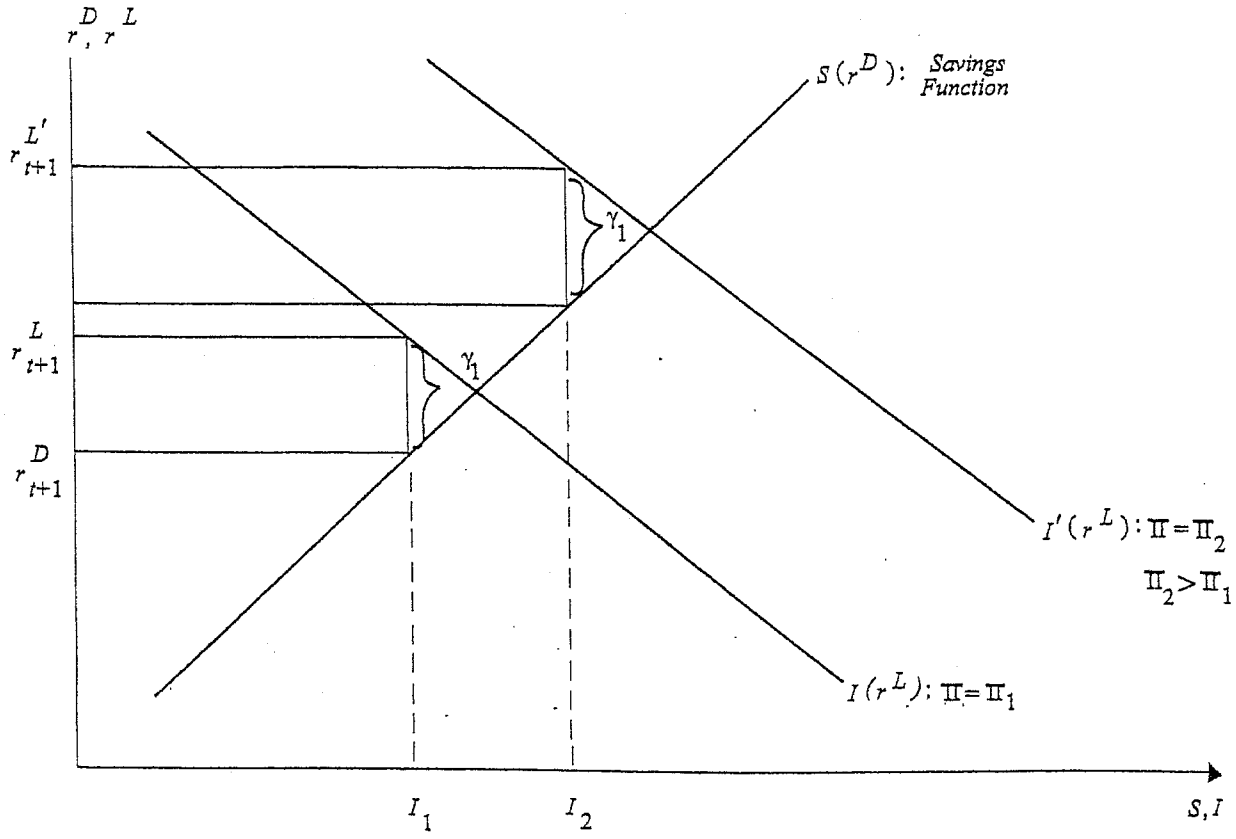
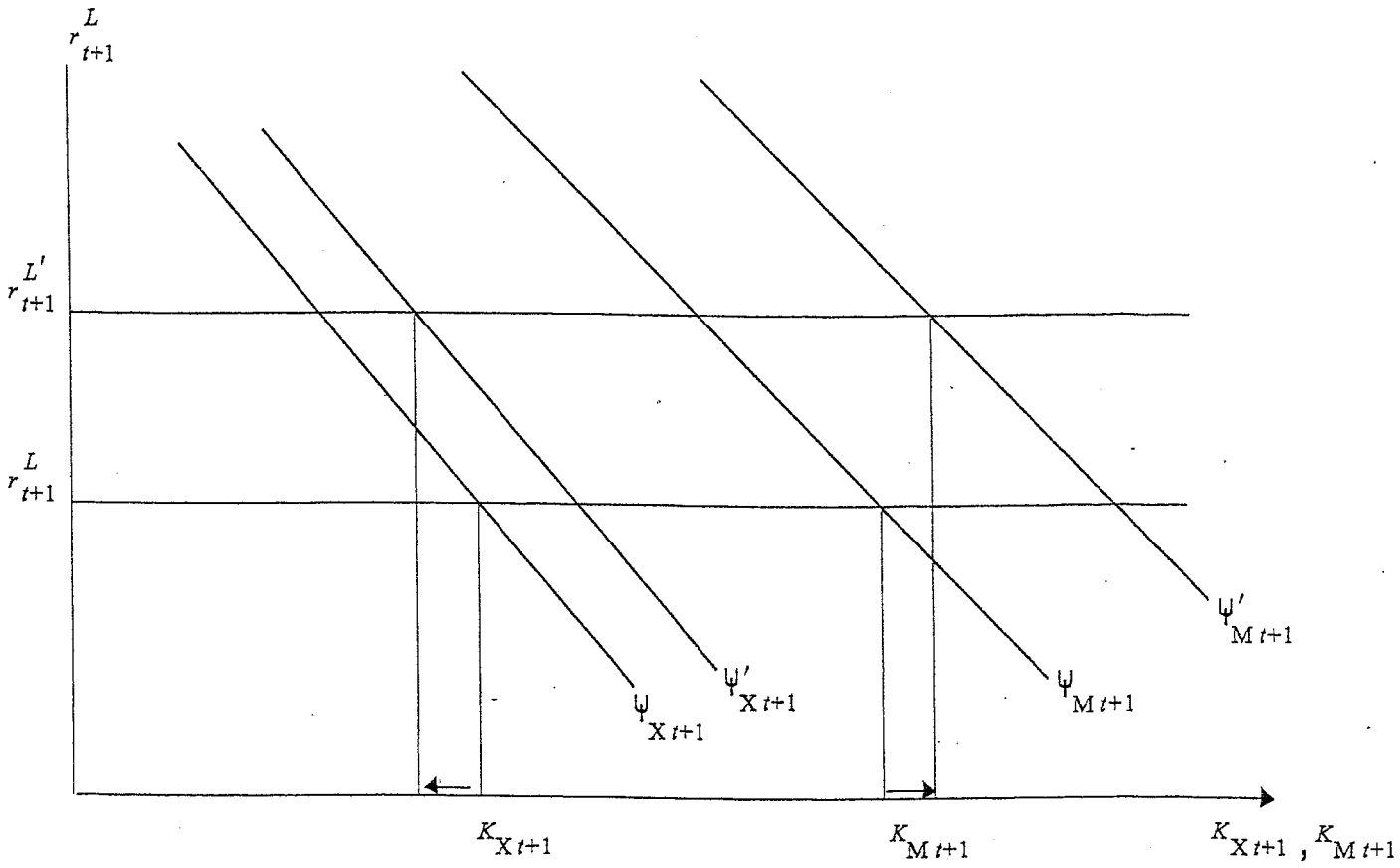
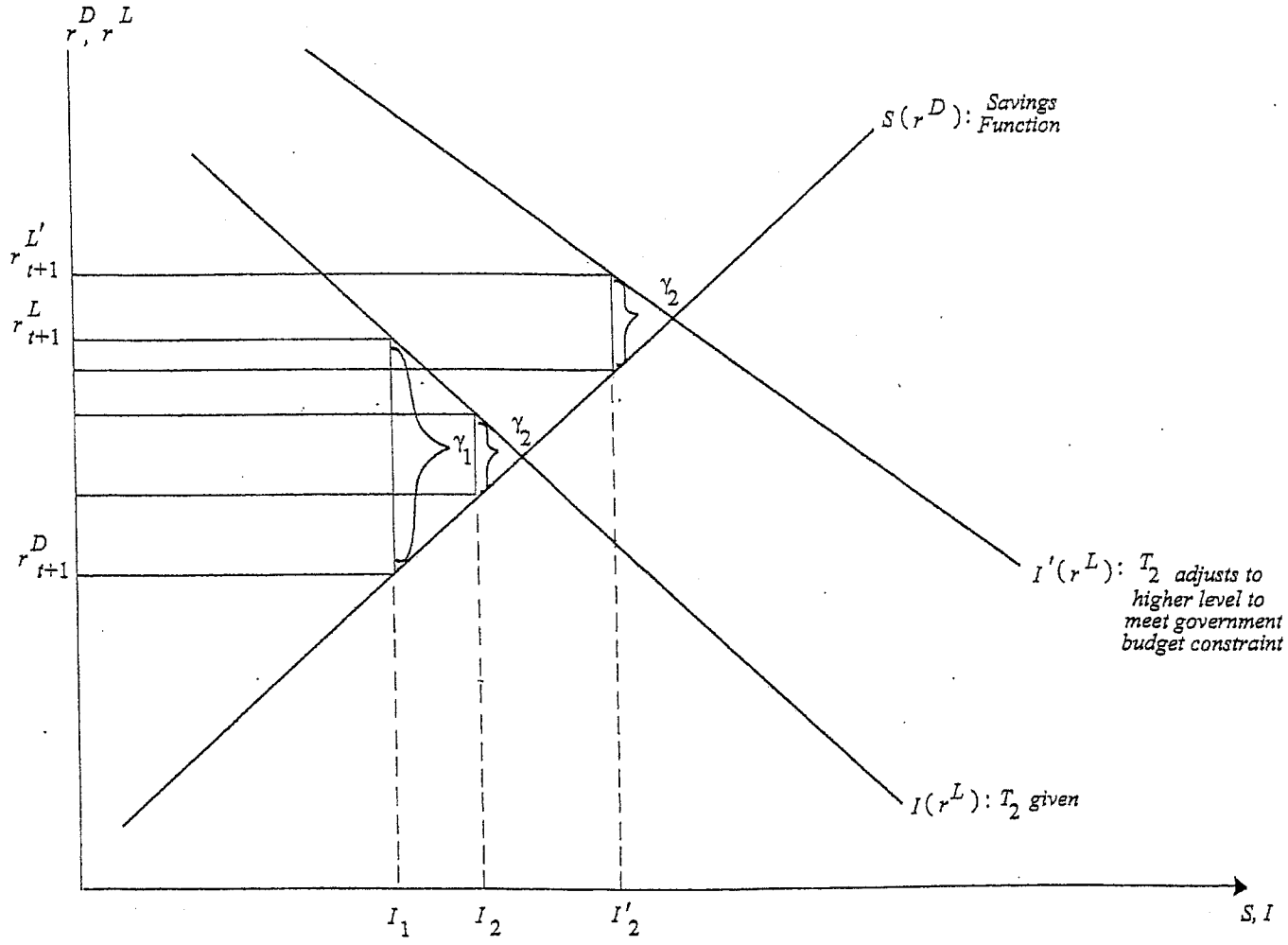

r^D, r^L
$S(r^D)$: Savings Function
$r^{L'}_{t+1}$
r^{L}_{t+1}
r^{D}_{t+1}
γ_1
γ_1
$I'(r^L)$: $\Pi=\Pi_2$
$\Pi_2>\Pi_1$
$I(r^L)$: $\Pi=\Pi_1$
I_1
I_2
S, I

FIGURE 2


r^{L}_{t+1}
$r^{L'}_{t+1}$
r^{L}_{t+1}
$\Psi'_{X\,t+1}$
$\Psi_{X\,t+1}$
$\Psi'_{M\,t+1}$
$\Psi_{M\,t+1}$
$K_{X\,t+1}$
$K_{M\,t+1}$
$K_{X\,t+1}$, $K_{M\,t+1}$

A fall in the tax rate on savings in this simple model will also lead to a rise in savings and investment in the economy. This is illustrated in Figure 3 below. A fall in the tax rate on savings from γ_1 to γ_2 in the first instance increases investment from I_1 to I_2 in Figure 3. However, there is also an indirect effect: as the tax rate on savings falls, and assuming no Laffer Curve type effects, the tariff rate T_2 must rise in general equilibrium in order to meet the government's budget constraint in period (t+1). The investment demand schedule consequently shifts out, to $I'(r^L)$, leading to a further rise in investment to I_2'.

FIGURE 3



Although overall domestic capital formation in the economy will increase, the effect on investment in the exportable sector is ambiguous. The direct effect of a fall in γ will be to raise investment in both sectors. However, in general equilibrium (as explained earlier) a lower γ will mean a higher T_2 for the government's period (t+1) budget constraint to be met (see Appendix 1). This will raise the expected profitability from investing in the importable sector for any given value of π. The result would be a shift outwards in the investment demand schedule so that r^L_{t+1} rises, which in turn will have a negative effect on investment in the exportable sector. Thus the indirect effect of a fall in γ will be to lower investment in the exportable sector, and the overall general equilibrium effect is ambiguous. This leads to Proposition 2:

Proposition 2:

If the importable sector is the capital-intensive sector then in general equilibrium

$\delta K_{Xt+1}/\delta\gamma$ is ambiguous
$\delta K_{Mt+1}/\delta\gamma < 0$

The proof is given in Appendix 1.

This section has assumed that π is exogenous. The next section looks at how the results presented above are affected when the probability of tariff reform is a function of the tax rate on household savings.

III. Endogenising the Probability of Tariff Reform

The story becomes more interesting when the probability of tariff reform becomes a function of the tax rate on savings, either positive or negative.

π could be a negative function of γ if, for example, a low tax on household savings means that more revenue must be raised through either a tax or a tariff and this raises the required tax rate on wage income to politically infeasible levels and makes the tariff more politically attractive.

On the other hand π could be a positive function of γ if a high tax rate on savings leads to strong lobbying by firms for protection against imports on the grounds that they face 'unfair' competition from abroad due to the fact that domestic producers have to pay a higher cost for capital. How are the results in the previous section affected when π becomes a function of γ?

To answer this note that

$$\delta K_{it+1}/\delta\gamma = \delta K_{it+1}/\delta\gamma_{\pi=\pi^*} + (\delta K_{it+1}/\delta\pi)^*(\delta\pi/\delta\gamma) \quad i = X,M \qquad (19)$$

The first part of these expressions represent the direct effects of financial liberalization on domestic capital formation while the second part of the expressions represent the indirect effects which arise from π being a function of γ.

In the previous section we showed that $\delta K_{Xt+1}/\delta\pi$ is negative, while $\delta K_{Mt+1}/\delta\pi$ is positive, as long as the importable sector is the capital-intensive sector. From this it follows that

Proposition 3:

If π is a positive function of γ then the indirect effects of financial liberalization would be to reduce investment in the exportable sector and to raise investment in the importable sector. Conversely if π is a negative function of γ.

The policy implications are interesting. One of the main objectives of trade liberalization is to shift resources away from protected sectors subject to high tariffs and instead encourage investment in the exportable sectors. If π is a positive function of γ the above analysis suggests that, if trade liberalization and financial sector reform take place simultaneously, the indirect effects of financial liberalization (i.e. of lowering the tax on savings) may in fact serve to frustrate this objective, at least in part. Conversely if π is a negative function of γ. To the best of the author's knowledge this aspect of the political economy linkages between trade liberalization and financial sector reform has not been discussed in the existing academic literature.

IV. Implications for Sequencing

What are the implications of the above analysis for the sequencing issue? The results in the previous sections suggest that a higher probability of tariff reform (i.e. a lower π) serves to lower investment in the importable sector while increasing investment in the exportable sector. By contrast financial liberalization (i.e. a lowering or removal of the tax on household savings) in this model leads to higher investment in the importable sector, with the impact on investment in the exportable sector ambiguous. Note that, if relative prices are unchanged, the Rybczynski theorem says that any increase in domestic capital formation resulting from financial liberalization leads to an expansion of the importable sector and a contraction of the exportable sector. There is thus a movement in opposite directions; if one of the main aims of tariff reform is a reallocation of resources from the importable sector to the exportable sector, then financial liberalization will tend to defeat one of the objectives of trade liberalization, at least in part.

Indeed, Johnson (1967) has shown in the case of a small open economy with tariffs on imports that immiserizing growth may occur with domestic capital accumulation if the importable sector is capital-intensive. The point is that when capital is accumulated production of the capital-intensive importable sector increases through the Rybczynski effect, and so the negative welfare effect of the pre-existing distortion is reinforced. This effect can be strong enough for the accumulation of capital to result in a reduction of welfare.

But what are the conditions for immiserizing growth to take place in the above model? If we assume that the tariff rate on the importable good remains at T_1 indefinitely, then it can be shown (see Bhagwati and Srinivasan (1984), Chapter 25) that the condition for immiserizing growth is equivalent to

$$1 + T_1 > \frac{\omega_{t+1}{}^{T} L_{Xt+1}{}^{T} / Q_{Xt+1}}{\omega_{t+1}{}^{T}(1-L_{Xt+1}{}^{T}) / p^{*}(1+T_1)Q_{Mt+1}} = \frac{1-\alpha}{1-\beta}$$

where $(1-\alpha)$ and $(1-\beta)$ are the labor shares in the exportable and importable sectors respectively (from equations (5) and (6)).

In short, if domestic financial liberalization leads to an increase in domestic capital accumulation in the presence of a tariff on imports of the capital-intensive good, then immiserizing growth will occur if $(1+T_1)$ exceeds the ratio of the labor share in the unprotected sector to the labor share in the protected sector subject to the tariff. The policy implication is that, from a welfare point of view, reform of the domestic financial market should not precede trade liberalization.

It is interesting to compare these results with those in Kahkonen (1987). The main policy conclusions of that arise from Kahkonen's model are that domestic financial liberalization (raising the deposit rate of interest and removing the 'tax' on household savings) may reduce welfare if tariffs are present, whereas tariffs can raise welfare when financial repression discourages savings.

The intuition behind these results are as follows. An artificially low deposit rate discourages domestic savings. At the same time the presence of a tariff in the first period, and the knowledge that it will be removed with certainty in the second period, encourages households to postpone their consumption to the future and thereby encourages domestic savings. If the tariff is high enough there can actually be excess domestic savings initially. Since a higher deposit rate unambiguous increases domestic savings, financial market reform can worsen intertemporal allocation by encouraging households to save even more. Thus domestic financial liberalization may reduce welfare if tariffs are present.

Tariffs in turn cause two types of welfare losses in Kahkonen's model. First, there is the standard static welfare loss resulting from overproduction and underconsumption of the protected good. In addition, as discussed above, the presence of a first period tariff encourages a shift in consumption to the second period and this can lead to excess domestic savings. In the absence of other distortions trade liberalization would reduce both types of welfare loss. However, the presence of distortions in the domestic financial market complicates matters. A low deposit rate leads to low domestic savings so that, with a sufficiently low tariff, the combined effect of a tariff and financial repression is suboptimal savings. Thus tariffs can raise welfare when financial repression discourages savings. In this case trade liberalization worsens the intertemporal allocation of domestic savings further, and this intertemporal welfare loss may outweigh the static welfare gain.

The policy implications that arise from Kahkonen's model are that tariff reductions increase welfare unambiguously only if the domestic financial market is unregulated, while financial liberalization will unambiguously cause welfare gains only under free trade. Kahkonen concludes that, although "recommendations about the optimal order of liberalization based on the relatively simple model presented here should be interpreted cautiously, it appears that a simultaneous liberalization of trade and domestic financial markets would be beneficial in a financially repressed economy, whether capital movements are regulated or not." (Kahkonen (1987), pp. 543).

One of the main differences between our model and that of Kahkonen (1987) is that households in our model are assumed not to consume the capital-intensive importable good subject to the tariff. Consequently in our model the presence of a first period tariff does not encourage a shift in consumption to the second period and therefore does not give rise to excess savings. However, our framework allows us to analyze the case where there is uncertainty about tariff reform, and where the probability of tariff reform is a function of the tax rate on savings. It is particularly interesting to look at the case where the probability of tariff reform is a negative function of the tax rate on borrowing—that is, when a lower tax rate implies a greater probability that the tariff will not be removed in the next period. Here the indirect effects of financial liberalization will tend to offset the direct effects and encourage a movement of resources in the desired direction. This is a result that does not come out in the existing academic literature, primarily because existing theoretical models looking at trade and domestic financial market reform do not explicitly incorporate the political economy linkages between the two.

With regard to factor payments, the higher level of domestic investment resulting from a lower tax on borrowing will tend to increase real wages (at least when measured in terms of tradable goods) and to lower the equilibrium rate of return on capital. By the Stolper—Samuelson Theorem, trade liberalization will have a similar effect on factor rewards as long as the importable sector is the capital-intensive sector. Thus both financial liberalization and trade liberalization are likely to have the same implications for equilibrium factor returns, even though the consequences for resource allocation between sectors may be very different.

V. Conclusion

The results presented in this paper suggest that trade liberalization leads to less investment in the importable sector and to more investment in the exportable sector. By contrast the direct effect of financial liberalization (i.e. a lowering or removal of the tax on household savings) is an increase in investment in the importable sector, with the impact on investment in the exportable sector ambiguous. There is thus a movement in opposite directions; if one of the main aims of tariff reform is a reallocation of resources from the importable sector to the exportable sector, then financial liberalization will tend to defeat one of the objectives of trade liberalization, at least in part.

It is interesting, however, to look at the case where the probability of tariff reform is a negative function of the tax rate on borrowing—that is, when a lower tax rate implies a

greater probability that the tariff would not be removed in the next period. For example, a lower tax on household savings may mean that more revenue must be raised through either a tax or a tariff and this may raise the required tax rate on wage income to politically infeasible levels and make the tariff more politically attractive. Here the indirect effects of financial liberalization will tend to offset the direct effects and encourage a movement of resources in the desired direction. Conversely if the probability of tariff reform is a positive function of the tax rate on borrowing. This aspect of the political economy linkages between trade liberalization and financial sector reform has been largely ignored in the existing literature. Another interesting result is that both trade liberalization and financial sector reform are likely to have the same implications for equilibrium factor returns—a rise in the real wage and a lower equilibrium rate of return on capital—even though the consequences for resource allocation between sectors may be very different. It is relevant here to note that a key assumption of this model - as in many theoretical trade models—is full employment in labor markets. In practice trade liberalization is likely to impose (often significant) costs of adjustment in the labor market, reducing employment in the protected sector and giving rise to higher frictional unemployment. An interesting extension of the model presented in this paper would be to introduce costs of adjustment in reallocating labor between sectors over the two periods.

The model presented and analyzed in this paper can be extended in a number of other directions. In particular, it would be interesting to look at the implications of introducing more complex household savings functions where there are income and substitution effects from trade liberalization and financial sector reform. Another interesting extension would be to incorporate a nontraded sector into the model and analyze the implications for resource allocation and for the exchange rate.

Solving the Model Presented in Section II

It can be shown that labor allocation in period t is unaffected either by the uncertainty parameter π or by the tax and tariff rates expected in period (t+1). L_{Xt} is therefore taken to be a constant for the purpose of solving the model. Thus the first order conditions for the firm's optimization problem presented in Section 2 are:

$A(K_{Xt+1},K_{Mt+1},L_{Xt}) =$

$$(1+\theta)^{-1} * \quad [\, \pi\, \alpha a(K_{Xt+1}/L_{Xt+1}{}^{T})^{\alpha-1} + (1-\pi)\, \alpha a(K_{Xt+1}/L_{Xt+1}{}^{NT})^{\alpha-1} \,] - [\, (1+\theta)^{-1}(1+r^{L}_{t+1}) - 1 \,] * p^{*}(1+T_1) = 0 \qquad (20)$$

$B(K_{Xt+1},K_{Mt+1},L_{Xt}) =$

$$(1+\theta)^{-1} * \quad [\, \pi\, \beta p^{*}(1+T_2) b(K_{Mt+1}/(1-L_{Xt+1}{}^{T}))^{\beta-1} + (1-\pi)\, \beta p^{*} b(K_{Mt+1}/(1-L_{Xt+1}{}^{NT}))^{\beta-1} \,] - [\, (1+\theta)^{-1}(1+r^{L}_{t+1}) - 1 \,] * p^{*}(1+T_1) = 0 \qquad (21)$$

By the implicit function theorem

$$\begin{vmatrix} A'(K_{Xt+1}) & A'(K_{Mt+1}) \\ B'(K_{Xt+1}) & B'(K_{Mt+1}) \end{vmatrix} \begin{vmatrix} \delta K_{Xt+1}/\delta\pi \\ \delta K_{Mt+1}/\delta\pi \end{vmatrix}$$

$$= - \begin{vmatrix} A'(\pi) \\ B'(\pi) \end{vmatrix}$$

Solving the model we have

$$\delta K_{Xt+1}/\delta\pi = - [\, C_{11}A'(\pi) + C_{21}B'(\pi) \,] / \Delta$$
$$\delta K_{Mt+1}/\delta\pi = - [\, C_{12}A'(\pi) + C_{22}B'(\pi) \,] / \Delta$$

where

C_{ij} is the determinant of the cofactor matrix associated with the element in the i^{th} row and j^{th} column of the Hessian

and Δ is the determinant of the Hessian matrix and is positive definite by the second order sufficient conditions for the firm's optimization problem.

Applying the Implicit Function Theorem, and substituting the balance-of-trade conditions and the government budget constraints into the firm's first order conditions, we get the following results:

$$\delta K_{Xt+1}/\delta\pi = -(1/\Delta)\,[\,A'(\pi)B'(K_{Mt+1}) - B'(\pi)A'(K_{Mt+1})\,] \tag{22}$$

$$(-ve)\;[\;(-ve)(-ve) - (+ve)(-ve)\;] < 0$$

$$\delta K_{Mt+1}/\delta\pi = -(1/\Delta)\,[\,B'(\pi)A'(K_{Xt+1}) - A'(\pi)B'(K_{Xt+1})\,] \tag{23}$$

$$(-ve)\;[\;(+ve)(-ve) - (-ve)(-ve)\;] > 0$$

$$A'(\pi) = -(1+\theta)^{-1}\,\alpha p^* b K_{Xt+1}^{-1} K_{Mt+1}^{\beta} *$$
$$[\,(1-L_{Xt+1}^{T})^{1-\beta} - (1-L_{Xt+1}^{NT})^{1-\beta}\,] < 0$$

since $\quad (1-L_{Xt+1}^{T})^{1-\beta} > (1-L_{Xt+1}^{NT})^{1-\beta}$

$B'(K_{Mt+1}) < 0$ and $A'(K_{Xt+1}) < 0$ by the second-order necessary conditions for the firm's optimization problem.

$$B'(\pi) = (1+\theta)^{-1} *$$
$$[\,\beta p^*(1+T_2) b (K_{Mt+1}/(1-L_{Xt+1}^{T}))^{\beta-1}$$
$$- \beta p^* b (K_{Mt+1}/(1-L_{Xt+1}^{NT}))^{\beta-1}\,] > 0$$

$$A'(K_{Mt+1}) = -(1+\theta)^{-1}\, b\beta K_{Mt+1}^{\beta-1} \alpha p^* K_{Xt+1}^{-1} *$$
$$[\,\pi\,(1-L_{Xt+1}^{T})^{1-\beta} + (1-\pi)\,(1-L_{Xt+1}^{NT})^{1-\beta}\,]$$
$$- (1+\theta)^{-1} p^* (1+T_1)\,\delta(1+r^{L}_{t+1})/\delta K_{Mt+1} < 0$$

$$B'(K_{Xt+1}) = -(1+\theta)^{-1} p^* (1+T_1)\,\delta(1+r^{L}_{t+1})/\delta K_{Xt+1} < 0$$

Before looking at the impact on domestic investment of changes in the tax rate on borrowing, note that in general equilibrium a lower γ will mean a higher T_2 for the government's period (t+1) budget constraint to be met. This can be shown as follows.

Substituting (14) into the Worker Government's period (t+1) budget constraint (16a) we get

$$\gamma(1 + r^{L}_{t+1}) p^* (1+T_1)(K_{Xt+1}+K_{Mt+1}) =$$

$$(1 + r^*)D^*_t - p^* T_2\,[K_{Xt+2} + K_{Mt+2} - G(K_{Mt+1}, 1-L_{Xt+1}^{T})] \tag{24}$$

Differentiating (22), and noting that in general equilibrium $(1 + r^{L}_{t+1})$ is a positive function of γ, we get

$$p^*(1+T_1)(K_{Xt+1}+K_{Mt+1})\,[\,(1 + r^{L}_{t+1}) + \gamma\,\delta(1 + r^{L}_{t+1})/\delta\gamma\,]\,\delta\gamma =$$

$$- p^*\,[K_{Xt+2} + K_{Mt+2} - G(K_{Mt+1}, 1-L_{Xt+1}^{T})]\,\delta T_2 \tag{25}$$

This in turn gives us that

$$\delta T_2 / \delta \gamma =$$

$$\frac{- \; p^*(1+T_1)(K_{Xt+1}+K_{Mt+1}) \; [\; (1 + r^L_{t+1}) \; + \; \gamma \; \delta(1 + r^L_{t+1})/\delta\gamma \;]}{p^* \; [K_{Xt+2} + K_{Mt+2} - G(K_{Mt+1}, 1-L_{Xt+1}{}^T)]} \qquad (26)$$

< 0 given our assumptions about no "Laffer Curve" effects.

$$\delta K_{Xt+1}/\delta\gamma = - (1/\Delta) \; [\; A'(\gamma)B'(K_{Mt+1}) - B'(\gamma)A'(K_{Mt+1}) \;] \qquad (27)$$

$$\delta K_{Mt+1}/\delta\gamma = - (1/\Delta) \; [\; B'(\gamma)A'(K_{Xt+1}) - A'(\gamma)B'(K_{Xt+1}) \;] \qquad (28)$$

$$A'(\gamma) \; = \; - p^*(1+T_1)(1+\theta)^{-1} \; \delta(1 + r^L_{t+1})/\delta\gamma \qquad < 0 \qquad (29)$$

$$\begin{aligned} B'(\gamma) \; &= \; - p^*(1+T_1)(1+\theta)^{-1} \; \delta(1 + r^L_{t+1})/\delta\gamma \\ &+ \; (1+\theta)^{-1} \; \pi\beta p^* b(K_{Mt+1}/(1-L_{Xt+1}{}^T))^{\beta-1} \; \delta T_2/\delta\gamma \\ &= \; A'(\gamma) \\ &+ \; (1+\theta)^{-1} \; \pi\beta p^* b(K_{Mt+1}/(1-L_{Xt+1}{}^T))^{\beta-1} \; \delta T_2/\delta\gamma \quad < 0 \end{aligned} \qquad (30)$$

$$\begin{aligned} \delta K_{Xt+1}/\delta\gamma \; &= \; - (1/\Delta) \; [\; A'(\gamma) \; (B'(K_{Mt+1}) - A'(K_{Mt+1})) \\ &\qquad - \; (1+\theta)^{-1} \; \pi\beta p^* b(K_{Mt+1}/(1-L_{Xt+1}{}^T))^{\beta-1} \; (\delta T_2/\delta\gamma) \; A'(K_{Mt+1}) \;] \\ &= \; (-ve) \; [\; (-ve) \; (-ve) \; - \; (-ve) \; (-ve) \;] \\ &\Rightarrow \; \text{ambiguous.} \end{aligned}$$

$$\begin{aligned} \delta K_{Mt+1}/\delta\gamma \; &= \; - (1/\Delta) \; [\; A'(\gamma) \; (A'(K_{Xt+1}) - B'(K_{Xt+1})) \\ &\qquad + \; (1+\theta)^{-1} \; \pi\beta p^* b(K_{Mt+1}/(1-L_{Xt+1}{}^T))^{\beta-1} \; (\delta T_2/\delta\gamma) \; A'(K_{Xt+1}) \;] \\ &= \; (-ve) \; [\; (-ve) \; (-ve) \; + \; (-ve) \; (-ve) \;] < 0 \end{aligned}$$

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