

INTERNATIONAL CAPITAL MOBILITY AND  
THE CORPORATION INCOME TAX

by

Melvyn B. Krauss

October 1977

No. 77-18

# INTERNATIONAL CAPITAL MOBILITY AND THE CORPORATION INCOME TAX

by

MELVYN B. KRAUSS  
New York University

One of the more interesting developments in the world economy in the past decade has been the increased mobility of capital between nations. This change in the international economic environment mandates that economists re-orient and extend traditional analysis to take this fact into account. A case in point is the analysis of the corporation income tax (CIT). For the most part, the analysis of the CIT has been performed under the assumption of a closed-economy. Yet this controversial tax has obvious international implications, especially in a world where capital is mobile between nations. It would seem compulsory that an analysis of the CIT take international capital mobility explicitly into account. This is the purpose of the present paper.

The analysis of the CIT when capital is assumed to be perfectly mobile between nations proceeds under two different sets of assumptions in this paper. One set corresponds to an extended Heckscher-Ohlin-Samuelson (HOS) Model; the other to a specific factor (SF) Model. The results can be briefly summarized. In the HOS Model, the CIT is completely ineffective in transferring resources from the private community to government. Its sole

effect is to shut-down the corporate sector of the tax-imposing country. Domestic consumption and economic welfare remain unaffected by the tax. In the SF Model, on the other hand, the tax does raise tax revenue, which is paid by the factor of production specific to the corporate sector out of its economic rent. Capital completely avoids the tax. Furthermore, the CIT imposes an "excess burden", in that the loss to the specific factor in the corporate sector is greater than the the tax revenues gained by the taxing authority.

I

The HOS Model

The assumptions of the HOS Model are sufficiently well-known that only the briefest of enumerations suffices.<sup>1)</sup> The HOS is sometimes called the "two-by-two-by-two", because it assumes two economies, two goods and two factors of production in perfectly inelastic supply to each economy. It also assumes that competition prevails, and that each good is produced by both productive factors (homogeneous labor and homogeneous capital) in constant returns to scale production functions, such that one of the goods is unambiguously capital-intensive and the other unambiguously labor-intensive. Technology is assumed to be the same in the two countries. Normally, the HOS Model also assumes that the factors of production are internationally immobile, but this assumption is not made in this paper.

One sector of the HOS Model is identified as being corporate in this paper, the other non-corporate. It is assumed throughout that the corporate good is the import good. Capital services are distinguished from capital owners, and only the former are assumed to be internationally mobile.

Consider a situation where initially there is only free trade in goods. The equilibrium in this case is represented in Figure 1 by the terms of trade line TT being tangent to the transformation curve HH at point P, and to the community indifference curve at point C. The assumptions of factor-price equalization imply that, from this initial free trade position, an allowance for international capital mobility would not alter the existing international allocation of capital in the world economy. Capital would be free to move, but no capital in fact would move, because free trade has equalized factor prices.

Now assume that a CIT is imposed in the home country. Following Harberger, the CIT is conceptualized as a <sup>distortionary</sup> tax on capital only in the corporate sector of the economy, bearing in mind that this is precisely true only if there is no deductability of interest payments and full deductability of true economic depreciation.<sup>2)</sup> Because both net factor prices and commodity prices must be the same in the home and foreign countries, the tax neither can be passed forward to consumers nor passed backwards on to factors. Hence, the CIT necessitates that the home corporate sector shut down

entirely. Furthermore, this surprising conclusion is true regardless of (1) whether the tax-imposing country is a small or large one, and (2) whether the ad valorem rate of CIT is low or high.

The shutdown of the home corporate sector involves an inflow or outflow of capital depending upon whether the corporate sector is capital- or labor-intensive by comparison with the non-corporate sector. If capital-intensive, the shutdown of the corporate sector creates an excess supply of capital in the taxing country at constant factor prices, so that capital is exported. This situation is illustrated in Figure 1 by the production point moving from P to R on the vertical along the Rybczynski line RR; in Figure 2 by the shift in the factor endowment point from E to E'. If the corporate sector is labor-intensive, the corporate sector shutdown creates an excess supply of labor at constant factor prices, so that capital is imported. This situation is illustrated in Figure 1 by the production point moving from P to R' on the vertical along the Rybczynski line R'R'; in Figure 3 by the shift in the factor endowment point from E to E'.

If the corporate sector is capital-intensive, gross domestic product, measured in terms of the non-corporate good at constant prices, falls by TR, but national income, similarly measured, remains the same at OT because of the interest income of TR from foreign investment. With constant numeraire income and commodity prices, the pre-tax consumption point C is obtainable. If the

corporate sector is labor-intensive, gross domestic product rises by  $TR'$ , but national income remains the same at  $OT$  because of the interest outpayments of  $TR'$ . Thus, regardless of whether the corporate sector is assumed to be capital- or labor-intensive, the corporate income tax imposes no burden on the private community because it produces no revenue for the government. The tax closes down the corporate sector and thus dries up the tax base. It is completely ineffectual in transferring resources from the private community to government.

It is interesting to note that this result is analogous to that obtained by Robert Mundell in his factor mobility paper, where he demonstrates that under factor-price equalization assumptions and perfect mobility of capital services, an attempt to tax imports by a tariff cuts off all "goods for goods" trade.<sup>3)</sup> The tax base, imports in this case, disappear, and the tariff has no domestic welfare effect. Similar conclusions hold when a production tax on a particular sector is imposed under conditions of international capital mobility. Again the base disappears, which implies that the taxed industry closes down in response to the tax. In all three cases, a welfare-equivalent international-exchange pattern of "capital services for goods" replaces that of "goods for goods".

In the HOS Model, the CIT closes down the corporate sector when capital is internationally mobile even if the income produced by home country corporate capital abroad is taxed at the same rate as income produced by home country corporate capital at home - that is, even if the home country employs a compensating tax on imported interest income. This is because the production changes implied by the CIT can not be made due to the constraint that domestic be equal to foreign factor prices. To effectuate the CIT under capital mobility assumptions, the tax must be applied as a consumption tax on corporate sector goods. This implies that destination principle border tax adjustments (import compensatory duties plus export tax rebates at an ad valorem rate equal to that of the domestic tax) be applied to the CIT.<sup>4)</sup> The border tax adjustment mechanism allows domestic consumer prices to differ from world prices by the tax.

The general equilibrium effect of imposing the CIT under the destination principle is illustrated in Figure 4. Because gross factor prices (to producers) are not the same in the two industries, the transformation curve is distorted. But since the tax is passed forward to consumers via the border tax adjustment mechanism, production is at an efficient point on the distorted transformation curve (point P'), while consumption is at an inefficient point on the terms of trade line T'T' (point C'). The tax is effective in the sense that it transfers resources from the private community to the

government. In so doing it imposes an "excess burden" on the private community equal to the difference between  $U_3$  and  $U_1$ . This result is independent of whether international capital mobility is assumed or not, since the tax is imposed on the "uses of income" rather than the "sources of income" stream.

## II

### Specific Factor Model

The HOS result that a CIT, no matter how small, shuts down the corporate sector when applied upon the "sources of income" flow, seems extreme. The CIT is widely applied by various nations on this flow, and the corporate sector persists in spite of substantial international capital mobility. This may be explained by the presence of specific factors.

Consider a neo-Ricardian economy producing two goods, one corporate the other non-corporate. Both goods use two factors of production. The corporate good uses capital and labor; the non-corporate good uses capital and land. In effect, capital links the two goods, since land is specific to the non-corporate good and labor is specific to the corporate good. If the corporate good is identified with industry and the non-corporate good with agriculture, this specific factor model may have considerable applicability to the real world.



The country in question is assumed to be a small one in the world economy that imports the corporate good and exports the non-corporate one at fixed terms of trade. It is assumed that capital, besides being mobile between the two domestic sectors, is internationally mobile as well. Hence the price of capital also is set in the world market. It is convenient to assume the initial equilibrium to be one where there is commodity trade, but the entire capital stock is employed at home.

Let  $O_C O_{NC}$  in Figure 5 represent the initial stock of capital services in the home country. The value of the marginal product of capital schedule in the corporate sector is shown by  $D_C D_C$  and that in the non-corporate sector by  $D_{NC} D_{NC}$ . The initial free trade equilibrium is at point E, with  $O_{NC} T$  capital employed in the non-corporate sector and  $O_C T$  capital employed in the corporate sector. Given the foreign price of capital equal to  $O_C K$ , the value of the marginal product in both industries must be equalized at this price. For if it were not so, the discrepancy would be adjusted either by capital inflow or outflow, depending upon whether at the price  $O_C K$  there is an excess demand or excess supply of capital.

Let the home country impose a tax at an ad valorem rate of  $K'K/O_C K$  on capital in the corporate sector only. If the tax is applied on the "sources of income" flow, corporate capital flees the taxing country until the net-of-tax rental of capital in the corporate sector again is restored to  $O_C K$ . This implies that the gross-of-tax rental of capital must be  $O_C K'$  in the corporate

sector, and that  $O_C O_C'$  units of capital leave the home country.  $O_C' T$  units of capital continue to be employed in the domestic corporate sector (at a net-of-tax rental of  $O_C K$  and a gross-of-tax return of  $O_C K'$ , while the original  $O_{NC} T$  units of capital remain employed in the non-corporate sector (at a net equal to gross return of  $O_{NC} K$ ).<sup>5)</sup>

What are the distributional and welfare consequences of the CIT in the SF Model? It is at once obvious that the tax affects neither the owners of corporate nor non-corporate capital. The net of tax price of corporate capital remains equal to the world price, as does the price of capital used in the non-corporate sector. Instead the tax affects a transfer of resources from labor - the specific factor in the corporate sector - to government. It is labor not capital that pays the tax! Tax revenues increase by  $E' N' NE$ , while labor loses  $LE' N' N$  out of its Ricardian rent. Hence, the tax imposes an "excess burden" equal to the triangle  $LE' E$ .

The relationship between the CIT in the SF Model, and a consumption tax on one of the goods in the HOS Model, is worth noting. In both cases, the tax is paid out of the surplus "produced" by the taxed entity. In the HOS Model at constant terms of trade, a tax on the consumption of one of the goods raises the price of that good to consumers and is paid out of consumer's surplus. In the SF Model, at a constant price of capital, a tax

on the use of capital raises its price to its "consumers" - that is, to the firms who use it - and is paid out of the surplus produced by capital. But the surplus produced by capital in the SF Model goes to labor - the specific factor - not to firms. Hence, it is labor that must pay the tax in the SF Model, while it is the consumer who pays the tax in the HOS Model.

It is realized, of course, that the CIT in the HOS Model also increases the price of corporate-sector capital to corporate producers at a fixed net price of capital. But in the HOS, the surplus produced by corporate-sector capital does not go to the co-operating factor labor; it goes instead to consumers of corporate-sector outputs, and this surplus is protected from the tax by the assumption of fixed commodity prices. Hence, with no surplus to finance it, the tax is inconsistent with normal profits being earned by corporate-sector producers who go out of business.

Finally, it has been assumed in the foregoing analysis that the home country in the SF Model is a small one. To what extent do the conclusions of the analysis depend upon this assumption? The answer is not at all! This is demonstrated in Figure 6 where  $OO_F$  represents the initial world output of the corporate good and  $OO_H$  the initial world output of the non-corporate good. At the initial terms of trade  $TT$ , point  $P$  represents home country production with respect to  $O_H$  and foreign production with respect to  $O_F$ . Similarly, point  $C$  represents home country consumption with respect to  $O_H$  and foreign consumption with respect to  $O_F$ . The home

country exports PB of the non-corporate good for BC of the corporate good, and vice-versa for the foreign country. As is clear from the Figure, both countries are large ones.

Consider the effect of the CIT measured at constant prices. Production shifts from P to P', with the home country producing PP' less of the corporate good and the foreign one producing PP' more. Consumption, however, remains the same at point C in both countries despite the shift in the production point. The home country exports capital services and imports more of the corporate good, and vice-versa for the foreign country.

The home country continues to export P'B' (equal to PB) non-corporate goods for B'C' (equal to BC) corporate goods at given prices. In addition, it exports PP' worth of capital services for CC' imports of corporate goods. This would appear to create an excess demand for the corporate good on world markets at constant prices and thus, since both countries are assumed to be large, a terms of trade adjustment. But this is not the case. For while the CIT creates an excess demand for the corporate good equal to CC' in the home country, it simultaneously creates an identical excess supply of this good in the foreign country. No terms of trade adjustment is required for world markets are cleared at constant prices. The results of the small country case hold for the big one as well!

## FOOTNOTES

1. A complete description of the HOS Model can be found in M. B. Krauss and H. G. Johnson, General Equilibrium Analysis (Chicago: Aldine Publishing Co., 1975), Chapter 1.
2. A. C. Harberger, "The Incidence of the Corporation Income Tax," Journal of Political Economy (June 1962). It has been shown recently by Stiglitz and by King that the CIT is distortionary only if the tax system disallows interest payments as a deduction and grants only true economic depreciation allowances. However, if interest payments are deductible for tax purposes, or if firms can deduct investment expenditures for tax purposes, the CIT is equivalent to a neutral lump-sum tax on corporations. J. E. Stiglitz, "Taxation, Corporate Financial Policy and the Cost of Capital," Journal of Public Economics, 2 (1973) 1-34; M. A. King, "Taxation, Corporate Financial Policy, and the Cost of Capital, A Comment," Journal of Public Economics, 4 (1975) 271-279.
3. R. A. Mundell, "International Trade and Factor Mobility," American Economic Review (June 1957).
4. H. Johnson and M. Krauss, "Border Taxes, Border Tax Adjustments, Comparative Advantage and the Balance of Payments," Canadian Journal of Economics (November 1970).
5. For simplicity, a parallel shift in the marginal product of capital schedule is assumed. The cases of non-parallel shifts are not reported in the paper, but do not alter the analysis' principal results.

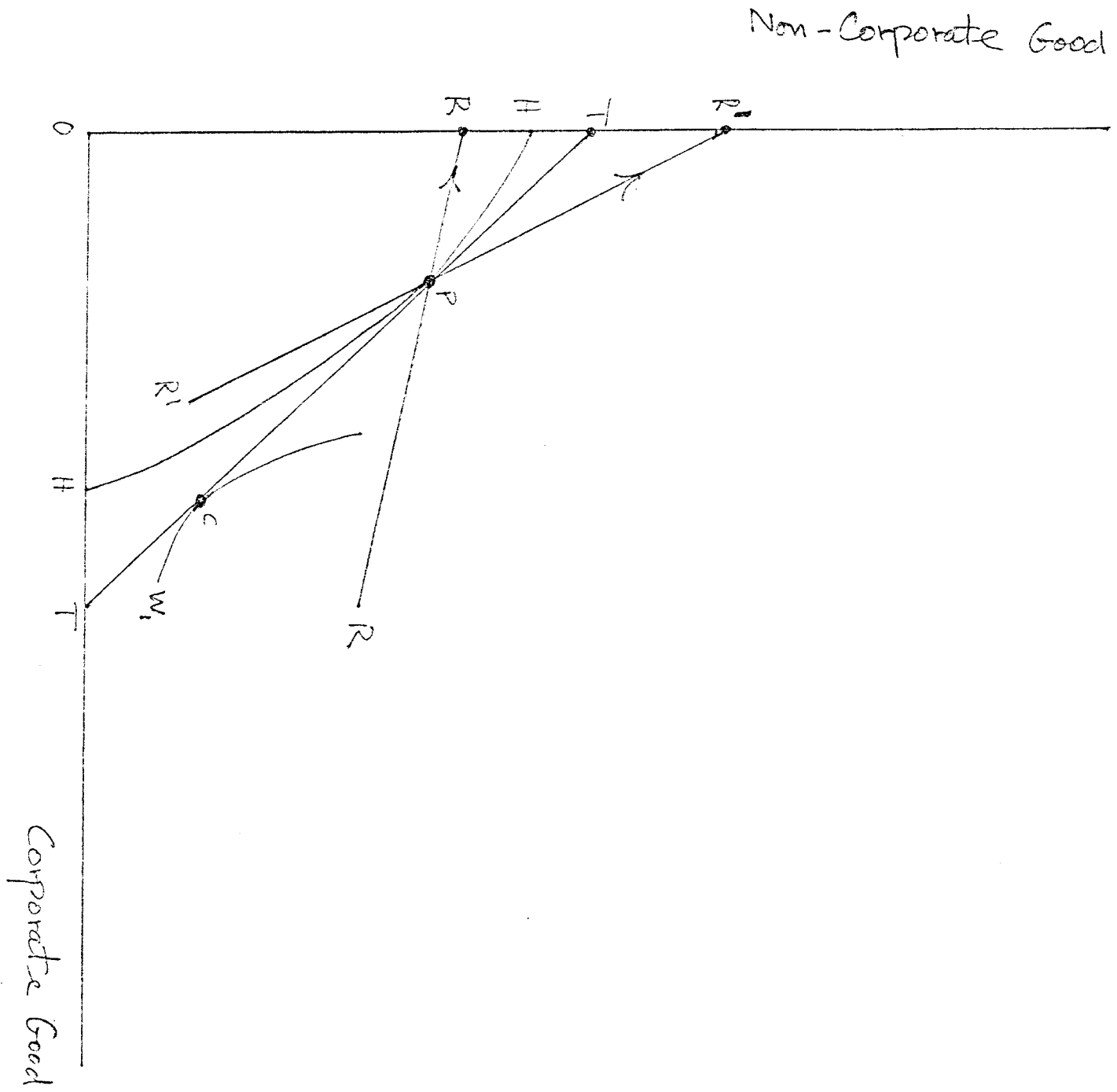


Figure 1.

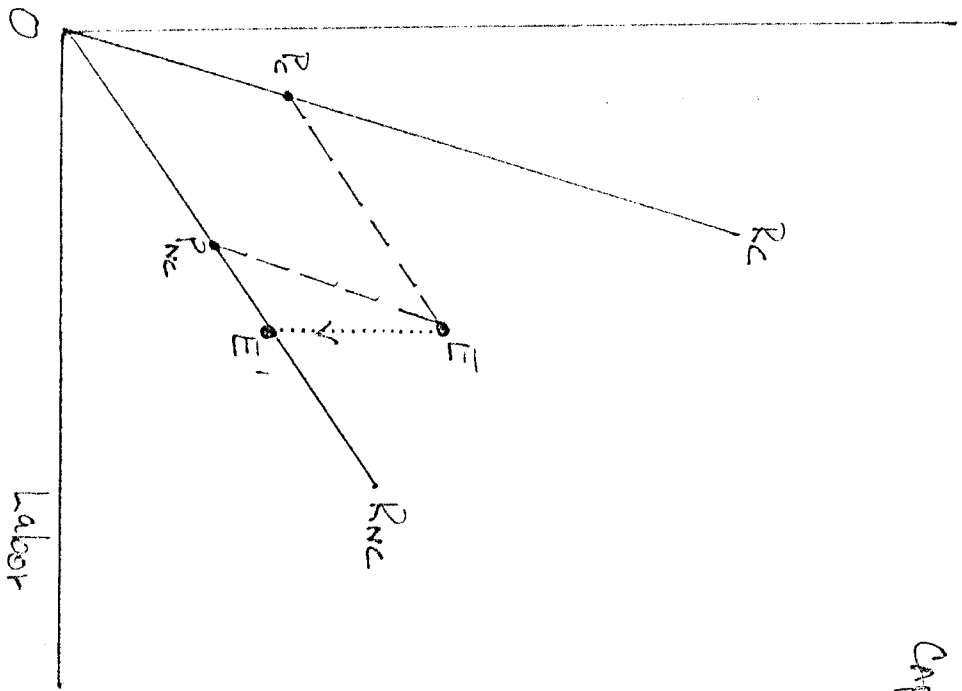


Figure 2

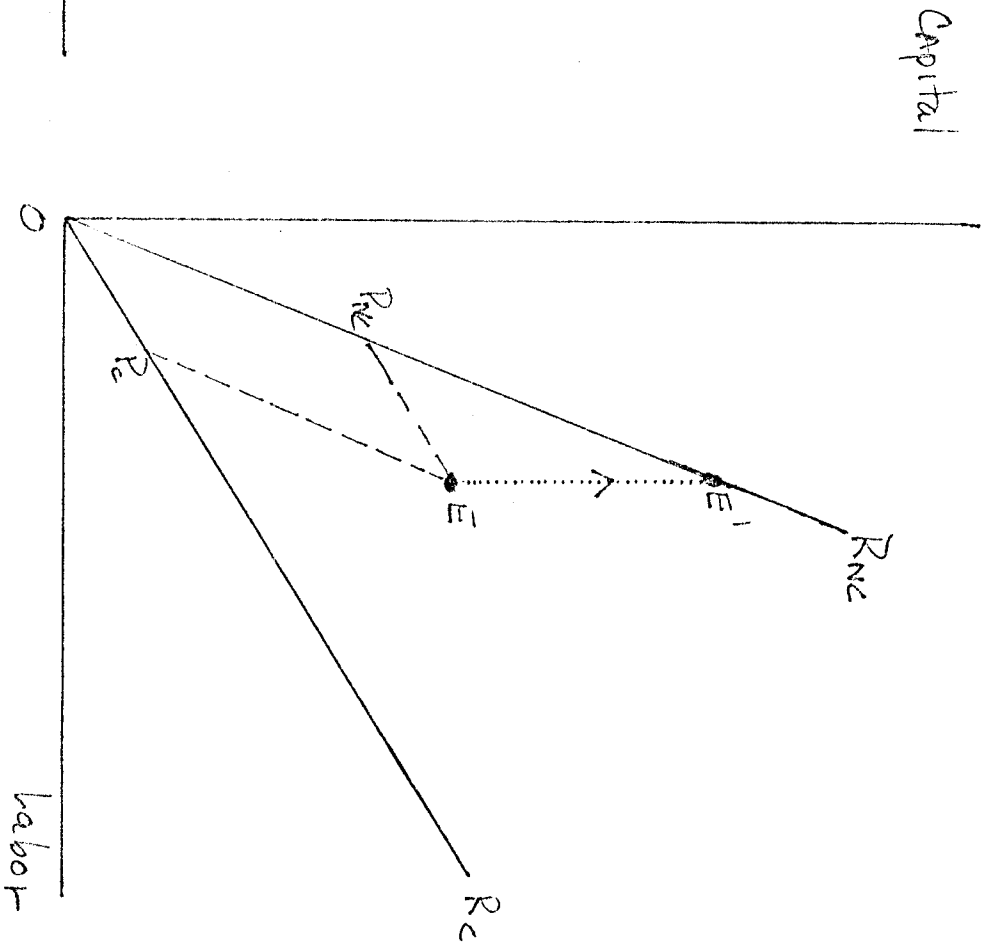


Figure 3

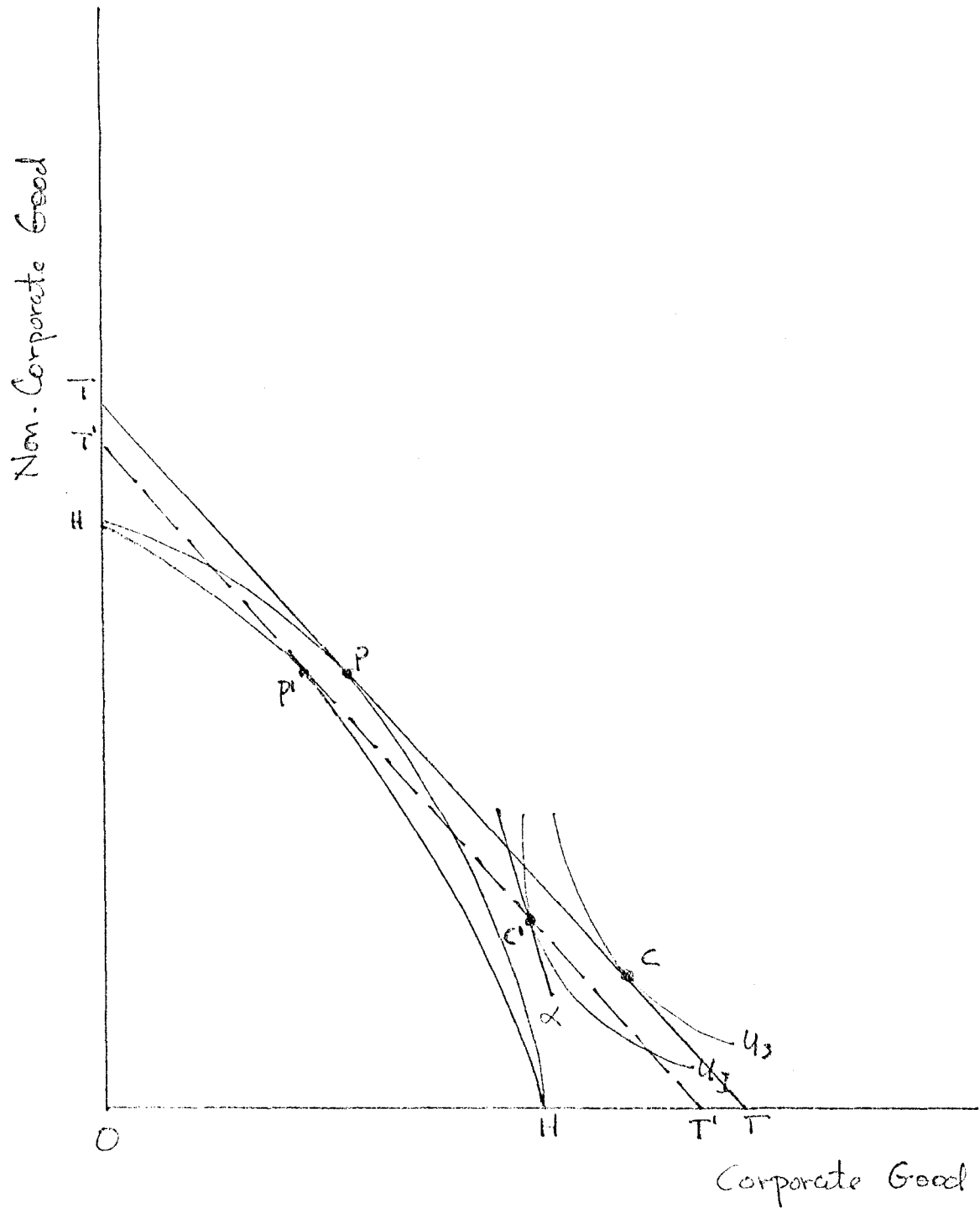


Figure 4



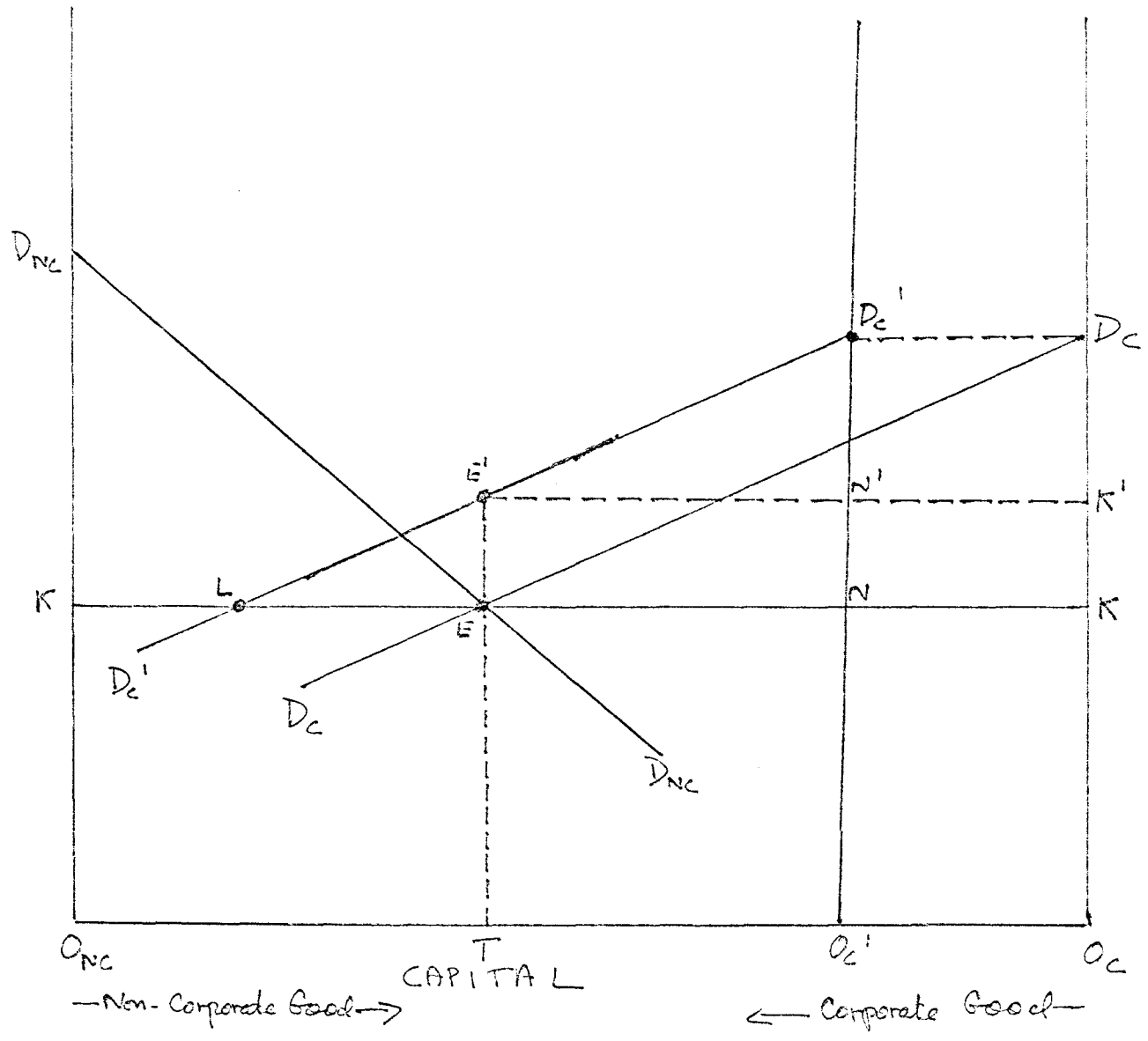


Figure 5

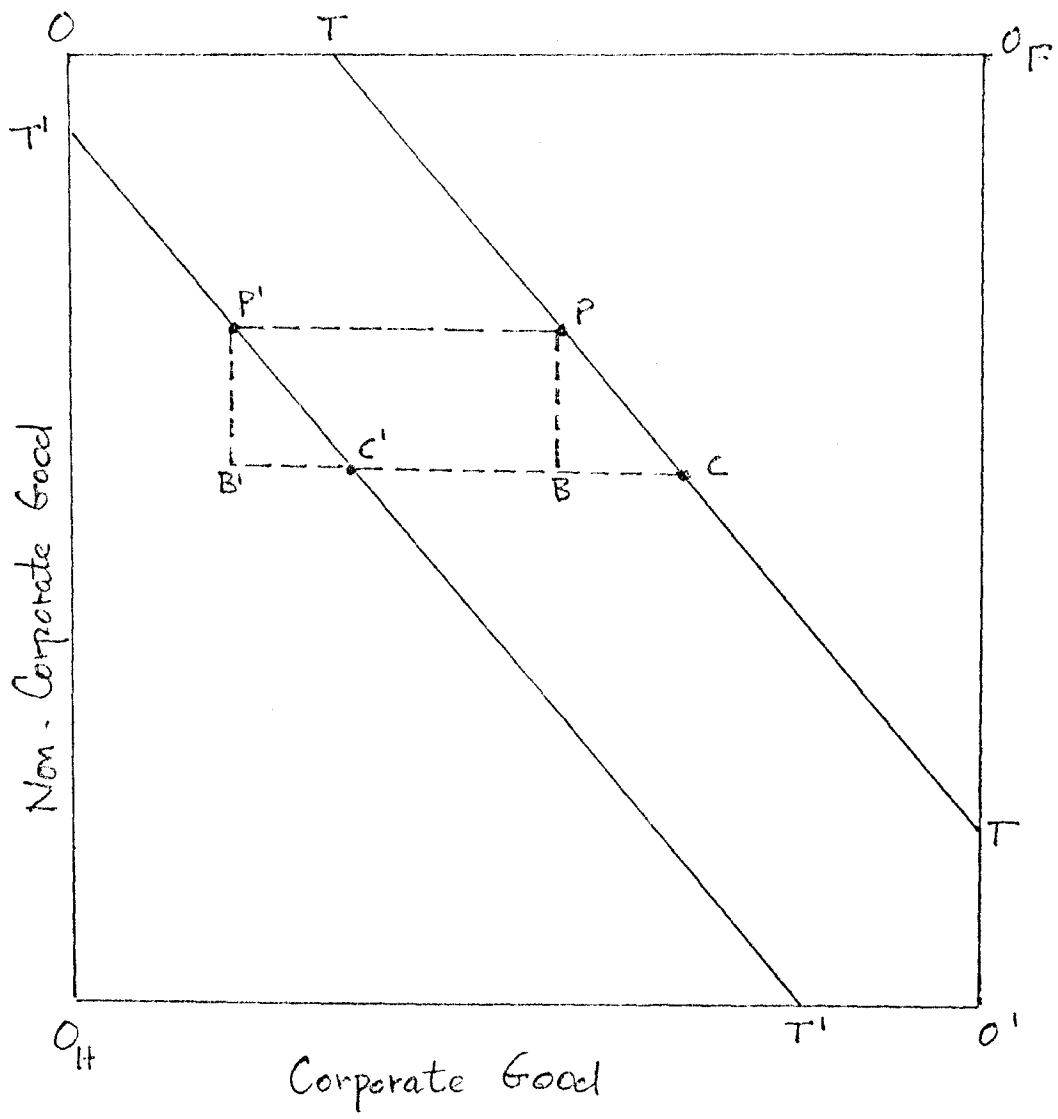


Figure 6