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Liberalisation and Capital Flight

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Abstract: A two-period trade theoretic model is used to analyse the effects of liberalisation programmes in a financially repressed economy (where official bank loan and deposit rates are artificially low). Financial repression creates incentives for households to overcome the capital controls and invest abroad (capital flight). It is shown that capital controls, financial regulation and trade policies are intimately related in the sense that some financial repression and capital controls are optimal if imports are subject to tariffs, and tariffs are optimal if there is financial repression. Hence, sequential liberalisation programmes may lead to a deterioration of welfare. It is shown that the presence of capital flight improves the possibilities that financial deregulation may succeed even when trade has not been completely liberalised.

I INTRODUCTION

The literature on the effects of liberalising markets can be divided in two parts. The earlier literature which was led by the contributions from McKinnon (1973) and Shaw (1973) analysed the problems of so-called financially repressed economies. These are economies which among other things are characterised by regulated interest rates at very low levels on both bank deposits and official loans even though the marginal loan rate (marginal cost of foreign borrowing or the curb market rate) may be much higher than the world market rate (see Fry, 1982). The early wisdom to reform these economies was that financial markets should be liberalised; later research has raised some doubts as to whether this is always reasonable (e.g., Buffie, 1984; and van Wijnbergen, 1983).

The other part of the literature on liberalisation was inspired mainly by the experiences of some Latin American countries in the 1970s and 1980s (e.g.,

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Buffie, 1985; Edwards, 1986a, 1987; Edwards and van Wijnbergen, 1986; Haaparanta and Kähkönen, 1986; and Obstfeld, 1986). This literature has analysed the consequences of liberalising trade and capital movements but has not touched upon the issue of financial repression. Recently, however, Kähkönen (1987) has made an attempt to bring together these two strands of literature in an intertemporal general equilibrium optimisation model. He is able to show that it is, indeed, important to consider these two issues jointly. He argues, for example, that liberalisation of foreign trade and financial markets are intimately related. He concludes also that liberalisation of capital movements has effects quite independently of the state of domestic financial markets.

A potentially serious drawback in Kähkönen's analysis (as he himself notices) is that he ignores the problems of capital flight. Empirical research has shown that capital flight is in practice quite a sizeable problem (Cuddington, 1986). This has led to theoretical studies on capital flight based on the idea that the risk of expropriation of private investment in a country exceeds the risk of expropriation abroad (see Khan and ul Haque (1986) for an exogenous risk, Eaton and Gersowitz (1987) for an endogenous risk). In this paper I shall try to explain and analyse the general equilibrium implications of capital flight in a financially repressed economy where individuals are prohibited from investing abroad. Since the rate of return on domestic bank deposits (assumed to be the only form of legal saving for individuals) is kept low there is an incentive to place funds abroad. The strictness of capital controls obviously affects these incentives. Hence, I shall be able to analyse the relations between liberalisation programmes and capital flight. This paper continues my study (1988) on the interaction between capital flight and liberalisation. In that paper I considered the connection between capital flight and liberalisation of domestic financial markets. Here I treat this issue more deeply and consider in addition the whole spectrum of liberalisation measures.

II THE MODEL

The model I shall use is an extension of the two-period general equilibrium trade models used quite widely to analyse the impacts of liberalisation programmes (e.g., Edwards, 1987; Haaparanta and Kähkönen, 1986, and especially Edwards and van Wijnbergen, 1986; and Kähkönen, 1987). In each period the economy produces two goods, an exportable (x) and an importable (y). There are four types of agents in the economy: households, firms, banks, and the government. In each period the households consume both goods. Their utility level is determined by the homogenously separable function

$u = u(z^1(c_x^1, c_y^1), z^2(c_k^2, c_y^2))$, where c_j^1 = the amount of commodity j, j = x,y, consumed in period i, i = 1-2, and z^1 = period i sub-utility derived from that period's consumption assumed to be linearly homogenous. The utility function and the sub-utility functions satisfy the usual neo-classical properties. The households can place their savings either on domestic bank deposits (s_D) giving the rate of interest r_D or abroad (s_F) giving the rate of interest r*. Investment abroad is, however, officially prohibited and controlled[1], and hence, it can be called capital flight. The household escapes the controls with probability Φ; if it gets caught (with probability $1-\Phi$) then it loses both the interest and the value of the investment. The expected return from capital flight is therefore $\Phi(1+r^*)s_F$. Hence, the income available for period 1 consumption is $y_1 - s_D - \sigma(s_F)$ and the income available for period 2 consumption is $y_2+(1+r_D)s_D+(1+r^*)s_F$ with probability Φ and $y_2+(1+r_D)s_D$ with probability $(1-\Phi)$. Here I have assumed that capital flight incurs some costs. The function σ represents the gross costs associated with capital flight (see Khan and ul Haque (1986) for a similar treatment and some rationalisation). Hence $\sigma(s_F) > s_F$, I assume further that $\sigma' > 1$ and $\sigma'' > 0$ everywhere (again following Khan and ul Haque (1986). The net flow y_i is the income of the household in period i which it regards as exogenous.

The household's choice variables are the investment in domestic banks, s_D, and capital flight, s_F. Since the returns on capital flight are uncertain the choice is made under uncertainty. To analyse this choice I assume that the households' risk preferences are represented by Selden's risk neutral Ordinal Certainty Equivalent preferences (Selden, 1978). This means that welfare is given by $w = u(z^1, Ez^2)$, where E is the expectation operator. Since I have assumed the sub-utilities to be homothetic they can be solved from the following equations:

$$\pi(p^1)z^1 = y_1 - s_D - \sigma(s_F), \tag{1a}$$

$$\pi(p^2)z^2 = y_2 + (1+r_D)s_D + (1+r^*)s_F, \text{ with probability } \Phi,$$

$$= y_2 + (1+r_D)s_D, \qquad \text{with probability } 1-\Phi. \tag{1b}$$

Here π is the unit expenditure function and p^i = period i prices. Hence, the welfare of the household is given by

1. I could easily allow for the case where households are allowed to invest abroad a fixed amount of money and are penalised only if they invest more than the allowed quota. It would not substantially change the present analysis.

$$w = u[(y_1 - s_D - \sigma(s_F))/\pi(p^1), (y_1 + (1+r_D)s_D + \Phi(1+r^*)s_F)/\pi(p^2)], \quad (2)$$

which is to be maximised with respect to s_D and s_F. The first order conditions for the optimum are:

$$u_1/u_2 = R_D \pi(p^1)/\pi(p^2), \quad (3)$$

$$\sigma'(s_F)u_1/u_2 = \Phi R^* \pi(p^1)/\pi(p^2), \quad (4)$$

where $R_D \equiv (1+r_D)$, $R^* \equiv (1+r^*)$; f_j denotes the partial derivative of function f with respect to the j^{th} variable. Together (3) and (4) imply that investment abroad is determined by[2]

$$\sigma'(s_F) = \Phi R^*/R_D, \text{ or} \quad (5)$$

$$s_F = s_F(\Phi R^*/R_D), \; s_F' > 0. \quad (6)$$

Capital flight increases when the expected yield on foreign assets relative to domestic assets increases.

Consider next the behaviour of firms. It is assumed that they produce both of the goods taking the prices of goods as given. The country cannot affect the world market prices of the goods p^{*1} but tariff policies can make domestic prices differ from world market prices. Assume in particular that the economy currently has tariffs on the importable, but in the long run (period 2) there is free trade. Hence, $p_x^1 = p_x^{*1}$, $i = 1,2$, $p_y^1 = p_y^{*1} + t$, $p_y^2 = p_y^{*2}$. Production of both of the goods requires the use of three factors of production, labour, capital, and land (to ensure that factor price equalisation does not hold). In each period perfect competition ensures that factors are allocated to maximise the value of production. This maximised value can be described by GNP functions (see e.g., Dixit and Norman, 1980): $g^1(p^1)$ is the value of first period production and $g^2(p^2, k+i)$ the value of period 2 production, where k is the capital stock in period 1 and i is the investment in physical capital made by the firms in period 1 which has an effect on capital stock in period 2. The firms make investments to maximise profits. These investments have to be financed by loans from domestic banks[3], as is usually assumed in the financial repression literature (see Fry, 1982). Another important aspect of financial

2. Notice that for an interior solution I must have that $\Phi R^* > R_D$. If it does not hold then $s_F = 0$.

3. In the formal developments below, the banking sector could equally well be interpreted as a socialised banking system. Another interpretation is that firms borrow directly from the private sector at the regulated rate and borrow abroad the allowed amount and pay the tax on the capital imports. The crucial aspect in all cases (and emphasised in the literature) is that investment is financed by loans alone.

repression is that the interest on *official* bank loans is very low. This leads to credit rationing in the bank loan market and the demand for loans is satisfied by curb (or grey money) markets, where the interest rate is high (Buffie, 1985; Fry, 1982, van Wijnbergen, 1983). The curb market rate is then the relevant marginal cost of investment. It is also usual that firms' borrowing abroad is restricted. Without modelling the curb markets separately, I have tried to capture all these relevant aspects of financial repression (in addition to the regulation of the interest rates on bank deposits) in a simple fashion. The interest rate charged by the banks, r_L, is higher than the world market rate of interest r^* (because of capital controls on banks to be explained below). The first order condition for profit maximisation is then that $g^2{}_3 = R_L$, where $R_L \equiv (1+r_L)p_x{}^1$. I assume that the exportable good is used as the capital good; were I to assume that the importable is the capital good then the marginal cost of investment would be affected by tariffs. But, as Buffie (1984) has noted, many imports of capital goods are exempt from tariffs and, hence, it may not be too unrealistic to ignore this tariff effect. Solving the first order condition gives the investment function

$$i = i(R_L),\ i' < 0. \tag{7}$$

(In (7) I have suppressed the prices as arguments in the investment function since I shall not be concerned with the effects of changes in period 2 prices.)

Banks collect deposits s_D from the households at the rate of interest r_D and finance the firms' investment i. To be able to fulfil the financing task the banks borrow abroad the amount $i - s_D$ at rate r_L (which implies that the tax on capital movement is $r_L - r^*$). Hence the banks' profits P^B in period 2 are

$$P^B = R_L i - R_D s_D - R_L(i - s_D) = (R_L - R_D)s_D.$$

Government revenue consists of three components: the period 1 tariff revenue, the tax revenue from capital controls on banks, and the revenue collected from households caught investing illegally abroad. The first component is $P^T = t(\pi^1{}_2 z^1 - g^1{}_2)$[4], and the second is $(R_L - R^*)(i - s_D)$. In assessing the third component I assume that capital flight consists of a continuum of independent projects totalling s_F. Hence, the government collects a sure revenue of $(1-\Phi)s_F$ in period 2.

I assume that the aggregate behaviour of the economy can be characterised as arising from the behaviour of a single individual. This individual receives as her income the revenue of all factors of production, the profits of banks, and

4. I have here used the obvious notation $\pi^1 \equiv \pi(p^1)$.

the government revenue, each in the period when they arise. Hence, using (1a) and (1b)

$$\pi(p^1)z^1 = g^1(p^1) + P^T - s_D - \sigma(s_F), \tag{8a}$$

$$\pi(p^2)Ez^2 = g^2(p^2, k+i) + R^*(s_D+s_F-i). \tag{8b}$$

(8a) implies, using the expression for P^T, that

$$z^1 = [g^1(p^1) - tg^1{}_2 - s_D - \sigma(s_F)]/A\pi(p^1), \tag{8c}$$

where $A = 1 - t\pi^1{}_2/\pi^1$. $A > 0$ since π is homogenous of degree 1 in prices[5].

The aggregate behaviour of the economy can now be characterised by Equations (6), (7), (8b,c), and by

$$u_1(z^1, Ez^2)/u_2(z^1, Ez^2) = R_D\pi(p^1)/\pi(p^2) \equiv R^\circ, \tag{9}$$

$$w = u(z^1, Ez^2), \tag{10}$$

where R° is the real rate of interest on domestic bank deposits. When (6) - (8b,c) are substituted in (9) savings in domestic banks can be solved. After that (10) gives the welfare of the representative individual.

III THE EFFECTS OF LIBERALISATION PROGRAMMES

(a) *Liberalisation and Saving*

Consider first the impact of liberalisation programmes on savings in domestic banks (and then on total savings). For ease of interpretation I calculate first the partial impacts (i.e., impacts at a given level of capital flight s_F) and evaluate then the general equilibrium impacts. From Equation (9) one can calculate that

$$\delta s_D/\delta R^\circ = 1/B, \tag{11}$$

where $B = \{u_2[-u_{11}/A\pi^1 + R^*u_{12}/\pi^2] - u_1[-u_{12}/A\pi^1 + R^*u_{22}/\pi^2]\}/(u_2)^2$. $B > 0$ by the properties of the utility function. Hence, an increase in the real rate of interest increases savings in domestic banks, $\delta s_D/\delta R^\circ > 0$.

5. $\pi^1(p^1) = \pi^1{}_1 p_x{}^1{}^* + \pi^1{}_2(p_y{}^1{}^{*+t})$. Dividing this expression by π^1 on both sides gives the desired result.

A change in capital flight affects saving in domestic banks by

$$\delta s_D/\delta s_F = -C/B, \tag{12}$$

where $C = \{u_2[-u_{11}\sigma'/A\pi^1 + R^*u_{12}/\pi^2] - u_1[-u_{12}\sigma'/A\pi^1 + R^*u_{22}/\pi^2]/\pi^2\}/(u_2)^2$. $C > 0$ because of the properties of the utility function. Also, since $\sigma' > 1$, $C > B$, and thus $\delta s_D/\delta s_F < -1$: capital flight reduces *total savings*, *ceteris paribus*. Equations (11) and (12) can be used to evaluate the effects of an increase in domestic deposit rate on savings:

$$\delta s_D/\delta R_D = (\delta s_D/\delta R^\circ)\pi^1/\pi^2 + (\delta s_D/\delta s_F)(\delta s_F/\delta R_D). \tag{13}$$

Since (from (6)) $\delta s_F/\delta R_D < 0$, it is clear that $\delta s_D/\delta R_D > 0$, and especially, since $\delta s_D/\delta s_F < -1$, $\delta s_D/\delta R_D > |\delta s_F/\delta R_D|$. Thus, an increase in the domestic deposit rate increases both the savings in domestic banks and total savings. The increase in deposit rate increases savings directly because of the usual substitution effects and indirectly because it reduces capital flight. The result conforms to the usual view that a reduction in the degree of financial repression of households increases total savings.

An increase in the domestic bank loan rate reduces the marginal rate of substitution u_1/u_2 since it reduces period 2 welfare: $\delta z^2/\delta R_L = (g^2{}_3 - R^*)i'/\pi^2 < 0$ (because $g^2{}_3 = R_L > R^*$). Hence, an increase in s_D is required to achieve equilibrium when R_L increases:

$$\delta s_D/\delta R_L > 0. \tag{14}$$

A reduction in capital controls facing the households reduces savings in banks, since it increases investment abroad:

$$\delta s_D/\delta \Phi = (\delta s_D/\delta s_F)(\delta s_F/\delta \Phi) < 0. \tag{15}$$

Besides reducing savings in domestic banks, the easing of controls also reduces total savings, since $\delta s_D/\delta s_F < -1$.

Finally, we must study how changes in current tariffs affect savings. First, it is clear that period 1 welfare declines, if tariffs are increased:

$$\delta z^1/\delta^t = t(\pi^1{}_{22}z^1 - g^1{}_{22})/\pi^1 A < 0,$$

because the expenditure function is concave and the GNP function convex in prices. This implies that the marginal rate of substitution u_1/u_2 increases. But simultaneously the real rate of interest R° also increases, since the current

period consumer price index increases but the future price index remains unchanged. It is not clear which of these increases more and, hence, it is not possible to say whether an increase in tariffs reduces or increases bank savings (and total savings, since s_F does not depend on t). Consequently, it is not possible to say anything about the effects of trade liberalisation on savings: I shall, however, assume that the substitution effect outweighs the income effect:

$$\delta s_D/\delta t > 0. \tag{16}$$

(b) *Liberalisation and Welfare*

As the model stands, it is clear that the first best optimum in the economy can be achieved by abolishing *simultaneously* all the distortions from the economy. But this is not the way that liberalisation programmes usually proceed. Attempts to liberalise international trade have usually preceded the liberalisation of capital movements; some country examples about the sequencing of liberalisation are particularly striking. For example, in Chile tariffs were reduced substantially and domestic financial markets were liberalised before the capital controls were reduced (see Edwards, 1986b). Thus, liberalisation typically takes place in a distorted economy, and, hence, the general theory of the second best should make one cautious about the welfare consequences of such programmes. Here I shall analyse the welfare consequences of liberalising some markets while other markets remain distorted.

(i) Liberalisation of domestic financial markets

The financial repression school emphasises strongly the need to increase domestic deposit rates. The welfare consequences of increasing R_D are given by

$$\delta w/\delta R_D = [-u_1/\pi^1 A + u_2 R^*/\pi^2]\delta s_D/\delta R_D + [-u_1 \sigma'/\pi^1 A + u_2 R^*/\pi^2]\delta s_F/\delta R_D.$$

Using the first order conditions for the individual welfare optimum (3) and (4) allows us to write this expression as

$$\delta w/\delta R_D = (u_2/\pi^2)\{R^*[1-(R_D/AR^*)]\delta s_D/\delta R_D + R^*[1-(\Phi/A)]\delta s_F/\delta R_D\}. \tag{17}$$

Consider first the case where international trade has been liberalised, t = 0, i.e., A = 1. Then, since an increase in the deposit rate increases both savings in domestic banks and total savings and $\Phi R^* > R_D$, it is clear that the expression in (17) is positive: as financial repressionists argue, increasing deposit rates increases welfare. An analogous result is derived in Kähkönen (1987) but without regard to the existence of capital flight. This result depends cru-

cially on the assumption that trade is free trade. Assume now that imports are regulated by tariffs at the time financial markets are deregulated, i.e., $A < 1$. Now, if tariffs are so extensive that $R_D/AR^* > 1$ the first term in (17) is negative: an increase in domestic savings reduces welfare, since they are already excessive due to the tariffs, and since an increase in the deposit rate increases s_D, it reduces welfare, *ceteris paribus*. Changes in the deposit rate also affect capital flight: the second term in (17) is positive, since $\Phi R^* > R_D$ implies that $\Phi/A > R_D/AR^*$. Thus, the existence of capital flight makes it more likely that liberalisation of domestic financial markets succeeds even in the presence of heavy import protection. This result is strongly at variance with Kähkönen (1987) who claims that large tariffs necessarily imply a welfare deterioration when domestic deposit rates are increased.

(ii) Liberalisation of capital controls on households

Liberalisation of capital controls can have two meanings in the present framework. One can ease the controls on households, i.e., take measures that increase Φ, the probability that the investor is not caught by the controls, or reduce R_L, the rate of interest the banks must pay for foreign loans. Consider first the former case. With the same methods as were used to obtain (17) one can derive

$$\delta w/\delta\Phi = R^*\{[1-(R_D/AR^*)]\delta s_D/\delta s_F + [1-(\Phi/A)]\}\delta s_F/\delta\Phi. \qquad (18)$$

If trade has been liberalised (A=1), but domestic financial markets are not, welfare declines. This is, since $\Phi > R_D/R^*$ and $\delta s_D/\delta s_F < -1$. The term in braces is then negative, and since the reduction in capital controls increases capital flight there is a welfare loss. The intuition is that financial repression has reduced savings below the optimal, and the reduction in controls causes an outflow of savings which reduces aggregate savings further. The presence of tariffs does not necessarily alter these results. Consider, e.g., the case where initially $\Phi/A = 1$. Since $\Phi/A > R_D/AR^*$ welfare is again reduced when controls are eased. The only situation where liberalisation may be beneficial is when $\Phi/A > 1$ and $R_D/AR^* > 1$ since then savings are above the optimal level and a reduction in them improves welfare.

The optimal degrees of capital controls and financial repression can be solved from (17) and (18): the first order conditions for the optimum $\delta w/\delta R_D = 0 = \delta w/\delta\Phi$ hold, when

$$R_D = AR^*, \qquad (19)$$

$$\Phi \leqslant A \qquad (20)$$

where, it may be recalled, that $A = 1 - t[\delta\pi^1(p_x{}^{*1}, p_y{}^{*1}+t)/\delta p_y{}^1\pi^1]$. Hence, if trade is subject to tariffs, then both domestic financial markets and households' foreign investment should be regulated. Equations (19) and (20) imply that at the optimum one should have $R_D \geqslant \Phi R^*$. This means that at the optimum no foreign investment occurs abroad.

The optimum rate of interest on deposits is below the world market rate and thus the optimum requires some financial repression. This result is quite analogous to the result reached in Kahkonen (1987). The innovation here is that the optimal policy package should be so strict as to abolish capital flight altogether. All this depends on the fact that trade is subject to tariffs. Under conditions of free trade the optimal policy is both to liberalise the financial markets and controls on households' investment.

(iii) Liberalisation of capital controls on banks

The welfare consequences of changing the bank loan rate are

$$\delta w/\delta R_L = (u_2/\pi^2)\{[R^*-(R_D/A)]\delta s_D/\delta i + (g^2{}_3 - R^*)\}\delta i/\delta R_L, \qquad (21)$$

where $\delta s_D/\delta i = -[(u_2 u_{12} - u_1 u_{22})/\pi^2 B](g^2{}_3 - R^*)$; using the expression for B given above it is seen that the coefficient of $g^2{}_3 - R^*$ in this formula is less than 1 in absolute value. This implies, since $g^2{}_3 = R_L \geqslant R^*$, that reducing the bank loan rate towards the world market rate always increases welfare regardless of the presence of tariffs or financial repression. Hence, quite unlike the controls on investment abroad, the welfare implications of reducing controls on banks are independent of the trade regime. This result, noted also in Kähkönen (1987), is in strong contrast to the common view that controls on capital movements should be abolished only after trade has been liberalised (see e.g., Edwards, 1983). This view is correct with respect to the controls on households' investment abroad but not with respect to controls on banks' foreign borrowing.

(iv) Liberalisation of trade

Welfare change with the tariff is as follows:

$$\delta w/\delta t = (u_2/\pi^2)\{tR_D(\pi^1{}_{22}z^1 - g^1{}_{22})/A + [1-(R_D/AR^*)]\delta s_D/\delta t\}. \qquad (22)$$

The first term within the braces in (22) is negative. It gives the usual deadweight loss due to tariffs. The second term, however, is positive, because the increase in current tariff increases savings via increasing the real rate of interest. Hence, the welfare impact of changes in tariffs is ambiguous. Equation (22) can be solved for the optimal rate of tariff. As in Kähkönen (1987), it is

positive as long as the deposit rate is below the world market interest rate. Tariff increases the real rate of interest which alleviates the distortion created by the low deposit rate. The existence of capital flight does not affect these results.

IV CONCLUDING COMMENTS

The main result reached above is that liberalisation of trade, domestic financial markets, and capital controls of households are very much interrelated. The welfare consequences of sequential liberalisation are thus uncertain, as is typical in second best situations. It was shown that, as long as imports are subject to tariffs, liberalisation of domestic financial markets or capital controls on households may lower welfare and, indeed, the optimal second best policy is to keep the domestic financial markets in financial repression and reduce capital flight. It was also shown that the presence of capital flight makes it more likely that liberalisation of financial markets leads to a welfare improvement. Conversely, if trade liberalisation is undertaken when financial markets are repressed welfare may decline.

In contrast to the control of capital flight, liberalisation of the control of foreign borrowing by banks improves welfare regardless of conditions in other markets. This conclusion may, however, be very much dependent on the fact that I have not modelled the curb loan markets explicitly, since one would expect that bank loan rates and curb market rates are interrelated. The modelling of curb loan markets in the framework used here is a subject of ongoing research.

The analysis here has neglected many important issues relating to economic reforms. Calvo (1986) has studied the reforms in an environment where the private sector does not necessarily believe that the reforms are long lasting. This is a special case of the problem of time inconsistency of policies. Another general problem is that the proper study of reforms may require the knowledge of why the policies that are currently used have been adopted in the first place, the policies have always an endogenous component. One could try to incorporate some of this by borrowing from the ordinary static trade theory, e.g., some of the analysis of "non-economic" objectives.

Another problem with the present analysis is that it has considered only distortions which are policy induced. The modern theory of credit markets would, however, suggest that credit markets are inherently incomplete due to the problems created by incomplete information (see, e.g., Stiglitz and Weiss, 1987). The incorporation of these ideas provides an interesting avenue for future research.

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