



## Restricting capital outflow- the political economy perspective<sup>1</sup>

by

Roni Frish \*

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\* Bank of Israel, Research Department. <http://www.bankisrael.gov.il>

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## **Abstract**

According to the CAPM model the individual can maximize his utility by diversifying his capital across countries, so why does a government restrict the capital outflow of its residents? This paper argues that foreign resident capital owners have less political power than domestic capital owners; hence capital liberalization weakens the political power that protects capital and increases capital tax. Indeed, most of the empirical evidence suggests that capital liberalization is positively correlated with government expenditure, social security spending and corporate tax.

According to this paper residents have two objectives: one is to diversify their own capital across countries to eliminate risk; the other is to increase the home country's capital stock (and wages). The model emphasizes the tradeoff between those two targets: if residents invest their own property abroad they will not be committed to protecting the capital owners' interests in the next period. Hence foreign investors will not invest in this economy and the residents will not achieve the second target of increasing capital stock. The residents can commit themselves *ex-ante* to protecting capital only by restricting capital outflow.

## **1. Introduction**

Why does the government restrict the capital outflow of its residents? The goal of this paper is to explain this phenomenon. According to the CAPM model the individual can maximize his utility by diversifying his capital across countries. Why does a collective of residents (represented by the government) restrict themselves from maximizing utility and force themselves to invest mainly in their home country?

Restrictions on capital flows, which hamper the efficient allocation in the economy, are very common. By the end of 1999, 147 countries out of a total of 185 had controls on direct investment, 125 countries controlled transactions in capital market securities, 110 countries controlled trade in money-market instruments, and 108 countries regulated commercial credit (source: Annual Report on Exchange Arrangements and Exchange Restrictions for 2000, IMF). As Schulze (2000) summarizes: "Although globalization is seen by many as the key economic trend of recent times, restrictions on international capital movements remains the norm in international finance."

In order to explain capital-flow restrictions one must consider the effects of those restrictions on fiscal policy. Most of the empirical evidence suggests that capital liberalization is positively correlated with government expenditure, social security spending and corporate tax. Quinn (1997) analyzed annual average data of 36 countries over the years 1974-1989, and found that capital liberalization lead to higher corporate taxation and government expenditures. Swang (1998) used panel data for 17 industrialized countries for the period 1966-1993, and he also found that financial liberalization positively associated with profits taxation, business social security and payroll taxation. Swang found that "restrictions on capital and total flows relative to

GDP also have positive and significant effects on corporate profits taxation." Both Quinn and Swang used dummy variables to measure capital and financial restrictions (from the IMF, Balance of Payments Yearbook); Swank also used actual capital flows as a measure of capital liberalization.

The political economy literature explains capital controls as a result of conflict of interests between 'capitalists' (capital owners) and 'workers'; this thesis has empirical support. Garrett (1995) found that countries dominated by left-wing parties and the trade unions had more controls on cross-border capital flows. He emphasizes that in spite of the increasing integration of goods and capital, the power of those parties and the unions in fifteen OECD countries was quite stable from 1970 to 1990. Garrett found that a combination of left-labor power and high levels of capital and trade liberalization lead to increased government spending and budget deficits.

This paper uses a very simple model to explain capital-flows control using the basic empirical evidence that capital liberalization leads to higher corporate taxation and government spending (Quinn and Swang) and that left wing parties impose capital controls (Garrett). This paper used the median voter theorem, and argues that median voters with less domestic assets impose a higher capital tax rate; as a result residents as a collective have to insure that the median voter will have more domestic assets to ensure a lower tax rate in the future.

The positive correlation between capital liberalization and capital tax (or social security) implies that the capital is not footless. Instead, assume that after capital is invested it becomes an inelastically supplied factor and it is vulnerable to domestic political decisions such as the level of capital tax. In addition assume that foreign capital owners have less political power than domestic capital owners and the tax system cannot distinguish between residents' and nonresidents' capital. Those

assumptions imply that capital liberalization weakens the political power that protects capital, and increases tax on capital. In the median voter model foreign investors do not have political power, since they do not participate in the domestic political process. Hence, after capital liberalization the median voter will have fewer capital assets in the domestic economy and will impose a higher tax rate.

Before capital liberalization takes place (and capital has been invested), residents have two objectives: one is to diversify their own capital abroad to reduce risk; the other is to increase the home country's capital stock (and wages). This model emphasizes the tradeoff between those two targets: if residents achieve the first target and invest their own property abroad (and the domestic capital is owned mainly by foreign investors) they will not be committed to protecting the capital owners' interests in the next period. Since the foreign investors are sophisticated, they will not invest in the domestic economy and residents will not achieve the second target of increasing capital stock.

Residents can commit themselves ex-ante to protecting capital only by restricting capital outflow. A resident will support a collective decision to restrict capital outflow because in compensation for restricting himself he will enjoy benefits if everybody else restricts their own capital outflow. Restricting capital outflow will increase the capital stock since it signals to foreign investors that residents will use their political influence to protect their own capital (and to resist capital tax). The model shows that foreign investment will flow into countries in which the domestic capitalists have strong political influence, but growing foreign investment will weaken political protection on capital.

The voting mechanism in this paper is based on Tabellini (1991). Political decisions are taken by referendum of all residents, so foreign investors have no

franchise and no political power. There are two political decisions to make. Before capital is invested the voter considers restricting capital outflow. Every voter considers a tradeoff between restricting the capital outflow of everyone (including himself) in order to maximize the next generation capital on the one hand, and not restricting it and benefiting from risk sharing on the other. After capital is invested voters determine the capital tax rate.

The capital-flow restrictions are needed to deal with the time consistency problem, and to ensure a low capital tax in the future. This model does not include credibility or reputation; however, it is clear that countries with high credibility have no reason to impose capital-flow restrictions, while countries with low credibility will more probably use those restrictions. This can explain why developing countries, which have less credibility and a lower reputation than the industrialized countries, actually have more severe capital-flow restrictions: according to Quinn, capital restrictions in the non-OECD countries is much more severe than those of the OECD countries (3.3 and 1.8 respectively).

Alesina, Grilli, and Milesi-Ferrtti (1994), in their study of 20 OECD countries, found that inflation is significantly and positively correlated with capital controls.<sup>1</sup> Lemlang (1997) found that capital controls are used as part of an overall policy of financial repression, which allows the government to collect seigniorage tax and to reduce the cost of recycling domestic public debt. However, this paper argues that capital-flow restrictions are not just a necessary step in collecting seigniorage and that capital control is not determined by financial repression, but both inflation and capital control are related to low credibility and hostile expectations.

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<sup>1</sup> One can easily argue that capital restriction is needed to collect seigniorage and to avoid the loss from currency substitution.

The remainder of this paper is organized as follows. Section 2 summarizes the literature that deals with capital controls from a political-economy perspective. Section 3 presents the model. Section 4 describes the empirical evidence, Section 5 concludes.

## **2. Capital controls - the political economy literature**

Although there are arguments in favor of restrictions on capital, most economists would probably argue that restricted capital flows decrease welfare. Capital flow is necessary to Pareto efficient allocations since it equalizes the marginal rate of return on capital to the world interest rate and eliminates unsystematic risk. The political economy literature gives some explanations for those restrictions;<sup>2</sup> these explanations focus on the conflict of interests between ‘capitalists’ (capital owners) and ‘workers’.

Alesina and Tabellini (1989) explain the phenomenon of the accumulation of large external debts by public sectors combined with the accumulation of extensive external assets by the private sectors. They analyzed a small open economy with two periods and two political parties, ‘workers’ and ‘capitalists’ (the probability of being in office in period 2 is exogenous). Each government does not attribute any weight to its opponent’s constituency. Hence, if the workers are in office they expropriate the property of capitalists and do not tax labor, and vice versa. Capital exports (in the first period) are the only way to eliminate the risk of expropriation (in the second period), so that the capitalist government will deliberately refrain from controls in order to allow its constituents to insure against expropriation by labor. On the other hand, the labor government will impose some degree of capital controls in order to increase

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<sup>2</sup>For other explanations see Schulze (2000), “Traditional reasons for capital controls,” pp.14-23.

domestic capital formation and to tax capital more heavily (at the cost of reduced workers' insurance against capitalist expropriation).

Schulze (1992a) removed the dichotomy of capitalists and workers and allowed individuals to own different amounts of capital and labor in order to use the median voter theorem. In his first model he analyzed a small open economy, assuming that foreign shares are perfect substitutes for domestic shares (neither bears any risk). Restricting capital outflows (by imposing a tax on dividends earned abroad) increases domestic capital, and hence it increases wage and reduces capital gains. Individuals with higher capital endowment relative to labor endowment will be hurt by the restriction of capital outflows, while individuals with a lower capital/labor ratio will benefit. In the common case, where the median voter's factor ownership ratio is smaller than average, capital exports will be restricted only if the marginal product of domestic capital is lower than the interest rate abroad.

Schulze also analyzed a small open economy producing two goods, the first produced by capital and labor and the second produced by land and labor; the intersectoral mobility of labor equalizes the wage rate. Restricting capital exports will decrease the rewards of the specific factors (capital and land) and increase the rewards of the mobile factor (labor). It turns out that the result of majority voting depends not only on the factor ownership distribution of the different industries but also on their relative size in term of the number of individuals owning a specific factor of the respective industry.

Bartolini and Drazen (1997a) found that removing capital controls on outflows has led to increased capital inflows in many countries. Their models suggest that liberalization is a signal of lower capital tax in the future. The purpose of capital controls is to insure the capital tax base against bad states of nature, when capital



would flow out. The curve of government welfare is concave in the level of expenditures; hence the cost of capital mobility is higher for a government without good (nondistortionary) alternative sources of revenue. Investors have imperfect information about the government's revenue constraints; hence they use capital control as a signal. In a separating equilibrium, countries with good alternative sources of revenue allow free capital mobility in order to achieve a higher expected capital tax levy (but a lower capital tax levy in bad states of nature), while governments without such alternative sources will restrict capital, and will benefit from a higher capital tax levy in bad states of nature (but a lower expected capital tax levy).

Alesina, Grilli and Milesi-Ferretti (1994) analyzed twenty OECD countries in the period between 1950 and 1989. They searched for political and institutional characteristics that differed between countries that imposed capital controls and those that allowed free capital flows (they used a zero-one dummy variable based on the classification in the IMF's "Restrictions on Payments on Capital Transactions" as the dependent variable). Left-wing governments impose capital controls just as right-wing governments do; the difference between the two governments is small and insignificant. Capital controls are more likely to be introduced by majority governments (and dictatorships) than by coalition and minority governments, and by stable political systems (higher number of years between significant government changes) and short-lived governments than by long-lived governments. Inflation, seigniorage and central bank independence are significantly higher where there are capital controls. Besides the political and institutional factors, Alesina, Grilli and Milesi-Ferretti find that capital controls are linked with lower interest rates, slower debt accumulation, and fixed and managed exchanged rates. The larger the

agricultural sector with respect to the service sector, the higher the probability that capital controls will be imposed, but capital controls have no effect on growth.

Leblang (1997) also examined the factors that determine capital controls and he also used a zero-one dummy variable for capital control (based on the IMF's classification) as the dependent variable; the sample included ninety-one countries for the period from 1967 to 1992. Leblang found that capital controls are more likely to be imposed by governments that repress the financial sector, that choose to maintain a fixed exchange rate, and that are facing balance of payments crises. He also found that the rise of global financial markets has not led to the abolition of capital controls.

The following model is closely related to Schulze's model: both models assume a small open economy with one homogeneous good; the voters who differ in their capital ownership determine the capital control intensity according to majority rule. But the following model differs from the Schulze model in several aspects: first it assumes that domestic shares are risky and that domestic and foreign shares are not perfect substitutes. Hence, domestic investors will choose to invest abroad even if the marginal product of physical capital at home is equal to (or greater than) the foreign interest rate. However, the society may wish to restrict capital exports.

Second the median voter determines not just capital control but also the capital tax: by imposing capital control the society increases the median voter's domestic assets and decreases the median voter's desire to expropriate capital. Capital controls increase domestic capital indirectly because they decrease the median voter's optimal capital tax and not (as in Schulze's model) because they directly restrict capital outflow and prevent the marginal product of domestic physical capital from equaling the foreign interest rate.

### 3. The model

#### *A. The model assumptions*

Assume a two-period model; in the first period only “parents” are alive, where each parent lives for both periods. In the second period another generation of “children” is born, who live only one period; each parent has  $1+n$  children. Parents and children are linked by altruism.

Families differ only in the first period endowment of parents. The parents save in the first period and consume only in the second period; the children work and consume in the second period. In the first period the parents divide their endowment between a risk-free foreign asset and a risky domestic asset - physical capital. The parents are allowed to invest only a certain proportion of their endowment in a risk-free foreign asset, while this proportion is determined in the first period referendum.

In the second period firms operate in a competitive environment, using labor and capital to produce consumption products. The domestic capital belongs to the parents (residents) and to foreign investors, as the children supply the labor. The second period referendum determines the capital tax rate; the capital levy finances the transfer payments for the children. Only residents (children and parents) participate in the second period election referendum.

#### I. The production function

Production in the second period is a function of capital, labor and productivity shock. The second period capital is equal to the first period investment. Labor factor is supplied only by children. Every child supplies one unit of labor factor (inelastically), and the total number of children equals one. The product is exposed to productivity shock according to the state of nature. The product per worker in state of nature  $j$ :

$$(1) \quad y_j = (1 + \varepsilon_j)k^\alpha,$$

where  $y$  is product per worker,  $k$  capital per worker,  $\varepsilon_j$  is the productivity shock with

zero expectation:  $E(y_j) = E((1 + \varepsilon_j)Ak^\alpha) = Ak^\alpha$ .

The marginal product of physical capital in state of nature  $j$ :

$$(2) \quad F'_{k,j}(k) = \alpha Ak^{\alpha-1}(1 + \varepsilon_j).$$

The marginal product of labor (that equal to wage) in state of nature  $j$ :

$$(3) \quad F'_{L,j}(k) = (1 - \alpha)Ak^\alpha(1 + \varepsilon_j).$$

## II. The government

The government's budget constraint is:

$$(4) \quad s^j = t \cdot (kF'_{k,j}(k)).$$

Total transfer payments to children equal total capital levy (the number of children equals one).

## III. The residents

Parent  $i$  maximizes:

$$(5) \quad \Omega_i^p = \frac{1}{l}(c_i)^l + \sigma_p \times \zeta_i, \text{ and}$$

child  $i$  maximizes:

$$(6) \quad \Omega_i^c = \sigma_c \times \frac{1}{l}(c_i)^l + \zeta_i,$$

where  $c_i$  and  $\zeta_i$  are family  $i$ 's parents' and children's second period consumption respectively, and  $\sigma_p$  and  $\sigma_c$  measure the altruistic urges of parents and children

respectively. The parents' utility is concave in consumption and children's utility is linear in consumption.

Families differ only in the endowment of parents, where the endowment of (parents in) family  $i$  is  $v_i$ . Assume that  $v_i$  is distributed inside the population according to a known distribution  $D(v)$ .

The budget constraints for parents  $i$  are:

$$(7) \quad c_i + d_i = v_i R_j(\phi, t^e) + (1+n)o_i,$$

$$R_j(\phi, t^e) \equiv (1-\phi)(1+r_f) + \phi \cdot [F'_{k,j}(k)(1-t)],$$

where  $d_i$  is bequests to children,  $o_i$  is gifts from children,  $R_j$  is the total return on parents' investments in state of nature  $j$ ,  $r_f$  is the yield on the risk free foreign asset,  $\phi$  is the endowment proportion that is invested in the risk-free foreign asset. The total return on domestic physical capital is given in the square bracket,  $t$  is the capital tax, and the return on physical capital (before tax) is given in equation 2.

A child's budget constraints is:

$$(8) \quad \varsigma_i + o_i = s + F'_{L,j}(k) + \frac{d_i}{1+n},$$

where  $s$  is transfer payments for a child (in the second period) which according to the government budget constraints equals the total capital tax levy (the number of children is equal to one). The wage is a function of capital per worker and the state of nature.

#### IV .Foreign investors.

The economy is characterized as small and open to foreign investment. The covariance between the rate of return on capital in the small economy (the productivity shock) and the rate of return on another foreign investor's assets (the

foreign portfolio) is zero. So foreign investors require the net rate of return (on capital investment in the small economy) to be equal to (or above) the rate of return on risk-free foreign assets. The net rate of return on capital investment is equal to the rate of return on risk free foreign assets. If it is higher than  $r_f$ , the foreign investors increase their investments, the capital accumulation continues until the net rate of return on capital is equal to the rate of return on risk-free foreign assets. In a small economy with foreign investment,

$$(9) \quad 1 + r_f = E[F'_{k,j}(k)(1 - t^e)].$$

Hence, capital per worker is a function of the expected tax rate and the rate of return on risk-free foreign assets (the world interest rate).

#### *B. The second period optimization*

For the parent, maximization in the second period yields only desired bequest (a parent cannot enforce liabilities on his children). The desired bequest is a function of endowment and the net rate of return on endowment; the latter is the function of capital accumulation, capital tax rate and the state of nature and the world interest rate. The desired bequest is

$$(10) \quad \frac{\partial \Omega_i^p}{\partial d_i} = -\{v_i R_j - d_{i,j} + (1+n)o_{i,j}\}^{l-1} + \frac{\sigma_p}{1+n} \leq 0.$$

If the parents' marginal utility (with no bequest) exceeds  $(1+n)^{-1}\sigma_p$ , the parents would leave no bequest to their children, and equation 10 will not equalized. Equation 10 will be equalized if parents leave a bequest to children [ $d_i > 0$  if the parents marginal utility equals  $(1+n)^{-1}\sigma_p$ ].

For the children, maximization in the second period yields only the desired gift (children cannot enforce liabilities on their parents). The desired gift is a function

of the parents' endowment, the net rate of return on parents' endowment, the children's wages and the transfer payment. The desired gift is

$$(11) \quad \frac{\partial \Omega_i^c}{\partial o_i} = \sigma_c \{v_i R_j - d_{i,j} + (1+n)o_{i,j}\}^{l-1} (1+n) - 1 \leq 0.$$

If the parents marginal utility (with no gift) exceeds  $[(1+n)\sigma_c]^{-1}$  the children would not transfer any gift to their parents and equation 11 will not be equalized. Equation 11 will equalize if children transfer gifts to their parents ( $o_i > 0$  if the parents marginal utility equals  $[(1+n)\sigma_c]^{-1}$ ).

Assuming that in the absence of government policy the marginal utility of all parents in the economy is high enough so they will have no desire to give positive bequests, but the marginal utility of all parents is not too high, so their children have no desire to give positive gift,

$$(12) \quad \sigma_p < (1+n) \{v_i [(1+\phi)(1+r_f) + \phi \cdot F'_{k,j}(k)(1-t^e)]\}^{l-1} < \frac{1}{\sigma_c}.$$

Since we assume foreigners invest in the small economy we can rewrite equation 12:

$$(13) \quad \sigma_p < (1+n) \{v_i (1+r_f)(1+\phi \cdot \varepsilon_j)\}^{l-1} < \frac{1}{\sigma_c}.$$

### C. The second period referendum

The second period referendum determines the capital tax rate. The second referendum takes place after the capital has been invested and before the state of nature is exposed. Using the utility function and budget constraints of parents  $i$ , the government budget constrains, parents' desired negative bequests and children's desired negative gift (equations 4, 5, 7 and 12), then differentiating with respect to capital tax rate one obtains the tax rate choice of parent  $i$ :

$$(14) \quad \frac{\partial \Omega_p^i}{\partial t} = 0 \Leftrightarrow E[(1+r_f)(1-\phi) + \phi F'_{k,j}(k)(1-t)]^{l-1} (1+\varepsilon_j) = \sigma_p \frac{k}{v_i^l \phi}.$$

Parents will differ in their desired tax rate due to their endowments; one may easily show that wealthier parents prefer a lower tax rate. Wealthy parents have relatively more domestic capital and hence they will be disproportionately hurt by increases in the domestic capital tax. However, the tax rate will increase children's utility (from children's consumption) by the same amount, independent of their parents endowments. This outcome stems from the assumption that children have a linear utility function or (alternatively) from the assumptions of equal wages and no transfers between parents and children's.

Similarly, for child  $i$  using equations 4, 6, 8 and 12 then differentiating with respect to capital tax rate one obtains the choice of child  $i$ :

$$(15) \quad \frac{\partial \Omega_c^i}{\partial t} = 0 \Leftrightarrow E[(1+r_f)(1-\phi) + \phi F'_{k,j}(k)(1-t)]^{l-1} (1+\varepsilon_j) = \frac{1}{\sigma_c} \frac{k}{v_i^l \phi}.$$

As in the case of a parent, the child weighs his parent's utility from lower tax against his own disutility from lower transfer payment.

This model follows Tabellini (1991) and reproduces his "median voter pair", each parent can be paired with a child (not his own) who will vote the same way. Specifically, using equations 15 and 16, a child whose parents' endowment is  $\hat{v}$  will vote the same way as a parent with endowment  $(\sigma_p \sigma_c)^{1/l} \hat{v}$ , (since  $(\sigma_p \sigma_c)^{1/l} < 1$ , a wealthy child and poorer parent prefer the same tax rate). Using the distribution of endowments, one can aggregate all parents that own endowment smaller than same amount (say  $v_i$ ) and all children whose parents have endowment smaller than  $(\sigma_p \sigma_c)^{1/l} v_i$ . By aggregating half of the voters, one can define the median voter pair.

$$(16) \quad (1+n)^{-1} \int_{v=a}^{v=\hat{v}} v_i + \int_{v=a}^{v=\hat{v}(\sigma_p \sigma_c)^{-1/l}} v_i = 0.5(1+(1+n)^{-1}).$$



Denoting the endowment that equalizes equation 16 by  $\varkappa$ , one can define a median voter pair (parents who have an endowment  $\varkappa$  and a child whose parents have an endowment  $(\sigma_p \sigma_c)^{1/l} \varkappa$ ).

The capital tax rate chosen by the median voter pair for each  $\phi$  will given implicitly by equation 14 with  $v_i$  replaced by  $\varkappa$ :

$$(17) \quad E[(1+r_f)(1-\phi) + \phi F'_{k,j}(k)(1-t)]^{l-1} (1+\varepsilon_j) = \frac{k\sigma_p}{\varkappa^l \phi}.$$

The anticipated capital tax rate will be higher if the median voter invests a higher proportion of his endowment in the foreign asset (higher  $\phi$ ) and if foreign investors own a higher proportion of local capital (equation 17).

The investors are rational and use equation 17 to form their expectations. Foreign investors require that the net rate of return on capital will equal the rate of return on risk-free foreign assets. One can solve the quantity of capital as a function of  $\phi$ , the proportion of endowment that has been invested in the domestic asset (equations 9 and 17).

$$(18) \quad k = \frac{\varkappa^l \{E(1+\phi\varepsilon_j)^{l-1} (1+\varepsilon_j)\}}{\sigma_p (1+r_f)^{1-l}} \phi.$$

The quantity of capital defined by equation 18 is consistent with the economic and political equilibrium in the second period. The first period problem becomes clear now; high domestic capital is tied with higher consumption volatility (smaller  $\phi$ ) and vice versa.

$$(19) \quad \frac{\partial k}{\partial \phi} = \frac{\varkappa^l E(1+\phi\varepsilon_j)^{l-2} (1+\varepsilon_j)(1+l\phi\varepsilon_j)}{\sigma_p (1+r_f)^{1-l}} > 0.$$

Note: This model (as Tabellini's model) assumes that parents and children are linked by altruism but all agents (parents and children) desire negative transfers (bequests

and gifts). Those assumptions are needed in order to avoid an extreme tax rate. In the absence of altruism all children vote for one hundred percent tax rate and all the parents vote for zero tax. Altruism with positive transfers leads all families that are richer than the average to vote for no capital tax and leads all other families to vote for full taxation. Since the model's assumptions exclude excess burden (ex-post) the model must assume altruism and negative transfers (bequests and gifts) in order to avoid the extreme solution.

#### *D. The first period referendum*

In the first period referendum the first generation has to decide how much to restrict capital outflow. The voters (parents) have to solve the time consistency problem. The first best solution is to avoid any capital restriction on the one hand (in order to eliminate risk) and to commit to zero capital tax rate on the other hand (in order to encourage capital accumulation). The voters could not achieve the first best because first period voters have no way of preventing the next period voters from taxing capital. The first period voters have to reduce their own desire to tax capital when they become second period voters, because nothing they do in the first period can stop them from fully satisfying their second period desire. Restricting capital outflow in the first period forces the second period voters to own domestic capital, and as we already know capitalist voters resist capital tax. The first period voter has a tradeoff; he must restrict himself to risky domestic assets in exchange for reducing capital tax expectations. A lower tax expectation encourages capital accumulation and increases next period wages.

Using equation 3,7 and 9 one can rewrite the utility function of parent's  $i$ :

$$(20) \quad E(\Omega_i^p) = E \frac{(c_i)^l}{l} + \sigma_p \varsigma_i = \frac{1}{l} [v_i(1+r_f)E(1+\phi\varepsilon_j)]^l + \sigma_p [F(k) - (1+r_f)k].$$

From the first order condition one can obtain parent's i desire for capital restriction,

$$(21) \quad \frac{\partial E\Omega_p^i}{\partial \phi} = 0 \Leftrightarrow g \equiv v_i^l (1+r_f)^l E(1+\phi\varepsilon_j)^{l-1} \varepsilon_j + \sigma_p [F_k'(k) - (1+r_f)] \frac{\partial k}{\partial \phi} = 0.$$

Restricting capital outflow increases consumption volatility. The utility loss caused by volatility is proportional to endowment; restricting capital outflow causes more damage to rich parents than to poor ones, while the utility gain from those restrictions which is derived from higher wage to next generation is equal for all parents.

From equations 19 - 21 one can see that with no capital restrictions domestic capital equals zero, which causes the marginal product of capital and the marginal utility from capital restrictions ( $\partial\Omega_i/\partial\phi$ ) to go to infinity. In order to satisfy the conditions of the median voter theorem one must prove that the second derivative of parents' utility with respect to  $\phi$  is negative.

$$(22) \quad \frac{\partial^2 \Omega_p^i}{\partial^2 \phi} = - \frac{(1-l)\{v_i(1+r_f)\}^l}{\{E[(1+\phi\varepsilon_j)^{l-2} \varepsilon_j^2]\}^{-1}} + \sigma^p \frac{\partial^2 y}{\partial k^2} \left[ \frac{\partial k}{\partial \phi} \right]^2 + \sigma^p \left[ \frac{\partial y}{\partial k} - (1+r_f) \right] \frac{\partial k}{\partial^2 \phi} < 0.$$

The first and second components in equation 22 are negative but the third component is positive. One can notice from equation 23 that although the second derivative of capital with respect to  $\phi$  is positive it approaches zero when the productivity shocks are small. Assume productivity shocks are small enough so that the third component in equation 22 is small relative to the other two components. One can conclude that the second derivative of parent's utility with respect to  $\phi$  is negative for small productivity shocks.

$$(23) \quad \frac{\partial k}{\partial^2 \phi} = \frac{-v^l(1-l)}{\sigma_p(1+r_f)^{1-l}} E(1+\phi\varepsilon_j)^{l-3} (1+\varepsilon_j)(2+l\phi\varepsilon_j)\varepsilon_j > 0.$$

Using equation 21 and 22 one can notice that poorer parents vote for higher capital restrictions then the median voter while rich voters desire less restrictions:

$$\frac{\partial \phi}{\partial v_i} = - \frac{\frac{\partial g}{\partial v_i}}{\frac{\partial g}{\partial \phi}} = - \frac{(1+r_f)E(1+\phi \varepsilon_i)^{l-1} \varepsilon_j}{\frac{\partial^2 g}{\partial^2 \phi}} < 0.$$

One can already be sure that equation (22) represents a unique equilibrium solution since the first derivative of parents utility with respect to  $\phi$  approaches infinity when  $\phi$  approaches zero and the second derivative of parents' utility with respect to  $\phi$  is negative. Substituting  $v_i$  in equation (22) by the median voter  $v$  one gets the restriction of capital outflow that is consistent with both economic and political equilibrium. The solution is implicitly defined by equation 24.

$$(24) \quad v_m^l (1+r_f)^l E(1+\phi \varepsilon_j)^{l-1} \varepsilon_j + \sigma_p [\alpha k^{\alpha-1} - (1+r_f)] \frac{\partial k}{\partial \phi} = 0.$$

The final step in finding the interior solution is to ensure that the first derivative of median voter utility with respect to  $\phi$  is negative when  $\phi$  equal one. The condition is:

(25)

$$\frac{\partial \phi}{\partial v_m}(\phi=1) < 0 \Leftrightarrow E(1+\varepsilon_j)^{l-1} \varepsilon_j + \left[ \frac{\alpha}{(1+r_f)^{l+\alpha-l\alpha}} \left( \frac{\sigma_p}{v^l E(1+\varepsilon_j)^l} \right)^{1-\alpha} - 1 \right] \left( \frac{v}{v_m} \right)^l E(1+\varepsilon_j)(1+l\varepsilon_j)^{l-1} < 0$$

The first component in equation 25 is always negative; the second component is negative only if the square bracket is negative. If  $\sigma_p < v_m^l$  the component in the square bracket is negative and one can be sure that medians' voter have interior solution. (If the parents' altruism exceeds  $v_m^l$  they will maximize capital accumulation and wages in the second period.)

E. Comparative statistic:

Using equation 18, 19 and 21 one can rewrite the implicit solution for  $\phi$ :

(26)

$$g = \left( \frac{\psi}{v_m} \right)^l \left[ \frac{\alpha}{1+r_f} \left( \frac{\sigma_p (1+r_f)^{1-l}}{\psi^l \phi E (1+\phi \varepsilon_j)^{l-1} (1+\varepsilon_j)} \right)^{1-\alpha} - 1 \right] + \frac{E(1+\phi \varepsilon_j)^{l-1} \varepsilon_j}{E(1+\phi \varepsilon_j)^{l-2} (1+\varepsilon_j)(1+l\phi \varepsilon_j)} = 0$$

In order to find the endowment of a second period median voter ( $\psi^l$ ) one must know the endowment's distribution. Assume that  $v_i$  is distributed inside the population according to a uniform distribution  $v_i \approx [v_l, v_h]$  and using equation (16):

$$(27) \quad \psi = \frac{2+n}{1+(1+n)(\sigma_c \sigma_p)^{-1/l}} v_m,$$

where  $v_m = 0.5[v_h - v_l]$ .

Using equation (27) to replace  $\psi$  in equation (26) then differentiating equation (26):

Proposition 1: increasing parents' altruistic motives increases the capital restriction, decreases tax-rate expectations and increases capital accumulation and wages in the second period.

Proposition 2: increasing children's altruistic motives increases capital accumulation, decreases tax-rate expectations and increases capital accumulation and wages in the second period but has ambiguous effects on capital restrictions.

Proposition 3: increasing productivity shock variation decreases capital restriction, and decreases capital accumulation and wages in the second period.

Proposition 4: higher median endowment decreases capital restrictions.

Proposition 5: higher fertility rates have an ambiguous effect on capital restriction.

#### **4. The Empirical Evidence**

The basic result of the model is that restricting capital outflows will decrease capital tax rates; and lower expected capital tax rates will accelerate capital accumulation. Quinn (1997) examines the impact of capital restriction on capital tax rates and government expenditure. He found that capital account liberalization is robustly and positively associated with increasing corporate taxation and increasing government expenditure. Quinn's measure of capital restriction was created from the International Monetary Fund (IMF) Annual Report on Exchange Restrictions. The IMF reported the legal regulations that restrict residents' ability to pay or receive payment from nonresidents. Those annual reports used the same categories regarding legal regulation from 1950 to the present. Quinn coded those reports to measure capital account restrictions and current account restrictions.

Swank (1998) supported Quinn's results that financial liberalization lead to increasing capital tax, using polling data for seventeen industrialized economies for the years 1966-93. He measured capital mobility as total capital inflows and outflows as a percent of GDP and in addition he also used Quinn's measure of capital restriction. He found that financial mobility liberalization and capital mobility total flows are positively correlated with corporate profit taxation. The author of the current paper also used actual capital movement as a measure for capital liberalization in order to examine the correlation between capital flows and the total tax burden.

According to the model there is a positive correlation between the proportions of foreign assets owned by residents and the capital tax rate (equation 19) and it also predicts that a higher proportion of capital owned by foreigners will lead to a higher tax rate imposed by voters (equation 17). In order to examine those arguments two different indices were used based on balance of payments statistics. The first index

measures the investment income credit (inflows) relative to GDP (IIC index), which indicates residents' investment abroad. The second index measures the investment income debit (outflow) relative to GDP (IID index), which indicates foreign investment in the domestic economy. Tax revenue will serve as the dependent variable. We will use the total tax revenue and not the capital tax revenue as the dependent variable because the latter has been examined by Swank

### *Specification and Data*<sup>3</sup>

Using a panel for countries  $i=1\dots I$  and years  $t=1\dots T$  the estimated equations are as follows:

$$1. T_{i,t} = \alpha + \beta_1 IIC_{i,t} + \beta_2 GDP_{i,t} + \beta_3 GDPPC_{i,t} + \varepsilon_{i,t},$$

$$2. T_{i,t} = \alpha + \beta_1 IID_{i,t} + \beta_2 GDP_{i,t} + \beta_3 GDPPC_{i,t} + \varepsilon_{i,t},$$

$$3. T_{i,t} = \alpha + \beta_1 LIB_{i,t} + \beta_2 GDP_{i,t} + \beta_3 GDPPC_{i,t} + \varepsilon_{i,t},$$

where

T= total tax revenue (of the consolidated central government) relative to GDP.

IIC = investment income credit (from balance of payments statistics) relative to GDP.

IID = investment income debit (from balance of payments statistics) relative to GDP.

LIB= (stock of) liabilities per GDP. The liabilities for international investments include direct and portfolio investment in the domestic economy, financial derivatives and liabilities of the monetary authorities and the general government.

GDPPC= gross domestic product per capita.

The unbalance panel covers (for the first and second regression) up to 106 countries over the period 1972-2000, but the data for the liabilities (the third

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<sup>3</sup> The total tax revenue of the consolidated central government is obtained from the IMF Government Finance Statistics. The investment income data (credit and debit) and the exchange rate data are obtained from the IMF Balance of Payments Statistics (the latter used to convert domestic prices into US prices). The IMF International Finance Statistics is the source of the remaining variables: GDP, GDP per capita and liabilities.

regression) is available for only 55 countries. The following tables include results of the fixed effects and the random effects. The  $p$ -value for a Hausman specification test is also reported. Whenever it is larger than 0.05 the random effects (GLS) estimation is valid.

*The Results:* () The coefficients on investment income debit per GDP (IID), investment income credit per GDP (CID), and liabilities per GDP (LIB) are all significant and have the expected sign. The Hausman specification test indicates that the random effect estimates are valid only for the full sample regressions, but not valid for the OECD regressions. The regressions suggest that higher investment income credit (IIC) and higher investment income debit (IID) are positively correlated with lower tax rates. The liability per GDP (LIB), which is another indicator of foreign investments, is also positively correlated with the tax rate. The causality is probably from higher foreign investments to higher tax rates since the opposite causality implies that higher tax rates encourage foreign investments.

#### Rodrik (1998) Specification

Rodrik (1998) examined the question "Why do more open economies have bigger governments?" and reported that "there exists a positive correlation between an economy's exposure to international trade and the size of its government." Since it is possible to find a positive correlation between capital account liberalization and trade liberalization it is important to examine whether the size of the government (or the tax burden) is related to capital account liberalization (as argued by Quinn, Swank and this paper) or to exposure to international trade (as argued by Rodrik). In order to examine this question it is helpful to repeat the Rodrik regressions. Columns 1 and 2 (in Table 3) replicate columns 1 and 2 in Rodrik's work (Table 1 p1003). The dependent variables are the average of real government consumption (as shares of



GDP) in 1990-92 and in 1985-89, while the independent variables are the previous decade's trade openness (export plus imports divided by GDP), per capita income, dependency ratio, urbanization rate, dummy variables for socialist countries, for OECD countries, and for geographical regions (LAAM, ASIAE, and SAFRICA for Latin America, East Asia, and sub-Saharan Africa respectively). The trade openness in Columns 1 and 2 are positive and highly significant as in Rodrik.

In Columns 3 and 4 the variable for trade openness are replaced by the variable for capital openness –  $((IID+IIC)/GDP)$ . The dependent variables and the other independent variables are as in Rodrik's specifications, and the previous decade's capital account openness is positive and highly significant. In order to examine if the size of the government is related to capital account liberalization or to exposure to international trade one must include both trade openness  $((EX+IM)/GDP)$  and capital openness  $((IID+IIC)/GDP)$  as has been done in Columns 5 and 6. The conclusions are not clear: from column 5 one can realize that capital openness in 1975-84 had robust influence on the government size in 1985-90 while trade openness is fragile, from column 6 it appears that trade openness in 1980-90 had robust influence on government size in 1990-92 while capital openness was fragile.

Table 4 repeats Table 3, but with the share of total government expenditure in GDP as an dependent variable. Once again the trade openness and capital openness are robust when they appear separately in the regression. When both trade openness and capital openness appear together only trade is robust in column 5 (1985-90) but in column 6 both trade openness and capital openness are robust (1990-92). Table 5 reveals a positive and significant (at 90 percents level) correlation between the capital openness in the 1980's and the social security expenditure (relative to GDP) in 1990-92. The author could not find robust correlation between trade openness and the

social security expenditure in the 1990-92 regression, nor was there a significant correlation between either capital or trade openness and social security expenditure in the 1980-85 regression.

One can conclude that the fact that more open economies have bigger governments could be related also to capital openness and not solely to trade openness. Rodrik (1998) focused on the positive correlation between trade openness and the size of the government. He explains that trade liberalization increases the economy's aggregate risk and that government spending plays a risk-reducing role. However, it is well known that capital liberalization reduces aggregate risk; hence Rodrik's model cannot be expanded to explain the positive correlation between capital liberalization and the fiscal variables.

## **5. Concluding remarks**

This model assumes that foreign investors have less political power than residents. Hence, when nonresidents replace residents as the owners of domestic capital, the political power that protects capital weakens. The motivation for capital restrictions becomes clear: the voters restrict themselves from diversifying capital abroad and invest mainly in their own economy to increase the political power that protects capital. Capital restrictions signal that residents will use their political influence to resist capital tax. Foreign investments will flow into countries in which residents have a strong incentive to protect capital, but growing foreign investment will weaken the political protection of capital. Capital outflows are more restricted when the voters care more for the next period workers. An increase in productivity shocks variation (and higher median endowment) decreases capital restrictions.

The empirical evidence supports the model's basic assumptions. Quinn found that capital liberalization is positively and robustly correlated with increasing government expenditure and with increasing corporate taxation. Grarrett found that a combination of left-labor power and capital liberalization lead to a higher level of public spending. Swang found that financial-mobility liberalization and capital-flows increased corporate profits taxation. Table 1 in this paper shows a positive correlation between capital liberalization and the total tax burden, and Table 2, which replicates Rodrik regressions, could not always reject the positive correlation between capital liberalization and the fiscal variables (government expenditure and government consumption). Those positive and robust correlations between capital liberalization and the fiscal variables support the model's basic assumption that capital liberalization leads to higher tax rates.

The basic argument is that capital-flow restrictions are needed to deal with the time-consistency problem, and to ensure a low capital tax in the future. This model does not include credibility; however, it is clear that the damage from the time consistency problem depends on the country credibility. Countries with excellent credibility have no reason to use capital-flow restrictions, while countries with bad credibility will (probably) use those restrictions. This can explain why developing countries, which have less credibility than the industrial countries, actually have more severe capital-flow restrictions.

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Dependent Variable - total tax revenue relative to GDP

Table 1: Regression Results-Random effects (GLS)

	ALL Countries	ALL Countries	ALL Countries	OECD Countries	OECD Countries	OECD Countries
C	2.099 (24.1)	0.2089 (24.1)	0.2451 (20.6)	0.2594 (15.8)	0.2554 (16.3)	0.2681 (14.2)
GDP	-5.18e-17 (-2.75)	-5.24e-17 (-2.79)	-6.09e-17 (-3.58)	4.02e-16 (6.13)	3.92e-16 (6.15)	2.47e-16 (2.72)
GDPPC	3.40e-09 (2.82)	3.44e-09 (2.85)	3.98e-09 (3.65)	-1.87e-08 (-4.95)	-1.82e-08 (-4.96)	-9.56e-09 (-1.82)
IIC	0.0278 (2.44)			0.3743 (7.03)		
IID		0.0322 (2.91)			0.3759 (8.84)	
LIB			0.0495 (2.13)			0.0115 (3.47)
Hausman test	0.7286	0.6256	0.0504	0.000*	0.000*	0.0164*
Countries	106	106	53	19	19	17
Observations	1770	1787	564	462	462	273

Table 2: Regression Results –fixed effects (Within)

	ALL Countries	ALL Countries	ALL Countries	OECD Countries	OECD Countries	OECD Countries
Cons	0.2199 (237)	0.2082 (208)	0.2426 (93.8)	0.3722 (7.00)	0.2614 (115.6)	0.2647 (94.5)
GDP	-5.05e-17 (-2.67)	-5.10e-17 (-2.70)	-6.01e-17 (-3.55)	4.34e-16 (6.60)	4.24e-16 (6.63)	3.05e-16 (3.297)
GDPPC	3.32e-09 (2.74)	3.35e-09 (2.77)	3.93e-09 (3.62)	-2.05e-08 (-5.41)	-2.00e-08 (-5.44)	-1.29e-08 (0.016)
IIC	0.0238 (1.99)			0.3722 (7.00)		
IID		0.0282 (4.68)			0.3708 (8.76)	
LIB			0.0071 (2.91)			0.0112 (3.41)
Countries	106	106	53	19	19	17
Observations	1770	1787	564	462	462	273

Table 3: Dependent Variable - Government consumption relative to GDP

	Log CGAVG90 92	Log CGAVG85 89	Log CGAVG90 92	Log CGAVG85 89	Log CGAVG90 92	Log CGAVG85 89
<b>Log OPENAVG8089</b>	<b>0.2226 (3.45)</b>				<b>0.258 (3.17)</b>	
<b>Log OPENAVG7584</b>		<b>0.2047 (3.57)</b>				<b>0.1174 (1.56)</b>
<b>Log (IIC+HID)8089</b>			<b>0.091 (2.57)</b>		<b>0.0202 (0.49)</b>	
<b>Log (IIC+HID)7584</b>				<b>0.199 (5.76)</b>		<b>0.1411 (2.74)</b>
Log GDP per capita	-0.0297 (-0.35)	-0.1050 (-1.67)	-0.0545 (-0.59)	-0.1561 (-2.45)	-0.0600 (-0.68)	-0.1724 (-2.64)
Log dependency ratio	0.6421 (2.66)	0.6302 (3.26)	0.5819 (2.30)	0.4998 (2.71)	0.5777 (2.34)	0.4900 (2.50)
Log urbanization	-0.2034 (-2.18)	-0.1363 (-1.80)	-0.1727 (-1.73)	-0.1921 (-2.49)	-0.1751 (-1.82)	-0.1682 (-2.12)
Socialist	0.1690 (1.30)	0.0915 (0.91)	0.1256 (0.83)	0.0650 (0.58)	0.1330 (0.92)	0.0799 (0.71)
OECD	-0.0074 (-0.05)	-0.0139 (-0.11)	-0.0252 (-0.16)	-0.0160 (-0.14)	0.0039 (0.026)	0.0313 (0.24)
Latin America	-0.1714 (-1.51)	-0.2184 (-2.32)	-0.2913 (-2.37)	-0.3382 (-3.81)	-0.2138 (-1.77)	-0.3035 (-3.11)
East Asia	-0.2062 (-1.47)	-0.3380 (-2.60)	-0.2535 (-1.66)	-0.3538 (-2.96)	-0.2670 (-1.79)	-0.3517 (-2.57)
Sub-Saharan Africa	-0.1073 (-0.90)	-0.2388 (-2.36)	-0.0590 (-0.48)	-0.2444 (-2.47)	-0.1143 (-0.96)	-0.2525 (-2.45)
Constant	3.2889 (6.13)	3.7863 (9.88)	4.5466 (7.48)	5.8766 (11.31)	3.3513 (4.90)	5.2302 (8.10)
<b>Adjusted R<sup>2</sup></b>	<b>0.428</b>	<b>0.458</b>	<b>0.396</b>	<b>0.494</b>	<b>0.438</b>	<b>0.486</b>
<b>Observations</b>	<b>103</b>	<b>125</b>	<b>96</b>	<b>112</b>	<b>95</b>	<b>105</b>

Note: t-values in parentheses.



Table 4: Dependent Variable - Government expenditure relative to GDP

	Log EXPGDP 9092	Log EXPGDP 8589	Log EXPGDP 9092	Log EXPGDP 8589	Log EXPGDP 9092	Log EXPGDP 8589
<b>Log OPENAVG8089</b>	<b>0.3846 (5.23)</b>				<b>0.2404 (2.45)</b>	
<b>Log OPENAVG7584</b>		<b>0.4308 (6.41)</b>				<b>0.374 (4.26)</b>
<b>Log (IIC+IID)8089</b>			<b>0.2557 (5.32)</b>		<b>0.1623 (2.69)</b>	
<b>Log (IIC+IID)7584</b>				<b>0.2401 (4.44)</b>		<b>0.0937 (1.47)</b>
Log GDP per capita	0.1256 (1.26)	0.0370 (0.42)	0.1223 (1.23)	0.0976 (0.97)	0.0828 (0.85)	0.0100 (0.10)
Log dependency ratio	0.2558 (0.91)	0.1120 (0.43)	0.1275 (0.46)	0.2058 (0.75)	0.1262 (0.46)	0.0811 (0.31)
Log urbanization	0.0128 (0.10)	0.0501 (0.44)	-0.0403 (-0.34)	-0.0713 (-0.55)	-0.0079 (-0.07)	0.0270 (0.23)
Socialist	0.1689 (0.90)	0.4465 (2.89)	0.1619 (0.87)	0.4083 (2.32)	0.1473 (0.82)	0.4224 (2.74)
OECD	-0.0290 (-0.20)	0.1432 (1.03)	-0.1510 (-1.08)	0.0793 (0.54)	-0.0702 (-0.49)	0.1699 (1.16)
Latin America	-0.4440 (-3.56)	-0.2390 (-2.18)	-0.7514 (-5.99)	-0.4090 (-3.42)	-0.6103 (-4.50)	-0.3131 (-2.61)
East Asia	-0.4841 (-2.94)	-0.3877 (-2.26)	-0.6429 (-4.00)	-0.2905 (-1.78)	-0.5905 (-3.65)	-0.4465 (-2.56)
Sub-Saharan Africa	-0.1480 (-1.10)	-0.1386 (-1.10)	-0.1124 (-0.86)	-0.1175 (-0.84)	-0.1619 (-1.26)	-0.1947 (-1.53)
Constant	-3.6603 (-6.68)	-3.4212 (-6.87)	-1.1121 (-1.66)	-0.8584 (-1.17)	-2.1794 (-2.82)	-2.5720 (-3.38)
<b>Adjusted R<sup>2</sup></b>	<b>0.562</b>	<b>0.544</b>	<b>0.559</b>	<b>0.386</b>	<b>0.598</b>	<b>0.554</b>
<b>Observations</b>	<b>69</b>	<b>73</b>	<b>68</b>	<b>75</b>	<b>67</b>	<b>69</b>

Note: t-values in parentheses.

Table 5: Dependent Variable – social security expenditure relative to GDP

	Log SOCGDP 9092	Log SOCGDP 9092	Log SOCGDP 9092
<b>Log OPENAVG8089</b>	<b>0.2625</b> <b>(1.16)</b>		<b>-0.0526</b> <b>(-0.17)</b>
<b>Log (IIC+IID)8089</b>		<b>0.2688</b> <b>(1.78)</b>	<b>0.3130</b> <b>(1.65)</b>
Log GDP per capita	0.9768 (2.98)	1.0347 (3.16)	0.9684 (2.97)
Log dependency ratio	-1.1393 (-1.23)	-0.7214 (-0.77)	-1.0836 (-1.17)
Log urbanization	-0.1729 (-0.43)	-0.4535 (-1.14)	-0.2761 (-0.69)
Socialist	0.7850 (0.88)	0.9445 (1.04)	0.8250 (0.93)
OECD	-0.5435 (-1.20)	-0.5152 (-1.17)	-0.6376 (-1.40)
Latin America	0.1027 (0.26)	-0.0995 (-0.25)	-0.2126 (-0.50)
East Asia	-1.8412 (-3.22)	-2.3135 (-4.26)	-1.8791 (-3.31)
Sub-Saharan Africa	-0.6466 (-1.30)	-0.8751 (-1.74)	-0.7408 (-1.50)
Constant	-12.0766 (-6.20)	-9.3855 (-4.16)	-9.3187 (-3.65)
<b>Adjusted R<sup>2</sup></b>	<b>0.679</b>	<b>0.671</b>	<b>0.682</b>
<b>Observations</b>	<b>53</b>	<b>53</b>	<b>52</b>

Notes: t-values in parentheses.

The same regressions for the period 1985-1989 show that all openness variables are not significant.