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TAXATION AND INFLATION: A NEW EXPLANATION FOR CURRENT ACCOUNT IMBALANCES

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ABSTRACT

In a world of mobile capital, the current system of nominal interest taxation implies that the cost of capital and the return to saving in each country are strongly and negatively correlated with the rate of inflation. It follows that a country's net foreign asset position (and its current account balance) ought to be negatively correlated with its inflation rate. The magnitude of these effects is shown to be large, both theoretically and empirically. For OECD countries, cross-sectional regressions confirm that inflation rates are good predictors of current accounts, even after controlling for business cycles and government budget deficits. These results imply that existing current account imbalances largely reflect tax distortions rather than an optimal allocation of world savings.

Taxation and Inflation:
A New Explanation for Current Account Imbalances

Tamim Bayoumi and Joseph Gagnon[1]

I. Introduction

What causes persistent movements of capital from one economy to another? Or, to rephrase the question in terms of the current balance, what causes persistent current account surpluses or deficits between countries? To most macroeconomists in the 1960s this would have seemed a rather odd question; one of the objectives of economic policy was to ensure that current accounts were not allowed to deviate from their "basic balance" (which, in practice, was usually zero) for any length of time. With the deregulation of international capital markets in the last two decades, however, long-term capital flows have become a feature of the international economic landscape, with countries like the United States, the United Kingdom, and Australia borrowing from the rest of the world, and Germany and Japan lending to it. This experience is similar to earlier periods with free capital markets. In particular, the period of the classical gold standard from 1880 to 1913 was characterized by large and persistent capital flows from rich and relatively developed countries, such as the United Kingdom and Germany, to nations on the periphery, such as Australia and Canada.[2]

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[2]These flows were considerable, with the average current account surplus of the United Kingdom over this period being 4.5 percent of GDP, while Australia ran an average deficit of 3.7 percent of GDP.

While the emergence of persistent current account "imbalances" in the 1980s may come as little surprise, their incidence is less easy to explain. Unlike the situation during the gold standard, the main flows at present are not from the core developed industrial countries of Northern Europe and North America to the newly emerging periphery. Two of the main capital importers are the United States and the United Kingdom, both part of the industrial core, while one of the main exporters is Japan, still the fastest growing country in the OECD. The lack of any unifying explanation is reflected in the discussion of international capital flows. Most explanations point to specific features of the country concerned: For example, the U.S. budget deficit, the high saving rate in Japan, and economic booms in the United Kingdom and Australia.

In this paper we suggest a single mechanism that explains a large part of the capital flows of the 1980s, namely the interaction between nominal interest payments and the tax system. The explanation has two crucial elements. First, since income taxation generally conforms to the residence principle, differences in inflation across countries are reflected one-for-one in before-tax interest rates. Second, because nominal interest receipts are taxable for consumers while payments are tax deductible for companies, real after-tax interest rates are low in high-inflation countries and high in low-inflation countries. As a result, capital flows from countries with a low rate of inflation to those with a high rate of inflation. This mechanism can, we believe, explain a significant portion of the capital flows among nations in the 1980s.

The rest of this paper is organized as follows. The next section discusses the earlier literature looking at the relationship between inflation, taxation and international capital flows. In section III, our model of the interaction between taxation and inflation is presented along with numerical simulation results. Section IV reports empirical tests of the theory, while the final section contains conclusions.

II. Literature Review

The implications of taxing nominal interest income in the context of a closed economy were originally explored by Darby (1975), Feldstein (1976), and Tanzi (1976). If one assumes that the marginal source of investment finance is corporate debt and that the corporate tax rate is equal to the individual tax rate on interest income, then an increase in the expected rate of inflation causes the nominal interest rate to increase by an even larger amount, $1/(1-\tau)$, where τ is the tax rate.[3] Under these assumptions, inflation has no effect on the stock of capital.

Initial attempts to test the Darby/Feldstein hypothesis consisted of regressions of the nominal interest rate on measures of inflation expectations. Instead of a coefficient greater than one, they generally found a coefficient of one or less (e.g., Carlson (1979) and Tanzi (1980)). Other researchers noted that these results would be consistent with the Darby/Feldstein hypothesis if the real after-tax rate of interest were negatively correlated with the inflation rate for other reasons. In particular, Peek and Wilcox (1984) provided evidence that, despite the low response of nominal interest rates to inflation, agents do respond to taxes on interest income.

At the same time, theoretical research in the context of open economies provided what we believe to be an explanation for these results. Hartman (1979) showed that when taxation is based on the residence of the investor rather than the source of the income, international arbitrage

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[3]In contrast, Tobin (1969) argued that inflation would not feed one-for-one into higher interest rates because it would lower the demand for money. Tobin's model ignores the effect of taxation, which has been the main focus of the subsequent literature.

enforces equality of real before-tax interest rates. A permanent increase in the rate of inflation raises the nominal interest rate by an equal amount, lowering the real after-tax return. He concluded that higher inflation increases a country's equilibrium capital stock and decreases its stock of net foreign assets.

Hartman's results were extended by other authors. Howard and Johnson (1982) showed that, while Hartman's result obtains in the long run, in the short run an increase in the inflation rate of a small open economy may lead to some combination of a lower real after-tax interest rate and an expectation of a depreciating real exchange rate. Schinasi (1986) showed how Hartman's finding is modified by the existence of different tax rates on exchange rate gains and interest income. Ben-Zion and Weinblatt (1984), Hansson and Stuart (1986), and McClure (1990) all demonstrated that under some tax regimes it is not possible for uncovered interest rate parity to hold simultaneously with different inflation rates across countries. Gruen (1991) appealed to nominal interest taxation and imperfect goods markets to explain the high nominal interest rate and over-valued real exchange rate of Australia in the late 1980s.[4]

The only empirical study of the international effects of nominal interest taxation, to our knowledge, is by Howard and Johnson (1983). They found evidence that countries with low inflation had appreciating real exchange rates in the mid-1970s, but that this correlation was reversed in the late 1970s. However, they did not provide any evidence on real interest rates or current account balances. Rather than test for the intermediate effects of inflation on the expected real exchange rate or on the real after-tax interest rate, our empirical work analyzes the

[4]Sinn (1991) reached a conclusion that runs counter to the above studies. By effectively assuming that taxation is based on the source of the income rather than the residence of the investor, he showed that permanent inflation has no effect on the real after-tax interest rate of a small open economy and that it has a small negative effect on the desired capital stock.

effect of inflation on net foreign assets and current account balances directly. We chose to analyze this connection directly because the implications of the theory for net foreign assets are both unambiguous and robust. Nevertheless, it would be useful to study the intermediate effects of inflation on real interest rates and exchange rates.

Altogether then, we believe that the interaction between international capital mobility and the residence principle of taxation can explain the empirical findings on the Darby/Feldstein hypothesis, by providing an explanation for why the real after-tax interest rate appears to be negatively correlated with expected inflation. These results imply that net asset positions ought to be negatively correlated with inflation rates across countries, forming the basis for our empirical analysis.

III. Theory

This section explores the relationship between nominal interest rates, taxation, the cost of capital, and real returns to saving for a small open economy. We start by discussing the relationship between nominal interest rates and inflation rates across countries under perfect capital mobility. We then consider the implications of inflation and taxation for the cost of capital, followed by an analysis of the implications for real returns to saving. Finally, we illustrate the implications of these effects for capital stocks and net foreign assets using numerical simulations from a small theoretical model.

A. International Capital Mobility

Assume that corporations are able to borrow and lend freely across countries. Arbitrage ensures that the expected cost of borrowing in the domestic market is equal to the expected cost of borrowing in the foreign market. This relationship is shown by equation 1, where the domestic currency interest rate is i, the foreign currency interest rate is i^*, the logarithm of the exchange rate is e, Δ is the difference operator, and τ_i, τ_{i*}, and τ_e are the tax rates on domestic interest income, foreign interest income, and exchange rate gains, respectively.

$$(1-\tau_i)i = (1-\tau_{i*})i^* + (1-\tau_e)\Delta e \tag{1}$$

Assuming that taxation is based on the residency principle, tax rates are independent of the currency of the loan, and hence $\tau_i = \tau_{i*} = \tau_e$.[5] In long-run equilibrium the rate of change of the exchange rate must equal the difference between the domestic and foreign inflation rates, π and π^*, or else there would be ever increasing arbitrage opportunities across the domestic and foreign goods markets.

$$\Delta e = \pi - \pi^* \tag{2}$$

Substituting equation 2 into equation 1 and simplifying terms yields the following expression for the domestic interest rate as a function of the foreign interest rate and the foreign and domestic inflation rates.

$$i = i^* + \pi - \pi^* \tag{3}$$

[5]In almost all OECD countries any gains or losses on foreign currency borrowing are treated as interest receipts or payments for corporate tax purposes.

Finally, if we accept the foreign interest and inflation rates as exogenously determined, we can express the effect of a permanent change in the domestic inflation rate on the domestic interest rate in simple terms.

$$\Delta i = \Delta \pi \tag{4}$$

It is worth noting at this point that the open interest rate parity relation as defined by equation 1 (with equal tax rates) has been employed by almost all researchers who have explored the implications of tax structures and inflation in international finance. One recent exception is Sinn (1991), who looks at interest rate arbitrage from the point of view of the individual saver rather than the corporate borrower or lender. Given the importance of equation 4 for our analysis, we compare the merits of these two formulations in some detail.

By assuming that exchange rate gains or losses are taxed at a lower rate than interest income, Sinn obtains a different interest rate parity relationship which implies that the domestic interest rate increases more than proportionally to any increase in the domestic inflation rate. In equations 5 and 6 the tax rate on individual interest income is θ_i and the tax rate on exchange rate gains is θ_e.

$$(1-\theta_i)i = (1-\theta_i)i^* + (1-\theta_e)\Delta e \tag{5}$$

$$\Delta i = \frac{(1-\theta_e)}{(1-\theta_i)}\Delta \pi \tag{6}$$

There are several reasons for believing that the effective arbitrage relationship is best described by equation 1 and not by equation 5. First, corporate arbitrage with the rest of the world works identically through both borrowing and lending, whereas individual arbitrage works differently for borrowing than lending because individuals cannot deduct interest payments from their income for tax purposes. In fact, individual arbitrage through borrowing would reverse Sinn's conclusion and cause the domestic interest rate to increase less than proportionally to any increase in the domestic inflation rate. (This conclusion is easily seen by eliminating the interest income tax rate from equation 6.) Second, many OECD countries do not tax individual exchange rate gains at a lower rate than individual interest income. Third, while individuals in certain countries may see unexploited arbitrage opportunities, the inherent risk and expense of arbitrage at an individual level almost certainly places a comparatively low ceiling on the total funds available for such arbitrage. Corporations that regularly engage in international transactions are much better placed to take advantage of risky arbitrage opportunities. Therefore, we believe that the open interest parity condition enforced by corporate borrowing and lending (equation 1) is the most realistic outcome.

B. The Cost of Capital[6]

We now analyze the effect of domestic inflation on the cost of capital for a corporation in a small open economy. For simplicity we assume that physical capital does not depreciate,[7]

[6]For more detail on the methodology of this section, see Auerbach (1983).

[7]The results would be unaffected by a positive depreciation rate of capital if the tax allowance for depreciation were indexed to the price level. If a firm can deduct only the historic depreciation cost our results are weakened but not eliminated. On the other hand, widely used accelerated depreciation schemes help to offset the effect of historic cost deductibility. The implications of historic cost depreciation allowances and accelerated depreciation schedules are explored in section III.D. below.

and that all physical capital is owned by corporations.[8] In accordance with the general practice of OECD countries, we assume that corporate residence is determined by the location of a firm's physical capital and labor force, rather than by the location of its headquarters. Hence, a multinational firm makes its investment decisions in each country subject to that country's corporate tax structure.[9]

The cost of financing physical capital by debt, cc_d, is equal to the interest payment on debt minus any increase in the value of physical capital caused by inflation adjusted by the additional tax benefits arising from the ability to deduct the inflation component of the interest payments. This relationship is expressed in equation 7, where τ is the corporate tax rate, which is assumed to be equal for all types of income or loss.

$$cc_d = i - \frac{\pi}{1-\tau} \tag{7}$$

The cost of equity-financed capital is derived assuming that individual savers equate the real returns to holding debt and equity. The real return to holding debt, rr_d, is given by equation 8.

$$rr_d = (1-\theta_i)i - \pi \tag{8}$$

[8]The obvious exception to this assumption is the stock of owner-occupied housing. We believe that the effects of inflation on the housing stock are likely to be at least as strong as the effects of inflation on business capital.

[9]Some OECD countries do tax profit remittances from foreign operations of domestically-owned corporations. However, such taxes have relatively little effect since full credit is granted for taxes paid in the foreign country and no tax is assessed on foreign profits that are reinvested abroad.

The real return to holding equity, rr_e, is the sum of after-tax dividends, d (taxed at rate θ_d), and after-tax capital gains, c (taxed at rate θ_c), minus inflation.

$$rr_e = (1-\theta_d)d + (1-\theta_c)c - \pi \tag{9}$$

Of course, the stream of dividend payments is determined endogenously by the firm in response to investment opportunities and tax considerations, however, to make the analysis tractable, we express the dividend payout ratio, p, from corporate net income, I, as a parameter.[10] In equilibrium, net earnings that are not paid as dividends must be translated one-for-one into capital gains since they represent an increase in the underlying asset value of the firm. Inflation also increases the nominal value of the firm. Thus, we have the formulae for dividends and capital gains in equations 10.

$$d = pI \qquad\qquad c = (1-p)I + \pi \tag{10}$$

The cost of equity-financed capital, cc_e, can now be derived as the level of income before tax that is needed to equate individual real returns to debt and equity. This yields equation 11.

$$cc_e = \frac{I}{1-\tau} = \frac{(1-\theta_i)i - (1-\theta_c)\pi}{(1-\tau)[(1-\theta_d)p + (1-\theta_c)(1-p)]} \tag{11}$$

[10] As long as the optimal dividend payout ratio moves smoothly and continuously in response to changes in the inflation rate, conclusions about the cost of equity finance based on a fixed payout ratio will be correct to a first-order approximation.

At this point we note that an extensive literature exists concerning the relationship between cc_d and cc_e. Some researchers have focused on specific aspects of the tax structure that might allow cc_d and cc_e to be equal for some combinations of the debt-equity ratio and the dividend payout ratio. Other researchers have considered omitted factors such as bankruptcy costs and imperfect information to explain the apparent inequality between cc_d and cc_e for arbitrary values of the tax rates. In the interest of generality, we shall try to avoid making unnecessarily restrictive assumptions on the nature of cc_d and cc_e.

We are now able to look at the effect of inflation on the cost of capital. Increasing the rate of inflation unambiguously lowers the cost of debt-financed capital, and lowers the cost of equity-financed capital for plausible values of the relevant tax rates. To see this, we rewrite equations 7 and 11 in first difference form using equation 4 assuming that tax rates and the dividend payout ratio are fixed.

$$\Delta cc_d = -\frac{\tau}{1-\tau}\Delta\pi \tag{12}$$

$$\Delta cc_e = \frac{(\theta_c - \theta_i)\Delta\pi}{(1-\tau)[(1-\theta_d)p + (1-\theta_c)(1-p)]} \tag{13}$$

Inflation unambiguously lowers the cost of debt-financed capital and also lowers the cost of equity finance as long as the effective tax rate on individual capital gains is lower than the tax rate on individual interest income.

These inflation effects are large for reasonable values of the various tax rates. In the case of debt finance with a 35 percent corporate tax rate, each additional percentage point of inflation lowers the cost of capital by 55 basis points. For low values of the capital gains tax rate, similar results are obtained for the effect of inflation on the cost of equity capital. By way of contrast, changes in tax rates generally have small and ambiguous effects on the overall cost of capital. For example, increasing the dividend or capital gains tax rate raises the cost of equity capital but has no effect on the cost of debt capital, while increasing the tax rate on interest income lowers the cost of equity finance with no effect on the cost of debt finance. Finally, increasing the corporate profit tax rate lowers the cost of debt capital, but it raises the cost of equity capital. Perhaps more significantly, a percentage point increase in the tax rate has a much smaller effect on the cost of capital than a percentage point increase in the inflation rate in all cases. Assuming a 10 percent interest rate, the effect on the cost of capital of a 1 percentage point change in any tax rate is approximately 10 basis points at most.

C. The Return to Saving

The previous section demonstrated that changes in the domestic inflation rate have a large effect on the cost of domestic capital, and, by implication, on the desired capital stock. This section considers the effect of inflation on the return to saving and desired national asset holdings. By substitution of equation 4 into equation 8 we see that an increase in the inflation rate will lower the after-tax return to debt. Because we assumed that individual behavior equates the returns to debt and equity, it follows that inflation reduces the return to equity by an equal amount.

$$\Delta rr_e = \Delta rr_d = -\theta_i \Delta \pi \qquad (14)$$

If we allow individuals to hold foreign equity, we must consider the implications of arbitrage on equity returns across countries.[11] Since the domestic country is small, the nominal return to foreign equity in the foreign currency is unaffected by an increase in domestic inflation. A rise in inflation is offset by an expected appreciation of the foreign currency, leaving the real before-tax return in domestic currency unaffected. However, this higher nominal return on foreign holdings is taxed, hence the real after-tax return declines. This relationship leads to equation 15, where foreign asset returns, rr^f, depend negatively on the domestic inflation rate.[12] It is easy to show that equation 15 also describes the effect of higher domestic inflation on the real return to holding foreign debt.

$$\Delta rr_e^f = \Delta rr_d^f = -\theta_e \Delta \pi \tag{15}$$

If exchange rate gains are taxed at the same rate as interest income, the real return to domestic individuals declines equally for all assets.[13] These results imply a large effect of inflation on the real return to saving. In the case of a 30 percent tax rate on interest income, each percentage point of additional inflation reduces the real return on domestic debt by 30 basis points.

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[11]Consideration of corporate arbitrage of equity returns is complicated by tax rates that depend on the fraction of outstanding shares held in the foreign firm. In any event, it seems more reasonable to assume that individuals are the marginal investors in equity.

[12]Most OECD countries have a positive tax rate on individual exchange rate gains, although there are notable exceptions, such as Germany.

[13]In the more realistic case that the tax rate on exchange rate gains is lower than the tax rate on interest income, the real return on foreign assets does not decline as much as the real return on domestic assets when domestic inflation increases. This implies a gap between the real rate of return on domestic and foreign assets. As we stated previously, we believe that the ability of individuals to arbitrage across foreign and domestic assets is probably limited, leading to the existence of unexploited arbitrage opportunities by individuals.

D. Numerical Analysis

The previous two sections demonstrated that a higher domestic inflation rate would reduce both the cost of capital and the return to saving in the small open economy. These effects should encourage more domestic investment and less domestic saving, thereby inducing a decline in the current account balance and changing the net foreign asset position.[14]

To gauge the magnitude of these effects, we conducted numerical simulations of a model of a small open economy. The model has a Cobb-Douglas production function, an interest-elastic money demand, a positive depreciation rate of capital, historical cost deduction of depreciation expense, a positive population growth rate, and an interest-elastic saving rate. In order to keep the analysis tractable, we assume that marginal investment projects are always financed by debt, that corporate arbitrage equates the cost of borrowing in domestic and foreign currency, and that individuals have limited opportunities to hold assets denominated in foreign currency so that their saving decision is determined by the real return on domestic currency debt. Our basic findings are that the effect of the inflation rate on net assets and the current account balance is large, and that it is robust to alternative assumptions.

The numerical model is defined by equations 16 to 26. Because we allow for population growth, all real and nominal quantities are expressed in per capita terms. Equation 16 gives output as a Cobb-Douglas function of capital and labor, with per capita labor normalized at unity; $\boldsymbol{Q}$ denotes the level of technology of the production function, which is assumed to be constant.

[14]If we drop the assumption of perfect goods markets, then it is possible for the cost of capital to be unaffected in the short run because agents expect a real depreciation of the domestic currency in the near future. If agents are rational and the economy is on a smooth trajectory to long-run equilibrium, then the real exchange rate must have appreciated immediately upon the expectation of higher inflation so that it could begin the gradual real depreciation during the transition to long-run equilibrium. During the transition, the real exchange rate would be overvalued, and therefore would tend to cause a current account deficit. This argument is developed further in Gruen (1991).

Disposable income is defined in equation 17 as output less depreciation of the capital stock plus monetary injections and real returns on net foreign assets and the money stock. For simplicity, we assume that all tax revenues are rebated to individuals in the form of lump-sum transfer payments so that tax rates do not appear in equation 17. Consumption is a simple function of disposable income that may depend on the real return to saving. The total money stock grows at the exogenous rate, μ, but per capita money balances increase at a slower rate when population growth, n, is positive. Real money demand is proportional to real income, but it reacts negatively to increases in the after-tax nominal interest rate. Equation 21 defines the inflation rate. Equation 22 is the open interest rate parity condition combined with the purchasing power parity condition. The real return to saving is defined in equation 23, and the cost of capital is defined in equation 24. Equation 24 allows for nominal cost depreciation of capital at an accelerated rate, where δ is the real rate of depreciation and γ is the rate allowed for tax purposes.[15] Equation 25 determines the capital stock by setting the cost of capital equal to the return to capital. With perfectly competitive firms, the share of output earned by capital is the exponent α in the production function. Finally, per capita net foreign assets are given by the budget constraint and population growth. Because of the open interest parity condition, we are free to model net foreign assets in either domestic or foreign currency, and we choose domestic currency for simplicity.

[15]See King and Fullerton (1984) p. 20. Strictly speaking, this formula applies only to the steady-state cost of capital. The exact dynamic formula contains the expected path of the interest rate over the infinite future. We experimented with expectations of i set five and ten years ahead, and we found no significant change in our numerical results.

$$Y_t = QK_{t-1}^{\alpha} \tag{16}$$

$$YD_t = Y_t - \delta K_{t-1} + (i_{t-1} - \pi_t)\frac{A_{t-1}}{P_t} + (\mu_t - \pi_t)\frac{M_{t-1}}{P_t} \tag{17}$$

$$C_t = (1 - s_0 - s_1 rr_t)YD_t \tag{18}$$

$$M_t = \frac{(1+\mu_t)}{(1+n)}M_{t-1} \tag{19}$$

$$\frac{M_t}{P_t} = \frac{mY_t}{(1+(1-\theta_{t+1})i_t)^{\lambda}} \tag{20}$$

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \tag{21}$$

$$i_t = i_t^* + \pi_{t+1} - \pi_{t+1}^* \tag{22}$$

$$rr_t = (1-\theta_{t+1})i_t - \pi_{t+1} \tag{23}$$

$$cc_t = \left(1 - \frac{\tau_{t+1}\gamma}{(1-\tau_{t+1})i_t + \gamma}\right)\frac{(1-\tau_{t+1})i_t - \pi + \delta}{1-\tau_{t+1}} \tag{24}$$

$$cc_t K_t = \alpha Q K_t^{\alpha} \tag{25}$$

$$A_t = \frac{(1+i_{t-1})}{(1+n)} A_{t-1} + \frac{Y_t P_t - C_t P_t}{(1+n)} + \frac{(1-\delta) K_{t-1} P_t}{(1+n)} - K_t P_t \tag{26}$$

Table 1 Initial Steady State

Parameters		Variables	
Q	0.711	Y	1.0
α	0.30	K	3.112
δ	0.05	A	0.0
γ	0.10	YD	0.864
s_0	0.095	C	0.782
s_1	0.0	M/P	1.0
n	0.02	i	0.12
m	1.253	i^*	0.12
λ	3.0	π	0.05
		π^*	0.05
		μ	0.071
		τ	0.35
		θ	0.35
		rr	0.028
		cc	0.096

Table 1 presents the parameter and variable values for the initial steady state of the model; they were chosen to mimic the typical developed country with output normalized at unity. The real depreciation rate is 5 percent, but firms can deduct historical depreciation costs at the faster rate of 10 percent. The interest semi-elasticity of money demand is 3. Both tax rates are 35 percent, and the population growth rate is 2 percent. The inflation rate is 5 percent at home and abroad. Capital's share of output is 30 percent, and the capital-output ratio is approximately 3. Households save almost 10 percent of their disposable income. Saving is not sensitive to the real interest rate (we relax this assumption later).

Table 2 displays the effects of changes in the exogenous variables on the capital stock and real net foreign assets. As shown in the first row of the Table, a 1 percentage point increase in the inflation rate raises the steady-state capital stock by almost 6 percent, or 17 percent of initial output. The capital stock reaches its long-run equilibrium in approximately 5 years. This increased capital stock is financed almost completely by foreign borrowing, as shown by the change in real net foreign assets after 5 years.[16]

Table 2

Effects of Changes in Inflation and Taxation on the Capital Stock and Real Net Foreign Asset Holdings (Percent of Initial Output after 5 Years)

Simulation	Capital Stock	Real Net For. Assets
Inflation +1%	17	-16
Corp. Tax +1%	4	-4
Ind. Int. Tax +1%	0	0
γ=.05, s_0=.09, Q=.73 and		
Inflation +1%	16	-16
Corp. Tax +1%	2	-3
Ind. Int. Tax +1%	0	0
s_1=5, s_0=-.04, and		
Inflation +1%	17	-22
Corp. Tax +1%	4	-4
Ind. Int. Tax +1%	0	-3

The effect of increasing the inflation rate on the current account balance is given by the change in nominal net foreign assets period by period. Under the initial parametrization of the model, a 1 percentage point increase in the inflation rate leads to current account deficits of 8 percent of output in the first year, 5 percent in the second year, and 3 percent in third year. The current account deficit stabilizes at 1 percent of nominal output after the fourth year. The current account deficit persists indefinitely in order to maintain the level of real per capita net foreign assets in the face of inflation and population growth.

In addition to the impact of the inflation rate, the second and third rows of Table 2 show the impact of changes in the tax rates on corporate profit and individual interest income. A 1 percentage point increase in the corporate tax rate raises the stock of physical capital by 4 percent

[16]Real net foreign assets continue to decline in the long run--but at a much slower rate--because the saving rate is not quite sufficient to maintain the higher capital stock as the population grows. If we had included a wealth effect on saving, real net foreign assets eventually would stabilize.

of output and lowers the stock of net foreign assets by the same amount. This effect is less than a quarter of that due to a 1 percentage point rise in inflation. Changes in the tax rate on individual interest income have no effect on the capital stock and net foreign assets.

The Table also reports the results from two variations of the parameter values. To check on the sensitivity of these results to our assumption that firms can write off depreciation expense at an accelerated rate, we conducted the same experiments under the assumption that firms can deduct historical depreciation costs only at the rate of economic depreciation. Setting the rate of depreciation for tax purposes (γ) equal to the rate of economic depreciation (δ=.05) increases the cost of capital from .096 to .104 and decreases the steady-state capital stock from 3.11 to 2.90. We made corresponding changes in the saving rate and technology factor to keep output normalized at 1. We then examined the effects of changes in the inflation rate and tax rates relative to the new initial capital stock of 2.90. The effect of inflation on the capital stock and net foreign assets is nearly identical to the situation in which firms can take accelerated depreciation deductions. The effect of increasing the corporate tax rate is somewhat lower when firms cannot take accelerated depreciation deductions. There is still no effect on the capital stock and net foreign assets of increasing the interest income tax rate.

We also report a simulation that assumes a positive interest-elasticity of saving. The parameter s_1 is the slope of the saving rate as a function of the real return to saving. We chose a value of s_1 that would overstate the elasticity of saving with respect to the real return. With $s_1=5$, a 1 percentage point increase in the real return induces a 50 percent increase in the saving rate, from 10 percent of disposable income to 15 percent. The parameter s_0, the intercept, was changed to keep the overall saving rate at its initial level. The results indicate that the capital stock is invariant to saving behavior. Real net foreign assets are only slightly lower than under the assumption of insensitive saving after the first 5 years. Over a longer horizon, however, the lower real after-tax return to saving leads to further declines in net foreign asset holdings.

These results--that capital and net foreign assets are more sensitive to inflation and less sensitive to changes in tax rates--are robust to reasonable changes in the values of all of the model parameters. The magnitude of the predicted effect of domestic inflation on the current account balance is sufficiently large under all circumstances that one would expect to be able to find evidence for it in the data, at least during a period of international capital mobility. Indeed, the effect is almost too large to be plausible. In our basic scenario, a 1 percentage point increase in the domestic inflation rate induces an 8 percent of GDP current account deficit in the first year. Although the current account deficit declines quickly thereafter, it does not return to zero even in the long run. Due to the simplicity of our model, we have almost certainly overstated the speed of adjustment of the capital stock and net foreign assets. If we were to include an adjustment cost to the capital stock and imperfect international goods markets, the effect of higher inflation would clearly be reduced and delayed somewhat. Nevertheless, it is clear that the effect we have examined is quite large in economic terms. It is also clear that for values of tax rates and inflation rates that are typical of OECD countries, the effect on the current account balance and the capital stock of an additional percentage point of inflation is several times greater than the effect of an additional percentage point in the tax rate.

IV. Empirical Results

A. The Estimating Equation

The theoretical model implies that the net asset position of a country should be directly related to its expected rate of inflation and its tax rates. Furthermore, of these two factors, the major effect comes through differences in inflation rates. This section tests the validity of the theory by estimating cross-sectional regressions looking at the relationship between inflation and net foreign asset positions across OECD countries. Due to the complexity of the tax structure in most countries and the limited number of observations available, it was not feasible to incorporate tax effects in our empirical work.[17]

The basic estimating equation involves regressing the net foreign asset position across different countries on a measure of the inflation rate of those countries over the recent past. Inflation was measured by taking the average of the actual inflation rate across countries for the previous four years. The reason for averaging the data over several years being to get rid of cyclical influences on the inflation rate and hence get a more accurate measure of the underlying inflationary performance and expectations.

Of course, expected inflation and tax rates may not be the only influences on net asset positions. Of the other factors that might have an influence, two are particularly important. The first is recent budgetary policy, since it is often argued that current account imbalances reflect fiscal imbalances.[18] The second is the overall level of operation in the economy, since

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[17]We did augment some of our estimating equations with corporate tax rates for 1989. The coefficient on the tax rate was generally correctly signed, but small in magnitude and statistically insignificant. We thank the Directorate for Financial, Fiscal, and Enterprise Affairs at the OECD for providing us with these tax rates.

[18]See Bayoumi and Hayakawa (1991) for an examination of the role of budgetary policy in determining the current account balance.

economies operating at a high level might be expected to borrow capital to finance this expansion while those operating at a low level may export capital. Accordingly, two extra variables, the fiscal position of the government (measured as general government net lending divided by GDP) and the unemployment rate (measured relative to the average over the period 1973-88) were included in some of the regressions.[19] As with the inflation rate, these two variables were averaged over the previous four years in order to identify long-term trends in the data.

The basic estimating equations were therefore:

$$(A/Y)_j = b_0 - b_1 \pi_j \tag{27}$$

$$(A/Y)_j = b_0 - b_1 \pi_j + b_2 (FIS/Y)_j + b_3 UN_j \tag{28}$$

where A_j is the net foreign asset position of country j, Y represents GDP, π is the rate of inflation, FIS is the fiscal surplus, and UN is the rate of unemployment. All the coefficients except the constant are expected to be positive; underlying inflation should lower net assets while fiscal surpluses and high unemployment should raise them.

B. Data Sources

Data on external assets and liabilities were collected for 17 OECD countries for the period 1981-89.[20] The data come from *External Assets and Liabilities of Industrial Countries* (The Institute of International Finance, Washington, February 1991) and are, to our knowledge, the

[19]Experiments with GDP growth rates in place of unemployment rates showed similar results.

[20]The countries were Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. Data for Switzerland were lacking for 1981-1982.

most complete data available on a comparable basis. The net asset positions were calculated by taking the difference between total assets and total liabilities, normalized as a percentage of GDP.

As discussed above, inflation was measured as the average increase in the consumption deflator over the previous four years.[21] The fiscal surplus was measured as the level of general government net lending, while the level of unemployment was measured as the OECD standardized unemployment series, both averaged over the last four years to measure overall trends. Since the object of the unemployment data is to look at relative performance over time, the unemployment series were normalized by subtracting the mean unemployment rate over 1973-88 from the raw data. The first two series come from the *OECD Annual National Accounts*, while the unemployment data come from *OECD Labour Force Statistics*. Government net lending data were not available for Belgium and Switzerland, so the final data set comprises 15 countries.

C. Inflation and Net Foreign Assets

Table 3 shows the results from estimating equations 27 and 28. The left side of the Table shows the results for regressions on inflation alone; the right side shows the results when government net lending and unemployment are also included as independent variables. The top half of the Table shows the results using the full data sample and net asset data for three different years, 1981, 1985 and 1989. Since much of the deregulation of international financial markets has occurred over the course of the 1980s, the effect of inflation might be expected to be becoming more important over time. This does indeed appear to be the case. In the regressions with inflation as the sole explanatory variable, the coefficient on inflation has the expected sign

[21]Data were also collected on the GDP deflator; however, since the results were so similar, only those with the consumption deflator are reported.

Table 3 Results from the Net Asset Regressions							
	Simple Regression		Extended Regression				
	Inflation	Adj R^2	Inflation	Fiscal Stance	Unemploy-ment	Adj R^2	No. Obs
Full Sample							
1981	0.38 (0.77)	-.07	0.97 (0.77)	-2.69*** (0.79)	-2.07 (3.14)	.00	15
1985	3.41*** (0.73)	.28	3.64*** (0.70)	0.74 (0.74)	6.99** (2.53)	.40	15
1989	6.19*** (1.11)	.37	6.40*** (0.80)	-0.89 (0.82)	2.07 (1.52)	.38	15
Smaller Sample							
1981	7.10** (2.03)	.46	7.35** (1.99)	11.37 (6.64)	-10.01 (6.47)	.34	7
1985	7.49*** (2.07)	.42	6.16** (1.56)	3.79*** (0.85)	8.90** (3.05)	.45	9
1989	7.88*** (1.69)	.36	7.60*** (1.40)	0.27 (2.50)	8.44* (3.39)	.47	9

* indicates significance at the 10 percent level
** indicates significance at the 5 percent level
*** indicates significance at the 1 percent level

Notes: The full sample comprises Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, the United Kingdom and the United States. The smaller sample excludes Austria, France, Italy, Norway, Spain and Sweden due to significant capital controls. The United Kingdom and Japan were also excluded from the 1981 regressions since they had extensive capital controls until 1979 and 1980, respectively. All standard errors are adjusted for heteroscedasticity. The constant terms are not reported.

in all three regressions, however its value and statistical significance increase steadily over time, from 0.38 in 1981 (insignificantly different from zero) to 6.19 in 1989, when it is highly significant, with a t-statistic of over five. This implies that by 1989 a 1 percentage point rise in underlying inflation was associated a 6 percentage point reduction in net foreign assets to GDP, a relatively powerful effect. The adjusted R^2 statistics indicate that inflation, which has very little explanatory power in 1981, explains 40 percent of the variance in net asset positions by 1989. A similar pattern emerges when the other explanatory variables are included. The coefficients on inflation in these regressions are very similar to those in the simpler regressions discussed earlier, moving from (an insignificant) 0.97 in 1981 to (a significant) 6.40 by 1989. The other two explanatory variables, the fiscal stance and relative unemployment, do not appear to be important factors in determining net asset holdings across countries. The coefficient on general government net lending is incorrectly signed in two of the three regressions, and is insignificant when it is correctly signed. The coefficient on unemployment is correctly signed in the 1985 and 1989 regressions, but is only significant in 1985.[22] A further indication of the lack of explanatory power is that the adjusted R^2 statistics for these regressions are similar to the simpler ones without the additional variables.

One problem with the results discussed so far is that the sample includes several countries that maintained significant capital controls over the estimation period, namely: Austria, France, Italy, Spain, Sweden and Norway.[23] Accordingly, the lower half of Table 3 repeats the

[22]Alternative regressions using the raw level of unemployment or the ratio between current unemployment and the 1973-88 average gave similar results.

[23]The information on capital controls comes from *Liberalization of Capital Movements and Financial Services in the OECD Area* (OECD, Paris, 1990).

estimation with these six countries excluded from the sample, reducing the total sample to nine countries.[24] Since this new sample represents those countries with relatively free capital markets, we would expect the significance of the coefficient on inflation to increase, and to become more stable over time.

The bottom half of Table 3, where the results from this smaller sample are reported, confirm this intuition. In the regressions with inflation as the sole right hand side variable, the coefficient on inflation is larger in this subsample than it is for the full sample in all three regressions. The effect is substantial, statistically significant, and increases slightly over time from 7.10 in 1981 to 7.88 by 1989 (this change presumably reflects the steady liberalization of capital flows over time in the rest of the world). The adjusted R^2 statistics indicate that inflation alone explains between one third and one half of the underlying variance in net asset positions in the 1980s. These patterns are repeated in the expanded regressions, where the coefficient on inflation is both larger than in the full sample and getting larger over time. The coefficients on the other explanatory variables generally are correctly signed and half are significant at conventional levels. In particular, the relative level of unemployment appears to play a role in determining net asset positions in both the 1985 and 1989 regressions. However, these additional explanatory variables have little impact on the coefficients on inflation, which are consistently the most significant variables in the regression.

As a check on the robustness of the results, two alternative specifications were estimated: To check for simultaneity bias, the equation using only inflation as an explanatory variable was re-estimated using two stage least squares, the instruments being a constant and the inflation rate

[24]For the first data period, the United Kingdom and Japan are also excluded from the sample since they had extensive capital controls up until 1979 and 1980, respectively.

over the four-year period prior to the data being used in the regression; to see if the results reflected the choice of a four-year time horizon, the regressions were re-estimated using averages of data over the previous eight years. The pattern of behavior in these regressions (not reported for the sake of brevity) was similar to those reported in Table 3; in particular, the coefficient on inflation always had the proper sign, which became larger and more significant over time, with the sub-sample results outperforming the full data set.

To summarize the results from these initial regressions, inflation appears to have a significant effect on the net asset position across countries with open capital markets, and its importance appears to be rising over time. This result is true both when inflation alone is included in the regression and when measures of fiscal stance and relative unemployment are added. The coefficient of 7.88 that is estimated for 1989 can be compared with the value of 16 calculated in our numerical simulations. Given the simplicity of the theoretical model and the imperfections of actual markets, this appears to be a surprisingly good correspondence. We now extend the analysis to look at the influence of inflation on net flow of international capital, rather than net stocks.

D. Inflation and the Current Account

In addition to affecting the distribution of net capital stocks across countries, inflation should also be related to capital flows. This relationship reflects three factors: First, to the extent that net foreign asset positions were kept artificially close to zero by government regulations in the 1960s and 1970s, capital flows in the 1980s may reflect a transition to a new equilibrium in which net foreign asset positions reflect relative inflation performance. Second, even for countries in long-run equilibrium, changes in inflation will produce capital flows.

Finally, the maintenance of long-run equilibrium asset positions may require sustained nonzero current account balances.

There are two ways of measuring international capital flows. The first is to calculate the actual flows of capital between countries using (suitably adjusted) data from the balance of payment statistics. The second is to look at the change in the net asset position of the economy. The main difference between these measures is that the first excludes revaluations caused by changes in exchange rates while the second includes them. To the extent that exchange rate revaluations represent genuine long-term changes in the net asset position of the economy, they should be included in the data. However, it has often been difficult to explain exchange rate movements in the 1970s and 1980s in terms of fundamentals, hence much of the exchange rate movements may reflect short-term noise, which will obscure the fundamental relations in the economy.[25] As a result, our primary measure of capital flows will be the (inflation adjusted) current account balance, although regressions using the change in net assets as the dependent variable are also reported.

Current account data were collected from 1973-1988 (from the OECD *Annual National Accounts*) the longer data period being chosen to allow a comparison of behavior in the 1970s to that in the 1980s. In order to get an accurate measure of capital flows from the current account data, however, it is necessary to make some adjustments. This is because all nominal interest and dividend payments are counted as income. As a result, assuming that gross assets are in foreign currency and gross liabilities in domestic currency, the current account will be distorted by inflation as (say) high nominal interest rate payments on liabilities will simply reflect

[25]Since this noise applies to the dependent variable it does not cause any bias in estimated coefficients, although it will lower the fit of the equation.

the inflation differential. Accordingly, the current account data were adjusted by taking interest and entrepreneurial income payments out of the data and then adding back the real return on the net asset holdings, which was assumed to be 5 percent. The effect of these adjustments is to eliminate a spurious negative correlation between inflation and measured current account balances. Mathematically,

$$\text{Adjusted CA} = \text{CA} - \text{Entrepreneurial Income} + .05*(\text{Net Assets}).$$

The rate of return of 5 percent was chosen as a reasonable approximation to the actual return on net capital holdings. Experiments with values of 3 and 7 percent made little difference to the results.

These "inflation-adjusted" current accounts were calculated for the period 1973-1988. Since asset positions were not available for the 1970s, net assets in 1981 were used to adjust the first two data periods (the small level of capital flows over the 1970s makes it unlikely that these asset positions varied very much over time). Since we are interested in looking at steady flows of capital, averages of the data were calculated for 1973-76, 1977-80, 1981-84 and 1985-88. As discussed earlier, these averages were intended to remove cyclical influences, and hence measure underlying trends in capital flows.

These data were regressed on inflation and on inflation, general government net lending and relative unemployment, all averaged over the same periods.[26] The estimating equations being,

$$(CA/Y)_j = b_0 - b_1 \pi_j \tag{29}$$

$$(CA/Y)_j = b_0 - b_1 \pi_j + b_2 (FIS/Y)_j + b_3 UN_j \tag{30}$$

which are the same form as those estimated earlier using the net asset data.

The results from this exercise are shown in Table 4, which has the same format as Table 3. For the full sample the level of inflation generally has the expected negative coefficient, but for the first three periods (1973-76, 1977-80 and 1981-84) the coefficients are relatively small and only marginally significant.[27] For the 1985-88 period, on the other hand, the results do show a close correlation between inflationary performance and capital flows, presumably reflecting the move towards more open capital markets. The other two variables, the government surplus and relative unemployment, also provide little explanatory power, indeed on the only two occasions they are significant they are incorrectly signed. Overall, as shown by the adjusted R^2 statistics, these regressions provide little explanation of capital flows in the period up to 1984, while for the late 1980s inflation appears to be a significant explanatory variable.

[26]Regressions using unadjusted current account balances generally produced larger coefficients on inflation, indicating that our inflation adjustment did indeed reduce the negative correlation between inflation and the current account balance.

[27]Limited experiments with data from the 1960s show the same pattern.

Table 4 Results Using the Adjusted Current Account Data								
	Simple Regression		Extended Regression					
	Inflation	Adj R^2	Inflation	Fiscal Stance	Unemploy-ment	Adj R^2	No. Obs	
			Full Sample					
73-76	.25* (.13)	.12	.37*** (.09)	-.39*** (.11)	-.51 (.48)	.32	15	
77-80	-.07 (.10)	-.06	.03 (.08)	-.32** (.11)	.10 (.41)	.04	15	
81-84	.23* (.13)	-.04	.19 (.19)	.19 (.24)	.16 (.47)	-.04	15	
85-88	.73*** (.15)	.49	.77*** (.14)	.00 (.11)	.27* (.14)	.47	15	
			Smaller Sample					
73-76	.59*** (.11)	.39	.17 (.20)	-.62* (.24)	-.91 (.54)	.47	7	
77-80	.38* (.18)	.25	.52*** (.04)	.55* (.19)	-1.09*** (.13)	.86	7	
81-84	.51* (.24)	.17	.26 (.21)	-.17 (.21)	1.10** (.30)	.31	9	
85-88	1.11*** (.19)	.68	1.14*** (.12)	.20 (.17)	.68* (.31)	.76	9	

* indicates significance at the 10 percent level
** indicates significance at the 5 percent level
*** indicates significance at the 1 percent level

Notes: See Table 3. The United Kingdom and Japan were excluded from the smaller sample in the first two periods due to capital controls.

The results for the sub-sample of countries with relatively open capital markets--shown in the bottom half of the Table--are superior, as might be expected. The coefficients on inflation are larger and better determined for this sub-sample than for the regressions using the full data set, and again rise significantly in the 1985-88 period. This is particularly true for the regressions where inflation alone is included in the estimation. Turning to the other explanatory variables, the results are somewhat mixed. Relative unemployment is correctly signed and significant in the two regressions using 1980s data, but incorrectly signed in the two 1970s regressions, while the fiscal stance shows even less pattern. Overall, there does appear to be evidence that inflation plays a role in explaining current account balances, the effect being particularly strong in the second half of the 1980s. However, in the full sample the effect is partly obscured by the inclusion of inappropriate countries.

Finally, Table 5 shows the results from the same regressions, but using the change in net assets over 1981-1985 and 1985-1989 (divided by 4 to give an annualized rate) as the dependent variable. When inflation is the sole independent variable, the coefficient estimates are correctly signed but significant in only two of the four regressions. This is the pattern that would be expected if the dependent variable includes a considerable element of noise, since in this case the estimated coefficients will be unbiased but inaccurately estimated. When the fiscal stance and relative unemployment are included in the regressions, they are often significant, but in one case the coefficient takes the wrong sign. These results in Table 5 probably reflect noisy data as much as actual behavior. In any event, the coefficient on inflation is correctly signed every time, and significant in four of the eight regressions.

Table 5 Results Using the Change in Net Assets

	Simple Regressions		Extended Regressions				
	Inflation	Adj R^2	Inflation	Fiscal Stance	Unemploy-ment	R^2	No. Obs
Full Sample							
81-85	.45** (.17)	.21	.32** (.07)	.50** (.07)	.45 (.28)	.62	15
85-89	.30 (.28)	.01	.24 (.23)	-.36* (.17)	.00 (.16)	.25	15
Smaller Sample							
81-85	.18 (.31)	-.11	.05 (.21)	.87*** (.10)	1.18** (.32)	.36	9
85-89	.40* (.18)	.17	.52** (.17)	.47** (.14)	.39* (.16)	.54	9

* indicates significance at the 10 percent level
** indicates significance at the 5 percent level
*** indicates significance at the 1 percent level

Notes: See Table 3.

E. Pooled Regression Results over Time

Since we have annual observations on the variables in the regressions, we can complement the cross-sectional results with pooled time series cross-sectional estimates. Accordingly, the following regression equations were estimated as a system across countries using Zellner's seemingly unrelated regressions.

$$(A/Y)_{j,t} = b_0 - b_1 \pi_{j,t} + b_2 (FIS/Y)_{j,t} + b_3 UN_{j,t} + b_4 (A/Y)_{j,t-1} \tag{31}$$

$$(CA/Y)_{j,t} = b_0 - b_1 \pi_{j,t} + b_2 (FIS/Y)_{j,t} + b_3 UN_{j,t} \tag{32}$$

These equations are time series analogs to the earlier cross-sectional equations. All the coefficients were constrained to be equal across countries during estimation.[28] A lagged dependent variable was included in the regressions using net foreign assets since net asset positions trend markedly over time. To see if the coefficient on inflation was trending over time with deregulation of international capital markets, the regressions were re-estimated with the coefficient b_1 replaced by the expression $(b_1 + b_{11}t)$ where t is a trend equal to 0 in the first year of the sample. Hence b_1 represents the coefficient at the start of the estimation period, while b_{11} represents the change in the coefficient in each successive year. A similar adjustment was also made to the current account regression.

[28]This includes the constant term, since we want to explain capital flows both over time and across countries. Allowing the constant term to vary across countries has little effect on the net asset regressions, but it substantially reduces the coefficient on relative inflation in the current account regressions. In the latter case we believe that the country constants have spuriously picked up the inflation effect because the estimated constant terms were highly negatively correlated with inflation rates across countries. Moreover, at the same time that capital market liberalization has allowed larger current account imbalances, inflation differentials across OECD countries have narrowed, thus inducing a downward bias into the relative inflation coefficient in time series regressions. We try to control for this effect by allowing the coefficient on relative inflation to have a linear time trend, but this correction is at best a crude approximation to the effect of capital market liberalization over time.

Table 6 shows the results from estimating these equations over the years 1982 through 1988. Due to the short sample, it was only possible to include data on seven countries.[29] We chose the same seven countries that were identified earlier as having relatively open capital markets throughout the 1970s and 1980s. Because capital flows ought to respond to differences in inflation rates across countries, the inflation variable was measured as the difference between each country's inflation rate and the GDP-weighted average value across all seven countries.

The results for the net asset regressions, both with and without a trend in the inflation coefficient, are shown in the left half of the Table. As might be expected from annual regressions, the coefficients on the two cyclical variables, unemployment (measured relative to its average over the sample for each country) and general government net lending, are highly significant. When estimated without a time trend, the coefficient on relative inflation is correctly signed, large (.63), and highly significant. When allowed to trend over time, the effect of relative inflation is small and insignificant in 1982 but it increases by (a highly significant) .24 per year to an implied coefficient of just over 1 by 1988. As in the earlier cross-sectional regressions, inflation appears to be an important determinant of net assets positions in the 1980s. Finally, the coefficient on the lagged dependent variable is close to 1 in both cases, implying that these are effectively regressions in the first difference of net foreign assets, while the R^2 and Durbin-Watson statistics indicate no evidence of misspecification.

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[29]To calculate the weighting matrix for the second stage of the regression it is necessary to have more time periods than equations.

Table 6 Results From the Pooled Cross-Section Time Series				
	Net Foreign Assets		Adj. Current Account	
Relative Inflation (Constant)	.63*** (.09)	-.12 (.15)	.81*** (.03)	.54*** (.06)
Relative Inflation (Trend)		.24*** (.03)		.09*** (.02)
Fiscal Stance	.45*** (.05)	.53*** (.06)	.07*** (.02)	.10*** (.01)
Unemployment Rate	.86*** (.10)	.51** (.20)	.84*** (.04)	.74*** (.04)
Lagged Dependent Variable	.98*** (.01)	.97*** (.01)		
Adjusted R^2	.20-.98	.03-.97	.05-.69	.01-.81
Durbin-Watson Statistic	.41-3.07	.71-3.02	.06-1.27	.07-1.10

* indicates significance at the 10 percent level
** indicates significance at the 5 percent level
*** indicates significance at the 1 percent level

Notes: The regressions were estimated with data from Australia, Canada, Denmark, Germany, Finland, the Netherlands, and the United States from 1982 through 1988 using Zellner's seemingly unrelated regressions. All coefficients, including the constant term, were set equal across countries.

The results using the adjusted current account as the dependent variable show a similar overall pattern, but with some interesting differences in detail.[30] The coefficients on the fiscal stance and unemployment are correctly signed and significant, however, those on the fiscal stance are considerably smaller than in the net asset regressions, indicating that much of the effect of fiscal policy on net assets may come through the exchange rate via asset revaluations. The coefficients on relative inflation are all correctly signed and highly significant, including the coefficient representing the effect in 1982 in the "trending" equation, which was insignificant in the net asset regressions. Turning to the descriptive statistics, the R^2 statistics are acceptable, but the Durbin-Watson statistics are quite low. This may indicate a problem with autocorrelation, although with such a short data sample (7 years) any such inference is rather uncertain.

Overall, our empirical results indicate that underlying inflation is an important factor in explaining international capital flows between countries with open capital markets, particularly in the second half of the 1980s. Given continuing deregulation of international capital markets (France, Italy, Spain, and Sweden ended capital controls in 1990) and the fact that net asset positions are probably still adjusting to the new steady state values implied by free international capital markets, expected inflation is likely to remain an important factor in the determination of capital flows, and hence current account balances, into the foreseeable future.

[30]Regressions using unadjusted current account balances, which can be estimated over a longer sample, indicate that the basic pattern of the results also holds when data from the 1970s are included.

V. Conclusions

One of the most striking economic developments of the 1980s has been the emergence of large current account surpluses and deficits among the industrialized nations. This paper demonstrates that nominal tax distortions may provide an important explanation for this pattern of current account balances. With the liberalization of international markets for capital, the tax treatment of interest income may have powerful effects on desired national net asset positions, and thus on current account balances. Under the existing system of nominal income taxation, differences in inflation rates across countries are *not* neutral with respect to real variables, even when tax rates are the same across countries. In particular, we show that countries with higher inflation rates must have lower real after-tax interest rates, at least in the long run. A movement to a higher long-run inflation rate therefore increases the desired capital stock and may decrease the saving rate. Both of these shifts decrease the current account balance until net foreign assets have declined enough to equilibrate the new capital stock and saving rate. Experiments using a small theoretical model indicate that the effect of inflation is likely to be large and robust to plausible extensions of the model.

We estimate the effect empirically using cross-sectional and time series techniques. A 1 percentage point increase in inflation is estimated to reduce the stock of net foreign assets by as much as 8 percent of GDP and the current account balance by as much as 1 percent of GDP. Moreover, the effect of inflation differentials on net asset positions and current account balances is strongest for the time periods and countries with the fewest restrictions on capital mobility.

An important implication of these results is that existing current account imbalances among industrial countries largely reflect tax distortions caused by differences in inflation rates, rather than an optimal allocation of world savings. In other words, international saving and investment decisions do not reflect the true economic returns to society. This inefficiency will remain as long as governments tax nominal instead of real interest income.

An even more striking implication of our theoretical model is that monetary policy can have a powerful effect on aggregate demand even when it is perfectly anticipated. Indeed, it is precisely the expectation of future inflation that provides the mechanism for money to affect the economy through the effect of lower real after-tax interest rates on consumption and investment. If increased aggregate demand stimulates domestic production at the same time that it reduces the current account balance, then our regressions may have understated the importance of this channel of monetary transmission by including the unemployment rate as an independent variable in the analysis. A topic for future research is to examine the intermediate mechanisms through which inflation affects aggregate demand and net foreign assets by looking at the behavior of real after-tax interest rates and real exchange rates.

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