8 Multinational Corporations, Exchange Rates, and Direct Investment

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Multinational corporations represent an enormous concentration of economic power in the United States and the rest of the world. U.S. multinationals themselves account for sales of $3.5 trillion and control assets of $4.2 trillion, which is almost 60 percent of total U.S. business assets. They occupy a dominant position in world trade. U.S. parents and their affiliates, for example, are associated with 79 percent of U.S. exports and 46 percent of U.S. imports; they alone account for about 18 percent of world trade.[1]

How might the presence of such large multinationals affect the behavior of the exchange rate? The typical business executive would probably find this question easier to answer than the economic theorist. The executive would probably point out that there has been a revolution in international financial markets over the last decade. Securitization, globalization, innovation, and deregulation have resulted in an explosion of new instruments and trading volume. The structure of multinationals' liabilities have changed dramatically, and today's investment projects are financed in ways that were difficult to imagine only a few years ago. The executive's view might be that the real-time fungibility of financial resources in today's hectic markets may, in the large, make exchange rates less manageable, more volatile, and increasingly unpredictable. He would probably add that the undisciplined behavior of the dollar during the 1980s has done nothing to assuage his concerns.

The source of these concerns probably lies more in the role of corporate

are major players in international financial markets by virtue of their size and global orientation. But most observers would agree that the impact of financial innovation would not disappear if all multinationals were suddenly restructured as wholly owned domestic corporations. Nevertheless, the prospect that currencies as well as a host of other financial variables are not well behaved is legitimate and worthy of more study.

In section 8.1 of this paper, we focus on the exchange rate effects of financial market innovations used by large corporations. We begin by showing that firms' choices of capital structure have no effects on exchange rates if capital markets are perfect. Thus, observers concerned that financial innovations have contributed to excessive exchange rate volatility must base their arguments on capital market imperfections. We consider several ways in which international capital markets may in fact be quite imperfect: incomplete integration, high costs of transacting, and irrationality on the part of investors.

We then argue there is no evidence that the kinds of financial innovations that firms have put to use for project financing make exchange rates more volatile or difficult to control. While there is mixed evidence on whether exchange rates are "excessively" volatile, firms' financial managers do not appear to be culpable. Indeed, the evidence that we do have suggests that, if anything, corporations trading at long investment horizons, rather than shorter speculative horizons, help to stabilize exchange rates. Policy proposals aimed at discouraging heavy trading and high volatility, such as "Tobin" and interest equalization taxes on foreign exchange transactions, do not usually distinguish between different motives for trading. To the extent that these taxes ignore such distinctions, they may be throwing the financial market innovation baby out with its bathwater.

The business executive's second answer to how multinationals affect exchange rates would be the economic theorist's first: through the return on real investments in different countries. There is, however, little literature on the effects of multinational investment on exchange rates. The reason is simple: the modern theory of the multinational as pioneered by Hymer (1976) and Kindleberger (1969) has no special implications for exchange rates or international capital flows. Under their "economic-organizational" view, firms engage in foreign direct investment (FDI) in order to internalize what would otherwise be market transactions. A host country firm may be more valuable under the control of the foreign parent than under anyone else because of imperfections in the goods or factor markets, economies of scale and scope, the difficulties in writing perfect licensing contracts, etc. Notice this interpretation of ownership and investment is completely agnostic on the way in which the host country assets are purchased. The capital need not flow in from the parents' home country or from investors anywhere abroad. It can be borrowed just as easily in the host country.

There is, however, an older, classical trade literature on multinationals which sought to explain foreign direct investment through international capital flows. Under this view—which Caves (1982) calls the "capital-arbitrage"

explanation—multinationals act as a conduit for capital flows, and thus have a well-defined role in exchange rate determination. So it might be sensible to study the effect multinationals would have on exchange rates under this scenario. To the extent that the cost of capital is influenced by monetary policy, fiscal spending, and taxes, this view would lead to precise implications for domestic and international policy. Unfortunately, this view has several basic problems and has largely been discarded. It does not explain why foreign capital should flow into direct as opposed to portfolio investment. It also does not explain why rates of return are unequal in the first place, why the international capital market would ever be in disequilibrium.

Today, most international economists subscribe to Hymer's (1976) view of FDI, dismissing the empirical importance of the capital arbitrage view. We shall not argue here with the need to model foreign direct investment more as a problem in industrial organization than as a problem in international finance. Yet some recent research suggests a sense in which the older, capital arbitrage view of FDI may be realistic and of increasing importance from a policy perspective.

In the section 8.2 of this paper, we argue that technological progress, combined with multinationals' unique ability to move international capital, has made multinationals more important in determining international capital flows. Imperfections in capital markets which previously were regarded as small may now elicit large movements of capital. Changes in corporate taxation, in particular, may have substantial effects on both the level and composition of international capital flows, and to a more limited extent, the exchange rate. The new mobility of multinationals implies that subtle changes in incentives can significantly alter behavior.

These issues are particularly relevant for the United States, which is currently thought to be experiencing a large inflow of foreign direct investment. We look at evidence which suggests that incentives for direct investment by foreigners and incentives for foreign investment by domestics have been altered substantially by tax changes in the 1980s. The Tax Reform Act of 1986 (TRA), for example, may help explain the current surge in foreign FDI in the United States as well as the less well advertised (but equally significant) increase in U.S. FDI abroad. In terms of welfare effects, we cannot evaluate whether the 1986 TRA was a good thing. We can say, however, that given the current tax law, U.S. taxpayers benefit from the increase in foreign FDI, which effects a transfer of resources from foreign taxpayers to the U.S. Treasury.

We conclude in this section that the presence of astute and informed multinationals poses a new challenge to policymakers. We are rapidly leaving behind an era in which it was acceptable to design tax policy without regard for the effects of FDI incentive and currency value.

8.1 Multinational Financing and Exchange Rates

In this section we explore how financial innovation affects firms' financing decisions, and how these financing decisions in turn affect exchange rates.

In order to establish a way to think about this problem, we first examine the effects of financial market innovation under the assumption that capital markets are perfect. (We discuss below just what we mean by "perfect.") Under these conditions we show that Modigliani and Miller's (1958, hereafter MM) first proposition implies that changes in firms' capital structures should have no effect on exchange rates. We then discuss evidence which suggests that international markets are not perfect, and that the MM proposition fails. Specifically, we address the concerns of those observers who argue that financial innovations have had adverse effects on exchange rate volatility. We argue that the most important financial innovations for large firms are new markets for securitized corporate borrowing and security swaps. These facilitate trading at longer horizons. We then review, but find no evidence to support, the hypothesis that these particular innovations have tended to destabilize exchange rates.

MM's famous proposition 1 demonstrates the irrelevance of a firm's choice of debt and equity in a perfect capital market. The logic of their irrelevance proposition is, however, very general, and does not apply only to simple debt and equity instruments.[2] The proposition applies to *any* combination of financial instruments, no matter how complex. The basic intuition for irrelevance is very simple: a firm cannot change the *total* value of its securities by splitting its cash flows into different streams. The value of the whole is always equal to the sum of the values of the parts—the principle of value additivity. There is also a second, less obvious point in MM: the allocation of risk in the economy is independent of the firm's capital structure, so that asset prices like the exchange rate are not affected by alternative financing schemes.

To see the logic of this argument, consider an example in which financial innovations have made it possible for a firm to issue debt in different currencies. Specifically, consider an all-equity firm which can finance a fixed investment project with debt denominated either in dollars or in deutsche marks (DM). The market value in dollars of the firm's securities under dollar-debt finance is given by the market value of the equity plus the market value of the dollar debt $V_\$ = E_\$ + D_\$$. Suppose an investor purchases the equity in this firm, spending $E_\$ = V_\$ - D_\$$. He is then entitled to the profits from the investment project less the payments on the dollar debt. For simplicity, assume that the debt is sold to the rest of the world for $D_\$$ dollars. Figure 8.1a shows the balance sheets for the firm, the investor, and the rest of the world, respectively. The equity and debt are purchased out of liquid dollar assets, L_i and L_{RoW}, held initially by the investor and the rest of the world.

Now suppose that an identical firm decides to issue debt in DM rather than in dollars (perhaps even a different dollar amount of DM debt). The market value in dollars of the firm's securities is given by $V_{\text{dm}} = E_{\text{dm}} + D_{\text{dm}}$. Clearly, the cash flow generated by the firm's equity will generally be different under DM-debt financing than under dollar-debt financing: the payoffs from E_{dm} will not equal those of $E_\$$. Under DM-debt financing, for any

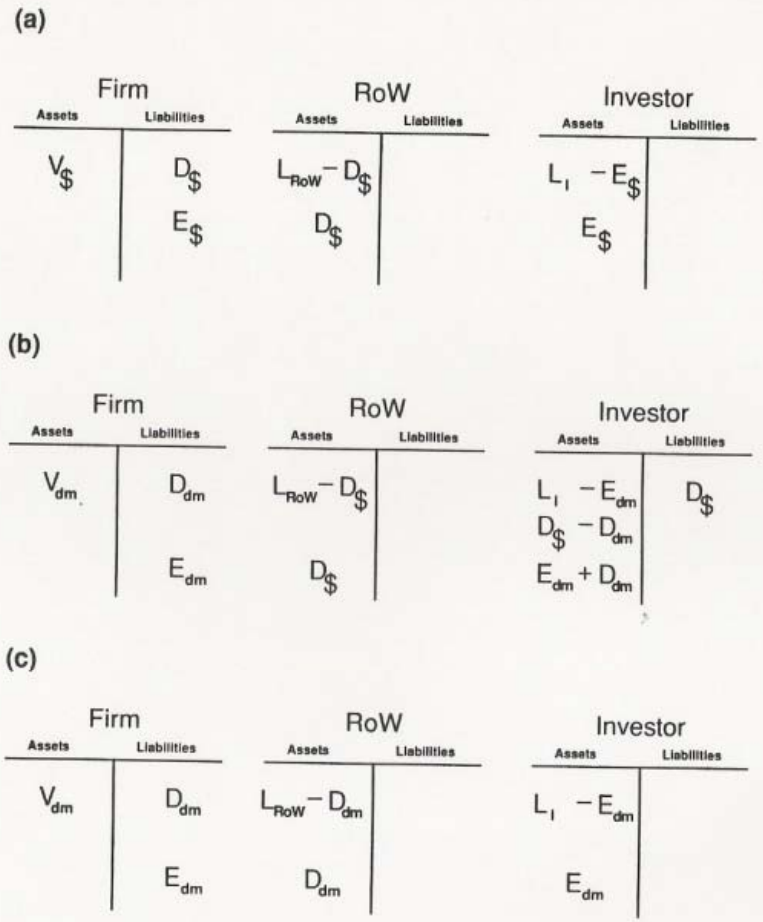


Fig. 8.1 Balance sheet implications of foreign-currency financing

given level of profits, an unanticipated appreciation of the mark relative to the dollar creates a windfall transfer to bondholders from shareholders. How does this particular capital structure affect the market value of the firm's securities and the equilibrium exchange rate?

To answer this, we assume that investors will pay the same amount of money for any two portfolios which provide exactly the same cash flow. If the investor purchases the equity only, he pays $E_{\text{dm}} = V_{\text{dm}} - D_{\text{dm}}$. This would entitle him to the firm's profits as before, but from those profits the payments on the DM-debt will be subtracted. To duplicate the payoffs from $E_\$$, the investor must also lend the equivalent of D_{dm} dollars in DM, while borrowing $D_\$$

dollars. For this portfolio he must pay $E_{dm} + D_{dm} - D_{\$} = V_{dm} - D_{\$}$. Since this portfolio yields the firm's profits less the dollar-bond payments, it has the same payoff as the dollar-financed equity above. Therefore it must also have the same cost: $V_{dm} - D_{\$} = E_{\$} = V_{\$} - D_{\$}$. But this implies that the total market value of the firm's securities must be the same under both types of financing, $V_{dm} = V_{\$}$.[3]

Figure 8.1b shows the balances from these transactions. Notice first that rest-of-the-world (RoW) expenditures and receipts are the same in both figures. In figure 8.1a, RoW lends $D_{\$}$ to the firm, whereas in figure 8.1b it lends $D_{\$}$ to the investor. In 8.1b the investor in turn borrows dollars from RoW and lends marks directly to the firm. The investor thereby duplicates the future cash flows and current expenditures he had in figure 8.1a. Since investors and RoW have the same expenditures and receipts as before, it follows that the firm must receive the same amount of cash from the sale of its securities: $V_{dm} = V_{\$}$. By lending marks and borrowing dollars, the investor has undone the firm's change in financing. MM's proposition 1, that investors will not pay a firm to do anything that they themselves can do, holds across different currency denominations of debt financing.

Another way of interpreting this result is to notice that the marketable assets of the firm are all in zero net supply. The firm is short debt and equity to the extent that the rest of the private sector is long. Only the firm's real investment projects, which generate the cash flow, are in positive net supply. Regardless of how this cash flow is partitioned, the sum of the value of the parts is equal to the value of the whole.

The figures suggest more than the indifference of firm managers to alternative capital structures. MM also implies that the capital market equilibrium is completely unaffected by alternative means of finance. We can see by comparing figures 8.1a and 8.1b that all real economic variables must remain the same. This follows because all three agents in the figures have the same current and future resources available to them in all states of nature. Thus exchange rate expectations, volatility, risk premiums, forward rates, and borrowing and lending rates are unaffected. As long as the financial markets are perfect, firm financing remains a veil, and has no implications for real economic variables.

In the discussion so far we have implicitly assumed that the investor prefers to purchase $E_{\$}$ over E_{dm}. In other words, he thinks that the added exchange rate exposure of $E_{\$}$ is worth paying for. There are two reasons why investors may not be willing to pay much for this exposure, why they may be approximately indifferent between $E_{\$}$ and E_{dm}.

First, if exchange rate risk is purely diversifiable then investors are not willing to pay to avoid it. There is, of course, a large empirical literature testing the diversifiability of exchange rate risk. While several studies have found that a number of variables, such as forward rates and past exchange rate changes, appear to have predictive power for exchange rate changes in excess of the

forward discount, there is little positive evidence that this predictive power is attributable to an exchange risk premium.[4] Second, investors may be indifferent between $E_{\$}$ and E_{dm} even if exchange risk is not diversifiable as long as they already hold optimal amounts of currency risk. Investors might, for example, hold the stocks of foreign firms or hold foreign currency deposits directly. Once they have reached their optimal level of exchange rate exposure, investors' marginal utility of small changes in exposure is zero. Figure 8.1c shows the expenditures and receipts for all three agents when the firm issues DM-denominated debt which is then purchased by RoW. If both our investor and RoW already hold optimal levels of exchange rate exposure, then the value of the firm's securities will be the same in figure 8.1c as in 8.1a ($V_{\$} = V_{dm}$). MM would therefore hold even if the debt swap depicted in figure 8.1b were ruled out.

Notice that investors could be satisfied with their exposure to exchange rates regardless of the size of the exchange risk premium. If risk premiums are large, then the first firms to provide diversification to investors would have been able to extract a substantially higher price for their securities, much like the innovative monopolist who is first to sell a new product. But as other firms move to fill the gap, the excess returns to financial innovation disappear. A firm which can diversify cheaply—due, for example, to low transactions costs—can gain by providing an unsatisfied clientele of shareholders with additional diversification. MM will fail, but this activity will make investors better diversified and world capital markets more integrated.

Before we go on to discuss the empirical shortcomings of MM, it is worth seeing more formally why asset valuations do not change as long as all clienteles are satisfied. Suppose that asset markets are efficient and investors are optimally diversified. Let the investor's utility be a function of his next-period consumption, $U = U(c)$. Suppose the investor, who holds N assets with real returns given by $r_1 \ldots r_N$, sells an amount of the ith asset equal to a share $d\omega_i$ of his total wealth, and uses the proceeds to purchase a share $d\omega_j$ of the jth asset, where $d\omega_i = -d\omega_j$. (To continue with the previous example, we might think of the investor selling a small amount of E_{dm} and using the proceeds to purchase $E_{\$}$ of an identical firm's stock.) Let investor consumption be current wealth times the gross return on the portfolio, $c = W\omega'\mathbf{r}$, where W is total wealth, ω is the $N \times 1$ vector of asset shares, and $\mathbf{r}$ is the $N \times 1$ vector of gross returns. The requirement that the investor has set his portfolio optimally implies

$$E[U'(r_i - r_j)] = 0. \tag{1}$$

At the optimum, the expected marginal gain from a self-financing swap of one asset for another is zero.

It is easy to see that the capital market equilibrium remains efficient and that the consumption CAPM holds. As a result, the swap will not change asset

prices. Suppose that r_j is the return on a portfolio of assets which is independent of consumption and the returns are normally distributed. Then equation (1) can be rewritten as:[5]

$$E(r_i) - E(r_j) = \frac{E(U'')}{E(U')}\operatorname{cov}(r_i,c). \tag{2}$$

Because equation (2) holds for any asset or portfolio, it must also hold for the world market portfolio, ω_m, the shares of each asset in the world portfolio:

$$E(r_{m,i}) - E(r_j) = \frac{E(U'')}{E(U')}\operatorname{cov}(r_{m,i},c), \tag{3}$$

where $r_{m,i}$ is the return on the world market portfolio, deflated by the ith investor's consumption price index. Combining equations (2) and (3) yields the standard consumption CAPM for the investor:

$$E(r_i) - E(r_j) = \beta_i[E(r_{m,i}) - E(r_j)], \tag{4}$$

where

$$\beta_i = \frac{\operatorname{cov}(r_i,c)}{\operatorname{cov}(r_{m,i},c)}.$$

A similar equation would hold for RoW:

$$E(r_{i,\mathrm{RoW}}) - E(r_{j,\mathrm{RoW}}) = \beta_{i,\mathrm{RoW}}[E(r_{m,\mathrm{RoW}}) - E(r_{j,\mathrm{RoW}})], \tag{5}$$

where

$$\beta_{i,\mathrm{RoW}} = \frac{\operatorname{cov}(r_{i,\mathrm{RoW}},c_{\mathrm{RoW}})}{\operatorname{cov}(r_{m,\mathrm{RoW}},c_{\mathrm{RoW}})}.$$

All securities continue to be priced by the same rule as they were before the swap. If the investor and RoW were initially not at an optimum, equations (4) and (5) would contain additional terms reflecting the swap of assets i and j (i.e., $[dU/d\omega_i]d\omega_i + [dU/d\omega_j]d\omega_j$), and then there would be a first-order effect on equilibrium prices. But as long as equation (1) holds for all investors, real required returns and the world capital market equilibrium are unaffected by the swap.

We have obviously made several strong assumptions to get these results, and we focus on these below. First, we assumed that international capital markets are integrated. By this we mean that all investors are informed of and have access to assets traded anywhere in the world. Second, we assumed that transactions costs are zero and that there are no taxes. And finally, we assumed that the multinational's choice of financing does not affect the value of its investment project, an assumption which we also relax below.

In spite of these unrealistic assumptions, the results above are very general. International asset pricing models are much more complicated than standard asset pricing models. They explicitly allow individuals in different countries to have different consumption baskets, and in any case, to use different numeraires to appraise real returns. Under these circumstances, the usual touchstone portfolios, such as the minimum-variance portfolio and the mean-variance efficient portfolio, are no longer very useful for describing the world capital market equilibrium, since different investors will define them differently. The usual separation theorems will fail. Yet, in spite of this kind of heterogeneity across investors, the above example and model continue to hold. Small changes in the financial structure do not alter the allocation of resources, and therefore, the world capital market equilibrium, no matter how complicated, remains unaffected.

8.1.1 Financial Innovation

Few economists would argue that the international capital market is perfect. Certainly, markets were far from perfect before the last decade's dramatic changes in the financial tools available to large firms. In this section we look briefly at how financial innovations affect firms' costs and choices of financing.[6] Our interest in these innovations is to see whether they have eliminated important market segmentation (by cutting transactions costs and reducing regulations and capital controls) and to identify new instruments corporations use to hedge risks and finance investments.

Twenty years ago corporations borrowed predominantly from banks, usually in domestic currency. Transactions costs were higher than they are today. International bond and currency markets were essentially undeveloped. The domestic capital markets of the largest developed countries (the U.S., Germany, France, Japan, and the U.K.) were largely separated from each other by a variety of capital controls.

The growth of the international currency market is a useful benchmark for the speed of financial innovation. Transactions costs have fallen to the point where on an average day the difference between the bid and ask rates in New York on the DM is about 0.05 percent! In 1973, the average bid/ask spread for the DM was slightly more than twice as large, 0.11 percent. Over $250 billion changes hands in currency markets around the world each day, roughly an order of magnitude greater than a decade ago. Indeed, some observers express concern that there may now be "too" much trade. Goodhart (1987) has found that only about 10 percent of daily trades in the foreign exchange market are between a bank and its customers, the remaining 90 percent are trades between banks.

A number of restrictions in the 1950s and 1960s on capital flows affecting multinationals stimulated the growth of the Eurobond market. Imposed in 1963, the U.S. interest equalization tax made it difficult for foreign affiliates of U.S. corporations and other foreign borrowers to issue debt in the U.S.

market. After having issued $14 billion of debt on U.S. markets at low rates from 1946–63, foreigners suddenly faced a cost-of-capital disadvantage in the U.S. market of 1 percentage point. In 1967 this was raised to 1.5 percentage points, and new restrictions on U.S. capital outflows were added.[7] The Eurobond market sprung up in London and Luxembourg as a response to these regulations. In addition to providing a means for avoiding the interest equalization tax, these bonds were more attractive to lenders than comparable U.S. domestic bonds because they did not have to be registered. Lenders therefore found it easy to avoid all taxes on their Eurobond earnings.

Volume grew quickly. Table 8.1 shows the growth of the international bond market, which includes both Eurobonds (bonds issued in a currency different from that of the jurisdiction of issue) and foreign bonds (bonds issued by a foreign source in the currency of the jurisdiction). Growth has been spectacular in every year except that following the oil shock in 1973, when the U.S. interest equalization tax was removed in an effort to assist in recycling petrodollars. This expansion of the international debt market is truly international, in that it is not limited to dollar-denominated borrowing. Table 8.1 also shows that while the denomination of most securities is still the dollar, the *share* of international borrowing in DM, yen, and the pound has grown as well. The DM and yen together have gone from 3 percent of international borrowing in 1981 to about 27 percent today.

Throughout the late 1970s, U.S. corporate borrowers had to be enticed to issue their debt on the international market instead of on the domestic market.

Table 8.1 **New Issues in the International Bond Market (as a percentage of U.S. domestic bond issues)**

	International Bond Issues			Currency of Eurobond Issues			
Year	Total	Foreign	International	U.S. Dollar	DM	Yen	Pound
1976	120.13	43.12	77.00	21.32	6.59	—	—
1977	110.49	34.31	76.18	27.11	12.04	—	0.52
1978	266.27	98.69	167.58	33.47	31.90	—	1.42
1979	239.16	84.25	154.90	39.86	18.74	—	1.10
1980	133.93	40.09	93.84	32.25	7.17	—	0.76
1981	194.53	55.95	138.58	55.56	3.61	—	1.41
1982	233.46	59.04	174.42	104.98	6.98	—	1.13
1983	210.37	56.18	154.19	108.59	7.19	—	3.63
1984	608.59	125.85	482.74	293.51	19.33	5.39	17.98
1985	544.96	84.98	459.98	265.35	26.32	18.09	16.72
1986	144.77	24.43	120.34	73.22	10.60	11.47	6.57
1987	101.47	21.06	80.41	32.45	8.87	13.22	8.58

Source: World Financial Markets, various issues; Economic Report of the President, 1988, table B-93; and *Financial Market Trends*, various issues. Data for 1987 are annualized from October for the foreign and international bond figures.

Perhaps as a consequence, the interest differential between Eurodollar and domestic dollar bonds was negative. As the market grew and borrowers became more familiar with the Eurobond market, the interest differential narrowed steadily toward zero. Kidwell, Marr, and Thompson (1985) study these interest differentials, finding them to be in the range of 70–140 basis points over the 1977–81 period and 30–60 basis points in 1983, the end of their sample.[8] Figure 8.2 shows the differential between dollar-denominated corporate bonds in the U.S. domestic and Eurobond markets. In 1984, the U.S. government lifted the 30 percent interest-withholding tax on the earnings of foreign investors. This granted U.S. domestic bonds the same U.S. tax status as Eurobonds, and may help explain the fall in the interest differential in 1985 and 1986.

Naturally, the fall in this interest differential could be a result of changes in required returns rather than improved financial integration. Evidence that these differentials are due to segmentation comes from a study by Kim and Stulz (1988). They argue that Eurobonds are imperfect substitutes for domestic bonds from the lenders' point of view. When Eurobonds first became popular, purchasers wanted to hold more than were initially available, and therefore bid up prices. Firms responded slowly to this unexpectedly strong demand. Because firms were able to raise capital relatively cheaply in this way, their stock prices increased when a Eurobond issue was announced. From 1979 to 1984 the savvy corporate CFO was able to raise the value of his or her firm by selling to an unsatisfied clientele of Eurobond purchasers. On this view,

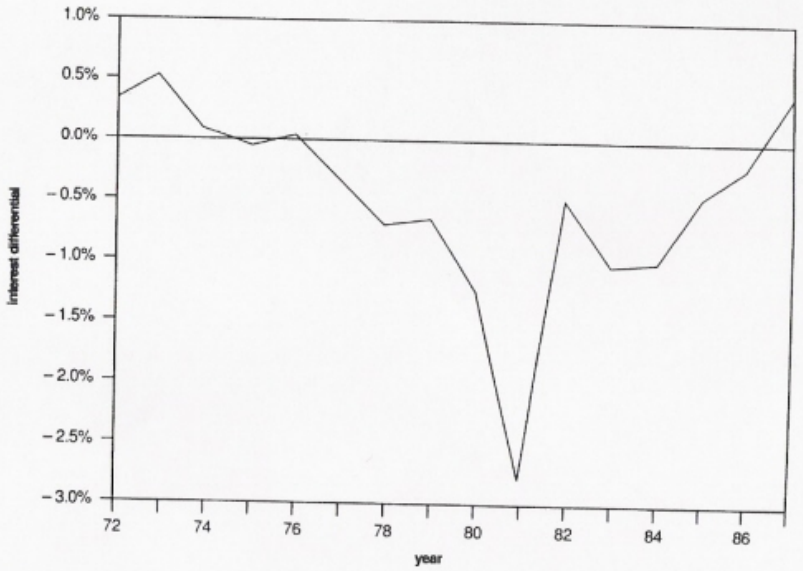


Fig. 8.2 **Interest rate differentials: Eurobonds less domestic corporate bonds**

MM failed, but only temporarily. As lenders became satisfied with the share of their portfolios devoted to Eurobonds, the differential fell. Today, CFOs cannot raise the value of their firm by issuing Eurobonds rather than domestic bonds; the clientele effects have disappeared.

Perhaps the strongest evidence that the Eurobond market was initially segmented comes from arbitrage activities that firms have been able to engineer. In the early 1980s, Exxon bought $175 million of 30-year zero coupon U.S. Treasury bonds, and sold an offsetting amount of Eurobonds for $200 million, earning an essentially riskless profit of $25 million. In early 1984, several other multinationals issued foreign DM bonds and used the proceeds to purchase German government securities called *Schuldschein*. PepsiCo, for example borrowed 250 million DM for ten years at 7.7 percent and then purchased 235 million DM in ten-year *Schuldschein* yielding 8.35 percent. The *Schuldschein* were placed in an irrevocable trust to cover interest payments and principal on the new PepsiCo debt. The deal, called a "morning-to-midnight defeasance," locked in a riskless profit worth approximately $2 million. The company was not even required to record the bonds on its balance sheet. Soon after these deals were consummated, the interest differentials that made the arbitrage possible disappeared.[9]

To some extent, growth in international securitized borrowing has crowded out other sources of borrowing. As a result of "securitization," traditional bank borrowing has fallen dramatically over the past decade. Even though many U.S. corporations view the Eurobond market as a financing substitute for the U.S. domestic market, domestic debt issuance has also grown at a rapid rate. Indeed, recent growth has been large relative to the growth of both GNP and equity financing, as shown in table 8.2.

Along with securitization and the fall in transactions costs has come an expanded set of debt instruments. While traditional fixed-rate debt still dominates, floating rate bonds and convertible bonds now account for almost 35 percent of total international issues. The growth of these instruments is shown in table 8.3. In addition, financial futures and options have grown quickly. While these instruments are redundant in that their payoffs can in theory be duplicated by trading other instruments, they have drastically reduced the costs of executing many trading strategies.

Perhaps the most important and newest instruments available to multinationals are currency and interest rate swaps. These have changed the international capital market in two respects. First, they allow the hedging of interest rate and exchange rate risk at horizons far longer than were previously possible on forward markets. Swaps therefore contribute to more efficient risk sharing. Second, swaps help reduce market segmentation. Swaps exploit the comparative advantage of one firm's ability to borrow more cheaply in one market compared with another firm, relative to both firm's borrowing costs in a second market. To the extent that these borrowing differentials are due to local market

Table 8.2 Equity and Debt as a Fraction of GNP

Year	Common Stock Issued	Bonds and Notes Issued
1970	0.69	2.86
1971	0.86	2.73
1972	0.88	2.11
1973	0.56	1.52
1974	0.27	2.14
1975	0.46	2.68
1976	0.47	2.37
1977	0.40	2.12
1978	0.34	0.91
1979	0.35	1.06
1980	0.71	1.63
1981	0.84	1.25
1982	0.75	1.41
1983	1.33	1.45
1984	1.77	0.59
1985	2.23	0.91
1986	1.31	3.81
1987	1.39	3.89

Source: Economic Report of the President, 1988, tables B-93 and B-1.

Table 8.3 New Issues on the International Bond Market (in billions of dollars)

Instruments	1982	1983	1984	1985	1986	1987
Fixed Rate	57.6	57.6	58.4	94.8	141.5	123.8
Floating Rate and CDs	15.3	13.8	38.2	58.7	51.2	10.7
Convertible	2.6	5.7	10.9	11.3	26.9	39.3
Other	—	—	—	5.4	6.2	3.5
Total	75.5	77.1	107.5	170.2	225.8	177.3

Source: Financial Market Trends, various issues.

differences in information or perception, swaps help reduce segmentation in the international capital market.

There is little data on swap volumes because swaps are an agreement between two parties and lack a clearinghouse mechanism and because current accounting standards treat swaps as off-balance-sheet transactions. Outstanding currency swaps grew from zero in 1982 to about $100 billion at the end of 1986. The outstanding volume of interest rate swaps is about three times larger.

8.1.2 Financial Innovations and Volatility

Many observers see financial innovations as reducing transactions costs, completing markets, improving international risk sharing, and pushing authorities toward financial liberalization.[10] Under this view, recent innovations are closing

the gap between the real world and the idealized and frictionless capital market described in the examples above. The received wisdom is that innovations lubricate the market mechanism: they are all for the better.

Some observers, however, question whether this traditional response is correct. They ask whether easy access to trading has increased the volatility of exchange rates without adding to their information content. We now turn to these arguments, highlighting the particular ways that corporations have taken advantage of the revolution in international finance.

The long-held Keynesian view that asset prices do not move solely in response to changes in fundamentals has received new attention over the last decade. A number of studies have asked whether asset prices move too much to be consistent with simple fundamentals models.[11] Economists have also begun to study the effect on asset prices of "noise traders:" investors who trade simply for the sake of trading, or who trade on what they (irrationally) believe to be valid information.[12]

Some of this work addresses the popular concern that increased trading has helped promote greater volatility in financial markets. French and Roll (1986), for example, have found that the variance of stock market prices is substantially higher when the market is open rather than when it is closed. This is true even for those days on which the market is closed but normal or larger than normal amounts of information are released (e.g., election days).

Looking at exchange rate data, one is immediately skeptical of any long-term relationship between trading volume and volatility. Indeed, there is little evidence that exchange rate volatility is markedly higher today than over the past fifteen years. Table 8.4 presents simple calculations of the annual volatility of the dollar against the pound, DM, and yen over the floating rate period. There is little evidence of any upward trend in volatility to match the growth in trading volume.

Perhaps, however, there is a great deal of high-frequency correlation between trading and volatility which gets lost when looking at longer-period averages. Because it is so difficult to measure trading in foreign-exchange markets, there have been no studies of the relationship between volume of trade and exchange rate volatility. This gap can be filled, however, by examining trading in exchange rate futures, for which records of trading volume and transactions prices are available. By using transactions prices and trading volumes, we can gain a better sense for whether there is any basis to the allegations that trading volume itself generates exchange rate volatility.

For a closer look at this question, we obtained transactions data on both price changes and the number of contracts traded over fifteen-minute intervals in five foreign-exchange futures contracts (the pound, Canadian dollar, Swiss franc, deutsche mark, and yen) each trading day during the period 1984–1987. These are the highest-frequency exchange rate time series that I have seen used. Table 8.5 presents summary statistics from these data. The lower part of the table shows the average number of futures contracts traded every fifteen minutes. As

Table 8.4 Volatility of the Dollar Against Selected Currencies (in percent per annum)

	Currency		
Year	Pound	DM	Yen
1973	7.57	13.26	10.47
1974	7.20	8.07	7.05
1975	7.98	10.53	2.21
1976	8.37	4.75	5.27
1977	8.92	7.36	9.96
1978	11.70	13.11	17.38
1979	11.68	14.27	13.17
1980	11.35	9.01	10.99
1981	9.67	10.30	15.19
1982	10.07	7.30	13.00
1983	8.61	11.63	7.61
1984	16.62	12.26	5.78
1985	12.21	15.93	12.29
1986	9.03	8.30	10.55
1987	8.60	8.07	9.38
1988	14.73	13.55	15.66

Note: Volatility measures the standard deviation of monthly data, multiplied by 12 and expressed as a percentage.

Table 8.5 Volatility and the Volume of Trade in Exchange Rate Futures

	1984	1985	1986	1987	Average % Increase 1984–87
Volatility ($\times 10^{-8}$)					
Pound	194	525	244	166	−3.9
Canadian dollar	22	46	43	35	11.6
Swiss franc	184	393	328	252	7.9
Deutsche mark	232	337	299	200	−3.7
Yen	106	170	243	201	16.0
Volume of Trade					
Pound	10.1	17.9	14.5	12.2	4.7
Canadian dollar	4.5	5.6	7.1	7.0	11.0
Swiss franc	26.4	29.7	11.9	32.1	4.9
Deutsche mark	27.7	36.6	41.9	43.0	11.0
Yen	14.4	15.3	27.1	34.2	21.6

Note: Futures' prices are from the Chicago Monetary Exchange. The data are sampled every fifteen minutes, beginning at 7:30 am until 12:30 pm each trading day. Annual estimates are averages over all trading days. Volatility is the average variance of daily futures' price changes, computed over the fifteen-minute intervals. Volume is the average number of futures contracts traded every fifteen minutes.

one might expect, trading volume grew steadily over the sample period. For some currencies, growth was very rapid: volume of trade in yen grew the fastest of any currency, at an average annual rate of 22 percent.

In the upper part of the table, we record the average variance of the futures prices over each year. Here the results are more mixed than in the lower part of the table. The variance grew most rapidly again for the yen, rising at an average annual rate of 16 percent. But in two of the five currencies, including the DM, the variability of futures prices actually declined. The simple correlation between variability and volume of trade across these currencies (allowing each currency to have its own mean) is positive, but not statistically greater than zero. There is thus only slight evidence that high-frequency volatility has increased with the volume of trade.

There are, however, several problems to bear in mind when interpreting the numbers in these last two tables. First, a positive relationship between volatility and volume of trade need not imply that trading itself *causes* greater volatility. We cannot give a causal interpretation to positive correlations because we expect that information about fundamentals could increase both trading and volatility. The usual presumption behind information-based correlations is that an improvement in the information content of prices allows more efficient risk sharing, regardless of its effect on volatility. But new investors with new information may also bring new noise to prices, so that increases in trading, volatility, and the flow of information may still be associated with a reduction in welfare.[13] Second, our measure of volume is the number of contracts traded, and not the dollar value of those contracts. Depending on one's model of how trading and volatility interact, one may wish to measure the dollar volume of trade instead. Third, futures contracts are derivative, in that sense that futures prices are constrained by the behavior of the actual spot exchange rate and interest differentials. Even if trading does itself generate volatility, we might not see any such relationship in table 8.5. If the futures rate fluctuates for reasons other than futures trading (perhaps because of trading in the spot market that is uncorrelated with trading in futures) then we would expect variance to increase only on average with an increase in futures trading.

One way to get around this latter problem is to regress the squared price change for each fifteen-minute interval on the volume of trade over that interval. In doing this, we interpret the squared price change as a noisy estimate of the variance. This assumption would be problematic for standard time series samples, where the data are sampled less finely. Changing expected returns could easily account for a large portion of the variation in such series. But in finely sampled data, the stochastic component should dominate expected price changes.[14] Thus high-frequency squared price changes are very nearly unbiased estimates of the next interval's conditional variance. The high frequency of our time series is advantageous for another reason: for each currency we have at least 22,377 degrees of freedom!

The results of regressions of the log of the squared price change on the log of volume are presented in table 8.6. In contrast to the secular averages in the previous table, here the estimates indicate that volatility and volume of trade are positively related. All the coefficients are many standard errors from zero. There is some evidence, however, that the relationship between volatility and volume of trade is not stable. When we run the samples by year, as in table 8.7, we find that for several currencies in 1984 and 1985 the coefficient is negative, although it is not statistically different from zero. For all currencies in 1986 and 1987, the relationship is strongly positive.

Finally, we look at the average number of transactions and the average volatility by time of day. Figure 8.3 shows the graphs of these series. Both volatility and volume are high at the beginning of the day, then show a steady downward trend until they reach a low point at lunch time. After lunch, traders come back for an hour or so of vigorous trading, which reaches a peak at the close of the futures market. Volatility behaves similarly. It would seem hard to explain this pattern in daily volatility by arguing that the flow of information into the markets falls at lunch time or rises strongly during the last hour of trading. On the other hand, if much of the information reflected in prices must first be processed slowly by investors, then one might expect to see a decline in volatility during lunch and a rise thereafter. Of course, these daily patterns are also consistent with the noise-trading hypothesis, which would say that there should not be much volatility when traders are busy eating.

Overall, the positive relationship between volatility and the volume of trade is stronger for very high frequency fluctuations than for the lower-frequency secular averages reported in tables 8.4 and 8.5. Why should trading itself generate additional short-term volatility? We mentioned earlier that trading could be greater when more information is reaching the market. A second explanation would be that traders have short-run "bandwagon expectations," in which a current price increase by itself generates expectations of further price increases. Trading on the basis of bandwagon expectations, which was the concern of Nurkse (1944), would today qualify as noise trading. If financial

Table 8.6 Regressions of Volatility on Volume of Trade

Currency	Years	a	b	t-test ($b=0$)	DF	DW	R^2	F-value
Pound	1984–87	131	11.01	8.00	24,235	2.01	0.00	64
Canadian dollar	1984–87	−4	6.73	27.86	23,326	1.95	0.03	776
Swiss franc	1984–87	135	4.16	5.91	24,111	1.99	0.00	34
Deutsche mark	1984–87	208	2.33	3.22	24,260	1.98	0.00	11
Yen	1984–87	13	7.32	13.04	24,284	2.01	0.01	170

Note. Futures' prices are from the Chicago Monetary Exchange. The data are sampled every fifteen minutes, beginning at 7:30 am until 12:30 pm each trading day. Volatility is the average variance of daily futures' price changes, computed over the fifteen-minute intervals. Volume is the average number of futures contracts traded every fifteen minutes.

Table 8.7 **Regressions of Volatility on Volume of Trade**

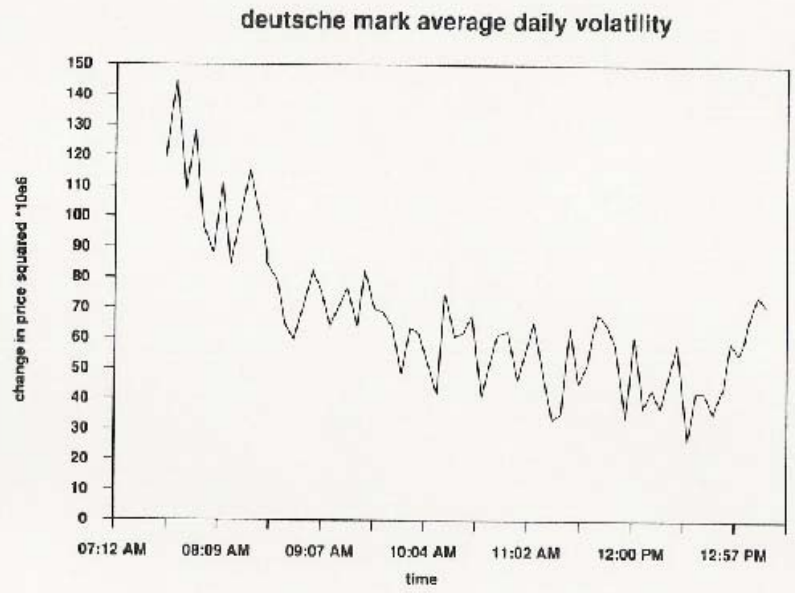
Currency	Years	a	b	t-test ($b=0$)	DF	DW	R^2	F-value
Pound	1984	174	2.0	1.29	6,069	1.99	0.00	1.7
	1985	619	−5.2	−1.27	6,045	1.98	0.00	1.6
	1986	−71	21.7	13.80	6,045	2.05	0.03	190
	1987	−90	21.0	15.66	6,070	2.03	0.04	245
Canadian dollar	1984	9	2.9	9.89	6,044	1.95	0.02	98
	1985	21	4.4	6.70	6,070	1.90	0.01	45
	1986	−14	8.2	17.03	5,822	1.99	0.05	290
	1987	−27	8.8	20.23	5,384	1.94	0.07	409
Swiss franc	1984	195	−0.4	−0.46	5,895	1.99	0.00	0.2
	1985	581	−5.1	−2.16	6,070	1.96	0.00	4.7
	1986	−93	10.1	9.45	6,070	2.03	0.01	89
	1987	−95	8.1	10.31	6,070	2.01	0.02	106
Deutsche mark	1984	298	−2.5	−2.03	6,069	1.95	0.00	4.1
	1985	485	−5.0	−1.96	6,070	1.98	0.00	3.9
	1986	209	7.6	5.30	6,070	1.98	0.00	28
	1987	−114	9.8	12.94	6,045	1.94	0.03	167
Yen	1984	53	3.6	3.81	6,069	1.96	0.00	14.52
	1985	168	0.2	0.07	6,070	1.99	0.00	0.0
	1986	−144	14.3	11.49	6,070	2.04	0.02	132
	1987	−69	7.9	10.32	6,069	2.01	0.02	106.6

Note: Futures' prices are from the Chicago Monetary Exchange. The data are sampled every fifteen minutes, beginning at 7:30 am until 12:30 pm each trading day. Volatility is the average variance of daily futures' price changes, computed over the fifteen-minute intervals. Volume is the average number of futures contracts traded every fifteen minutes.

market innovations, such as lower transaction costs, increase the frequency of such trades, then bandwagon expectations may destabilize prices.

While Nurkse's concern has long been familiar, it is only recently that have we become better able to test it. The problem has been finding a valid measure of the (unobservable) expected future spot rate. The usual presumption is that exchange rate expectations can be extracted from ex post spot rate realizations, but this strategy may not work in testing for bandwagon expectations. After all, these expectations may not be rational, or they may be rational but disguised by peso problems or nonstationarity in the ex post spot rate. The other traditional measure of expected future rates, the forward rate, is contaminated by the exchange risk premium. A third alternative, survey data on exchange rate expectations, are not subject to these problems, and in any case provide new information about the behavior of the market's unobservable expectations.

On the issue of bandwagon expectations, the surveys give a very strong answer. Over short horizons of one week and one month, there are statistically significant bandwagon tendencies: investors tend to predict that current exchange rate changes will be extrapolated, and that current movements away



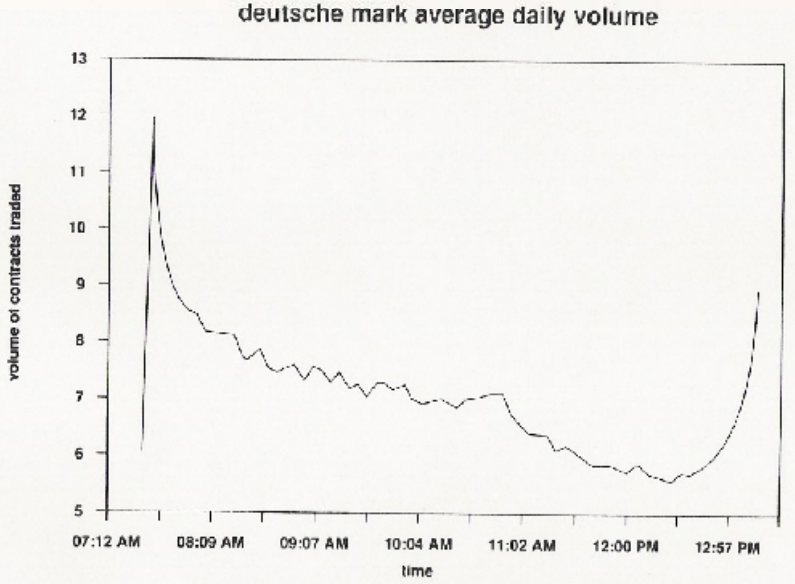


Fig. 8.3 Deutsche mark futures' volatility and trading volume, 1984–1987

from plausible long-run equilibrium values will continue.[15] Froot and Ito (1989), for example, show that a 10 percent exchange rate appreciation over the past week leads investors to expect on average a 1.5 percent further appreciation over the following week. Interestingly, however, the bandwagon effect is reversed for longer-term forecasts. At horizons of twelve months, for example, a current appreciation of 10 percent generates expectations of a 3.2 percent subsequent *depreciation*.

The contrasting behavior of expectations at different forecast horizons is difficult to square with the predictions of any single model. Froot and Ito (1989) test to see whether short-run and long-run expectations are consistent with a single, autoregressive model. They reject this hypothesis. In addition, they find that a current, positive exchange rate shock leads agents to expect a higher long-run future spot rate when iterating forward their short-term expectations than when thinking directly about the long run. In this sense short-horizon expectations may overreact to current exchange rate changes.

One way of interpreting these results is to think of agents using different models to forecast the spot rate at different horizons. Frankel and Froot (1988) discuss a case in which short-term expectations come out of "chartist" models, which are based on information only about past spot rates, whereas long-term expectations come from a "fundamentalist" model which ignores past exchange rates and uses the information in present and future fundamentals. This kind of theoretical explanation combined with the results above would suggest that short-term bandwagon expectations are destabilizing, whereas longer-term expectations are stabilizing.

8.1.3 Corporations and Exchange Rate Volatility

Within this framework, popular concerns about financial innovations leading to greater volatility seem more believable. But note that not all financial innovations and agents are subject to this line of criticism. The above results suggest that short-term volatility and trading are positively related and that short-term expectations may be destabilizing. There is no evidence that the same is true over long-term horizons. Indeed, the long-term survey data support the opposite contention, that trading at longer horizons is stabilizing.

Corporations are, however, precisely the agents responsible for the dramatic rise in longer-horizon currency trading, as evidenced by the growth of the swap and international bond markets. Banks and individual investors rarely use these primary markets, trading instead at shorter horizons on secondary markets. Spot currency traders at banks, for example, typically hold open positions only for short periods of time. Because of the paucity of other agents willing to take long positions, global corporations provide a unique, stabilizing role in currency determination. Indeed, while the international bond and swap market were in their infancy in the late 1970s, McKinnon (1979) identified a problem of "insufficient speculation." He recognized that while there were plenty of

agents willing to trade at short horizons, few at that time took long-term positions. Financial innovations that encourage longer-term trading would appear to strengthen the role of fundamentals in determining exchange rates.

Of course, this view does not imply that all innovations are for the better. Policymakers eager to restrict noise trading must be careful not to undo the benefits from speculation based on stabilizing expectations. The evidence in this section suggests that, to the extent that noise trading is a problem, it affects short-horizon trades more than long-horizon trades.

To the extent that financial innovations have allowed multinationals and large domestic corporations to trade more at longer horizons, these innovations may have a stabilizing effect on the exchange rate. Corporations appear more able than private individuals or small companies to take advantage of imperfections in international capital markets and more likely to base their decisions on longer-term fundamentals. The arguments that exchange rates are too volatile may have some validity, but there is no evidence to support the contention that financial behavior of multinationals has contributed to excessive volatility.

A number of economists advocate the imposition of "Tobin" taxes on exchange rate transactions. It is important to note that if such taxes are applied to transactions in the international bond and swap markets, they will put U.S. firms at a cost-of-capital disadvantage, making it difficult to raise money in one currency and to spend it in another. As U.S. firms already complain that the U.S. tax law and institutional structure of U.S. capital markets places them at a cost-of-capital disadvantage, such a tax might be very unpopular. And to the extent that it discourages firms from issuing or swapping long-term securities, it may *reduce* the amount of stabilizing speculation.

8.2 Multinationals' Foreign Investment Decisions

As we mentioned earlier, there is a second channel by which multinationals influence exchange rates: through their real investment decisions. In this section we briefly review these effects.

Consider for a moment a multinational based in the United Kingdom which has a new low-cost technology for casting engine blocks. The company recognizes there is a great demand for this technology in the United States and may choose to purchase facilities near U.S. auto manufacturers in order to produce the engine blocks locally. There are clearly fixed, nonrecoverable costs for the company to set up a new production site in the United States. Denote these (dollar) costs by F, which might include establishing contacts with U.S. raw materials suppliers, shipping companies, local unions, costs of hiring top management, etc. Expressed in pounds, these costs are Fe, the dollar cost multiplied by the real price of the dollar in terms of the pound. Clearly, if Fe is too high the firm would not wish to produce its product in the United

States. It might elect instead to produce the engine blocks in the United Kingdom and export them, for which the firm incurs the fixed and nonrecoverable cost X.

The firm's decision to produce in the U.S. can affect exchange rates through a flow effect of increased domestic spending. Under a Keynesian model in which productive resources are not used to full capacity, if the firm adds to production in the United States, the result is an increase in U.S. investment spending, or a positive shock to the IS curve. The increase in spending tends to raise output and interest rates and to appreciate the dollar. Notice that if the U.K. firm were to purchase control of an existing engine block facility in the United States, however, investment spending would not rise. There would be no effect on the dollar.

The first point here is that FDI spent on new investments helps stabilize the real exchange rate. If there is a sudden real depreciation of the dollar—enough to generate expectations of future real appreciation—real interest rates in the United States will be low, and foreign firms will take advantage of this by investing Fe in order to produce in the U.S. Firms already exporting to the United States may wish to take advantage of the low real interest rates by shifting some of their production into the United States. While low real interest rates are an incentive for all agents to invest in the United States, the large differences in real interest rates across countries suggest that these incentives are not immediately arbitraged away. The presence of more multinationals on the margin of investing can only help eliminate these differentials. Notice also that improvements in communications technology, air transportation, etc., may lead to reductions in the fixed costs of establishing a foreign production site. Such technical progress would tend to enhance multinationals' stabilizing effects on exchange rate fluctuations.

The second point concerns the volatility of future exchange rates. Lately, a number of authors have focused on how uncertainty about future exchange rates affects the decisions to export.[16] If our U.K. firm had chosen to export to the United States, a large depreciation of the dollar would make the firm uncompetitive enough to sustain losses and even to stop exporting. If future exchange rates are uncertain, there is always a risk that exporting from the United Kingdom will not be a profitable strategy. The riskier are future exchange rates, the more reticent is the firm to commit to spending X in order to begin exporting. Krugman (1988) points out that this effect may feed back to magnify the volatility of the exchange rate. As the exchange rate is more volatile, firms are more reluctant to begin exporting. But as firms are more reluctant to export, the exchange rate must move by more to change the trade balance by a given amount. Thus, under uncertainty the exchange rate equilibrating function fulfilled by trade flows is reduced.

Foreign direct investment, however, is not as sensitive to uncertainty about future exchange rates. When our U.K. firm produces in the United States, it earns a profit, which from the U.K. firm's point of view is subject to exchange rate risk. If the U.K. firm produces in the United Kingdom, then its entire gross revenues, earned in the United States, are subject to exchange risk. But profits are only a tiny fraction of gross revenue. Thus the firm's production location decision will be much less affected by uncertainty in the exchange rate than is its decision to trade as long as Fe is comparable to X. When the United States becomes a low-cost place to produce, foreign firms will take the opportunity to move more of their production there, even when the exchange rate is very volatile. The lower are the costs of relocating production, F, the larger this effect is likely to be. Unlike trade flows, FDI's stabilizing influence on exchange rates is unlikely to be badly eroded by exchange rate uncertainty.

8.3 Net Capital Flows and Foreign Direct Investment

Charles Kindleberger once said that multinationals are about direct investment and not about international financial flows. Yet there are a number of reasons why the separation is artificial. So far we have followed proposition 1 of MM in that we have assumed firms' investment and financing decisions are completely separate. In practice, however, investment and financing decisions are rarely independent. Costs of capital across home and host countries, across firms, and across investment projects can and do vary. These differences can lead to important international financial flows. In this section we discuss two types of distortions which link investments and financing: segmentation of capital markets and taxes. We then turn to assess the importance of these distortions in the recent experience of the United States.

When investment and financing decisions are linked, multinationals will have a portfolio effect on exchange rates. To see this in our previous example, suppose that the United Kingdom changed its tax rules to make FDI tax preferred, and suppose that the firm's cheapest source of financial capital is cash or liquid assets that it has on hand. Foreign demand for U.S.–based production facilities would increase relative to U.S. demand for those facilities. The increase in demand for U.S. assets will appreciate the dollar provided that the price of the plants, equipment, and real estate in the United States are relatively sticky. Notice that, unlike the flow effect above, this effect does not depend on new production facilities being built. The greater demand to buy existing U.S. facilities will itself tend to appreciate the dollar. Finally, notice that the power and presence of a multinational will determine the importance of this effect.

8.3.1 Capital Market Integration, The Cost of Capital, and Investment

If capital markets are segmented, firms will have different costs of capital depending on where they are located and to whom they sell their securities. Much as in the Eurobond example above, firms which can raise money from unsatisfied clienteles will have a lower cost of capital than other firms. In countries with closed domestic capital markets, we would therefore expect to

see a positive relationship between FDI and direct investment inflows in the balance of payments.

Consider a small country which is completely closed to FDI and foreign portfolio capital. What criteria will a firm operating in that country use to determine the investment projects it should undertake? If it can issue securities only to domestic residents, then the firm's cost of capital will be determined in part by the domestic capital market. Because domestic residents are not as well diversified as foreign investors (who have access to the world capital market), domestic residents will demand a higher return than foreign investors. Global firms which have access to international capital markets will have a lower cost of capital, and therefore will undertake more investment projects.

An example may help to show this effect. Under the Capital Asset Pricing Model (CAPM) and assuming no taxes, a firm's cost of capital is equal to the riskless rate plus a term measuring the firm's systematic risk:

$$E(r) = r_f + \rho\Omega\omega, \tag{6}$$

where r_f is the riskless rate of return, ρ is the market price of risk (equivalent to the coefficient of relative risk aversion), Ω is the $N \times N$ covariance matrix of security returns, and ω is an $N \times 1$ vector of market portfolio weights.[17] The relevant set of N securities included in equation (6) will depend on which investors are purchasing the firm's securities. We assume that domestic residents hold N^d securities in their portfolios and that world residents hold a disjoint set of N^w securities.

For simplicity, we let each asset comprise an equal share of domestic and world portfolios. In order to obtain ballpark estimates of the cost of capital, we use the fact that the average return covariance of two securities from the same country is about 1 percent (per year), and the average own variance of returns is about 15 percent. Based on these numbers and equation (6), the firm's cost of capital from domestic residents is

$$E(r) = r_f + \frac{\rho}{N^d}[0.01(N^d - 1) + 0.15]. \tag{7}$$

Under the assumptions that ρ, the coefficient of relative risk aversion is 2 and that $r_f = 0.07$, equation (7) implies that the cost of capital from domestic residents is 11.8 percent for $N^d = 10$ and 10.1 percent for $N^d = 25$.

The cost of capital for world residents can be calculated in the same way. There are only two changes. First is that the average covariance between securities across countries is lower, about 0.5 percent. Second, world residents can hold better diversified portfolios. The firm's cost of capital in the world market would then be 8.3 percent if $N^w = 100$ and 8.0 percent if $N^w = \infty$. A global firm with access to the world capital market would find projects with returns between 8 and 10 percent to have positive net present value (NPV), whereas the purely domestic firm would find them to have negative NPV. Thus

access to the world capital market is likely to lower a firm's cost of capital and increase investment when capital markets are segmented.

In this way, both the globalization of firms and the liberalization of domestic financial markets will tend to raise domestic investment. As with any other positive goods market shock, the effect is to generate a real appreciation. In this case, however, the increase in investment spending is associated with a capital inflow. Countries with floating currencies will experience a rise in interest rates (for a given monetary policy) and a currency appreciation. For fixed rate countries, the mechanism is that of the "Dutch disease": an increase in domestic spending leads to higher interest rates and a balance of payments surplus, which in turn raises the domestic price level. Either way, as the barriers of a restricted domestic capital market fall, real appreciation is likely to be the result.

Of course, globalization is a slow process, reflecting the inexorable evolution of technology and the reduction in costs of moving production sites. Financial market liberalization, by contrast, can be sudden and deliberate. Thus countries that have liberalized rapidly have seen dramatic reductions in the cost of capital, and have witnessed simultaneous investment booms. In Chile, for example, investment went from 17 percent of GNP in 1979 to 24 percent two years later as the result of the liberalization of its domestic financial markets and capital account. For Chile, as for several other developing countries, the rapid change was debilitating, as the real appreciation lead to expectations of depreciation, and therefore to even higher domestic interest rates.

8.3.2 Exchange Rates, Taxation, and Investment

Financing and investment decisions inevitably become blurred in the face of corporate taxation. In this field, multinationals operate in an extremely complex environment and spend a great deal of resources in tax planning. Taxes create distortions in international financial markets by affecting both the after-tax cash flows and the after-tax costs of raising funds for one national relative to another. Because tax effects are project- and financial-instrument-specific, small changes in the tax code can lead to large changes in firms' behavior. As improvements in technology, transportation, and communications make multinationals more mobile internationally, home and host country corporate tax codes necessarily become more powerful government instruments for influencing foreign investment by domestic multinationals as well as domestic investment by foreign multinationals.[18] In this section we give a brief overview of how corporate tax codes affect multinationals' incentives for FDI.

The most obvious effect on firms' location choices comes from differing marginal tax rates across countries. By locating their headquarters in low-tax rate "havens," some firms can pay far less income tax on earnings repatriated from foreign affiliates. As one might expect, there is enormous variation across

countries in effective corporate income taxation.[19] Multinational corporations in tax havens such as Bermuda paid an average effective tax of 0.5 percent of income in 1982, while those in Panama paid an average of 19 percent. These effective tax rates compare very favorably with the average rate across all countries of about 39 percent, and the 36 percent effective rate in the United States.

The evidence that multinationals can increasingly take advantage of international tax havens is presented in table 8.8.[20] The share of income of foreign affiliates of U.S. corporations that is earned in tax havens has almost doubled between 1968 and 1982, rising to about 20 percent of total before-tax income. It is also clear from the table that multinationals across different industries differ in their ability to exploit the advantages of tax havens.

One might guess that much of this income shifting is a result of creative accounting, and that it does not primarily represent an increase in physical investment in these countries. However, gross private fixed investment did rise in most of the tax haven countries from 1968 to 1982, on average by 3.5 percent of GNP. Yet in absolute terms, this does not represent a large amount of investment.

It is likely that other tax practices have a greater impact on the choice of location for subsidiary affiliates. The most overt attempts to encourage foreign direct investment come from explicit subsidies and project-specific tax breaks. Host government financial incentive packages for investment are extremely common. For example, when Volkswagen decided to locate assembly operations in the United States, it received subsidies valued at over $50 million from local, state, and federal governments, as well as a $1.00 per hour wage concession from the U.A.W., which was worth an additional $40 million. The subsidies included municipal interest tax subsidies, foreign trade-zone tax subsidies, and CETA grants.[21] Not all subsidies to investment and project financing require negotiation, however. The province of Quebec in Canada, for example, allows a 10 percent tax credit on salaries paid to research workers. Another example is access to low-interest borrowing, which is a common subsidy to multinational investment in less-developed countries.

Table 8.8 **Fraction of Before-Tax Earnings of Foreign Affiliates of U.S. Multinationals Located in Tax Havens**

Industry	1968	1972	1980	1982
All Industries	11.0	12.8	14.0	20.2
Finance, insurance and real estate	30.4	35.5	42.5	NA
Wholesale trade	21.5	34.1	22.4	NA
Services	19.2	19.2	19.8	NA
Other industries	7.3	6.2	6.2	NA

Source: Kenadjian (1986).

Direct subsidization of investment, either explicitly or through lower marginal tax rates is an overt means of altering incentives. There are, however, more subtle and potentially more important ways that taxes can effect multinational investment decisions. For example, the United States and many other developed countries grant to foreign affiliates of home corporations a tax credit on foreign income taxes paid. To a first approximation, the foreign tax credit (FTC) may be thought of as adding to the incentives for home corporations to invest abroad. However, this is only a first approximation because the incentive to invest in any given host country is a function of both the home and host countries' corporate income tax codes. When the host and home countries define income differently, taxes paid may not result in taxes credited.[22]

These tax credits have several important effects on multinationals and governments. First, governments interested in foreign direct investment have an incentive to levy high income taxes—in order to provide foreign firms with a larger FTC—while at the same time offering offsetting non–income-based subsidies on investment. These subsidies may either lower the cost of capital for the investment project, or may directly reduce the after-tax cost of investment. Countries (such as some in Western Europe) which rely heavily on value-added taxes (VATs) effectively reduce the incentives for foreign investment, since VATs are not usually refundable through foreign tax credits.

Second, FTCs bias foreign corporations' incentives toward investment in heavily income-taxed investments. The U.S. affiliate of a foreign corporation can get no foreign tax credit on domestic investments that are sheltered from income taxes. Yet, because these investments are preferred by domestic investors, they have lower rates of return. Thus if the foreign affiliate invests in tax-preferred items, it pays an *implicit* tax. International economists will recognize this as an example of comparative advantage: because of the foregone FTC, tax-preferred investments have a *relatively* higher opportunity cost to foreign investors than to domestic investors.

One implication of the FTC is that changes in the domestic tax code which discourage domestic investment in a certain type of asset, encourage foreign investment in that same asset. For example, the U.S. Tax Reform Act (TRA) of 1986 removes several investment tax credits and highly accelerated depreciation rates. For U.S. corporations this makes many investment projects less attractive in comparison with passive investments (such as CDs). Yet the incentives for foreign multinationals to undertake those investment projects improve. Scholes and Wolfson (1988) present data which indicate that in the four quarters following the 1986 TRA, mergers and acquisitions in the United States by foreigners ran at an annual rate of $46 billion.[23] In the year prior to the tax reform act, mergers and acquisitions by foreigners came to only $12 billion. Over the same period, mergers and acquisitions of U.S. companies by U.S. residents *fell* by $33 billion, or about 16.5 percent. This would suggest

countries in effective corporate income taxation.[19] Multinational corporations in tax havens such as Bermuda paid an average effective tax of 0.5 percent of income in 1982, while those in Panama paid an average of 19 percent. These effective tax rates compare very favorably with the average rate across all countries of about 39 percent, and the 36 percent effective rate in the United States.

The evidence that multinationals can increasingly take advantage of international tax havens is presented in table 8.8.[20] The share of income of foreign affiliates of U.S. corporations that is earned in tax havens has almost doubled between 1968 and 1982, rising to about 20 percent of total before-tax income. It is also clear from the table that multinationals across different industries differ in their ability to exploit the advantages of tax havens.

One might guess that much of this income shifting is a result of creative accounting, and that it does not primarily represent an increase in physical investment in these countries. However, gross private fixed investment did rise in most of the tax haven countries from 1968 to 1982, on average by 3.5 percent of GNP. Yet in absolute terms, this does not represent a large amount of investment.

It is likely that other tax practices have a greater impact on the choice of location for subsidiary affiliates. The most overt attempts to encourage foreign direct investment come from explicit subsidies and project-specific tax breaks. Host government financial incentive packages for investment are extremely common. For example, when Volkswagen decided to locate assembly operations in the United States, it received subsidies valued at over $50 million from local, state, and federal governments, as well as a $1.00 per hour wage concession from the U.A.W., which was worth an additional $40 million. The subsidies included municipal interest tax subsidies, foreign trade-zone tax subsidies, and CETA grants.[21] Not all subsidies to investment and project financing require negotiation, however. The province of Quebec in Canada, for example, allows a 10 percent tax credit on salaries paid to research workers. Another example is access to low-interest borrowing, which is a common subsidy to multinational investment in less-developed countries.

Table 8.8 **Fraction of Before-Tax Earnings of Foreign Affiliates of U.S. Multinationals Located in Tax Havens**

Industry	1968	1972	1980	1982
All Industries	11.0	12.8	14.0	20.2
Finance, insurance and real estate	30.4	35.5	42.5	NA
Wholesale trade	21.5	34.1	22.4	NA
Services	19.2	19.2	19.8	NA
Other industries	7.3	6.2	6.2	NA

Source: Kenadjian (1986).

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that the change in taxes improved the relative profitability of takeovers to foreigners while lowering it for domestic residents. It is striking that, although the tax changes were in part intended to discourage mergers and acquisitions, overall M&A activity increased by $1 billion in the year following the reform. Whether a foreign firm should borrow from its parent or itself in the U.S. market will also be determined by relative tax preferences. If firms find assets within the firm to be a cheaper source of financing than selling securities on the open market or borrowing from banks would be, then we would expect such an increase in M&A activity to be associated with capital inflows of direct investment.

In addition to receiving a FTC on income earned abroad, U.S. multinationals may defer U.S. taxes on certain types of foreign-earned income until it is repatriated to the U.S. parent. Specifically, if majority-owned foreign affiliates of U.S. corporations reinvest their foreign earnings in active investments in host countries, where tax rates are often lower than in the United States, they need not pay U.S. income taxes, and can therefore shelter their interest earnings from U.S. taxes. This means that passive investments have high implicit tax rates for foreign affiliates of U.S. corporations. This distinction between passive and active investments, made in Subpart F of the U.S. tax code, was enacted in 1962. A number of other countries have comparable measures.

The policy of deferred domestic taxation combined with the FTC also creates an incentive for U.S. multinationals to repatriate earnings from high-tax countries and actively to reinvest earnings from low-tax countries. In these ways, the U.S. tax laws skew the incentives across foreign investment opportunities as well as the incentives for foreign versus domestic investment. The picture is further complicated, of course, once one takes into account the distortions created by foreign tax codes.

The Tax Reform Act of 1986 clearly creates major changes in incentives for investment and capital inflows by foreign affiliates of U.S. multinationals. And the 1986 TRA is already the fourth major U.S. tax reform bill in the 1980s! Add to this frequent changes in the tax laws of a multitude of countries in which multinationals operate, and it is clear that relative investment incentives in different countries move frequently due to changes in taxes. Each industrial country's tax changes may now influence the investment decisions of all other countries' multinational foreign affiliates.

8.3.3 Foreign Direct Investment Flows into the U.S.

For most international economists, it is difficult to believe that changes in taxation or in other capital market distortions can explain more than a tiny fraction of either the composition of U.S. capital inflows or the dollar's unprecedented swings in the 1980s. Other observers, however, have been more bold. The dollar's appreciation in the early 1980s is sometimes ascribed to the U.S. becoming a "safe haven" for investment and to the passage of the 1981

Economic Recovery Tax Act (ERTA) which purportedly raised the return on physical investments in the U.S.[24] Economists have tended to discount these explanations because during the dollar's appreciation there was little sign of a boom in investment spending.

This rules out much of the flow effect on exchange rates discussed above. However, if there are substantial adjustment costs or other costs to increasing the capital stock, existing assets will provide a higher return than new assets do until their prices fully adjust. Indeed, ERTA is frequently cited for having given U.S. firms an incentive to "churn" their assets, and is often credited with the subsequent boom in takeover activity by U.S. firms.[25] In addition, the 1984 repeal of interest withholding taxes on U.S. corporate bonds issued abroad and the simultaneous switch to bearer-bond status for U.S. Treasury bonds are often credited with causing further dollar appreciation. It is interesting to note that the difference between U.S. and foreign interest rates fell during this period, which corresponds with the predictions of this tax-change view of the dollar.

Data on FDI can shed light on whether capital inflows (and therefore potentially the exchange rate) were affected by major tax changes. Notice that the FDI data measure net purchases of new *and existing* assets. Thus, we might expect tax changes which affect old but not new asset values to show up in the balance of payments data even if those changes have little effect on investment in the national income accounts. The FDI data, however, do a poor job of measuring what we would like to know to gauge the ultimate effect of tax changes on the exchange rate. This would require information on the net increase in dollar exposure by foreign and U.S. multinationals.[26]

Figure 8.4 shows FDI inflows into the United States in relation to U.S. GNP. It is clear that the inflow has increased substantially in the 1980s and is particularly strong during periods of dollar depreciation. The generally higher inflows of the 1980s coincide with the widening overall capital inflow into the United States. Note that there is a discernible increase beginning in the fourth quarter of 1986, when the 1986 TRA was passed. (Recall that the TRA lowered foreign multinationals' relative effective tax rate on active U.S. investments). In addition, there is a drop in the FDI inflow in 1981 when the ERTA was passed. By the same arguments we used earlier, ERTA was likely to have *raised* foreign multinationals' relative effective tax on active U.S. investments.

The major impression created by figure 8.4, however, is that of a strong upward trend. The increase in foreign ownership of U.S. corporations has led to much public controversy. Figure 8.5 shows that much of the commotion is misplaced. The FDI inflow here is measured as a fraction of the total foreign capital inflow into the United States. The tendency toward greater FDI inflows is no longer apparent (except for the spurt around 1980, which is primarily due to a drying up of foreign private capital inflows). Indeed, it is clear that the enormous U.S. current account deficits of the mid-1980s (and possibly the

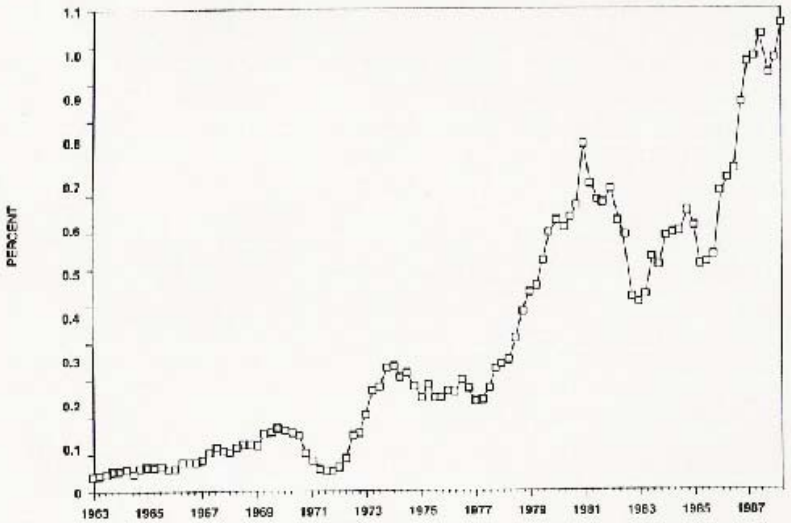

Fig. 8.4 Foreign direct investment inflows into the U.S. (as a percent of U.S. GNP)

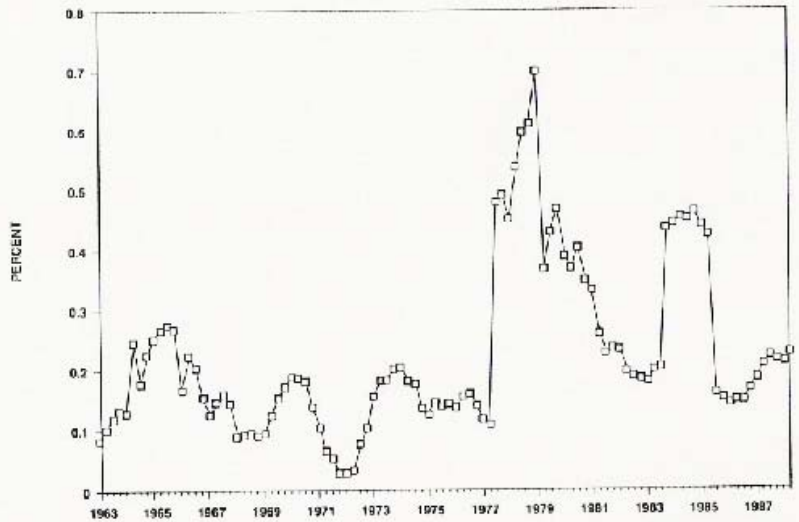

Fig. 8.5 Foreign direct investment inflows into the U.S. (as a fraction of total foreign capital inflows)

1981 tax change) are associated with a change in the composition of inflows toward portfolio investment and away from direct investment. FDI inflows have not kept pace with purchases of U.S. bonds by foreigners.

Naturally, some argue that the U.S. external deficits should have been financed entirely by borrowing instead of by the sale of U.S. corporate control. They think that the FDI inflow should not vary with total U.S. borrowing. Malcolm Forbes is on the record as saying, "It's one thing for Japanese and Germans and others to buy U.S. Government bonds to finance our huge trade imbalances . . . but it's a whole and totally impermissible other thing for them to use their vast billions of dollars to buy great chunks of America's big businesses. . . ."[27] Even though the stock of FDI in the United States has risen rapidly—going from 2 to 6 percent of GNP from 1979–87—it is still below the level of many other countries in which the United States is the major foreign investor.

Next we turn to U.S. FDI outflows. Figure 8.6 shows U.S. FDI abroad as a fraction of total U.S. private capital outflows. The steady downward trend is again a source of concern to some. But note the contrast with figure 8.7, which shows U.S. FDI abroad as a percentage of U.S. GNP. Strikingly, the FDI outflow is, by this measure, larger than twenty-five years ago. The conclusion is that U.S. direct investment abroad has suffered no secular decline. The downward trend seen in figure 8.6 is instead an indication that U.S. residents are taking advantage of foreign financial market liberalization in order to diversify their portfolio holdings.

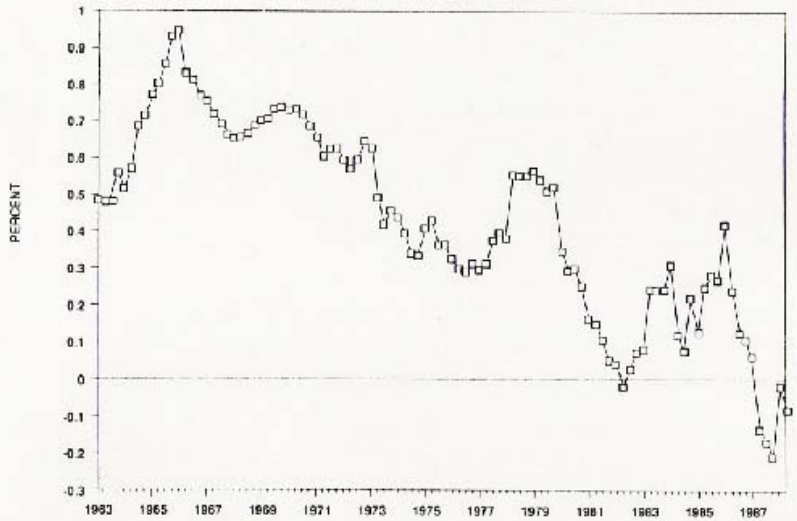

Fig. 8.6 U.S. direct investment outflows (as a fraction of total U.S. capital inflows)

Notes

1. See Lipsey (1988) for a survey of U.S. multinational trade and investment.

2. It is interesting to note that it took economists a long time to understand this apparently obvious point. Mehra (1974) was the first to prove that the MM propositions also hold for a two-country capital market with stochastic exchange rates.

3. Notice that borrowing and lending is not the only way for the investor to achieve payoffs equivalent to $E_{\$}$. He could take a long position in a DM futures contract, which would replicate borrowing $D_{\$}$ dollars and lending the equivalent dollar amount of DM.

4. See Frankel (1982), Froot (1988), Froot and Frankel (1989), and Hodrick (1987).

5. In going from equation (1) to equation (2) we use the fact that for normally distributed random variables, $\text{cov}[f(x),y] = f'(x)\text{cov}(x,y)$. See Rubinstein (1976). We would get the same result even without normality if trading takes place continuously.

6. For a complete survey of international financial innovation, see Levich (1988).

7. These restrictions included penalties on U.S. banks for new loans made to foreigners and mandatory controls on capital transfers for U.S. corporations to their foreign affiliates. The controls discouraged both foreign borrowing from U.S. sources and repatriation of U.S. profits from foreign sources.

8. Mahajan and Fraser (1986) also find the average differential to be negative. In their 1975–83 sample, however, the differential is not statistically different from zero.

9. See *Institutional Investor* (1984, 1985).

10. See Cooper (1986) for an in-depth discussion of financial market innovation.

11. See, for example, Shiller (1981), Campbell and Shiller (1986), and Froot (1988). Of course, these findings can never be conclusive because fundamentals may be moving in ways not captured by the models being tested, biasing the results toward finding "excessive" volatility.

12. See, for example, Black (1986).

13. See Stein (1987), who presents a model in which the introduction of rational speculators destabilizes prices and lowers the welfare of other agents in the model.

14. Continuous-time stochastic processes are of unbounded variation, which means that as the sampling interval shrinks to zero, the fraction of price variation due to stochastic changes converges to one.

15. See Frankel and Froot (1988) for tests of these propositions.

16. See Baldwin and Krugman (1987) and Krugman (1988).

17. Equation (6) can be rewritten in the more familiar CAPM form as follows. Multiplying equation (6) by ω', the vector of portfolio weights, gives $E(r_m) = r_f + \rho\omega'\Omega\omega$. Using this expression, equation (6) becomes

$$E[r] - r_f = \frac{\Omega\omega}{\omega'\Omega\omega}[E(r_m] - r_f] = \beta[E[r_m] - r_f],$$

where β_i is the usual covariance of the ith asset with the market divided by the variance of the market.

18. For an interesting discussion of these issues see Blumenthal (1987).

19. See the discussion in Hines (1988), from which some of the following material is drawn.

20. In this table, countries designated as tax havens are the Bahamas, the Netherlands Antilles, Bermuda, Panama, Hong Kong, Liberia, Luxembourg, and Switzerland.

21. See Baldwin (1986) for a detailed analysis of the Volkswagen case.

22. Canada, for example, permits generous depreciation allowances on fixed investment. Because the U.S. law is stricter, a portion of a Canadian affiliates' income would not be considered income in the United States, and therefore the FTC for

investments in Canada is less valuable than it would be for investments in other countries. Even leaving these factors out, the ultimate effects on foreign investment of foreign tax are sensitive to a variety of assumptions. See Hartman (1985) and Hines (1988).

23. This is the total value of publicly traded stock purchased by foreigners in mergers and acquisitions of U.S. companies. To the extent that some of this was borrowed from third parties, the amount of FDI recorded in the balance of payments is smaller.

24. Canto (1988) goes so far as to argue that changes in marginal tax rates explain the dollar's entire 1981–84 appreciation, part of its 1985–87 depreciation, and all of its mid-1988 appreciation.

25. Mergers and acquisitions by and of U.S. firms doubled between 1980 and 1981. See Gilson, Scholes, and Wolfson (1987).

26. The FDI data on inflows report increases in foreign ownership of U.S. establishments that are either owned or acquired by foreigners. An establishment is considered foreign owned if a foreign entity owns more than 10 percent. Increases in ownership are defined net of all borrowing, unless the borrowing is done through the foreign parent. Tax changes will not create capital inflows to finance foreign direct investment if the cost of capital to foreign firms is lowest in the United States.

27. Quoted in Tolchin (1988).

28. See Scholes and Wolfson (1988).

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Comment

Geoffrey Carliner

Since the end of fixed exchange rates in the early 1970s, the dollar has fluctuated dramatically in relation to other major currencies. Especially during the 1980s, the real as well as the nominal value of the dollar has varied sharply. Partly as a result, the U.S. trade deficit has become a serious problem; finance ministers from the G–7 countries have met regularly to discuss exchange rate coordination; and economists have written volumes like the present one to review past attempts at coordination and examine possible future efforts by major countries to keep their currencies in line.

One common response to critics of the floating rate system is that international capital flows are now too large for a fixed rate system to function successfully. In the 1960s virtually all countries had controls on capital flows, and defending currencies against speculative attacks was within the power of central banks. In the 1980s, according to some supporters of the floating rate system, capital markets in the industrial economies are so integrated that a fixed rate system is no longer possible.

It is clear from Ken Froot's analysis that multinationals, acting as producers of goods and services in many countries, have not played a large part in the exchange rate fluctuations of the 1980s. If anything, their foreign direct investments have tended to stabilize the long-run value of the dollar. In any event, foreign direct investment by multinationals is dwarfed by international flows of portfolio capital. If international capital flows have in fact destabilized exchange rates or made fixed rate systems unworkable, it is clearly the actions of financial institutions rather than multinationals that are responsible.

One fact cited by Froot and by Goodhart (1987) brings this point home: 90 percent of the trading in foreign-exchange markets is between banks, and only 10 percent is between banks and their customers. It is this huge flow of assets across international borders, done primarily by banks for their own account, that makes a fixed exchange rate system so hard to imagine.

Other financial institutions besides banks have also become important players in foreign-exchange markets during the past decade. Thanks to capital market liberalizations, Japanese insurance companies and pension funds have joined American mutual funds, Swiss banks, and Dutch investment trusts in the buying and selling of foreign portfolio capital. Ten years ago there were tight limits on the percentage of assets which Japanese fund managers could

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invest abroad. Today these limits are much higher. Ten years ago, U.S. mutual funds had a much smaller share of U.S. financial assets, and they invested only a tiny fraction of their portfolios abroad. Today, U.S. mutual funds have a larger share of total financial assets, and a significantly higher fraction is in foreign stocks and bonds.

It is true that multinationals can speculate in foreign-exchange markets along with financial institutions. The actions of Exxon and Pepsico in Eurobond markets, cited by Froot, are good examples. By moving their liquid assets from one country to another in response to interest differentials and expected exchange rate movements, multinationals as well as banks and other financial institutions now make the job of maintaining fixed exchange rates far more difficult. However, when they engage in these transactions, they are no different from other owners of financial assets and are not acting as multinationals, in Froot's words, as companies which manage production facilities in more than one country.

Foreign investments by multinationals may in fact respond to exchange rate fluctuations, but in a way that would dampen rather than amplify these fluctuations. In another paper with Stein (1989), Froot reports that FDI into the United States increased by $5 billion for every 10 percent fall in the value of the dollar between 1973 and 1988. The dollar's decline is thus associated with an increase in demand for dollars by multinationals who wish to buy nonfinancial U.S. assets. This increase in demand for dollars by multinationals will of course tend to offset the decline in the dollar's value. Froot and Stein suggest that this increase in FDI is the result of the greater ability of foreign firms to obtain external financing for their investments when the dollar value of their equity rises as a result of the fall in the dollar exchange rate.

When multinationals enter foreign-currency markets in their role as producers, either to invest abroad or to repatriate earnings, they are likely to be motivated by factors other than exchange rate speculation or to lean against it. Hines and Hubbard (1990) have shown that tax considerations dominate the timing of repatriation of foreign profits by U.S. multinationals. Under U.S. law, profits earned abroad are not taxed until they are repatriated. Hines and Hubbard found that U.S. multinationals waited to bring their overseas profits home until they could use foreign tax credits to minimize the taxes owed to the U.S. government. Repatriation was thus not sensitive to fluctuations in the value of the dollar but rather depended on their profits and tax liabilities at home and abroad.

As Froot points out in the present paper, the possibilities of international coordination of tax policies may be at least as great as the possibilities for international coordination of exchange rates. Without coordination, multinationals and other owners of capital can exploit international differences in tax codes to minimize their taxes. Countries that are too small to be important producers or consumers of the products of multinationals can serve as tax havens that allow these firms to avoid taxes in all countries. A failure to coordinate among countries can even lead to tax competition of the sort that has sometime plagued groups of states in the United States.

Froot's paper conclusively answers the question which he set out to answer: multinational corporations acting as producers of goods and services in more than one country do *not* tend to increase exchange rate fluctuations. If anything, they tend to dampen these fluctuations. Rather, it is the loosening of capital controls and the growth of financial institutions that has made international exchange rate coordination more difficult if not impossible. However, the growth of multinationals does raise questions about the need for international coordination of tax policies. Those issues certainly deserve some of the attention which exchange rate coordination has received during recent years.

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Comment J. S. Flemming

This wide-ranging paper touches on many related issues to which it contributes either analytical insights or novel data. It thus clarifies areas which are subject to widespread confusion, mystery, and prejudice. Its range does however diminish the structure of the argument and the coherence of its conclusions which are scattered through the text.

I have half a dozen comments, some on what Kenneth Froot has said and two on themes he might have been expected to address but did not—at least explicitly.

Among the financial developments of recent years has been an increase in securitization as the LDC debt problem reduced the credit worthiness of many banks relative to their corporate customers. This has led to disintermediation as the margin available to banks narrowed or disappeared. Notice, however, that a guarantee even from an inferior source adds to the value of any security as long as there is a chance that the guarantor will survive some events leading to default by the primary issuer.

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This is the basis of the acceptance business on which the London merchant banks were built and also plays an important role in explaining modern currency and interest rate swaps.

Froot argues correctly that exchange rate instability militates more strongly against trade than foreign direct investment, but he does not draw out the point that much of the undeterred FDI displaces the deterred trade. Moreover, FDI itself is likely to be reduced to the extent that in the absence of exchange risk a U.K. firm might have planned to meet Pacific demand from a U.S. plant.

Again, in the risk area, the comparison of open and closed economies is not straightforward. In a closed economy with limited scope for diversification, people may save more and depress the return on safe (or indeed any given risk level of) investment below that available elsewhere, contrary to Froot's implicit assumption of a uniform safe rate.

It is sometimes suggested that because multinational corporations are more sensitive to relative costs in, for example, their sourcing decisions than other firms are, they contribute to closer adherence to PPP. Though they may be assumed to have the relevant information, so may international buying agencies, and multinational corporations' plants in different countries are as subject to the costs of adjustment of switching production as any others. Moreover, to the extent that they have market power, they may be even better placed to discriminate in their pricing between different markets—as the automobile industry in particular shows.

On the more general question whether financial innovation by enhancing hedging opportunities reduces the effectiveness of interest and exchange rate policies, I think that a negative answer would be consistent with the thrust of Froot's arguments. Such instruments may eliminate the income effects of unexpected developments but do nothing to blunt their substitution effects.