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*International Financial
Integration: The Continuing Process*

by
Richard J. Herring

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International Financial Integration: ¹
The Continuing Process

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Abstract : This is the second chapter of a book, *Financial Regulation in the Global Economy*, written with Robert Litan. In this chapter we show how technological advances--dramatic reductions in transportation, telecommunications and computation costs--are creating an increasingly integrated financial market that ignores national boundaries. First we examine the effect of these technological advances on users of financial services and regulators of financial services. Then we document the increasing volume of international financial transactions and evaluate the extent to which financial prices are integrated across countries. We conclude by highlighting the risks that are the consequence of increasing international financial integration and pose a challenge to managers of financial institutions and regulators.

International Financial Integration: The Continuing Process

Richard J. Herring

Technological advances have reduced the costs of cross-border transactions in all sectors of the economy. The dramatic reductions in transportation, telecommunications and computation costs shown in figure 1 have greatly increased the ease with which firms can bridge the natural barriers of time and space that separate national markets. Nowhere has technology had a greater impact on cross-border activity than in the financial services sector.

The fundamental function of financial service firms is to gather and process information. The sharp reductions in the costs of telecommunications and in the costs of compiling, storing and analyzing information, have broadened the geographic domains over which financial service institutions and their customers make decisions. Advances in computer hardware and software have dramatically reduced the costs of collecting and analyzing data, initiating and confirming transactions, clearing and settling payments, and monitoring financial flows through management information and accounting systems. Indeed, technological advances have made it possible for sophisticated firms to raise or invest funds, exchange currencies, or change the attributes of assets around the globe, around the clock.

In this chapter we sketch the impact of these technological advances on users of financial services, providers of financial services and regulators of financial services in the industrialized countries that have been most affected by these advances. Next we document the increasing volume of international financial transactions. Finally, we evaluate the extent

Figure 1:

Declining Transportation, Communication and Computer Costs

Year	Average Air Transport Revenue per Passenger Mile (1990 dollars)	Cost of a 3 Minute Call New York to London (1990 dollars)	Department of Commerce Computer Deflator (1990 = 1000)
1930	\$0.68	\$244.65	N/A
1940	\$0.46	\$188.51	N/A
1950	\$0.30	\$53.20	N/A
1960	\$0.24	\$45.86	125000
1970	\$0.16	\$31.58	19474
1980	\$0.10	\$4.80	3620
1990	\$0.11	\$3.32	1000

Sources: Historical Statistics of the United States; Statistical Abstract of the United States; Gary Hufbauer, "World Economic Integration: The Long View," International Economic Insights, May/June 1991; U.S. Department of Commerce

Computer.XLS

to which financial prices are integrated across countries. In short we demonstrate how technology is creating an increasingly integrated financial market that ignores national boundaries.

Impact on Consumers

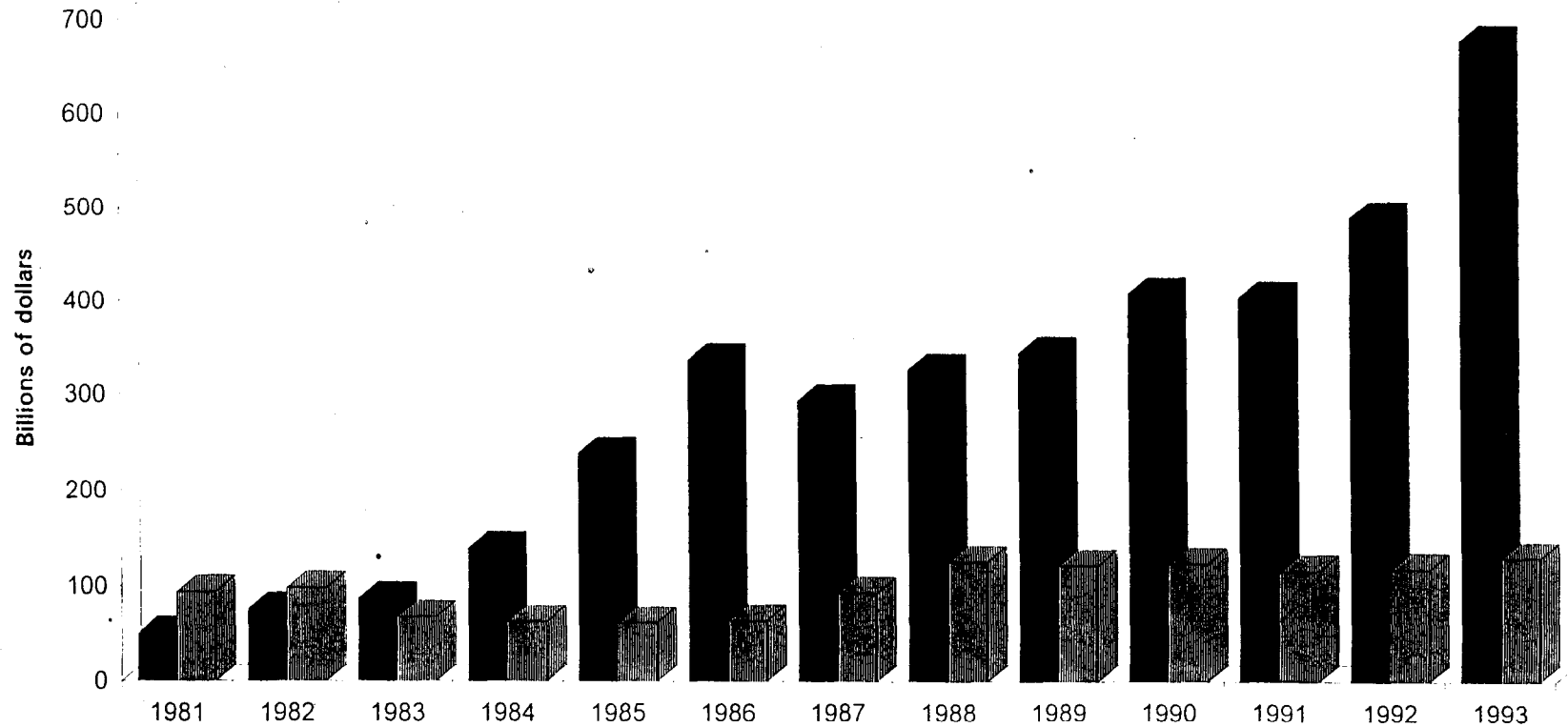
Although the same customer may be both a provider of funds and a user of funds, it is useful to distinguish the two roles when assessing the impact of technological advances on customer behavior. Users of funds have sought to broaden their funding base internationally as a means of enhancing their liquidity and lowering their costs.

Multinational corporations and governments have financial needs sufficiently large to justify substantial search costs to identify the cheapest source of funds. Some of these needs continue to be satisfied by traditional international bank loans, albeit often in the form of new kinds of loan contracts that include a variety of embedded options. But increasingly, large borrowers have found that they can place issues of securities in markets more cheaply than they can borrow from international banks. Figure 2 shows that since 1983, direct issues of securities have dominated international flows of credit intermediated through banks.

This trend has been facilitated in part by an improved flow of information. News services provide a continuous flow of information relevant to valuing securities. In addition, a number of vendors provide analytic software to transform raw financial data into a format useful for making decisions. Security analysts and ratings agencies continually prod borrowers to improve their disclosure practices. Both security analysts and ratings agencies have invested significant resources in analyzing a wider range of foreign borrowers to help potential investors make better decisions. Accountants and regulatory

Figure 2:

The Increasing Importance of Direct Issues of Securities in International Flows of Credit



1. International Intermediated Loans include Euroloans and Foreign Loans

■ Direct Issues

▨ Intermediated Credit

2. Intl. Direct Issues include issues of fixed, floating

Source: OECD Financial Market Trends

Direct.XLS

authorities in several countries have also required that a greater range of data be disclosed on a more timely basis. Moreover, borrowers who are eager to tap broader, international sources of savings have voluntarily disclosed more data relevant to evaluating their creditworthiness.

These trends have generally favored investment banks and universal banks that have specialized in facilitating the access of borrowers to world financial markets. But commercial banks have also participated in the process, sometimes with striking success. Because commercial banks in the United States and Japan have had broader securities powers outside their domestic markets,¹ they have been particularly active in helping their clients gain access to foreign markets. In addition, some of the largest corporations have formed in-house banks to serve their international financial needs.

Financial institutions have introduced a variety of innovations to reduce transactions costs and broaden the range of options available to borrowers in national and international financial markets. In general these innovations have permitted institutions to unbundle and repackage financial attributes so that both borrowers and lenders end up with the financial instruments they prefer and risks are redistributed to investors who are most willing to bear them. For example, a firm that wants a ten-year, floating-rate, U.S. dollar-denominated loan may find that the cheapest alternative is to issue a ten-year, fixed-rate, Australian

¹This is one of many examples of the attempt of regulatory authorities to enhance the international competitiveness of their regulatees. As Dale notes, the Federal Reserve Board's "willingness to pare down the constraints imposed by Glass-Steagall reflects, among other considerations, the U.S. regulatory authorities' concern to maintain the international competitiveness of the U.S. banking system." Similarly as Dale observes "Japanese financial institutions can combine banking and securities business in foreign financial centers [even though] they are denied this privilege in their home market." Richard Dale, International Banking Deregulation. The Great Banking Experiment, (Oxford: Blackwell Finance, 1992), pp. 70 and 90.

dollar-denominated bond combined with a currency swap from Australian dollars into U.S. dollars and an interest rate swap from fixed interest rates to floating interest rates. The information systems and analytic capacity to compare such borrowing alternatives are formidable; they require virtually instantaneous information about global developments that can be factored into investment, funding and credit evaluation decisions. But sophisticated international borrowers have come to expect that they can select from an extremely broad menu that includes a multitude of indirect ways to achieve the desired result.

Large customers have also demanded a variety of noncredit services to facilitate international transactions. These include global management of cash flows through integrated computer networks; global custody, recordkeeping and trustee services for pension, savings, and other sorts of employee benefit plans worldwide; and fiduciary and agency services in connection with capital and debt financing for entities throughout the world.

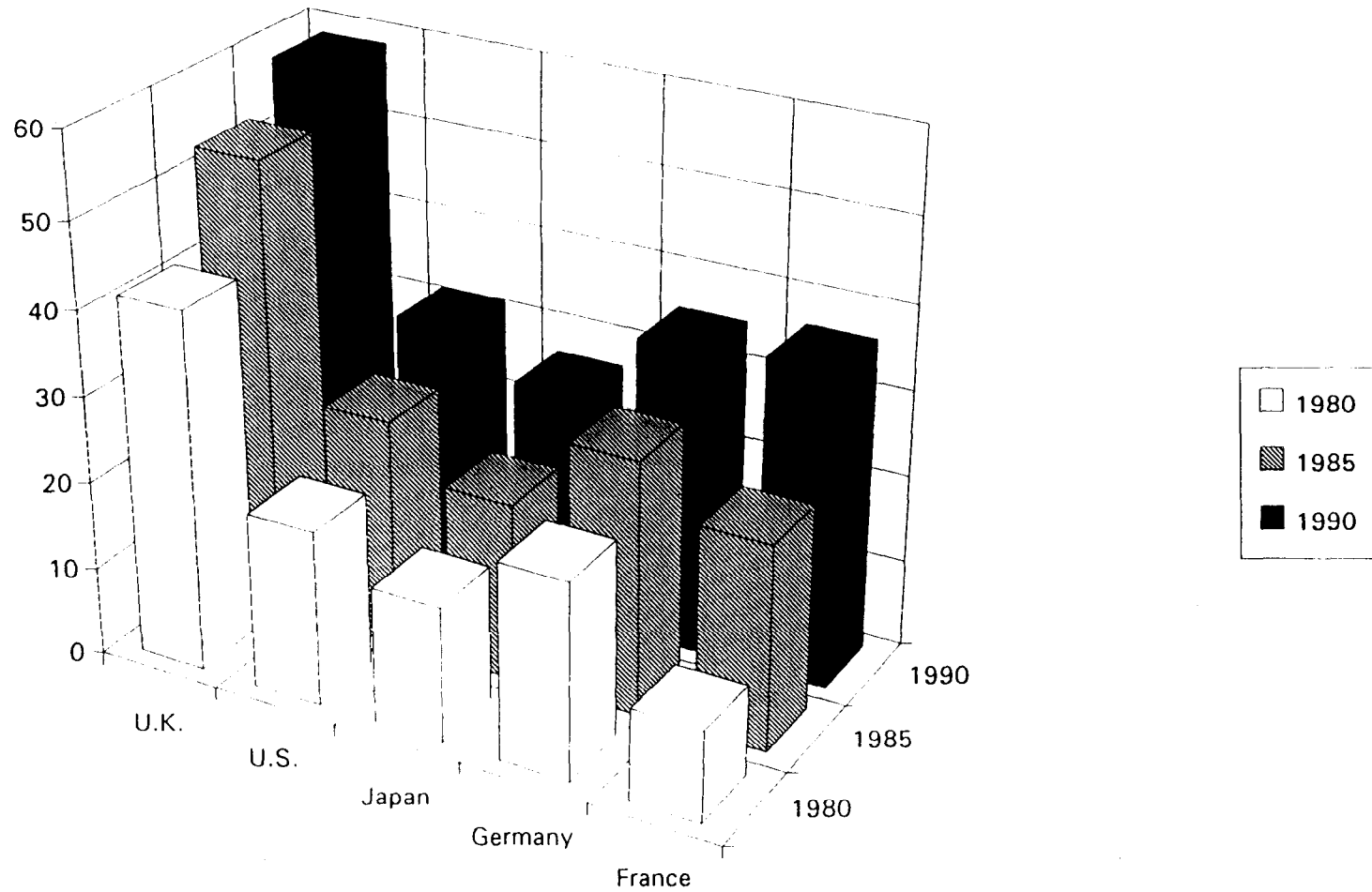
Providers of funds have also become increasingly international in their outlook. In almost every major country, more and more funds are being managed by a smaller number of decisionmakers (see figure 3). Institutional investors -- pension funds, insurance companies, and mutual funds -- have come to dominate financial markets. This trend is particularly apparent in the United States. Forty years ago individuals held ninety percent of corporate equity. Even ten years ago, individuals owned well over two-thirds of corporate equity. Today, institutional investors control more than half of the shares of American public corporations.²

²Wharton School and the New York Stock Exchange, The Policy Implications of Stockownership Patterns, A Conference Summary and Research Agenda, Rodney L. White Center for Financial Research, (1993), p. 1.

Figure 3:

The Growing Importance of Institutional Investors

Life Insurance, Pension and Mutual Fund Assets as a Percentage of Household Assets



Institutional investors often behave differently than individual investors. They are able to reduce their per unit transactions costs relative to individual investors by pooling transactions, negotiating commissions, and, on occasion, by dealing directly with issuers of securities. They have the capability to follow market developments closely throughout the world, to analyze investment prospects, and to execute decisions promptly. Moreover, they are under intense pressure to earn competitive risk-adjusted returns. Just as ratings agencies have arisen to help investors analyze the issuers of securities, advisory services have also developed to help savers evaluate the performance of institutional investors.

Increasingly, institutional investors are diversifying internationally as a means of boosting their returns and reducing the volatility of their portfolios.³ Although prudential regulations have constrained the amounts some institutional investors can invest abroad, these restrictions are being relaxed. Regulators are becoming convinced that, contrary to their earlier presumptions, careful international diversification can actually enhance the safety and soundness of portfolios managed by institutional investors.

Impacts on Financial Service Institutions

In order to meet the demand for international financial services, financial institutions have invested heavily in the technical infrastructure to compete effectively in international financial markets. In addition, they have established offices in foreign financial centers. By 1986, foreign banks operated more than 600 offices in the United States, triple the

³Morningstar Mutual Funds, an advisory service that compares the performance of hundreds of mutual funds, observed that even within the category 'domestic fund.' "Only one domestic fund in four now fails to own a foreign stock." Indeed a substantial number of equity funds including the Fidelity Magellan Fund and the Vanguard/Windsor Fund -- two of the largest actively managed equity mutual funds -- hold more than 10 percent of their equity in non-U.S. issues. Morningstar Mutual Funds, vol. 20, issue 3, July 9, 1993, p. 1.

number from the mid-seventies. And more than 400 foreign banks operated in London, a more than four-fold increase from the mid-seventies.⁴ The number of foreign banking offices increased three-fold in Japan and nearly four-fold in Germany from 1970 to 1985.⁵ This competition is largely focused on wholesale, institutional markets because foreign financial institutions have usually found it difficult to acquire large, local retail bases.

Foreign banks have made deep inroads in several major markets. In the United States foreign banks gained nearly a 45 percent share of the market for commercial loans by 1991.⁶ These competitive inroads have undoubtedly been facilitated by technology. For example, fax machines have enabled Japanese banks to respond quickly to U.S. loan customers. The U.S. office of a Japanese bank can take a loan application during the U.S. business day, fax the information to Japan where the loan application can be evaluated during the Japanese business day and the decision can be faxed back to the United States to communicate to the loan applicant by the start of the next U.S. business day.

Just as direct investment in the manufacturing sector often embodies transfers of technology, foreign financial establishments often introduce financial innovations in local markets. European banks have enhanced the quality of foreign exchange services available to U.S. residents and U.S. banks have introduced derivative instruments in several markets abroad.

⁴J.P. Morgan & Co. Incorporated, Annual Report 1986.

⁵Bank for International Settlements, Recent Innovations in International Banking, (Basle, April 1986), p. 151.

⁶This estimate made by McCauley and Seth combines loans made from U.S. offices of foreign banks and loans extended from their off-shore offices. Robert N. McCauley and Rama Seth, "Foreign Bank Credit to U.S. Corporations: The Implications of Offshore Loans," Federal Reserve Bank of New York Quarterly Review, (Spring 1992), pp. 52.

Increased competition among financial services firms has led to increased international specialization of labor. Systems analysts and computer programmers in India are providing services for financial firms in many other parts of the world. And Ireland, which has invested substantial resources in developing a computer-literate work force, has become an important exporter of back office services to several financial service firms in North America.

Impacts on Regulators

Perhaps most important for the issues we address in this book, technological advances have diminished the ability of financial regulators in each country to maintain more burdensome regulations that increase the cost of financial services relative to that in other countries. This has occurred in two ways. First, as noted, technological advances have facilitated the unbundling and repackaging of individual financial products. Consequently, regulations that prohibit one kind of activity can easily be circumvented by product redesign to produce a close substitute. These financial innovations may occur in the domestic market -- for example, the development of money market mutual funds. They may also involve international financial transactions such as Eurodollar deposits or off-shore commercial paper facilities.

Second, technology has undermined the significance of geo-political boundaries. Regulation that distorts prices creates profit opportunities for customers of financial institutions and financial institutions themselves. Institutions or their clients can often avoid onerous regulation by moving the locus of activity to a more congenial regulatory domain. In short, technology has allowed participants in the financial marketplace to engage in “regulatory arbitrage.”

Heightened global competition thus exposes differences in national regulatory structures to an exacting market test. Regulatory policies designed to accomplish objectives such as raising revenue or redistributing wealth from one sector of the economy to another or from one class of institutions to another have become increasingly untenable as users of financial services turn to foreign sources of supply whenever domestic financial products are not competitively priced.

In recent decades several tax and regulatory initiatives have been more effective in shifting the location of financial activity than in accomplishing the objective that the regulation was intended to achieve. For example, the attempt by the United States to impose an Interest Equalization Tax to discourage foreign borrowing in dollar capital markets, led to creation of an active market in dollar-denominated bonds -- the Eurobond market -- outside the regulatory domain of the United States. Similarly, during the 1960s and 1970s, each time market interest rates rose above deposit interest rate ceilings in the U.S., an enormous volume of dollar deposits shifted from the U.S. to Eurodollar centers. When U.S. bank customers found they could not roll-over their Certificates of Deposit in U.S. banks at the market rate of interest, many simply transferred their deposits to Eurobanks -- often shell branches of their American banks -- but, located beyond the reach of interest-rate ceiling regulations.

Examples of this phenomenon are apparent in other parts of the world as well. In the early 1980s Japanese investors faced high tax rates on interest income, but no taxes on capital gains. This led to a strong demand for zero-coupon Eurobonds until the Japanese

tax laws were reformed.⁷ In 1988 almost \$11 billion of German investment funds flowed into the Luxembourg bond market following the announcement of a German 10 percent withholding tax to become effective January 1989. Likewise, the establishment of organized markets for derivative instruments has been so inhibited in Germany by the interpretation of gambling laws that most futures trading in German government bonds has taken place in London. Similarly, the imposition of a transfer tax in the Swedish market caused market activity to relocate to London. The tax mainly succeeded in shifting market activity rather than in raising revenue for the government or dampening volatility in market prices.

Of course, regulatory authorities often try to anticipate or respond to regulatory arbitrage. International competition among national regulatory authorities is a long-standing tradition⁸; it has become more intense as the costs of traversing time and space have fallen. In several important financial centers the regulatory authorities have reacted to competitive pressures by relaxing regulations covering both financial markets and depository institutions. Indeed, some countries have taken active measures to attract a larger share of international business by improving the infrastructure to support financial services and by virtually eliminating regulatory burdens on international financial transactions.⁹ In addition, several countries -- most notably Canada, France, New Zealand, and the United

⁷Staff Team, Exchange and Trade Relations and. Research Departments, International Capital Markets, Developments and Prospects, International Monetary Fund, (April 1990), p. 65.

⁸For example, in the middle ages, the King of France tried to attract commercial and financial business to Lyons by forbidding merchants to travel to the rival center, Geneva.

⁹Edward J. Kane, "How Market Forces Influence the Structure of Financial Regulation," Restructuring Banking and Financial Services in America, W. S. Haraf and R. M. Kushmeider, eds., (American Enterprise Institute for Public Policy, 1987), pp. 343-82.

Kingdom -- have relaxed traditional restrictions on the permissible scope of operations of domestic depository institutions to permit them greater flexibility in responding to changing market conditions.¹⁰

The liberalization of domestic financial systems and the dismantling of capital controls has often been attributed to the rise of conservative ideology. Indeed, the trend is often associated with President Ronald Reagan of the United States and Prime Minister Margaret Thatcher of Great Britain. But in the United States the first important initiative to phase-out interest rate ceilings, the Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA) was introduced by and enacted during the Carter Administration. Similarly, the deregulation efforts of the Conservative government in Great Britain have been largely matched by the actions of the Socialist governments in other parts of Europe. In short, market developments are at least as important as ideology in motivating policymakers to change the financial regulatory landscape.

Regulatory competition has recently intensified because of the European Community's bold initiative to enhance the efficiency of financial regulation within the Community.¹¹ As we discuss again in chapter 4, the Second Banking Directive, approved in December 1989 by the European Parliament, insures that European institutions can choose to become universal banks. European banks will be permitted to accept deposits, make long-term loans, issue and underwrite corporate securities and take equity positions. The

¹⁰G. Bröker, Competition in Banking, (Paris: Organization for Economic Cooperation and Development, 1989).

¹¹Richard J. Herring, "92 and After: the International Supervisory Challenge," World Financial Markets After 1992, H. Genberg and A. Swoboda (eds.), (Kegan Paul International 1993).

Community's approach to harmonization of banking regulation among the member states, which combines the adoption of a single banking license with the principles of mutual recognition and home country control, will create a competitive dynamic which makes it likely that the European regulatory system will remain flexible and efficient.¹² These principles have been largely adopted in the directives covering investment services, life assurance and nonlife insurance.¹³

European financial institutions will have the freedom to select from regulatory regimes in any of the current twelve member countries. This will cause each national regulatory authority to assess carefully the competitive impact of its regulatory structure. The approach deliberately encourages national regulatory authorities to compete, subject to basic safety and soundness constraints, in providing the most efficient regulatory system. As Sir Leon Brittan observed, "in one bound [the European Community] . . . has moved from twelve fragmented and confusing structures of national (banking) regulation to a single market of a size and simplicity unmatched anywhere else in the world." He emphasized that the motive was not "merely to benefit banks . . . [but] . . . to increase the competitiveness of European industry by giving it access to the cheapest, most efficient, and most innovative financial products in the world."¹⁴ The European Community estimated that financial integration would yield gains equal to one third to one half of the

¹²Sydney J. Key, "Mutual Recognition: Integration of the Financial Sector in the European Community," Federal Reserve Bulletin, (September 1989), pp. 591-609.

¹³Innes Fraser and Paul Mortimer-Lee, "The EC Single Market in Financial Services," Bank of England Quarterly Bulletin, (February 1993), vol. 33, no. 1, pp. 92-97.

¹⁴Sir Leon Brittan, "Opening World Banking Markets," transcript of a speech delivered at the American Enterprise Institute, March 23, 1990.

total benefits of completing the European single market initiative.¹⁵

In sum, technological advance has had a powerful impact on international financial integration. It has broadened the financial horizons of users of financial services and it has enhanced the ability of financial institutions to provide international solutions to financial problems. Regulators have faced a stark choice: they can regulate domestic financial institutions heavily, but the main consequence is likely to be a migration of business away from heavily regulated firms to less regulated domestic firms or foreign institutions. Alternatively, rather than preside over the decline of their regulatees, regulators can liberalize domestic rules and relax international capital controls. Most countries have opted for the second course.

In the process, government policies have heightened international financial competition and deepened international financial integration. The hope is that better international integration of financial markets will facilitate the pricing and reallocation of a broader range of risks thereby enhancing the international allocation of resources.

It is instructive, however, that the efforts at policy integration described thus far have proceeded both unilaterally and multilaterally. Whether and to what extent future financial regulatory policies should be coordinated across national boundaries is an issue we explore more fully in subsequent chapters.

Expanding international flows of capital

Can the trends toward increased financial integration be quantified? Unfortunately, no comprehensive measure of gross international financial flows exists, but there is little doubt

¹⁵M. Catinant, E. Eonnai, and A. Italianer, "The Competition of the International Market: Results of Macroeconomic Model Simulations," The Cost of Non-Europe, Commission of the European Community, vol. 2, chap. 10, (1988).

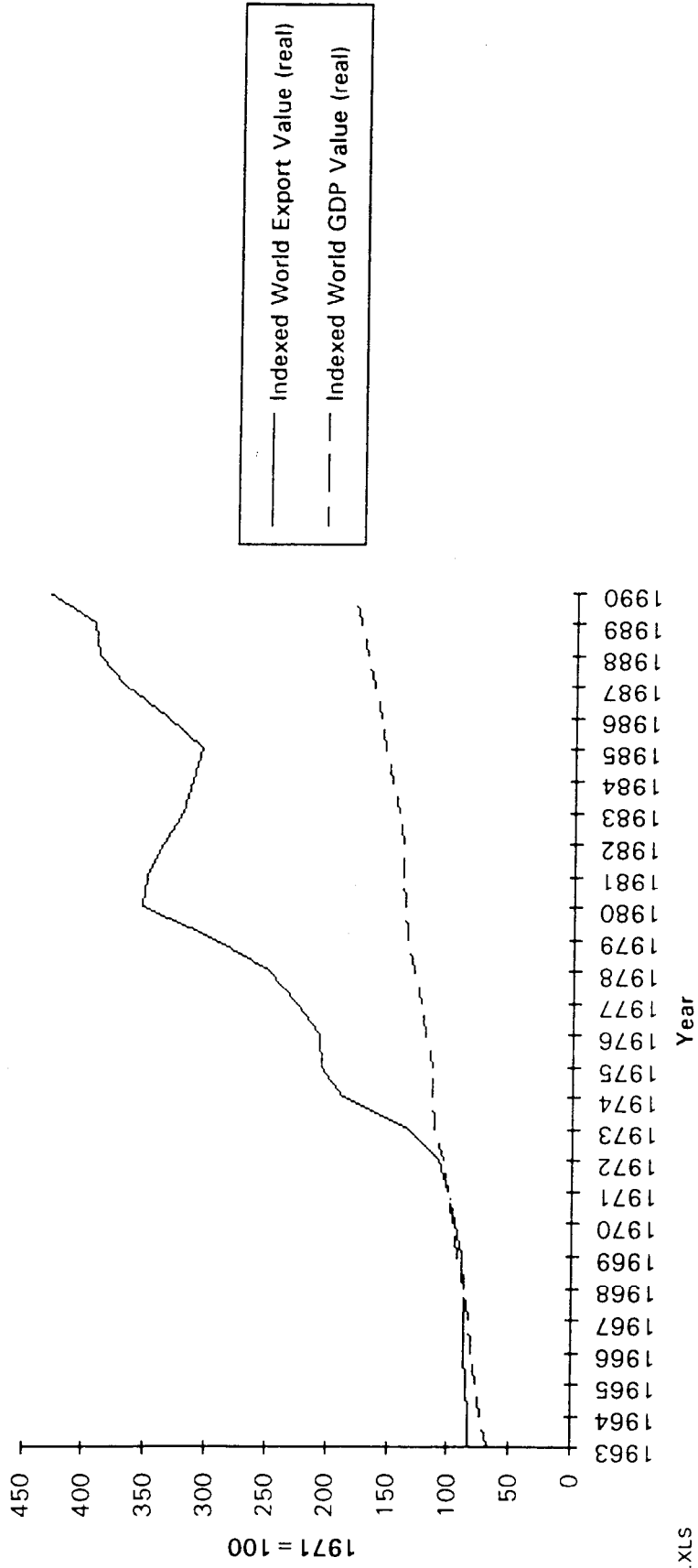
that cross-border flows have risen over the past two decades. International trade has continued to grow faster than GNP (see figure 4). Thus even in the absence of the technical advances and liberalization of regulation, the volume of international transactions would have increased relative to GNP, if only to support the growth in world trade.

In fact international financial transactions have grown much faster than world trade. One plausible, though admittedly imperfect proxy for the volume of international financial transactions, is the value of payments cleared through the Clearing House Interbank Payment System (CHIPS). CHIPS is the electronic payment system that transfers and settles international transactions based on U.S. dollars, the paramount vehicle currency for international finance and commerce.¹⁶ CHIPS handles over 90 percent of all dollar payments moving among countries around the world including foreign exchange transactions, Eurodollar transactions, Eurosecurities settlements, and international disbursements of dollar-denominated loans.¹⁷ As figure 5 shows, the dollar value of clearings through CHIPS has grown much faster than the dollar value of world trade. By 1992, the average daily volume of transactions cleared through CHIPS was \$942 billion.

¹⁶In the colorful prose of the CHIPS brochure, "the world is evolving into a single, seamless financial market-place that functions around the clock. Decisions involving megasums are communicated electronically in nanoseconds. And, in the overwhelming majority of the transactions, the denominator is the U.S. dollar. . . . [CHIPS is the central clearing system in the United States for international transactions." New York Clearing House Association, "From Sydney to Stockholm. From Tokyo to Toronto. From London to Lisbon . . .," Clearing House Interbank Payments System, (1986), p. 1.

¹⁷This measure presents a useful indicator of trends, but it cannot be regarded as a precise measure of the volume of international financial transactions for several reasons. First, it includes trade as well as financial transactions. Second, domestic U.S. transactions account for a minor portion of the volume. Third, an estimated 10 percent of international dollar payments do not flow through CHIPS. Fourth, although the dollar is usually the currency against which any other currency is traded, this is not invariably the case. Moreover, as other currencies become more important in international financial transactions -- displacing to some extent the vehicle role of the dollar -- the flow of transactions through CHIPS understates the volume of international transactions.

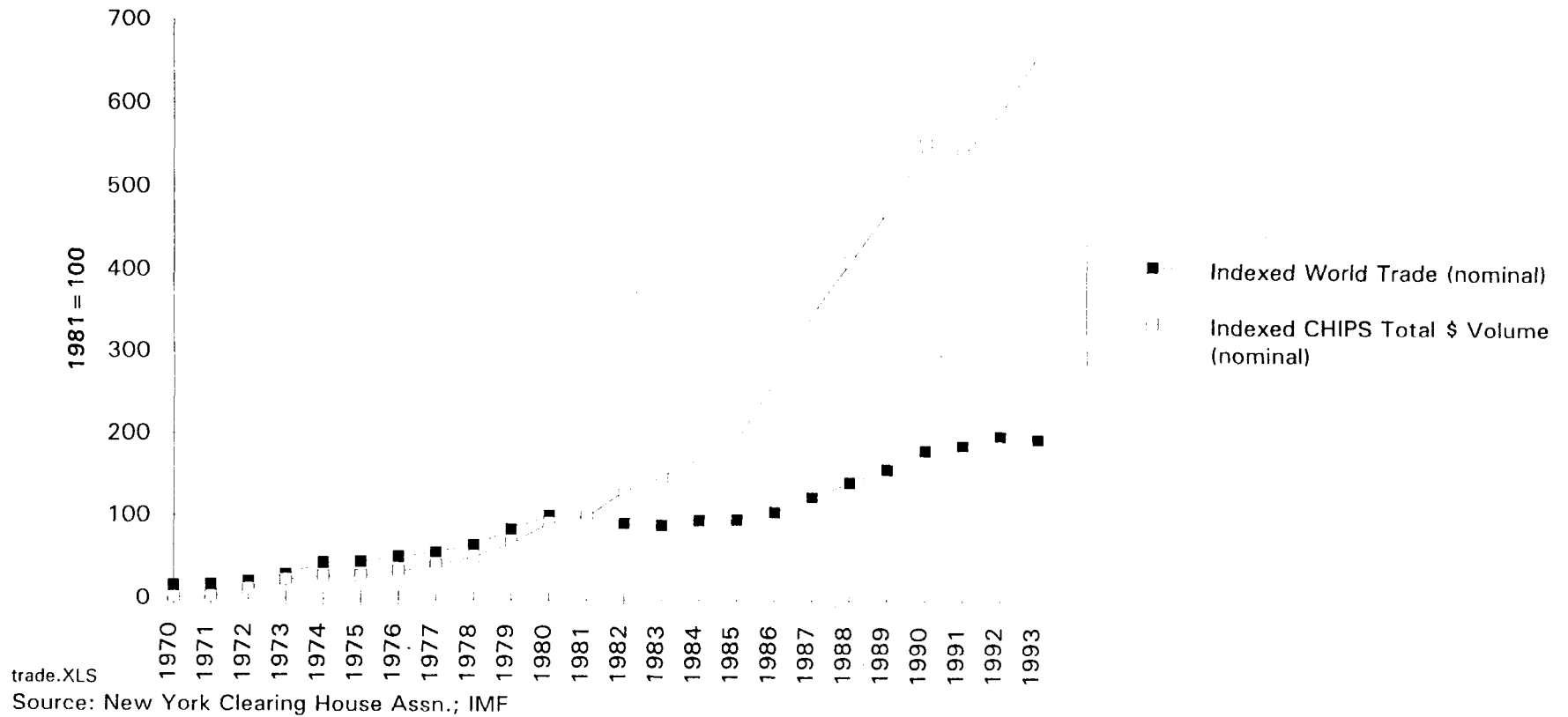
Figure 4:
World Exports Have Grown Faster Than World GDP



trade.XLS
 Source: IMF Yearbook

Figure 5:

International Financial Transactions Have Grown Faster Than World Trade



The increasing volume of international financial flows can be seen in the rising volume of foreign exchange trading in three major centers that have conducted surveys of their foreign exchange markets during March of 1986, and April of 1989 and 1992 (figure 6). In each three year interval the increase has exceeded the rise in GDP and merchandise trade. Undoubtedly a substantial part of the increase in foreign exchange turnover has been generated by the rise in cross-border capital flows stimulated by the relaxation of capital controls and continued deregulation of domestic financial markets. The Bank for International Settlements (BIS) has combined the survey results from these three centers with comparable surveys conducted in 23 other leading centers. After adjusting for double-counting as well as for estimated gaps in reporting, the BIS estimates the global net turnover in the world's foreign exchange markets to have been \$880 billion per business day in April 1992.¹⁸ This average daily turnover during a very placid period in the foreign exchange markets was virtually identical to the total stock of official foreign exchange reserves for all countries reported at the end of April 1992.¹⁹

Figure 7 shows that the stock of international bank lending as reported by the Bank for International Settlements also has grown steadily. Nonetheless, the rate of growth of international bank lending has been eclipsed in the last decade by the growth in international issues of securities and in derivative instruments.

International issues of bonds are graphed in figure 8. In figure 2 we saw that new issues of international bonds began to exceed the flow of bank loans in 1983. Since that

¹⁸Bank for International Settlements, Central Bank Survey of Foreign Exchange Market Activity in April 1992, Monetary and Economic Department, (Basle, March 1993).

¹⁹The stock of foreign exchange reserves was SDR 648,330 million or \$888,082 million. International Monetary Fund, International Financial Statistics, (July 1992).

Figure 6:
Daily Turnover in FX

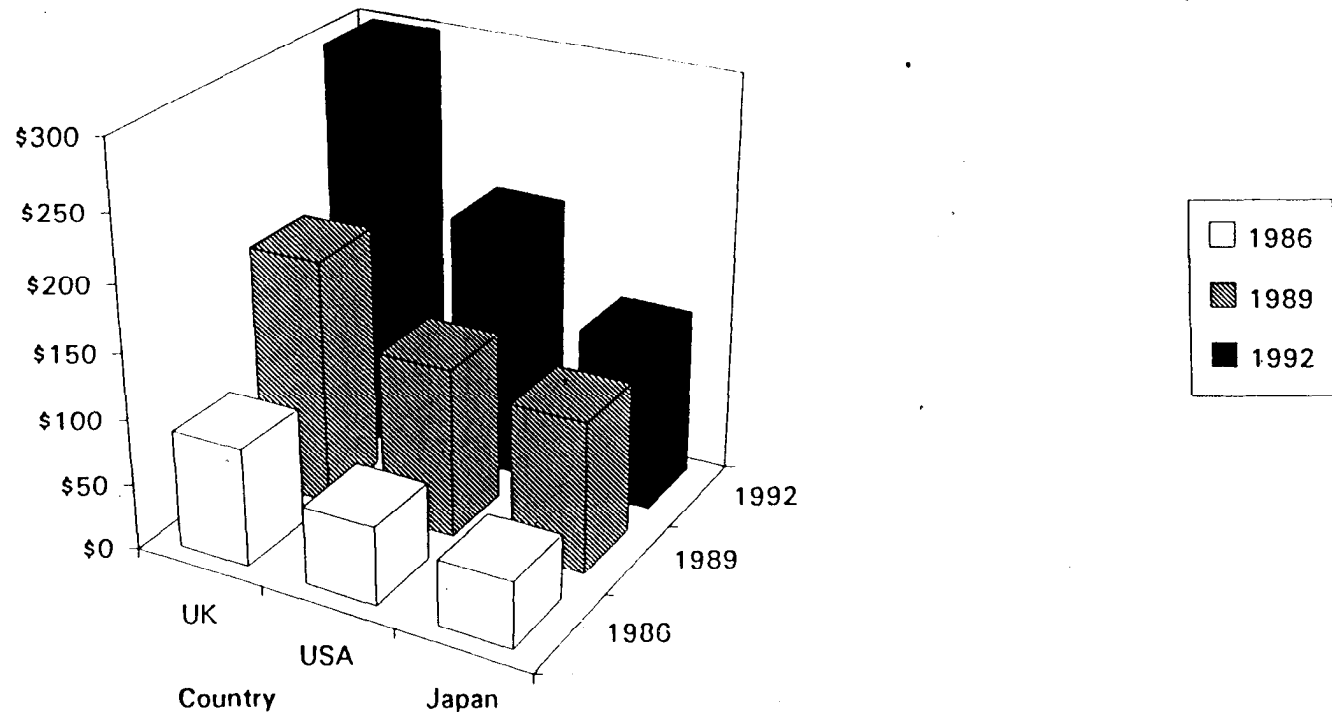
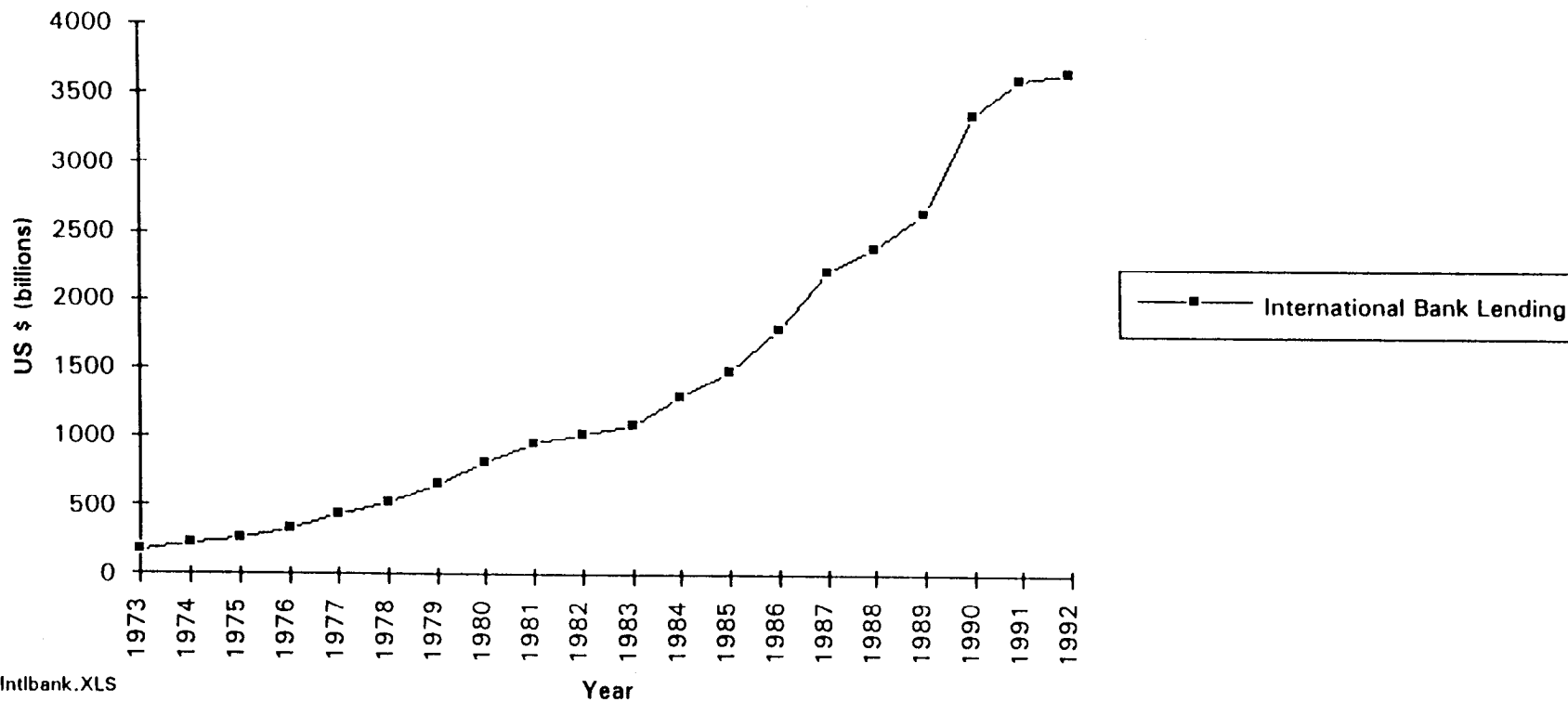


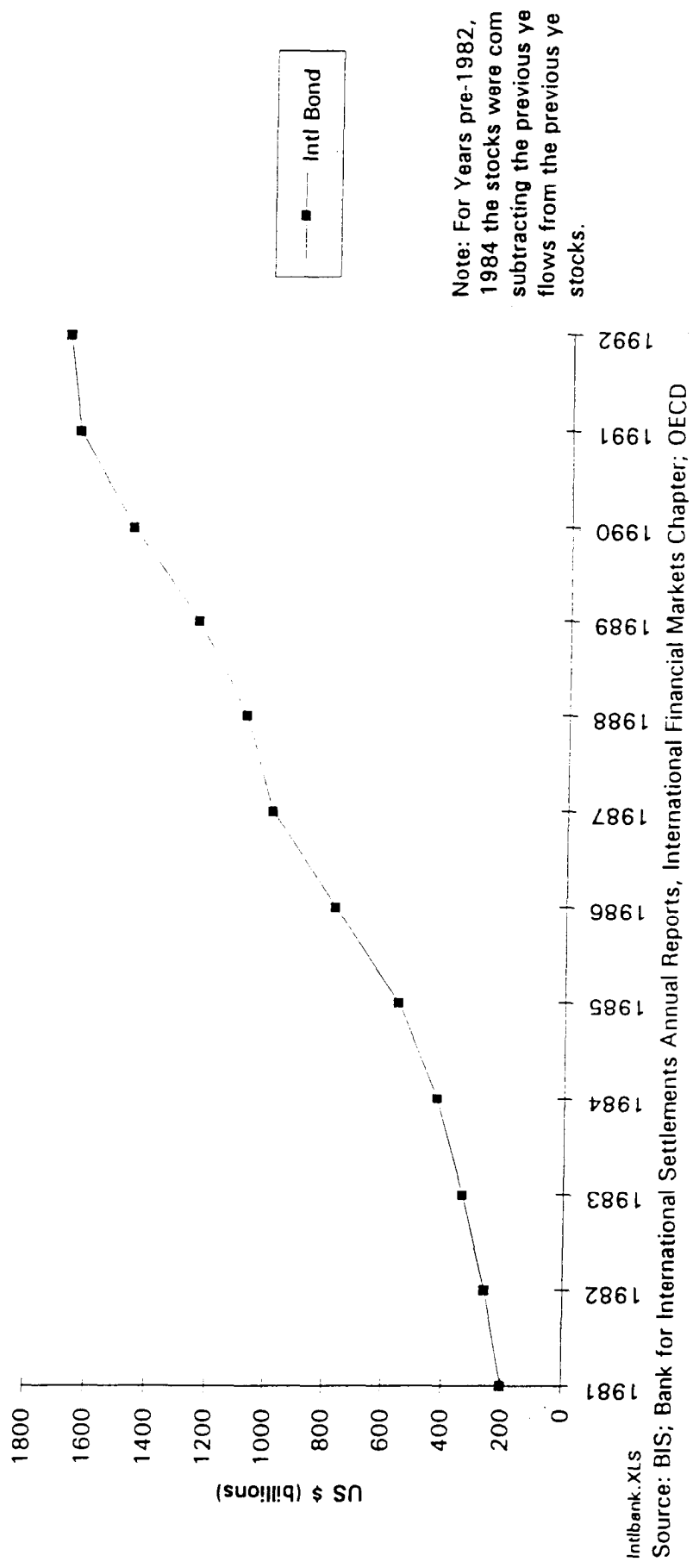
Figure 7:
International Bank Lending



Intlbank.XLS

Source: BIS, Bank for International Settlements Annual Reports, International Financial Markets Chapter

Figure 8:
International Issues of Bonds



Intlbank.XLS

Source: BIS; Bank for International Settlements Annual Reports, International Financial Markets Chapter; OECD

time they have continued to dominate new bank lending. Over the decade several kinds of bonds were introduced that had equity-like characteristics. During periods when equity prices were expected to rise, issuers found that they could reduce interest costs dramatically by issuing convertible bonds or bonds with equity warrants attached. Japanese borrowers made especially aggressive use of these instruments in the latter part of the decade. During 1989, equity-related issues accounted for more than 30 percent of all bonds issued on international markets.²⁰

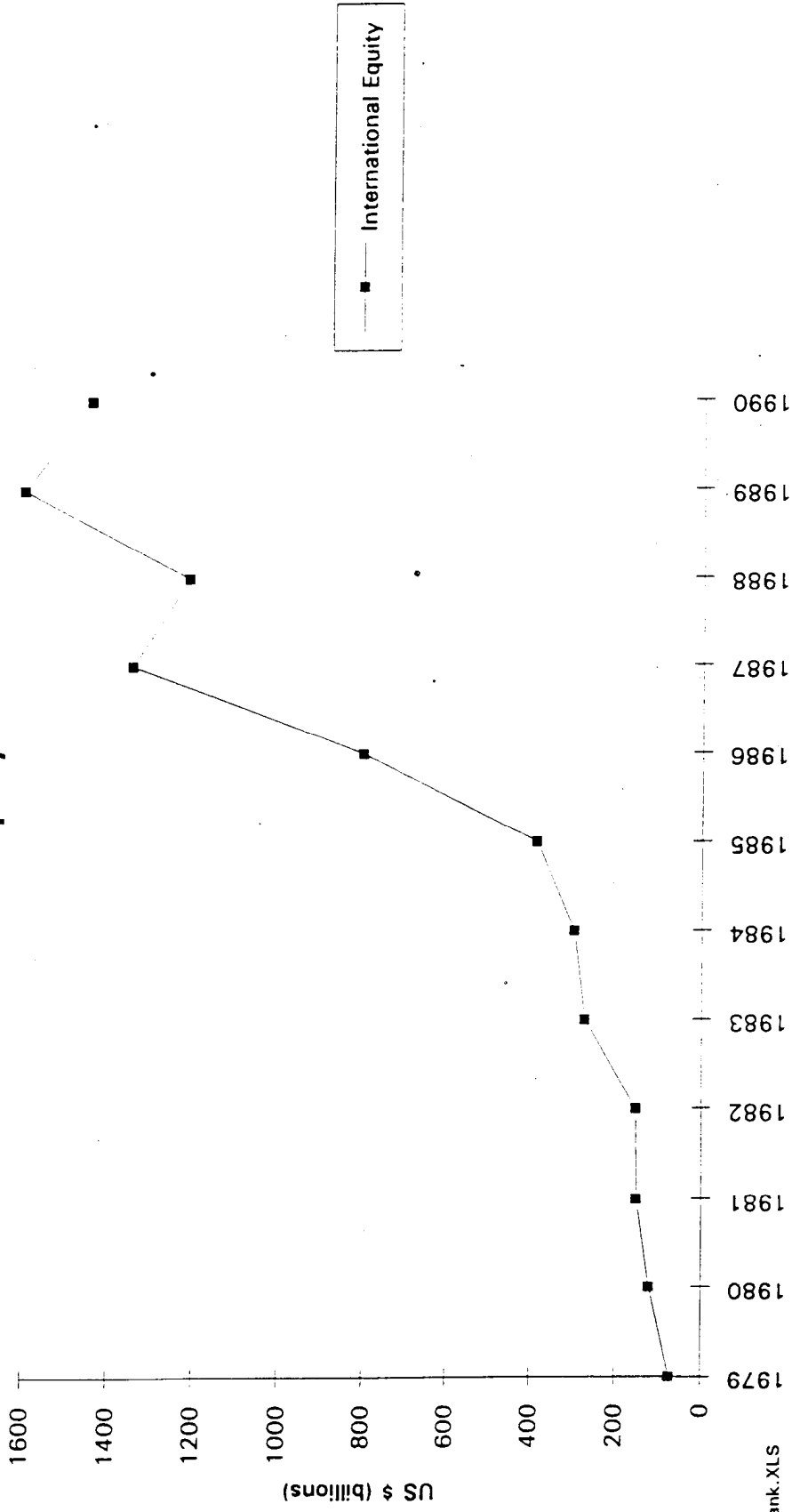
Cross-border flows of equities have become increasingly important over the last decade as well (see figure 9). Professional traders continually monitor prices for the same securities quoted on different markets to profit from price discrepancies. In addition, investment managers attempt to exploit what they perceive to be valuation discrepancies for comparable companies traded in different national markets. Gross cross-border equity flows -- the sum of equity purchases and sales associated with international portfolio investment -- have been well above \$1 trillion per year since 1987. During 1989 gross cross-border flow was equal to 14.8 percent of the world market capitalization.²¹

The growth in derivative products has been perhaps the most remarkable feature of international markets over the last five years (see figure 10). Interest rate swap contracts in which two counterparties agree to exchange two different interest payment streams over time -- one usually pays a fixed interest rate, the other, a floating interest rate -- account for

²⁰Morris Goldstein, Donald J. Mathieson, and Timothy Lane, "Determinants and Systemic Consequences of International Capital Flows," Determinants and Systemic Consequences of International Capital Flows. A Study by the Research Department of the International Monetary Fund, Occasional Paper 77, chap. 1, (Washington D.C.: March 1991), pp. 1-45.

²¹Michael Howell and Angela Cozzini, "New Risks and New Products," International Equity Flows, 1990 Ed., (London: Salomon Brothers, August 1990), p. 13.

Figure 9: Gross Cross-Border Equity Flows



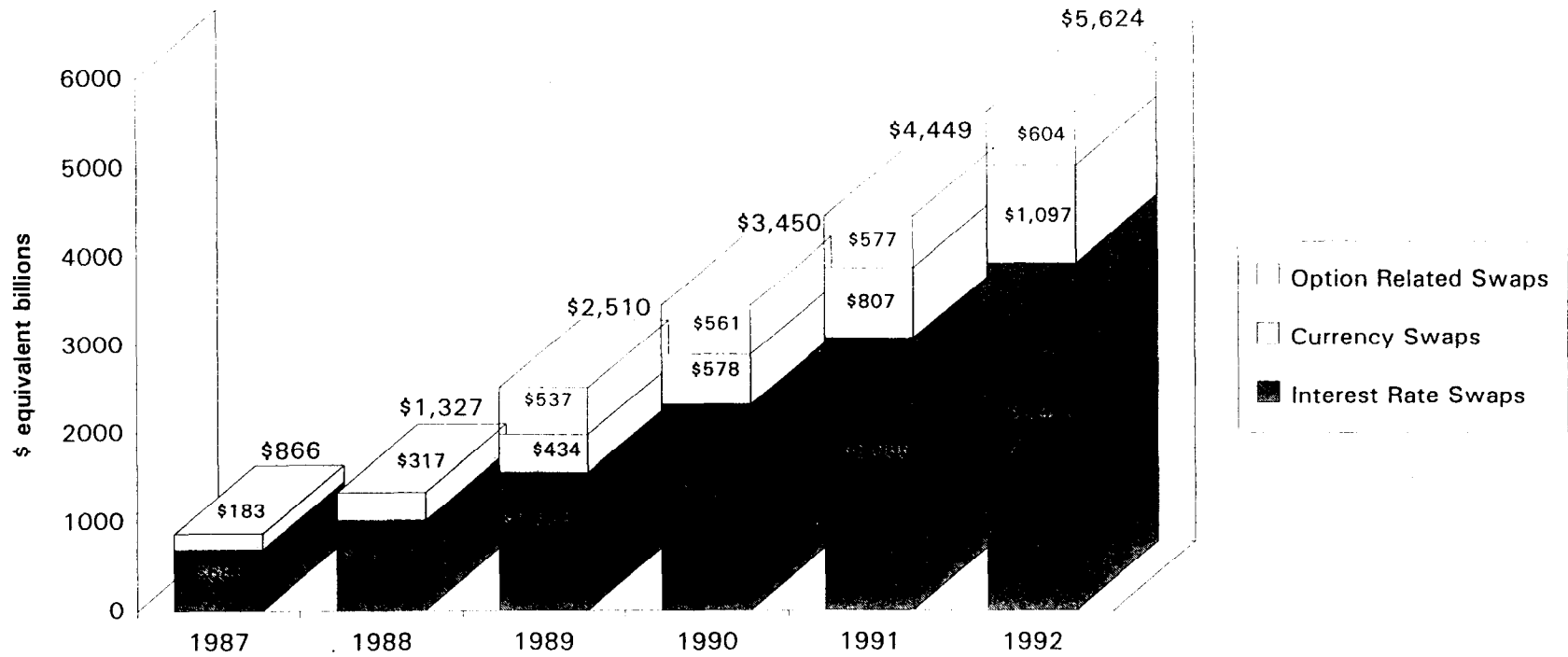
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Source: Solomon Brothers

Figure 10:

Swap Market Growth

(notional values)



Sources: ISDA Data 1987-1991; JPM Estimate 1992; Morgan Guaranty

the largest volume of trading. Interest rate swaps help integrate short- and long-term markets denominated in a particular currency. Currency swap contracts, in which two counterparties agree to exchange payment streams denominated in two different currencies over time, help integrate financial markets denominated in different currencies.

This statistical sketch of large and increasing international financial flows suggests a high degree of international financial activity, but it does not clearly indicate the degree of financial integration that has been achieved. Moreover, even if comprehensive and reliable statistics on gross international capital flows and derivative transactions were available, they could shed only limited light on the extent of international financial integration.

Increasing international asset price integration

As markets become more highly integrated, asset prices often adjust in anticipation of capital flows that would otherwise occur. Indeed, it is possible to imagine a perfectly integrated international market in which capital never actually flows from one market to another. Instead, market participants adjust equilibrium prices instantaneously to new information because transactors know that they would experience losses if they were to conduct transactions at the preceding price. If prices do not diverge from equilibrium levels, no arbitrage flows will take place. Thus an additional way of evaluating the extent of international financial integration is to measure the extent of asset price integration.

Figure 11 summarizes five different degrees of international financial integration as reflected by asset prices starting from the most superficial level extending to the deepest level. Each level will be considered in turn to measure how deeply international financial integration has progressed.

Figure 11. Five Levels of International Financial Integration

	U.S. Market (\$)	Offshore Market	Foreign Market (*)	
1		$i_{ES} = fp + i_{E*}$		Covered Interest Rate Parity Among Eurocurrency Rates
2	$i_s =$	i_{ES} i_{E*}	$= i_*$	Integration of Offshore and Onshore Markets
3		$i_s = fp + i_*$ $\rightarrow i_s - (fp + i_*) = 0$		Covered Interest Rate Parity Among National Rates ²²
4		$i_s = sp' + i_*$ $\rightarrow i_s - (sp' + i_*) = 0$		Uncovered Interest Rate Parity Among National Rates ²³
5	$r_s = i_s - \% \Delta P'_s$	$r_s - r_* = i_s - i_* + \% \Delta P'_* - \% \Delta P'_s = 0$ $\rightarrow r_s - r_* = (fp - sp') + sp' - (\% \Delta P'_s - \% \Delta P'_*) = 0$	$r_* = i_* - \% \Delta P'_*$	Real Interest Rate Parity Among National Rates ²⁴

²²The precise covered interest rate parity relationship includes an additional term, the product of the forward premium and the foreign interest rate -- $fp \cdot i_*$ -- that is customarily omitted for simplicity. This omission becomes more important the higher the foreign interest rate and the larger the forward premium.

²³The precise uncovered interest rate parity relationship includes an additional term, the product of the speculative premium and the foreign interest rate -- $sp' \cdot i_*$ -- that is customarily omitted. The omission becomes more important, the higher the foreign interest rate and the larger the speculative premium.

²⁴The term, $sp' - (\% \Delta P'_s - \% \Delta P'_*)$, can be interpreted as an approximation to the anticipated deviation from purchasing power parity or the anticipated real depreciation of the dollar. If the exchange rate is currently at purchasing power parity then the current price of a bundle of goods priced in dollars (P_s) is equal to the current price of the same bundle of goods priced in the foreign currency (P_*) translated into dollars at the spot dollar price of a unit of foreign currency (e): $P_s = P_* \cdot e$. If the exchange rate is expected to remain at purchasing power parity, then the expected exchange rate (e') will adjust by precisely enough to offset the anticipated difference in inflation between the dollar and the foreign currency: $P_s \cdot (1 + \% \Delta P'_s) = P_* \cdot (1 + \% \Delta P'_*) \cdot e'$. This implies that the anticipated change in the exchange rate (sp') must be precisely equal to: $sp' = \% \Delta P'_s - \% \Delta P'_* - sp' \cdot \% \Delta P'_*$. The last term in this expression is customarily omitted.

Figure 11 continued

 Definitions of Symbols

- i_{ES} = the Eurodollar rate on a Eurodollar deposit that matures in one year.
- i_{E*} = a nondollar Eurocurrency rate on a nondollar-denominated Eurocurrency deposit that matures in one year.
- fp = the forward premium stated as the difference between dollar price of a unit of foreign currency for delivery in one year less the dollar price of a unit of foreign currency for spot delivery scaled by the spot price of foreign currency.
- i_x = the national interest rate in country x on an instrument that is comparable in all other respects to the Eurocurrency deposit denominated in the same currency.
- sp' = the speculative premium stated as the expected dollar price of a unit of foreign currency in one year less the actual dollar price of a unit of foreign currency for spot delivery, scaled by the spot price of foreign currency.
- $\% \Delta P'_x$ = the anticipated annual percentage change in the price index of country x.
- r_x = the real (inflation-adjusted) interest rate in country x for a one year maturity. The real interest rate is conventionally expressed as $r_x = i_x - \% \Delta P'_x$, but this omits a term. For precision, the product of the real interest rate and the anticipated inflation rate should also be included.
-

Covered Interest Parity in the Eurocurrency Market

The first and most superficial level of international financial integration is integration of the offshore markets -- covered interest rate parity among Eurocurrency deposits. This implies that, when adjusted for the cost of protecting against a change in the foreign exchange rate (the forward premium), investors receive precisely the same return regardless of the denomination of Eurocurrency deposit they choose to hold. For example, if interest parity holds, investors will earn the same return whether they invest in a Eurodollar deposit or instead, convert dollars into sterling, invest in a Eurosterling deposit of comparable maturity and simultaneously sell the sterling proceeds in the forward market for dollars (thus locking-in a dollar-sterling exchange rate in advance).²⁵ Several studies have shown that forward exchange rates have remained at interest-rate parity with respect to Eurocurrency interest rates since the mid-1960s.^{26, 27} The highly integrated Eurocurrency markets offered large, sophisticated international investors and borrowers an important alternative to national markets that were often highly regulated and insulated from other national markets and the international market by capital controls.

²⁵In this example, as in all subsequent examples, routine transactions costs are neglected. It should be noted, however, that as competition increases, transactions costs tend to decline thus enhancing incentives for arbitrage. For example, Goldstein, Mathieson and Lane present evidence that bid-ask spreads on some of the lesser traded Eurocurrency deposits have declined over the 1980s to a fifth of the level at the beginning of the decade so that now bid-ask spreads are relatively uniform across all major Eurocurrency deposits. Goldstein, Mathieson, and Lane, "Determinants and Systemic Consequences," p. 7.

²⁶Robert Z. Aliber, "The Interest Rate Parity Theorem: A Reinterpretation," Journal of Political Economy, (November/December 1973), pp. 1451-59; and Richard C. Marston, "Interest Arbitrage in the Eurocurrency Markets," European Economic Review, (January 1976), pp. 1-13.

²⁷For a model that analyzes the simultaneous determination of forward exchange rates and Eurocurrency rates, see Richard J. Herring and Richard C. Marston, "The Eurocurrency Markets and their Interaction with the Forward Exchange and National Money Markets," National Monetary Policies and International Financial Markets, chap. 4, Contributions to Economic Analysis 104, (Amsterdam: North-Holland Publishing Company, 1977), pp. 79-105.

Interest rate parity holds in the Eurocurrency markets because Eurocurrency deposits are nearly ideal vehicles for interest arbitrage. Four features explain why arbitrage is so effective in integrating the Eurocurrency markets. First, arbitrage need not be inhibited by differences in credit risk. Eurocurrency deposits issued by a particular bank in different currency denominations have equal credit risk. Moreover, they are free of taxes, sinking fund or call provisions that complicate comparisons of returns among other assets. Second, Eurocurrency rates are market-determined and so they fully reflect prevailing market conditions, unlike administered interest rates or interest rates subject to regulatory ceilings or floors. Third, the Eurocurrency markets are free from capital controls and other restrictions that have often inhibited arbitrage between national markets. Fourth, the Eurocurrency markets share a negligible and equal vulnerability to future capital controls. Even a country that is inclined to impose capital controls on transactions denominated in its own currency lacks incentive to regulate securities denominated in foreign currencies because Eurocurrency activities can readily shift to another center. Moreover, a country is especially unlikely to have a motive to discriminate among Eurocurrency deposits denominated in different foreign currencies and so all Eurocurrencies share the same low risk of future controls.²⁸

Integration of offshore and Onshore Markets:

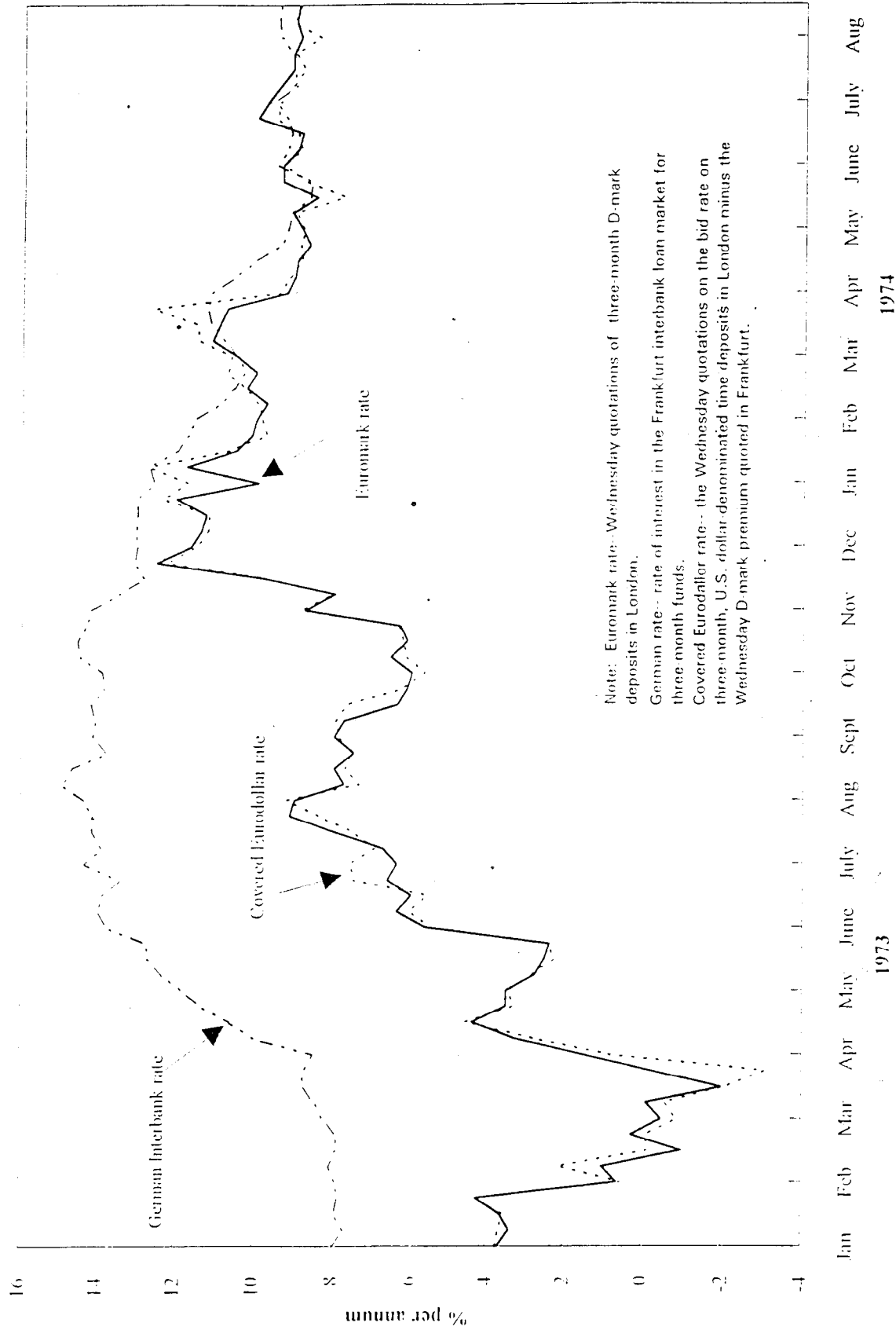
²⁸In this regard, the U.S. sanctions against Iran and Libya were exceptions that prove the rule. In both instances the U.S. attempted to freeze the Eurodollar deposits held in offshore branches of U.S. banks. The Iranian freeze was ended before it could be tested in court, but the Libyan freeze was challenged in British courts in two cases against U.S. money center banks. In each case the British court required that the U.S. branch to repay the Eurodollar deposit in full. Richard Herring, "Who Bears the Risk of Controls on Eurodeposits? Some Recent Developments," Protectionism and International Banking, G. Fels and G. Sutija (eds.), (London: Macmillan, 1991).

Offshore markets have been integrated since the early days of the Eurocurrency market, but integration of offshore and onshore markets has been a more sporadic, uneven development. Capital controls and domestic bank regulations have often separated Eurocurrency markets from the corresponding national markets. Two historical examples suggest the importance of these restrictions.

The first example illustrates the importance of controls on capital inflows designed to keep a strong currency from becoming stronger. In figure 12, the relationship between the Euromark rate and the German interbank rate is graphed from January 1973 through December 1974. Until January 1974, the German authorities attempted to discourage capital inflows through a variety of means including a 60 percent marginal reserve requirement on bank liabilities to foreigners and a 50 percent cash deposit ratio on foreign borrowing.²⁹ The result was that the Euromark rate diverged markedly below the internal German rate even though it remained at interest parity with respect to the Eurodollar rate. The effectiveness of these controls on capital inflows in separating the internal and external market was especially apparent when the German mark came under speculative attack during March 1973. The onshore rate rose above 10 percent while the offshore rate fell below negative 2 percent. Foreigners expected such a large appreciation of the mark that they were willing to pay more than 2 percent to hold mark-denominated assets offshore. But when Germany removed capital controls during January 1974 the offshore and onshore mark-denominated rates became virtually identical.

²⁹If capital controls were merely taxes on cross-border flows it would be possible to identify a precise wedge between interest rates in the onshore and offshore markets. But in Germany, as in most other countries that have imposed capital controls, tax-like regulations were combined with quantitative limitations on some activities. Since it is also very difficult to know how capital controls function in practice, it is usually not possible to specify a precise, meaningful arbitrage band.

Figure 12: The External and Internal Money Markets in the Deutsche Mark



Source: Money Manager for Eurodollar rate, and Federal Reserve Board for all other interest and exchange rates.

The second example illustrates the importance of controls on capital outflows intended to support a weak currency. In figure 13, the Eurofranc rate is graphed alongside the domestic French rate to illustrate the impact of controls on capital outflows on the differential between offshore and onshore rates. Capital controls were maintained in France for one and a half decades longer than in Germany; indeed, they were tightened substantially early in the Mitterand regime. Regulation of trade credits, however, was sufficiently loose so that the internal and external money markets moved together relatively tightly unless the franc was under speculative attack.³⁰ During speculative periods, in contrast, the controls were binding and the speculative demand for franc-denominated loans caused the Eurofranc rate to rise far above the internal French rate. The speculative attack against the franc during March 1983 provides a good example. The differential between the external and internal franc rate rose above 9 percent.³¹ When France removed capital controls as a prelude to entering the European Community's single market in financial services, the offshore and onshore franc-denominated rates merged.

Covered Interest Parity Among National Rates:

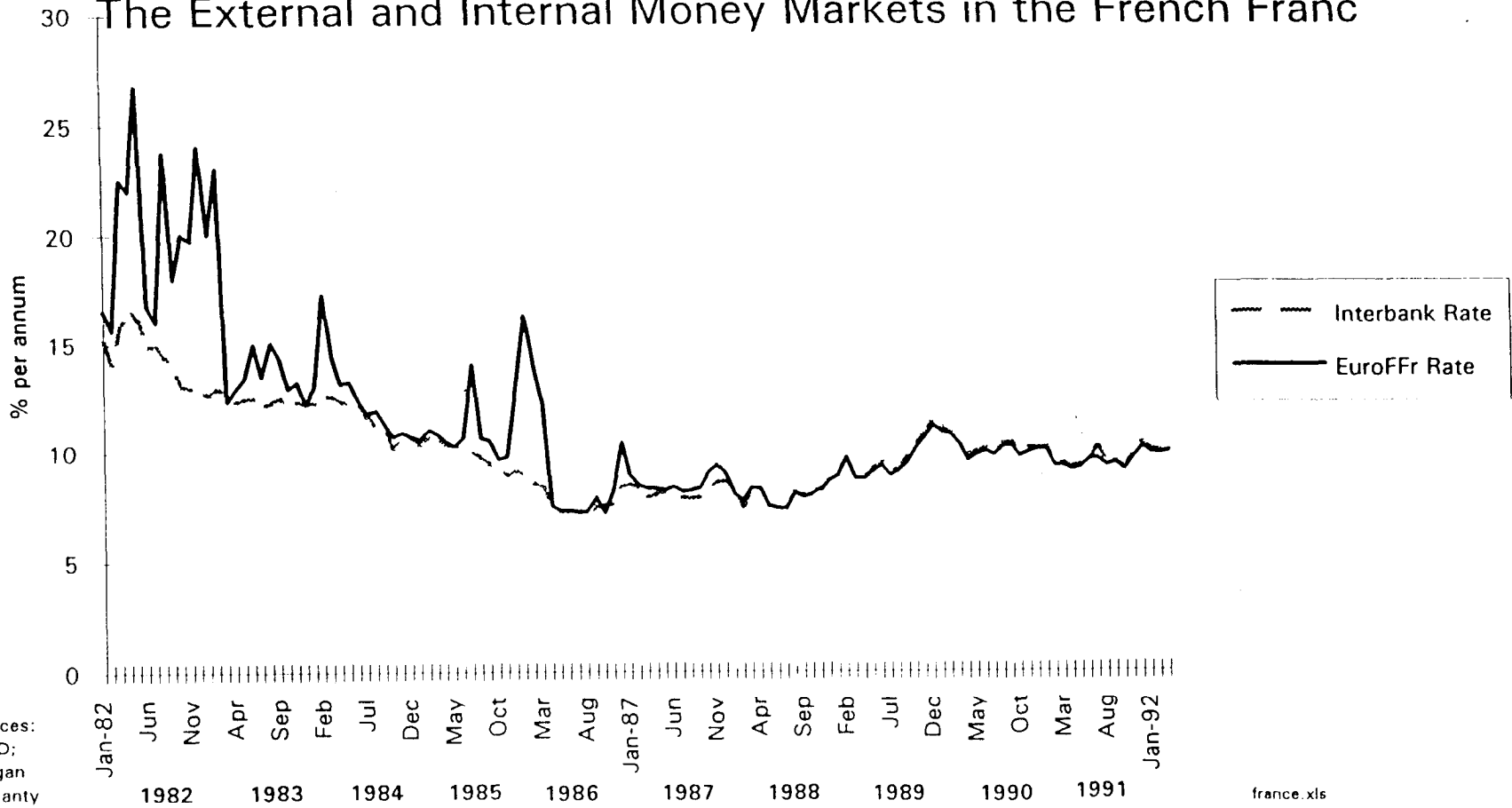
By 1993 offshore money markets have been integrated with onshore money markets in most industrial countries. For large, sophisticated transactors the Eurocurrency markets have merged with the corresponding domestic currency markets. Capital controls were relaxed during three different periods. With the abandonment of fixed exchange rates

³⁰For further details, see Francesco Giavazzi and Alberto Giovannini, Limiting Exchange Rate Flexibility: the European Monetary System, chap. 7, (Cambridge: MIT Press, 1989).

³¹Marston shows that the interest differential responded significantly to the anticipated realignment of the exchange rate. Richard C. Marston, Real Interest Rates in the Group of Five Industrial Countries: A Study of International Financial Integration, chap. 3, (Cambridge University Press, 1994).

Figure 13:

The External and Internal Money Markets in the French Franc



Sources:
OECD;
Morgan
Guaranty

Canada, Germany, the Netherlands, Switzerland and the United States shed their capital controls during 1974. During 1979 the United Kingdom abandoned its capital controls and Japan began the process of dismantling its capital controls.³² And during 1990 France and Italy abolished their capital controls as part of the step-by-step approach to economic and monetary union in the European Community.

Once offshore and onshore markets became integrated, covered interest rate parity among national rates was also achieved.³³ Since the Eurocurrency rates were at interest rate parity and the Eurocurrency rates were equal to the corresponding national rates, the national rates were at interest rate parity. More fundamentally, capital controls and domestic financial regulations no longer inhibited arbitrage flows between national markets. This third level of international financial integration permits virtually frictionless capital mobility: investors perceive national assets insured against possible changes in exchange rates as virtually perfect substitutes. This can happen only when all barriers between national markets except exchange rates have become negligible. These include transactions costs, perceptions of default risk, current capital controls, and the expectation of future

³²Japanese capital controls were somewhat unusual because they applied to both inflows and outflows of capital.

³³For recent evidence, see Jeffrey Frankel, "Quantifying International Capital Mobility in the 1980s," National Saving and Economic Performance, Douglas Bernheim and John B. Shoven, eds., (Chicago: University of Chicago Press, 1991); and Marston, Real Interest Rates in the Group of Five, chap. 3. Note that it is difficult to demonstrate covered interest parity for longer-term instruments because forward exchange markets become very thin as the maturity of the contract increases and disappears altogether for long-term maturities. Forward cover is available for long-term transactions, but it is an over-the-counter product for which data are not readily available. Swap contracts can be viewed as bundles of forward contracts so the growth of interest rate and foreign exchange swap markets in longer maturities is expanding the opportunities for covered interest arbitrage.

capital controls. Frankel³⁴ describes these factors as the “country premium”. The elimination of the country premium does not, however, assure that uncovered funding costs -- those in which no exchange rate protections have been purchased -- will be the same in all countries.

Uncovered Interest Rate Parity:

The next, deeper level of international financial integration -- uncovered interest rate parity -- implies that the difference in nominal interest rates is equal to the anticipated change in exchange rates. If this condition holds then expected returns on investments in different currencies are identical when measured in the same currency. Uncovered interest rate parity is much more difficult to verify because it incorporates a variable that is not directly observable, the speculative exchange rate premium.

Most major countries have reached the third level of integration in which covered interest rate parity holds. If uncovered interest rate parity also holds for these countries, then the forward premium must equal the expected change in the exchange rate, the speculative premium -- $fp = sp'$. Although we can compute the forward premium from market rates, we cannot observe investors' expectations of the corresponding speculative premium. Consequently most tests of uncovered interest rate parity use the forward premium as a proxy for the speculative premium and are really joint tests of two hypotheses: (1) uncovered interest parity and (2) the efficiency of the forward premium as

³⁴Jeffrey Frankel, “Measuring International Capital Mobility: A Review,” The American Economic Review. vol. 82, no. 2, (May 1992), pp. 199.

a forecast of the exchange rate change. Tests almost always reject the joint hypothesis.³⁵ Most investigators infer that uncovered interest parity does not hold; but, the rejection of the joint test could also be attributable to the inefficiency of the forward premium as a predictor of exchange rate changes. See figure 14 for a graph of uncovered interest rates under the naive assumption that actual exchange rates were expected by market participants.

In a recent study Marston³⁶ reaffirms that forward premiums (or nominal interest differentials) are biased predictors of actual changes in exchange rates. He then employs survey data on exchange rate expectations as a direct measure of the speculative premium that does not depend on the assumption that the forward premium is an efficient estimate of the speculative premium. This enables him to compute measures of the forecast error and the risk premium. His analysis of the two series leads him to conclude that both systematic forecast errors and time-varying exchange risk premiums cause deviations from uncovered interest rate parity and explain why the forward premium is not equal to the speculative premium. Uncertainty over changes in the nominal exchange rate thus precludes the major industrial countries from reaching the fourth level of integration.

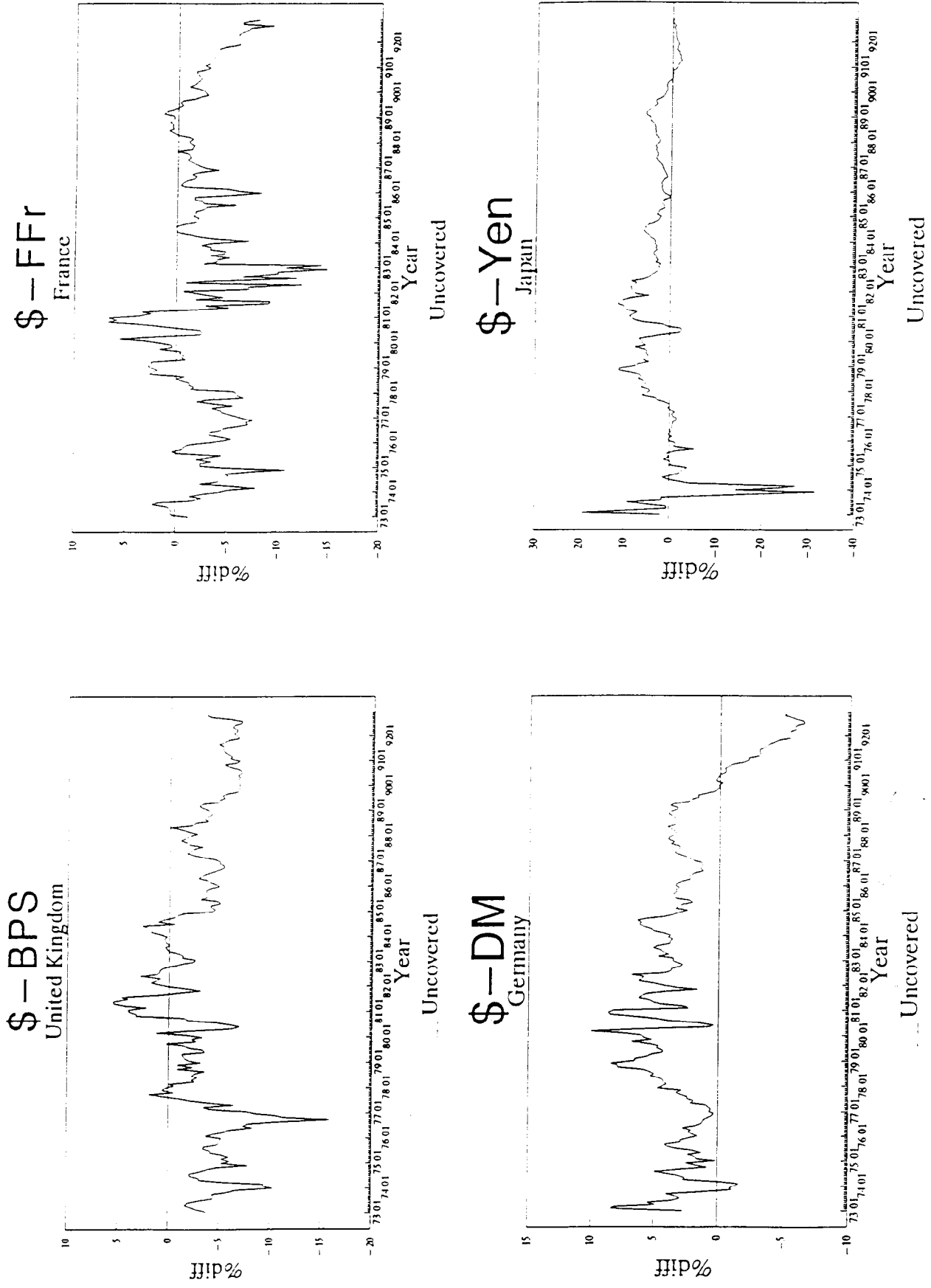
Real Interest Rate Parity:

The fifth and deepest level of integration assumes that uncovered interest parity holds and makes the additional assumption that the expected change in the exchange rate just offsets the anticipated inflation differential in both countries thus maintaining real exchange

³⁵The uncovered interest rate parity relationship has been widely investigated in literally hundreds of published studies. For an excellent recent survey and extension, see Marston, "Interest Arbitrage," chap. 4.

³⁶1994, Chapter 4.

Figure 14: Uncovered Interest Differentials



Sources: OECD; Moran Guaranty Trust

rates.³⁷ Real interest rate parity implies that capital flows equate real interest rates across countries and that the difference in nominal interest rates is precisely equal to the anticipated difference in inflation rates.³⁸ For example, a one-year U.S. interest rate of 5 percent would be at real interest parity with a one-year Japanese interest rate of 4 percent, if the anticipated inflation rate was 3 percent in the U.S. and 2 percent in Japan and if the dollar was expected to depreciate relative to the yen by 1 percent. Under these circumstances the real (inflation-adjusted) interest rate would be 2 percent in both countries.

Figure 15 shows international comparisons of real interest rates based on the simplistic assumption that the actual inflation rate was the anticipated inflation rate. This ex post measure of real interest spreads indicates that differences between real interest rates are large and variable.

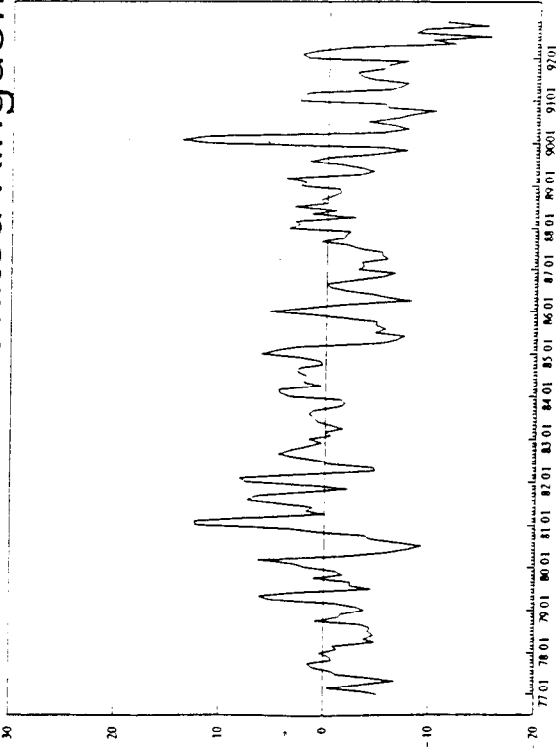
It is difficult to quantify the reasons for departures from real interest parity because the relationship depends on three variables that are not directly observable -- the anticipated inflation rates in both countries and the speculative premium. Deviations from uncovered interest parity are clearly part of the explanation. Tests of uncovered interest parity imply

³⁷A similar analytic framework can be found in Goldstein, Mathieson, and Lane, "Determinants and Systemic Consequences," pp 1-45; and Frankel, "Measuring International Capital Mobility," pp. 197-202.

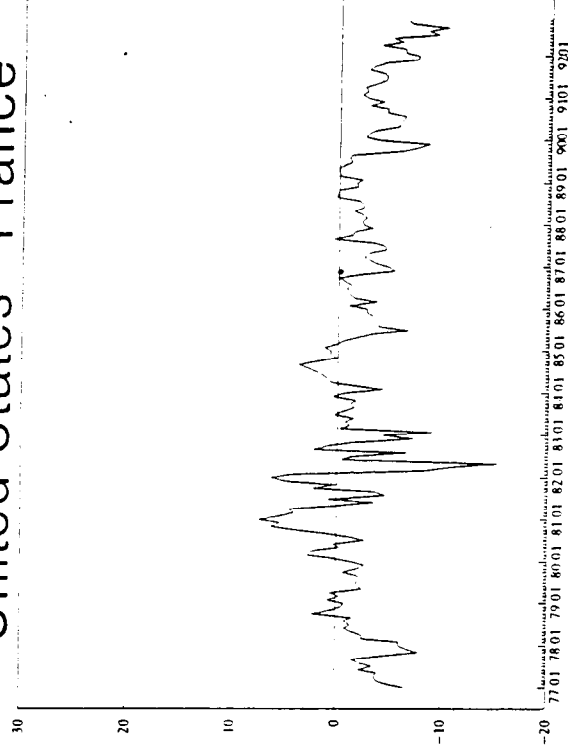
³⁸For discussion of purchasing power parity as an ex ante relationship see Roll and Adler and Lehmann. For evidence on real interest rate differentials see Cumby and Obstfeld and Frankel and MacArthur. Richard Roll, "Violations of Purchasing Power Parity and their Implications for Efficient International Commodity Markets," International Finance and Trade, Marshall Sarnat and G. P. Szego, eds., (Cambridge: Ballinger Publishing Co., 1979); Michael Adler and Bruce Lehmann, "Deviations from Purchasing Power Parity in the Long Run," Journal of Finance, (December 1983), pp. 1471-87; Robert Cumby and Maurice Obstfeld, "International Interest Rate and Price Level Linkages under Flexible Exchange Rates: A Review of Recent Evidence," Exchange Rate Theory and Practice, John Bilson and Richard Marston, eds., (Chicago: University of Chicago Press, 1984), pp. 121-51; and Jeffrey Frankel and Alan MacArthur, "Political vs. Currency Premia in International Real Interest Rate Differentials: A Study of Forward Rates for 24 Countries," European Economic Review, (June 1988), pp. 1083-114.

Figure 15: Real Interest Rate Differentials

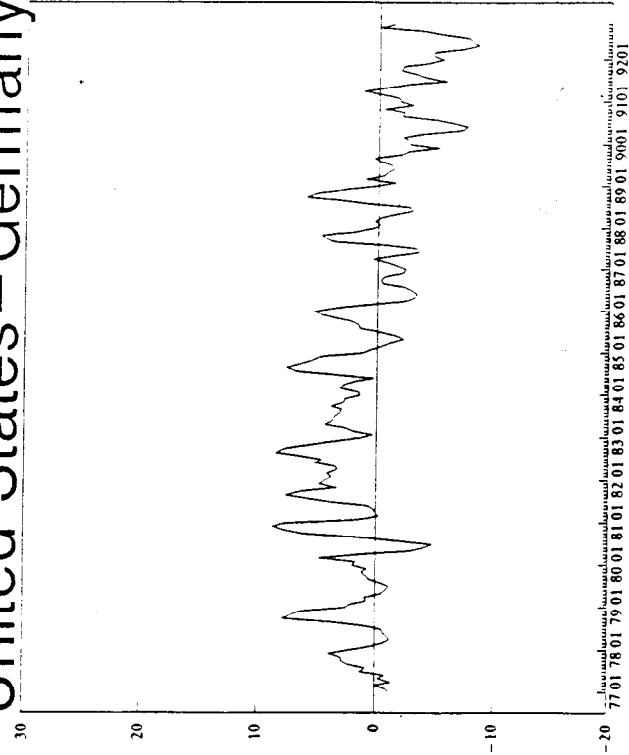
United States – United Kingdom



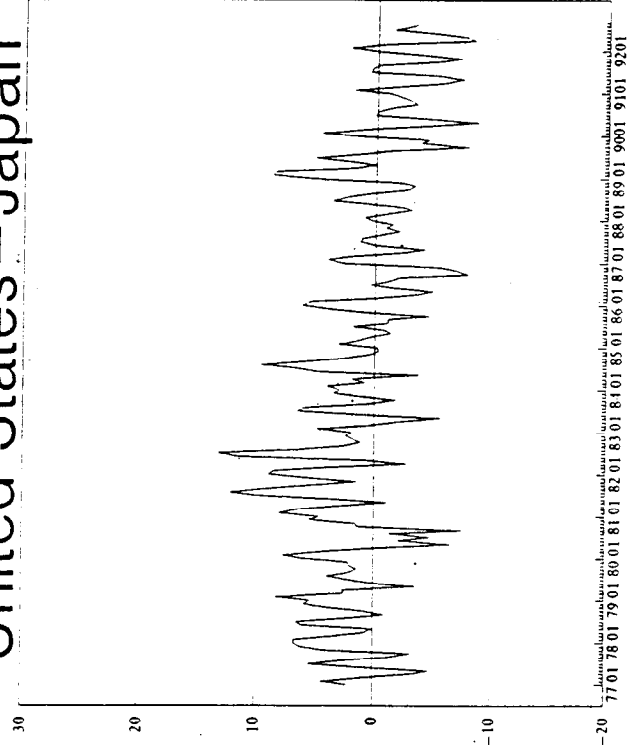
United States – France



United States – Germany



United States – Japan



that the forward premium is not an efficient forecaster of the expected change in the exchange rate and so uncertainty about nominal exchange rate changes will contribute to differences in real interest rates. But expected deviations from purchasing power parity are also likely to be important. Many factors in addition to differences in inflation rates affect exchange rates. Indeed, in view of the substantial deviations from purchasing power parity that have occurred among the major currencies over the last fifteen years, it would be surprising if international investors were not concerned about real exchange rate variability. Real exchange rates can be as variable and uncertain as nominal exchange rates.

Summary and Implications:

The implication of the failure of real interest parity is that the current level of international financial integration falls short of what would prevail in a truly integrated financial market. For example, the real interest rate in one region of the United States is likely to be virtually identical to the real interest rate in any other region of the United States even if the regions are located three thousand miles apart. There are several obvious barriers to flows of financial capital between nations that are of little importance inside nations. The preceding analysis emphasizes the risk of nominal and real exchange rate changes, but other sources of friction may also be relevant.

Although country premiums have largely disappeared for high quality, short- to medium-term financial investments, they may still be an important inhibition to international substitutability between long-term bonds, equities and real investments. Information and transactions costs are higher for assets that are not traded in broad, deep, liquid markets. Different countries have different legal systems that assign different rights to creditors in the event that a borrower defaults; indeed, rules for winding down a failed

business may discriminate against foreign residents.³⁹ And differences in tax laws may discriminate against foreign residents.⁴⁰ Moreover, differences in language, business traditions, disclosure laws, taxes, political traditions, macroeconomic stability and the risks of future interferences with international capital flows become more important in international comparisons of longer-term investments and equity than in comparisons of short-term, nominally risk-free assets that underlie the preceding attempt to quantify the level of financial integration.

Since international financial integration does not appear to have advanced to the fourth level, much less the fifth level, it should not be surprising that the supply of national savings still seems to influence the quantity of national investment. In contrast to an integrated national financial market in which inter-regional capital flows quickly bridge regional imbalances between savings and investment, international capital flows are inhibited by exchange rate variability and, probably, for some categories of transactions, by residual country premiums as well. Unlike a financial system in which real interest parity prevails, imbalances between national savings and investment may lead to changes in the national real interest rate. A shortfall in private savings or an increase in the government deficit may crowd out private investment.

Studies of national savings and investment are consistent with inferences about the level of international financial integration based on arbitrage relationships. The

³⁹For a comparison of bankruptcy laws in the United Kingdom and the United States. see Julian R. Frank and Walter N. Torous, "A Comparison of the U.K. and the U.S. Bankruptcy Codes," Journal of Applied Corporate Finance, vol. 6, no. 1, (Spring 1993) pp. 95-103.

⁴⁰Fukao discusses important international differences in bankruptcy procedures and tax laws. Mitsuhiro Fukao, "International Integration of Financial Markets and the Cost of Capital," Economics Department Working Paper 128, (OECD, Paris 1993).

pathbreaking study by Martin Feldstein and Charles Horioka⁴¹ showed that national savings and investment rates tend to be highly correlated. Their results have been replicated over a wide range of countries. A number of subsequent studies have suggested additional reasons why national savings and investment rates might be highly correlated even if real interest parity held.⁴² National savings and investment tend to respond positively to the national income and the growth in population or productivity. Government policy may accentuate the correlation if it attempts to limit current account surpluses by boosting national savings. And a large country that can influence real interest rates throughout the world will have positively correlated savings and investment even if real interest parity holds. These factors undoubtedly contribute to the observed positive correlation between national savings and investment. But, until real interest parity is achieved, national investment will necessarily depend to some extent on the supply of national savings.

Conclusion: The Extent of International Financial Integration

Our analysis of the impact of technological advances in telecommunications and information technology showed that the costs of surmounting natural impediments to international financial transactions have fallen sharply. Financial information flows almost instantaneously throughout the industrial world, twenty-four hours a day. This has had an important impact on the behavior of users of financial services, producers of financial services and regulators of financial services.

⁴¹Martin Feldstein and Charles Horioka, "Domestic Saving and International Capital Flows," Economic Journal, (June 1980), 90, pp. 314-29.

⁴²See Frankel for a detailed discussion and analysis of the literature. Frankel, "Measuring International Capital Mobility," pp. 197-202.

Cross-border flows of financial transactions have increased more rapidly than the growth of income or international trade. These flows have undoubtedly tightened international linkages between national financial markets in leading industrial countries. The growth of cross-border flows has been supported by the international expansion of financial institutions headquartered in leading industrial countries. Although these foreign offices must comply with local regulations, they inevitably intensify competition and introduce new kinds of financial products and practices which often lead to changes in local regulations. The menu of financial choices in different national markets is consequently becoming more similar over time. This trend has been most pronounced with regard to large, wholesale transactions. But the same forces of innovation and technological advance that are integrating offshore and onshore markets are also breaking down barriers within traditionally segmented national financial markets.

International comparisons of assets returns indicate that international financial integration has advanced to the third level in which short- to medium-term fixed income assets insured against foreign exchange risk are virtually perfect substitutes across the leading industrial countries. But uncertainty about movements in nominal and real exchange rates presents an obstacle to achieving the deeper level of financial integration that prevails within leading industrial countries. For longer-term, more heterogeneous financial instruments, residual country premiums may also interfere with international substitutability of otherwise comparable assets.

Large, sophisticated institutions dealing in short- to medium-term financial instruments enjoy a degree of international financial integration that is without precedent in the post-war era. This is in striking contrast to the tightly-insulated, heavily-controlled

national markets that prevailed just after World War II. Even before all leading industrial nations had achieved external convertibility, the development of the Eurocurrency markets gave the largest investors and borrowers access to an offshore market in which covered interest rate parity prevailed. But domestic financial regulations and capital controls continued to impede the integration of offshore and onshore markets.

Since the 1970s the major industrial countries have liberalized their domestic financial regulations and relaxed controls on international flows of capital. The correspondence of the two trends was not coincidental. Growing cross-border flows put pressure on restrictive domestic regulations and the liberalization of domestic regulations further increased cross-border flows. These developments tended to be sporadic; but by 1990, covered interest differentials were negligible for all major industrial countries.

Are these changes irreversible? The answer is clearly no. Indeed, it is arguable that the world has not yet returned to the level of financial integration that prevailed in the late 19th century when real interest rates differed little across major countries.⁴³ Moreover, the behavior of France in the 1980s indicates that decisions to liberalize can be reversed for at least short periods of time.

But even though a retreat from international financial integration is possible, the costs of withdrawing from an integrated world financial market are rising. Technological advances have limited the scope for autonomous regulatory action that raises the cost of

⁴³Turner concludes from his analysis of the gold standard era (1881-1913) that "nominal long-term interest rates in the major industrial centers (Belgium, France, Germany, the Netherlands, the United Kingdom and the United States) did not diverge from each other by more than one percentage point. Because prices in different countries also tended to move together, there was a marked tendency for real rates of return to be equalized internationally." Philip Turner, Capital Flows in the 1980s: A Survey of Major Trends, BIS Economic Papers, no. 30, (April 1991), Bank for International Settlements, Monetary and Economic Department, Basle, p. 17.

financial services. The introduction of personal computers, modems and international direct-dial telephone systems has sharply limited a government's options for insulating its financial sector from the integrated international financial system. Unless a government chooses to impose draconian controls on cross-border flows of information and people, sophisticated transactors can readily shift from costly domestic financial services to cheaper foreign substitutes. And controls of that degree of stringency on movements of people and information would impose heavy costs, not just on the financial sector, but on the whole economy. Governments may still choose to impose costly regulations, but these regulations may no longer accomplish the policy goals they are intended to achieve.

Will the world economy proceed to higher levels of integration, ultimately approaching real interest parity? The answer depends in part on the kind of exchange rate system that countries choose. The policy changes that have reduced country premiums and advanced the industrial nations to the third level of integration have required only autonomous policy decisions to liberalize domestic financial regulations and lower capital controls. To a considerable extent, technological advances have driven this process by facilitating innovations that permit sophisticated transactors to evade costly regulations. Liberalization and deregulation have as often been an admission that traditional policies no longer work, as an attempt to achieve welfare gains from a more competitive financial system. This process is likely to continue to integrate internal markets between maturities, between sectors, between institutions, and between instruments to facilitate international substitutability over a wider range of assets.

The main barrier to the next higher levels of integration, however, is exchange rate uncertainty. Reduction of exchange rate uncertainty requires a very high degree of

international cooperation. It cannot be accomplished by the actions of a single country. Although groups of countries may choose to adopt a common currency -- and in mid-1993, even the plans of the European Community in this regard seem highly uncertain -- it is doubtful that all major countries would choose this option.

Even if international financial integration does not advance to the next higher levels, the current level of integration raises important challenges for policy makers. The degree of substitutability between domestic financial instruments and international alternatives is already great enough to constrain the discretion of national policy makers with respect to macroeconomic, regulatory and prudential policies. Other monographs in this series consider the way in which international financial integration affects monetary policy, fiscal policy, exchange rate policy and the regulation of multinational enterprises. This monograph focuses on the implications of international financial integration for prudential policies -- measures designed to protect the safety and soundness of the financial system.

As we argue in Chapter 3 and 4, international financial integration affects both ex ante policies devised to prevent threats to financial stability and ex post prudential policies designed to limit the damage to the financial system and the real economy once a shock has occurred. Ex ante, the authorities face increasing difficulties in monitoring the safety and soundness of financial institutions as they become more involved in international financial transactions. Information on foreign transactions is often more costly to obtain and interpret. Moreover, notwithstanding the substantial potential benefits of international diversification, financial institutions engaged in international transactions may face three kinds of risk that do not occur in purely domestic financial transactions.

First is foreign exchange risk. Foreign exchange positions, like other speculative

positions in assets with volatile prices, may jeopardize the solvency of an institution.

Second is transfer risk -- the possibility that residents of a particular foreign country will be unable to pay a promised amount because the central bank on which they depend for foreign exchange is unable or unwilling to permit local currency to be converted in the currency in which the contract is denominated. Third is international settlement risk -- the possibility that the quid pro quo in a foreign exchange transaction that an institution paid out earlier in the Greenwich-mean-time day will not be received when the relevant market settles later in the Greenwich-mean-time day.⁴⁴ This risk arises from the fact of multiple time zones.

After a shock to the solvency of an important financial institution has occurred -- either because of the realization of a foreign risk or a traditional domestic risk -- the authorities may experience greater difficulty in organizing an effective response when markets are highly integrated internationally. An effective, ex post response may require cooperation among national authorities in several different countries to gather information and perhaps to perfect collateral and provide resources. Moreover, the increased capital mobility that has accompanied deeper international financial integration means that the authorities have a much shorter time to perceive and react to a shock. And, the acceleration of financial innovation that has gone along with greater international financial integration has increased the complexity of interconnections among financial market participants. This makes it more difficult to implement an effective, ex post prudential policy if an important market participant were to fail. We shall address these aspects of international financial integration in the chapters which follow.

⁴⁴This intra-day risk is sometimes known as “Herstatt risk” (see Chapter 3).

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