The Credit Slowdown Abroad

by S. Hickok and C. Osler[1]

Introduction

Over the last few years credit growth has slowed sharply in most industrialized countries. This paper examines the factors behind this credit slowdown. We concentrate on the recent behavior of credit in Japan, the United Kingdom, and France. These countries are chosen because of their prominence and the broad range of their credit experiences. We put these countries' experiences into an historical perspective and then undertake an econ-ometric examination of the factors lying behind them. In addition, we discuss the similarities among credit developments in these and other major foreign industrial economies.

We find that the slowdowns in credit growth in Japan, the United Kingdom, and France reflect in large part the return of credit growth rates to more normal levels after exceptionally rapid growth in the 1980s. Cyclical factors—the rapid rise and then slowdown in GDP growth—played a role in these credit dynamics, particularly in France, but noncyclical factors were generally more important. The financial market deregulation and innovations that took place in most industrial countries during the 1980s were the most significant noncyclical factors. Deregulation, most notably the end of credit controls, was generally followed by a period of fast growth in credit as previously rationed sectors gained improved access to credit markets. This source of growth would naturally have tapered off as such agents, typically consumers, began to reach their desired borrowing positions. We find that this deregulation-induced swing in credit growth was most important in France, where deregulation was most recent, but was important elsewhere as well. Other financial market developments, such as the introduction of commercial paper markets in all three countries and the sharply increased issuance of equity-linked bonds in Japan, led to temporary surges and declines in individual categories of credit as agents shifted their portfolios to take advantage of new opportunities. More generally, financial innovation led to a deepening in financial intermediation and permanently higher credit/GDP ratios.

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Financial market deregulation and innovations were primary forces behind rapidly rising equity and real estate prices in the 1980s, and these asset price dynamics in turn contributed significantly to the surge and subsequent slowdown in credit growth. Agents' wealth and their ability to borrow increased along with asset prices, as did the amount agents needed to borrow to purchase any individual asset, providing impetus to credit growth. Asset prices eventually began to slow, which reduced growth in agents' borrowing capacity and lending. This wealth-related effect of asset prices on credit seems to have been important in all three countries. Fast asset price increases also attracted speculative borrowing during the late 1980s, and then declining prices discouraged such borrowing. This relatively transitory speculative element is estimated to have been most important in shaping credit developments in Japan and least important in France.

The recent slowdown in credit growth abroad was also influenced in some countries by increased attention to capital adequacy levels in the late 1980s and early 1990s, in response to the announcement by the Bank for International Settlements (BIS) of new bank capital standards. This source appears to have contributed significantly to the credit slowdown in Japan but not to the credit slowdowns in the United Kingdom and France.

The pattern we observe in our three focus countries appears in most other industrialized economies. Germany, Italy, Spain, Sweden, Switzerland, and Australia generally experienced rising credit growth which peaked at levels much higher than GDP growth and subsided thereafter. As in our focus countries the rise and fall in credit growth generally followed deregulation and other financial market changes and was accompanied by rapidly rising and then falling asset prices, particularly in real estate. Credit adjustment problems tied to speculative asset market dynamics, in particular, appear to have been substantial in many countries where credit surged markedly. Germany stands out as having little deregulation, no burst of credit growth, and no major developments in asset prices; Sweden stands out as being relatively extreme in all these dimensions.

Section I of our study provides an historical perspective on credit market developments in Japan, the United Kingdom, and France. In Section II we support these narrative observations with econometric analysis of credit behavior in each country. Section III summarizes credit developments in the other foreign countries and in Section IV we conclude.

I: Historical Perspective on Credit Developments in Japan, the United Kingdom, and France

Nominal credit growth slowed markedly after 1989 in Japan, the United Kingdom, and France (Charts 1-3), and by 1991 it had generally fallen to half or less than half of the rates of growth registered during the late 1980s. The U.K. credit slowdown was particularly dramatic: bank credit grew only 2 1/2 percent in 1991, down from 30 percent in 1988. The credit slowdown in each of the countries was widespread as well as severe, affecting most types of loans and most categories of borrowers and lenders.

In this section we present these credit developments in an historical perspective. For each of the three focus countries we provide first an overview of credit developments since 1980 and then an in-depth discussion of the factors behind those developments, particularly the recent credit slowdown. We highlight the contributions of financial market deregulation and innovation, asset market developments, cyclical factors, and credit supply constraints.

Chart 1: Credit and GDP: Japan

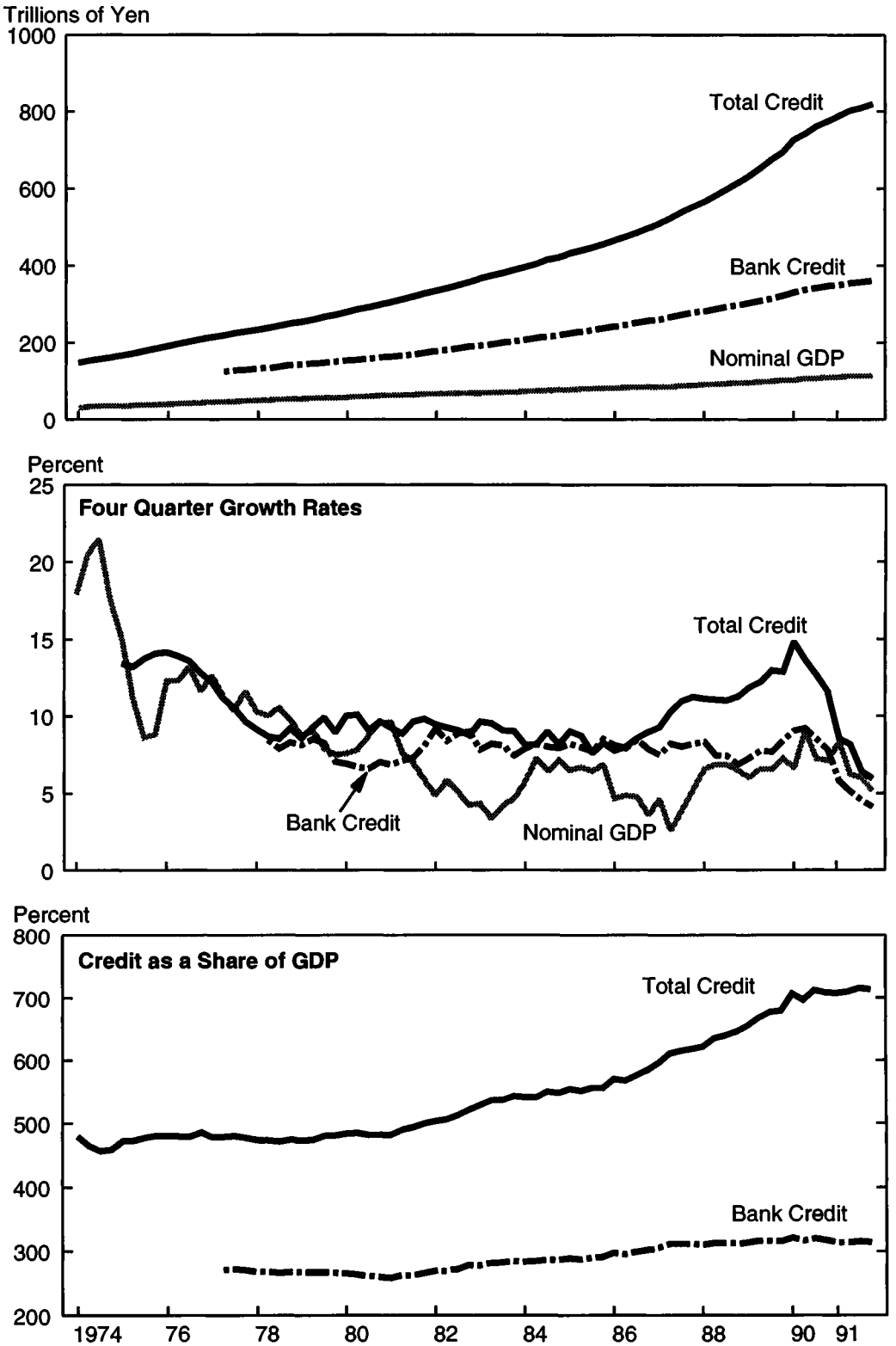


Chart 2: Credit and GDP: United Kingdom

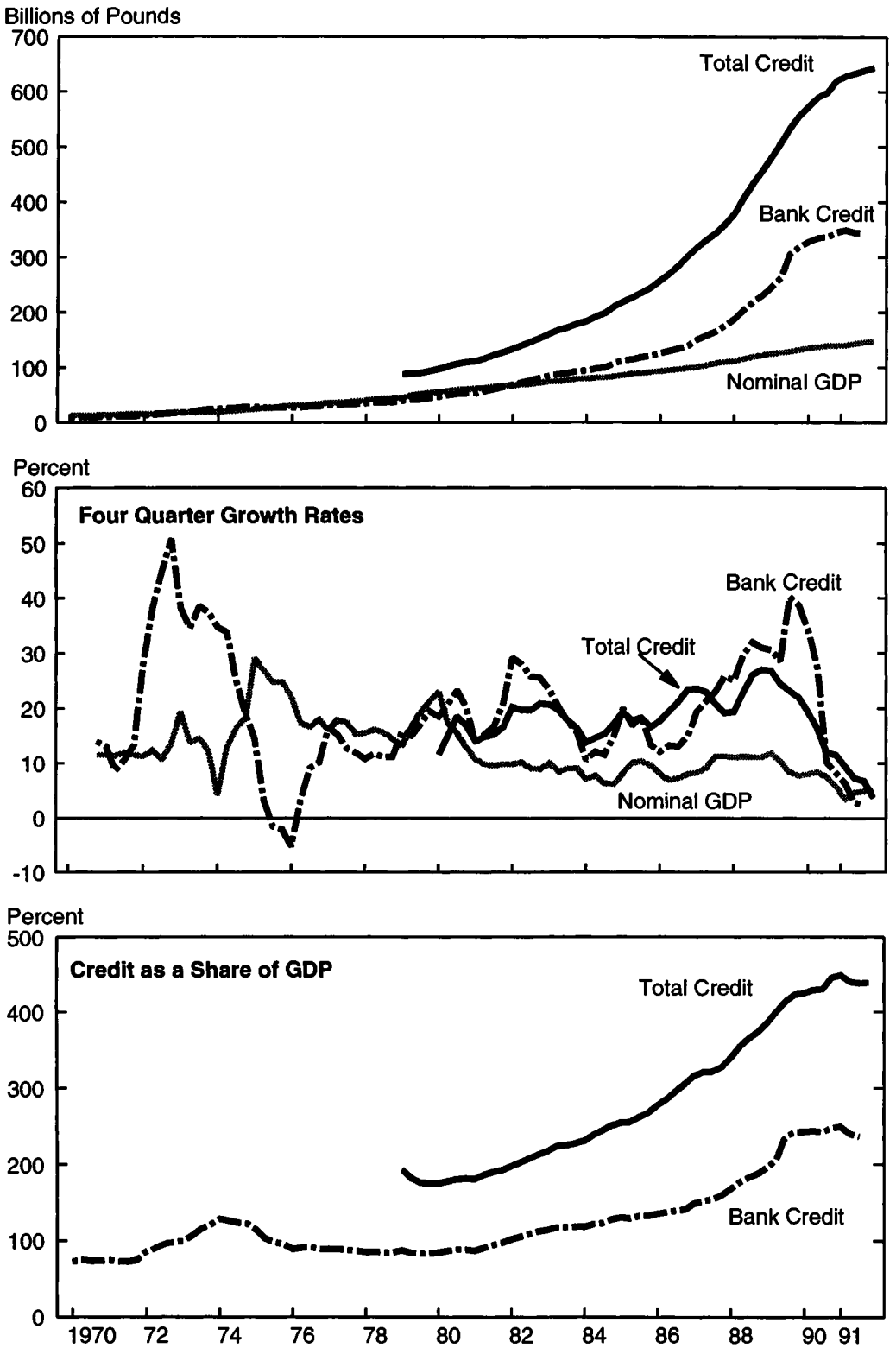
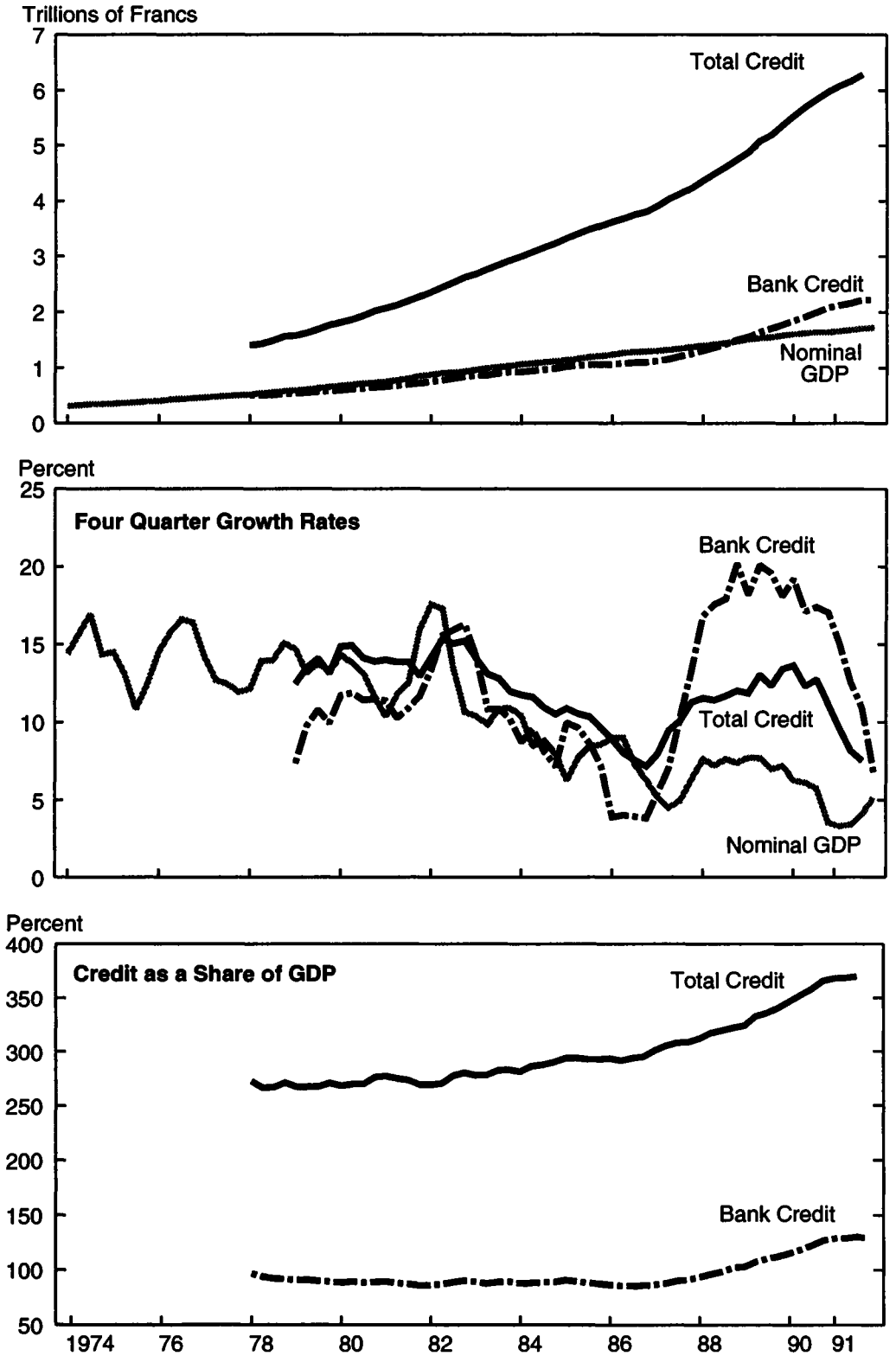


Chart 3: Credit and GDP: France



We focus on credit to the private nonfinancial sector and use two measures of credit, "bank credit" and "total credit." "Bank credit," which includes loans to commercial and industrial firms, consumer loans, and mortgages, is of primary interest to those concerned with the banking sector *per se*. "Total credit," which includes bonds issued by nonfinancial companies, commercial paper, and mortgages issued by non-bank financial firms, as well as bank credit itself, is of greatest relevance to those interested in economic growth.

Japan

As shown in Chart 1, credit growth in Japan slowed dramatically in 1991. This slowdown must be evaluated in light of the extremely rapid growth which preceded it, also shown in Chart 1. A brief historical and cyclical perspective on Japanese credit will be helpful before we turn to analyze the underlying determinants of recent credit developments.

Table 1 presents a disaggregated view of recent Japanese credit developments. Growth in credit and GDP were fairly comparable during the 1970s but diverged sharply thereafter. Despite the slowdown in nominal GDP growth in the early 1980s, growth in

Table 1: Japan: Outstanding Growth in Private Nonfinancial Credit
Average Annual Growth Rate

	1974-IV to 1977-IV	1977-IV to 1981-IV	1981-IV to 1982-IV	1982-IV to 1985-IV	1985-IV to 1986-IV	1986-IV to 1989-IV	1989-IV to 1990-IV	1990-IV to 1991-IV
Nominal GDP	10.7	8.2	4.2	6.2	3.6	6.3	7.1	5.1
Real GDP	4.4	4.2	3.9	4.2	2.5	5.3	4.7	3.2
CPI	8.0	5.1	2.2	1.8	-0.7	1.5	3.3	2.8
Total credit	12.2	9.4	8.8	9.8	8.9	13.5	11.5	5.9
Bank credit of which to:	n.a.	7.6	9.0	7.9	7.8	7.8	7.8	4.1
Corporations	n.a.	7.0	9.5	8.3	7.1	5.6	6.4	3.5
Consumers and unincorporated businesses	n.a.	7.1	8.9	16.0	25.8	30.1	22.8	7.2
Mortgages		13.4	4.9	2.9	9.3	17.1	10.2	6.0
Nonbank credit of which:	n.a	11.7	8.6	11.8	10.0	18.6	14.3	7.2
Bonds	14.1	9.0	5.6	29.1[a]	13.9	26.9	18.3	11.9
Commercial paper	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	24.7	-22.9

[a] Foreign currency bonds are included in bond values outstanding from 1985-IV on; growth in domestic bonds alone averaged 15.7 percent over the 1982-IV to 1985-IV period.

almost all types of credit was quite robust.[2] Credit to consumers and small (unincorporated) businesses rose particularly rapidly.

The 1986 economic slowdown in Japan had no apparent effect on the rate of credit growth. Mortgage credit growth increased and credit to consumers and small businesses accelerated even further. The sharp divergence of GDP and credit growth continued during the rapid economic growth period of 1987-89. Nonbank credit growth surged to a 19 percent annual rate, triple the rate of GDP growth, an acceleration which was spurred in part by the introduction of a commercial paper market. Bank credit growth, on the other hand, remained high during the recovery but did not accelerate. The banks' traditional corporate customers increasingly met their credit needs in the nonbank securities market, a force which offset soaring growth of bank lending for mortgages, consumers loans, and small businesses.

Credit growth remained strong through 1990, then abruptly fell off. The deceleration was pronounced in all types of credit instruments and to all credit borrowers. The sharpest decline, however, was in the commercial paper market, where credit outstanding actually fell by 23 percent. The slowdown in bank credit growth to consumers and small business was also acute.

Viewed over the entire 1980s, Japanese credit growth clearly exhibited a sharp rise relative to economic activity (GDP). This rise was especially evident in 1982 and 1986 when credit growth picked up and then maintained its momentum despite slowdowns in the Japanese economy. Only in 1991 did the rising trend in Japanese credit growth appear to have waned. We will now investigate the primary factors—financial deregulation coupled with financial innovation, asset price developments, and monetary and capital adequacy policies—shaping this credit behavior. During our investigation we will distinguish between those factors likely to have had a fundamental (that is, sustained) impact on the credit-GDP relationship and those factors that probably only temporarily altered this relationship during the last decade.

Sources of Rapid Credit Growth in the 1980

A key factor leading to a sustained rise in credit relative to GDP was the deregulation of Japanese credit markets in the early 1980s. Of particular note, Bank of Japan "window guidance" credit controls on banks, occasionally binding in the 1970s, were employed much less restrictively in the 1980s.[3] One result of the loosening in credit controls was that loans to individuals and small business, to a large extent rationed out in the 1970s, rose sharply in proportion to loans to manufacturing corporations (in Table 1 this can be inferred from the much higher growth rates of loans to individuals and small businesses than loans to manufacturing corporations). Much of the *growth* in consumer and small business loans represented a credit stock adjustment as previously unsatisfied credit demand was met and the *stock* of credit outstanding permanently rose relative to the level of GDP.

A shift in corporate borrowing to nonbank sources, reflecting both deregulation and financial innovation, facilitated bank lending to consumers and small businesses. The introduction of commercial paper in 1987 was a salient example of deregulation and innovation spurring nonbank credit growth. Newly sanctioned Japanese borrowing in the

[2] Only mortgage growth slowed along with GDP growth in the early 1980s. However, mortgage credit had grown very rapidly in the 1970s due to government incentives.

[3] *OECD Economic Survey on Japan*, July 1984, discusses the declining importance of window guidance as a policy instrument. See also Cargill and Royama (1992).

Euromarkets was another example. Technological advances in financial services along with new hedging and other financing options further promoted growth in corporate borrowing, especially outside of traditional "main bank" channels.[4] Again, here was a fundamental shift in credit dynamics that affected the credit-GDP relationship during the 1980s.

The mid-1980s increase in the spread of bank lending rates over government bond yields was, surprisingly, clear evidence of the significant impact of financial market deregulation and liberalization. Financial opening to foreign investors tended to push government bond yields down. At the same time the lifting of interest rate ceilings tended to raise private borrowing rates.[5] In consequence, by the mid-1980s the mortgage spread over government bonds was well over 100 basis points, compared to a negligible or negative spread in the early 1980s (Chart 4).

Another important factor promoting, as well as being promoted by, the rise in credit growth was a rapid rise in stock and real estate prices (Chart 5).[6] Land prices almost doubled in the 1980s while equity prices increased fivefold. These sharply escalating prices were in part a result of rapid credit growth but the rising asset prices, in turn, spurred credit growth even further.[7] Specifically, rapidly rising stock prices drastically

[4] Japanese corporations have traditionally had a "main bank" that looked after their financial needs. Ogusi (1990) discusses the role of swaps and other new financing options in diversifying the sources of corporate funding.

[5] Bank of Japan (1990) discusses the impact of interest rate liberalization.

[6] Stock price developments shown on Chart 5 are based on index of all share issues listed on the Tokyo Exchange, published in the International Monetary Fund's *International Finance Statistics*. Urban land price developments are based on an index reported in the Nikkei Macro Economic Statistics Data Bank.

[7] Japan's strong economic performance relative to other industrial countries also fueled the asset price rise.

Chart 4: Housing vs Government Bonds Yields: Japan

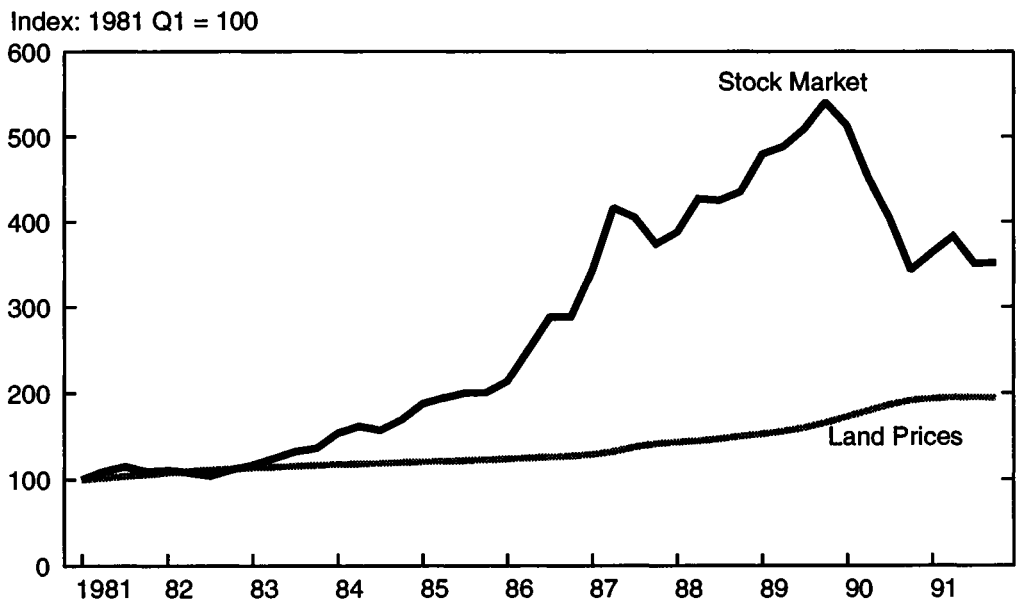
reduced the price of corporate convertible and warrant bonds and, hence, led to an explosion in the corporate issuance of these securities in the second half of the 1980s.[8] A sharp drop in bank interest rate spreads over government bonds in the latter 1980s was in part a result of the emergence of this alternative cheap source of credit. On the real estate side, rapidly rising land prices provided a growing source of collateral for bank loans. Soaring asset prices also raised the demand for borrowed funds to support both speculative and nonspeculative stock and real estate purchases.

These asset price developments clearly had both sustained and temporary effects on the credit-GDP relationship. Permanently *higher* asset prices meant permanently higher credit demand to cover the cost of asset purchases and permanently higher credit supply in response to permanently higher collateral value. Sharply *rising* asset prices temporarily raised credit demand for speculative purchases and temporarily raised credit supply in response to the attractiveness of potential gains on warrant and convertible bonds. Both factors pushed up the credit/GDP ratio in the 1980s.

Monetary easing following the sharp appreciation of the yen in the mid-1980s further fueled credit growth. The Bank of Japan's discount rate was lowered to a historically low (in nominal terms) 2 1/2 percent in 1987 while the monetary base grew on average 11 1/2 percent per year between 1986 and 1989, up from 7 percent per year in the preceding four year period. The slowing Japanese economy in 1986 was partly responsible for the monetary easing, but the easing was greater (measured in terms of monetary base growth) than that following the two previous Japanese slowdowns. In consequence, credit growth was further promoted relative to GDP growth in the late 1980s. Monetary ease also contributed to the 1988-89 drop in bank lending spreads over government bond yields since bank rates were more closely tied to Bank of Japan policy.

8. The outstanding level of convertible bonds rose at an average annual rate of 39 percent between the end of 1985 and the end of 1989.

Chart 5: Asset Prices: Japan



The Credit Slowdown of the 1990s

The catalyst for the slowdown in credit growth in 1991, in turn, was a tightening in monetary policy. Partly in response to concern about the asset price boom, the Bank of Japan raised the discount rate to 6 percent by 1990 and loan spreads widened. Both GDP and credit growth slowed. The 1991 credit/GDP slowdown was notable in that for the first time in a decade credit growth fell back to the pace of nominal GDP growth, suggesting that the noncyclical factors pushing credit growth during the 1980s had dissipated as the 1990s began.

One factor that contributed to the declining credit growth rate in 1991 was a sharp drop in credit growth to the areas that were earlier promoted by financial market deregulation. Growth in credit to consumers and nonincorporated businesses slowed markedly while commercial paper issuance dropped precipitously. Some slowing in credit growth to consumers and nonincorporated business was to be expected; the surging credit growth rates of the 1980s would eventually decline as actual credit levels began to meet previously rationed out (unsatisfied) credit demand. Indeed, the ratio of household debt to household disposable income had roughly doubled during the 1980s, suggesting substantial stock adjustment had occurred by the end of the 1980s in response to the earlier financial opening to this sector. Both borrowers and lenders, viewing the consequent rise in debt service obligations, would not likely be willing to sustain the previous pace of debt accumulation. Overall, the stock adjustment dynamics suggest that credit growth would naturally slow eventually but the level of credit outstanding relative to GDP would be permanently higher at the end of the decade in response to early 1980s deregulation.

Growth in commercial paper issuance would have *slowed* for the same stock adjustment reason. The outright *decline* in commercial paper was attributable, in part, to loan problems (to be discussed shortly) at financial firms, the prime purchasers of commercial paper. This decline helped generate a rise in commercial paper rates which further depressed commercial paper sales since it eliminated the profitable arbitrage opportunity corporations had found in selling commercial paper to fund large time deposits.[9]

A second factor affecting credit growth that clearly changed at the end of the 1980s was the bursting of the asset price bubble. After an earlier dramatic ascent, Japanese stock prices fell 25 percent during 1989-91. Japanese land prices levelled off and in some areas (most notably in Tokyo) tumbled substantially. Tightened monetary policy, a sense that asset prices had moved to an unsustainably high level, and Ministry of Finance restrictions on real estate lending (banks were only allowed to increase real estate loans at the same rate as they increased their total loan portfolio during 1990 and 1991) all contributed to the turn-around in asset prices.[10]

The turnaround in asset prices affected credit growth in a variety of ways. Some bank borrowing may actually have been promoted as equity-related funding decreased. However, desired borrowing for speculative purchases was discouraged by the end of the asset price rise while borrowing needs to finance actual asset transactions declined. Turnover on the Tokyo stock exchange fell 58 percent measured by the number of shares sold (67 percent measured by the yen value of transactions) between 1989 and 1991. The volume of real estate transactions also sank.

[9] The outstanding level of convertible bonds rose at an average annual rate of 39 percent between the end of 1985 and the end of 1989.

[10] Bank of Japan (1992a) emphasizes the role of real estate lending restrictions. It is of note that real estate lending did not pick up with the ending of restrictions, as discussed in Bank of Japan (1992b).

A more significant impact of declining asset prices, particularly in real estate, was erosion of the value of collateral held against many loans. Real estate lending based on liberal loan/value ratios during the real estate boom exacerbated this problem. Problems with credit losses from 1989 on, many associated with real estate loans, badly hurt bank balance sheets and, therefore, bank credit availability. Estimates of the magnitude of problem loans eventually ranged as high as ¥60 trillion, or 16 percent of total bank credit outstanding to the private sector.[11] These estimates, even if overstated, raised deep concerns about the financial health of the banking sector, further freezing up financial transactions and, thereby, limiting loan growth.

The effect of the turn-around in asset prices on bank credit availability was amplified by the BIS capital adequacy rules introduced in major industrial countries in 1988.[12] These rules specified what level of bank capital was necessary, in relation to a bank's asset portfolio, for a bank to be considered adequately capitalized. In Japan, corporate equities form a significant part of the bank capital base. The sharp decline in Japanese stock prices, consequently, made meeting the new BIS capital adequacy ratios much more difficult. In order to attain the BIS capital adequacy ratios banks slowed credit growth as the equity component of their capital base declined.

The bursting of the asset price bubble clearly ended the temporary, speculative factors pushing up credit growth in the 1980s. In fact, to the extent that it contributed to financial problems, the bursting of the bubble actually temporarily pushed credit growth down. Asset price developments had a more sustained impact on Japanese credit levels as well. Asset prices and therefore wealth had, on net, risen much more rapidly than nominal GDP over the whole 1980-91 period. Consequently, asset price developments during the 1980s were partially accountable for a sustained rise in the credit/GDP ratio over the last dozen years.

Overall, the recent slowdown in Japanese credit growth appears to reflect to a large extent an unwinding of developments that spurred a dramatic credit surge during the 1980s. With the unwinding of these developments, credit growth appears to have returned to its more normal relationship with GDP growth, although the credit/GDP ratio has been left permanently higher by the 1980s developments. To be sure, the unwinding of the developments that had spurred the 1980s credit surge has now temporarily slowed both GDP growth and credit growth, with the slowdown in each reinforcing the slowdown in the other. Despite this current role played by weak GDP growth, noncyclical factors (some fundamental and some temporary) appear to have been the prime determinants of the credit slowdown in Japan, just as they were the prime determinants of the earlier credit surge.

United Kingdom

The United Kingdom has had a quite varied credit growth picture over the last two decades. The early 1970s started with a credit boom (Table 2). Nominal credit growth then slowed markedly in the mid-1970s as recession hit the U.K. economy. With recovery in the later 1970s, nominal credit grew apace with GDP. As in Japan, however, a

[11] *The Economist* (4/11/92); *Financial Times*, (11/27/92).

[12] In 1988 the BIS member countries agreed upon minimum risk-weighted capital/asset ratios that banks would be required to meet by 1993. Interim targets were set to be met by the end of 1990. Banks responded to these requirements prior to 1990 and 1993 because an adjustment in capital/asset ratios takes time and because financial markets began to measure the strength of banks in terms of these risk-weighted values.

notable change occurred in the relationship between credit and GDP at the turn of the decade. Credit began to significantly outpace nominal GDP as the U.K. economy again entered recession. In fact, during the early 1980s recession consumer credit from banks grew at an average annual rate of 27 percent, in sharp contrast to its 5 percent average annual decline during the mid 1970s recession.

Mortgage credit growth, along with still relatively buoyant consumer credit growth, led strong total credit growth in the subsequent recovery. During the 1982-89 period total credit growth averaged about 20 percent a year, with business borrowing eventually outpacing still strong mortgage and consumer credit growth rates in the second half of the decade. A sharp pick-up in business borrowing from banks (to an annual average growth rate of 32 percent) also offset some tapering off of nonbank credit growth in the second half of the decade.

The fact that U.K. credit grew at roughly twice the pace of U.K. nominal GDP from 1982 on means that there has been a sharp rise in the U.K. credit/GDP ratio over the past decade, similar to the rise that occurred in Japan. As was also the case in Japan, this rise ended abruptly as the 1990s began. By 1991, nominal U.K. credit growth was slower than nominal GDP growth (4 percent versus 5 percent), with actual declines registered in business and consumer credit.

Sources of Rapid Credit Growth in the 1980s

Again as was true with Japan, regulatory changes played a major role in the rise in British credit outstanding during the 1980s. Regulatory changes, in fact, played an impor-

Table 2: United Kingdom: Outstanding Growth in Private Nonfinancial Credit
Average Annual Growth Rate

	1970-IV to 1973-IV	1973-IV to 1976-IV	1976-IV to 1979-IV	1979-IV to 1981-IV	1981-IV to 1986-IV	1986-IV to 1989-IV	1989-IV to 1990-IV	1990-IV to 1991-IV
Nominal GDP	12.5	20.2	16.9	11.3	8.4	10.0	5.2	5.4
Real GDP	3.6	0.9	2.5	-1.7	3.3	3.4	-1.4	-1.1
CPI	9.1	19.4	12.8	13.6	5.0	6.1	10.0	4.2
Total credit	n.a.	n.a.	n.a.	16.7	18.8	22.3	11.5	3.7
Bank credit of which to:	32.9	8.7	14.1	20.5	16.7	27.4	8.2	2.4[a]
Corporations	28.3	11.3	10.9	15.5	11.5	32.2	7.7	-3.7
Consumers and unincorporated businesses	46.1	-4.9	23.3	27.0	19.0	21.4	9.3	-0.3
Nonbank credit	n.a.	n.a.	n.a.	13.2	20.8	17.6	15.0	11.5[a]
Residential mortgages, all private lenders	18.0	17.5	14.2	17.4	21.3	19.3	14.6	9.3

[a] 1990-III to 1991-III.

tant role in British credit developments in the 1970s as well. The early 1970s credit boom followed measures of financial market deregulation; the boom ended in the mid-1970s when the Bank of England introduced the "corset" mechanism to control credit growth. The corset required banks expanding credit beyond specified limits to hold noninterest-bearing deposits (in excess of their ordinary reserves) at the Bank of England.[13] The corset, along with the mid 1970s recession, explains the sharp slowdown in credit growth in the mid 1970s.

The abolition of the corset mechanism at the beginning of the 1980s was a major factor contributing to the rapid rise in British credit outstanding over the last decade. One of the most important ramifications of the end of the corset was commercial banks' entrance into the mortgage arena. Corset lending ceilings had led commercial banks to avoid this financial area in the 1970s, allowing building societies (institutions analogous to savings-and-loans in the United States) to run the mortgage market in an informal cartel-like manner.[14] The government had helped deter commercial banks, and thus solidify the cartel, by putting pressure on building societies to hold mortgage rates down. The result was mortgage rationing, mortgage queues, and little price competition in the mortgage market prior to lifting of the corset. With the end of the corset, commercial banks began a decade-long trend of increased penetration in the mortgage arena.

The initial stock adjustment of banks to the new lending environment took place during 1981-82. This period coincided with the surge in council-house sales, as the Thatcher policy of encouraging home-ownership took hold. Around 630,000 dwellings were transferred from the public to the private sector during 1980-84,[15] representing roughly 5 percent of the 1980 privately-owned housing stock and 40 percent of the total increase in owner-occupied housing during the period.[16] Together these forces led to an unprecedented increase in mortgage lending during the early 1980s (Table 2). The sharp rise in mortgage lending initially represented a permanent stock adjustment to the end of the mortgage rationing and mortgage queues that had marked the 1970s. This trend weakened during the mid-1980s, and then accelerated once again during the late 1980s, spurred in part by the end of government discouragement of borrowing against house values for purposes unrelated to housing.[17]

It is notable that the spread between mortgage rates and Treasury bill rates actually widened in the early 1980s (Chart 6) despite the sharp rise in mortgage lending competition. The widening spread was evidence that government pressure on building societies to hold mortgage rates down eventually gave way to market forces in the face of intense commercial bank competition. As was the case in Japan, this widening in the mortgage spread may be viewed as a signal of significant financial market deregulation.

Another contributor to the sustained rise in British credit outstanding relative to GDP during the 1980s was financial innovation, notably the introduction of new financial instruments. The commercial paper market opened in Britain in 1986. Note issuance facilities, swaps, and options were further significant innovations making credit more

[13] For a detailed discussion of the corset, see Bank of England (1982).

[14] See Coles (1992), and Davis and Saville, (1982).

[15] Bank of England (1985): 80-91.

[16] Table 1, p. 32, "Housing Tenure," in the Council of Mortgage Lenders' (1992).

[17] *Ibid.*, p. 226.

attractive to business.[18] These innovations were promoted by 1986 changes in financial market rules (primarily the end of restrictive practices such as fixed commissions and rigid demarcations between brokers and jobbers), known as the Big Bang, which led to a huge expansion in the financial services sector as financial firms jockeyed to gain market share in financial areas previously closed to them.[19]

Also contributing to business credit growth in the 1980s, but to a much more transitory extent, was an enhanced feeling of confidence in the British economy beyond that which would normally be associated with the U.K.'s actual GDP growth in any given year of the decade. Real GDP growth in Britain had been very strong from 1982 through the end of the decade. Averaging over 3 percent a year, British growth was substantially higher than that in the rest of Europe. This strong growth, coupled with sharp productivity increases and expected gains from the Europe 1992 program, temporarily raised the level of business confidence and investment beyond what it normally would have been.[20] The resulting investment boom contributed significantly to the sharp increase in business credit growth.

A dramatic increase in mergers and acquisitions (M&A) activity starting in 1985, partly related to increased confidence, further fueled the rise in business credit growth.[21] Running at roughly £20 billion a year, M&A activity in the second half of the 1980s was almost five times the level it had been in the first half of the decade. Although primarily financed by equity issuance, the credit-financed portion of the M&A boom was large enough to affect credit growth rates while the boom lasted.

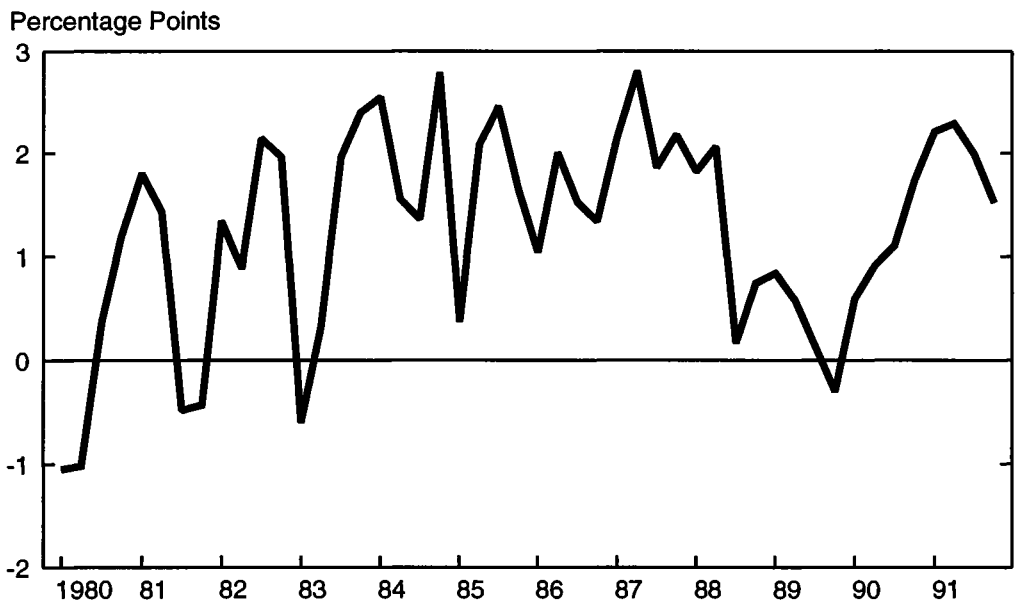
[18] See Benzie (1988).

[19] *The Economist* (1986).

[20] The surge in foreign direct investment in Britain in the late 1980s reflected the same forces.

[21] Benzie (1989) states that improving corporate financial positions were a major factor behind the British takeover boom.

Chart 6: Housing vs Government Bill Yields—United Kingdom



Strong British economic growth in the 1980s, buttressed by rising business confidence and the rapidly expanding British financial industry, led to a sharp rise in commercial real estate purchases, particularly in the London area. This real estate boom put further upward pressure on credit demand. The sharp rise in commercial real estate purchases, coupled with strong growth in the residential mortgage market, sent real estate prices soaring (Chart 7).[22] The ensuing large capital gains drew speculators deeper into the real estate market, temporarily pushing credit demand and real estate prices up even higher. Meanwhile, greater competition in real estate lending was accompanied by a loosening in credit quality standards: loan-to-value ratios rose significantly.[23] This loosening exacerbated the real estate bubble and eventually led to credit problems.

The Credit Slowdown of the 1990s

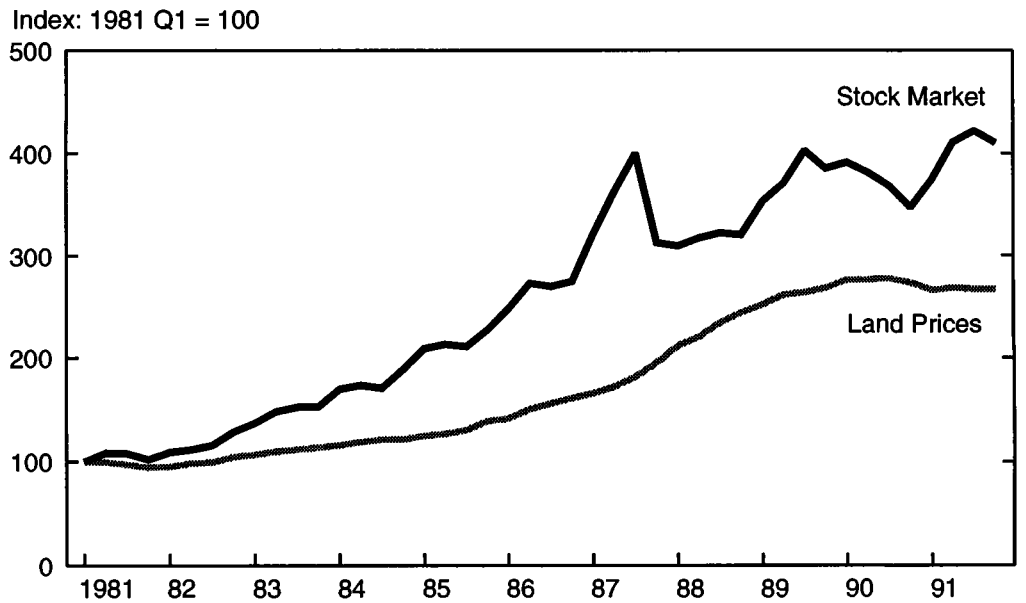
The slowdown in U.K. credit growth at the beginning of the 1990s had several significant elements in common with the slowdown in credit growth in Japan. The catalyst for the U.K. slowdown was tightened monetary policy. The Bank of England raised U.K. base rates by roughly 6 1/2 percentage points, to 15 percent, between the beginning of 1988 and the end of 1989. Monetary tightening precipitated an economic slowdown in the United Kingdom and the accompanied unwinding of the special factors that had led to the rise in British credit during the 1980s.

The U.K. economy fell into recession in the summer of 1990. The recession brought with it a great fall in business confidence and a bursting of the U.K. real estate bubble.

[22] Stock price developments shown on Chart 7 are based on the Financial Times Index of 750 stock issues. New dwelling price developments are based on an index published in the Central Statistical Office's *Economic Trends*.

[23] Bank of England (1992).

Chart 7: Asset Prices: United Kingdom



It also coincided with the natural tapering off of adjustment to earlier market deregulation. This natural tapering off can be seen in the slowing, albeit still fast, growth for residential mortgage lending in the second half of the 1980s.

A particularly salient aspect of the U.K. slowdown was an actual decline in house prices beginning in late 1990. This decline in house prices contributed to already surging mortgage foreclosures and personal insolvencies. The volume of house sales and of mortgage lending declined dramatically for the same fundamental and transitory reasons discussed in relation to Japanese real estate developments. Mortgage repayment problems and concern about the ability of borrowers to make scheduled payments in the high interest rate environment also explain why U.K. mortgage lenders let spreads over government bond rates narrow significantly in 1991.[24]

Housing market problems were not the only source of credit losses for the British financial system. The M&A boom had left the corporate sector more highly leveraged than it had been in previous recessions—net corporate interest payments rose to 19 percent of post-tax income in 1990 versus only 9 percent in 1980. Not surprisingly, the rate of business insolvencies has been quite high during the recent recession. Aside from raising bank concern about corporate credit quality, rising insolvencies chipped away at bank capital. Although British banks remained strongly capitalized, with BIS risk-adjusted capital adequacy ratios generally above 10 percent, credit losses had to slow the rate of growth of loans if banks were to retain their capital positions.

All of these developments sapped the confidence that had supported Britain's credit boom in the late 1980s. Indeed, investment has been unusually weak during the current recession while consumers have clearly retrenched with personal savings rates sharply rising. Business and consumer credit have fallen accordingly.

Overall, slowing credit demand due to cyclical factors appears to explain some but not all of the recent slowdown in British credit growth. The slowdown also reflects the natural tailing off of credit growth from its unsustainably rapid levels of the 1980s. This tailing off resulted as previously rationed mortgage demand became satisfied and credit levels reached their new, higher equilibrium levels relative to GDP. Credit quality problems that developed in both residential real estate and the corporate sector, problems which were in part due to unusually high debt burdens accumulated during the 1980s, temporarily exacerbated the credit slowdowns just as speculative and overconfident credit demand had temporarily exacerbated the credit surge in the previous period.

France

A sharp slowdown in French credit growth occurred in 1991. As in the other countries, the slowdown came after over a decade of double-digit credit growth, and it was widespread. As was also the case with the other countries, much of the French credit slowdown had its roots in the unwinding of the special factors accounting for the earlier rise in credit outstanding relative to the level of nominal GDP.

The history of French credit growth is so closely entwined with the use and then the termination of credit controls that it can best be chronicled in reference to credit control policies.[25] During the 1970s credit growth in France generally kept pace with nominal GDP growth (Table 3). During 1975, a year with some recessionary quarters, credit growth was just slightly above GDP growth. During the subsequent relatively strong

[24] Mortgage rates are flexible and adjusted annually in Britain.

[25] For a discussion of credit control policies, see Melitz (1991). For an analysis of their impact in the 1980s, see Quintyn (1991).

growth period of 1976-79, credit growth was just slightly below GDP growth. Credit to consumers and unincorporated business grew most rapidly but from a small base. This base was constrained by credit control measures known as the *encadrement du crédit*. The *encadrement* set individual bank ceilings on credit growth and punitive reserve requirements on banks breaching their ceilings.[26] Much of the credit extended during this period was granted at government subsidized interest rates.

The pattern of comparable French credit and GDP growth rates held through the oil shock period at the turn of the decade, although adjustments in the *encadrement* tightened allowable consumer credit growth. From 1982 on, however, French credit started to grow considerably faster than nominal GDP. Nonbank credit led the way, spurred by government incentives designed to develop the French capital market.[27]

There were further significant changes in mid-decade. During the 1985-86 period the *encadrement du crédit* was dismantled in a series of steps. Interest rate subsidies were also largely eliminated. Bank credit growth to consumers and unincorporated business soared. Banks competed to gain market share in the newly deregulated areas,

[26] Certain types of credit were exempted from the ceilings.

[27] Individuals were given tax concessions in return for investing in the French capital market. Banks were also encouraged to develop mutual funds.

Table 3: France: Outstanding Growth in Private Nonfinancial Credit
Average Annual Growth Rate

	1974-IV to 1975-IV	1975-IV to 1979-IV	1979-IV to 1981-IV	1981-IV to 1984-IV	1984-IV to 1986-IV	1986-IV to 1989-IV	1989-IV to 1990-IV	1990-IV to 1991-IV
Nominal GDP	12.5	14.1	13.7	9.8	7.4	7.0	3.5	5.2
Real GDP	1.5	3.5	1.4	1.3	2.4	3.6	1.5	1.8
CPI	10.0	10.0	13.9	8.7	3.5	3.3	3.6	2.9
Total credit	14.0	12.9	13.4	12.5	11.6	12.2	11.1	2.9
Bank credit	n.a.	n.a.	11.6	11.1	5.5	17.2	17.0	6.7
Nonbank credit of which:	n.a.	n.a.	14.3	13.2	14.2	10.2	8.5	1.0
Bonds	n.a.	n.a.	n.a.	n.a.	n.a.	10.2	12.5	12.8
Commercial paper	n.a.	n.a.	n.a.	n.a.	n.a.	75.3	23.3	0.2
All loans[a] of which to:	13.9	15.8	13.5	12.0	7.5	11.0	10.0	5.1
Business	12.3	15.3	13.0	11.4	5.7	11.4	12.9	6.4
Consumers	23.0	18.3	9.4	17.1	30.9	25.0	5.7	-2.3
Residential mortgages	15.4	16.4	14.8	12.5	7.9	8.3	6.2	4.4

[a] Loans granted by all financial institutions.

driving the quoted interest rate spread between mortgage credit and government bonds down to negligible levels by 1987 (Chart 8; interest rate subsidies had kept the quoted spread negative before 1985). Total bank credit growth, however, did not accelerate during this period, as corporations flocked to the commercial paper market which opened in the second half of 1985. Increased reserve requirements also held bank credit in check. Total credit growth, both bank and nonbank, continued to be significantly faster than nominal GDP growth.[28]

In the late 1980s bank credit picked up speed relative to both total credit and nominal GDP. This change can partly be explained by reduced reserve requirements and by changes in bank policy in response to nonbank competition, such as increasing the number of bank loans offered at close to money market interest rates as opposed to the higher prime rate.[29] Also important was a sharp increase in business trade credit borrowed from banks in light of the booming French economy. Overall, in the late 1980s total French credit growth was much stronger relative to nominal GDP growth than it had been in the late 1970s, the previous period of strong French economic growth.

Rapid French credit growth eventually came to an end. Although the slowing French economy in 1990 did not significantly slow overall credit growth that year, credit growth to consumers and unincorporated businesses did slacken substantially. In 1991, growth in total credit itself weakened dramatically, falling to only 3 percent from 11 percent in 1990. Bank credit growth slowed to 7 percent from 17 percent. Credit outstanding to consumers and unincorporated business actually declined, while the commercial paper market grew at only one-eighth its 1990 pace. Bonds were the only credit instrument whose growth held up.

[28] Bruneel (1987), discusses French financial market liberalization and innovation during this period.

[29] Melitz (1991).

Chart 8: Housing vs Government Bond Yields: France

The 1980s rise in credit relative to nominal GDP in France, consequently, appears to be in large part the permanent result of the ending of quantitative credit controls as well as other financial market deregulation. Although these factors also played a role in the Japanese and U.K. credit slowdowns, they appear to have been quantitatively much more important in France.

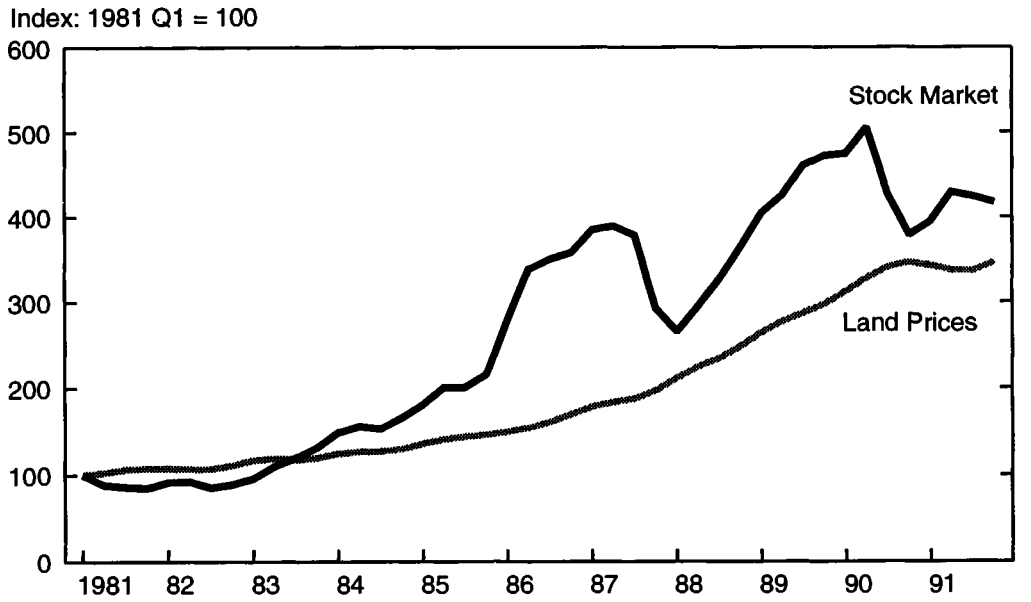
The contribution of asset price developments to credit growth in France is only partially similar to asset price effects in Japan and the United Kingdom (Chart 9).[30] As in those two countries, real estate prices in France rose rapidly, more than tripling over the decade. Equity prices increased even more, although at a very uneven pace. However, the impact of asset price rises on French credit growth was less than the corresponding impacts of asset price rises in Japan or the United Kingdom. French lending for real estate development was more highly regulated than in the other two countries, limiting the growth of credit to finance real estate speculation although not the growth of credit to finance nonspeculative real estate purchases.[31] A lower level of real estate speculation explains in part why the downturn in French urban commercial real estate prices since the beginning of 1990 has been much milder than that in either Japan or the United Kingdom. Stock price changes would likely have had a smaller impact on credit growth in France than in Japan or the United Kingdom because the share of equities in total corporate capital in France is far smaller than corresponding shares in Japan and the United Kingdom.

The recent deceleration in French credit growth accompanied a tightening in French monetary policy, as was the case with Japan and the United Kingdom. The Banque de France intervention rate rose from 7.75 percent in 1987 and 1988 to 10.0 percent by the

[30] Stock price developments shown on Chart 9 are based on an index published in the Banque de France's *Quarterly Bulletin*. Paris house price developments are based on an index published in the Bank for International Settlements' *Annual Reports*.

[31] For a detailed discussion of this point, see Sahling (1991).

Chart 9: Asset Prices: France



end of 1989. Yet the French situation again differed from that of Japan and the United Kingdom. On the consumer side the slowdown in French credit growth actually started before the monetary tightening. Consumer credit growth peaked in 1987 at 36 percent. There was some natural tapering off from this extraordinarily rapid pace in 1988 and 1989 as previously rationed out demand was finally satisfied.

The slowdown in consumer credit growth was also a response to the 1990 implementation of the *Loi Neiertz*, a bankruptcy law which limited the ability of banks to recoup credit losses.[32] This law, coupled with some increase in consumer loan problems as the economy slowed, reduced the willingness of banks to make consumer loans. Indeed the spread between mortgage loan rates and government bond rates rose from earlier negligible levels to about 100 basis points in the early 1990s.

Tightened monetary policy, together with a concomitant decline in economic activity, appears to have been the direct catalyst for the slowdown in French corporate business borrowing. However, other factors played a role here as well. Corporate profits, at over 9 percent of sales revenue, remained much higher than in previous periods of slack French growth (the average profit rate in the first half of the 1980s was 7.5 percent). Consequently, firms were able to finance a high proportion of their capital needs through retained earnings, further slowing credit growth. A second factor slowing business credit demand was a change in tax laws which made it less profitable for businesses to borrow money to invest in mutual funds. That corporate bond growth held up in 1991, while other forms of business borrowing slowed, probably reflected a shift from equity to bond financing of investment projects in view of the weakening in the French stock market in the early 1990s.

The financial situation of French banks appears to have contributed only modestly to the slowdown in French credit growth. At 8.7 percent in 1990, the average French bank BIS risk-weighted capital adequacy ratio was already above the 8 percent level required for 1993.[33] Moreover, since equity is a significantly smaller share of bank capital in France than Japan or the United Kingdom, the fall in French share prices since 1990 would have had a much more limited negative impact on bank credit growth. It should be noted, however, that since some French banks are nationalized, their lack of ability to raise new capital in the stock market may have made the BIS requirements somewhat more onerous than the requirements would be for private banks.[34] In general, the BIS requirements were not viewed as a major constraint to lending. Although problem loans did lead to increased bank provisioning and decreased profits in 1992, bank profit levels had been substantially higher in the late 1980s than in the early 1980s (30 percent of after-tax income in the late 1980s versus 20 percent in the early 1980s), suggesting substantial room for banks to adjust.

Overall, the slowdown in French credit growth appears to reflect to some degree the cyclical slowdown in the French economy in conjunction with tight monetary policy. But it also appears to reflect, to a very large degree, stock adjustment to regulatory changes in the form of some natural slowing from the extremely rapid credit growth

[32] Jacolin and Odonnat (1992).

[33] *Ibid.*

[34] The BIS risk-adjusted capital adequacy ratios come in two tiers. The Tier 1 requirement states that primary capital, which includes equity, must equal at least 4 percent of a bank's risk-weighted cumulative asset level. The inability of nationalized banks to raise new equity capital may make meeting the Tier 1 requirement more difficult. (The Tier 2 requirement states that a broader definition of capital must equal 8 percent of risk-weighted cumulative assets.)

rates that followed earlier credit market deregulation. Other important factors were adjustment to new financing opportunities (such as the opening of the commercial paper market) and more recent changes in tax and bankruptcy regulations. These adjustments have slowed credit growth, while still leaving France with a permanently higher credit/GDP ratio than it had at the beginning of the 1980s. Unlike Japan and the United Kingdom, asset price developments and bank loan problems seem to have played only a minor role in tempering French credit growth. Perhaps for these reasons, the French credit slowdown has not been as dramatic nor as troubling for underlying economic growth as have been the credit slowdowns in Japan and the United Kingdom.

II: Econometric Analysis of Recent Credit Behavior in Japan, the United Kingdom, and France

To test the conclusions suggested by the previous analysis regarding the sources of the recent credit slowdowns we conducted an econometric examination of credit behavior in Japan, the United Kingdom, and France. We paid particular attention to the fundamental versus transitory nature of the factors affecting credit growth since our regression framework lent itself naturally to this disaggregation. Our analysis used quarterly data covering 1980 through 1991.[35] Similar regressions were run with bank credit and total credit, both to the private nonfinancial sector, as dependent variables. Because the period was one of tumultuous financial market change, and because the data were not of a consistently high quality, we feel that our econometric results should be interpreted with care. We view them as providing no more than qualitative support for our earlier conclusions regarding forces behind the credit slowdowns, rather than accurate point estimates of the effects of particular contributors to the slowdowns.

Estimating Equations

Our dependent variable in each estimating equation was the quarterly growth rate of credit (represented as the change in the log of credit). We try to explain the behavior of this growth rate using a standard stock adjustment model, for which the estimating equation can be schematically represented as follows:

$$\mathbf{C}_t - \mathbf{C}_{t-1} = X_t\beta - \theta\mathbf{C}_{t-1} + \varepsilon_t \qquad (1)$$

$\mathbf{C}_t$ is the log of nominal credit outstanding; $\mathbf{X}_t$ is a matrix of variables which affect credit demand and supply other than the lagged level of credit; β represents the coefficients on the variables in X_t; and θ is the coefficient on lagged credit.

Our version of Equation (1) can be derived from simple theoretical foundations. Using bank credit for purposes of illustration, suppose that private sector demand for bank credit is determined as follows:

$$\mathbf{C}^d = \mathbf{D}\alpha^d - \mathbf{r}\gamma^d .$$

Time subscripts have been dropped for notational convenience. $\mathbf{C}^d$ represents desired bank credit of the private sector, $\mathbf{D}$ represents the factors which determine desired credit excluding the loan rate (which can be thought of as a weighted average of individual loan rates),[36] and α^d represents their coefficients. The letter $\mathbf{r}$ represents the loan rate and γ^d is its coefficient. $\mathbf{D}$ can be further broken down into $\mathbf{D}^f$ representing the funda-

[35] The period was chosen to provide maximum degrees of freedom while trying to minimize statistical difficulties associated with substantial financial deregulation in these three economies.

[36] These variables will be discussed in detail later in this section.

mental factors such as GDP, which, when altered, have a sustained effect on the desired credit level, and $\mathbf{D}^t$ representing the transitory factors such as asset market speculation, which may temporarily raise or lower desired credit relative to its fundamental value.

Suppose further that the amount of private sector loans which the banking sector in aggregate wishes to have outstanding in any period is determined as:

$$C^s = S\alpha^s + r\gamma^s .$$

C^s represents the desired supply of bank credit to the private sector, **S** represents the factors which determine it excluding the loan rate, α^s represents their coefficients, and γ^s represents the supply coefficient on **r**. Again, **S** can be broken down into $\mathbf{S}^f$ representing fundamental supply determinants such as capital regulatory requirements, which, when altered, have a sustained effect on the desired supply of credit, and $\mathbf{S}^t$ representing transitory supply considerations. Changes in the Central Bank intervention rate (as distinct from the weighted average lending rate **r**) could arguably be included in this latter category.[37]

The market-clearing value of credit outstanding as well as the market-clearing loan rate, **r**, will be determined simultaneously as the values at which demand equals supply, and the market-clearing stock of such credit can be expressed as a function of all its non-interest-rate determinants: $C^{mc} = C^{mc}(D^f, D^t, S^f, S^t)$.[38] This expression can be broken into a fundamental component, $C^f = C^f(D^f, S^f)$, plus a transitory adjustment, $C^t = C^t(D^t, S^t)$, for the purpose of analyzing whether market-clearing credit changes are likely to be sustained.

Since it takes time for agents to achieve credit goals,[39] we do not assume that actual credit outstanding always equals the instantaneous market-clearing quantity. Instead we assume that any difference between the two is eliminated over time by credit growth. The assumption that credit approaches its market-clearing level over time is consistent with the standard stock adjustment model, in which current credit growth is modeled as proportional to the lagged discrepancy between market-clearing and actual credit outstanding:

$$C_t - C_{t-1} = \theta[C^{mc}(D_t, S_t) - C_{t-1})] + \varepsilon_t \qquad (2)$$

The speed of adjustment term, θ, measures the rate at which credit growth will close any gap between the two. At $\theta = 0.5$, 50 percent of any gap would be eliminated within one quarter. At $\theta = 0.3$, by contrast, the same 50 percent would be eliminated in two quarters.

Note that we are using a relatively simple stock adjustment representation where credit growth depends only on the difference between the lagged market-clearing level of credit and the lagged actual level of credit.[40] One implication of this specification is that, in a growing economy, market-clearing credit will generally be greater than actual

[37] The argument would be that intervention rates do not affect real long-term interest rates. See Howe and Pigott (1991-92).

[38] Explicitly, the market clearing interest rate and market clearing value of credit derived from these simultaneous equations are:

$$r^{mc} = \frac{D\alpha^d - S\alpha^s}{\gamma^d + \gamma^s}$$

$$C^{mc} = D\alpha^d\left(\frac{\gamma^s}{\gamma^s + \gamma^d}\right) + S\alpha^s\left(\frac{\gamma^d}{\gamma^s + \gamma^d}\right)$$

[39] Time is required to collect information, to coordinate the activities of many agents, and to adjust to deregulation by choosing new business strategies and establishing new markets.

[40] There are a number of alternative approaches to modeling credit growth that could have been chosen, the most salient of which is the familiar two-step approach to assessing theoretically cointegrated relationships (Engle and Granger (1987): 251-76). The stock-adjustment approach should provide the same insights as the two-step procedure, and uses fewer degrees of freedom.

current credit in order to induce positive credit growth. A second implication is that the gap between market-clearing and actual credit declines monotonically over time. For simplicity, we have not made credit growth a function of future expectations of credit supply or demand except to the extent that they affect the underlying determinants of the current market-clearing credit level.

This specification implicitly includes two different equilibrium credit concepts: market-clearing credit and the subset of it determined by fundamental factors, which we will label the "fundamental component" of market-clearing credit. In a model without stock adjustment dynamics the former concept would be analogous to a "temporary equilibrium" and the latter would be analogous to a "long run equilibrium." The specification also assumes that the response of credit growth to gaps between market-clearing and actual credit levels does not depend on whether these gaps are due to changes in fundamental or transitory factors.

Alternative specifications could have allowed credit growth to respond differently to the two types of factors. For example, credit growth could have been treated as partly related to the gap between fundamental and actual credit levels, and partly related to transitory influences included in a second equation capturing short-run dynamics. This specification, which has only one equilibrium concept for credit, has its own set of problems, however. Distinguishing fundamental from transitory determinants of credit is often difficult, because some determinants have both sustained and transitory effects (as will be noted when these determinants are discussed in more detail below). Given this difficulty and the more general caveats we have made about the imprecision in our regression results, the simple approach of combining fundamental and transitory factors appears appropriate for our purposes. We now turn to specifying these fundamental and transitory factors.

The factors which determine credit growth include economic activity, monetary policy, asset market factors, bank capital, and regulatory changes in financial markets. As we discuss each of these factors, we will note if they are likely to have a fundamental or only a transitory effect on credit growth. This distinction between fundamental and transitory effects will, however, be only suggestive at best as certain factors will clearly have both a fundamental and a transitory component. We will not try to classify the various factors as either "supply" or "demand" since this distinction is even harder to draw for some factors.

1. **Activity variables** include GDP (or personal disposable income (PDI) for the United Kingdom) and business expectations. We expect that, in a stable economic environment, the fundamental component of credit and hence actual credit will rise roughly proportionately with GDP in the long run. When business expectations are included in addition to GDP, they are likely to capture transitory shifts in confidence, such as occurred in the United Kingdom in the mid-1980s. The coefficients on GDP and business expectations are all expected to be positive.

2. **Monetary policy** is measured here by the intervention rate of each country. This differs from the loan rate, which is not included in the regressions because it is determined endogenously. The intervention rate may be thought of as measuring the lenders' own cost of funds. This interpretation would suggest that the coefficient on the intervention rate would be negative. Alternatively, the intervention rate could be thought to be a proxy for financial market rates which move more freely than the weighted average lending rate to private nonfinancial borrowers. This interpretation would suggest that a rise in the intervention rate could be signalling a strengthening in credit demand relative to credit supply and could be positively correlated with credit growth. In either case, in keeping with economic theory we will assume that the intervention rate does not permanently affect the level of credit and will therefore classify it as a transitory factor.

3. **Asset market variables** include house or land prices, share prices, mergers-and-acquisitions activity, and business and personal insolvencies. House or land prices are included for two reasons, both of which suggest positive coefficients on these variables. First, real estate prices affect wealth and, hence, agents' ability to take on additional debt. Second, they affect the size of a loan required to purchase a given piece of real estate. A sustained change in house or land prices is likely to have a permanent effect on the level of credit for both reasons and, hence, will be categorized as a fundamental influence. Stock prices affect wealth but, since they also affect corporations' interest in credit relative to equity as a source of capital (higher share prices reduce the relative cost of equity), the coefficient on this variable could theoretically be either positive or negative. In either event, a sustained change in stock prices is also likely to have a permanent effect on credit and will be categorized as an fundamental influence.

Our regressions include not just the level but recent percent changes in asset prices. Asset price *changes* are intended to capture the effect of reportedly heavy speculative activity in some countries in the late 1980s. Speculative activity should be strongly affected by expected asset price appreciation. Since evidence exists suggesting that expectations are determined to a substantial degree in a backward-looking manner,[41] we have included past price changes in our list of regressors. If individuals expected rises in prices to be followed by further rises, the coefficient on this variable would be positive. If individuals expected prices to return to some central value, then the coefficient on this variable would be negative. Because we have defined the fundamental component of credit as not being affected by speculative asset market behavior, the asset price change variables will be listed as transitory credit factors.

Mergers and acquisitions activity in the United Kingdom is included for obvious reasons and is expected to have a positive sign. We also included business and personal insolvencies, expecting them to have a negative sign since they would reduce lenders' interest in extending credit to the private sector relative to the public sector. They would also, presumably, reduce loan demand. These variables are mentioned here, rather than under the "economic activity" subheading, since econometric evidence indicates that developments in these variables during the past few years have been more closely related to asset price changes than to economic activity (although not perfectly correlated with either). In this sense, these variables may be categorized as transitory credit factors. However, since they do reflect to some extent normal economic activity, the component of their movement correlated to GDP growth may be separated and classified as an fundamental factor.

4. **Bank capital**, measured as the log of Tier 1 capital wherever possible, was included in several forms. Most simply, the level of bank capital was entered. We expect this variable to have a positive coefficient, assuming that the higher the level of bank capital, the greater would be the willingness of banks to lend. Also included in the regressions is a variable measuring the growth rate of bank capital. We postulate that bank lending may be positively related to the growth in bank capital because this growth may be positively associated with banks' expectated future capital levels.[42]

[41] For inflation expectations, see Figlewski and Wachtel (1981): 1-10 and references listed therein. For exchange rate expectations, see Frankel and Froot (1987), 133-53.

[42] The growth rate of bank capital may also be positively associated with our dependent variable, credit growth, for reasons outside of the stock adjustment framework. If bank capital is a strictly binding constraint, then credit growth may be strictly determined by bank capital growth rather than the gap between equilibrium and actual credit. A switching regression would be the ideal framework to capture periods when bank capital was a binding constraint, but data limitations prohibit its use.

We expect that the relationship between bank capital and banks' willingness to lend would have changed with the introduction of the BIS risk-adjusted capital requirements in 1988. Theoretically, any change in the banks' supply function (Equation (3)) in response to the BIS requirements could change all the coefficients in our estimating equation and by using dummy variables we could estimate these changes. To conserve degrees of freedom we allow only the constant term and the coefficient on variables explicitly related to bank capital to change, effective in 1988-II. Since the BIS capital ratios were announced some banks have become very sensitive to these levels, for which reason we expect a positive coefficient on the slope dummy for bank capital and a negative coefficient on the intercept dummy.[43] We expect that the dummy on bank capital growth post-BIS-announcement to have a positive sign. Since they permanently affect the supply of credit, all bank capital related variables are assumed to be fundamental factors.

5. **Financial market deregulation and innovation** occurred in all of our focus countries throughout the sample period, as discussed earlier. In theory this could affect the coefficients on all our variables and could introduce kinks and other nonlinearities, but we have insufficient data to capture these with any precision. Further, the frequency of such regulatory shifts means that the associated adjustments can not be isolated. For example, the effects of regulatory shifts after 1987 are unavoidably captured to some extent by the "BIS Dummies."

Despite these difficulties we attempt to capture some of the consequences of deregulation in two ways. First, we use the stock adjustment framework, which (as mentioned above) assumes that credit takes time to reach its market-clearing level, and that the adjustment is proportional to the size of the difference between the two. This econometric specification allows credit growth to be a function of the gap between market-clearing and actual levels, a gap which may be due to deregulation as well as to other factors. Note, however, that the stock adjustment framework does not capture periods of quantitative credit control very satisfactorily, since during these periods actual credit growth is inhibited from adjusting toward market-clearing levels. For Japan and the United Kingdom, this problem is not important since our regression periods start after the end of quantitative credit controls. For France, regression results during the early 1980s, when the *encadrement* was still in place, are more difficult to interpret.

Our second approach to capturing the effects of deregulation is to include some carefully chosen proxies and dummy variables. As a proxy for the effects of deregulation on mortgage markets we have included in each regression the mortgage interest spread, which is the difference between rates on mortgage loans and rates on government securities of comparable maturity. The reasons why these spreads have been affected by deregulation as well as by other factors have been discussed in the earlier country sections.[44]

In addition to mortgage spreads we have been able to capture some of the effects of the end of the *encadrement* and other financial deregulation in France by including dummies beginning in 1985-I and 1988-II. These will be discussed in detail when we present the regression results for France. Overall, we treat the deregulation proxy variables as permanently affecting credit levels, with the caveat that these variables are par-

[43] If the BIS ratio made bank capital a greater consideration, any given level of bank capital would support a lower level of credit supply (our negative constant dummy), but changes in bank capital would have a greater impact on credit growth as measured by a positive sign on this slope dummy.

[44] Corporate spreads (that is the spread of corporate lending rates over government securities of comparable maturity) were subject to multiple influences, such as increasing competition from bond markets, that make them less meaningful as a measure of deregulation.

ticularly likely to pick up the influence of other, transitory, factors affecting credit growth.

Using these variables explicitly in Equation (2) leads to the following regression equation:

$$\mathbf{C}_t - \mathbf{C}_{t-1} = \alpha_0 + \alpha_1 \mathbf{GDP}_{t-1} + \alpha_2 \mathbf{BusExp}_{t-1} + \ldots - \theta \mathbf{C}_{t-1} + \varepsilon_t . \qquad (3)$$

The effect of any variable on market-clearing credit is measured as the ratio α_i/θ. The initial regressions for each country included most of the variables we have just discussed. Variables which were insignificant by standard criteria were then systematically excluded. Occasionally a variable was allowed to remain despite statistical insignificance if we had strong reason to believe it was important. For example, when a variable's impact was significant in the bank credit regression but was not precisely measured in the total credit regression, we included the variable in both regressions. Likewise, if a variable's statistically measured effect on credit was inconsistent with any theory and that variable did not strongly affect overall explanatory power we excluded it.

The list of final right-hand-side variables is reported below in Table 4. A subset of these variables is used for each individual country's regressions. Many of the right-hand-side variables, such as GDP and business failures, are determined simultaneously with credit. To accommodate this, all right-hand-side variables were lagged at least one period with the exception of the already-lagged level of credit.

Results

The regression results for each country are reported separately below. Before turning to their individual analysis, let us first note how the regressions did overall. The explanatory power of these regressions was consistently high, especially in light of the fact that the dependent variables are measured as quarterly percent changes. Other performance measures for these regressions were also quite strong: there seems to be little remaining correlation in the residuals, and the signs on most coefficients were consistent with those indicated above. The R^2s for the total credit regressions generally exceeded those for the bank credit regressions, which is not surprising since the substitutability between bank loans and alternative forms of credit would make bank credit growth harder to estimate than total credit growth.

The estimated speeds of adjustment are encouraging for a number of reasons. First, they have the right sign and they are all well below unity in absolute value, supporting the stock adjustment formulation chosen here. The sizes of these variables are also quite plausible. With the exception of the very low speed of adjustment for Japanese bank credit, estimated speeds of adjustment range from 20 percent to 45 percent per quarter, implying that discrepancies between equilibrium and actual credit have half-lives of at most three quarters. The strong significance of these coefficients indicates that credit is cointegrated with the regressors, which has the reassuring implication that actual credit is always subject to forces bringing it back towards its market-clearing level.

Despite these encouraging results, the econometric findings should be interpreted with care due to the difficulties inherent in modeling credit growth during a relatively brief period characterized by major financial market changes. In particular, although some estimated coefficients do not change significantly if other variables are added or subtracted or if the time period of the regressions is slightly changed, estimated coefficients on other variables do shift significantly. Moreover, given the short period under consideration, the regressions themselves do cover the credit slowdown period in question, and thus provide only in-sample analysis. They do not claim out-of-sample reliability.

Before going into a country-by-country discussion of the regression results, it is useful to consider how we may use the regressions to apportion responsibility for the recent credit slowdowns in each country to (i) the stock adjustment effect, (ii) changes in the factors which have a sustained effect on market-clearing credit ("fundamental factors"), and (iii) changes in the factors which have only a transitory effect on market-clearing

Table 4:

Name	Variable
GDP:	Log of Nominal GDP
PDI:	Log of Nominal Personal Disposable Income (used only for U.K. regressions)
BusExp:	Business Expectations
BusFail:	Business Failures
PHous:	Log of House Prices (used in U.K. and France Regressions)
PLand:	Log of Land Prices (used in Japan regressions)
ChLand:	Change in Log of Land Prices
StkMkt:	Log of Stock Market Prices
ChStkMkt:	Change in Log of Stock prices
IntvRate:	Official Intervention Rate
MSprd:	Mortgage Spread Relative to Government Securities
M&A:	Mergers and Acquisitions Activity
BkCap:	Log of Bank Capital
IntDum:	Intercept Dummy for BIS Announcement, begins 1988-II
LDum:	Dummy for Level of Bank Capital, begins 1988-II
ChDum:	Dummy for Growth in Bank Capital, begins 1988-II
TCred:	Log of Nominal Total Credit Outstanding to the Private Nonfinancial Sector
BCred:	Log of Nominal Bank Credit Outstanding to the Private Nonfinancial Sector
DeregDum:	Intercept Dummy for End of Encadrement in France, begins 1985-I
GDP1:	Dummy for log GDP in France, begins 1985-1
IntvRate1:	Dummy for the intervention rate in France, begins 1985-1
PHous1:	Dummy for the log of house prices in France, begins 1985-1
GDP2:	Dummy for log GDP in France, begins 1988-II
TCred1:	Dummy for TCred in France beginning in 1985-I
TCred2:	Dummy for TCred in France beginning in 1988-II
BCred2:	Dummy for BCred in France beginning in 1988-II

credit ("transitory factors"). In order to do this apportionment, it is necessary first to specify what credit path would be implied by "unchanged" fundamental factors. Note that since we are attempting to explain the slowdown in credit from the quarter of peak credit growth, we need to look at the change in fundamental factors from the course they were taking leading up to the period of peak credit growth. Though specification is by necessity somewhat arbitrary, a reasonable assumption would be that credit would have remained on an unchanged "fundamental" path, relative to that it took leading up to the quarter of peak credit growth, if its fundamental factors continued to grow in recent quarters at the same average rate they had been growing during the eight quarters prior to the quarter of peak credit growth.[45]

The impact of changes in transitory factors on credit growth can be handled in a comparable fashion. That is, deviations from the eight quarter path followed by these factors leading up to the quarter of peak credit growth may be interpreted as changes in transitory conditions. Given that the conditions are transitory by definition, changes in them are not unexpected. However, since the natural process of change in transitory conditions does affect actual credit growth, documenting the change in this fashion allows for a quantitative assessment of its impact on actual credit growth rates.

The portion of the slowdown in actual credit growth that remains after accounting for the impact of changed fundamental and transitory factors may then be charged to stock adjustment effects.[46] Note that this methodology is based on a direct, narrow definition of stock adjustment. Some of the change in the paths of fundamental factors or transitory factors could actually reflect a stock adjustment effect working through asset price changes. That is, part of the rise in asset prices in the three countries may be attributed to credit deregulation. Some slowing in this component of asset price growth, which by our methodology would show up as a change in the fundamental credit growth path or in transitory asset price dynamics, would naturally occur as asset markets finished adjusting to credit deregulation.

The country discussions below will evaluate the contributions of various factors to the recent credit slowdown following this framework. We reserve a full examination of the consequences of the BIS announcement on each country's credit developments for a final subsection.

Japan: Table 5 shows the regressions for total and bank credit growth in Japan. Overall, the regressions track the quarterly growth rates quite well, explaining most of the variance in both total and bank credit growth. The coefficients on the regressors are generally of reasonable magnitude, when significant, and of the expected sign, supporting our earlier analysis. However, since these are in-sample results, and insufficient data were available for out-of-sample tests, we reiterate our earlier caution that these results should be considered indicative rather than definitive.

How does this model account for the slowdown in credit growth since 1990-I? As indicated at the top of Table 6, the growth rate of total credit slid from a peak of 4.3 per-

[45] A period of eight quarters is chosen to smooth any anomalous one quarter fluctuation in the credit determinants.

[46] The regression results make it a straightforward exercise to estimate what "actual" credit growth would be at the end of the period if all the underlying fundamental and transitory factors had grown in recent quarters at their average rate during the eight quarters leading up to the quarter of peak credit growth. The difference between this estimated "actual" credit growth accompanying unchanged fundamental and transitory credit paths and the estimated actual credit growth at the end of the period based on the estimated changed fundamental and transitory credit paths that occurred can then be attributed to changes in fundamental and transitory credit conditions.

cent (quarterly) in 1990-I to just 1.3 percent by 1991-IV. At corresponding annual rates this represents a drop of 13.2 percentage points, from 18.3 percent to 5.1 percent. Our regression results would have predicted a decline of 2.3 percentage points in the quarterly rate, or about 80 percent of the actual decline. The predicted decline in bank credit growth, 1.6 percent at quarterly rates, falls more notably short of the actual decline of 2.4 percent. This predicted shortfall could well be the result of widely known but immeasurable factors such as a reaction to unrecognized losses on banks' property loans.[47] We are also calculating the slowdown in credit from 1990-I, the quarter of peak credit growth; chance timing factors may have made credit growth unusually strong in that quarter.

Chart 10 plots the levels of actual credit (dashed line) along with our estimated value of market-clearing total credit (solid line) and of the fundamental component of market-clearing credit (dot-dashed line). The difference between these latter two is, of course, the consequences of changes in transitory factors.

The bottom two thirds of Table 6 disaggregate the total and bank credit slowdowns into the three components described earlier: (i) the stock adjustment effect, (ii) changes in fundamental factors, and (iii) changes in transitory factors. The table shows the estimated proportionate contribution of individual factors, along with the proportionate contribution of all fundamental factors in aggregate and of all transitory factors in aggregate. For the following discussion of these contributions, we stress again that "tran-

[47] Quantitative restrictions on real estate lending, not captured in the regressions, may also have contributed to the recent slowdown in credit growth, but are generally considered to have been non-binding in 1992-I.

Table 5: Regression Results for Japan

Change in Total Credit =	
+ 0.193 GDP_{t-1}	(3.25)
- 0.001 $IntvRate_{t-1}$	(-2.08)
- 0.007 $BusFail_{t-1}$	(-3.88)
+ 0.067 $PLand_{t-1}$	(2.55)
+ 0.099 $ChLand_{t-1}$	(2.96)
+ 0.022 $ChStkMkt_{t-1}$	(3.27)
+ 0.004 $MSprd_{t-1}$	(1.57)
+ 0.020 $BkCap_{t-1}$	(2.29)
- 0.003 $IntDum_{t-1}$	(-2.70)
+ 0.068 $ChDum_{t-1}$	(4.52)
- 0.196 $TCred_{t-1}$	(-3.13)
1981-I to 1991-IV	
$R^2 = 0.76$ $Rbar^2 = 0.69$	
Q(11) = 9.05 Sig of Q = 0.62	

Change in Bank Credit =	
+ 0.0474 GDP_{t-1}	(3.02)
+ 6.667e-5 $BusExp_{t-1}$	(2.64)
- 0.005 $StkMkt_{t-1}$	(-2.15)
+ 0.230 $ChLand_{t-1}$	(5.61)
+ 0.014 $ChStkMkt_{t-1}$	(1.47)
+ 0.002 $MSprd_{t-2}$	(4.21)
- 0.006 $IntDum_{t-1}$	(-3.34)
+ 0.069 $ChDum_{t-1}$	(3.80)
- 0.041 $BCred_{t-1}$	(-2.71)
1981-I to 1992-II	
$R^2 = 0.64$ $Rbar^2 = 0.56$	
Q(12) = 17.235 Sig of Q = 0.14	

sitory" and "fundamental" factors cannot always be clearly distinguished in the data, and the results should be interpreted with caution.

Stock Adjustment: The stock adjustment effect is estimated to account for only a trivial portion (4 percent) of the total credit slowdown. The estimated contribution of this effect to the bank credit slowdown, about one-third, is more substantial. This is consistent with our earlier analysis which stressed the importance of the elimination of credit guidelines and other constraints on bank lending. The visual counterpart of this analysis can be seen in Chart 10 where the gap between the fundamental component of market-clearing credit and actual credit begins at a relatively high level and continues to grow rapidly during the very early 1980s, the period of most intense bank deregulation. Thereafter this gap narrows, as the adjustment to deregulation takes place. The narrowing of this gap by itself would have slowed the growth of credit quite naturally during the late 1980s, if transitory factors had not begun to have great importance at that same time.

The Fundamental Component of Market-Clearing Credit: Factors whose influence on credit is likely to be sustained are estimated to account, in aggregate, for about one-third of the total credit slowdown and roughly one-sixth of the bank credit slowdown in

Table 6: Decomposition of the Credit Slowdown in Japan

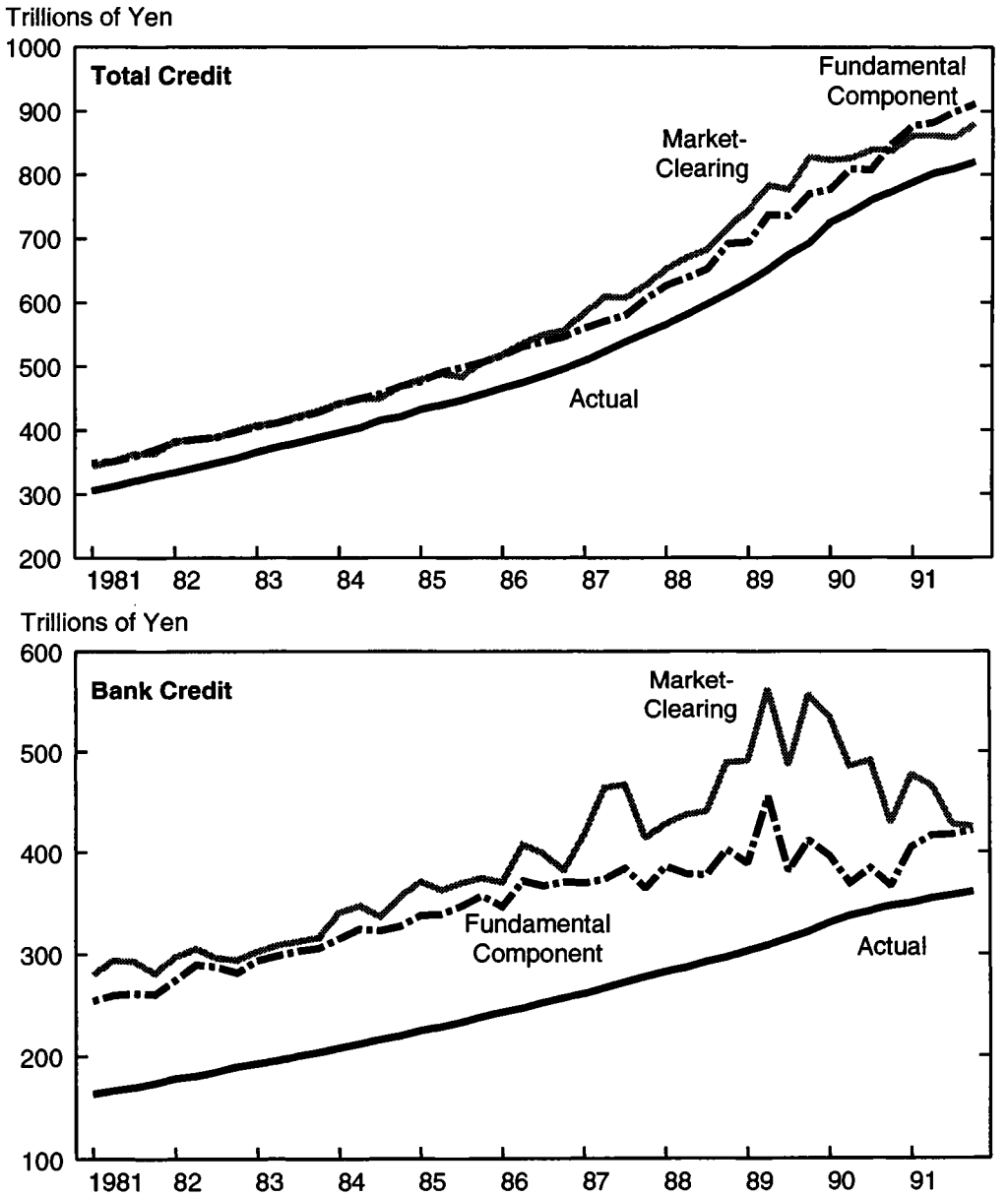
	Total Credit Growth (In Percent)	**Bank Credit Growth (In Percent)**
Peak quarterly credit growth: 1990-I	4.30 (18.3 annualized rate)	2.64 (11.0 annualized rate)
End of sample quarterly credit growth (1991-IV Total; 1992-I, Bank)	1.26 (5.1 annualized rate)	0.27 (1.1 annualized rate)
Actual decline	-3.04	-2.38
Estimated decline	-2.27	-1.55
Proportion of decline attributable to:	**(In Percent)**	**(In Percent)**
Stock adjustment effect	**-4**	**-34**
Effects of fundamental factors of which:	**-36**	**-16**
GDP	-11	-4
Land or stock price levels	-3 (Land)	-20 (Stock)
Bank capital	-21	-31
Effects of transitory factors of which:	**-60**	**-50**
Land price changes	-9	-37
Stock price changes	-7	-2
Business failures (transitory component)	-45	–
Business expectations	–	-10
Intervention rate	-3	–

Note: The contributions of some regressors are not listed. The omitted contributions to the credit slowdown are all below 5 percent.

Japan. Within this category, slowing growth in nominal GDP was generally of modest importance, accounting for about one tenth of the total credit slowdown and one twentieth of the bank credit slowdown. The contribution of increased attention to bank capital growth following the announcement of the BIS standards was, predictably, stronger for the slowdown in bank credit than the slowdown in total credit. It is interesting to note, however, that in both cases the contribution is estimated to exceed the contribution of slowing GDP growth.

Stock price developments appear to have played a significant role in the recent evolution of bank credit. The overall decline in the level of the stock market between 1990 and 1991 seems to have directly supported bank credit growth by encouraging firms to substitute bank loan finance for equity funds or bond funds tied to equity markets. This

Chart 10: Japan



substitution toward bank credit is estimated to have prevented the slowdown in bank credit growth from being 20 percent larger. The net effect of stock price changes on bank credit, however, is ambiguous since falling stock prices indirectly played a role in determining the level of bank capital and the consequent negative effect of bank capital on credit. Other fundamental factors are estimated to have had only a negligible effect on credit growth.

The Transitory Component of Market-Clearing Credit: The importance of factors whose influence on credit is likely to be transitory, such as speculative activity and monetary policy, grew substantially in the late 1980s and dissipated in the early 1990s. In aggregate these factors are estimated to account for half or more of the credit slowdown in Japan. The variables intended to capture speculative activity—land price changes, stock price changes, and the transitory component of business failures[48]—themselves account for about half of the total credit slowdown and almost 40 percent of the bank credit slowdown. As such, speculative factors appear to have been the strongest single force behind the slowdown in Japanese credit growth. Worsening business expectations and tighter monetary policy also had small transitory effects on credit growth.

Summary: Overall, the Japanese regression results generally support our earlier conclusions about the causes of the Japanese credit slowdown. Declining asset prices and associated bankruptcies are estimated to have been extremely important to the slowdown. Indeed, transitory asset market dynamics appear to have greatly aggravated a more muted underlying credit deceleration. Bank capital developments are also estimated to have played a significant role in the Japanese credit slowdown. Deteriorating economic conditions, by contrast, are estimated to have been of secondary importance.

The United Kingdom: The U.K. regressions, shown in Table 7, also appear to fit the data well. The U.K. regressions differ most notably from those for Japan and France in two dimensions. First, the value of mergers and acquisitions activity is included based on its importance, as suggested by our analysis in Section II. Second, personal disposable income (PDI) was chosen as an activity variable, since it consistently outperformed GDP in our regressions. We believe this superior performance is related to the fact that PDI partially screens out the erratic effects of the oil sector.

Once again the equations have fairly high explanatory power. The speeds of adjustment are both over 20 percent per quarter, indicating that most adjustment of actual credit to changes in market-clearing credit takes place in less than three quarters. Most of the coefficients have the sign predicted by our earlier analysis.[49] Looking more closely at the individual coefficients, however, it becomes immediately apparent that *total* credit responds to personal disposable income with a unit elasticity over the long run, but *bank* credit's response is negligible. This asymmetry presumably reflects the fact that during most of our sample period the commercial banking industry was adjusting to the end of the corset and the newly competitive environment for banking. This also underlines our

[48] The "transitory" component was taken as the portion of business failures not predicted by a simple regression of business failures on lagged GDP.

[49] Taken at face value the dummy variables intended to capture the effects of the BIS announcement of new capital adequacy standards present a puzzle. The coefficient on the intercept dummy in the total credit regression is positive while the corresponding dummy in the bank credit regression is negative. Since it seems unlikely that regulations directly aimed at affecting banks would have a distinctly different effect on credit in aggregate, the dummies must be capturing some other factor, in addition to the BIS announcement. This additional factor affecting total credit is likely to be the 1986 inception of the U.K. commercial paper market, which grew rapidly during its first few years. In addition to spurring growth in total credit this market may have taken business away from the banking sector.

commitment to viewing the results as providing a general indication of whether or not our earlier analysis was on target, rather than as providing point values for various elasticities or for the contribution of individual factors to the credit slowdown.

Table 8 shows that predicted declines in U.K. credit growth are fairly close to the actual declines from the quarter of peak credit growth, 1988-II, to 1991-IV. Total credit growth actually declined 6.3 percent while the regression results predicted a 6.7 percent decline. Bank credit growth declined 8.9 percent while the regression findings predicted a decline of 9.8 percent.

Chart 11 provides a graphical depiction of the growth in actual, market-clearing, and fundamental credit during the slowdown period, and Table 8 shows the contribution of the stock adjustment, fundamental, and transitory factors.

Stock Adjustment: The estimated slowdown of growth in market-clearing total credit generated by a slowdown in both fundamental and transitory factors was much less pronounced than the estimated slowdown of growth in market-clearing bank credit generated by these factors. Consequently, more of the slowdown in actual total credit growth must be attributable to the stock adjustment effect. Indeed, Table 8 shows that the stock adjustment effect is measured to have accounted for roughly 30 percent of the total credit slowdown but virtually none of the bank credit slowdown.

The Fundamental Component of Market-Clearing Credit: Our estimates indicate that land price deflation was by far the strongest force behind both the U.K. bank and total credit slowdowns. This deflation is estimated to account for roughly three-quarters

Table 7: Regression Results for the United Kingdom

Change in Total Credit =		Change in Bank Credit =	
- 1.813	(-6.12)	-0.819	(-1.50)
+ 0.273 PDI_{t-1}	(5.4)	+ 0.026 PDI_{t-1}	(0.33)
+ 1.30e-4 $BusExp_{t-4}$	(2.70)	+ 1.21e-4 $BusExp_{t-4}$	(1.80)
- 0.016 $PerInsol_{t-1}$	(-1.74)	- 0.018$PerInsol_{t-1}$	(-3.30)
+ 0.182 $PHous_{t-1}$	(5.91)	+ 0.318 $PHous_{t-1}$	(11.18)
- 0.027 $StkMkt_{t-1}$	(-2.68)	- 0.037 $StkMkt_{t-1}$	(-2.61)
+ 0.003 $M\&A_{t-1}$	(1.87)	+ 0.006 $M\&A_{t-1}$	(1.75)
+ 0.001 $Msprd_{t-1}$	(1.22)	+ 0.003 $Msprd_{t-1}$	(2.28)
+ 0.056 $BkCap_{t-1}$	(2.08)	--	
+ 0.733 $IntDum_{t-1}$	(4.40)	- 0.561 $IntDum_{t-1}$	(-4.03)
- 0.68 $LDum_{t-1}$	(-4.42)	+ 0.049 $LDum_{t-1}$	(3.96)
- 0.274 $TCred_{t-1}$	(-4.72)	-0.211 $BCred_{t-1}$	(-6.04)
1982-I to 1991-IV		1982-I to 1992-I	
$R^2 = 0.85$ $Rbar^2 = 0.78$		$R^2 = 0.76$ $Rbar^2 = 0.68$	
Q(11) = 7.89 Sig of Q = 0.64		Q(12) = 11.99 Sig of Q = 0.29	

of the slowdown in bank credit growth and half of the slowdown in total credit growth. Given the large contribution mortgage credit growth made to bank and total credit growth during the credit surge, it is not surprising that real estate developments played an important role in the credit growth deceleration. The land price variable, in fact, is estimated to have had the strongest single effect on the credit slowdown in this country.

Nominal personal disposable income (PDI), the economic activity variable for the United Kingdom, does not seem to have been particularly important for the credit slowdown. This does not mean, however, that the slowdown in *real* economic growth had little effect on real credit growth, since any effects on real credit growth of the onset of recession would have been masked by a simultaneous acceleration of inflation.

The bank capital variables indicate that bank capital developments had a slight effect on the bank credit slowdown and virtually no effect on the total credit slowdown. This supports the Bank of England's view that U.K. banks are well capitalized and have not substantially slowed their lending for capital-related reasons.[50]

The Transitory Component of Market-Clearing Credit: Our estimates indicate that

[50] Bank of England (1991): 256-259.

Table 8: Decomposition of the Credit Slowdown in the United Kingdom

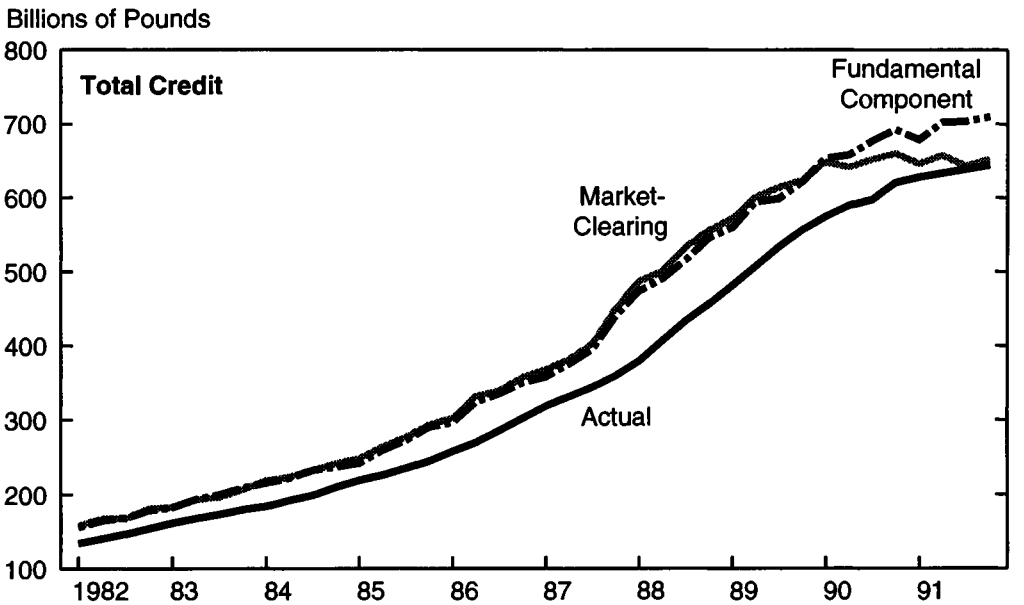
	Total Credit Growth (In Percent)	**Bank Credit Growth (In Percent)**
Peak quarterly credit growth: 1988-II	7.10 (31.6 annualized rate)	8.32 (37.7 annualized rate)
End of sample quarterly credit growth (1991-IV)	0.78 (3.2 annualized rate)	-0.62 (-2.5 annualized rate)
Actual decline	-6.33	-8.95
Estimated decline	-6.69	-9.79
Proportion of decline attributable to:	**(In Percent)**	**(In Percent)**
Stock adjustment effect	**-28**	**-1**
Effects of fundamental factors of which:	**-52**	**-74**
PDI	-3	0
Land or stock price levels	-50	-72
Bank capital	+2	-4
Effects of transitory factors of which:	**-20**	**-23**
Personal insolvencies (transitory component)	-10	-9
Mergers and acquisitions (transitory component)	-5	-10
Business expectations	-5	-4

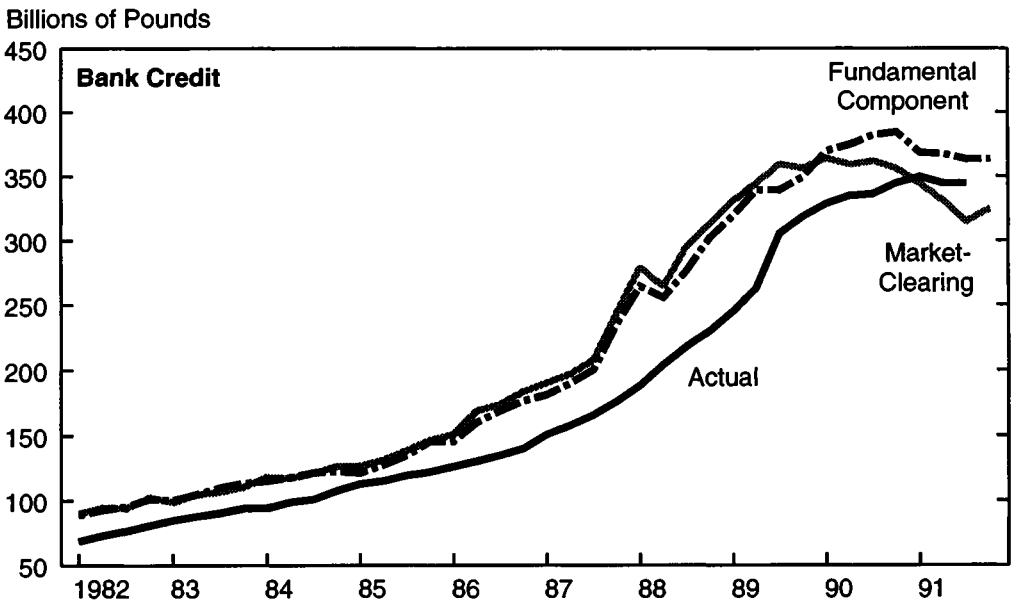
Note: The contributions of some regressors are not listed. The omitted contributions to the credit slowdown are all below 5 percent.

the contribution of transitory factors to the U.K. credit slowdown was quite small compared with their contribution to the Japanese credit slowdown. Nonetheless, the roughly 10 percent contribution of the transitory component of personal insolvencies to both the total and the bank credit slowdowns is notable. Declining mergers and acquisitions activity and business expectations also played a minor but significant transitory role in the U.K. credit slowdown.

Summary: In sum, the U.K. regression results generally agree with our earlier analysis of the U.K. credit slowdown. Mortgage developments played a predominant role in the slowdown. The stock adjustment effect and transitory factors were present but neither was particularly strong. Weakened economic conditions and bank capital developments made only minor contributions to the U.K. credit slowdown.

Chart 11: United Kingdom





France: Table 9 shows our stock adjustment regressions for credit growth in France. These regressions were the most challenging of the set, since the end of the *encadrement* took place in 1985-87, the middle of our sample period. It is unsurprising, therefore, that there were some disappointments in the results, such as the marginally significant Q-statistic in the total credit regression.[51]

Overall, however, the results were surprisingly good. The regressions' overall "fit" are more than respectable: they appear to capture over 80 percent of the changes in credit growth rates during the sample period. Most of the coefficients are of the expected

[51] This statistic is the sum of (adjusted values of) the correlations between the first eleven lags of the residuals. That this sum is statistically "high" indicates that we may not have fully captured the dynamics of aggregate credit's response to variables such as GDP and house prices. The point estimates are likely to be unbiased and efficient, nonetheless.

Table 9: Regression Results for France

Change in Total Credit =		Change in Bank Credit =	
-0.420	(-1.06)	-0.939	(-3.37)
+ 0.220 GDP_{t-1}	(3.74)	+ 0.157 GDP_{t-1}	(3.91)
+ 0.685e-3 $IntvRate_{t-1}$	(2.30)	+ 1.765e-3 $IntvRate_{t-1}$	(3.14)
+ 0.087 $BankCap_{t-1}$	(5.71)	+ 0.004 $MSprd_{t-1}$	(1.81)
+ 1.503 DeregDum	(2.92)		
-0.312 $GDP1_{t-1}$	(-4.59)	- 0.195 $GDP1_{t-1}$	(-12.07)
+ 3.758e-3 $IntvRate1_{t-1}$	(5.42)	+ 9.055e-3 $IntvRate1_{t-1}$	(6.86)
+ 0.066 $PHous1_{t-1}$	(7.18)	+ 0.289 $PHous1_{t-1}$	(12.24)
+ 0.427 $GDP2_{t-1}$	(3.12)	+ 0.291 $GDP2_{t-1}$	(2.93)
+ 0.073 $ChDum_{t-1}$	(2.19)	+ 0.103 $ChDum_{t-1}$	(7.48)
- 3.708 $IntDum_{t-1}$	(-2.56)	- 2.127 $IntDum_{t-1}$	(-1.88)
- 0.110 $LDum_{t-1}$	(-2.13)		
-0.385 $TCred_{t-1}$	(-6.02)	- 0.180 $BCred_{t-1}$	(-4.39)
+ 0.273 $TCred1_{t-1}$	(-4.65)		
- 0.199 $TCred2_{t-1}$	(-5.53)	- 0.271 $BCred2_{t-1}$	(-5.24)
1980-III - 1991-III		1980-III - 1992-I	
$R^2 = 0.81$ $Rbar^2 = 0.72$		$R^2 = 0.86$ $Rbar^2 = 0.81$	
D.W. = 2.99 Q(11) = 20.94 Sig of Q = 0.04		D.W. = 2.48 Q(12) = 12.98 Sig of Q = 0.29	

sign and reasonable magnitude, and the speeds of adjustment are plausible.[52] Lagged asset price changes are not significant, supporting our earlier conclusion that speculative demand for credit was not a major factor behind French credit developments in the 1980s. Despite these successes, we stress that the results, especially those for total credit, should be interpreted with great care.

To deal with French deregulation during the 1980s, it seemed appropriate to allow credit behavior to vary over time by including dummy constant and slope variables for a number of the regressors. The deregulation was quite protracted, so we allowed the responses of credit to its major determinants to change at two points, first in 1985-I and then around the time of the BIS announcement, in 1988-II.[53] The results are largely consistent across the two forms of credit and generally conformed to our expectations, with the exception of those for the 1985-87 period. Since the 1985-87 period was one of tumultuous changes in the French financial structure, this difficulty is not surprising and we will not try to draw quantitative inferences about the importance of various factors during this period. Our more general caution regarding the interpretation of the regression results stems in part from the fact that they are not robust to changes in the choice of which regressors are included with dummies and which years the dummies are introduced.[54]

The deregulation dummies tell a story regarding the consequences of deregulation that is largely consistent with our earlier, more impressionistic analysis. Comparing the behavior of credit in the prederegulation period, up until 1985, and the post deregulation period, after 1987, indicates that after deregulation credit was more sensitive to most of its determinants. House prices, which are estimated to have had no significant effect on credit prior to deregulation, had an estimated bank credit elasticity of 0.64 and total credit elasticity of 0.21 afterwards. The estimated long run elasticity of total credit with respect to GDP also rose substantially. The estimated long-run elasticity of bank credit with respect to GDP actually declined, however. This decline may reflect reduced government control of bank credit growth (earlier government control had aimed to keep bank credit growth in line with GDP growth).

The positive sign and strong significance of bank capital growth after 1988-II for both total and bank credit growth would seem to challenge our earlier statement that bank capital considerations played little role in determining French credit growth. The significance of the bank capital variables in the post 1987 period may be due to Tier I capital constraints faced by state-owned French banks which could not issue equity.

Table 10 shows the predicted decline of French credit growth rates between 1989-II, the peak of the economic cycle, and the end of our sample period. The implied declines in bank and total credit growth rates are once again fairly close to the actual declines. This is very encouraging in view of the many regulatory shifts during this period.

Stock Adjustment: Chart 12 shows the levels of actual credit, market-clearing credit, and the fundamental component of market-clearing credit in France during our sample period.[55] Due to credit controls, the market-clearing credit levels are not well estimated

[52] For these regressions we excluded the business expectations variable, despite its significance, since it seemed unacceptably collinear with GDP.

[53] Since the deregulation dummies use so many degrees of freedom, we did not include additional dummy variables to capture the effects of tax changes.

[54] We tried systematically to exclude dummies on variables which seemed least important for the determination of credit, as a method of husbanding our few degrees of freedom.

[55] We have adjusted the equilibrium credit values in 1985-I and 1988-II to eliminate discontinuities in this level series arising from dummy shifts in the estimated speed of adjustment.

prior to 1985. Growth in estimated market-clearing credit began to surge around 1986-III, and continued at a very rapid pace through 1989. Though this growth brought with it a rapid increase in actual credit, the gap between estimated market-clearing credit and actual credit remained large. In light of this it is not surprising that the stock adjustment of French credit to the mid-1980s deregulation is estimated to have accounted for almost half of the slowdown in bank credit growth and a third of the slowdown in total credit growth, as shown on the middle rows of Table 10. These stock adjustment shares are larger than the corresponding shares for the British and Japanese credit slowdowns. The French stock adjustment shares support our conclusion that, because it occurred later in the decade, deregulation was more important to the French credit slowdown than deregulation was to the credit slowdowns in the other countries.

The Fundamental Component of Market-Clearing Credit: Our regression results indicate that, excluding the stock-adjustment effect, slowing economic activity may have been the single most important factor behind the total credit slowdown in France. This factor is also estimated to have contributed significantly to the slowdown in bank credit growth. In both cases the relative contribution of slowing economic activity is notably larger in France than in Japan or the United Kingdom.

House prices, but not share prices, appear to have been significant determinants of credit growth in France. Table 10 indicates that slowing growth in the level of house prices accounted for more than half of the slowdown in bank credit growth, and almost a third of the slowdown in total credit growth. The importance of the cooling of house prices to the French credit slowdown is a little surprising, given that mortgage credit growth did not slow as precipitously as other types of credit. However, in part the esti-

Table 10: Decomposition of the Credit Slowdown in France

	Total Credit Growth (In Percent)	**Bank Credit Growth (In Percent)**
Peak quarterly credit growth: 1989-II	4.02 (17.1 annualized rate)	5.50 (23.9 annualized rate)
End of sample quarterly credit growth (1991-III, Total; 1992-I, Bank)	1.84 (7.6 annualized rate)	0.70 (2.8 annualized rate)
Actual decline	-2.18	-4.80
Estimated decline	-2.66	-4.49
Proportion of decline attributable to:	**(In Percent)**	**(In Percent)**
Stock adjustment effect	**35**	**-44**
Effects of fundamental factors of which:	**61**	**-57**
GDP	-31	-8
Land price levels	-32	-53
Bank capital	+2	+2
Effects of transitory factors of which:	**-4**	**+1**
Intervention rate	-4	+1

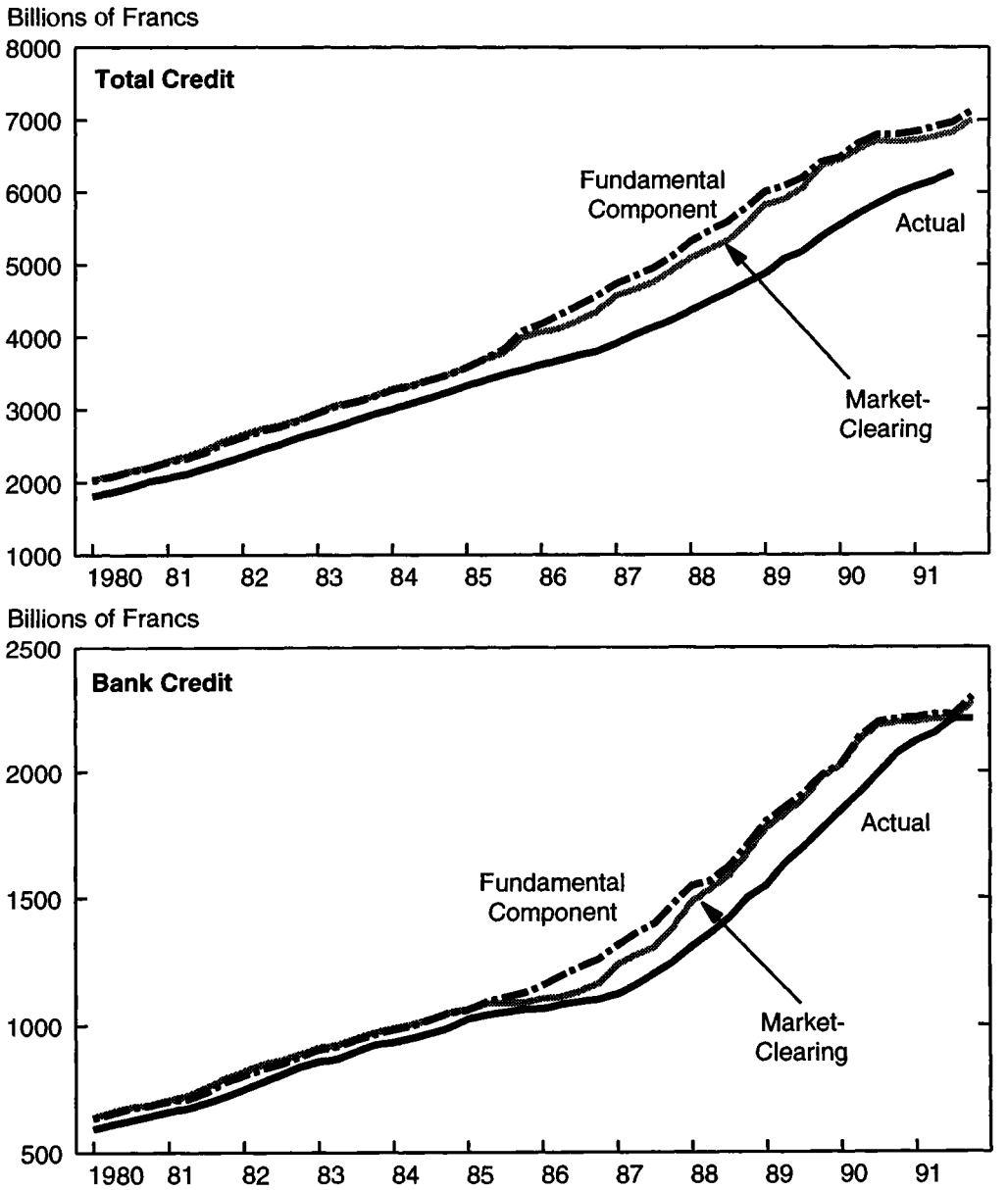
Note: The contributions of some regressors are not listed. The omitted contributions to the credit slowdown are all below 5 percent.

mated impact of slowing house price changes may actually reflect the stock adjustment mechanism in France, working its way through asset prices. We noted earlier the ambiguity in excluding all asset price changes from the stock adjustment effect.

Bank capital is estimated to have had negligible effects on the overall credit slowdown in France. Although the bank capital variables were significant in our French regressions, bank capital continued to grow at a sufficiently rapid pace that it made no apparent contribution to the French credit slowdown. This result is consistent with our earlier French analysis.

The Transitory Component of Market-Clearing Credit: The contribution of transitory forces to the French credit slowdown is quite small, consistent with the analysis of Section II. This is also consistent with Chart 12, where market-clearing credit and its fundamental component track each other quite closely.

Chart 12: France



Summary: Overall, the French regression results generally support our earlier French credit analysis. Adjustment to relatively recent credit decontrol was very important in determining the path of credit growth. The economic slowdown was also a significant factor behind the French credit slowdown, and speculative forces were not. The regression results suggest house price developments following credit deregulation were an important factor behind the evolution of credit growth at the end of the 1980s.

BIS Standards: Our regression framework allows us to make a quasi-quantitative assessment of the impact of the BIS capital adequacy standards on Japanese and U.K. bank lending in the late 1980s. This assessment cannot be accomplished for France because the effects of the BIS announcement are not distinguishable from the effects of deregulation, which occurred roughly simultaneously with the announcement itself. We characterize our assessments for Japan and the United Kingdom as only quasi-quantitative because they are based on the coefficients on dummy variables which are subject to other influences and tend not to be highly robust to changed specifications. In fact, we have separated this BIS standard analysis from the country analysis above to highlight its tenuous nature.

To evaluate the effects of the announcement of the BIS standards we ran a counterfactual simulation of our Japanese and U.K. regression estimates assuming the BIS announcement never occurred and, consequently, the BIS dummies in our regressions equalled zero. This counterfactual exercise suggests that the BIS announcement slowed quarterly bank credit growth in Japan by roughly 0.25 percentage points on average from 1988-II to 1992-I. A similar exercise for the United Kingdom shows a weaker impact of the BIS standards: growth in U.K. bank credit is estimated to have been slowed by only 0.18 percentage points in response to the BIS announcement. This supports our earlier conclusion that bank capital constraints have had their most notable effect in Japan.

Synthesis: Overall, the regression results strongly support our earlier conclusions about the causes of the credit slowdowns in Japan, the United Kingdom, and France.[56] The (stock) adjustment of these markets to earlier developments, especially deregulation, is estimated to have been an important factor in the credit slowdown. As expected, this factor is estimated to have been most important for credit in France. Asset price changes, predominantly changes in the price of real estate, have also played a major role in the credit slowdown. In Japan the contribution of asset price developments has largely been through transitory channels, that is through the impact on the credit market of speculative asset transactions which fed and then burst the asset price bubble, causing ripple effects throughout the financial system. In the other countries speculative demand does not seem to have been nearly as important, but the actual changes in asset price levels appear to have altered the amount of credit needed to finance nonspeculative real estate purchases or the amount of funding obtainable through equity issuance. Through these two more fundamental channels asset price developments appear to have strongly influenced credit growth in France and the United Kingdom. As for the other determinants

[56] The results of similar regressions using U.S. data may be of interest to the reader. These suggest that stock adjustment effects account for one tenth and one quarter of the slowdowns in bank and total credit, respectively. The largest single factor behind the slowdowns in both bank and total credit growth was the concurrent slowdown in GDP growth. Asset price developments are estimated to have contributed modestly to the bank credit slowdown but to have been unimportant in the total credit slowdown.

There are many reasons for viewing these U.S. results with caution. First, to accurately capture the consequences of the thrift crisis would have required greater disaggregation of the data. Second, the consequences of regional developments, such as the apparent bubbles in real estate prices in the Northeast and Southwest, are probably not well-measured in the aggregate data.

having a sustained impact on credit growth, bank capital as expected is estimated to have contributed notably to the credit slowdown in Japan, but not to the credit slowdowns in the United Kingdom or France. For France, slowing nominal GDP growth has been important, but cyclical developments have not been the chief determinant of the credit slowdown in any of the three countries.

All told, the results in this Section, coupled with those in Section II, suggest that the recent credit slowdown abroad primarily reflects a break in the rise in credit relative to GDP that occurred throughout most of the 1980s in all three focus countries. This break came as the key factors underlying this rise—stock adjustment and asset price dynamics—unwound over the last few years.

III. Credit Developments in Other Major Industrial Economies

We reviewed the experiences of six other industrialized nations—Germany, Italy, Spain, Sweden, Switzerland, and Australia—to see whether the common pattern of credit development we found in Japan, the United Kingdom, and France occurred more generally. We found that in all of these countries but Germany the pattern could be discerned quite clearly, though typically it began somewhat later in the 1980s than in our focus countries. As shown in Table 11, Italy, Spain, Sweden, Switzerland, and Australia all experienced growth in credit which greatly exceeded growth in GDP following deregulation or financial innovation (or both). The shift in the credit-GDP relationship was accompanied in all five countries by surging real estate prices. A shift towards monetary tightening in 1989 or thereafter generally contributed to a slowing or reversal of these asset and credit developments. Loan problems resulting from the real estate retrenchment as well as the cyclical downturn exacerbated the decline in credit growth, though the magnitude of credit losses due to problem loans varied greatly across countries.

This pattern was most extreme in Sweden, where bank credit reached the astonishing average annual rate of 34 percent during 1988, far exceeding GDP growth. Sweden is also notable for having had, prior to these credit developments, a financial market structure in which government controls on quantities and prices were particularly pervasive and powerful. In the aftermath of the mid-1980s deregulation of domestic financial markets, while credit quantities were adjusting, commercial and residential property prices in Stockholm rose on average about 20 percent per year during the 1987-90 period. The boom ended following monetary tightening begun in 1989. Commercial real estate prices dropped 43 percent in 1991, and residential prices also began to soften in that year. The bursting of the real estate bubble created large bank and finance company loan loss problems, necessitating massive government support for two major banks.

Germany, where the ratio of private non-financial debt/nominal GDP remained virtually unchanged from 1982 through 1989, represents the other extreme of foreign credit experience.[57] Germany also stands out as having undertaken the least degree of financial market deregulation in the 1980s. Most notably, Germany had not employed quantitative credit controls during the 1970s and, consequently, experienced no credit surge following credit control removal in the 1980s. Concomitant with the absence of a German credit surge in the 1980s was the absence of marked asset price inflation in Germany. Frankfurt residential real estate prices, for example, rose on average only 2 percent per year, much less than residential real estate prices in other large cities abroad. Though Germany stands out as unusually insulated from the credit and asset market ex-

[57] Data apply only to the former West Germany; developments are only analyzed through 1989 to abstract from the impact of German unification.

Table 11: Credit Growth in the Private Nonfinancial Sector in Selected Other Major Foreign Countries
Average Annual Growth Rates

	1980-IV to 1987-IV	1987-IV to 1988-IV	1988-IV to 1989-IV	1989-IV to 1990-IV	1990-IV to 1991-IV
West Germany					
Nominal GDP	4.6	5.5	5.8	–	–
CPI	2.9	1.7	3.0	–	–
Total credit	5.4	4.6	6.5	–	–
Bank credit	5.8	5.5	7.4	–	–
Italy					
Nominal GDP	14.8	10.6	9.3	9.7	8.1
CPI	12.2	5.1	6.3	6.7	6.1
Total credit	12.2	15.6	18.0	15.4	14.7
Bank credit[a]	8.4	17.3	22.4	16.0	16.0
Spain					
Nominal GDP[b]	13.5	11.1	12.1	11.2	9.4
CPI	10.9	5.5	7.1	6.8	5.6
Total credit	n.a.	17.6	15.4	9.9	11.7
Bank credit	10.1	14.1	17.9	9.3	16.9
Sweden					
Nominal GDP[c]	9.6	9.6	9.4	6.7	5.3
CPI	8.2	5.9	6.5	11.2	7.9
Total credit[d]	n.a.	21.9	21.3	15.5	3.4
Bank credit[e]	12.5	33.8	26.5	16.6	-3.5
Switzerland					
Nominal GDP	6.0	3.9	8.1	7.6	5.4
CPI	3.4	1.8	4.4	5.9	5.3
Total credit	n.a.	n.a.	n.a.	n.a.	n.a.
Bank credit[f]	8.4	12.8	15.2	8.8	5.1
Australia					
Nominal GDP	11.8	13.6	9.2	4.1	0.7
CPI	8.5	7.7	7.8	6.8	1.5
Total credit[d]	n.a.	23.9	15.5	7.3	-1.0
Bank credit[f]	17.2	25.0	29.9	16.8	5.1

n.a. = not available

a. Loans to private nonfinancial enterprises and persons for consumption purposes.
b. Year average (not Q4/Q4) growth rates.
c. 1981-IV to 1987-IV.
d. Excludes bonds.
e. Includes loans to local authorities.
f. Includes loans to financial sector.

periences of most industrialized countries in the 1980s, its experience further supports the idea that common forces were at work in those countries, among which financial market deregulation seems particularly important.

IV: Conclusions

This study has examined the marked slowdown in credit growth in Japan, the United Kingdom, and France after 1990. It has found that for all three countries a tightening in monetary policy preceded the slowdown and the ensuing decline in GDP growth contributed significantly to the credit weakness. However, most of the recent weakening in credit growth is explained by the unwinding of noncyclical factors that had led to credit surges earlier in the 1980s. Prominent among these factors was financial market deregulation which spurred credit growth as the stock of credit outstanding rose to a new, higher equilibrium level relative to nominal GDP. Once this new credit level was approached, credit growth naturally slowed. Another major factor, whose importance differed significantly across the three countries, was the rapid increase in asset prices during the 1980s. These prices slowed or actually fell as the decade ended. The recent reversal in asset price developments removed this earlier accelerant to credit growth and in some cases actively slowed credit growth. Financial problems resulting from unsuccessful speculative asset purchases have further dampened credit conditions.

For France, our analysis, supported by econometric results, suggests that the end of adjustment to bank deregulation, combined with the cyclical downturn, accounts for much of the waning in credit growth. Slowing French demand for credit to finance primarily nonspeculative asset purchases, concomitant with a slowdown in asset price increases, also appears to have been a significant factor. In the United Kingdom, the country with the largest credit surge, qualitative and econometric analyses indicate that increases in personal insolvencies and sharply declining housing prices in the initial wake of the credit slowdown significantly exacerbated the weakening credit situation. Credit ultimately slowed dramatically as both speculative and nonspeculative asset market forces took their toll.

Finally, in Japan we find that sharply declining stock market and land prices hurt the financial base of the banking system which was less well capitalized than that of France or the United Kingdom. Juxtaposed against tighter banking capital standards, measured by required BIS capital/asset ratios, the deterioration in the Japanese banks' capital base contributed significantly to the recent credit weakness. A sharp fall in credit demand to finance speculative purchases, following the bursting of the Japanese asset price bubble, also substantially reduced credit growth. More fundamental factors, such as the stock adjustment process and slowing Japanese economic growth also contributed—but to a smaller extent than in France or the United Kingdom—to the credit slowdown.

The credit experiences of Japan, the United Kingdom, and France appear to fit into a broader pattern common to many foreign industrialized countries. Looking at developments in half a dozen other countries, we generally find that financial deregulation and innovation led to soaring credit growth and sharply rising credit/GDP ratios in the 1980s. Although the timing of developments varied across countries, eventual tightening in monetary policy, coupled with a natural decline in credit growth rates as the stock adjustment to credit deregulation worked itself out, brought on a credit correction. Rapidly rising asset prices typically contributed to the credit surge, and their subsequent levelling off or decline contributed to the credit slowdown. Credit adjustment problems tied to speculative asset market dynamics appear to have been substantial in about half the countries experiencing a pronounced credit surge.

In a volume devoted primarily to considering the U.S. credit slowdown, it may be appropriate to finish by comparing the U.S. experience with those abroad. The overall process of financial innovation and deregulation was important to the evolution of both the U.S. and foreign country credit cycles over the 1980s. The extent of deregulation within the broader process, however, appears to have been greater abroad than in the United States. Quantitative credit controls, for example, were generally pervasive and economically significant abroad, but not here in the U.S. For this reason the removal of those controls probably played an important role in many of the credit cycles abroad.

The role of monetary policy also differs between the U.S. credit experience, where the credit slowdown was not associated with monetary tightening, and the experiences of the U.S.'s major trading partners, where tightening of monetary policy helped precipitate the credit slowdowns in most cases. Both in the United States and abroad, however, the evolution of credit growth was most strongly affected by a set of market forces, such as financial innovation and asset price developments, which initially promoted rapid credit expansion but eventually led to a slowdown in credit growth.

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