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A Historical Perspective on the 1989-92 Slow Growth Period

by David Brauer

The National Bureau of Economic Research has determined that the recession that began in July 1990 ended in March 1991. A broad range of key output and employment measures suggest that the recession itself was moderate—roughly comparable in severity to the average of past recessions since 1960. More specifically, these indicators show the 1990-91 recession to be approximately equal in severity to the brief downturn in 1980, and although in many respects harsher than the 1960-61 and 1969-70 episodes, considerably milder than the 1973-75 and 1981-82 recessions.

Nonetheless, the United States experienced an unusually protracted period of below-normal growth between early 1989 and early 1993. During that period real gross domestic product (GDP) rose at an average annual rate of less than 1 percent, compared with a potential growth rate of between 2 and 2½ percent. This slow rise represents the weakest performance over any four-year period since the Great Depression, with the single exception of the economy's performance from early 1979 through the end of 1982.[1] Although it is not uncommon for output growth to slacken during the last several quarters before the onset of recession, the slowdown preceding the 1990-91 recession began earlier and was more pronounced than in most previous episodes. More important, the recovery since early 1991 has been unusually anemic. This article examines in greater detail both the 1990-91 recession and the longer period of slow growth in the context of earlier episodes.

[1]In contrast to the moderate recession during the most recent episode, this earlier period encompassed two separate recessions, one of which was by some measures the most severe downturn of the postwar era.

The 1990-91 recession

We begin by focusing on the narrowly defined recession period as designated by the National Bureau of Economic Research (NBER). Most economists would define a recession as a period during which economic activity is contracting. Typically, this involves declines in real GDP, industrial production, employment, and real income, together with a rising unemployment rate.

Table 1 reports the change in ten key measures of activity during the 1990-91 recession, as well as in six earlier recessions. Because real GDP and other output measures are reported on a quarterly basis only, and because some monthly measures at times exhibit considerable month-to-month volatility, all data are expressed as quarterly averages. Note that although the NBER-designated peak occurred during the first month of the third quarter of 1990, both real GDP and private employment declined during that quarter.[2] Consequently, this analysis treats the second quarter of 1990 as the peak.[3]

During the 1990-91 recession, real GDP declined 2.2 percent, close to the average 2.0 percent decline of the six previous recessions. The loss of output was roughly similar to that of the 1980 and 1957-58 recessions, slightly smaller than in 1981-82, much smaller than in 1973-75, but significantly greater than in the 1960-61

[2]The figures available to NBER when it designated July 1990 as the peak showed a small increase in output during the third quarter of 1990; they have since been revised.

[3]For similar reasons, the first quarter of 1960 is designated as a cyclical peak, even though the official NBER-designated peak occurred in April.

and 1969-70 recessions.[4] Other indicators suggest a more mixed picture. Industrial production fell considerably less than in past recessions.[5] Both private employment and the unemployment rate likewise suggest that the 1990-91 recession, viewed narrowly, was among the mildest in recent decades. Nevertheless, real income growth was weaker than average during the 1990-91 recession, though not as anemic as in the 1973-75 recession. Moreover, consistent with the decline in income, consumer spending slackened more than normal during the last recession. Both commercial and residential construction also remained somewhat weaker than in most past recessions, but real spending on producers' durable equipment declined less than in any of the previous six recessions.

As measured by the standard deviation, the dispersion of employment losses across geographic regions during the 1990-91 recession roughly matched that of earlier recessions. However, in contrast to the last two recessions, the Atlantic Coast was affected to a greater extent than the nation's midsection (Table 2).[6] Changes in real personal income by state and region follow a similar pattern. New England's employment loss was greater than in any of the four earlier recessions and, with one exception, exceeded previous declines in other regions as well. The Mid-Atlantic also experienced above-average employment losses in 1990-91, comparable in magnitude to those suffered in 1973-75 but greater than those in 1981-82. Likewise, employment losses in the South Atlantic surpassed both the national average and the average of previous recessions within that region. However, the recession was unusually mild in the Midwest and the East South Central regions, and employment actually grew in two areas that are traditionally not very vulnerable to recessions—West South Central and Mountain.

In sum, the decline in GDP during the 1990-91 recession roughly equaled the average decline for past recessions. A broader set of indicators suggests that on the whole, the recession can be classified as moderate, with smaller than normal declines in employment and industrial production but unusual weakness in several

[4]Although real GDP measured in 1987 dollars showed no meaningful decline during the 1960-61 and 1969-70 recessions, calculations based on more contemporaneous deflators and earlier output measures indicated that real output did decline modestly in both instances.

[5]The relatively small decline in industrial production is slightly exaggerated by the use of quarterly averages. Monthly figures show a 3.8 percent decline between July 1990 and March 1991, compared with an average drop of 8.9 percent between the peak and trough months of the previous six recessions.

[6]The figures in Table 2 were first seasonally adjusted by state (but not by industry), then aggregated at the regional level. With the exception of California, they do not fully reflect recent historical revisions to payroll employment data, which indicated smaller employment declines nationally during the 1990-91 recession than had previously been reported. Consequently, for regions other than the Pacific, these declines may be somewhat overstated. Data on state and regional employment are not available for the 1957-58 and 1960-61 recessions.

Table 1

Peak-to-Trough Percentage Change in Major Economic Indicators

	1990-II to 1991-I	1981-III to 1982-IV	1980-I to 1980-III	1973-IV to 1975-I	1969-IV to 1970-IV	1960-I to 1961-I	1957-III to 1958-II	**Average of Six Preceding Columns**
Real GDP†	**−2.2**	−2.7	−2.5	−4.1	−0.1	0.0	−2.5	**−2.0**
Personal consumption expenditures†	**−1.1**	2.1	−1.0	−0.8	1.7	1.4	0.6	**0.7**
Producers durable equipment†	**−4.3**	−11.8	−8.3	−12.4	−5.2	−9.7	−17.2	**−10.8**
Nonresidential structures†	**−7.4**	−6.4	−3.5	−11.3	−3.1	5.6	−6.0	**−4.2**
Residential investment†	**−18.7**	−10.9	−17.3	−30.4	9.1	−10.6	−3.8	**−10.7**
Industrial production	**−2.8**	−8.0	−4.3	−12.8	−5.4	−7.5	−11.2	**−8.2**
Private employment‡	**−1.1**	−3.2	−1.5	−2.6	−1.6	−2.3	−5.0	**−2.7**
Unemployment rate§	**1.3**	3.3	1.4	3.5	2.3	1.7	3.1	**2.5**
Real disposable income†	**−1.0**	0.7	−0.7	−4.2	3.0	1.4	0.2	**0.1**
Real wage and salary income‖	**−2.5**	−1.5	−1.4	−4.7	−1.1	−0.4	−2.8	**−2.0**

†1987 dollars.
‡Based on monthly establishment survey.
§Percentage points.
‖1987 dollars, deflated by implicit deflator for personal consumption expenditures.

income measures. Employment losses were to a greater than normal extent concentrated along the Atlantic Coast. That the drop in industrial production was small relative to the decline of real GDP hints at unusual weakness in service-producing sectors, which in past recessions generally experienced merely a pause or slowdown in growth.

The extended slow growth period: 1989-93

Although the 1990-91 recession was not particularly severe when compared with earlier postwar recessions, several key macroeconomic indicators suggest that in the extended period from early 1989 to early 1993 the U.S. economy experienced greater weakness than in any other period surrounding a single recession since World War II. In fact, the periods immediately preceding and following the most recent recession were characterized by unusually weak output, employment, and income growth. As a result, as late as June 1993 (according to preliminary data), private employment was still slightly below its peak level, and most other indicators remained well below the levels reached at the same stage of earlier recoveries.

Table 3 presents the net change in the same key indicators as in Table 1 over the period from the second quarter of 1989 (one year before the peak) through the first quarter of 1993 (eight quarters after the trough), and over five similar periods surrounding earlier recessions. (The 1980 recession is omitted because the subsequent recovery was abbreviated.) By all ten measures, the most recent period showed substantially greater economic weakness than did the average of earlier episodes. In fact, we can observe only four earlier instances—unemployment in 1968-72 and 1972-77, residential investment in 1972-77, and real spending on producers' durable equipment in 1956-60—in which any of these measures exhibited weaker performance over the corresponding period.

These extended periods can be subdivided into the year before the recession, the recession itself, and the recovery phase. During the last several quarters of a typical expansion, economic activity gradually slows. In 1989 and the first half of 1990 this slowdown was somewhat sharper than it had been in the quarters leading up to most past recessions, though not entirely unprecedented. Real output grew just 1.3 percent during the last four quarters of the 1980s expansion, compared with an average growth rate of 2.8 percent during

Table 2

Percentage Change in Employment by Region: Peak to Trough

	1990-II to 1991-I	1981-III to 1982-IV	1980-I to 1980-III	1973-IV to 1975-I	1969-IV to 1970-IV	**Average of Four Preceding Columns**
National	**−1.1**	−2.9	−1.1	−1.3	−0.8	**−1.5**
New England	**−4.6**	−1.4	−0.8	−2.6	−1.7	**−1.6**
Mid-Atlantic	**−2.7**	−2.1	−1.2	−2.8	−1.6	**−1.9**
South Atlantic	**−1.9**	−1.3	−0.1	−2.6	2.1	**−0.5**
East North Central	**−1.1**	−5.6	−3.4	−3.2	−3.4	**−3.9**
West North Central	**−0.2**	−3.4	−2.1	0.6	−1.2	**−1.5**
East South Central	**−0.5**	−4.0	−2.6	−1.8	1.2	**−1.8**
West South Central	**1.0**	−2.0	1.6	3.0	−0.3	**0.6**
Mountain	**1.2**	−1.7	−0.6	1.8	3.0	**0.6**
Pacific	**−0.5**	−3.2	−0.9	1.0	−2.2	**−1.3**
Standard deviation of regional changes	**1.7**	1.3	1.4	2.2	2.0	

Notes: Table reports changes in total employment, including government employment. Figures are based on the monthly establishment survey and are seasonally adjusted by the author. Regions are defined as follows:
New England—Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island
Mid-Atlantic—New Jersey, New York, Pennsylvania
South Atlantic—Delaware, Washington, D.C., Florida, Georgia, Maryland, N. Carolina, S. Carolina, Virginia, W. Virginia
East North Central—Illinois, Indiana, Michigan, Ohio, Wisconsin
West North Central—Iowa, Kansas, Minnesota, Missouri, Nebraska, N. Dakota, S. Dakota
East South Central—Alabama, Kentucky, Mississippi, Tennessee
West South Central—Arkansas, Louisiana, Oklahoma, Texas
Mountain—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
Pacific—California, Oregon, Washington (Alaska and Hawaii omitted).

the last year of earlier expansions. The only comparable earlier instance is the real output growth rate of 1.1 percent over the five quarters before the 1980 recession.

While the degree of slowdown during the final year of the 1980s expansion was unusual but not unprecedented, the anemic recovery since early 1991 has no postwar parallel. Table 4 illustrates the economy's performance during the first eight quarters of the 1991-92 recovery and of the five previous recoveries. Through the first quarter of 1993, real GDP had grown only 4.2 percent, less than half as much as in any of the previous recoveries. Industrial production and income also recovered much more slowly than in the past. In contrast with all earlier recoveries, private employment after eight quarters was only fractionally higher than at the trough, and the unemployment rate was higher.

Salient features of the slow growth period

To get a better perspective on the slow growth period, it is useful to examine several important features of the recent experience. Charts 1-4 focus on four broad

Table 3

Percentage Change in Major Economic Indicators: Four Quarters before Peak to Eight Quarters after Trough

	1989-II to 1993-I	1980-III to 1984-IV	1972-IV to 1977-I	1968-IV to 1972-IV	1959-I to 1963-I	1956-III to 1960-II	**Average of Five Preceding Columns**
Real GDP†	**3.3**	12.3	9.2	12.5	14.0	9.4	**11.5**
Personal consumption expenditures†	**4.8**	14.1	11.8	17.1	14.1	12.8	**14.0**
Producers durable equipment†	**9.8**	22.7	13.3	20.6	15.3	0.6	**14.5**
Nonresidential structures†	**−17.6**	13.2	−3.5	6.8	16.2	2.7	**7.1**
Residential investment†	**−5.8**	29.6	−8.4	46.3	8.1	10.8	**17.3**
Industrial production	**2.8**	13.1	7.0	14.9	17.0	11.0	**12.6**
Private employment‡	**0.7**	8.1	7.4	7.9	5.2	2.6	**6.2**
Unemployment rate§	**1.8**	−0.4	2.1	2.0	−0.1	1.1	**1.0**
Real disposable income†	**5.6**	14.5	8.4	19.1	13.5	10.6	**13.2**
Real wage and salary income‖	**1.1**	9.8	4.3	14.4	14.0	9.8	**10.5**

†1987 dollars.
‡Based on monthly establishment survey.
§Percentage points.
‖1987 dollars, deflated by implicit deflator for personal consumption expenditures.

Table 4

Percentage Change in Major Economic Indicators: First Eight Quarters of Recovery

	1991-I to 1993-I	1982-IV to 1984-IV	1975-I to 1977-I	1970-IV to 1972-IV	1961-I to 1963-I	1958-II to 1960-II	**Average of Five Preceding Columns**
Real GDP†	**4.2**	11.6	9.9	10.5	9.8	9.3	**10.2**
Personal consumption expenditures†	**4.4**	9.7	10.7	11.6	8.6	9.2	**9.9**
Producers durable equipment†	**18.6**	31.2	15.0	24.3	17.4	19.2	**21.4**
Nonresidential structures†	**−13.7**	9.4	0.7	3.8	−0.2	10.2	**4.8**
Residential investment†	**23.7**	51.5	47.3	42.6	18.8	23.3	**36.7**
Industrial production	**6.2**	16.6	16.5	17.9	18.1	20.4	**17.9**
Private employment‡	**0.5**	9.2	6.0	6.2	4.3	7.1	**6.6**
Unemployment rate§	**0.5**	−3.4	−0.8	−0.5	−1.0	−2.1	**−1.6**
Real disposable income†	**4.4**	10.1	7.9	11.1	8.3	7.5	**9.0**
Real wage and salary income‖	**1.9**	9.1	6.0	10.0	8.9	10.8	**9.0**

†1987 dollars.
‡Based on monthly establishment survey.
§Percentage points.
‖1987 dollars, deflated by implicit deflator for personal consumption expenditures.

aggregate measures—real GDP, industrial production, private employment, and real disposable income. The charts illustrate the paths taken by these variables, relative to their peak levels, over periods ranging from one and a half years before the peak to three years after the peak. Each measure is tracked for the latest episode and for the periods surrounding the severe 1973-75 and 1981-82 recessions; an average is shown for the intervals surrounding the 1960-61 and 1969-70 recessions.

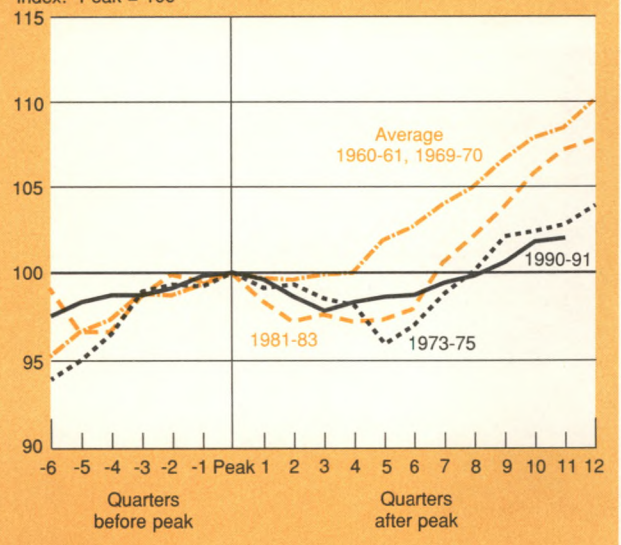
Chart 1 reveals that although the 1990-91 recession itself resulted in only a modest loss of output, real GDP did not regain its earlier peak level until the third quarter of 1992 (quarter 9).[7] In early 1993 the value of output relative to its peak level was slightly lower than at a similar stage relative to the 1973 peak and substantially below its relative level following the 1960-61, 1969-70, and 1981-82 recessions. Note too that apart from the back-to-back recessions in 1980 and 1981-82, output growth was weaker before the last recession than it had been before earlier recessions. Industrial production did not suffer as much as GDP during the slow growth period as a whole. Even so, as Chart 2 shows, its performance through early 1993 was much weaker than at a similar stage following the 1960-61 and 1969-70 recessions, and slightly weaker than in the quarters following the 1981-82 recession. Furthermore, despite a significantly smaller than normal decline during the recession, it did not rise above its peak level until October 1992 (month 27). Nevertheless, it was stronger relative to its peak level than it was at the same stage following the 1973-75 recession.

[7]Note that because Charts 1-4 are indexed to the peak, as opposed to the trough or one year before the peak, the differences between the most recent episode and earlier ones do not appear as sharp as those illustrated in Tables 3 and 4.

Chart 1

Real GDP

1987 Dollars



Source: Bureau of Economic Analysis, May 28 release.

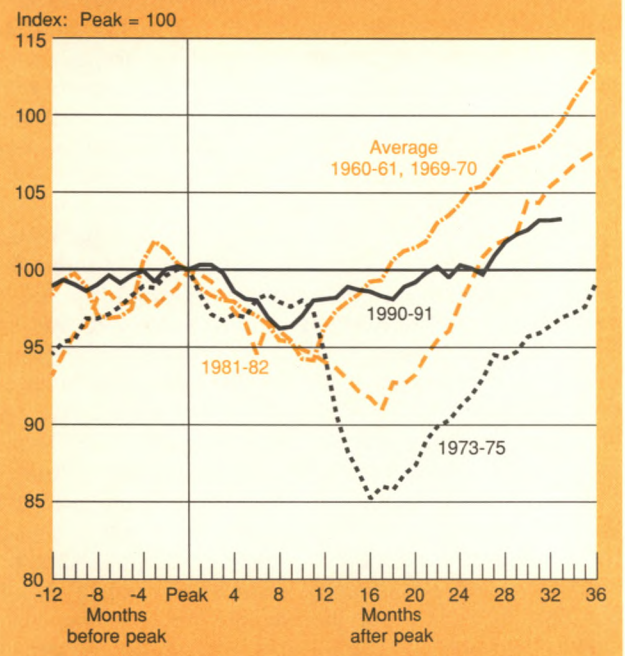
Chart 3 shows the striking weakness of employment during the recent slow growth period as compared with earlier episodes.[8] Private employment continued to decline through February 1992 (month 19) and was still below its peak level in June 1993, although solid growth did begin to appear in early 1993. This performance contrasts with the rapid growth observed in past episodes: even after the sharp 1973-75 and 1981-82 recessions, employment was 1½ to 3½ percent higher than its peak level at the same stage. Like output and industrial production, employment growth was also relatively weak before the most recent recession. Finally, Chart 4 shows that the weakness of employment growth in turn contributed to sub par income growth over the entire slow growth period, comparable only to income growth in the period surrounding the 1973-75 recession.

Several explanations have been proposed for the weakness of employment growth. These explanations are not necessarily mutually exclusive and may in some instances be complementary. One explanation centers on restructuring moves by a number of large corporations, such as IBM and General Motors, that have resulted in permanently lower staffing levels. Of the large corporations responding to a survey by the American Management Association, 46 percent reported downsizing between July 1991 and June 1992. These cuts resulted in an average workforce reduction of 9.3 percent. The effects of the downsizing phenomenon may, however, be exaggerated for some sectors. Within manufacturing, the restructuring process had clearly been under way for a considerable time before 1989. One indication is that aggregate employment by Fortune 500 firms declined in all years but one since 1979. Although employment at these firms fell at a reported 2.1 percent annual rate between 1989 and 1992, this rate of decline was only slightly faster than that recorded between 1982 and 1989. In the service sector, however, downsizing may have been more widespread than in the past. The American Management Association survey results indicate that service-producing firms

[8]Chart 3 and the discussion in this paragraph reflect the recent benchmark revisions, which indicated smaller employment declines during the recession, and somewhat stronger growth in late 1992 and early 1993, than had previously been reported.

Chart 2

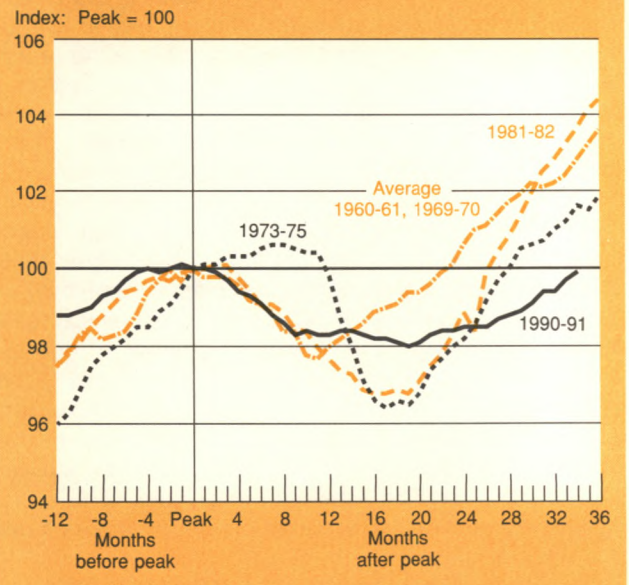
Industrial Production



Source: Board of Governors of the Federal Reserve System.

Chart 3

Private Employment



Source: Bureau of Labor Statistics, establishment survey data.

downsized in recent years at roughly the same rate as firms engaged primarily in manufacturing. Although we cannot compare this finding directly with job loss patterns in earlier episodes, anecdotal evidence and aggregate employment statistics by sector both suggest that downsizing probably did take place at service-producing firms during the last episode to a greater degree than in earlier episodes.

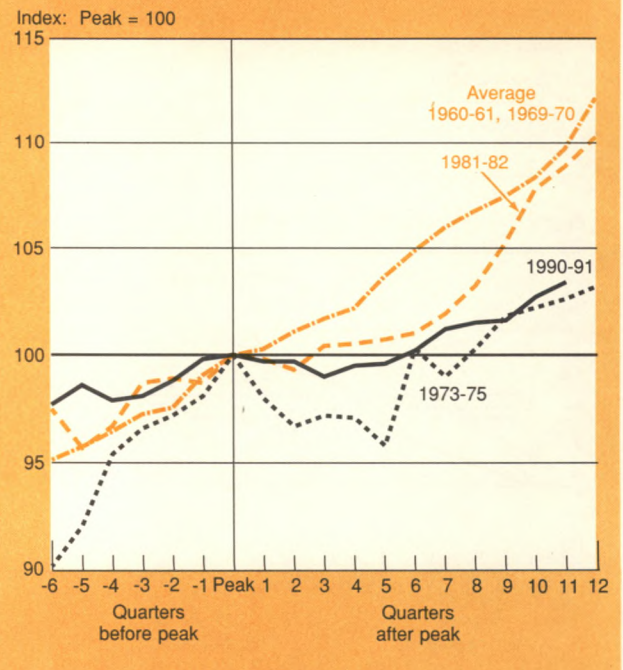
While employment at large corporations has been weak but possibly not exceptionally so, small businesses appear to be creating new jobs at a significantly slower pace than during the 1980s expansion. High debt levels of their own and bank balance sheet problems may have prevented some small businesses from borrowing in order to expand. Anemic consumer spending resulting from weak employment and income growth, together with a lack of confidence in the recovery's durability, may have inhibited the formation of new businesses and the expansion of existing small businesses.

Two other explanations for the poor job performance merit consideration. A recent study estimated that declining defense spending caused a 0.5 percent reduction in real GDP during the first five quarters of the

Chart 4

Real Personal Disposable Income

1987 Dollars



Source: Bureau of Economic Analysis.

latest recovery, and that 855,000 defense-related jobs, including 440,000 in private defense industries, were lost between fiscal years 1987 and 1992.[9] Such cuts are not unprecedented; defense spending and related employment also declined throughout most of the 1970s. Still, while it is difficult to assess the exact magnitude of the effect, these reductions are clearly at least partly responsible for the failure of manufacturing employment to recover following the recession. It has also been suggested that high nonwage labor costs, especially for health insurance, have led employers to expand output through productivity-enhancing investment and increased overtime rather than by hiring additional workers. Some support for this view is offered by the near-normal growth of productivity through the end of 1992 (Chart 5) despite the weakness of output growth.

Because the private service-producing sector accounted for virtually all of the growth in aggregate employment throughout the 1980s, weak employment growth in that sector during the recent period deserves special attention. As Chart 6 shows, in past cycles the growth of service employment typically merely paused during recessions before resuming its rapid pace early in the subsequent recovery. In the recent episode, by contrast, service employment declined modestly during the recession and did not rise above its pre-recession peak level until April 1992 (month 21).[10] Since then, service employment has grown steadily, but at a slower pace than in past recoveries. In particular, employment in finance, insurance, and real estate stagnated between 1987 and 1990 after a period of rapid growth during the previous two decades, declined during the recession, and has not recovered. Weakness in this sector can be attributed to consolidation in the securities industry—an apparent consequence of the 1987 stock market crash—and in banking. Weakness is also evident in wholesale and retail trade, where employment fell to a greater than normal degree during the 1990-91 recession (though, in the case of wholesale trade, less than in 1981-82) and did not begin to recover until more than a year after the recession ended.

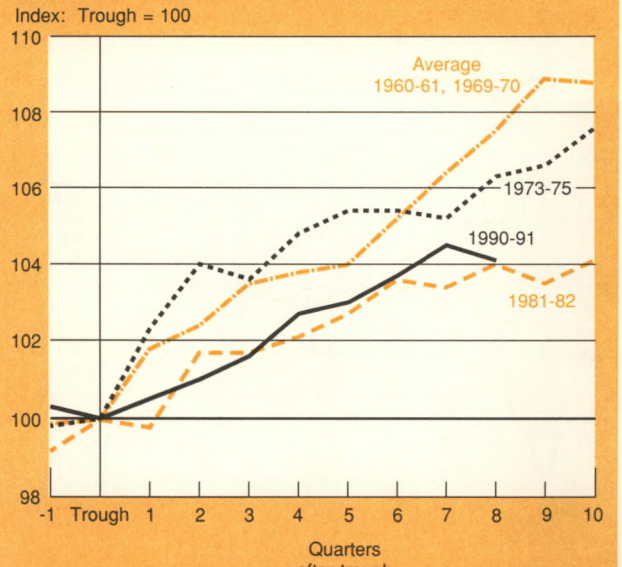
Another distinguishing feature of the latest episode

[9]Ronnie Lowenstein and Richard Peach, "The Impact of the Current Defense Build-down," Federal Reserve Bank of New York *Quarterly Review*, Autumn 1992, pp. 59-68.

[10]Results from the Displaced Workers' Surveys conducted by the Census Bureau indicate that persons employed in trade and financial services were more likely to lose their jobs for economic reasons in 1990 or 1991 than in 1982 or 1983. See Henry S. Farber, "The Incidence and Costs of Job Loss: 1982-91," *Brookings Papers on Economic Activity: Microeconomics 1993*, pp. 73-119.

Chart 5

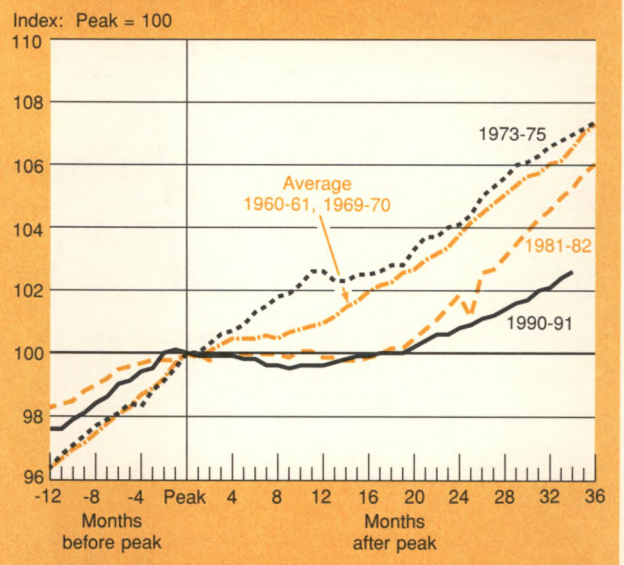
Nonfarm Business Productivity



Source: Bureau of Labor Statistics.

Chart 6

Employment in Private Service-Producing Industries



Source: Bureau of Labor Statistics, establishment survey data.

Note: Service-producing industries comprise transportation and utilities; wholesale and retail trade; finance, insurance, and real estate; business services, health services, and other services.

was the extreme weakness of construction spending, especially in commercial buildings. Over the full slow growth period, real expenditures on nonresidential structures declined nearly 18 percent, and housing expenditures also declined. As Charts 7 and 8 demonstrate, spending on both in fact peaked during the mid-1980s, and had been declining partly because of high vacancy rates (a consequence of earlier overbuilding) and the elimination of tax incentives supporting multifamily residential and commercial construction. Since the trough, residential investment has recovered to approximately its level at the start of the recession, though this performance has not been as strong as in earlier recoveries. Investment in single family structures had by the end of 1992 surpassed its level at the cyclical peak, but spending on multifamily structures remained depressed. Meanwhile, spending on commercial structures continued to decline, falling to its lowest level since 1978. Such a sustained drop is unprecedented during the postwar period.

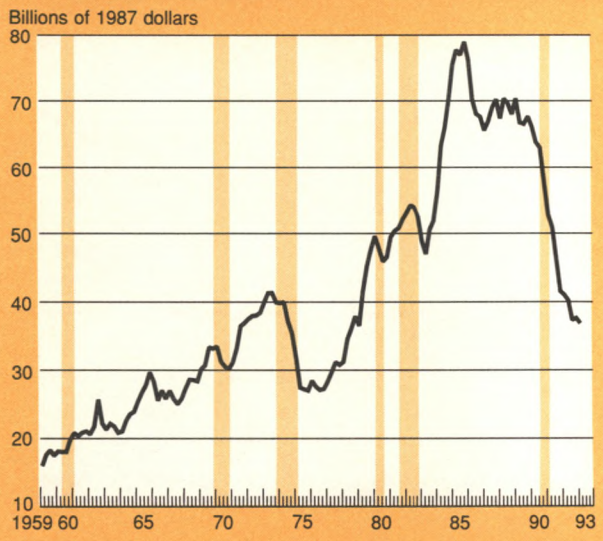
Real expenditures on producers' durable equipment over the entire period were also somewhat weaker than normal, though the difference was less dramatic than for construction. However, the reported 9.8 percent increase shown on line 3 of Table 3 is somewhat misleading because it reflects in part the impact of falling computer prices. Real business purchases of computers were reported to have more than doubled between the second quarter of 1989 and the first quarter of 1993, while nominal computer spending rose just 22 percent. Excluding computers, real investment in producers' durable equipment fell 3.7 percent over that period; the difference between the measures including computers and those excluding computers was especially pronounced during the recovery.

The regional pattern of employment developments over the extended slow growth period, shown in Table 5, was for the most part similar to that of the narrow recession period. Employment growth measured over the whole period was weaker than the average of past episodes in all regions, with the Northeast (New England and the Mid-Atlantic) showing declines and the South Atlantic and Pacific Coast (mainly California, where employment fell more rapidly after the national recession than during it) exhibiting unusually weak growth. For the first time in recent cyclical experience, however, employment growth in the East North Central region exceeded the national average, although it was still slightly below its own average of past episodes.[11]

[11]Employment in the East North Central region declined by 4.2 percent over the full period from 1979-I through 1984-III, which

Chart 7

Expenditures on New Nonresidential Commercial Structures

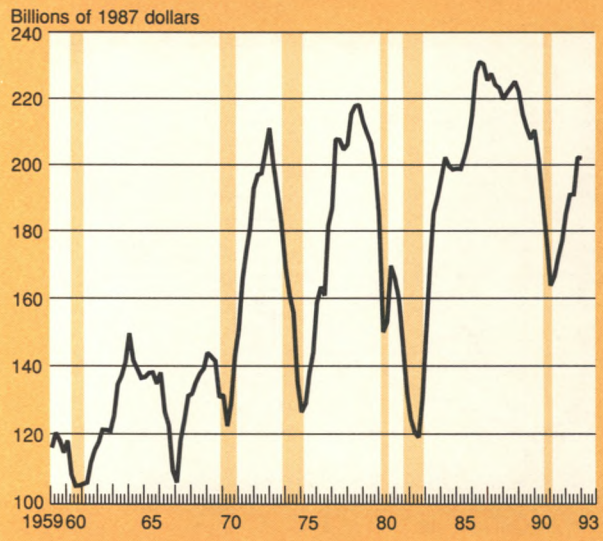


Source: Bureau of Economic Analysis, unpublished data.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

Chart 8

Residential Investment



Source: Bureau of Economic Analysis.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

Not surprisingly, estimates of personal income growth by state and region yield a picture generally similar to that for employment: those regions that show unusually poor employment growth also exhibit weak income growth.

Table 6 shows the pattern of unemployment during and after the last recession and three earlier recessions in ten large states. Because state unemployment rates tend to show sharp fluctuations from month to month, the figures shown are based on three-month centered moving averages. One striking fact is that the unemployment rate in each of these states during the latest recession and its aftermath never exceeded 10 percent, and only two states even saw peak-to-trough increases greater than 5 percentage points. By contrast, in the 1981-82 recession, four industrial states experienced unemployment rates of 12.9 percent or greater.[12]

Footnote 11 continued
encompassed two recessions. Incorporating this figure in the average of past episodes yields an average 1.4 percent increase.

[12]Although no state experienced a peak-to-trough increase in its unemployment rate of more than 6 percentage points during the narrowly defined 1981-82 recession, treating 1980 and 1981-82 as a single episode yields increases of at least 8 percentage points in Illinois, Ohio, and Michigan.

The effect on the output gap

Another way to gauge the economy's recent performance is to track the deviation of real GDP from its potential level. Estimates of potential output at any point in time can vary widely and are particularly sensitive to assumptions about the nonaccelerating inflation rate of unemployment (NAIRU)—in other words, the unemployment rate at which no upward or downward pressure exists on the underlying rate of inflation. In addition, the rate of change in potential output over time is related to assumptions about underlying trend growth in the labor force and productivity. These issues are discussed in much greater detail in the accompanying box.

It seems clear that regardless of the assumptions chosen, GDP exceeded its potential level a year before the recession. Thus, the slowdown in growth immediately before the recession apparently represented a

Footnote 12 continued

Table 5

Percentage Change in Employment by Region: Four Quarters before Peak to Eight Quarters after Trough

Seasonally Adjusted

	1989-II to 1993-I	1980-III to 1984-IV	1972-IV to 1977-I	1968-IV to 1972-IV	**Average of Three Preceding Columns**
National	**1.6**	6.5	8.0	8.7	**7.7**
New England	**−9.4**	9.8	5.3	4.3	**6.5**
Mid-Atlantic	**−4.9**	5.2	−1.0	2.8	**2.3**
South Atlantic	**2.5**	11.9	8.7	18.1	**12.9**
East North Central	**2.2**	0.4	5.7	4.5	**3.5**
West North Central	**5.1**	3.9	11.8	8.2	**8.0**
East South Central	**6.1**	4.2	11.0	14.3	**9.8**
West South Central	**8.2**	8.9	18.9	13.1	**13.6**
Mountain	**10.3**	12.2	19.1	25.2	**18.8**
Pacific	**0.7**	8.0	15.5	7.5	**10.3**
Standard deviation of regional changes	**5.9**	3.8	6.3	7.0	

Notes: Table reports changes in total employment, including government employment. Figures are based on the monthly establishment survey and are seasonally adjusted by the author. Regions are defined as follows:
New England—Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island
Mid-Atlantic—New Jersey, New York, Pennsylvania
South Atlantic—Delaware, Washington, D.C., Florida, Georgia, Maryland, N. Carolina, S. Carolina, Virginia, W. Virginia
East North Central—Illinois, Indiana, Michigan, Ohio, Wisconsin
West North Central—Iowa, Kansas, Minnesota, Missouri, Nebraska, N. Dakota, S. Dakota
East South Central—Alabama, Kentucky, Mississippi, Tennessee
West South Central—Arkansas, Louisiana, Oklahoma, Texas
Mountain—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
Pacific—California, Oregon, Washington (Alaska and Hawaii omitted).

Table 6

Unemployment Rates in Ten Large States

	Highest Rate†				Change, Peak to Trough‡				Rate Two Years after NBER Trough			
	1990-91	1981-82	1973-75	1969-70	**1990-91**	1981-82	1973-75	1969-70	**Mar. 1993**	Nov. 1984	Mar. 1977	Nov. 1972
National	**7.6**	10.7	8.9	6.0	**2.3**	3.3	4.1	1.8	**7.0**	7.2	7.4	5.4
Massachusetts	**9.2**	9.0	12.0	6.6	**5.1**	3.8	6.0	3.4	**6.9**	4.0	8.9	6.4
New Jersey	**9.5**	9.4	11.7	5.8	**5.6**	2.7	6.4	2.4	**8.4**	5.7	10.3	6.2
New York	**9.0**	9.4	10.5	6.8	**4.1**	2.2	5.3	3.3	**7.4**	7.1	9.7	6.2
Pennsylvania	**7.8**	13.4	8.7	5.4	**3.4**	6.0	4.4	1.9	**6.8**	8.3	7.9	5.0
Illinois	**8.6**	12.9	7.6	5.1	**2.9**	5.0	3.8	2.2	**8.1**	8.9	5.9	4.7
Michigan	**9.8**	16.6	13.4	8.3	**2.8**	5.1	8.1	3.2	**6.6**	10.9	8.1	5.9
Ohio	**7.5**	14.0	10.0	6.7	**2.2**	5.8	5.8	2.6	**6.6**	9.1	7.4	5.1
Florida	**8.7**	9.8	11.3	5.3	**3.3**	4.3	7.3	1.7	**6.7**	6.3	9.2	5.2
Texas	**7.7**	8.6	5.8	5.2	**1.9**	3.8	2.2	1.9	**7.0**	6.1	5.7	4.5
California	**9.9**	11.1	10.1	9.3	**4.9**	4.2	3.5	3.5	**9.3**	7.3	8.5	7.6
Coefficient of variation of state rates§	**.111**	.216	.224	.252	**.487**	.362	.408	.375	**.150**	.220	.190	.192

Note: Unemployment rates are based on a three-month centered moving average.

†During or after recession.
‡Values for 1990-91, 1981-82, and 1973-75 represent the difference between the highest state rate during or after the recession and the lowest state rate within one year of the NBER-designated peak. Values for 1969-70 give the change in the unemployment rate between the first quarter of 1970 and the highest rate during or after the recession.
§Standard deviation of state rates, weighted by adult civilian noninstitutional population, divided by national average.

reversion of output to its potential level. That both wage growth and price inflation accelerated beginning in 1988 lends credence to the view that GDP had been above its potential level. As a consequence of the recession, output fell below potential, but to a considerably lesser extent than in the 1973-75 and 1981-82 recessions. The recovery was so weak, however, that over its first two years the 2.1 percent annual rate of increase in real GDP actually failed to match the 2.2 percent growth in potential GDP under the baseline assumptions outlined in the box. Thus, in early 1993 the economy remained, under any reasonable set of assumptions, significantly below its potential level.

Conclusions

Although the 1990-91 recession, viewed narrowly, can be characterized as mild to moderate, the U.S. economy has since 1989 experienced an unusually long period of sub par economic performance. By every measure discussed, the economy's current performance relative to peak and year-before-peak levels is significantly worse than the average for earlier episodes at the same stage of the cycle. Growth in the year leading up to the recession was unusually weak, but this can apparently be explained as a reversion of output to its potential level. More important, the recovery since early 1991 has been extremely weak compared with past recoveries. In particular, employment continued to decline for some time after the recession ended and remained below its peak level more than two years after the trough. The recovery of output can be attributed mostly to productivity growth, which has been roughly comparable to that of past recoveries, rather than employment growth. Both coasts suffered the brunt of the recession and slow growth period, while the industrial Midwest was affected less than in past recessions. Plausible assumptions concerning potential output suggest that real GDP did not fall as far below its potential level during the last recession as it had during previous recessions. However, by any reasonable measure, output remained significantly below its potential level in early 1993.

Box: Estimating Potential Output

One key issue raised by the recent slow growth period is the degree to which real GDP has deviated from its potential level at various stages of the cycle. Potential GDP can be thought of as the total value of goods and services that the economy is capable of producing without causing an acceleration in inflation. If real GDP falls short of potential, resources are probably being underutilized or wasted. At the same time, an output level exceeding potential, while possible for a short period, cannot be sustained without generating upward pressure on inflation.

Potential GDP is, however, unobservable, and its estimation poses great difficulties. Defining the *level* of potential GDP at any point in time is clearly related to one's assumptions about the NAIRU—the unemployment rate at which there is no upward or downward pressure on the underlying rate of inflation. In the long run, the *growth* of potential output is related to trend growth in the labor force and in productivity. Nevertheless, temporary supply shocks (for example, energy price increases) can cause the levels of both potential and actual output to deviate from their long-term paths.

A relatively simple method for estimating potential output relies on "Okun's law," which describes the relationship between real GDP growth and the unemployment rate. Estimating this relationship from the fourth quarter of 1973 through the second quarter of 1990, a period encompassing three recessions and three expansions (one abbreviated), yields the following result (standard errors in parentheses):

$$(1)\quad \Delta Y = \underset{(0.08)}{0.63} - \underset{(0.19)}{1.81}\Delta U,\ \bar{R}^2 = .59,\ \text{D.W.} = 2.15,$$

where ΔY is the quarterly (not annualized) percent GDP growth rate, and ΔU the change in the unemployment rate. The equation indicates that when unemployment does not change in a quarter, GDP growth will approximately equal its long-term average as given by the constant term (0.63 percent, or an annual rate of about 2.5 percent). The equation also suggests that an abrupt 1 percentage point *decline* in the unemployment rate taking place over a single quarter would be associated with growth 1.8 percent above its average (equivalent to a compound annual growth rate of 7.4 percent above the 2.5 percent average).

To recast the above result in terms of potential output, we can simply substitute the gap between actual unemployment and the NAIRU for the change in unemployment. Thus, if the current unemployment rate were 1 percentage point above the NAIRU, we would need a 1.8 percent higher output level in that quarter to attain full employment.[†] We would therefore infer that output was about 1.8 percent below its potential. Any such inference, however, depends on the current value of the NAIRU, which must be estimated independently, or just assumed arbitrarily.

An alternative approach to estimating potential GDP centers on the computation of long-term trend values for output. In its simplest version, this approach involves picking an initial period in which actual output is assumed to be equal to potential output, then allowing potential output to grow at the long-term growth rate of actual output. Under this approach, we can use past estimates of the NAIRU to find periods when actual output was approximately equal to potential GDP.[‡] One major difficulty with this approach, however, is that it assumes that trends observed during previous cycles will continue into the current one. This assumption is especially problematic when the current level of potential GDP is estimated early in an expansion.

A more sophisticated version of this approach involves the decomposition of long-term growth into several components, each of which may follow distinct trends of its own. Specifically, potential output can be decomposed into labor productivity (output per worker hour), average hours worked per worker, and the labor force (number of workers). The latter can in turn be decomposed into labor force participation rates (workers per capita) and population. This procedure can be summarized as

$$(2)\quad Y = \frac{Y}{H} \times \frac{H}{L} \times \frac{L}{N} \times N,$$

where Y refers to output, H to total hours worked, L to the labor force, and N to the working-age population. Because both output per hour (Y/H) and average hours worked (H/L) are subject to cyclical influences as well as long-term trends, trend rather than actual values should be used. Trend values for labor force participation rates (L/N) by age-gender group, combined with actual population figures (N), yield estimates of the potential labor force. All of these components can be observed directly with a relatively short data collection lag.

[†]This figure captures the effects of other factors such as weekly hours, induced labor force growth, and capacity utilization, which tend to rise together with a decline in the unemployment rate. Martin F. J. Prachowny has estimated that when capacity utilization and the average work week are held constant, the *marginal* contribution to output of a 1 percentage point decline in the unemployment rate is only about two-thirds for the 1975-88 period ("Okun's Law: Theoretical Foundations and Revised Estimates," *Review of Economics and Statistics*, vol. 75, no. 2 [May 1993], pp. 331-36).

[‡]Using past values for the NAIRU is in some ways preferable to using current values, since one can observe the actual past behavior of price inflation.

Box: Estimating Potential Output *(Continued)*

Equation 2 can easily be expressed in terms of growth rates rather than levels. Thus, we can still use past values of the NAIRU to determine periods in which actual output is set equal to potential, then allow each component to follow its trend path (except population, which is exogenously determined). This approach, however, does not fully resolve our inability to observe recent breaks in the trend for the components of potential output. For example, since 1989 the adult female labor force participation rate has grown only about half as fast as during the previous decade. This slowdown probably contains both cyclical and permanent elements, but at this time it is impossible to distinguish between them.[§]

The accompanying table shows estimates of the gap between actual and potential output at several key stages of the recent slow growth period under a variety of alternative assumptions. The figures in row 1 represent a baseline path for potential GDP under the approach focusing on trend growth in components. Potential GDP is set equal to its actual level in the fourth quarter of 1987, implying a NAIRU of about 5.8 percent. Taking into account the 1979-89 trend in GDP per hour worked by employees (including government employees), we assume annual productivity growth of 0.9 percent. Since average weekly hours for private nonsupervisory employees fell at a slower rate during and after the 1990-91 recession than in the preceding decade, we assume only a 0.12 percent annual decline in average hours worked per employee, rather than the 0.2 percent average rate of decline during the 1980s. To obtain estimates of the potential labor force, we calculate population figures and labor force participation rates separately for men and women aged twenty to sixty-four, and for teens.[‖] Since no trend is visible during the expansion of the 1980s, we

[§]An alternative, theoretically appealing approach involves the use of an economy-wide production function or a set of sectoral functions. Given the existing technology, this approach yields an estimate of the level of output when all resources (usually represented by labor, capital, and energy) are fully utilized. Using this approach to analyze the growth of potential output, one can incorporate and estimate the importance of such factors as technological progress and the skills of the work force. It is not as useful for estimating the current level of potential output, largely because adequate data on many of the factors involved only become available with a considerable lag, and consequently it is not employed in this article.

[‖]Persons aged sixty-five and over were omitted from the analysis. This was done to avoid having to consider changes in participation rates resulting solely from changes in the age structure of the population. Since most persons over sixty-five are not employed, including them would not materially alter any results.

Alternative Estimates of the GDP Gap, 1989-93

Scenario	1989-II	1990-II	1991-I	1991-IV	1992-III	1993-I
(1) Baseline	1.4	0.6	−3.3	−4.0	−3.7	−3.5
(2) High NAIRU	2.7	1.9	−2.0	−2.7	−2.4	−2.2
(3) Low NAIRU	0.8	−0.1	−3.9	−4.6	−4.3	−4.1
(4) Faster productivity growth	1.4	0.3	−3.7	−4.6	−4.6	−4.5
(5) Slower labor force growth	1.4	0.8	−2.4	−2.9	−2.5	−2.2
(6) Okun's law, NAIRU = 6	1.4	1.3	−1.0	−1.8	−2.8	−1.9
(7) Okun's law, NAIRU = 6.5	2.3	2.2	−0.1	−0.8	−1.9	−1.0
(8) Okun's law, NAIRU = 5.5	0.5	0.4	−1.9	−2.7	−3.7	−2.8

Notes: A negative number means actual GDP was below potential. The assumptions underlying the alternative scenarios are as follows:

(1) Potential GDP equals actual GDP in 1987-IV. Productivity increases at 0.9 percent annual rate. Average hours per employee decline 0.12 percent annually. Labor force participation rate is constant at 88.6 percent for men aged 20-64; for women aged 20-64, it is 67.5 percent in 1987-IV, then rises 0.9 percentage points per year. Participation rate is constant at 55.0 percent for teens. Adult population growth is based on annual estimates of resident population from U.S. Department of Commerce, Bureau of the Census, Current Population Reports, P25-1095, *U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1991*, extrapolated to 1993-I. Teen population growth is based on monthly estimates of civilian noninstitutional population from U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Table A-4.

(2) Potential GDP equals actual GDP in 1987-II; otherwise assumptions are same as (1).

(3) Potential GDP equals actual GDP in 1988-II; otherwise assumptions are same as (1).

(4) Productivity grows at 1.2 percent annual rate beginning in 1989-IV; otherwise assumptions are same as (1).

(5) Alternative labor force participation rate assumptions: Adult male rate is 88.6 percent through 1990-I, then falls to 88.2 percent by 1991-I and thereafter. Adult female rate rises 0.9 percentage points per year through 1989-III and 0.45 percentage points per year thereafter. Teen rate is 55.0 percent through 1990-II, then 53.0 percent thereafter. Otherwise assumptions are same as (1).

(6)-(8) Based on equation 1 (see box).

Box: Estimating Potential Output *(Continued)*

assume constant participation rates for both working-age males and teens. Working-age female participation is allowed to grow at a rate corresponding to its trend growth rate during the 1980s. Given actual population growth, these assumptions together imply an average annual potential growth rate of about 2.2 percent since 1989. This rate is somewhat slower than the 1980s trend growth rate, in part because of slower growth in the working-age population.

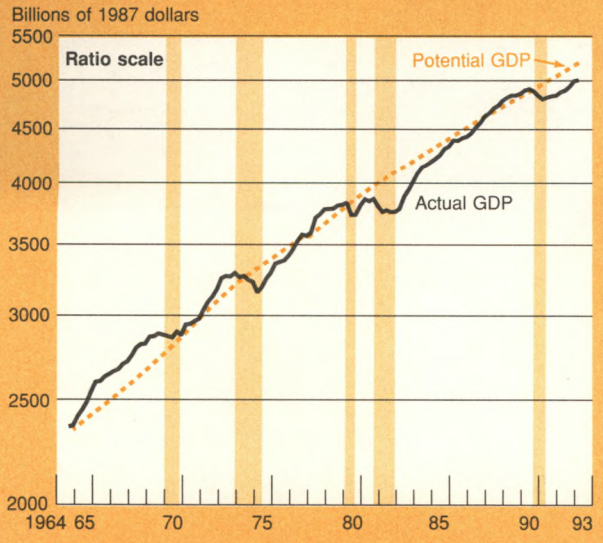
Rows 2-5 represent various alternative estimates of potential GDP, each based on a change in one of the baseline assumptions. Rows 2 and 3 correspond to NAIRUs of 6.3 and 5.5 percent, respectively, but with all components of potential output growing at the same rate as in the baseline case. Row 4 reflects the apparent productivity surge during the recovery, allowing trend productivity to rise at a 1.2 percent annual rate beginning in the fourth quarter of 1989. This change raises the potential growth rate to 2.5 percent. Row 5 recognizes the possibility that part of the sharp decline in labor force growth since 1989 reflects a permanent break in trend participation rates. This adjustment reduces the average potential growth rate since 1989 to just 1.8 percent. Finally, for the sake of comparison, rows 6-8 are based on the Okun's law coefficient from equation 1, under alternative assumptions about the current NAIRU.

Several points are apparent from the table. The first is that plausible alternative assumptions can yield quite different estimates of potential GDP, and consequently of the output gap. If we compare only those estimates based on the trend growth in components approach (rows 1-5), the gap in the first quarter of 1993 could be as small as 2.2 percent or as large as 4.5 percent. Because unemployment only increased modestly during the recent episode, estimates using Okun's law show uniformly smaller gaps than the corresponding measures with baseline trend growth rates.

Nonetheless, although differing assumptions can and do substantially affect the magnitude of the gap, the direction of the gap at the key points shown does not appear to be in dispute. Output was clearly above its potential level at the start of the slow growth period, and

Chart A1

Actual and Potential GDP

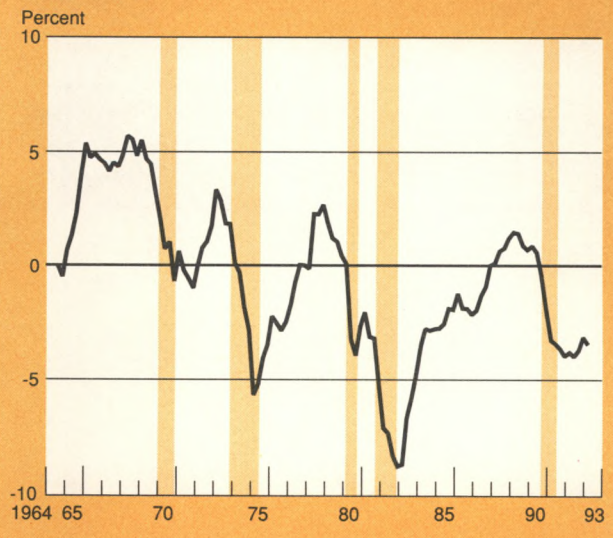


Sources: For actual GDP, Bureau of Economic Analysis, May 28 release; for potential GDP, author's estimates.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

Chart A2

GDP Gap



Notes: Chart shows percentage difference between actual GDP and estimated potential GDP. Values are negative when actual GDP is below potential GDP. Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

Box: Estimating Potential Output *(Continued)*

under all but one of the outlined scenarios it remained above potential at the start of the recession. At the same time, there is no doubt that output dropped well below potential during *and after* the recession, and that some degree of slack remains.[††]

Chart A1 illustrates the historical path of actual real GDP relative to estimated potential output, with figures for the most recent five years corresponding to the baseline scenario. Estimates for earlier periods were obtained by setting actual output equal to potential in the third quarter of 1964 (when the unemployment rate was 5.0 percent). The major components of output were initially allowed to grow at rates consistent with contemporaneous long-term trends. However, the growth rates were adjusted in line with significant permanent breaks in the trend, the most notable of these being a sharp slowdown in productivity growth beginning in 1973. The model was recalibrated by setting actual output equal to potential in the fourth quarter of 1977 (with a 6.7 percent unemployment rate), and, as noted above, in the fourth quarter of 1987. Although hindsight makes us better able to observe breaks in trends in the more distant past than in more recent episodes, these estimates still depend on assumptions concerning the NAIRU, and are also sensitive to one's treatment of the timing of breaks in trends.

The estimates shown here, summarized in Chart A2, suggest that the gap during the most recent episode was not particularly large by historical standards. In the first quarter of 1975, output by this measure was 5.6 percent below its potential level; at the end of the 1982 recession, we observe a gap of 8.7 percent. (Although other estimates vary widely, these figures are broadly consistent with them.[‡‡]) In contrast to the recent episode, however, in both previous instances the output gap began to shrink as the recovery got under way, and substantial progress was made toward eliminating the gap during the first two years of expansion.

††Another estimate of current potential output, by DRI/McGraw-Hill, suggests an output gap of about 4.2 percent in the first quarter of 1993 (*Review of the U.S. Economy*, April 1993, p. 106).

‡‡The now-discontinued potential GNP series issued by the Bureau of Economic Analysis showed a 5.3 percent output gap in the first quarter of 1975 and a 6.1 percent shortfall in the fourth quarter of 1982. Steven N. Braun, using a modified Okun's law framework with independently estimated NAIRUs, found a shortfall of 4.0 percent in 1975 and a 7.2 percent gap in 1982 ("Estimation of Current-Quarter Gross National Product by Pooling Preliminary Labor-Market Data," *Journal of Business and Economic Statistics*, vol. 8, no. 2 [July 1990], pp. 293-304). At the high end, Jeffrey M. Perloff and Michael L. Wachter estimated a 7.9 percent shortfall in 1975 using a production function approach ("A Production Function—Nonaccelerating Inflation Approach to Potential Output: Is Measured Potential Output Too High?" in Karl Brunner and Allan H. Meltzer, eds., *Three Aspects of Policy and Policymaking: Knowledge, Data, and Institutions* [Amsterdam: North Holland, 1979]). Charles Adams and David T. Coe, following a procedure in which the NAIRU and potential output are jointly estimated using a combination of the production function and Okun's law approaches, found gaps of 9.2 percent in 1975 and 11.2 percent in 1982 ("A Systems Approach to Estimating the Natural Rate of Unemployment and Potential Output for the United States," *IMF Staff Papers*, vol. 37, no. 2 [June 1990], pp. 232-93).

Recent Developments in New York City's Economy

by Rae D. Rosen

Four years of painful economic contraction appear to be drawing to a close in New York City. The severity of the recession eliminated virtually all of the job growth of the 1983-89 expansion. If employment is the economic yardstick, the city's economy reached a cyclical low in September 1992 and has since barely begun to inch forward. How will the local economy fare now against a background of widespread expectations of slower than normal growth in the national economy? This article examines the cyclical sources of strength as well as the lingering excesses[1] of the 1983-89 boom period, the long-standing structural impediments that could dampen growth, and the positive factors and anomalies that could argue for a more optimistic outlook.

On balance, this analysis finds that there are some signs of good-to-vigorous growth in incomes. By implication, given the job losses during the recession, productivity has risen significantly, suggesting that several key sectors are indeed healthy. The prospects for growth in employment are less robust, however. The overall employment trend appears to be nearly flat. Given time, an improving economy should push operating rates to capacity and the workforce will expand, but the process will be somewhat slow.

Signs of a recovery

Employment growth

At the local level, employment data are the broadest and most timely indicators of economic activity. Measures of gross production, personal income, and industrial production, all of which exist for the nation or state, are generally unavailable or woefully out of date at the city and county level. The latest labor market data indicate that the trough in the city's labor market occurred in September 1992 (Chart 1). Since then, employment has been almost flat, with only 6,000 jobs added to the city's payrolls, a gain that could easily be erased in a statistical revision. Nevertheless, it is significant that employment has apparently stopped declining for the first time since April 1989.

Job growth has developed in two broad areas. First, Service[2] employment is expanding, boosted by growth in health and social services as well as gains in engineering and management services. Second, retail trade employment is growing at restaurants and at discount outlets as major chains finally breach the New York City market. Although the aggregate FIRE sector (finance, insurance, and real estate) remains in decline, a small but critical FIRE subgroup—securities—has added several thousand jobs since September 1992. The gains in these sectors, combined with the moderating declines in construction, manufacturing, government, and transportation and utilities, produced some employment growth, albeit at an annualized rate of a mere 0.3

[1] In "The New York City Recession," Federal Reserve Bank of New York *Quarterly Review*, Spring 1992, David Brauer and Mark Flaherty identify the onset of the recession in New York City and analyze some of the excesses that led to it.

[2] This article adopts (except where noted) the narrow definition of Services used by the Bureau of Labor Statistics. The category comprises business, legal, and personal services; health services; engineering and management services; hotels, amusements, museums, and private education. It excludes the services provided by other sectors such as FIRE (finance, insurance, and real estate), retail trade, and utilities because useful information is obscured if these sectors are consolidated into a single generic group.

percent, from the fall of 1992 through the spring of 1993.

The source of the recent job growth, however, underscores the weakness of the local recovery. Job gains in health care and social services do not establish the strongest nucleus for future growth; these sectors rely heavily on federal, state, and local funding that may or may not be renewed from year to year. To narrow a persistent budget gap, city administrators have in fact proposed closing or reducing funding for some day care centers for children and the homeless in fiscal 1994. In contrast, more widespread and substantial gains in retail trade and the financial industry or an expansion in business services, construction, or hotel employment would be more suggestive of a robust, self-sustaining recovery.

The recovery in employment has also been unusually slow compared with earlier recoveries in New York City. Measuring from the trough of the U.S. recessions, the top panel in Chart 2 shows that the post-1991 pattern of job growth in New York City has been far slower than in the prior four recoveries. The lower panel of Chart 2 compares the current local recovery with the current national recovery. Here, the glacial pace of the local recovery even trails the atypically slow national recovery.[3]

Even if the national economy should begin to accelerate, however, faster national growth might not produce the same amount of local growth that earlier relationships would suggest. If, as some management surveys have suggested, corporations are flattening and reducing their managerial staff, then economic acceleration at the national level could lead to more decentralized hiring throughout the nation rather than additional staffing of corporate headquarters in New York City. In this way, recovery at the national level could generate less stimulus for the city than it has in the past.

Other indicators of cyclical recovery

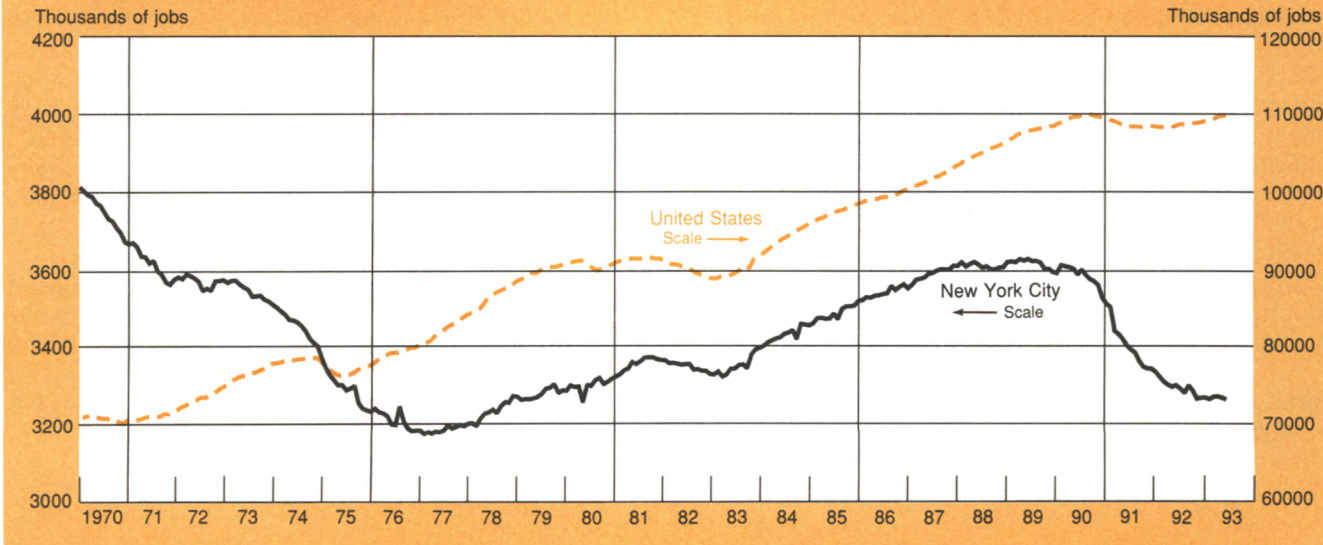
Fortunately, in addition to the marginally expanding employment data, there are supplementary indicators that suggest a more widespread economic upturn. The pattern of growth in wages and salaries, city tax collections, and retail sales all provide evidence of a nascent recovery.

Personal income tax collections and wages. Personal income data for New York City are usually released only with a two-year lag. However, because state and local tax collection agencies generally require personal income tax payments within the month or quarter that the income was earned, personal income tax collections are likely to give an early indication of the trends in the income data. As Chart 3 shows, the growth rates in personal income tax collections reached a turning point in the third quarter of 1990 and

[3]For a further discussion of national developments since the trough, see David Brauer, "A Historical Perspective on the 1989-92 Slow Growth Period," in this issue of the *Quarterly Review*.

Chart 1

Nonagricultural Employment



Sources: Bureau of Labor Statistics; Federal Reserve Bank of New York.

increased on average 10 to 25 percent throughout 1992 and early 1993. Although the rates dropped in April and May of this year, the decline probably resulted from extremely rapid growth a year earlier. In general, such growth over the past several quarters is somewhat unexpected given that the unemployment rate rose sharply during this period, peaking at over 12 percent in July 1992 and remaining above 10 percent through the first quarter of 1993 (Chart 4).

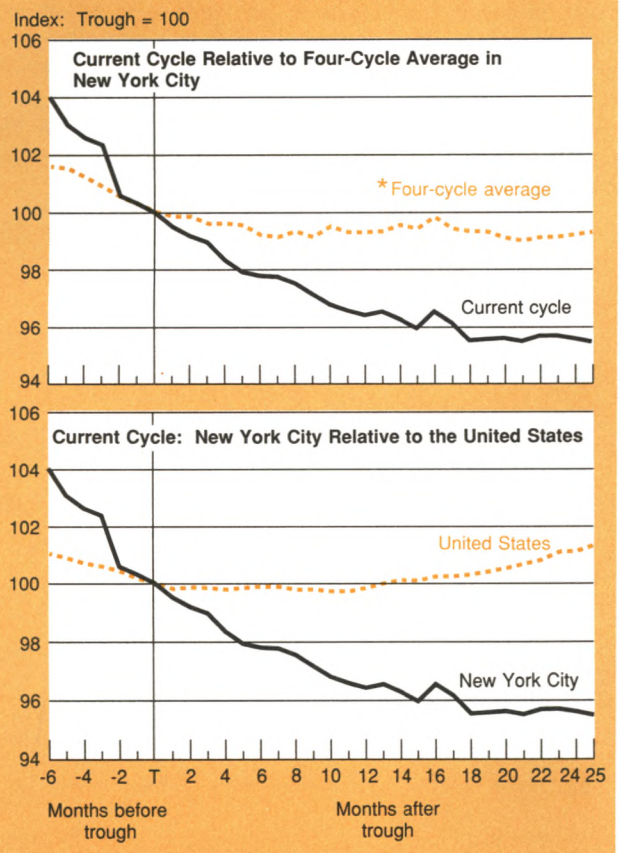
The gains in personal income tax collections are being driven by wage and salary growth that has occurred *notwithstanding* the high rate of local unemployment. At the state level, the composition of personal income shows no outsized increases in the nonwage and salary components of personal income, such as proprietors' income or dividend income, that would account for the strong growth in total personal income and personal income tax collections. Hence, in the state at least, wage and salary gains do seem to account for the strength in total income. Since the city accounts for close to 60 percent of the state totals of each of these components of state personal income, local wage and salary growth is likely to be the source of growth in local personal income and local personal income tax collections as well. Thus, somewhat surprisingly, given the large numbers of unemployed in New York City, personal income tax collections strongly suggest that those people who *are* employed are making substantial gains in income.

Additional information about the source of personal income gains can be gleaned from the local wage and salary data, which account for about 60 percent of total personal income in New York City. In the third quarter of 1992, the latest quarter for which data are available, New York City wages and salaries were up 4.2 percent on a year-over-year basis.[4] The driving industry was brokerage and securities, whose payroll jumped 25 percent, or $550 million, and accounted for nearly half of the gain in the city's total payroll. Because 1992 was the second consecutive year of record pretax profits for the industry, Wall Street bonuses undoubtedly boosted

[4]New York State Department of Labor.

Chart 2

Comparison of Employment Cycles



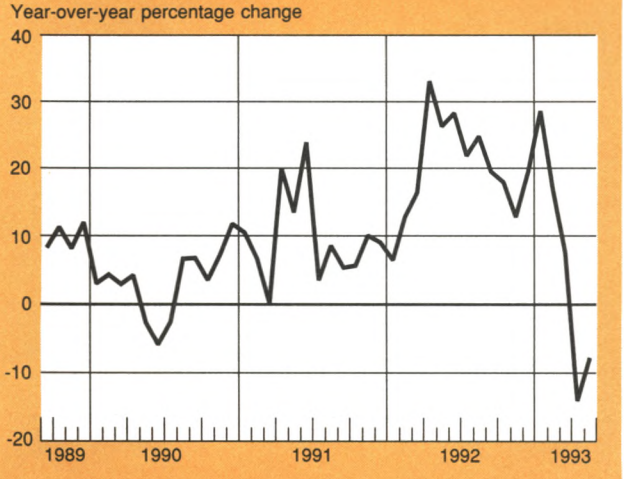
Source: Bureau of Labor Statistics.

* Average of 1960-61, 1969-70, 1973-75, and 1981-82 recessions.

Chart 3

Monthly Collections of New York City Personal Income Tax

Three-Month Moving Average



Source: New York City Office of Tax Policy.

wages and salaries in the fourth quarter of 1992 and the first quarter of 1993 well beyond the growth rates registered through the first three quarters of 1992.[5] Indeed, although the actual income and wage data will not be available for several months, the city's personal income tax collections do show a sharp spike in December 1992 and an even higher spike in January 1993.

Benefiting from both the gains in the securities payroll and the modest growth in the banking payroll, the FIRE sector has accounted for about half the growth in wages and salaries in the city in recent quarters. Nationally, wages and salaries in the FIRE sector contributed just 10 percent of the growth in aggregate wages and salaries in the third quarter of 1992. The importance of the FIRE sector at the local level is not adequately reflected by the number of jobs (which constitute only 15 percent of the local economy, or a mere 4 percent if limited to securities). Consideration must also be given to the high level of wages and salaries in the industry, which averaged more than $63,000 ($84,000 in the securities industry) in the first three quarters of 1992, compared with an average wage of $39,680 in New York State and $32,687 in the United States.

Wages and salaries paid in the Service sector have also begun to accelerate. Unlike the FIRE sector, the Service sector has been gaining in *both* payroll figures and jobs. Although the general salary level in the Service sector is sharply below that of the FIRE sector, the job base is considerably broader and represents about 34 percent of the total employment in New York City. The moderate 5.6 percent growth in third-quarter 1992 Service payroll wages accounts for most of the remaining gain in the aggregate payroll in New York City; importantly, it has accrued to a substantial portion of the working population.

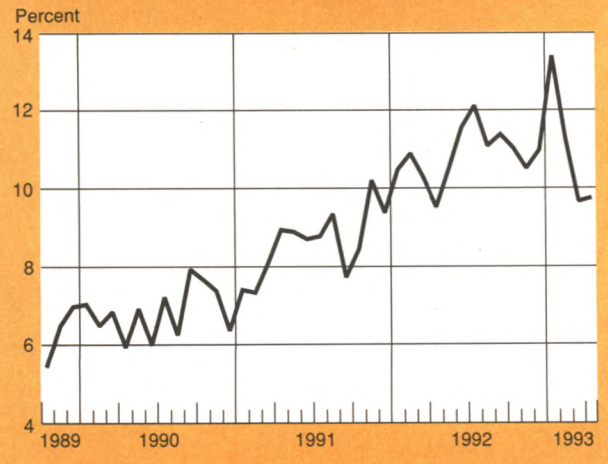
Retail sales. The improvement in wages and salaries, evident in payroll data and tax collections, is also reflected in retail sales. Six consecutive years of annual sales declines appear to have ended when retail sales rose sharply in the second half of 1992 (Chart 5). Although the pace faltered in the relatively harsh winter months of early 1993, growth seems likely to resume with better weather and further advances in income. The generally brighter sales picture suggests that the earlier gains in wages and salaries have begun to flow into the retail market. Moreover, the improvement is fairly diffuse, leading to increased spending in areas such as apparel, restaurants, services, and other nondurable goods. The city retail sales tax collection confirms the increases in retail spending. As Chart 6 indicates, the rate of decline in tax collections began to diminish in the third quarter of 1991, and by the first quarter of 1993, collections were running year-over-year gains of 3 percent.

[5]The bonuses in "good" years are substantial, ranging from three to five months' salary for clerical staff to several million dollars for senior executives and traders.

Chart 4

New York City Unemployment Rate

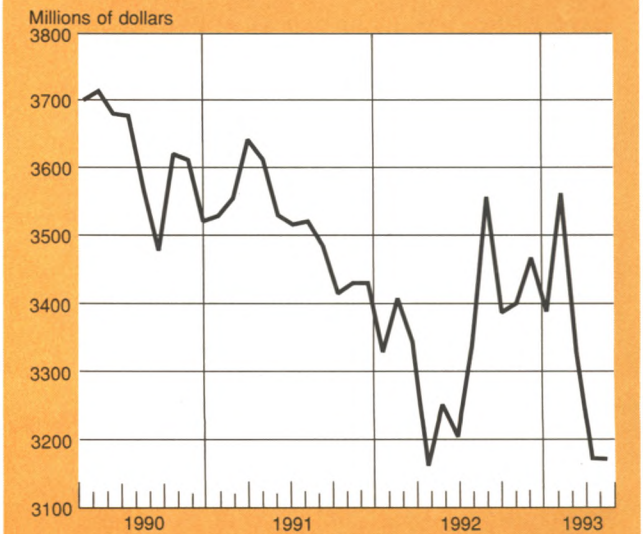
Not Seasonally Adjusted



Source: Bureau of Labor Statistics.

Chart 5

Retail Sales



Source: Bureau of the Census.

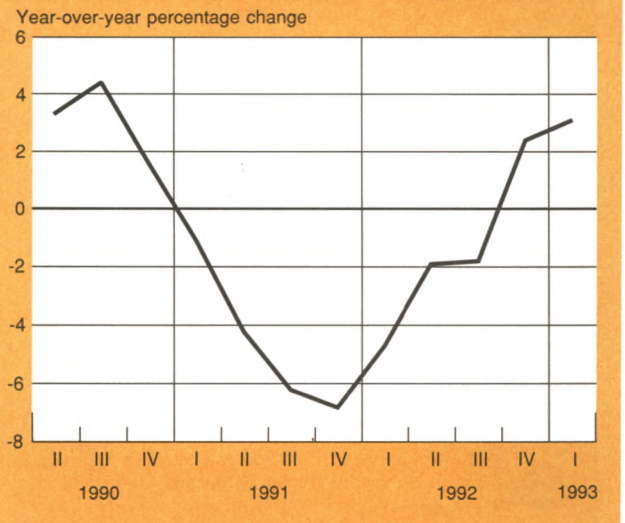
Real estate. In the housing sector, recovery has moved forward in fits and starts since the first quarter of 1991, when the decline in interest rates sparked a pickup in sales of existing homes throughout New York State. Reasonably reliable measures of the local housing market consist of the median price of existing single-family homes and the permits for construction of one-to-four-family homes. Both of these measures, however, cover the housing market in the greater metropolitan area, including Westchester, Long Island, and lower Connecticut, an aggregation well beyond the more narrow focus of New York City. Anecdotal evidence suggests, however, that unit sales in the city have picked up even as prices remain weak. Permits for construction of multifamily housing within the city are also rising for the first time in several years, a testament to builders' expectations of an improving market.

In the nonresidential market, vacancy rates for prime commercial space appear to have peaked in 1992. Absorption rates, the rate at which vacant space is leased, are rising, though at a glacial pace. However, the rate increases are driven by tenant upgrades from secondary to primary space rather than by an expansion in the workforce. Midtown vacancy rates for prime space declined nominally from a peak of 16.3 percent in the fourth quarter of 1992 to 16.1 percent in the spring of 1993, but at the same time, the vacancy rate for secondary space climbed to 19.8 percent.[6] In the downtown area, corporate consolidations, mergers, and closures have kept the pressure on vacancy rates, permitting only minimal absorption of space. Downtown primary vacancy rates have dropped slightly to 18.2 percent in the first quarter of 1993 from a peak of 18.7 percent in the fourth quarter of 1992, but the vacancy rate for secondary space has soared to more than 26 percent.

Chart 6

Quarterly Collections of New York City Sales Tax

Four-Quarter Moving Average



Source: New York City Office of Tax Policy.

Business costs. Another sign of firming demand in the city's economy is the stabilization of major business costs following several years of decline. Lofty vacancy rates clearly lowered rental costs for commercial office space well below their 1987-88 peak rates. Published estimates of rental costs indicate that rates declined at least 15 percent from their peak. Anecdotal evidence suggests that landlord "givebacks" in the form of decorating allowances, move-in bonuses, and free rent for the first few months or even a year combined to drop first year rental rates at least 30 percent below the peak. As of first-quarter 1993, asking rates for primary office space in midtown Manhattan averaged about $34 a square foot compared with a peak 1988 rate of $39.50, while rates in downtown Manhattan averaged close to $33 per square foot compared with a 1987 peak of $38. Since then, rental rates have begun to inch up in some areas of the city, suggesting some modest improvement in demand.

Although the level of rental rates is still higher in New York City than in many office areas elsewhere in the nation, the rise in rates in many other major cities coupled with the overall decline in rates in New York has improved the city's relative position. During the 1988-92 period, asking rates *rose* $1 to $5 per square foot in the central business districts of Atlanta, Houston, Tampa, and Chicago.[7] New York City's relative position improved even in relation to Northern New Jersey, where average asking rates fell to $23 per square foot—a significant drop but not as sharp as in New York City. Meanwhile, increases in construction costs have also moderated in New York City: the rate has dropped to about 4.3 percent from an average annual increase of 5.6 percent in the 1983-89 period.[8]

Prospects for growth

Similarities and differences between city and nation

To a significant extent, many of the local excesses of

[6]Data obtained from Cushman and Wakefield, "Marketrend," various issues.

[7]As of 1992, asking rates averaged $22.50 in Atlanta, $16.50 in Houston, $23.50 in Tampa, $29.00 in Chicago, and $28 in Los Angeles.

[8]R. H. Means Company, Inc.

the 1980s have been eliminated or are well on their way toward correction, setting the framework for future growth. However, the city does share some lingering problems with the nation. For example, the commercial office building boom of the 1980s has left not only New York but also most parts of the nation with extensive excess office space. As we have seen, this situation has some positive implications. With the vacancy rates in New York City estimated at 15 to 26 percent inclusive of both prime and secondary office space, asking rental rates are unlikely to rise sharply and should remain attractively priced for tenant upgrades and business retention for some time to come. But the disadvantage of the lingering supply of office space is that no new boom in construction and construction employment is likely to develop during this period.

The excesses in New York City's residential market, however, appear to be close to correction. The local supply of single-family housing, cooperatives, and condominiums appears to be returning rapidly to historic price/income ratios (Chart 7). In the 1982-88 period, home prices in the greater metropolitan area more than doubled, compared with a national average increase of 32 percent,[9] while personal incomes rose just 60 percent. During these years, affordability became a limiting factor as incomes failed to keep pace with home prices. Since then, several years of price declines or minimal price advances, combined with moderate income gains, have narrowed the gap, and the cyclical correction is largely finished. Moreover, a repeat of the 1983-87 boom in housing prices is unlikely in this decade because employment is expected to grow more slowly and lending standards have tightened. Note, too, that because local home prices are appreciating more slowly than elsewhere in the nation, the resulting *relative* improvement in housing costs may enhance the city's ability to attract and retain businesses and their employees in the coming years.

Unemployment rates are gradually receding for both the nation and the city. In the spring of 1993, the U.S. unemployment rate was about 7 percent while the city figure was close to 10 percent. Nevertheless, although the national and local rates are moving in the same direction, the difference between the two is understated because of the relatively low labor force participation rate in New York City. The fraction of the local working-age population that is working or looking for work in the city is substantially smaller (by 10 percentage points) than the national average. The employment and unemployment figures count only the number of people who claim that they are working or seeking work. Because of the poor participation rate, the city's official unemployment numbers are based on a labor pool that is significantly smaller than is typical elsewhere in the nation. As a result, the local unemployment rate seriously underestimates the number of working-age people who are not working. Accordingly, comparisons of the city's unemployment rate with the rate in other major cities or the nation are somewhat misleading.

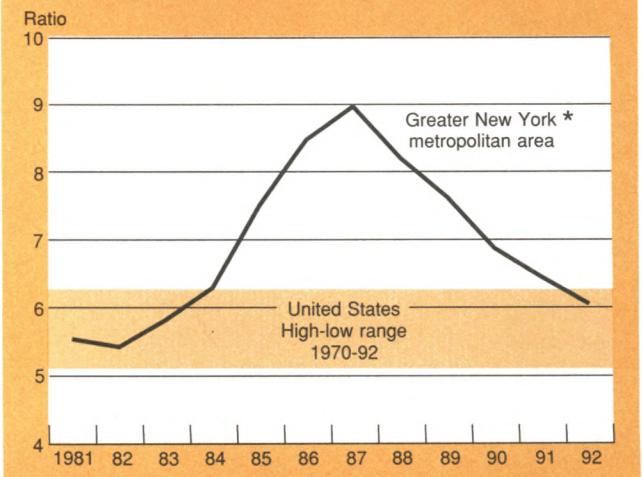
Moderate growth in income is a hallmark of both the city's and the nation's recovery, but nearly half the gains in income in the city have been tightly concentrated in the securities subsector, which accounts for just 4 percent of the jobs. In contrast, the national recovery has proceeded with gains in both wages *and* jobs in construction, trade, FIRE, and Services. The city's more recent and narrow gains stand in stark contrast to the broader national expansion.

On the positive side, two major differences in the local economic base could work to the comparative advantage of the city. First, New York City was never a major recipient of defense spending programs, so the defense build-down that is adversely affecting employment in other parts of the country is not a critical detriment to the city's economy. The closing of the Staten Island home port, for example, may cost New York City 2,600 jobs—less than 1/10 of 1 percent of the city's 3.3 million job base. Second, the composition of

Chart 7

Income and Home Prices

Ratio of Existing Single-Family Home Prices to Per Capita Personal Income



Sources: Bureau of Economic Analysis; National Association of Realtors.

*Comprises New York City, northern New Jersey, Long Island, and Westchester.

[9]Data obtained from the National Association of Realtors.

the city's economy is heavily oriented toward service employment in its broadest sense—that is, all sectors except manufacturing and construction. Seventy percent of the jobs in the city fall within the scope of the broadly defined service sector—utilities, FIRE, wholesale and retail trade, and other services—compared with about 60 percent for the nation. These are the sectors that are projected by most analysts to be the nation's growth areas in the 1990s. In its occupational structure, therefore, New York City is well positioned to participate in any national surge of economic growth.

Lingering cyclical difficulties in the Service and FIRE sectors

When the focus shifts from the most inclusive grouping of services to Services in the more specific sense used by the Bureau of Labor Statistics (defined in footnote 2 above), then both opportunities for future growth in the city's economy and some possible impediments become evident. Restructuring, mergers, and closures are thinning the ranks of both Service and FIRE corporations in the local economy. As the Service and FIRE sectors evolve, their sensitivity to national and international economic cycles also appears to be increasing. In addition, New York City's Service and FIRE sectors may be particularly susceptible to the staffing cutbacks occasioned by any trend in corporate management toward a flattened and leaner corporate hierarchy. And because Service and FIRE corporations include some of the largest employers in New York City, the cyclical expansion of staff is likely to be more limited than in earlier recoveries.

Contraction in the FIRE sector. Within the FIRE sector, employment for two key subsectors has been contracting. In just the last two years, over 23,000 jobs have been eliminated from the banking sector as the rationalization of the industry continues. At the same time, there has been some outmigration from the city of the securities industry, which has historically been heavily concentrated in the city in terms of both revenues and employment. In recent years, several prominent securities firms have relocated whole departments to other states such as Florida, Connecticut, and New Jersey. While the city lost 34,100 securities jobs (a decline of over 20 percent) during 1988-92 and minor declines were recorded for the nation as a whole (2.6 percent), securities employment in New Jersey rose each year, boosting the state's economy with a net addition of 8,600 jobs. Although local business cost differentials may have narrowed, New Jersey (like other states outside the Federal Reserve System's Second District) has the advantage of generally lower labor and other major costs, and can continue to attract segments of New York City's financial sector.

The Service sector. Similar forces of consolidation and restructuring are at work in the Service sector, suggesting that job growth in the current expansion is likely to be somewhat slower than in prior recoveries. As detailed in the accompanying box, the recent contraction in the city's Service sector was the first serious decline in Service employment in the city in the postwar period. Elsewhere in both the nation and New York State, Service employment continued to expand throughout the recession, and the recession itself was comparatively less severe than in New York City. Now, the hitherto inelastic response of the city's Service sector to an economic downturn has given way to increasing sensitivity to cyclical downturns.

Employment in two subgroups—business and health services—fueled the growth in aggregate Service employment during the expansion of the 1980s. In the recent recession, however, employment in business services fell 18 percent in New York City as against a 2.6 percent decline for the nation. The magnitude of the local decline suggests that city employment in this subsector can be highly sensitive to the business cycle. In a recession, the corporate market for business services may require less outside work because of generally weak business conditions. In addition, corporations may redirect some work to internal staff as budgets tighten during a downturn. Thus, an important source of growth in Service employment during the earlier expansion was also the source of extensive cyclical decline in the recent downturn. The data on business service employment are available from 1975 forward, so earlier patterns of business service employment during New York City recessions cannot be determined. However, the data on aggregate Services does suggest that the sensitivity of the Service sector to overall economic conditions is increasing, and that the future may therefore see cyclical variations in contrast to earlier patterns of stability.

Health and social services employment, the other major contributor to the growth of the Service sector, continued to expand throughout the 1989-92 recession, albeit at a slower pace than in the prior expansion. These services depend heavily on federal, state, and local funding, which of course is subject to change up or down in the coming years. The sustained expansion of health and social services in 1989-92 helped to blunt the effects of the recession in both an economic and a social sense, but it should be noted that on a per capita basis, the gross production per employee has been markedly below that of most other sectors of the economy (Chart 8 inset). In narrow economic terms, therefore, these jobs contribute less to the economy than do jobs in most other industries.

In sum, the one- to two-year prospects for job growth

in the FIRE and Service sectors are apparently subject to some limiting forces. Over the longer term, however, the prospects may well be stronger. Because many of the FIRE and Service jobs are in knowledge-based industries, these sectors carry the potential to "reinvent" themselves and become forceful engines of growth at some future time. For example, the securities sector has periodically devised new products and new markets: physicists now apply their mathematical knowledge to the financial derivatives market. Business services offered by system analysts, data base managers, biomedical researchers, health care managers, and paralegal and mass-market personal financial consultants are of relatively recent evolution; the increasingly sophisticated equipment used by these professionals also requires the engineering and maintenance skills of

Box: The City's Service Sector

Although total city employment has historically been subject to cyclical decline, the local Service sector (excluding finance, insurance, and real estate) has been largely recession-proof. Breaking with this pattern, Service employment fell 5.0 percent in the 1989-92 recession—compared with an average decline of 1.0 percent during the four prior recessions. This most recent drop is a potentially destabilizing development because Service employment accounts for about one-third of the city's work force. During the prior expansion period, first-quarter 1983 through third-quarter 1989, the job gains in the Service sector were driven by two subsectors: 1) business services and 2) health and social services. The business subsector, comprising such groups as advertising, public relations, marketing, legal, accounting, consulting, and engineering and management services, is heavily utilized by large corporations responding to national and international markets. Such demand and its multiplier effects are generated more by national and international business than by local business. The weakness in all three markets contributed to the 18 percent decline in business service employment.

Health and social services employment, the other major contributor to the growth of the Service sector, continued to expand throughout the 1989-92 recession, albeit at a slower pace. This subsector encompasses hospitals, doctors, and nurses, as well as home attendants, hotlines, outreach, job skills workshops, and senior citizens' centers. Such institutions and programs receive significant government funding, which could slow in the coming years with changes in health care programs.

Although the Service sector ranks first in employment, it ranks second in output. In New York State, Services account for 22 percent of nominal gross production; the FIRE sector ranks first, producing about 23 percent of the state's gross output. This structure of economic output differs markedly from the nation's. At the national level, manufacturing ranks first in contribution to gross domestic production, whereas in New York State, manufacturing accounts for about 14 percent of nominal gross production. In the city, over 15 percent of the work force is employed in FIRE and another 36 percent in the Service sector. If the state-level employment/production relationships are applied to the city data, the two sectors together appear to account for 55 to 60 percent of the city's gross production. The unusual dominance of these two sectors underscores their critical importance to the city's growth prospects.†

†The Bureau of Labor Statistics estimates real gross production for major industrial sectors in both the state and the nation. Although the Bureau makes no estimates of gross city production, the proportion of state personal income earned in New York City strongly suggests that the trends attributed to the state are at least equally attributable to the city.

Increasing Sensitivity in Service Employment

Cycle Dates	Percent Change in Total Employment	Percent Change in Services Employment	Service Employment as a Share of Total
Four-cycle average†	−6.1	1.0	20.8
April 1989-September 1992	−9.8	−5.0	31.6

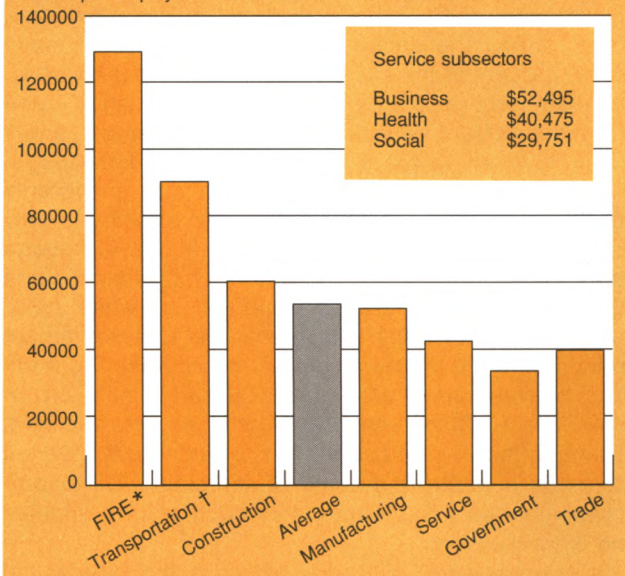
Sources: For data, Bureau of Labor Statistics; calculations by Federal Reserve Bank of New York staff.
†Average of the following cycles: December 1952-June 1954, April 1962-January 1963, August 1969-March 1977, September 1981-February 1983.

numerous technicians. Social change and scientific advances continually raise new issues requiring legal expertise. The common factor among all these jobs is that they are knowledge-based; they carry the potential for further evolution.

Moreover, recent trends in wages and salaries suggest that the prospects for growth in personal income in New York City remain reasonably good. As noted earlier, despite the large decline in FIRE employment, the growth in wages and salaries in the FIRE sector has been so large that it has boosted aggregate wages and salaries in the city. In the future, the city may continue to benefit from faster growth in income even if aggregate job growth is flat or remains slow. This outcome is possible because although the FIRE sector dominates gross production, accounting for roughly 30 percent of total output, it requires only 15 percent of the work force. On a per capita basis, each job in the FIRE sector generates *2.4 times as much output as all other sectors.* The wages and salaries that are paid in the FIRE sector reflect this degree of productivity. Indeed, as mentioned earlier, income gains in the FIRE sector appear to be leading the recovery in personal income. Therefore, even if the contraction in jobs in the FIRE sector continues, it may well be possible to sustain moderate growth in total personal income. Additional support for income growth may also develop in several other sectors. Declines in banking employment and the general paring of jobs in a wide range of industries throughout New York City suggest that productivity could increase significantly as demand begins to revive. Such gains in productivity would also support moderate growth in income.

Chart 8

New York State Nominal Gross Product



Sources: For data, Bureau of Economic Analysis and U.S. Department of Labor; calculations by Federal Reserve Bank of New York staff.

* Finance, insurance, and real estate.

† Transportation, public utilities, and communications.

Other constraints and opportunities

The cyclical and longer term prospects for New York City will be affected by the city's ability to deal with long-standing structural problems such as high costs and taxes and the comparatively large fraction of the population that is out of the labor force. These prospects will also depend on the city's ability to capitalize on the opportunities created by the improvement in relative business costs and the ongoing surge in immigration.

Inflation—prices and costs. The costs of housing and commercial rents, two of the largest components in consumer and business budgets, have already been discussed. Taxes are another major factor in the local economy. New York City taxes, at $2063 per person in fiscal 1990, are the highest in the nation on a per capita basis. This figure is nearly twice that for San Francisco, which ranked second at $1185.[10] Not only is New York City one of the few cities that taxes personal income, it also imposes several other taxes that are unusual or unusually high, such as the tax on commercial rent or the luxury hotel room tax (city and state tax combined) that applies to most hotel rooms in the city. Unfortunately, the effects of myriad local taxes are compounded by state taxes, which are also among the highest in the nation.

Taxes aside, other local costs of goods and services have risen more rapidly in the city than in most other areas in the nation over the past ten years. The consumer price index covers the largest sector of the real economy, consumer spending. Over the postwar period, the rate of consumer price inflation in the greater New York metropolitan area has outpaced the national rate of inflation for prolonged periods of time, including 1958-74 and 1983-92 (Chart 9). As a result, the greater New York metropolitan area has become increasingly more expensive relative to other areas of the country. In the last ten years, the consumer price index has risen 50 percent in New York City in contrast to a national

[10] U.S. Bureau of the Census, City Government Finances, series GF, no. 4, annual.

average gain of 40 percent. Housing was the primary contributor to the adverse local inflation differential during the 1980s, accounting for 75 percent of the local premium. The costs of food and personal items in the city also increased significantly faster than their national counterparts, accounting for 22 percent of the premium. Similarly, local wages and salaries also rose somewhat faster than the national averages. Today, the near absence of inflation in the local housing market should prove a positive factor, helping the city attract and retain new businesses and their employees. However, although the overall rate of local inflation has slowed in recent months, the national average (and the rate in other major cities as well) has shown a more pronounced decline, so that the relative position of the city has failed to improve.

Local government. Local government jobs were a prime contributor to the employment gains during the 1983-89 expansion, accounting for 88,000 jobs or 30 percent of the job growth. In the subsequent recession, the relative stability of local government employment was a moderating factor for the economy. Whereas total employment in the city declined about 10 percent, peak to trough, this sector fell only a moderate 3.6 percent. Today, the local government payroll accounts for about 14 percent of all employment in New York City; the national average is 10.4 percent.[11]

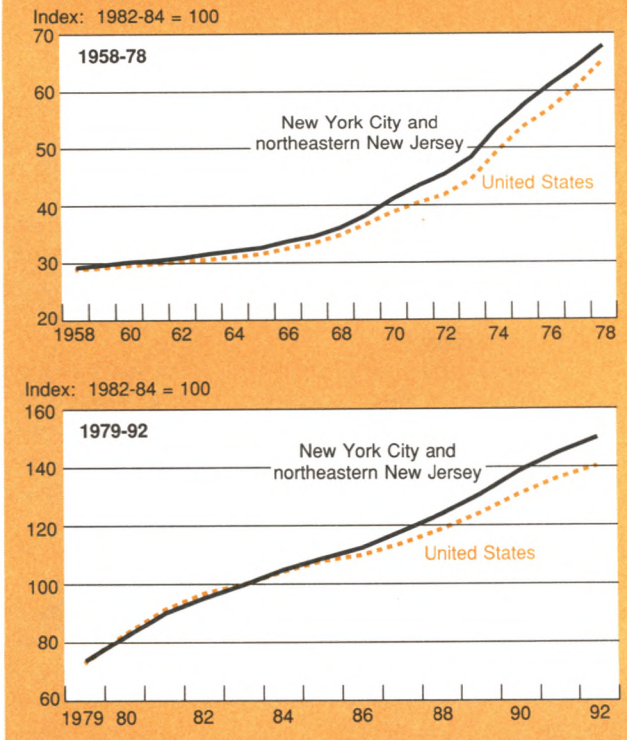
As the recovery proceeds, local government employment may continue to behave countercyclically and act as a drag on the city's economy. To maintain the sizable local government payroll in the face of a lackluster economic environment, the city must now either increase its revenue stream through additional taxes, licenses, and fees or cut back its services. These budget constraints make it difficult for the city to reduce unusual taxes, improve basic services, and enhance the general business climate.

Labor: Composition and participation. The second structural factor that has inhibited the city's underlying growth potential has been the unusual composition of the labor force and the low labor force participation rate. The population declines of the 1950s and the 1970s have yielded to slow growth of 0.35 percent per year in the 1980s. The recent population movements, however, appear to have occurred alongside some decline in the average education and skill levels of the resident (noncommuting) work force. Several hundred thousand people, many of them highly skilled, left the city during the 1980s. Their numbers were more than fully replaced through the arrival of 1 million new immigrants during the decade.[12] The immigrants, in many cases, brought to the city energy, youth, and innovation, but they have also placed additional demands upon New York's social services. Moreover, the growth areas of employment in the city tend to be in knowledge-based industries. At least initially, many immigrants from other countries lack the language or skills to fully replace the workers who have left the city. Language barriers make it very difficult for some highly skilled and educated groups to obtain employment, while other groups lack both skills and education. This settlement problem may be nearly as old as the city itself, but the city's heavy expenditures on social safety nets are of more recent vintage. Although Congress sets the laws governing the volume of legal immigration for the United States as a whole, the costs of settlement fall disproportionately on a few large cities such as Los Angeles and New York.

Of course, many of those who left the city in the

Chart 9

Consumer Price Index



Source: Bureau of Labor Statistics.

[11]Although local government accounts for 10.5 percent of total employment in Los Angeles, it averages about 9 percent of total employment in most other major cities such as Chicago, Philadelphia, Detroit, Dallas, Houston, and Atlanta.

[12]Decennial Census 1990, Bureau of the Census.

1980s moved to the suburbs and now commute to their jobs in New York, so their skills are not lost to the city's work force. Their tax revenue, however, is substantially reduced because the city's personal income tax rate drops significantly for nonresidents. In addition, commuters may require services such as police, fire, transportation, and water—and at levels not much below those required by city residents. Thus the revenue losses stemming from the emigration of workers to the suburbs may not have been matched by an equivalent decline in the cost of city services to these people.

Low labor force participation rates are another problem for the city's economy. As mentioned earlier, a smaller portion of the population in New York City is working or looking for work than in many other major cities in the United States. In 1992, the participation rate in New York City was 56.3 percent, significantly below the 66.0 percent participation rate of the nation. This means that nearly an additional 10 percent of the city's population would be working or looking for work if the city's participation rate matched that of the country at large. New York City ranks midway among major cities in its poor participation rate, and the low rates generally cross the lines of sex and race. That is, if the participation rates are compared across aging industrial cities, the New York City rates fall below those of many other major cities, *regardless* of sex or race (see table).

Some popular explanations of the comparatively low participation rate in New York City suggest an undercount of the work force. A large number of people employed in the arts may work outside established, record-keeping organizations; similarly, a large number of people may be employed in an undocumented, underground economy. This last factor, however, would depress the city's relative participation rate only if the city's underground economy were significantly larger than that of aging industrial cities that have higher participation rates. The arts community in New York *is* a large and possibly undermeasured sector of the local economy, and it could account for some of the difference in participation rates. Other than the arts, however, there seems little evidence to suggest that the city has an undocumentated economy proportionately larger than that of other major industrial cities.

Whatever the cause of the city's low participation rate, the result is a double-edged problem. First, the tax burden for both New York State and its major metropolitan area is spread over a proportionately smaller work force. Second, the low participation rate suggests increased public assistance, a relationship that is borne out by the data: fully 13.3 percent of the city's population receives public assistance, whereas the national average is 5.3 percent.[13] Thus, low labor force participation rates tend to raise the demands on the city's budget for social services because more people require assistance. (In addition, the cost of such services to the city is further inflated because the eligibility requirements for public assistance are less restrictive and the programs of assistance generally more comprehensive than in many other metropolitan areas.) Raising the participation rate will require a more robust economy.

[13]New York State Department of Social Services and Family Support Administration, Fiscal 1992.

Labor Force Participation Rates in Major Cities

	New York	Baltimore	Chicago	Detroit	Los Angeles	Philadelphia	Washington D.C.
Total	**56.4**	59.3	61.4	51.7	66.4	55.8	65.7
Men	**68.1**	65.3	72.2	61.3	78.4	64.5	70.3
Women	**46.5**	53.7	51.8	43.9	54.7	48.5	61.6
Both sexes, 16-19 years	**22.5**	N.A.	36.5	41.1	37.9	42.3	N.A.
White	**55.8**	54.0	66.8	45.6	67.9	56.1	79.2
Men	**69.3**	61.0	79.2	54.9	80.6	68.3	85.5
Women	**44.3**	47.0	54.6	36.6	54.8	46.4	72.6
Both sexes, 16-19 years	**26.3**	N.A.	49.3	N.A.	40.4	N.A.	N.A.
Black	**55.7**	62.7	53.7	53.1	58.0	55.7	58.3
Men	**63.3**	68.6	60.8	62.8	66.8	60.0	61.3
Women	**49.8**	57.6	48.4	45.6	50.8	51.8	55.8
Both sexes, 16-19 years	**15.2**	N.A.	N.A.	41.7	N.A.	N.A.	N.A.
Hispanic Origin	**50.7**	N.A.	70.4	N.A.	68.4	N.A.	83.7
Men	**67.1**	N.A.	83.8	N.A.	84.1	N.A.	92.7
Women	**38.3**	N.A.	54.7	N.A.	51.8	N.A.	75.7
Both sexes, 16-19 years	**20.0**	N.A.	N.A.	N.A.	36.5	N.A.	N.A.

Source: Bureau of Labor Statistics, *Geographic Profile of Employment and Unemployment*, 1991.

From 1983 to 1989, relatively strong local growth, albeit below national growth rates, did raise the city's labor force participation rate, but only by about 1.5 percentage points. Moreover, much of that gain was reversed during the recession.

The low participation rate and the steady flow of immigrants are not really new issues for the city; nor are the concurrent "quality of life" issues that have been raised since at least the late 1800s. New York City is a magnet precisely because it remains the city of opportunity, and the cyclical economic downturn may actually constitute a widened window of opportunity. Even now at the trough of the economic cycle, when painful city budget decisions are being made, lower business costs are attracting new enterprises to the city and there are increased reports of companies reviewing their plans to leave the city and opting instead to stay. With little or no expenditure, the city can streamline some regulations, enlarge the job market, and increase job opportunities. For example, major discounters that have served the rest of the nation for years are finally entering the New York City market because retail space is available at an attractive price *and* city zoning regulations have been changed to permit such large-scale operations. These stores will require clerks, sales staff, and stockroom workers—jobs that require some skill but not highly advanced training. Proposals have also been made to decrease the tax that small businesses pay on their rent in order to spur new business development and hiring. In effect, the city's financial difficulties and the sluggish economic environment have created the impetus to seek such low-budget changes. The city's problems are old, but the changing economic cycle has made all parties more willing to seek solutions.

Conclusion

Total private employment in New York City declined 10.9 percent, in aggregate, from the first quarter of 1989 to the third quarter of 1992, but the drop seems to have come to an end. Some cyclical and structural forces will tend to dampen the overall economic expansion in New York, impeding the recovery in construction and slowing employment growth in several sectors of the city's economy. In the absence of any major new external stimulus, the current slow trend of recovery appears likely to continue. However, the city's budget difficulties have also prompted many new efforts to seek solutions to the problems, so the opportunity for change is particularly strong at this point in the cycle. Because the city continued to shed jobs well into the third quarter of 1992, productivity in New York City may be poised to rise significantly as demand improves. Potential gains in real production per worker could boost the competitiveness of several industries in the city, thus partially offsetting the high-cost operating environment. In addition, productivity gains should support moderate growth in personal income and output, coincident with slow growth in employment.

Securitization, Loan Sales, and the Credit Slowdown

by Richard Cantor and Rebecca Demsetz

Household and business lending has slowed sharply in recent years, but the anemic growth in loans booked at depository institutions, mortgage companies, and finance companies may overstate the decline in credit originated by these institutions. In particular, increased financial stress at banks and nonbank intermediaries may have strengthened incentives to transfer loans booked on their balance sheets to other investors with lower funding costs. In this article, we report measures of credit growth that include "off-balance-sheet lending," loans that were originated by intermediaries but are absent from their balance sheets because of direct loan sales or the issuance of asset-backed securities. We also compare the relative volume of off-balance-sheet lending by types of intermediaries.

We examine three important lending categories: home mortgages, consumer credit, and loans to businesses. Our evaluation shows that for all three categories, the growth in loans inclusive of off-balance-sheet lending exceeded the growth in loans on the books of banks, thrifts, mortgage companies, and finance companies as a group in the two years following the onset of the recession. In the case of home mortgage credit, total lending rose 10.3 percent while loans on the books actually fell by 4.1 percent. For consumer loans, total lending fell by 0.4 percent, much less than the 7.2 percent decline in loans on the books of these institutions. Similarly, total business loans fell by 4.1 percent, less than the 5.0 percent decline in loans held on the books. As these figures show, however, even after lending totals are adjusted to include securitization and loan sales, business and consumer credit at these intermediaries declined during the last two years.

We also find that while all types of intermediaries used securitization to take loans off their balance sheets, nonbank financial institutions were relatively more active in this regard than commercial banks for certain types of loans. Thrifts, mortgage companies, and finance companies securitized a larger fraction of their mortgage originations than did banks. Similarly, finance companies securitized a larger fraction of their consumer credit than did banks. In the area of commercial lending, both banks and nonbanks increased securitizations, but direct loan sales by banks have declined over the last few years. These patterns suggest that banks' efforts to limit balance sheet growth through securitization and loan sales were no greater than those of nonbanks.[1]

This article proceeds with an overview of mortgage,

[1]Several authors have documented restraints on the supply of business lending from bank and nonbank sources of credit. For a discussion of the "credit crunch" at banks, see, for example, Ron Johnson, "The Bank Credit Crumble," Federal Reserve Bank of New York *Quarterly Review*, Summer 1991, pp. 40-51; and Ben Bernanke and Cara Lown, "The Credit Crunch," *Brookings Papers on Economic Activity*, 1991:2, pp. 205-39. Other authors have documented "credit crunches" at nonbank intermediaries. See, for example, Patrick Corcoran, "The Credit Slowdown of 1989-1991: The Role of Supply and Demand," *Credit Markets in Transition*, Federal Reserve Bank of Chicago, 1992, pp. 445-62; and Mark Carey, Stephen Prowse, John Rea, and Gregory Udell, "The Private Placement Market: Intermediation, Life Insurance Companies, and a Credit Crunch," *Credit Markets in Transition*, pp. 843-77. Both papers find evidence that life insurance companies sharply curtailed their purchases of below-investment-grade private placement securities beginning in 1990. Leland Crabbe and Mitchell Post, in "The Effect of SEC Amendments to Rule 2A-7 on the Commercial Paper Market," Board of Governors of the Federal Reserve System, unpublished paper, 1992, find that in 1990, money market mutual funds began shunning lower quality commercial paper following a few prominent defaults by commercial paper issuers. See also Richard Cantor and Anthony Rodrigues, "Nonbank Lenders and the Credit Slowdown," Federal Reserve Bank of New York, mimeo, 1993.

consumer, and business credit growth—both on and off the balance sheets of depository institutions, mortgage companies, and finance companies and before and after the onset of the recession. The next two sections examine in some detail the growth of off-balance-sheet funding for home mortgages and consumer credit. The fourth section, which analyzes off-balance-sheet funding sources for business credit, includes background information on asset-backed commercial paper programs and the commercial loan sales market. We present a summary of our results at the end of the article.[2]

[2]For a recent overview of securitization, see Charles Carlstrom and Katherine Samolyk, "Examining the Microfoundations of Market Incentives for Asset-Backed Lending," Federal Reserve Bank of Cleveland *Economic Review*, vol. 29, no. 1 (1993-I), pp. 27-38, and the references cited therein.

An overview of on-balance-sheet and off-balance-sheet credit growth

In the table, we contrast the growth of loans on the balance sheets of intermediaries with the growth of credits that were originated by those intermediaries but are absent from their balance sheets. We present on-balance-sheet and off-balance-sheet aggregates for home mortgage, consumer, and business lending originated by banks, thrifts, mortgage companies, and finance companies on three dates: June 30, 1988, June 30, 1990, and June 30, 1992. This sequence of dates allows us to track the changes in the aggregates before and after the onset of the most recent recession.[3]

[3]The National Bureau of Economic Research has identified July 1990 as the beginning of the most recent recession and March 1991 as

On-Balance-Sheet and Off-Balance-Sheet Lending by Banks, Thrifts, Mortgage Companies, and Finance Companies

	Outstanding Loans in Billions of Dollars			Percentage Changes	
	1988-II	1990-II	1992-II	From 1988-II to 1990-II	From 1990-II to 1992-II
Home mortgages					
On-balance-sheet†	1123	1352	1296	20.4	−4.1
Off-balance-sheet‡	789	1040	1343	31.8	29.1
Total	1912	2392	2639	25.1	10.3
Consumer instalment credit					
On-balance-sheet§	620	665	617	7.3	−7.2
Off-balance-sheet‖	15	66	111	340.0	68.2
Total	635	731	728	15.1	−0.4
Business credit					
On-balance-sheet††	964	1072	1018	11.2	−5.0
Off-balance-sheet‡‡	25	45	53	81.5	16.7
Total	989	1117	1071	12.9	−4.1
Memo items:					
Components of off-balance-sheet business credit					
Finance companies	0	2	10	n/a	336.4
Asset-backed commercial paper	4	16	30	305.1	92.4
Bank loan sales	21	27	13	29.2	−53.7

Definitions and Data Sources:
Data sources appear in parentheses.

†Home mortgages held by commercial banks, thrifts, finance companies, and mortgage companies (Board of Governors of the Federal Reserve System, Flow of Funds Accounts).
‡Securitized home mortgage pools and mortgages held by government-sponsored agencies (Board of Governors of the Federal Reserve System, Flow of Funds Accounts).
§Consumer instalment credit on the books of banks, thrifts, retailers, gasoline companies, and finance companies (Board of Governors of the Federal Reserve System, G.19 statistical release).
‖Securitized consumer instalment credit (Board of Governors of the Federal Reserve System, G.19 statistical release).
††Commercial and industrial loans on the books of U.S. banks and U.S. branches and agencies of foreign banks (Federal Financial Institutions Examination Council, Reports of Condition and Income), plus loans and leases to business on the books of finance companies and thrifts (Board of Governors of the Federal Reserve System, G.19 statistical release and Flow of Funds Accounts).
‡‡Loans and leases to business securitized by finance companies (Board of Governors of the Federal Reserve System, G.20 statistical release), plus 67 percent of bank-advised asset-backed commercial paper outstanding (Board of Governors of the Federal Reserve System, staff estimates), plus commercial and industrial loans outstanding sold by U.S. banks to nonbank institutions and non-U.S. offices of foreign banks (Federal Reserve Bank of New York, staff estimates).

Some brief definitions of these aggregates follow:

- On-balance-sheet home mortgages consist of the one-to-four-family residential mortgages booked at thrifts, banks, finance companies, and mortgage companies. Off-balance-sheet mortgages are mortgage-backed securities plus the unsecuritized holdings of government-sponsored agencies.
- On-balance-sheet consumer instalment credit consists of receivables booked at thrifts, banks, finance companies, retailers, and gas companies. Off-balance-sheet consumer credit consists of all outstanding consumer receivables underlying asset-backed securities.
- On-balance-sheet business credit consists of finance company loans and leases to businesses together with commercial and industrial loans on the books of thrifts, U.S.-chartered commercial banks, and U.S. branches and agencies of foreign banks. Off-balance-sheet business credit consists of asset-backed securities backed by business receivables issued by finance companies, commercial paper issued by bank-advised commercial paper programs backed by business receivables or loans, and outstanding balances on loans sold by U.S. banks to nonbank institutions and foreign offices of foreign banks.

More detailed descriptions of the off-balance-sheet items are given in later sections of this article.

In all three loan categories, the growth of off-balance-sheet credit was strongly positive during the two years following the onset of the recession, while the growth of on-balance-sheet credit was negative. Still, all three loan categories experienced substantial decelerations in total lending growth from two years before to two years after the start of the recession. Mortgage credit growth fell from a 25.1 percent increase to a 10.3 percent increase, consumer credit growth fell from a 15.1 percent increase to a 0.4 percent decline, and business credit growth fell from a 12.9 percent increase to a 4.1 percent decline.

Home mortgage credit

For well over a decade, a mature, highly liquid secondary market in residential mortgages has made it possible to separate the mortgage origination process from mortgage funding. The mortgage pools underlying mortgage-backed securities ("MBS") now exceed the stock of home mortgages held by financial intermediaries. Moreover, the MBS market has grown so large that it now exceeds the size of the entire market for U.S. corporate bonds. The MBS market has undoubtedly played a key role in sustaining the supply of home mortgages throughout the recession and the period of thrift industry contraction.

The growth of total mortgage credit has been reasonably strong over the last few years despite the recession and changing household attitudes toward indebtedness. Nevertheless, measures of mortgage credit growth that include the mortgage pools underlying MBS differ substantially from those that exclude the pools. The two panels of Chart 1 depict the growth in home mortgages by type of funding since 1985. At year-end 1992, mortgage pools (at $1.2 trillion) almost equaled the combined amount of home mortgage holdings of thrifts, banks, finance companies, and mortgage companies (at $1.3 trillion).[4] From 1988 to 1992, mortgage pools grew about 50 percent ($420 billion) while home mortgages held by financial intermediaries rose only about 2 percent ($22 billion). After combining these two funding sources, we calculate that mortgages grew 22 percent.[5]

The mortgage funding practices of different intermediaries are illustrated by the three panels of Chart 2. In each of the panels, gross mortgage additions to lender balance sheets are represented by the combination of originations and purchases (though purchases are relatively small). Mortgage sales (primarily to the government-sponsored agencies that sell MBS) represent reductions in balance-sheet holdings of mortgages. Following the wave of refinancings in 1986 and continuing through the end of 1989, commercial banks increased originations and purchases. During this period, thrifts reduced their originations and purchases while the pace of originations and purchases by mortgage companies and finance companies was relatively unchanged. Since 1990, all types of lenders have dramatically increased the pace of their mortgage originations and purchases (largely because of refinancings), although that increase has been the greatest for mortgage companies and finance companies. Chart 3 presents the ratio of mortgage sales to mortgage originations and purchases for the three types of lenders and provides additional insight into the recent rise

Footnote 3 continued
the beginning of the recovery. Necessary data on the sales of commercial and industrial loans are currently available only through June 1992.

[4] In addition, government-sponsored agencies held about $157 billion in home mortgages at year-end; most of these mortgages are now being packaged into pass-through securities.

[5] The right panel of Chart 1 shows that commercial banks increased their share of mortgage outstandings relative to thrifts in recent years. This increase, however, understates the degree to which banks have surpassed thrifts in funding home mortgages because during this period banks dramatically increased their holdings of mortgage-backed securities while thrifts reduced their holdings.

in mortgage securitization. Mortgage companies and finance companies, whose market share has been rising, generally sell about 100 percent of the home mortgages they acquire, whereas thrifts and banks sell only about 60 percent and 40 percent of their mortgage acquisitions, respectively. These percentages, however, have been rising for thrifts and banks in recent years.

The home mortgage market dramatizes how loan originations can be robust while loan growth on the books of intermediaries appears anemic. This sharp difference between total mortgage outstandings and mortgages on the books of intermediaries, however, results in part from factors specific to the home mortgage market and should not be expected to apply to other types of loans. In particular, home mortgages are fairly homogeneous and can be easily packaged to diversify away idiosyncratic risks. Moreover, government-sponsored agencies have been established to support the MBS market and provide guarantees against any remaining credit risks (including macroeconomic credit risks) at below-market prices. Lastly, the collapse of the thrift industry has provided a continuous flow of mortgage sales that has given depth to the secondary mortgage market.

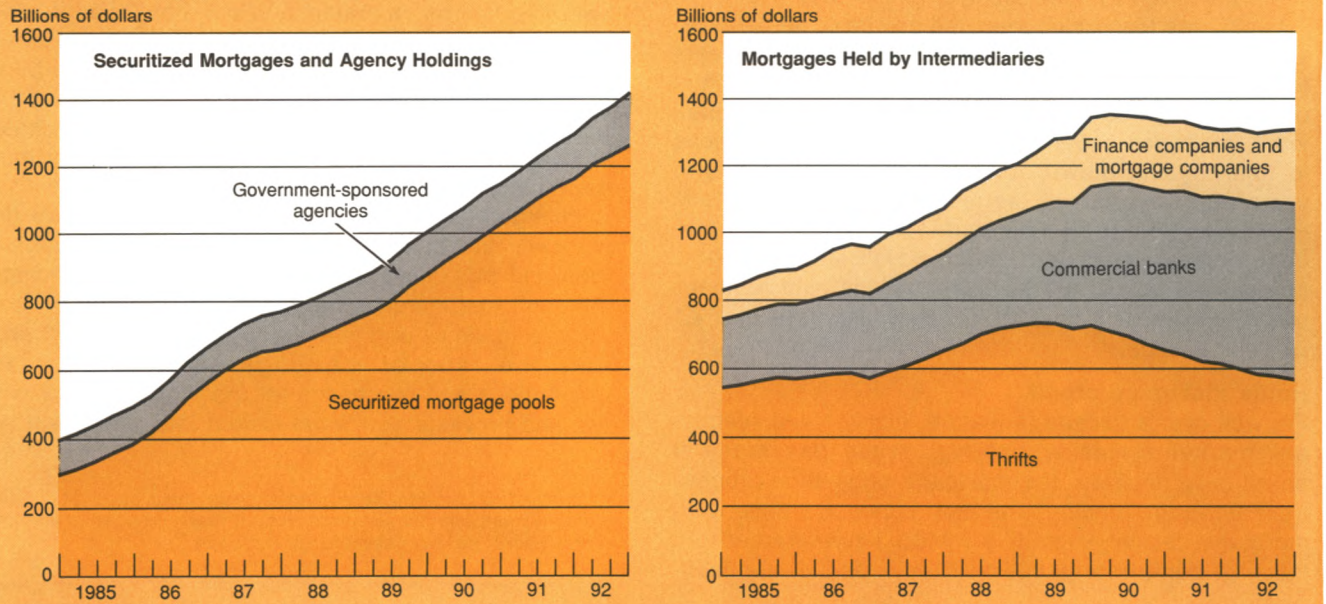
Consumer credit

The last four years have witnessed a rapid expansion of the market for securities backed by consumer receivables. The major issuers are finance companies, banks, and retailers. Banks and retailers primarily issue securities backed by credit card receivables; the majority of finance company issues are backed by retail auto loans. These and other intermediaries, however, have also issued securities backed by a wide variety of other types of consumer instalment credits. The growth rate of securitization of consumer credit has been even more rapid than the growth of mortgage-backed securities over the past few years. In total, securitized consumer credit rose $95 billion, from $30 billion to $125 billion, between year-end 1988 and year-end 1992.

The recent behavior of securitized and unsecuritized consumer instalment credit is depicted in the four panels of Chart 4. The upper left panel presents, in graphic form, the data on consumer credit reported in the table. The panel shows that on-balance-sheet consumer credit has declined slightly over the past few years, while securitized consumer credit has been growing rapidly. The other three panels show that securitized credit has grown at the same time that on-balance-

Chart 1

Home Mortgage Funding



Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts.

sheet credit has fallen at all the major originators of consumer credit—finance companies, banks, and retailers.

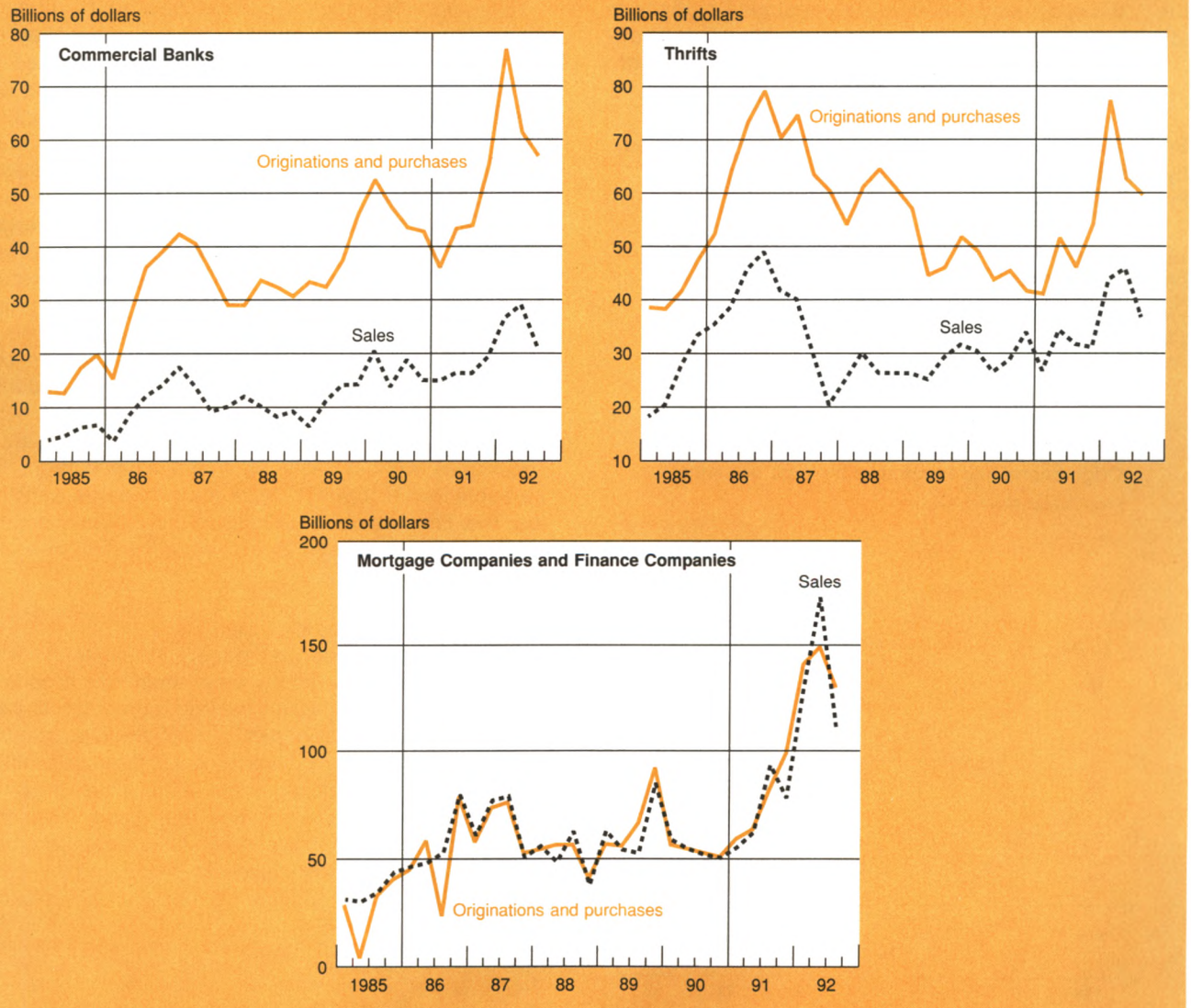
Chart 5 compares the fraction of total consumer credit originated and securitized by these three types of lenders and reveals that retailers and finance companies securitize more intensively than banks. This pattern can be explained by the differences in the relative cost of funds: retailers typically have unimpressive credit ratings and finance companies are often rated below banks.[6] In general, however, efforts by banks to limit the

[6]Of course, the last few years have been turbulent years for all three classes of intermediaries. Retailers fared badly in the recession following a number of leveraged buyouts and other restructurings within the industry in the 1980s. Many banks also suffered credit rating downgrades in 1990, 1991, and 1992 and experienced a rise in their cost of capital. During the same period, several finance

Chart 2

Home Mortgage Originations, Purchases, and Sales by Type of Lender

Quarterly Flows



Source: U.S. Department of Housing and Urban Development.

growth of consumer receivables on their balance sheets have been similar to those of other institutions.

Business credit

Highly idiosyncratic in nature, business loans are not pooled into asset-backed securities as commonly as mortgages or consumer receivables. Finance companies have nonetheless been rapidly increasing their issuance of securities backed by business receivables. Banks and other intermediaries have focused their efforts on providing off-balance-sheet funding to businesses by establishing and advising asset-backed commercial paper programs. In addition, banks often originate business credits that are later removed from their balance sheets through the direct sale of loans to other financial and nonfinancial institutions. The following subsections discuss these various forms of off-balance-sheet business credit.

Securities issued by finance companies and backed by business receivables

Finance companies now securitize a wide variety of business credits, including leases; roughly 5 percent of all business credit originated by finance companies is securitized. Chart 6 presents the finance company components of on- and off-balance-sheet business credit reported in the table. As the chart shows, the outstanding business receivables backing asset-backed securities have increased from a little more than $1 billion in the beginning of 1989 to more than $15 billion as of March 1993. Finance companies have been more active in issuing securities backed by business receivables than have banks, in part because finance company loans tend to be more homogeneous and easier to package than traditional commercial and industrial bank loans.

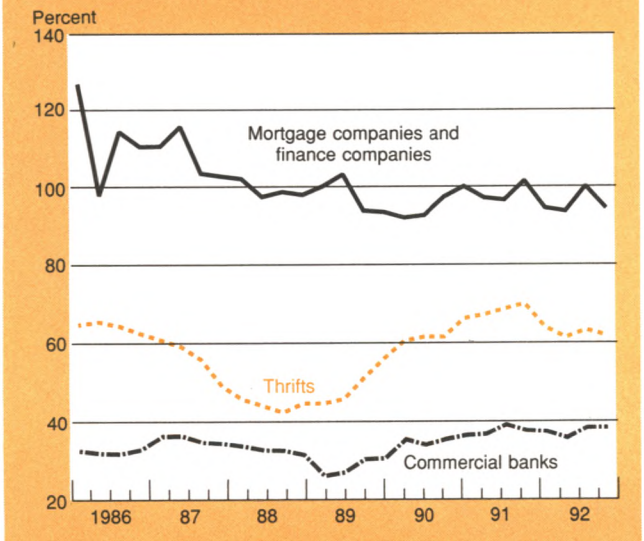
Until recently, most securities backed by business receivables have been privately placed rather than sold to the general public. Private placement ensures that the special purpose vehicle that pools the assets does not fall under the strictures of the Investment Company Act of 1940, which governs the regulation of mutual funds and unit investment trusts. The act exempts asset-backed securities from these regulations if (1) the asset pools consist of real estate-related investments or loans made in conjunction with the acquisition of merchandise or services or (2) the number of investors in the securities is less than 300. Private placement fulfills the second condition but implies that the securities will be less liquid and must offer higher yields than comparable public issues. In November 1992, the Securities and Exchange Commission passed Rule 3A-7, which liberally expanded the range of assets that could be securitized without requiring that the investment trust be subjected to the act. Market participants anticipate that this liberalization will lead to more public issuance of asset-backed securities and securitization of a wider range of assets.

Asset-backed commercial paper

Asset-backed commercial paper, in existence since 1983, is another means by which business credits are securitized.[7] Under asset-backed commercial paper programs, sponsoring banks or nonbank financial institutions are able to provide receivables financing for their customers without making direct loans. These programs utilize special purpose vehicles that issue commercial paper collateralized by a diversified pool of credits, often business trade receivables originated by corporate clients of the sponsor. When this asset-backed

Footnote 6 continued
companies—including the automotive captives that rank among the largest issuers of asset-backed securities—faced similar credit problems and experienced a rise in their cost of funding, particularly in the commercial paper market.

Chart 3
Home Mortgage Sales as a Percentage of Originations and Purchases by Type of Lender
Four-Quarter Moving Average



Source: U.S. Department of Housing and Urban Development.

[7]Comprehensive analyses of this topic have been written by Barbara Kavanaugh, Thomas Boemio, and Gerald Edwards, Jr., "Asset-Backed Commercial Paper Programs," *Federal Reserve Bulletin*, vol. 78, no. 2 (February 1992), pp. 107-16; and Mark Adelson, "Asset-Backed Commercial Paper: Understanding the Risks," *Structured Finance: Research and Commentary*, Moody's Investors Service, April 1993.

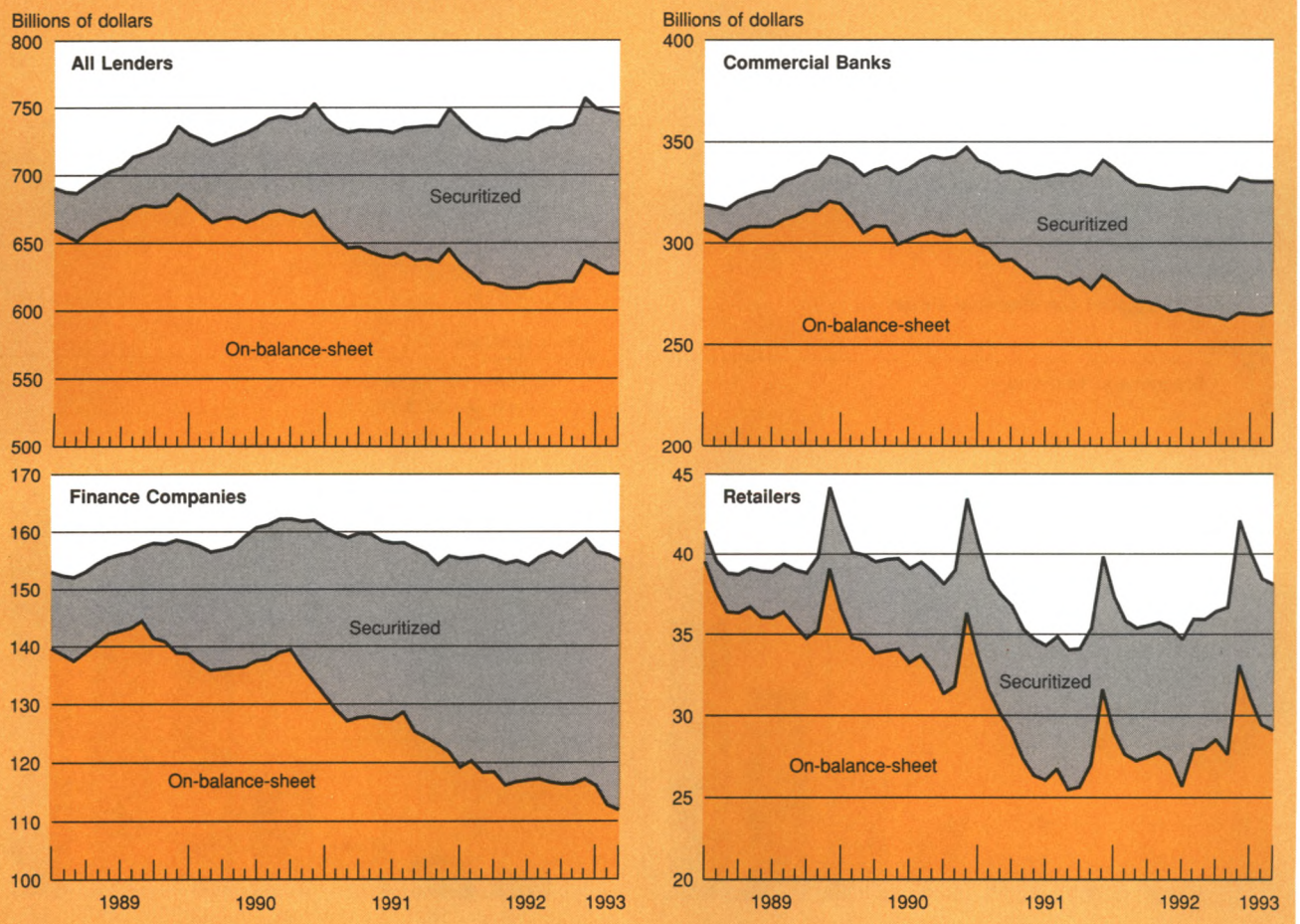
structure is combined with some other form of credit support, such as a third-party guaranty, the commercial paper often receives a top rating from the credit rating agencies. Banks or investment banks that arrange these programs for their clients are in effect using the capital markets to provide inexpensive funding to businesses that cannot directly access the markets as cheaply or at all.

The funding of trade receivables makes up roughly 60 percent of all asset-backed commercial paper programs, although other types of assets, particularly credit card receivables, have increasingly been securitized through such programs. In addition, about 12 percent of all programs have been set up to fund corporate loans. The loans funded by these programs typically represent new originations rather than purchases of existing loans. Many of these corporate loan programs are new and have not yet issued much commercial paper. We estimate that if the trade receivable and corporate loan programs are combined, roughly two-thirds of all outstanding commercial paper issued by asset-backed programs is effectively backed by business receivables.

The amount of commercial paper issued by asset-backed programs has grown from roughly $7 billion to $58 billion between the fourth quarter of 1988 and the fourth quarter of 1992. As shown in the two panels of Chart 7, banks are the primary advisors to 72 of the 120

Chart 4

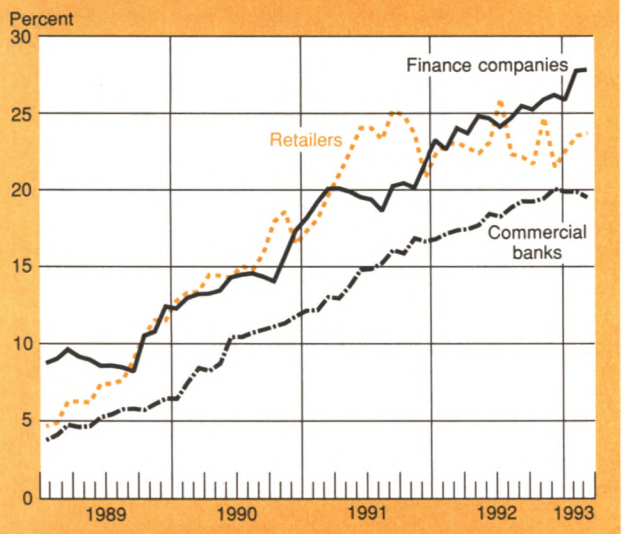
Consumer Instalment Credit by Type of Lender



Source: Board of Governors of the Federal Reserve System.

Chart 5

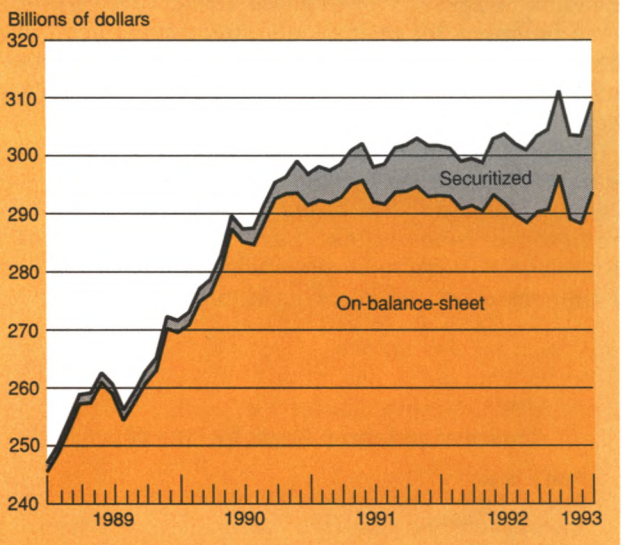
Securitized Share of Consumer Instalment Credit Outstanding by Type of Lender



Source: Board of Governors of the Federal Reserve System.

Chart 6

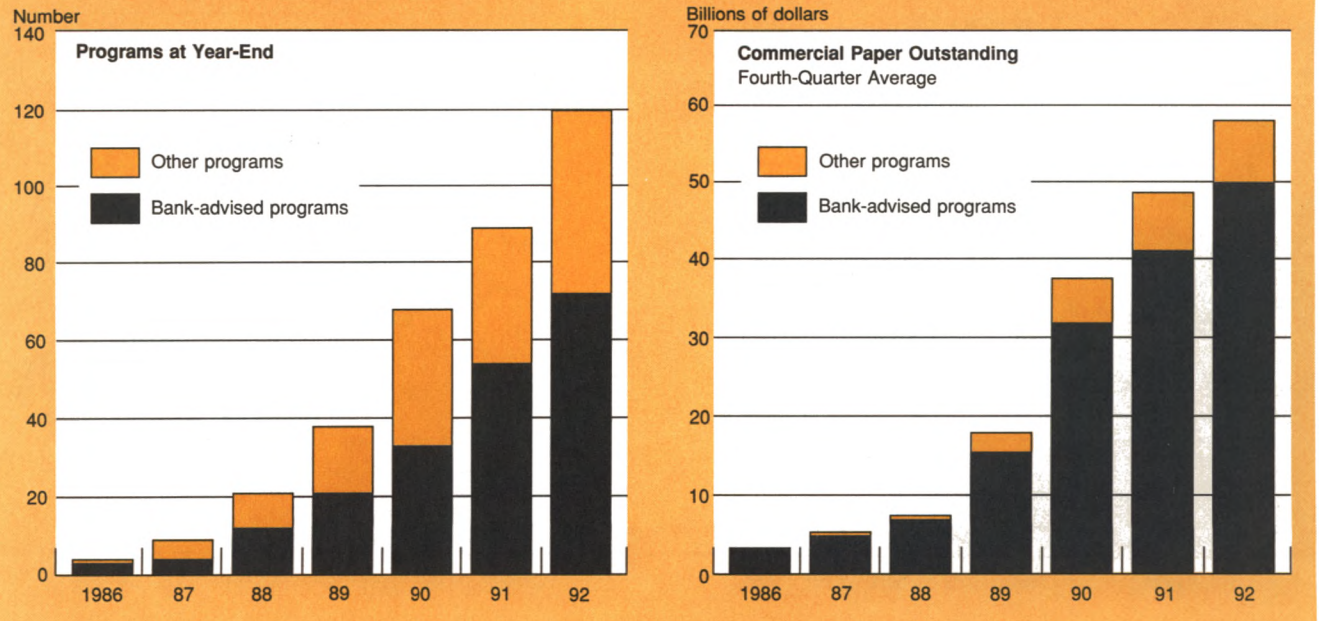
Finance Company Loans and Leases to Businesses



Source: Board of Governors of the Federal Reserve System.

Chart 7

Asset-backed Commercial Paper



Source: Board of Governors of the Federal Reserve System, staff estimates.

programs in existence, and these bank-advised programs issued $50 billion of the total $58 billion in asset-backed commercial paper in the fourth quarter of 1992.

Some of the $58 billion in commercial paper issuance represents off-balance-sheet credits accounted for elsewhere in this article. In particular, the data on consumer credit and finance company business credit securitization reported above include any loans sold to asset-backed commercial paper programs. Therefore, for the calculations underlying the table, we considered only bank-advised commercial paper programs that issued commercial paper backed by trade receivables or corporate loans.[8] Under the assumption that two-thirds of commercial paper issued by bank-advised programs is backed by business receivables or corporate loans, we conclude that this source of business credit rose dramatically from $4.6 billion in fourth-quarter 1988 to $21.3 billion in fourth-quarter 1990 and reached $33.4 billion in fourth-quarter 1992.

Sales of commercial and industrial loans by banks

In this section, we use information from the Federal Financial Institutions Examination Council's Reports of Condition and Income ("Call Reports") and from the Federal Reserve Board's Senior Loan Officer Opinion Survey on Bank Lending Practices ("Opinion Survey") to examine recent trends in commercial and industrial loan sales. During the late 1980s, the loan sales market underwent a rapid expansion that was followed by a significant decline. In particular, in the two years following the onset of the recession, loan sales by U.S. banks declined sharply, falling more in percentage terms than did on-balance-sheet loans.

To be removed from the originating bank's books, a loan or a portion of a loan (a "participation") must be sold "without recourse"—that is, the originating bank gives no guarantee to the loan buyer. Most loans are sold without recourse, and the data reported below pertain only to such loans. Large banks have consistently been the most active loan sellers, with the largest 1 percent of all banks typically accounting for over 90 percent of all sales flows. The average credit quality of the loans sold has varied over time. The Opinion Survey indicates that the fraction of loan sales representing lending to investment-grade borrowers declined from almost 70 percent in 1986 to about 35 percent in 1989, but by 1992 climbed back to almost 60 percent. While the typical loan sale involves a loan of short maturity, maturities of outstanding sold loans tend to be much longer because the shorter maturity loans are repaid more quickly. Data from 1987, 1988, and 1989 suggest that at least half of the outstanding stock of sold loans had maturities of at least one year.[9]

Chart 8 draws on data from the Call Reports to present the quarterly flow of commercial and industrial loan sales by insured U.S. commercial banks from 1986 through year-end 1992. Loan sales grew rapidly during the second half of the 1980s, reaching almost $300 billion per quarter in 1989. After the third quarter of 1989, loan sales slowed sharply, falling to about $100 billion per quarter by year-end 1991. Unfortunately, these data tell us very little about the stock of commercial and industrial loans originated by domestic banks (U.S. banks and U.S. branches and agencies of foreign banks) but now absent from the consolidated balance sheet of the domestic banking system. One problem is that Call Report data measure the flow of loan sales

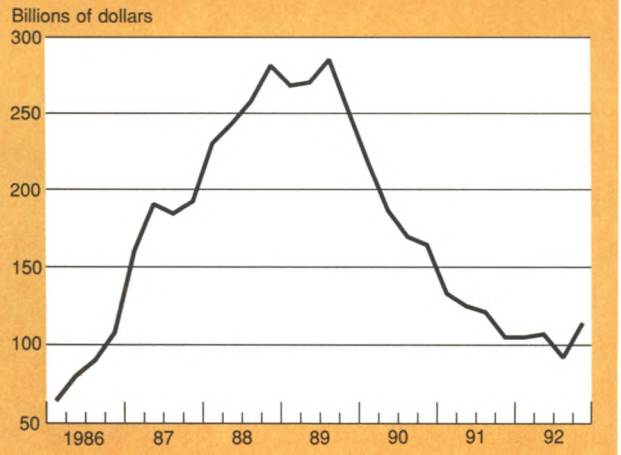
[8]The commercial paper programs sponsored by securities firms were excluded from these calculations because the table is intended to measure the extent to which traditional lenders (banks and finance companies) provide off-balance-sheet funding.

[9]For a more detailed description of the loan sales market, see Gary Gorton and Joseph Haubrich, "The Loan Sales Market," in George Kaufman, ed., *Research in Financial Services: Private and Public Policy*, vol. 2 (1990), pp. 85-135; Dennis McCrary and Jo Ousterhout, "The Development and Future of the Loan Sales Market," *Journal of Applied Corporate Finance*, vol. 2, no. 3 (Fall 1989), pp. 74-84; and Allen Berger and Gregory Udell, "Securitization, Risk, and the Liquidity Problem in Banking," in Michael Klausner and Lawrence White, eds., *Structural Change in Banking* (Homewood, Ill.: Irwin Publishing, 1992), pp. 227-91.

Chart 8

Commercial and Industrial Loan Sales by U.S. Banks

Quarterly Flows



Source: Federal Financial Institutions Examination Council, Reports of Condition.

rather than the stock of sold loans. A second problem is that these data include loans sold to domestic banks.[10]

As noted by Berger and Udell, the Opinion Survey provides the information necessary to estimate the stock of outstanding business loans sold by domestic banks to buyers *outside* the domestic banking system, loans that contribute to the off-balance-sheet business credit reported in the table. In the survey, responding banks report on outstanding balances of commercial and industrial loans originated by them but sold or participated to others and describe the types of institutions buying their loans. Starting in 1988, the survey classifies buyers into five groups: U.S. banks, U.S. branches and agencies of foreign banks, foreign offices of foreign banks, nonfinancial corporations, and "other" institutions, a catch-all group including finance companies, insurance companies, pension funds, mutual funds, and bank trust departments. Using a variant of this classification scheme, we divide loan buyers into two groups. Our first buyer group consists of foreign offices of foreign banks and all nonbank institutions.[11] Sales to these buyers contribute to the off-balance-sheet lending reported in the table. Our second buyer group consists of U.S. banks and U.S. branches and agencies of foreign banks.[12] Sales to these buyers do *not* contribute to the off-balance-sheet lending reported in the table since they are already included in the on-balance-sheet statistics.[13]

The left panel of Chart 9 reports our estimates of the outstanding balances on loans sold by U.S. banks to

[10]Data on loan purchases by U.S. banks are available from the Call Reports, but data on purchases by U.S. branches and agencies of foreign banks are not. For a comparison of Call Report and Opinion Survey loan purchase data, see Berger and Udell, "Securitization, Risk, and the Liquidity Problem in Banking."

[11]Over the period examined, sales to nonbanks are consistently greater than sales to foreign offices.

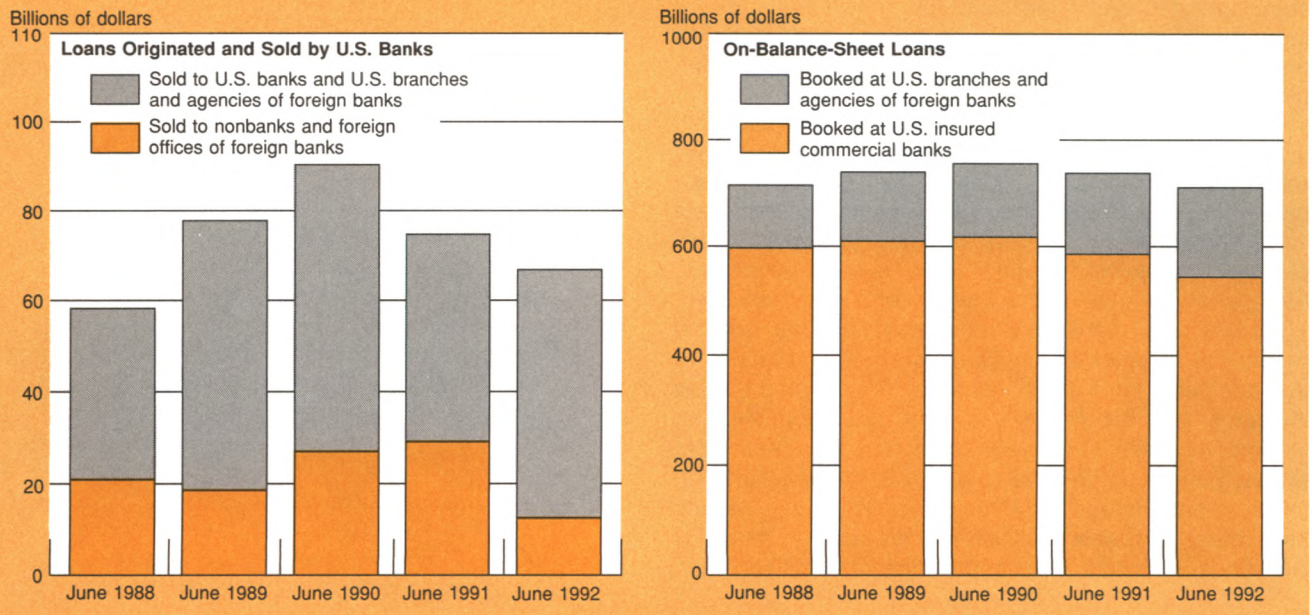
[12]Sales to U.S. branches and agencies are approximately equal to sales to U.S. banks over the five years examined.

[13]We believe that any remaining double-counting in the table is likely to be small. Finance companies, however, occasionally buy bank loans; therefore, some loans may be recorded in the table both as off-balance-sheet loans for banks and on-balance-sheet loans for finance companies.

Chart 9

Commercial and Industrial Loans Originated by Banks

End-of-Quarter Values



Sources: Board of Governors of the Federal Reserve System, Senior Loan Officer Opinion Survey; Federal Financial Institutions Examination Council, Reports of Condition; Federal Reserve Bank of New York staff estimates.

each of our two buyer groups over the 1988-92 period.[14] The total stock of sold loans increased substantially through June 1990; however, by June 1992, sales had declined from their high of $90 billion to $67 billion. It is difficult to compare these loan sales figures with those from the Call Reports because the reporting frequency differs for the two sources and because we lack the loan duration information needed to translate sales flows into changes in the stock of sold loans. Nevertheless, trends in the Call Report and Opinion Survey series appear roughly consistent, with a slightly later decline in the survey series.[15]

Focusing on sales from U.S. banks to nonbanks and foreign offices of foreign banks (sales contributing to the off-balance-sheet lending reported in the table), we find that outstanding balances on loans sold increased through June 1991 but fell sharply by June 1992.[16] As Chart 9 shows, the percentage decline in these outstanding balances between June 1990 and June 1992 was larger than the percentage decline in on-balance-sheet commercial and industrial lending by domestic banks over the same two years. In contrast, the other off-balance-sheet lending activities examined in this article grew over both of the periods captured in the table, and grew faster than their on-balance-sheet counterparts between June 1990 and June 1992. Thus, statistics that do not account for direct loan sales will understate the magnitude of the recent decline in business lending, whereas those that do not account for business loan securitization more generally will overstate the magnitude of the decline.

That loan sales to non-domestic-bank buyers not only fell, but also fell more sharply than on-balance-sheet commercial and industrial lending, is surprising given the observed strength in securitization of consumer and mortgage credit. Three explanations are possible for the recent decline in loan sales to non-domestic-bank buyers: reduced willingness to sell by banks, reduced secondary market loan demand by nonbanks and foreign banks, and reduced stock of salable loans. We suspect that the third explanation is the most important. Reduced willingness to sell by banks is unlikely, since banks demonstrated a growing preference for off-balance-sheet funding by securitizing a larger share of their mortgage and consumer credit originations in 1990 and 1991.[17] We also have little evidence that secondary market loan demand has significantly weakened. Although the demand for secondary market loans may have declined in a recession-related "flight to quality," responses to a question included in the 1992 Opinion Survey indicate little change in demand by typical loan purchasers between 1991 and 1992.[18] In contrast, the stock of salable loans has surely declined in recent years. In addition to the recession-related decline in bank borrowing by large corporations, the sharp drop in mergers and acquisitions and leveraged buyout activity and the reductions in bank debt by highly leveraged firms have probably caused the stock of salable loans to fall more dramatically than total commercial and industrial lending. According to market participants, the recent decline in loan sales did not result from a disruption in the secondary loan market; rather, it primarily reflected these reductions in loan originations and outstandings of large corporations.

Summary

The stock of loans originated by financial intermediaries but transferred to other investors through securitization or loan sales has grown rapidly in recent years. Over the two years following the onset of the recession, off-balance-sheet mortgage credit grew 29.1 percent, while

[14]These data are derived by scaling the Opinion Survey data. Using Call Reports, we calculate the fraction of quarterly commercial bank loan sales flows attributable to Opinion Survey banks. The magnitude of this scaling factor is quite high, averaging about 90 percent over the relevant period. Though we believe that our approach is appropriate given the available data, we offer three cautions: first, our scaling factor is based on flow data rather than stock data; second, the same scaling factor is applied to all loan sales, regardless of purchaser identity; and third, since the Opinion Survey responses of individual banks are not available, our scaling factor cannot reflect changes in the set of Opinion Survey banks reporting sales volume. The total number of Opinion Survey banks reporting sales volume reaches a minimum of 53 and a maximum of 57 over the 1988-92 time period. This range may overstate the severity of the reporting problem, however, since the largest banks tend to be the most active loan sellers as well as the most consistent reporters of survey sales data.

[15]As noted by Berger and Udell, "Securitization, Risk, and the Liquidity Problem in Banking," just two large institutions account for a significant share of the rise and fall of the sales flow series. Both of these institutions contribute to the Opinion Survey; hence, their sales activity likely accounts for a large portion of the rise and decline of the loan sales reported in Chart 9.

[16]The 1991-92 decline primarily reflects sales to nonbank financials. A precise measure of off-balance-sheet lending should include sales by U.S. branches and agencies to nonbanks and foreign offices of foreign banks. We lack sufficient data to calculate these sales for each year examined; however, data from the 1991 and 1992 surveys suggest that sales by U.S. branches and agencies of foreign banks to nonbanks and foreign offices of foreign banks are very small relative to U.S. bank sales to these same institutions.

[17]According to market participants, however, one prominent loan seller may have reduced its willingness to sell loans as part of a changing business strategy related to a mid-1992 merger.

[18]Of the fifty-one banks commenting on changes in demand by loan purchasers between June 1991 and June 1992, thirty-one reported little change, twelve reported an increased demand by loan purchasers, and only eight reported reduced demand. Market participants confirm that demand for secondary market loans has remained strong, with the possible exception of demand by Japanese banks.

on-balance-sheet credit dropped 4.1 percent. Similarly, off-balance-sheet consumer credit grew by 68.2 percent compared with a 7.2 percent decline for on-balance-sheet credit. Finally, although direct loan sales by banks fell substantially over recent years, the combined components of off-balance-sheet business loans grew 16.7 percent compared with a 5.0 percent decline for on-balance-sheet credit. Largely because of the mortgage-backed securities market, residential mortgage credit appears to have remained plentiful over the past few years despite the continued contraction of the thrift industry. By contrast, even after adjusting on-balance-sheet consumer and commercial lending to include securitization and loan sales, we find that the stock of consumer and business loans declined during the two years following the onset of the recession.

Securitization helped ease the effects of capital shortages and other funding constraints at banks and perhaps even more so at nonbanks. Thrifts, finance companies, and mortgage companies securitized a larger fraction of their mortgage originations than did banks, and finance companies and retailers securitized a larger fraction of their consumer credit than did banks. Although direct sales of bank-originated business loans have declined, both banks and nonbanks have increasingly securitized business credit.

Government Securities Investments of Commercial Banks

by Anthony P. Rodrigues

U.S. commercial banks have acquired federal government securities at a fast pace over the the last three years. At the same time, overall bank lending has slowed and even contracted for some classes of borrowers. These joint developments have raised concerns that banks are substituting securities investments for business loans to an extent that might be retarding economic recovery.

This article examines the reasons for the recent run-up in bank holdings of government securities and makes comparisons with earlier episodes. Although the current levels of government securities holdings relative to total assets at banks are not near post-World War II highs, growth in investments has been fast when compared with most other periods of securities acquisition. Typically, banks purchase government securities in recessions while waiting for attractive loan opportunities to develop. In the recent episode, however, factors in addition to slow business activity may have influenced banks' investment decisions. The article assesses other explanations for the buildup in securities holdings, including the unusual, sustained steep yield curve over 1990-92 and the imposition of risk-based bank capital standards.

The article also considers whether a rise in interest rates might unduly hamper future lending because of a "lock-in" effect. Banks that hold government securities when rates are relatively low may be unwilling to liquidate these instruments when rates rise if they would realize capital losses from the sale. And with their funds tied up in securities, these banks would have to raise deposits and capital to make new loans, an additional cost that could reduce their incentive to lend. A rough estimate of the interest rate risk exposure created by banks' securities positions suggests, however, that this restraint is likely to be moderate. Further, banks were quite willing to make loans in the 1950s and 1960s during recovery periods, even though their potential capital losses as a share of bank assets were comparable to recent exposure.

The run-up in government securities

Recently, commercial banks have held a large share of government securities in their assets, at least when compared with the asset mix of the 1970s and 1980s (Chart 1). However, current holdings are much lower than levels in the 1950s and early 1960s, and the recent run-up conforms somewhat to bank behavior during and after earlier postwar recessions. Nevertheless, the share of U.S. securities held by banks has risen more than in earlier periods, particularly if the pre-recession increase starting in late 1989 is included.

A more detailed view of recent securities behavior suggests that this period has indeed been unusual. Before the beginning of the recent recession, the real level of bank holdings of U.S. Treasury securities declined at a pace near that of earlier recessions (Chart 2). However, during the recession, holdings grew more quickly than usual and stopped rising only during the fourth quarter of 1992, the last point plotted for the 1990-92 period. At the same time, *total* real U.S. securities holdings at banks—that is, Treasury *and* agency securities—were growing before the recession and continued to grow after the recession began (Chart 3).

The different trends exhibited by the two components of government securities holdings are illustrated in

Table 1.[1] Treasury holdings increased after 1990, more than reversing the decline through 1990. The large change in total Treasury and agency securities from 1988 to 1992 thus largely reflects the continued increase in agency mortgage-related securities over the period.[2] The overall impact of the Treasury and agency run-up has been to lengthen the maturity distribution of securities held by commercial banks. While government securities have little or no credit risk, both the shift toward mortgage-related securities and the lengthening of the maturity distribution of securities potentially expose commercial banks to greater risk of loss in securities value if interest rates increase.

Partly because of the securities run-up, the securities-to-loans ratio has increased more quickly than usual in past recessions (Chart 4). The ratio dropped before past recessions, largely because of loan growth. After the earlier recessions began, however, the ratio typically rose as banks added securities to their portfolios, and then dropped again after about eight quarters when loan growth recovered and securities acquisition stopped. In contrast, the ratio of government securities to loans was about flat until the end of 1989 (corresponding to three quarters before the peak on the chart). Since then, the ratio has steadily risen as U.S. securities holdings have continued to outpace loan growth.

[1]The data in this table and the disaggregated data used in the following sections are obtained from bank responses to the Federal Financial Institutions Examination Council's Consolidated Reports of Condition and Income (Call Reports).

[2]This category includes Government National Mortgage Association (GNMA), Federal National Mortgage Association (FNMA), and Federal Home Loan Mortgage Corporation (FHLMC) certificates of participation in pools of residential mortgages, as well as collateralized mortgage obligations (CMOs) and real estate mortgage investment conduits (REMICs) issued by FNMA and FHLMC.

Reasons for the rise in securities holdings

Commentators have suggested several possible reasons for the recent sharp increase in government securities holdings. First, the slow pace of the economy and a widespread deleveraging of corporate balance sheets both before and after the recent recession could have weakened the demand for business loans.[3] Sec-

[3]See, for example, testimony by John LaWare before the House Subcommittee on Economic Growth and Credit Formation, April 2, 1993; testimony by Alan Greenspan before the House Subcommittee on Small Business, March 25, 1993; and Jonathan Nueberger, Federal Reserve Bank of San Francisco *Weekly Letter*, March 19, 1993. In their testimony, both LaWare and Greenspan suggest that

Chart 1

Government Securities Holdings by U.S. Commercial Banks

Share of Financial Assets, Not Seasonally Adjusted

Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

ond, the sustained steepness in the term structure may have made longer term Treasury securities a relatively more attractive investment than bank lending. Third, new bank risk-based capital standards[4] may have raised pressures on banks to increase their capital and to shift assets toward lower risk categories. These three explanations are not mutually exclusive; all of these factors could have played a role to varying degrees.

Footnote 3 continued
the weak demand for loans may also be related to the strict documentation requirements imposed on banks by the Federal Insurance Corporation Improvement Act of 1991. These requirements may represent a significant additional cost, particularly for small loans. Recently, however, a joint initiative by the Federal Reserve, Comptroller of the Currency, Federal Deposit Insurance Corporation, and the Office of Thrift Supervision was announced to reduce the requirements for small-business and selected farm loans.

[4]The risk-based capital standards, adopted in 1989 with final rules in effect at the end of 1992, created risk weights for various asset classes. These weights were intended to reflect in part the credit risk associated with different asset types. Tier 1 capital (essentially comprising common stock plus preferred stock) must exceed 4 percent of risk-weighted assets, while tier 1 plus tier 2 capital (including subordinated debt and loan loss reserves up to 1.25 percent of risk-weighted assets) must exceed 8 percent of risk-weighted assets. In addition, tier 1 capital must exceed at least 3 percent of unweighted assets. See Board of Governors of the Federal Reserve System, Capital Adequacy Guidelines, 12 CFR 208 and 12 CFR 225. The Federal Reserve Board, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency are currently developing interest rate risk regulations. A proposal for their implementation has been circulated for comment by the Federal Reserve Board.

Weak loan demand

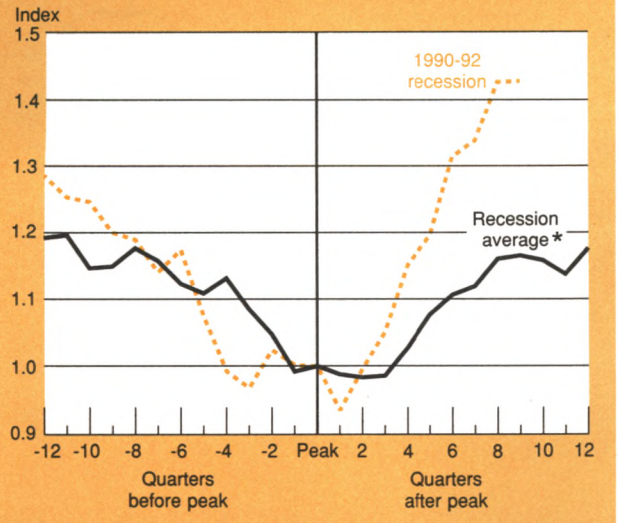
Two forces have combined to produce an environment of weak demand for bank loans. First, final demand has been unusually weak during the recovery from the 1990-91 recession, and manufacturing inventories, which play an important part in the cycle of bank lending, have been tightly managed. Second, U.S. corporations, reacting to the stresses of heavy indebtedness, have adopted a more conservative financial attitude and have begun to reverse the long-standing trend toward increasing leverage. In consequence, loan opportunities have dried up and banks have turned to securities investment as an alternative use of funds.

In the past, commercial bank loan growth typically paused after the onset of a recession (Chart 5, left panel) as the number of creditworthy borrowers requiring funds dropped. Strong loan growth resumed on average only about eight quarters after the recession peak or about three quarters after real GDP had recovered to previous peak levels (Chart 5, right panel).

The recent period appears different, both because

Chart 2

Real Bank Treasury Securities



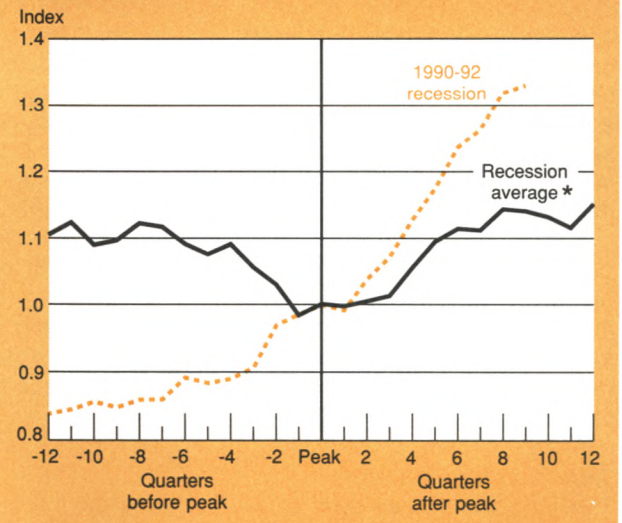
Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts; National Income and Product Accounts.

Note: The peak values are normalized to one.

*Average for the recessions of 1957, 1960, 1969, 1973, and 1981.

Chart 3

Real Bank Government Securities



Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts; National Income and Product Accounts.

Note: The peak values are normalized to one.

*Average for the recessions of 1957, 1960, 1969, 1973, and 1981.

Table 1

Commercial Bank Treasury and Agency Securities

(Percent)

Calendar Year through	Total†	Treasury Securities†	Non-Mortgage-Related Agency Securities†	Mortgage-Related Agency Securities†	Maturity Distribution of Fixed Rate Securities‡		
					0–1 Year	1–5 Years	More than 5 Years
December 1988	10.35	5.47	2.29	2.59	25	41	34
December 1989	10.78	4.75	2.76	3.27	23	37	40
December 1990	11.85	4.34	2.10	5.41	20	37	43
December 1991	13.58	4.88	2.17	6.53	19	38	43
December 1992	17.03	6.78	2.25	8.00	18	41	41

Sources: *Federal Reserve Bulletin*; Federal Financial Institutions Examination Council, Reports of Condition and Income.
†Share of average assets.
‡Share of total fixed rate securities held.

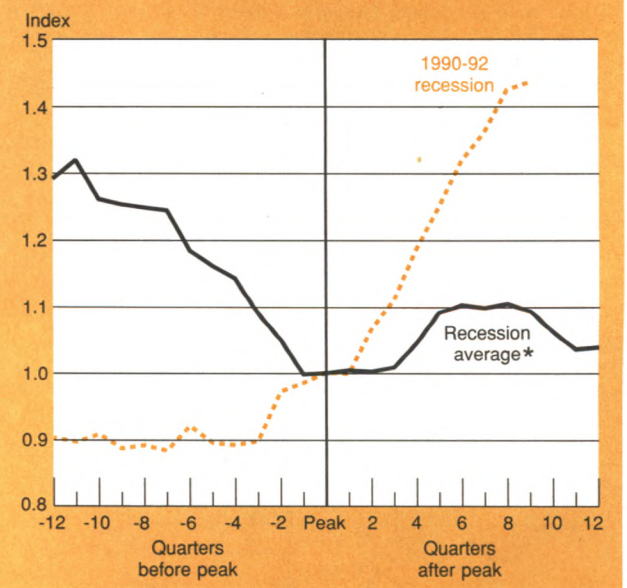
real loan growth stopped before the recession started and because the real level of outstanding loans has continued to fall during the recovery, dropping well below the previous peak level. While the real value of loans outstanding has been more cyclically volatile than activity on average during postwar recessions and recoveries, the decline in real loans outstanding since the start of the 1990 recession means that loans have not kept pace even with the unusually slow recovery in activity.[5] This observation suggests that factors in addition to the business cycle are at work.

The weak recovery aside, loan demand has also been affected by the deleveraging trend in the corporate sector. After significantly adding to debt both through bond issuance and bank borrowing during the 1980s (in part to retire equity as part of the merger and acquisition boom), the corporate sector has recently slowed its acquisition of debt. The desire to restructure balance sheets has restrained demand for additional debt, including bank loans, resulting in a drop in the aggregate ratio of credit market debt to assets (Chart 6).

While corporate deleveraging and a sluggish economy have reduced the demand for loans, other factors may have contributed to the run-up in securities holdings by encouraging banks to tighten their supply of loans. These factors—including the steep term structure of interest rates and the regulatory pressures on banks—are discussed next.

Chart 4

Ratio of Bank Securities to Loans



Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts; National Income and Product Accounts.

Note: The peak values are normalized to one.

*Average for the recessions of 1957, 1960, 1969, 1973, and 1981.

Term structure of interest rates

The persistent steep term structure during the 1990-91 recession and subsequent recovery very likely influenced banks' investment decisions. If bank lending rates decline with shorter term rates while investment securities retain relatively high yields, then banks would have an incentive to increase their securities holdings while limiting their lending activity. Although the spread of the prime rate, a proxy for lending rates, over the five-year Treasury rate, a proxy for securities rates, was

[5]Cara Lown and John Wenninger reach a similar conclusion in "The Role of the Banking System in the Credit Slowdown," Federal Reserve Bank of New York, mimeo, 1993.

somewhat higher in this cycle several quarters before the recession and slightly lower afterward, recent behavior seems very similar to recession averages (Chart 7, left panel). However, the prime rate may not provide an adequate benchmark for bank loan pricing since a large fraction of commercial and industrial loans extended during the 1980s had rates below prime.[6] Using the effective rate on new commercial and industrial loans after fourth-quarter 1979 as the bank lending rate suggests that bank rates are somewhat low relative to Treasury rates, a differential that would reduce the incentive to hold bank loans (Chart 7, right panel). Moreover, loan performance has been significantly worse in the recent recession than it was after the 1982 recession;[7] this observation suggests that, on a risk-adjusted basis, the current spread between loan rates and securities rates may be especially low. Thus, the recent behavior of lending rates relative to Treasury rates may have played some role in the shift toward government securities.

Capital requirements

Another possible explanation for the run-up in bank government securities holdings is that the risk-based capital requirements created incentives to substitute low-risk-weighted assets (U.S. government securities[8])

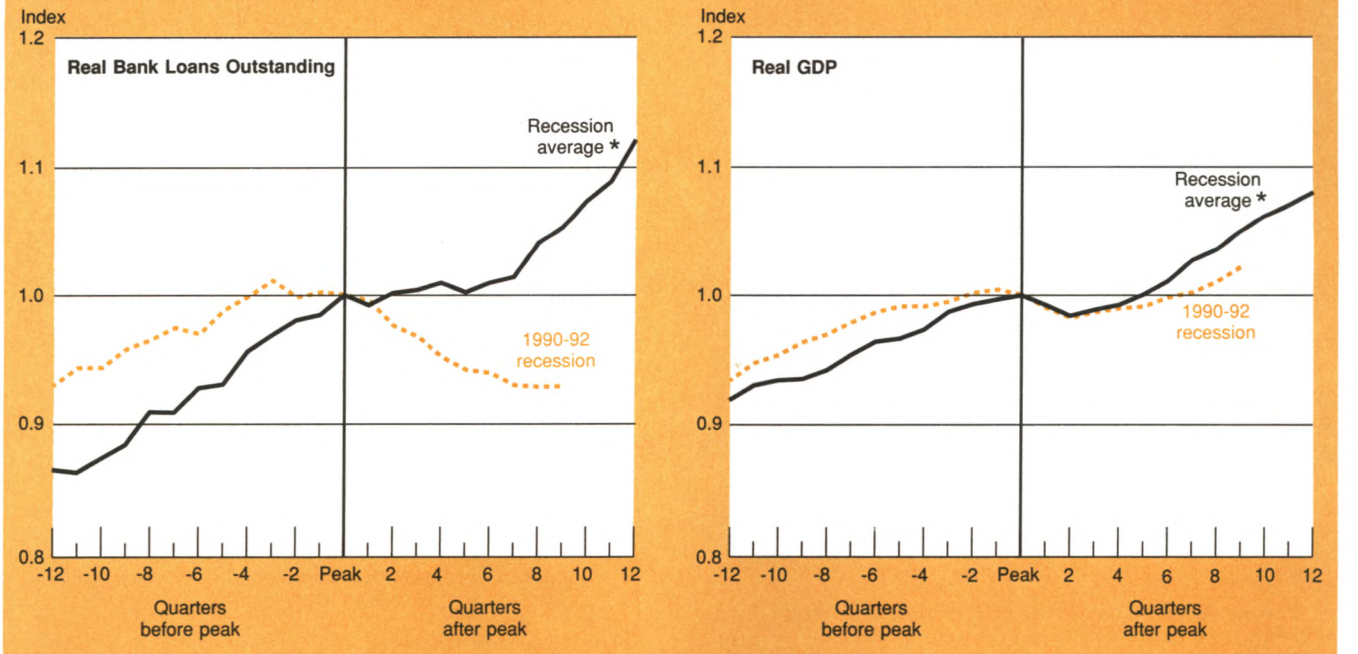
[6]For example, the Federal Reserve's quarterly survey of the term of bank commercial and industrial lending, reported in the E.2 statistical release, shows that the percentage of newly extended commercial and industrial loans with maturities under one year that were priced below prime grew from nearly 25 percent in the late 1970s to over 80 percent after the 1982 recession. After declining, albeit not steadily, from 1982 through 1990, this percentage rose slightly and has remained close to 67 percent.

[7]Alan Brunner et al., "Recent Developments Affecting the Profitability and Practices of Commercial Banks," *Federal Reserve Bulletin,* July 1992, show that charge-off rates on commercial and industrial, consumer, and real estate loans at commercial banks were at least twice as high during the recent recession as they had been during 1982.

[8]The weights are 0 percent for Treasury and GNMA-guaranteed securities, and 20 percent for FHMA and FHLMC mortgage pass-throughs. A significantly higher weight, 100 percent, is assigned to non-CMO securities based on stripped payment streams from these securities.

Chart 5

Bank Loans and GDP in Recessions



Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts; National Income and Product Accounts.

Note: The peak values are normalized to one.

*Average for the recessions of 1957, 1960, 1969, 1973, and 1981.

for high-risk-weighted assets (loans). These incentives could have worked both by lowering the relative return on loans or other high-risk-weighted assets in the portfolio and by constraining poorly capitalized banks to shift toward low-risk-weighted assets in order to satisfy the requirements.

Because more capital is needed for high-risk-weight assets and capital costs for banks are usually substantially higher than the cost of deposits, the capital requirements raise the cost of funding high-risk-weight assets (Box 1). The capital requirements also introduce a differential in cost across assets that did not exist in earlier periods when capital requirements for assets were uniform. A result is that the net return on high-risk-weight assets is lowered relative to the return on low-weight assets. This differential could thus restrain growth in high-weight assets.

The risk-based standards could also have promoted bank securities growth by compelling poorly capitalized banks to shift to low-weight assets. An analysis of a constant sample of commercial banks from 1990 to 1992[9] suggests, however, that direct capital constraints probably were *not* a major factor in securities growth. In the constant sample, banks that were initially well capitalized had the largest increase in portfolio holdings of Treasury and agency securities as measured by the change in the government securities-to-assets ratio (Table 2).[10] The well-capitalized banks were least constrained by the capital requirements.[11] These banks also currently hold a larger share of agency (and Treasury) securities than either adequately capitalized or undercapitalized banks.

A more general piece of evidence suggesting that factors other than the risk-weighted capital requirements were largely responsible for bank securities growth is the behavior of intermediaries not subject to these capital requirements. Credit unions, which are not constrained by the risk-based capital standards, have also significantly increased their share of securities in financial assets (Chart 8, top panel). Further, life insurance companies, which faced asset quality problems similar to those of banks, also shifted toward government securities holdings (Chart 8, bottom panel). Although insurers were bound by capital requirements that made government securities more attractive than junk bonds, these capital requirements did not provide an incentive to invest in government securities over investment grade bonds.

More generally, the current regulatory environment has been implicated for fostering a bank reluctance to extend loans. The major complaint is that intense oversight of examiners, particularly following the thrift deba-

[9]The sample includes all commercial banks that had data available to compute risk-based assets, securities holdings, and the maturity distribution of securities over each quarter in the years from 1990 through 1992. Because the analysis is based on banks that survived through 1992, the extent of securities acquisitions by undercapitalized banks may be underestimated if failing, undercapitalized banks are acquired by well-capitalized banks.

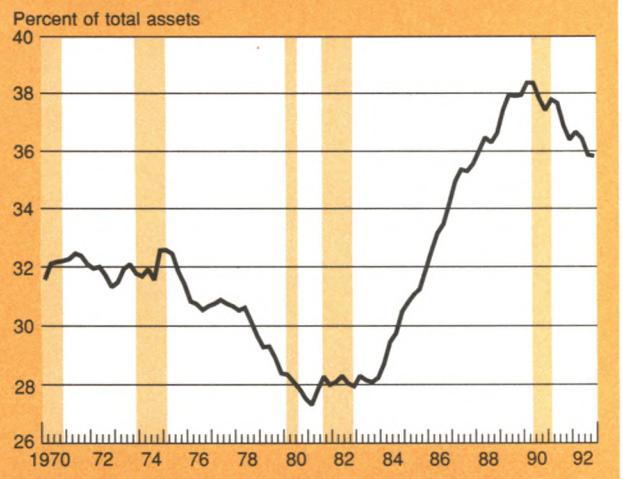
The sample is divided into three groups based on initial capital adequacy. Well-capitalized banks are those whose tier 1 risk-based capital ratio exceeds 6 percent, whose total risk-based capital ratio exceeds 10 percent, and whose leverage ratio exceeds 5 percent. Undercapitalized banks have a tier 1 capital ratio below 4 percent, a total risk-based ratio below 8 percent, or leverage ratio below 4 percent. Adequately capitalized banks are those that do not fall into the well-capitalized or undercapitalized groups.

[10]Although the *growth rates* of government securities relative to assets increase as the initial bank capital position deteriorates, this comparison seems less germane than the text argument for two reasons: First, the comparison overstates differences in securities growth because asset growth varied substantially by initial capital position. Assets declined for banks that were initially undercapitalized and grew most quickly at the well-capitalized banks. Second, given a bank's decision about asset growth, *changes* in asset shares provide more information about changes in portfolio allocation and changes in exposure relative to assets than does growth in asset shares.

[11]Internal capital targets could still explain the run-up in securities holdings if well-capitalized banks had set high target ratios of capital to risk-weighted assets. See Diana Hancock and James Wilcox, "Bank Capital and Portfolio Composition," mimeo, 1993.

Chart 6

Corporate Credit Market Debt



Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts.

Notes: Credit market debt includes bonds, mortgages, bank commercial and industrial loans, commercial paper, finance company loans, foreign loans, thrift loans, and bankers' acceptances. Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

cle and the early estimates of very large losses in the Federal Deposit Insurance Corporation (FDIC) insurance fund, led bank examiners to question closely loans that would earlier have been acceptable.[12] This evidence has tended to be anecdotal, and some have argued that the rigorous scrutiny of loans represents a return to earlier standards rather than the imposition of a new, more severe standard. Partly in response to complaints, however, the Administration and the major regulatory agencies recently announced an agreement that would reduce the documentation burden for some banks' loans to small businesses and farmers.

Models for securities acquisitions

To clarify the effects of the various factors on bank holdings of government securities, two groups of models describing changes in the government asset shares at commercial banks were developed: The first group consists of aggregate models relating securities holdings to the growth of GDP and the spread between loan rates and Treasury rates. These models are used to estimate how much of the securities run-up can be attributed to recent economic conditions, including unusually slow activity growth and small lending margins. The models in the second group describe changes in securities holdings at individual banks over the 1990-92 period. In these disaggregate models, a proxy for loan performance reflects loan return factors affecting individual bank portfolio choice. Given these factors, the models seek to measure the differential effect of initial capital status.

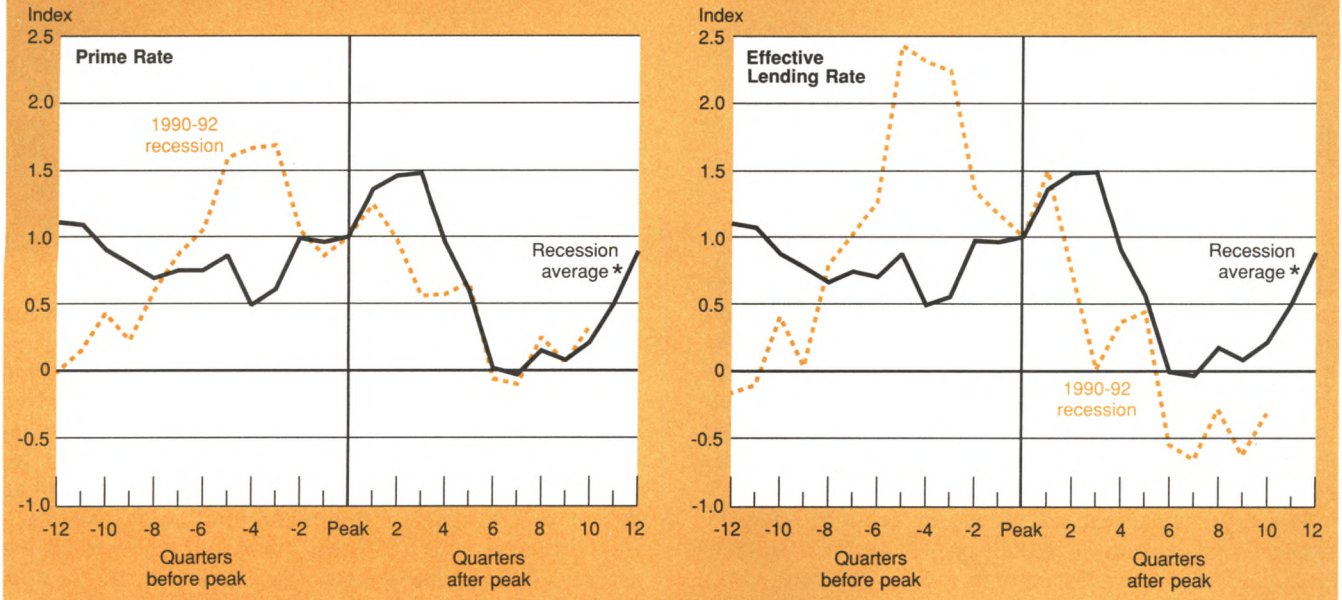
Time series models

The descriptive analysis above suggested that the recent slow growth in activity and the steep term structure might explain some part of securities growth at commercial banks. To capture the historical relation between activity and interest rates, a regression model connecting changes in securities' share of assets to real GDP growth and to a measure of the spread between bank loan rates and Treasury rates was estimated using

[12]See the testimonies of Stephen Steinbrink and Paul Fritts before the House Subcommittee on Economic Growth and Credit Formation, April 2, 1993.

Chart 7

Spread of Loan Rates over Five-Year Treasury Rate



Sources: Board of Governors of the Federal Reserve System, E.2 and G.13 statistical releases.

Notes: The peak values are normalized to one. Before 1979-IV, the effective lending rate is defined as the prime rate; beginning in 1979-IV, it is defined as the effective rate on new commercial and industrial loans.

*Average for the recessions of 1957, 1960, 1969, 1973, and 1981.

Box: The Impact of Risk-Based Capital Requirements on Funding Costs

Because the risk-based capital requirements impose different capital requirements on different assets, they have changed marginal funding costs across asset classes, altering the net returns that banks may receive from assets. Before the risk-based standards were put into place, all bank assets were subject to the same capital requirements. Hence, a differential in funding costs only exists in the current period. This differential will reduce the return on high-weighted assets relative to lower weighted assets. The accompanying table illustrates the relative effects, where r^D is the rate on deposits and r^C is the cost of capital.

The reduction in relative returns can be fairly large. For example, assume that a bank has a target ratio of tier 1 capital to risk-weighted assets of 6 percent and a ratio of tier 1 plus tier 2 capital to assets of 10 percent. Suppose also that the cost of tier 1 capital (represented by equity) is 15 percent, the cost of tier 2 capital is 7.0 percent, and the deposit rate is around 3.4 percent.† The implied difference in funding costs would reduce the return on commercial and industrial loans relative to Treasury securities by about 84 basis points from the spread of the lending rate over the Treasury yield.

†This cost of tier 1 capital is somewhat above the historical return on equity during the 1980s. The cost of tier 2 capital is assumed to be about 100 basis points above the ten-year Treasury rate in June 1993, and the deposit rate is approximated by the secondary market six-month certificate of deposit rate in June 1993.

Impact of Risk Weights on Bank Asset Returns

Asset	Return	Risk Weight (Percent)	Funding Cost	Net Asset Return Relative to Return on Treasury Securities
Treasury security	r^T	0	r^D	0
Agency security	r^A	20	$.98\ r^D + .02\ r^C$	$r^A - r^T - .02\ [\ r^C - r^D\ ]$
Mortgage†	r^M	50	$.95\ r^D + .05\ r^C$	$r^M - r^T - .05\ [\ r^C - r^D\ ]$
Other loan	r^L	100	$.90\ r^D + .10\ r^C$	$r^L - r^T - .10\ [\ r^C - r^D\ ]$

†The 50 percent risk weight only applies to first liens on single-family or one-to-four-family units.

quarterly data over 1970-89.[13] Both GDP growth and the loan-Treasury spread were expected to have negative signs because high GDP growth raises the demand for loans and a large spread suggests that bank loans are attractive relative to Treasury securities. The change in the securities-to-assets ratio, lagged four quarters, was included in the models to account for seasonality in the flow of funds data.

The regression models, shown in Table 3, have the expected signs; both fast GDP growth and a wide loan-Treasury spread are associated with a declining share of securities in bank portfolios. The loan-Treasury spread adds some additional explanatory power to the model containing activity alone.[14]

The models were used to forecast the change in the securities-to-assets ratio over the 1990-92 period. They generated a prediction based on the historical relation of the ratio to activity and spreads and the recent development of those variables (Chart 9). The regression model containing GDP growth alone accounts for about four-fifths of the portfolio shift toward securities from 1990 to 1992. The model that adds the loan-Treasury spread to GDP growth largely accounts for the entire portfolio shift toward securities over the period. Both models display a shortfall throughout most of the 1990-92 period, suggesting that other factors also contributed to the shift. Nevertheless, the models provide

[13]The spread is the prime loan rate over the five-year Treasury rate before fourth-quarter 1979 and the effective commercial and industrial loan rate over the five-year Treasury rate starting in fourth-quarter 1979.

[14]The F-test for the restriction that all the spread coefficients are zero gave $F(7,70) = 1.68$, which has a marginal significance level of about 12 percent.

some support for the view that demand factors, proxied by activity, and the steep term structure have played the major role in bank securities growth. Since aggregate time series models can only provide a crude estimate of the importance of factors such as the risk-based capital standards, the next section presents models estimated at the bank level to provide a more detailed analysis of individual bank responses.

A cross-section bank model

If the risk-based capital requirements constrained the lending behavior of some banks over the 1990-92 period, they could account in part for rising securities holdings even if they were not the primary factor. This section presents models relating changes in the portfolio shares of Treasury or agency securities to a proxy for loan performance and to controls for initial risk-based capital condition. The models were designed to show whether bank loan performance or the capital requirements account for changes in bank securities holdings.

The regression specification assumed that individual bank managements had target portfolio shares of Treasury or agency securities that varied predictably with bank characteristics. Among the factors included as explanatory variables were bank loan performance, bank size, asset growth over 1990-92, and dummy variables describing bank capital status at the beginning of 1990. Average bank loan performance (the ratio of loan loss provisions to loans) is likely to influence bank portfolio choice since banks with better performing loans will continue to be attracted to the loan market and will have less incentive to shift toward securities. Dummy variables indicating that a bank was initially either well capitalized or adequately capitalized determined whether the undercapitalized banks added securities at a different rate than better capitalized banks, once other bank characteristics were held constant. The 1990 asset shares of Treasury and agency securities were included in the model to allow for partial adjustment behavior over the observation period.[15] The regressions also contained initial bank size, to control for possible systematic differences in the desired securities-to-asset ratio by size, and asset growth, a proxy for extraordinary lending opportunities at the bank that is likely to be negatively related to securities growth. The Treasury and agency models were estimated over a constant sample of banks constructed from the Call Reports by dropping banks that: 1) exited the industry between 1990 and 1992, 2) merged with other banks between 1990 and 1992,[16] or 3) were missing data on

[15] If, for example, the Treasury/asset ratio adjusts slowly toward the desired level, then the regression model implicitly specifies the determinants of the desired Treasury securities/asset ratio:

$$\Delta(\text{Treasury/Asset}) = \delta(\text{Desired Treasury/Asset} - \text{Actual Treasury/Asset})$$

[16] A bank with otherwise complete data is excluded if the bank acquired equity capital through mergers over 1990-92. This may reduce the influence of asset growth if mergers and acquisitions are a major method of growth. Regression results similar to those described below were obtained for the Treasury model estimated over all banks, while the importance of initial capital status declined in the agency model.

Table 2

Commercial Bank Treasury and Agency Securities by First-Quarter 1990 Capital Status

(Percent)

Calendar Year Ending	Total†	Treasury Securities†	Non-Mortgage-related Agency Securities†	Mortgage-related Agency Securities†	Maturity Distribution of Fixed Rate Securities‡		
					0–1 Year	1–5 Years	More than 5 Years
Well-capitalized Banks 1990-I							
December 1990	15.80	5.83	3.44	6.53	21.06	41.11	37.83
December 1991	18.46	6.89	3.37	8.20	19.81	40.08	40.11
December 1992	20.75	8.47	3.47	8.81	17.75	44.34	37.91
Adequately Capitalized Banks 1990-I							
December 1990	7.74	2.12	.46	5.16	10.73	30.03	59.24
December 1991	10.10	3.89	.35	5.86	14.40	31.75	53.84
December 1992	11.51	4.06	.35	7.10	12.12	35.04	52.84
Undercapitalized Banks 1990-I							
December 1990	4.98	2.07	.57	2.34	21.64	35.37	42.99
December 1991	6.69	3.13	.49	3.07	19.62	38.26	42.12
December 1992	7.60	3.97	.39	3.24	23.35	41.63	35.02

Sources: *Federal Reserve Bulletin*; Federal Financial Institutions Examination Council, Reports of Condition and Income.
†Share of average assets.
‡Share of total fixed rate securities held.

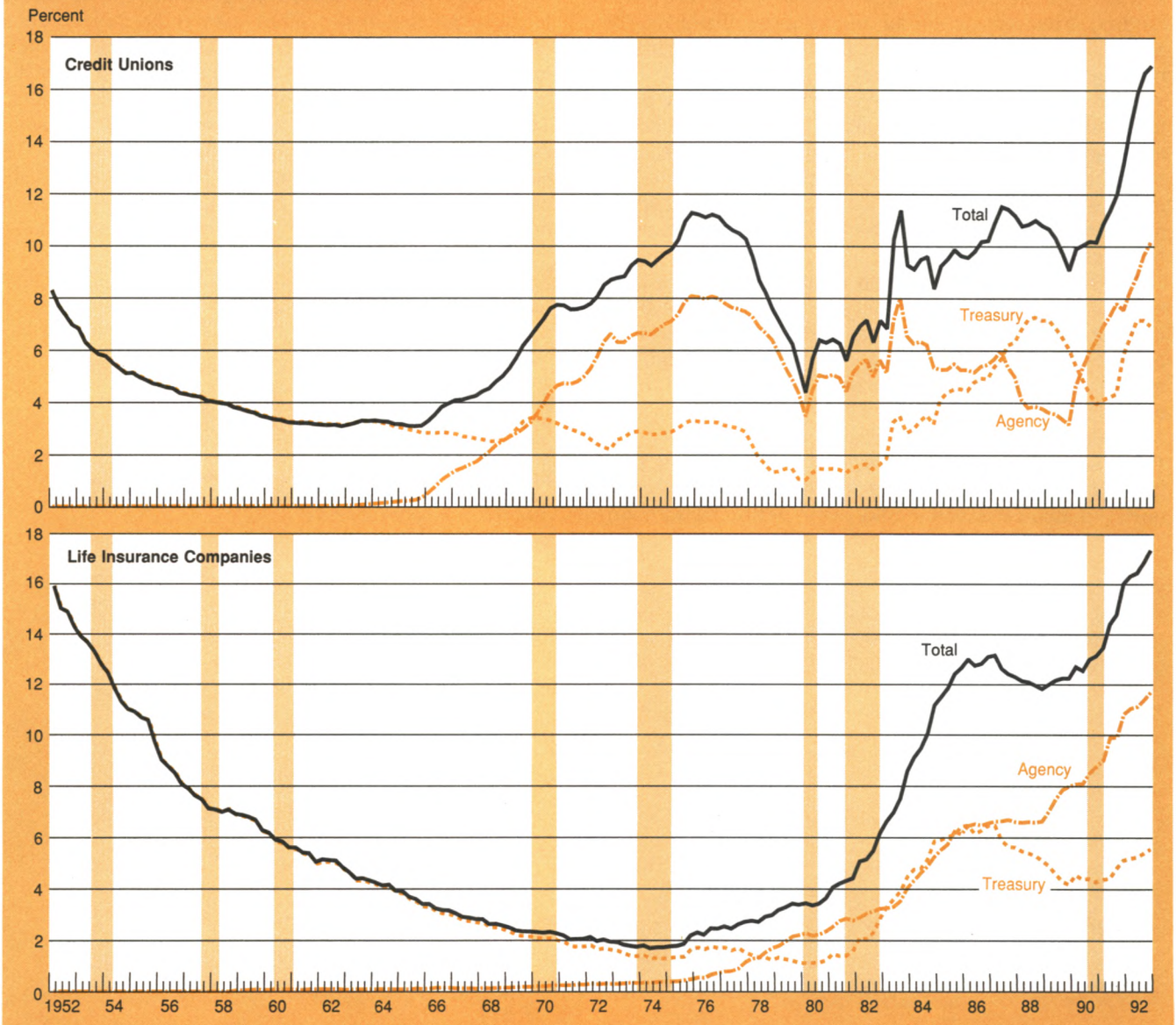
securities holdings, assets, or loan loss provisions over the sample.

The regression results are presented in Table 4. As expected, loan loss provisions enter positively for both the Treasury and agency models. The lagged Treasury/asset ratio and agency/asset ratio appear significant in the Treasury and agency models, respectively, as expected in a partial adjustment model. While not statistically different from zero in the Treasury model, initial asset size enters the agency model negatively. This

Chart 8

Government Securities Holdings by Selected Nonbank Financial Institutions

Share of Financial Assets, Not Seasonally Adjusted



Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

finding suggests that if loan performance is held constant, larger banks in 1990 had a slight tendency to lower their portfolio share of securities. Asset growth is not significantly different from zero in either model, perhaps because loan performance is a sufficient proxy for loan opportunities at banks.

When significant, initial capital status appears to be quantitatively important for subsequent securities growth. Both well-capitalized and adequately capitalized banks have lower target Treasury holdings than undercapitalized banks. In the agency model, well-capitalized banks also tend to have lower agency securities holdings than do undercapitalized banks (and implicitly also have a lower agencies/asset target than adequately capitalized banks). The models imply that undercapitalized banks added over 1 percent more Treasury securities to their assets than did banks with other capital levels while they added over 1 percent more agency assets than did well-capitalized banks.

The time series models presented in this section suggest that weak demand and the recent unusual term structure had an important role in the securities buildup at banks. The disaggregate models imply that the risk-based capital requirements did lead undercapitalized banks to increase their securities holdings beyond the amounts implied by their loan performance. Since initially undercapitalized banks contracted substantially in size from 1990 through 1992, this direct impact of the capital requirements was probably greatest in 1990.

Table 3
Time Series Models for Bank Securities Holdings
1970-I to 1989-IV
Dependent variable: Change in ratio of government securities to assets

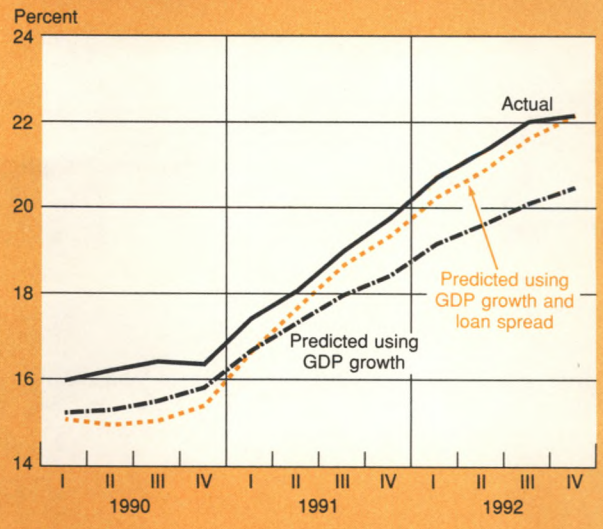
	Activity Model	Activity and Interest Rate Model
Real GDP growth		
t	−.03	−.07
	(.03)	(.04)
t-1	−.07	−.11*
	(.05)	(.04)
Spread of effective loan rate over five-year Treasury rate		
t		.03
		(.04)
t-1		−.03
		(.04)
t-2		−.06
		(.04)
t-3		−.01
		(.05)
t-4		−.06
		(.05)
t-5		−.02
		(.05)
t-6		−.05
		(.04)
Change in ratio of government securities to assets		
t-4	.39*	.45*
	(.09)	(.09)
Constant	.36*	.62*
	(.07)	(.13)
R^2	.39	.41
Box-pierce test for residual autocorrelation†	22.3	26.7

†The test statistic has a chi-squared distribution with twenty degrees of freedom.
*Statistically different from zero at 1 percent level.

Implications of large Treasury holdings

We have seen that banks have increased their government securities holdings significantly in recent years. This move may expose banks to additional interest rate risk if rates should rise substantially. Unwillingness to realize losses on the securities portfolio could discourage banks from liquidating part of their securities

Chart 9
Government Securities Holdings by U.S. Commercial Banks
Share of Financial Assets, Not Seasonally Adjusted



Sources: Board of Governors of the Federal Reserve System, Flow of Funds Accounts; National Income and Product Accounts.

Note: Predicted values are derived from the models in Table 3 relating the change in securities holdings to real GDP growth and the spread of the bank lending rate over the five-year Treasury rate.

holdings to finance loans as demand recovers.

Table 5 provides a very rough approximation of the impact that a 100 basis point increase in interest rates across the yield curve would have on the value of banks' government securities portfolios. The top row gives the assumed distribution of securities, using the fourth-quarter 1992 distribution of fixed rate securities to describe non-mortgage-backed government securities[17] and treating all agency mortgage-backed securities as mortgage pass-throughs.[18] The second row gives the estimated losses by security category; it suggests that a 100 basis point rise would lead to an overall drop in the value of government securities of about 74/100 of 1 percent of assets.

While fairly large compared with recent average bank earnings, this cost need not prevent banks from substantially reducing their securities portfolios in the event of additional loan demand. If we assume that banks liquidate their government securities uniformly across their holdings, the holdings would lose about (.74) divided by (17.03), or 4.3 percent, of their aggregate value. Losses of this magnitude would be partially off-

Table 4
Determinants of Commercial Bank Government Securities Holdings

	Dependent Variable	
	Change in Ratio of Treasury Securities to Assets (Percent)	Change in Ratio of Agency Securities to Assets (Percent)
Loan loss provision/loans†	.50*	1.10*
	(.09)	(.10)
Treasury securities/assets‡	−.24*	.02*
	(.01)	(.01)
Agency securities/assets‡	.01	−.22*
	(.01)	(.01)
Assets (billions of dollars)‡	−.03	−.07*
	(.03)	(.04)
Asset growth†	2×10^{5}	6×10^{5}
	(5×10^{5})	(5×10^{-5})
Well-capitalized banks‡	−1.88*	−1.28*
	(.59)	(.70)
Adequately capitalized banks‡	−2.05*	−.07
	(.82)	(.96)
R^2	.11	.08
Number of banks	10042	10042

Notes: All variables except assets and capital ratio dummies are measured in percent. Standard errors of coefficients are reported in parentheses.

†Average of year-end 1990, 1991, and 1992 values.
‡Measured in 1990-I.
*Significant at the 10 percent level.

[17]This assumption likely overestimates the fraction of non-mortgage-backed securities with long maturities. One major reason is that mortgage-backed securities are included in the Call Report maturity distribution at their stated maturities, which are significantly larger than their average life because of prepayments. Thus, the aggregate interest sensitivities of non-mortgage-backed securities reported here may exceed those that would be realized if interest rates rose.

[18]Specifically, this computation assumes that the mortgage-backed securities are all pass-through securities backed by thirty-year mortgages with rates near the average rate for new Federal Housing Administration mortgages in December 1992, and with prepayment rates of about 12 percent per year. The February 1993 Senior Loan Officer Survey indicates that most of the surveyed banks had fixed-rate CMO and mortgage pass-through securities with average maturities of less than five years, suggesting that the actual response of mortgage-backed securities value is likely to be smaller than that reported here.

The calculation significantly simplifies the actual response of the value of a mortgage-backed securities portfolio. The prepayment rates on a portfolio of mortgages will typically decline when interest rates rise, raising the duration of the portfolio and causing the value to drop more quickly than assumed in the calculation here. See James Gilkeson and Stephen Smith, "The Convexity Trap: Pitfalls in Mortgage Portfolios and Related Securities," Federal Reserve Bank of Atlanta *Economic Review*, November-December, 1992, for an introduction to these issues.

Table 5
Interest Rate Effect on Commercial Bank Government Securities Portfolios: Share of Average Assets
(Percent)

		Treasury and Agency Securities (Non-Mortgage-backed)			Agency Securities (Mortgage-backed)
	Securities	0–1 Year	1–5 Years	More than 5 Years	
Securities (December 1992)	17.03	1.65	3.71	3.66	8.00
Estimated loss	.74	.02	.09	.27	.37

Sources: Federal Financial Institutions Examination Council, Reports of Condition and Income; Federal Reserve Bank of New York staff estimates.

Notes: Assets equaled $3.4 trillion in December 1992. The calculation assumes an increase of 100 basis points in all yields and approximates the maturity distribution of non-mortgage-backed securities with the maturity distribution of fixed-rate securities.

Table 6

Interest Rate Effect on Commercial Bank Government Securities Portfolio by Capitalization in Fourth-Quarter 1992: Share of Average Assets

(Percent)

	Securities	Treasury and Agency Securities (Non-Mortgage-backed) 0–1 Year	1–5 Years	More than 5 Years	Agency Securities (Mortgage-backed)
Well-capitalized Banks (Assets = $3.0 trillion)					
Securities (December 1992)	18.06	1.67	3.82	3.88	8.70
Estimated loss	.80	.02	.09	.28	.41
Adequately Capitalized Banks (Assets = $397 billion)					
Securities (December 1992)	9.60	1.59	3.05	1.97	2.99
Estimated loss	.37	.01	.08	.14	.14
Undercapitalized Banks (Assets = $27 billion)					
Securities (December 1992)	11.40	3.61	2.08	1.77	3.95
Estimated loss	.40	.03	.05	.13	.18

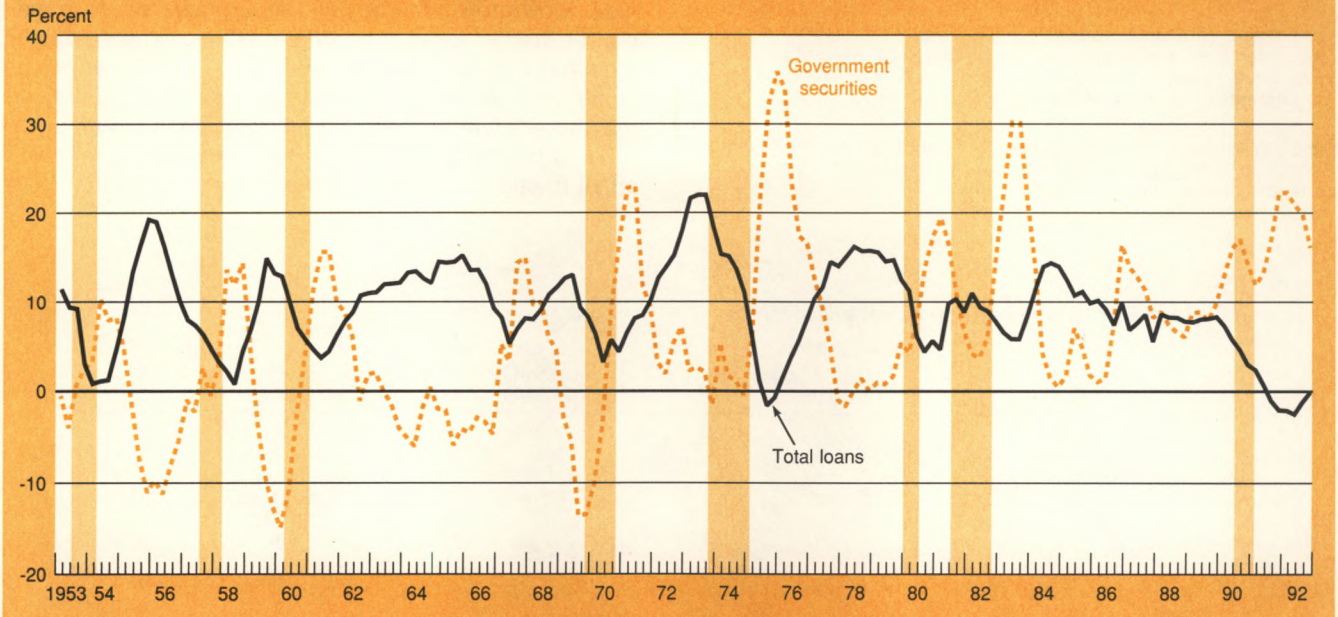
Sources: Federal Financial Institutions Examination Council, Reports of Condition and Income; Federal Reserve Bank of New York staff estimates.

Note: The calculation assumes an increase of 100 basis points in all yields and approximates the maturity distribution of non-mortgage-backed securities with the maturity distribution of fixed-rate securities.

Chart 10

Commercial Bank Loans and Government Securities

Four-Quarter Growth, Not Seasonally Adjusted



Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts.

Note: Shaded areas indicate periods designated recessions by the National Bureau of Economic Research.

set by the banks' reported excess of market to book value on government securities.[19] Of course, these calculations are at best only suggestive of the actual interest exposure created by bank securities holdings, not only because Call Reports collect very limited information on the actual securities held by banks but also because the calculation ignores possible exposure (or hedges) from off-balance-sheet activity or other balance sheet items.

Table 6 repeats this calculation for banks classified by capital status in fourth-quarter 1992. The well-capitalized banks have the greatest exposure to a large interest rate increase, largely because they hold significantly more longer term securities. Adequately and undercapitalized banks have smaller exposure.

As the comparison of securities holdings to loans in earlier recessions suggested, changes in bank loans and government securities holdings are negatively correlated (Chart 10). During recoveries in the 1950s and 1960s, potential capital losses from rising interest rates could have limited bank asset shifts from U.S. securities to loans.[20] Table 7 presents rough estimates of the potential loss in aggregate asset portfolio value during earlier periods of significant securities sales. These periods generally had ratios of losses to assets similar to the loss estimates computed from recent portfolios. Since banks typically sold much less than 10 percent of their total securities holdings, the actual losses realized from securities sales were substantially smaller than the aggregate loss of securities value. During these earlier periods, when banks generally held a much larger share of securities in their portfolios, the potential loss of value realized by securities sales did not discourage banks from resuming lending in recoveries. In short, there was no "lock-in" effect even when conditions supporting it were stronger than they are today.

While the lock-in effect appears to have been limited in these earlier periods, the risk-based capital requirements might restrain bank lending as the current recovery proceeds if many banks are near their regulatory capital constraints. The fraction of banks that were undercapitalized and directly subject to the capital constraints in fourth quarter 1992, however, was in fact quite small, slightly more than 1 percent of banks. These banks control less than 1 percent of commercial bank assets and loans. Moreover, most banks are well capitalized, with capital ratios at least 2 percent above regulatory minima. Thus, well-capitalized banks could accommodate some lending growth even at their current levels of regulatory capital. Their earnings performance has been good, a result that, if continued, would further relax their regulatory capital constraint.

Conclusions

The recent buildup in U.S. government securities holdings of commercial banks is faster than typical and has been driven in large part by acquisitions of mortgage-backed securities issued or guaranteed by U.S. agencies. Slow growth in activity appears partially responsible for the run-up in securities holdings. The sustained steepness in the term structure could also have played some role. Although the risk-based capital standards may have influenced some bank decisions to add securities, this effect seems important only for the relatively small fraction of banks with weak capital positions. The

[19] Government securities represented 17.03 percent of assets in December 1992 and had market values about 1.8 percent over book value, giving a potential cushion about 31/100 of assets or about 1.8 percent of the value of government securities.

[20] Albert Wojnilower, "The Central Role of Credit Crunches in Recent Financial History," Brookings Papers on Economic Activity, 1980, calls this phenomenon the "lock-in" effect.

Table 7

Interest Rate Exposure from Treasury Holdings

(Millions of Dollars)

Period	Loss in Portfolio Value	Realized Loss on Sales	Assets	Capital
June 1950–June 1951	389	36	154,701	11,078
December 1952–June 1953	385	55	186,682	12,585
December 1954–June 1956	833	54	200,588	14,279
December 1958–June 1960	857	21	237,473	18,191
December 1962–June 1964	452	12	295,983	23,752
December 1964–June 1966	391	20	345,130	27,438

Sources: Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics, 1941–1970;* Federal Reserve Bank of New York staff estimates.

Notes: Losses in government securities value are computed using the reported maturity distribution of securities and assuming a change from an average yield over the three years preceding the period to yields at end-of-period. Yields for the midpoint of maturity ratings are used.

growth in government securities may have exposed banks to some additional interest rate risk, but a fairly large rise in rates of, say, 100 basis points would lead to only a moderate loss in securities value. Moreover, this loss would be partially offset by the current excess of market to book value for commercial banking as a whole. While this lock-in effect may have been an important deterrent to lending for short periods in the past, it did not prevent banks from shifting to loans when loans became attractive during the 1950s and 1960s.

Emerging Equity Markets in the Global Economy

by John Mullin

Developing-country equity markets have undergone great changes in recent years. International investors have purchased emerging-market equity shares at unprecedented rates, tripling the value of their emerging-market equity portfolios between 1989 and 1992. Greater foreign investment in emerging markets has tightened their price linkages to the international financial centers. Partly as a result of these changes, emerging markets have matured considerably, achieving increased market size and an increased capacity to support equity issuance.[1]

Much of the attraction of developing-economy equity markets derives from the outstanding return performances registered by many of these markets in recent years. Between 1976-92, annualized equity returns exceeded 20 percent in Argentina, Chile, Mexico, South Korea, and Thailand. Equity returns in Chile and Mexico soared to almost 50 percent per year during 1990-92.

This article seeks to explain these striking emerging-market return performances. It examines recent structural reforms and their effects on equity portfolio inflows in nine of the most highly capitalized emerging markets: Argentina, Brazil, Chile, Mexico, South Korea, Taiwan, Malaysia, Thailand, and India.[2] The article also charts broad trends in developing-country equity markets, giving attention to the integration of these markets with the global financial system, analyzing how these markets have become more like developed-country markets, and identifying the substantial differences that remain. Finally, the article evaluates the effects of increased integration on the potential diversification gains that these markets offer to international investors.

The analysis shows that across national markets, equity returns have borne a positive relationship to measures of economic performance, such as rates of export growth and dividend-per-share growth. Nevertheless, the extraordinary equity returns registered by several developing-country markets in recent years have exceeded levels that can be explained by measures of ex ante risk and ex post macroeconomic performance. Returns in these countries appear to reflect fundamental structural changes that have increased investor demand for developing-country equity shares.

Among these structural changes are measures designed to make it easier for international investors to buy and sell developing-country stocks. Officials in several developing countries have modified domestic accounting and underwriting regulations in successful efforts to make public equity offerings in the United States. In addition, market openings in Mexico, Brazil, and South Korea have clearly accelerated foreign equity portfolio investment in those markets.

Other structural changes contributing to the demand for emerging-market equity shares involve basic economic reforms. Far-reaching programs to stabilize exchange rates and prices have helped bring about the particularly large increases in equity portfolio inflows observed in some Latin American countries. Ambitious

[1] The International Finance Corporation considers all stock markets in developing countries to be "emerging." The World Bank defines developing countries as those with GNP per capita of less than $7,620 in 1990 (see International Finance Corporation, *Emerging Stock Markets Factbook*, 1992, p. 3).

[2] These countries represent the nine most highly capitalized markets tracked by the International Finance Corporation's Emerging Markets Data Base.

privatization programs in Argentina and Mexico have also increased equity portfolio inflows, both directly by increasing the supply of internationally marketable equity shares and indirectly by improving government fiscal balances and thereby promoting future macroeconomic stability.

Evidence of increased emerging-market integration with the global financial system is found in the joint movements of returns realized by investors in developing-country and developed-country equities. Historically, monthly return correlations between pairs of developed markets have most often exceeded those between emerging and developed markets. In recent years, however, monthly return correlations have tended to increase between developed markets and those developing-country markets that became more open to foreign investment during the past decade. Moreover, an examination of correlations at different frequencies reveals that many developing-country markets may have been even more closely integrated with the global financial system during the past decade than the monthly return correlations would suggest.

The article's review of trends in emerging markets suggests that structural changes and equity portfolio inflows have helped accelerate a decade-long movement toward greater stock market capitalization—that is, an increase in the value of emerging-market equity shares outstanding. By 1991, several emerging markets' ratios of capitalization to gross domestic product (GDP) had converged with those of the world's most mature equity markets. Rapid capitalization growth has been accompanied by a recent surge in developing-country equity issuance, which has been particularly pronounced in the rapidly growing economies of East Asia. Equity issuance in these countries has exceeded the post-World War II norm for Group of Seven (G-7) economies and has been roughly in line with the high rates of equity issuance experienced by the United States during the 1920s. These patterns of equity issuance support the hypothesis that equity issuance becomes a more important source of finance in the latter part of an economy's rapid-growth stage of economic development.

Although emerging equity markets have become more like developed-country markets in key ways, substantial differences remain. One important difference is that developing-economy equity markets generally lack breadth. In addition, many developing-country stock markets remain more volatile than their more developed counterparts. The evidence indicates that this return volatility tends to reflect the volatility of economic conditions, especially that of inflation rates and real exchange rate changes.

The final section of the article finds that the vast changes that have taken place in emerging markets over the past decade have important implications for international investors. Financial analysts often argue that developing-country stocks, though volatile, offer striking diversification benefits because their returns have historically been both impressive and relatively uncorrelated with developed-country equity returns. Because many developing markets have undergone important structural changes in recent years, however, the procedure of using historical return averages and correlations to calculate ex ante diversification strategies is particularly suspect.

Return performance: the allure of emerging equity markets

Much of the allure of developing-country equity markets stems from the outstanding return performances registered by many of these markets. For instance, the International Finance Corporation (IFC) total return indexes for Argentina and Chile both grew at annualized rates in excess of 30 percent between December 1975 and December 1992 (Chart 1).[3] During the same seventeen-year span, the IFC total return indexes for Mexico, South Korea, and Thailand increased at impressive annualized rates of 22 to 24 percent.

In comparison, developed-country return performances tended to be more modest. The world equity return index computed by Morgan Stanley Capital International (MSCI) grew at an annualized rate of 14 percent between December 1975 and December 1992.[4] During the same period, the New York Stock Exchange (NYSE) total return index computed by the Center for Research in Securities Prices (CRISP) appreciated at an annualized rate of 15 percent, while the MSCI Japan total return index appreciated at an annualized rate of 17 percent. Of the seven emerging markets for which sixteen years of IFC data are available, only Brazil's IFC index increased at a significantly lower rate (6 percent per year) than the return indexes of these developed-country markets.

Chart 1 also gives the cumulative annualized rates of return of the NYSE over consecutive sixteen-year intervals since 1802.[5] The exceptional nature of the recent return performances of the Argentine, Chilean, Mex-

[3]Throughout the paper, unless explicitly noted, returns are calculated in terms of U.S. dollars. Return indexes are constructed in such a manner that the percentage change of a market's return index equals the market's rate of return.

[4]The Morgan Stanley Capital International index is almost exclusively composed of developed-country stocks.

[5]Data for 1802-25 were compiled originally by the Cowles Commission and subsequently adjusted by William Schwert in "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990.

ican, Korean, Thai, and Taiwanese stock markets is underscored by the fact that annualized returns of the NYSE did not exceed 16 percent in any of these sixteen-year periods.

Both developing-country and developed-country returns have been somewhat mixed in recent years. During 1990-92, three of the four Latin American markets under consideration—Argentina, Chile, and Mexico—had phenomenal annualized returns of between 30 and 50 percent. In the same three-year period, however, Korea and Taiwan experienced asset price deflations. The experience of these two countries mirrored that of Japan, where the speculative stock market rally of 1987-89 set the stage for a subsequent period of asset price deflation. Japan's tumbling share prices caused the MSCI world index to decline during the period, even though returns were positive in the United States and Europe.[6]

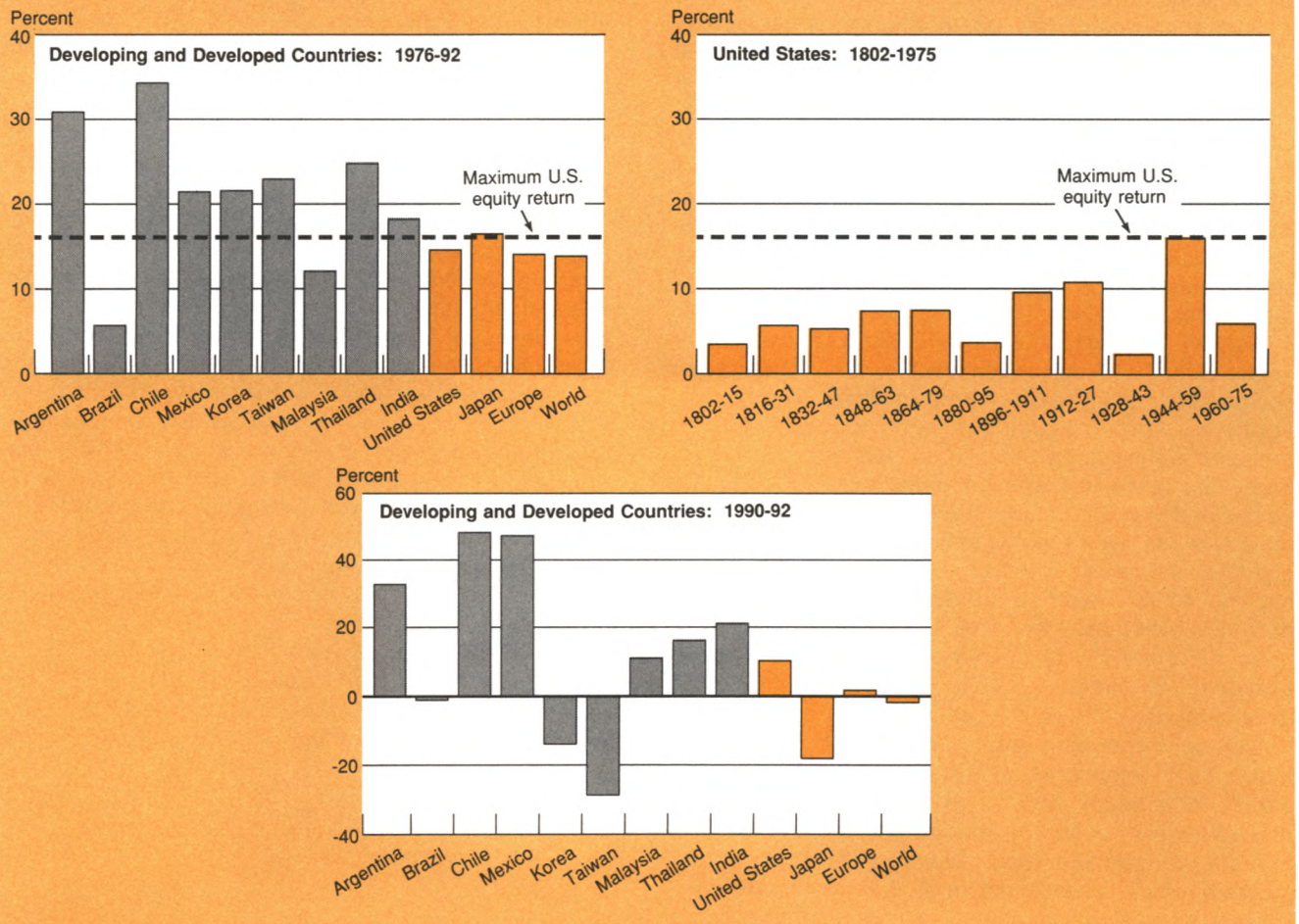
Stock returns and macroeconomic performance

Buying developing-country equity shares is often likened to taking a stake in the growth prospects of a

[6]World returns, as measured by the MSCI index, would have been higher (and perhaps positive) during the period had Japan's market capitalization been adjusted downward to take into account the effects of cross-holdings. See Jack McDonald, "The Mochiai Effect: Japanese Corporate Cross-Holding," *Journal of Portfolio Management*, Fall 1989, pp. 90-94.

Chart 1

Annualized Equity Returns



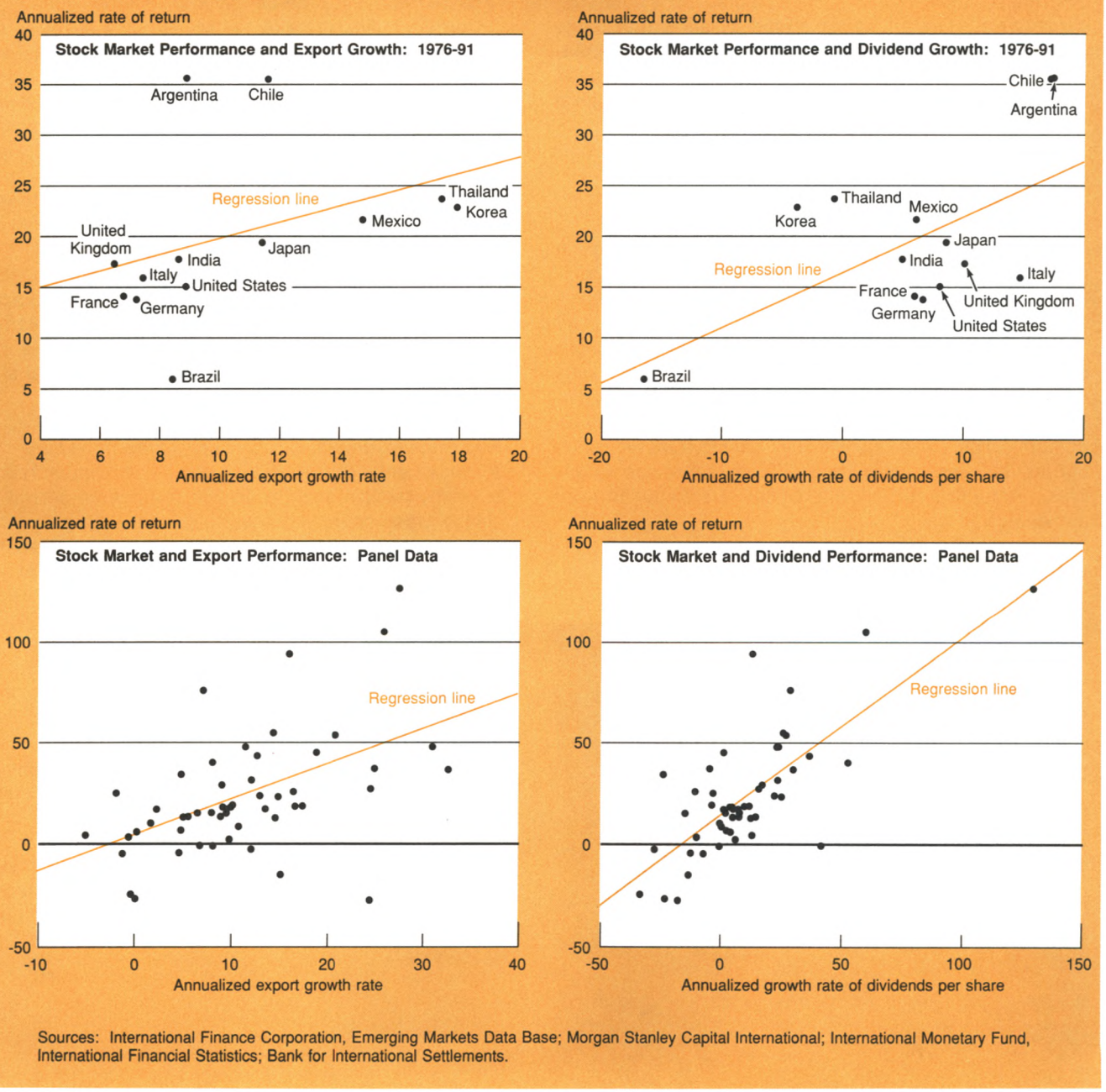
Sources: International Finance Corporation; Center for Research in Securities Prices; Morgan Stanley Capital International; William Schwert, "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990.

Notes: Grey-shaded bars represent developing countries. Data for Malaysia and Taiwan span 1985-92.

developing country. While ex ante or expected equity returns should reflect risk considerations, ex post or actual returns should also reflect an economy's realized macroeconomic performance. For this reason, it seems puzzling that cumulative equity returns in Argentina were greater between 1975 and 1991 than equity returns in Japan, Korea, and Thailand. After all, Argentine output growth was lethargic during the period, while the Japanese, Korean, and Thai economies boomed. Should we not expect to find a positive cross-country

Chart 2

Macroeconomic Determinants of Cumulative Equity Returns



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International; International Monetary Fund, International Financial Statistics; Bank for International Settlements.

correlation between cumulative equity returns and macroeconomic performance measures such as output and export growth rates? Should we not expect to see a negative relationship between equity returns and inflation? This section examines these questions and finds that cumulative equity returns are in fact correlated with various economic fundamentals. High returns among many developing countries stem partially from the robust growth that these economies have experienced over the past two decades. Nevertheless, the outstanding return performances registered by several of these countries surpass levels that can be explained by measures of ex ante risk and ex post performance. These return performances appear to reflect basic structural changes in the economies in question.

Returns and export and output growth rates

Consider first the relationship between equity returns and one important economic fundamental, export growth rates. A simple cross-country scatter diagram (Chart 2) provides only mixed support for the hypothesis that 1976-91 export growth rates and equity returns are positively related. While three export superstars (Korea, Thailand, and Mexico) had annualized stock returns of between 21 and 24 percent, two countries with much more modest export performances (Argentina and Chile) registered equity returns in excess of 35 percent.[7] The cross-country relationship appears much tighter, however, when three South American countries—Argentina, Brazil, and Chile—are excluded from the analysis.

[7]Exports are measured in U.S. dollars.

Table 1

Manufacturing's Share in the International Finance Corporation Index Relative to Its Share in GDP

Country	(A) Share in IFC Index (Percent)	(B) Share in GDP (Percent)	(A)/(B)
Argentina	44	22	2.0
Brazil	52	39	1.3
Chile	23	21	1.1
Mexico	35	25	1.4
South Korea	35	31	1.1
Taiwan	41	34	1.2
Malaysia	22	27	0.8
Thailand	33	26	1.3
India	97	19	5.1

Sources: Capitalization data are International Finance Corporation estimates for end-1991; GDP composition data are Federal Reserve Bank of New York staff estimates for 1989.

Stronger support for the hypothesis arises from an alternative way of assessing the relationship between equity returns and export growth rates. A panel-data scatter diagram, constructed by breaking each country's experience into four-year periods, indicates that the relationship between annualized returns and export growth rates is fairly tight. Regression analysis confirms that the panel-data relationship is statistically significant, whether or not dummy variables are included to take into account time-period and regional effects.

Corresponding tests of the relationship between output growth and equity returns reveal no statistically significant relationship between these two measures of performance. The finding that the correlation between export performance and equity returns is greater than the correlation between output performance and equity returns is perhaps not surprising when one considers that, in general, the IFC indexes for the countries in question are disproportionately composed of stocks in the manufacturing (traded goods) sector (Table 1). Only in Malaysia does the share of manufacturing capitalization in the IFC index fall below the share of manufacturing output in GDP. In most countries, and particularly in Argentina and India, the share of manufacturing capitalization in the IFC index overstates the share of manufacturing in GDP.

Returns and growth rates of dividends per share

A fundamental that in theory should be closely related to equity performance is dividend-per-share growth.[8] A simple cross-country plot of equity returns against dividend-per-share growth in U.S. dollars indicates that dividend-per-share growth is positively correlated with equity returns. The countries with very high rates of dividend-per-share growth—Argentina and Chile—exhibit high rates of return, while Brazil, with a very low rate of dividend-per-share growth, experienced very low returns over 1976-91. This positive relationship between dividend-per-share and equity performance holds up in the panel-data diagram as well. Regression results indicate that 57 percent of the variation in equity returns can be explained by rates of dividend-per-share growth.

Returns and rates of inflation

The time-series evidence for the United States reveals a negative relationship between inflation and equity returns.[9] Surprisingly, perhaps, cross-country data indi-

[8]Merton Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, vol. 34 (1961), pp. 411-33.

[9]See Nai-Fu Chen, Richard Roll, and Stephen Ross, "Economic Forces and the Stock Market," *Journal of Business*, vol. 59, no. 3 (1986), pp. 383-403. Strictly speaking, Chen, Roll, and Ross find a negative relationship between unexpected inflation and equity

cate no statistically significant relationship between equity returns and inflation rates. In part, this result reflects the very different equity performances of two high inflation countries: Brazil had very low annualized equity returns relative to other countries in the sample, while Argentina (with an even higher annualized rate of inflation) had extremely high equity returns (Chart 3). Like the cross-country data, the panel-data diagram does not indicate a negative relationship between equity returns and inflation.

Overall, the data support the hypothesis that ex post equity returns are related to economic performance. However, even a combination of measures of ex post performance and ex ante risk cannot adequately explain the outstanding equity returns registered by several emerging markets during the period of analysis. In a cross-country regression of mean annual returns against cumulative export growth rates, cumulative dividend-per-share growth rates, and a commonly used measure of risk (beta), the fitted regression errors tend to be positive among the developing countries and negative among the developed countries.[10] When a dummy variable for the developing economies is added to the equation, the dummy variable's estimated coefficient is positive and statistically significant (Table 2). A possible explanation of this finding is that high returns in several of the developing countries under examination reflect profound and largely unexpected changes in economic structure that have increased the demand for developing country stock and thereby increased share prices.

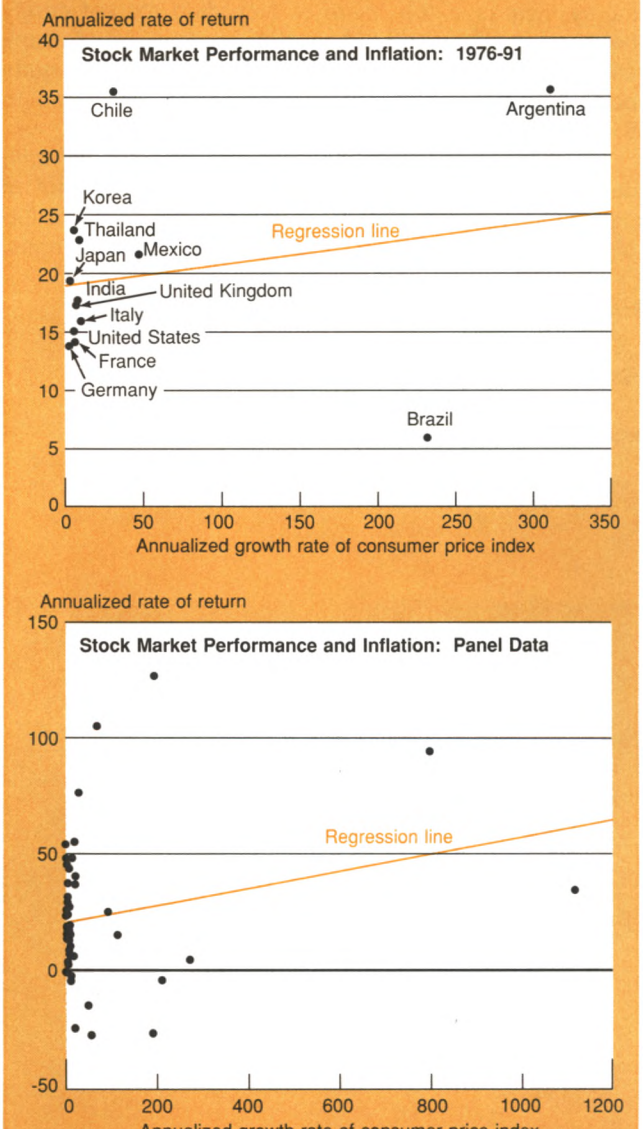
Structural reform and equity portfolio inflows

Structural reforms in developing countries have helped to accelerate foreign purchases of emerging-market stocks. This section highlights some of the more important changes that have made this trend possible, including market openings in developing countries, efforts by developing-country officials to obtain listings for emerging market companies on the world's major stock exchanges, and policies designed to stabilize exchange rates and prices.

Emerging market equity shares have historically been underrepresented in international investment portfolios. At the end of 1989, the combined market capitalization of the world's emerging equity markets amounted to more than 5 percent of world equity market capitalization. If international equity investors had held emerging

Chart 3

Inflation and Cumulative Equity Returns



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International; International Monetary Fund, International Financial Statistics.

Footnote 9 continued
returns. Given the substantial cross-sectional variation in the present data set and the lengthy time period of each observation (sixteen years per observation for the simple scatter diagrams and four years per observation for the panel-data diagrams), I assume that actual inflation rates are adequate proxies for unanticipated inflation rates.

[10]Beta is defined as the ratio of (a) the covariance between an asset's excess return and the world excess return to (b) the variance of the world excess return. The beta used in this exercise is based on annual data. A discussion of beta and the distinction between betas based on annual data and betas based on monthly data is contained in Box 2.

market shares in proportion to the markets' world capitalization weights, they would have devoted 5 percent of their funds to emerging market equity shares. At the end of 1989, however, estimated foreign equity portfolio holdings of emerging market shares amounted to no more than $17 billion, or 0.2 percent, of the roughly $7 trillion in funds controlled by institutional investors in the major industrialized countries.[11]

Since 1989, a rapid acceleration of net foreign purchases of developing-country equity shares has significantly increased the share of emerging market equity holdings in international portfolios. The World Bank estimates that during 1990-92, cumulative foreign equity portfolio inflows into emerging markets amounted to $19.5 billion.[12]

Reliable estimates of equity portfolio inflows are difficult to assemble, largely because only a handful of developing countries have compiled data on direct foreign purchases of shares on their stock exchanges. Data supplied by four developing countries, however, indicate that the World Bank estimate may understate the level of equity portfolio inflows into emerging markets over the past three years (Table 3). Brazil, Mexico, South Korea, and Taiwan have each experienced rapid accelerations of equity portfolio inflows since 1989. For this group alone, cumulative equity portfolio inflows amounted to $19.9 billion during 1990-92.

Equity portfolio inflows can be divided into three categories:

(a) international equity issuance, including both publicly offered and privately placed American depository receipts (ADRs);
(b) direct equity portfolio inflows: direct purchases in emerging stock markets by foreign institutions and individuals other than closed-end mutual funds;
(c) flows through country-specific and multicountry closed-end mutual funds.

International equity issuance

A notable feature of the recent increase in equity portfolio investment in developing countries has been a large increase in international equity market placements by developing-economy companies. The vast majority of these placements have taken the form of ADRs. An ADR is essentially a claim, issued by a U.S. depository institution, to an underlying share of stock in a foreign-based company. In what is essentially a custodial arrangement, the U.S. depository institution backs the ADR by holding shares of the underlying stock on behalf of the owner of the ADR. In exchange for a fee, the depository institution provides the service of converting dividend receipts denominated in a foreign currency into dollars and distributing them to ADR holders. Owners of ADRs are entitled at any time to redeem their ADRs for shares of the underlying stock. A particular advantage of the ADR instrument is that settlement of trades between U.S. investors can be handled by the depository institution without recourse to the home equity market of the non-U.S. company that issued the equity. In this way, the ADR mechanism avoids the risks and transaction costs associated with settlement and clearance in foreign markets.

Developing-country companies can place ADRs in the United States by two means. The first is a public ADR offering. To offer an ADR publicly in the United States, the company must obtain a listing on a U.S. exchange—the NYSE, AMEX, or NASDAQ. In several recent cases, developing-country officials have modified domestic accounting and underwriting regulations to help domestic companies obtain listings on United States exchanges and to make public equity place-

[11] See International Finance Corporation, *1991 Annual Report*, pp. 10-12; and World Institute of Development Economics Research of the United Nations University, "Foreign Portfolio Investment in Emerging Equity Markets," March 1990, pp. 12-13.

[12] See *1992-93 World Debt Tables*, vol. 1: Analysis and Summary Tables, p. 114. One reason that the World Bank estimate may be low is that it does not include Taiwan (although the IFC does include Taiwan in its emerging markets data base).

Table 2
Equations for Mean Annual Excess Return: 1976-91

Variable	Coefficient			
	Regression 1		Regression 2	
Constant term	−16.0	(15.1)	−17.8	(9.5)
Beta	13.2	(6.9)	13.5	(6.4)
Growth rate of dividends per share	1.0	(0.4)	1.0	(0.4)
Growth rate of exports	−.2	(1.1)	—	—
Dummy variable to control for emerging markets	28.2	(8.7)	27.5	(6.7)
Statistics				
n	13		13	
R^2	.76		.76	
Adjusted R^2	.64		.68	

Notes: Standard errors are given in parentheses. Sample includes six developed countries (France, Germany, Italy, Japan, the United Kingdom, and the United States) and seven developing countries (Argentina, Brazil, Chile, Mexico, South Korea, Thailand, and India).

ments in the United States. In the case of the May 1991 public offering of ADRs by Telemex (the Mexican telephone company), the U.S. Securities and Exchange Commission worked closely with Mexican officials to facilitate the offering, granting several technical exemptions to S.E.C. underwriting rules.[13]

Private placements have been a second means of issuing developing-country ADRs in international markets. During 1990-92, private ADR placements by developing-country companies were four times as numerous as public offerings.[14] Private ADR placements by developing-country companies received stimulus from the June 1990 adoption of Rule 144A by the U.S. Securities and Exchange Commission. Rule 144A exempts qualified institutional buyers—institutions that own and invest on a discretionary basis at least $100 million in securities—from a rule that previously required them to hold privately placed securities for two years before trading them.[15] The adoption of Rule 144A increased the liquidity of privately placed developing-country ADRs and thus enhanced the attractiveness of these securities.

Before 1990, international equity placements by developing country companies were quite rare. In 1990, Compania de Telefonos de Chile became the first Latin American company to list ADRs on the NYSE. The successful $1.2 billion Telemex offering of May 1991, however, marked a watershed for developing countries. International equity placements by developing-country companies increased from an estimated $1.2 billion in 1990 to an estimated $9 billion in 1992. As a result, the share of total international equity issuance attributable to developing-economy companies increased from an estimated 15 percent in 1990 to an estimated 40 percent during 1992.[16]

A breakdown of international depository receipt issuance for seven emerging markets is given in Table 3.

[13]See Edward Greene, "Cross-Border Equity Offerings: A Discussion of Some of the Critical Issues," Cleary, Gottlieb, Steen & Hamilton Working Paper, 1991.

[14]Citibank ADR data indicate that during 1990-92, there were thirty-eight private ADR placements by developing-country companies and only eight public offerings.

[15]See SEC Release No. 33-6862: "Resale of Restricted Securities; Changes in Method of Determining Holding Period of Restricted Securities Under Rules 144 and 145."

[16]IMF staff estimates of international equity issuance. Totals include Singapore, Hong Kong, and Israel. These countries' equity markets are categorized as developed, not emerging, by the IFC.

Table 3

Equity Portfolio Inflows: 1990-92

Millions of U.S. Dollars

	1990	1991	1992	1990-92
Total equity portfolio inflows				
Brazil	100	600	1,800	2,500
Mexico	1,300	6,300	6,000	13,600
South Korea	500	300	2,100	2,900
Taiwan	100	200	500	800
Total for four	2,000	7,500	10,500	19,900
American depository receipt placements				
Argentina	0	400	400	700
Brazil	0	0	100	100
Chile	100	0	100	200
Mexico	0	3,000	3,300	6,300
South Korea	0	200	200	400
Taiwan	0	0	500	500
India	0	0	200	200
Direct equity portfolio inflows				
Brazil	100	600	1,600	2,300
Mexico	1,100	3,200	2,700	7,000
South Korea	0	0	1,800	1,800
Taiwan	100	200	100	300

Sources: Citibank ADR Department; Federal Reserve Bank of New York staff estimates; author's communications with Bolsa Mexicana de Valores, Central Bank of Brazil, Korean Stock Exchange, and Taiwan Stock Exchange Corporation.
Notes: Equity portfolio inflows can be decomposed into three parts: (1) international placements, including ADR placements; (2) direct equity portfolio inflows; and (3) inflows through closed-end country funds. Components may not add to totals because of rounding.

Mexico has clearly been the dominant issuer of ADRs among developing countries, having raised $6.3 billion in international offerings during the past two years. Issuance of Telemex ADRs accounted for $2.4 billion of this total. By 1992, Telemex ADRs had become the most actively traded issue on the NYSE in terms of dollar volume. The dollar volume of trading in Telemex ADRs on the NYSE exceeded $23 billion during the year, compared with less than $16 billion for the second most actively traded ADR, the British pharmaceutical company Glaxo Holdings.[17]

Direct equity portfolio inflows

Direct foreign purchases of equity shares have accelerated dramatically in three of the four countries for which data are available (Table 3). In Mexico, Brazil, and South Korea, rapid increases in direct foreign share purchases largely reflect the dismantling of capital-account restrictions and other impediments to direct foreign share purchases.

In Mexico, the government implemented reforms in 1989 that permitted foreigners to purchase Mexican equities directly on the Bolsa (Table 4). At the same time, the Nafinsa Trust was established to allow foreigners to purchase "A" shares formerly restricted to Mexican nationals.[18] In the three years following these

[17]Bank of New York, "Depository Receipts: 1992 Market Review."

[18]"A" shares have full economic and corporate rights but can be directly owned only by Mexicans. Foreigners can own these indirectly by holding certificates of ordinary participation issued by a Mexican trust. The certificates convey full economic rights but no

Table 4

Liberalization of Restrictions on Foreign Access to Developing-Country Equity Markets

Country	Country Fund Admitted	Restrictions on Direct Equity Portfolio Purchases Liberalized	Repatriation Restrictions Liberalized	Recent Tax Rate Changes
Argentina	October 1991	July 1989. Prior approval of foreign portfolio investments is no longer required.	October 1991. Required three-year holding period prior to repatriation of capital is eliminated.	October 1991. Capital gains tax of 36% is removed.
Brazil	September 1987	May 1991. Foreign institutional investors are allowed to buy stocks directly.	1991. Required ninety-day holding period is eliminated.	1991. Dividend tax and capital gains tax are lowered from 25% to 15%.
Chile	October 1989	Foreign investment remains highly regulated because the government wishes to discourage short-term capital inflows.	January 1992. Required holding period is lowered from three years to one year.	Little change. Capital gains tax of 35% is maintained to discourage large inflows.
Mexico	June 1981	1989. Foreigners are permitted to buy shares directly on Bolsa.	—	1990. Dividend tax of 40% is removed.
Korea	November 1981	January 1992. Market is opened to direct foreign purchases, with foreign ownership of listed companies limited to 10%.	—	—
Taiwan	October 1983	December 1990. Market is opened but foreign involvement is regulated extensively.	Repatriation restrictions remain.	—
Malaysia	May 1987	Relatively few restrictions on direct equity portfolio inflows exist.	Capital and earnings may be freely repatriated.	1990. Dividend tax of 35% is removed.
Thailand	August 1985	April 1975: The Thai exchange has been open to foreign investment since its inception. However, ceilings on foreign ownership in individual stocks (25%-49%) have limited foreign inflows.	April 1991. Exchange control deregulation allows for easier repatriation of capital and earnings.	1991. Capital gains tax of 25% is removed.
India	July 1986	September 1992. Draft guidelines propose an easing of restrictions on foreign equity portfolio investment.	—	1991: Capital gains and dividend tax rates are lowered.

Sources: *Euromoney Guide to World Equity Markets*, 1992; International Finance Corporation, *Emerging Stock Markets Factbook*, various issues; International Monetary Fund, *Exchange Arrangements and Restrictions*, various issues; various country sources.

measures, cumulative direct foreign share purchases have amounted to $7 billion.

Two years after Mexico's market opening, Brazil followed suit. Before May 1991, foreigners could only purchase Brazilian equity shares through closed-end funds or Brazilian investment companies. Resolutions implemented in May 1991, however, allowed foreign institutional investors to buy stocks directly. In addition, dividend and capital gains tax rates on foreign equity holdings were lowered from 25 percent to 15 percent, and a ninety-day minimum time period for the repatriation of investments by foreigners was abolished. These liberalization measures contributed to an increase of direct foreign share purchases from $103 million in 1990 to $1.6 billion in 1992.

Argentina has also taken several steps in recent years to stimulate direct foreign equity purchases (Table 4). In 1989, the government eliminated the requirement that foreign portfolio investments receive prior approval. Two years later, the government lowered the capital gains tax rate applicable to foreigners from 36 percent to zero and eliminated a requirement that investors observe a three-year holding period before repatriating capital. Unfortunately, however, it is not possible to gauge the effects of these recent liberalization measures on direct equity portfolio inflows into Argentina because data on these flows are not presently available.

Recent liberalization attempts across the Pacific have had mixed results. The January 1992 opening of the Korean Stock Exchange induced a large flow of direct foreign purchases, which increased from zero in 1991 to $1.8 billion in 1992. Recent liberalization measures in Taiwan, however, have been partial and therefore less effective in stimulating direct equity portfolio inflows. Although the stock market was officially opened to direct foreign purchases in December 1990, remaining restrictions on access and the repatriation of cash dividends and capital gains discouraged potential investors. Direct foreign share purchases accelerated in 1991 following Taiwan's market opening, but not to the extent that foreign purchases accelerated in Mexico, Brazil, or South Korea following those countries' market openings.

Whereas Korea and Taiwan have only recently made efforts to open their equity markets to direct foreign purchases, Thailand and Malaysia have maintained open equity markets since the mid-1980s. The relatively liberal policies of Thailand and Malaysia are reflected in data on foreign ownership presented in Table 5, which gives the percentages of equity owned by foreigners in three markets: Thailand, Malaysia, and Mexico. Whereas foreign ownership of Mexican stock did not come close to 20 percent until 1991, foreign ownership of stock in Thailand and Malaysia exceeded 20 percent at least several years earlier. These data indicate that the Thai and Malaysian markets have been fairly well integrated with the global financial system for some time.

The evidence given in Table 4 indicates that by 1992, most of the developing countries under consideration had taken steps to encourage direct equity portfolio inflows. Five countries—Mexico, Brazil, Taiwan, South Korea, and Argentina—have taken these steps quite recently, while two countries—Thailand and Malaysia—maintained relatively open markets throughout the latter half of the 1980s. In contrast, two countries—Chile and India—stand out as having taken few steps in recent years to dismantle restrictions that discourage direct equity portfolio inflows.

Equity portfolio inflows through closed-end funds

A large number of closed-end funds specializing in developing-country equity shares were established during the 1980s. The IFC promoted the establishment of these funds by advising developing countries on legal and regulatory frameworks and by underwriting and investing capital in these funds. Since 1984, when the IFC helped establish the Korea Fund, the IFC has assisted in bringing twenty-five funds to the international market.

During the mid-1980s, closed-end country funds were the primary and in some cases only available channel through which international portfolio investors purchased emerging market equity shares. Developing-country closed-end fund issuance peaked, however, in

Table 5
Foreign Equity Portfolio Ownership
Percent

	Thailand	Malaysia	Mexico
1985	20	—	—
1986	22	—	—
1987	27	28	—
1988	12	27	—
1989	12	27	4
1990	19	25	12
1991	17	22	19
1992	19	—	21

Sources: Stock Exchange of Thailand, the Kuala Lumpur Stock Exchange, and the Bolsa Mexicana de Valores.

Footnote 18 continued
voting rights. Mexican "B" shares convey the same rights as "A" shares but can be owned by foreigners as well as Mexicans. "N" and "L" shares can also be owned by foreigners, but "N" shares convey no voting rights and "L" shares convey only very limited corporate rights.

1990 at $3.4 billion and then declined to $1.2 billion in 1991.[19] This decline stands in sharp contrast to the rapid rise of international placements and direct equity portfolio inflows during the same period. Apparently, the availability of these new means of acquiring developing-country equity shares dampened the demand for closed-end fund shares.

[19]IMF staff estimates.

Latin American reform and equity portfolio investment
The acceleration of equity portfolio inflows into Latin America derives only in part from innovations that have made it easier for foreigners to buy shares of the region's companies. The trend also owes much to the adoption of fundamental reforms in several of the region's economies. In 1987, following the lead of Chile, Mexico embarked on a stabilization program that has substantially reduced the government budget deficit

Box 1: United States Equity Portfolio Investment in Developing Countries

Treasury International Capital data indicate that United States net portfolio purchases of developing-country stocks reached record levels in recent years. According to Table CM-V-5 of the *Treasury Bulletin*, net equity portfolio inflows from the United States into nine of the most highly capitalized developing-country equity markets increased to a cumulative $8.5 billion during 1990-92 from a cumulative $791 million during 1987-89 (see table).

Most of this dramatic increase is attributable to an increase in U.S. net purchases of Mexican and Brazilian equity shares. During 1990-92, according to Treasury data, cumulative U.S. net purchases of Mexican stock amounted to $5.8 billion and cumulative U.S. net purchases of Brazilian stock amounted to $1.4 billion.

A comparison of the Treasury data with data provided by the central banks of Mexico and Brazil indicates that the U.S. share of total equity portfolio inflows into each of the two countries has been substantial in recent years. The $5.8 billion Treasury figure for U.S. net purchases of Mexican stock during 1990-92 equals 42 percent of the $13.6 billion in foreign net portfolio purchases of Mexican stock reported by the central bank of Mexico for the same period. In the case of Brazil, the $1.4 billion Treasury figure for U.S. stock purchases equals 56 percent of the $2.5 billion figure for foreign net portfolio purchases of Brazilian stock reported by the central bank of Brazil.

Net Portfolio Equity Inflows from the United States
Millions of U.S. Dollars

	Cumulative Inflows					
	1984-86	1987-89	1990-92	1990	1991	1992
Argentina	7	−40	73	−3	64	12
Brazil	9	515	1,415	22	326	1,067
Chile	8	92	116	97	−74	93
Mexico	37	38	5,761	918	2,078	2,765
India	2	0	2	−1	3	0
Korea	64	−1	435	−31	0	466
Thailand	18	161	331	41	89	201
Malaysia	12	79	348	138	−25	235
Taiwan	10	−53	46	−6	38	14
Total	167	791	8,515	1,175	2,499	4,841

U.S. Share of Total Portfolio Equity Inflows: 1990-92
Percent

Brazil	56
Mexico	42
South Korea	14
Taiwan	5

Sources: Treasury Bulletin, Table CM-V-5, various issues; country sources.

while stabilizing the exchange rate and reducing the domestic rate of inflation. The government also undertook an ambitious privatization program that contributed to increased equity portfolio inflows directly by expanding the supply of internationally marketable equity shares, such as Telemex, and indirectly by widening the scope of the private sector in Mexico. In addition, prospects for a North American Free Trade Agreement between the United States, Canada, and Mexico boosted confidence in the sustainability of economic growth in Mexico and thereby stimulated portfolio investment. The successful completion of a Brady Plan debt reduction agreement between the country and its commercial bank creditors in March 1990 also increased confidence.

The Argentine government followed suit, embarking on an ambitious program in 1990 to divest itself of long-held industries. The government balanced its fiscal accounts and, in April 1991, pegged the peso to the dollar in order to reduce domestic inflation. As in Mexico, the successful completion of a commercial bank debt-restructuring agreement under the Brady Plan has buoyed investor confidence in the country.

Although equity inflows in recent years have typically come on the heels of significant changes in government policy, this has not always been the case. Brazil experienced large equity portfolio inflows in 1992 despite continuing high inflation and fiscal incoherence. To a certain extent, these flows reflect the liberalization of Brazilian restrictions on direct equity portfolio inflows. However, the flows also reflect investors' belief, in early 1992, that the prospects were fairly good for an improvement in Brazil's situation. By early 1992, the country had restructured its Paris Club debt, signed a stand-by agreement with the International Monetary Fund, and appeared to be moving toward a Brady Plan agreement with its commercial bank creditors. During the first half of 1992, direct equity portfolio inflows into Brazil amounted to $1.4 billion. As prospects for financial improvement dimmed in the summer of 1992, however, inflows dropped to $344 million during the second half of 1992.

Equity market integration and rate of return correlations

Structural changes that have encouraged equity portfolio flows into emerging markets have helped integrate these markets with the global financial system. As this process has unfolded, developing-country equity markets have assumed many of the behavioral traits of their more developed counterparts. A key trait of developed-economy equity markets is that their returns tend to move together; that is, when returns are higher than average on the NYSE, returns tend to be higher than average on the London Stock Exchange.[20] Also noteworthy is that the return correlations of developed-country equity markets tend to increase during periods in which world equity markets are particularly volatile.[21] The analysis in this section shows that in recent years developing-economy equity markets have increasingly exhibited each of these two traits: developing-country stock returns have become more closely correlated with the returns of the world's developed stock markets, and developing-country return correlations have tended to peak during periods of high world return volatility.

The analysis in this section also suggests that monthly return correlations may understate the actual degree of interconnectedness between developing-country and developed-country equity markets. Annual return correlations indicate that developed and developing markets may be more closely tied than is commonly thought.

Evolution of monthly return correlations

In recent years, equity returns in those developing countries that have opened their markets to foreign portfolio investment have become more closely correlated with the returns of developed nations. In seven of the nine developing-country markets under consideration, monthly return correlations with the MSCI world index were greater during 1990-92 than during 1985-89 (Chart 4). Five of these seven countries (Argentina, Brazil, Mexico, Korea, and Taiwan) have taken substantial steps in recent years to remove impediments to equity portfolio inflows, while two of the seven (Malaysia and Thailand) have maintained relatively open equity markets since the mid-1980s. In fact, only in India and Chile—two countries that have continued to maintain relatively tight restrictions on foreign investment—were correlation coefficients lower during 1990-92 than during 1985-89.

Evidence of a somewhat longer term trend toward behavioral convergence is found in an examination of monthly return correlations during periods in which world equity markets have displayed large price swings, that is, during periods in which rates of return have been highly volatile. Among developed-country equity markets, return correlations tend to increase during these periods of high return volatility. Rate-of-return evidence indicates that during the latter 1980s, this pattern became more prevalent among developing-country markets as well. Chart 5 plots (a) the two-year rolling correlations between four emerging markets'

[20] See Bruno Solnik, *International Investments* (Addison-Wesley, 1988).

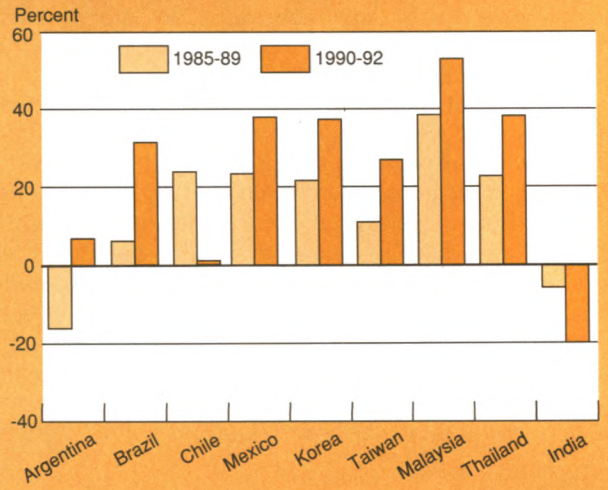
[21] See Paul Bennett and Jeanette Kelleher, "The International Transmission of Stock Price Disruption in October 1987," Federal Reserve Bank of New York *Quarterly Review*, Summer 1988, pp. 17-33.

monthly excess returns and the world monthly excess return and (b) the two-year rolling standard deviation of the world excess return.[22] The plots indicate that since 1986, world return volatility peaked twice. These two peaks are associated with the two largest post-1986 world stock market declines, the crash of October 1987 and the large decline of August 1990, the latter precipitated by large increases in international petroleum prices following Iraq's invasion of Kuwait. Similar declines hit seven of the nine emerging markets under consideration—Argentina, Brazil, Chile, Mexico, Thailand, Malaysia, and Taiwan—in October 1987 and August 1990. Consequently, the relationship between (a) correlation with world equity returns and (b) world return volatility was positive and statistically significant in each of these seven countries during the post-1986 period. The two countries in which the relationship was not statistically significant during the post-1986 period were Korea—whose equity market was not opened to direct foreign purchases until January 1992—and India—whose equity market remains closed to direct foreign purchases. In contrast, during the pre-1986

[22]An asset's excess return equals its return minus the return on a risk-free asset. As a practical matter, excess return correlations differ very little from return correlations during the period of analysis for the countries under examination. At each point in time, the twelve-month rolling correlation (standard deviation) equals the correlation (standard deviation) over the twelve-month period prior to and including the current month.

Chart 4

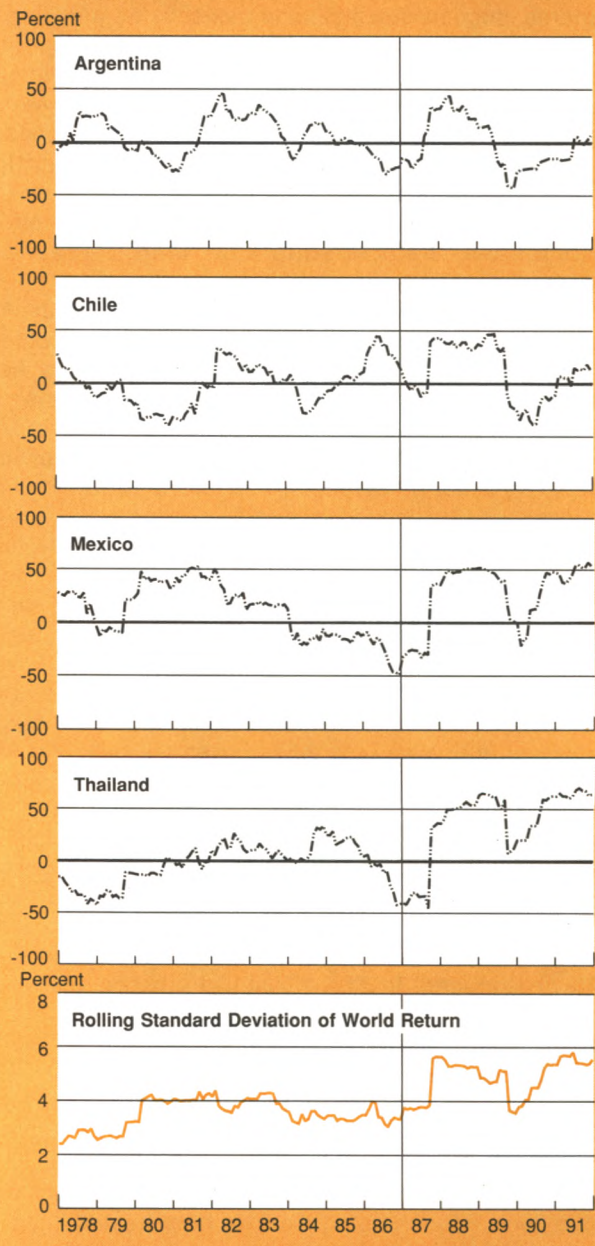
Changing Correlations between Developing-Country and World Monthly Returns



Source: International Finance Corporation, Emerging Markets Data Base.

Chart 5

Emerging-Market Return Correlations and World Return Volatility



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International.

Notes: Dashed lines represent rolling correlation between country returns and world returns. Line separating 1986 and 1987 represents a structual break.

period, the relationship was statistically significant in only two countries out of the group of nine: Mexico and Thailand.

Structural changes in developing countries have promoted recent changes in the behavior of monthly return correlations between developed and emerging markets. During the latter 1980s, when many impediments to foreign equity portfolio inflows were eliminated by developing-country governments, international investors were increasingly able to shift between developed- and developing-country equity shares. Emerging market equity returns consequently became more sensitive to the shifts in international investor sentiment that affected developed-country equity returns. Correlations between developing-country and developed-country monthly returns therefore increased, and events that sharply affected developed-country returns began to affect developing-country returns in a similar way.[23]

A comparison of monthly and yearly correlations and covariances

An examination of return correlations based on annual data reveals that the emerging markets under consideration may be more integrated with the global financial system than is indicated by return correlations based on monthly data. A comparison of the top panel with the bottom panel of Table 6 reveals that the (six) coefficients of excess-return correlation between the MSCI world index, Japan, the United States, and Europe do not vary significantly when the statistics are computed using monthly instead of yearly excess-return data. In contrast, among the emerging markets, yearly and monthly excess-return correlations can differ significantly. For instance, the yearly coefficient of excess-return correlation between Argentina and the NYSE is 62 percent, whereas the monthly coefficient of excess-return correlation is only 4 percent. For the seven

[23]Of course, it can be argued that capital market integration need not imply high correlations (see Vihang R. Errunza, "Emerging Markets: Some New Issues," *Journal of Portfolio Management*, forthcomming). On the NYSE, for example, a wide range of correlations are observed between pairs of stocks. Nevertheless,

Footnote 23 continued
the average correlation between pairs of common stocks on the integrated U.S. exchange is about 40 percent, which is much higher than most estimates of the average correlation between emerging market indexes and, say, the MSCI world index.

Table 6

Correlation Matrix of Yearly Excess Returns: 1976-91

Argentina	1.00										
Brazil	**0.33**	1.00									
Chile	**0.43**	−0.09	1.00								
Mexico	0.31	**0.38**	**0.44**	1.00							
India	0.20	**0.37**	0.17	0.07	1.00						
Korea	−0.01	0.09	0.27	0.18	0.17	1.00					
Thailand	−0.01	0.08	0.35	0.31	−0.23	**0.46**	1.00				
World	**0.22**	0.34	**0.41**	0.44	**0.35**	0.32	0.27	1.00			
Japan	−0.06	0.07	**0.33**	0.31	0.14	**0.64**	0.33	*0.78*	1.00		
NYSE	**0.62**	**0.46**	**0.34**	0.33	**0.33**	−0.14	0.08	*0.73*	*0.21*	1.00	
Europe	0.02	0.28	**0.38**	0.44	**0.56**	0.24	0.37	*0.78*	*0.52*	*0.49*	1.00
	Argentina	Brazil	Chile	Mexico	India	Korea	Thailand	World	Japan	NYSE	Europe

Correlation Matrix of Monthly Excess Returns: 1976-91

Argentina	1.00										
Brazil	**−0.04**	1.00									
Chile	**0.10**	0.00	1.00								
Mexico	0.13	**−0.03**	**0.13**	1.00							
India	0.14	**−0.05**	0.04	0.01	1.00						
Korea	−0.10	−0.00	0.05	0.11	0.02	1.00					
Thailand	−0.01	−0.01	0.11	0.26	0.05	**0.02**	1.00				
World	**−0.03**	0.10	**0.06**	0.25	**0.05**	0.26	0.23	1.00			
Japan	−0.04	0.06	**0.08**	0.11	0.02	**0.26**	0.17	*0.72*	1.00		
NYSE	**0.04**	**0.06**	**0.04**	0.29	**0.02**	0.20	0.14	*0.80*	*0.25*	1.00	
Europe	−0.03	0.11	**0.08**	0.21	**0.16**	0.19	0.28	*0.81*	*0.53*	*0.55*	1.00
	Argentina	Brazil	Chile	Mexico	India	Korea	Thailand	World	Japan	NYSE	Europe

Notes: Boldface type highlights those two-country couplets whose yearly return correlations exceed their monthly return correlations by at least 25 percentage points. Italicized type highlights those couplets composed exclusively of developed countries.

emerging markets included in the matrix, yearly excess-return correlations with the MSCI world index range between 22 percent and 44 percent. In contrast, the corresponding monthly excess-return correlations range between −3 percent and 26 percent.

The differences between these estimates of monthly correlations and yearly correlations point to the association of current returns in one market with past or future returns in another market. Significant impediments to capital mobility existed in most of the developing countries under consideration during the 1976-91 period. Restrictions on equity portfolio flows, including repatriation restrictions, undoubtedly dampened the monthly return correlations between these markets and the NYSE. In addition, poor liquidity in some of these markets made it difficult for investors to buy or sell stock quickly in response to changes in the economic environment. Many of these impediments to capital mobility were permeable over time, however, and investors were ultimately able to shift between foreign and domestic equity shares. Consequently, events that affected NYSE returns immediately tended to affect developing-country returns with a lag. This sort of lag structure tended to increase correlations between developing-country and developed-country returns at frequencies lower than one month.[24]

A statistical analysis of the difference between monthly and yearly return covariances provides additional evidence of the association between emerging markets' current returns and other countries' past or future returns (Box 2). This evidence implies that monthly return correlations have tended to understate the long-run interrelatedness of emerging markets and their more developed counterparts.

As impediments to capital mobility are increasingly reduced and emerging markets become more liquid, events that previously affected developing-country returns either before or after affecting developed-country returns will increasingly affect developing- and developed-country returns contemporaneously. This observation suggests that monthly return correlations between developed and developing countries may continue to rise in the future.

Convergence of stock market capitalization values

The same innovations that have promoted the integration of developing-country stock markets with the global financial system have encouraged a convergence of developing-country and developed-country ratios of stock market wealth to GDP. Market openings have tended to increase market capitalization, defined as the market value of outstanding equity shares listed on a country's stock exchanges, by increasing the demand for developing-country equity shares and thereby encouraging share price increases. Privatization programs and international equity placements have also contributed to the trend by increasing the supply of developing-country equity shares.

Emerging-market capitalization growth over the past decade has been striking. The combined capitalization of the largest nine emerging stock markets tracked by the IFC increased 761 percent between 1981 and 1991, from $64 billion to $551 billion (Table 7). Equity market capitalization in these nine markets grew twice as quickly during the period as equity market capitalization among the Group of Seven (G-7) countries, which increased 336 percent.

Market capitalization has also grown rapidly in relation to GDP in the emerging markets under examination. Between 1981 and 1991, the ratio of market capitalization to GDP more than doubled in all of the nine emerging markets except Brazil. Emerging equity markets were not unique in this respect, however; capitalization ratios also increased markedly in many of the G-7 economies, especially in the United Kingdom and Japan. Nevertheless, by 1991 capitalization ratios among the nine emerging markets had substantially converged towards those of their more developed counterparts. Malaysia's ratio (127 percent) exceeded those of all G-7 countries, while Chile's ratio (93 percent) was similar to the ratios of the United Kingdom (99 percent) and Japan (93 percent), and Taiwan's ratio equaled that of the United States (74 percent). By the end of 1991 within the group of developing and developed countries under examination, there appeared to be little correlation between market capitalization ratios and measures of economic development such as per capita income levels.

The historical rarity of such high capitalization ratios among developing countries is underlined by Goldsmith's 1985 data on two centuries of market capitalization ratios for the G-7 countries and for India and Mexico.[25] These data (Table 8) reveal that it is fairly unusual for countries' capitalization ratios to exceed 50 percent. The United States and the United Kingdom are notable exceptions because of the long-standing "thickness" of their securities markets in general and their equity markets in particular. In the bank-based economies of Germany, Italy, and Japan, however, capitalization ratios have historically hovered at levels below 50

[24]The existence of nonsynchronous trading is another potential explanation for the disparity between monthly and yearly correlations. Since developing-country stocks do not necessarily trade every day, monthly price data are not always based on end-of-month observations. This problem, which leads to underestimation of return correlations, becomes more modest as the frequency of observations becomes smaller.

[25]Raymond Goldsmith, *Comparative National Balance Sheets* (University of Chicago Press, 1985).

Box 2: Monthly and Yearly Correlations and Covariances

The linkages between one market's current returns and other markets' past and future returns are known as lead and lag effects. This box examines whether these lead and lag effects are more important among emerging markets than among three of the world's most highly developed and integrated markets: the NYSE, Japan, and the United Kingdom. Statistical theory holds that a comparison of monthly and yearly *covariances* provides more information relevant to this question than a comparison of monthly and yearly *correlations*. Yearly return covariances can be decomposed as follows:

$$cov(X_t, Y_t) = 12 \cdot cov(x_t, y_t) + \sum_{k=1}^{11} (12-k) \cdot cov(x_t, y_{t+k}) + \sum_{k=1}^{11} (12 - k) \cdot cov(y_t, x_{t+k}),$$

where X_t and Y_t denote year-t returns in the respective markets and x_t and y_t denote month-t returns in the same markets.† This equation indicates that the covariance of yearly returns equals twelve times the covariance of monthly returns (the first term on the right-hand side) plus the sum of lead and lag effects (the second and third terms on the right hand side). Consequently, the yearly covariance exceeds twelve times the monthly covariance if and only if the sum of lead and lag effects is positive.

The following statistic, therefore, is a reasonable point estimate of the relative size of the sum of lead and lag effects between countries x and y:

$$\frac{\frac{1}{15}\sum_{t=1}^{16}(X_t - \bar{X})\cdot(Y_t - \bar{Y}) - \frac{12}{191}\sum_{t=1}^{192}(x_t - \bar{x})\cdot(y_t - \bar{y})}{\left|\frac{1}{15}\sum_{t=1}^{16}(X_t - \bar{X})\cdot(Y_t - \bar{Y})\right|}$$

The first term of the numerator is an estimate of the annual covariance (based on 16 annual observations spanning 1976-91), while the second term is twelve times an estimate of the monthly covariance (based on 192 monthly observations over the same period). The expected value of the statistic is zero under the null hypothesis that lead and lag effects sum to zero. Alternatively, the expected value of the statistic is positive under the hypothesis that the sum of lead and lag effects is positive.

On average, this statistic is much higher for two-country couplets involving emerging markets than for couplets composed exclusively of the world's most developed equity markets. The mean of the statistic over forty-nine couplets that include emerging markets is 66.3 percent, with a standard error of 10.1 percent.‡ The implied t-statistic of greater than 6 means that, for the group of emerging markets under consideration, the sum of lead and lag effects is significantly greater than zero for the 1976-91 period. In contrast, the mean of the statistic over the three couplets exclusively involving the NYSE, Japan, and the United Kingdom is 1.5 percent with a standard error of 8.5 percent, which implies that the mean for these three couplets is not significantly different from zero in a statistical sense. The difference between the emerging-market mean and the three-couplet mean is 64.8 percent, or more than thirteen times the standard error of the difference between the means. This result indicates that lead and lag effects play a larger role in emerging markets than in the most highly integrated of world equity markets.

These results also indicate that monthly return covariances tend to understate the substantial interrelatedness of developing-country and developed-country equity markets over the longer intervals that matter to many investors. The question then arises, Which measure of developing-country covariance risk is reflected in expected equity returns: a measure based on monthly time intervals or one based on yearly intervals?

Monthly and yearly correlations and the CAPM

According to the Capital Asset Pricing Model (CAPM), the ratio of the expected excess return of asset i to the expected excess return of the world portfolio should equal stock i's riskiness as measured by its "beta" with respect to the market portfolio. Stock i's beta is defined as:

$$\rho_{i,w}\frac{\sigma_i}{\sigma_w},$$

where rho denotes the correlation between asset i's excess return and the world excess return and sigma denotes standard deviation. The CAPM implies that asset i's expected excess return must reflect the risk associated with asset i's volatility or standard deviation. In addition, the model implies that assets that are more highly correlated with the world portfolio must offer higher expected returns. The reason is that assets that are highly correlated with the world index do not provide

†This relationship is derived under the assumption that returns equal log differences of total return indexes.

‡The 42 couplets include (7 x 6)/2 = 21 combinations involving emerging markets exclusively plus (7 x 4) couplets involving the emerging markets and Japan, Europe, the NYSE, and the MSCI world index. The (approximate) standard error of the mean of the statistic is obtained by dividing the standard deviation of the point estimate over the couplets by the square root of the number of couplets.

Box 2: Monthly and Yearly Correlations and Covariances *(Continued)*

the diversification benefits of assets that are relatively uncorrelated with the world index.

Implicitly, all tests of the CAPM are joint tests of the CAPM and the model used to estimate ex ante returns and betas. This section examines the simple case in which arithmetic-mean returns are used to proxy for expected returns while sample covariances and standard deviations are used to construct ex ante betas. This exercise, while fraught with problems, still helps to reveal which measure of risk is better reflected in developing-country equity returns: the beta constructed using yearly data or the beta constructed using monthly data.§

The data indicate that developing-country equity returns are more closely related to yearly measures of covariance risk than to monthly measures of risk. The right-hand panel of the chart plots ratios of mean country excess returns to mean world excess returns against betas calculated with annual data from 1976-91. As predicted by the CAPM, the data indicate that country excess returns bear a positive and statistically significant relationship to country betas based on annual data (see table). Whereas the CAPM, however, predicts that the slope will equal one (meaning that there will be a one-to-one relationship between betas and excess return ratios), the regression analysis indicates that the estimated slope coefficient is almost three standard deviations greater than one.

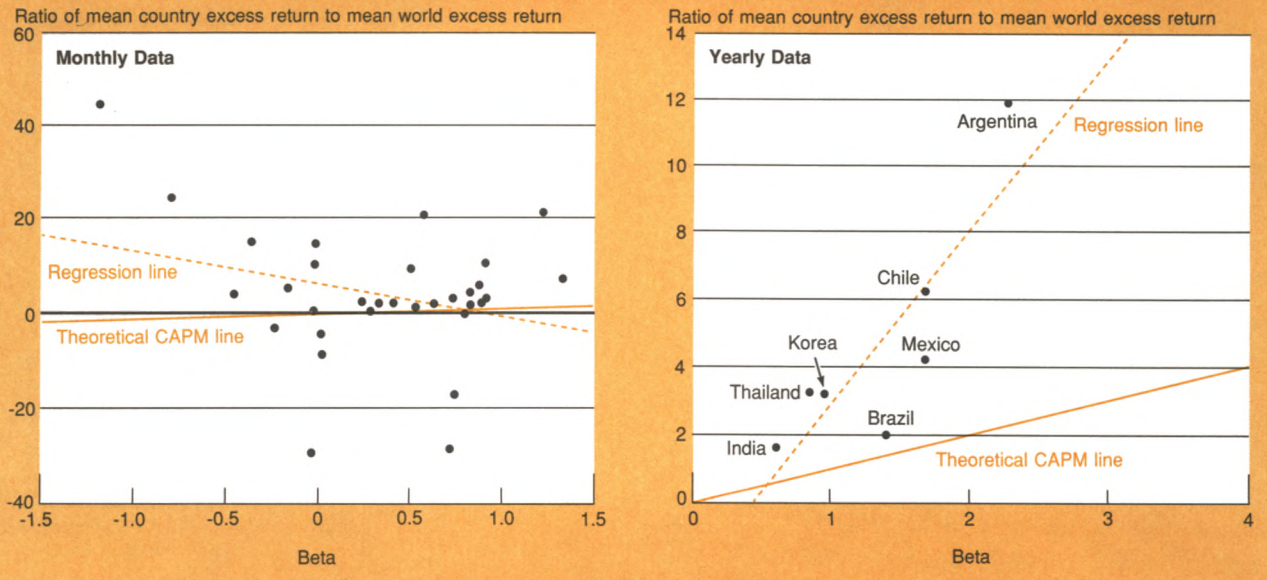
§A number of issues must be addressed when applying the CAPM to the international setting. A sufficient assumption is perfect correlation between the world market portfolio and world consumption. Alternatively, one can view the model as testing the mean-variance efficiency of the world market portfolio.

Equations for Capital Asset Pricing Model

Variable	Coefficient			
	Monthly Equation		Yearly Equation	
Constant term	6.3	(13.5)	−2.3	(2.1)
Beta	−7.0	(4.2)	5.2	(1.5)
Statistics				
n	32		7	
R^2	.09		.71	

Note: Standard errors are given in parentheses.

Capital Asset Pricing Model: Tests Using Monthly and Yearly Data



Sources: International Finance Corporation; Morgan Stanley Capital International.

Box 2: Monthly and Yearly Correlations and Covariances *(Continued)*

In contrast, betas calculated on a monthly basis are not positively correlated with relative equity returns. A test of the monthly CAPM was made using monthly excess-return data from a panel data set that was formed by breaking the experience of each country into four-year periods. The left-hand panel of the chart plots ratios of mean country excess returns to mean world excess returns against betas calculated using monthly data from the various four-year periods during 1976-91. The scatter plot reveals that we can reject with certainty the joint hypothesis that the monthly CAPM holds and that population moments (mean returns, standard deviations, and correlations) are reasonable proxies for ex ante moments.

Table 7

Total Market Capitalization: 1981-91

	1981		1986		1991	
	Billions of U.S. Dollars	Percent of GDP	Billions of U.S. Dollars	Percent of GDP	Billions of U.S. Dollars	Percent of GDP
Canada	106	36	166	46	267	45
France	38	7	150	20	374	31
Germany	63	9	258	29	394	25
Italy	24	6	140	23	154	13
Japan	431	37	1,842	93	3,131	93
United Kingdom	181	35	440	78	1,003	99
United States	1,333	44	2,637	62	4,180	74
Group of Seven markets	2,176	33	5,632	60	9,503	65
All developed markets	2,502	—	6,367	—	10,760	—
Argentina	2	2	2	2	19	17
Brazil†	13	5	42	16	43	9
Chile	7	22	4	24	28	93
Mexico	10	4	6	5	98	40
India	7	4	14	6	48	16
Korea	4	6	14	13	96	37
Thailand	1	3	3	7	36	41
Malaysia	15	61	15	54	59	127
Taiwan	5	11	15	19	125	74
Nine emerging markets	64	6	115	12	551	32
All emerging markets tracked by International Finance Corporation	83	—	145	—	643	—

Sources: International Finance Corporation, *Emerging Stock Markets Factbook*, various issues; and International Monetary Fund, International Financial Statistics.
Note: Capitalization data refer to the market value of shares listed on domestic exchanges, including shares associated with international placements and those used to back American depository receipts.
†Sao Paulo only.

percent. This observation makes the 1991 capitalization ratios of Korea and Mexico appear all the more impressive. By 1991, capitalization ratios in these two bank-dominated economies had increased to levels surpassing the historical capitalization ratios of the more developed bank-dominated economy of Germany. Of course, the 1991 capitalization ratios of Malaysia, Chile, and Taiwan appear even more impressive when compared with the historical capitalization ratios of Germany, Italy, France, and Japan.

Another striking feature of Goldsmith's data—the large upward and downward swings of individual countries' capitalization ratios over time—suggests the possibility that some of these high capitalization ratios may be transitory. The United States' capitalization ratio increased quickly from 95 percent in 1913 to 193 percent in 1929, declined dramatically to 58 percent in 1950, and increased again to 124 percent in 1965, only

to decline again to 57 percent in 1978. This sort of long-term volatility, which is common to almost all of the countries for which Goldsmith collected national balance-sheet data, implies that capitalization ratios do not tend to rise steadily or monotonically as economies develop over time. Capitalization ratios increase as stock markets boom and decline as they bust. Consequently, there does not appear to be a simple relationship between stages of economic development and capitalization ratios.

Even when viewed from a longer term perspective, however, the rapid growth of capitalization ratios among the emerging markets during the 1980s is quite impressive. For example, it may have taken as many as eighty-five years (1810-95) for the United States' capitalization ratio to rise from 7 percent to 71 percent (we cannot be absolutely sure, however, given the instability of the series). In contrast, the Taiwanese capitalization ratio rose from 11 percent to 74 percent in the ten years between 1981 and 1991. The data, therefore, suggest that the emerging stock markets of the present era have probably grown more rapidly than the stock markets of the G-7 countries during the nineteenth century.

Market capitalization remains highly concentrated

Market capitalization has been more highly concentrated in the emerging markets under study than in the highly developed markets of the United States and Japan. In Mexico, for example, shares of Telemex alone accounted for 17 percent of domestic capitalization at the end of 1991.[26] In Argentina, Telefonica de Argentina accounted for a similarly high 18.5 percent of total market capitalization. In contrast, Exxon—the most highly capitalized stock in the United States—accounted for only 2.6 percent of total market capitalization at the end of 1991.

An alternative measure of concentration reinforces the impression that emerging equity markets are often dominated by a relatively small group of highly capitalized shares. In 1991, the ten most highly capitalized stocks in Argentina together accounted for 68 percent of market capitalization, while the ten most highly capitalized stocks in Chile accounted for 50 percent of market capitalization. In contrast, the comparable figures for the United States and Japan were 15.7 percent and 16.7 percent, respectively.

In many emerging markets, however, capitalization has been less concentrated than in Germany's equity market, which is not as developed as those in the United States and Japan. The share of market capitalization attributable to the ten most highly capitalized German firms was 37.9 percent at the end of 1991, a figure that surpassed comparable concentration measures for India (23.4 percent), Brazil (27.0 percent), Korea (31.2 percent), Thailand (31.7 percent), Taiwan (35.9 percent), Malaysia (36.1 percent), and Mexico (36.5 percent).

According to one measure of equity market maturity—the ratio of capitalization to GDP—several developing-country markets appear to have converged with the world's mature markets. Nevertheless, an alternative measure, namely market concentration, indicates that these markets are less than fully developed.

Equity issuance and investment finance

With the maturation of emerging equity markets has come a greater reliance on those markets as a source of funds. Equity issuance has recently surged in the more mature developing countries, that is, those developing countries farthest along the path of industrializa-

[26]The data sources for this section are *Euromoney Guide to World Equity Markets* and International Finance Corporation, *Emerging Stock Markets Factbook*.

Table 8

Ratio of Market Capitalization to GDP: 1810-1978

Percent

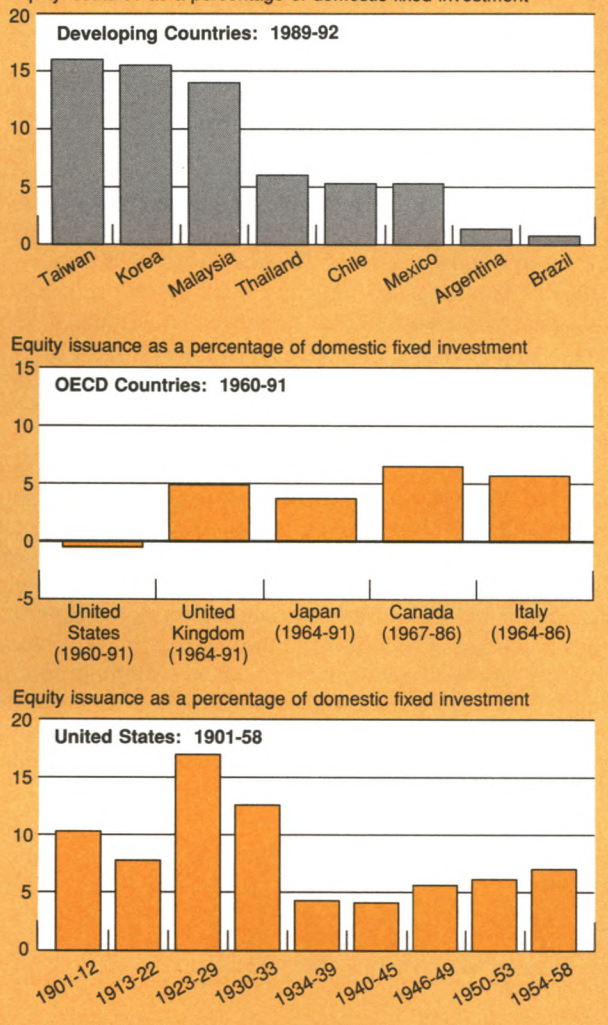
	1810	1850	1875	1895	1913	1929	1939	1950	1965	1973	1978
Canada	—	—	—	—	—	—	—	**59**	46	36	41
France	0	12	38	—	**65**	23	—	25	**111**	**63**	39
Germany	—	6	17	26	37	29	17	13	31	27	24
Italy	—	11	7	11	6	3	2	19	**57**	28	10
Japan	—	—	4	32	41	**75**	**118**	24	46	29	39
United Kingdom	13	**72**	**74**	**156**	**121**	**154**	**182**	**110**	**83**	**65**	**76**
United States	7	23	**54**	**71**	**95**	**193**	**105**	**58**	**124**	**83**	**57**
India	—	1	2	3	5	9	14	12	14	15	12
Mexico	—	—	—	—	—	25	47	44	30	25	**53**

Source: Raymond Goldsmith, *Comparative National Balance Sheets* (University of Chicago Press, 1985).
Note: Capitalization ratios exceeding 50 percent appear in boldface.

tion. Equity issuance in several of the rapidly growing economies of East Asia has exceeded the post-World War II norm for G-7 economies and has been roughly in line with the high rates of equity issuance experienced by the United States during an earlier stage in its development process. These observations are consistent with the hypothesis that equity issuance as a source of finance tends to become increasingly important in the latter part of an economy's rapid-growth stage of economic development and subsequently becomes more modest.

Chart 6

Equity Issuance and Domestic Investment



Sources: International Finance Corporation; Organization for Economic Cooperation and Development, *Financial Statistics*; Board of Governors of the Federal Reserve System, Flow of Funds Accounts; Raymond Goldsmith and Robert Lipsey, *Studies in the National Balance Sheet of the United States*, vol. 1 (Princeton University Press, 1963); U.S. Department of Commerce, *Historical Statistics of the U.S.: Colonial Times to 1970* (1975).

Note: Grey-shaded bars represent developing countries.

Equity issuance in the United States earlier in the century largely reflected the transition from closely held private ownership to ownership through publicly traded equity shares. In recent years, this transition has found a developing-country parallel in a shift from government ownership of enterprises to private-sector ownership of joint-stock companies. Privatization has accelerated equity issuance in several developing countries and thereby primed the pump for additional equity issuance by private corporations seeking nondebt sources of finance.

Since 1989, ratios of equity issuance to gross domestic fixed investment have been highest among those developing countries farthest along the path of industrialization. Equity issuance has been a particularly important form of investment finance in Taiwan and South Korea, developing countries that have moved beyond the manufacture of purely labor-intensive products, such as textiles, to higher value-added production. In these two countries, ratios of equity issuance to investment have recently exceeded 15 percent (Chart 6). In Malaysia and Thailand, countries that embarked on paths of rapid industrialization after Taiwan and Korea but have been growing rapidly for two decades now, issuance-to-investment ratios averaged 14 and 6 percent, respectively.

The ratio of equity issuance to investment has been smaller in the Latin American countries under consideration than in the Asian countries. Within Latin America, however, equity issuance has been highest in those countries where economic reform is most advanced. Issuance has been a steady, if not predominant, source of investment finance in Chile. Mexico's average issuance-investment ratio for the period masks the underlying fact that equity issuance in Mexico was very weak before 1990 but thereafter accelerated. Issuance of equity shares for cash, however, was relatively limited in Argentina and Brazil during 1989-1992.

The G-7 record of equity issuance during the past three decades also supports the hypothesis that equity issuance becomes increasingly important during rapid industrialization but then tapers off somewhat. In contrast to the recent experiences of the fast-growing economies of South Korea, Taiwan, and Malaysia, net equity issuance among the more mature G-7 economies has not been a quantitatively important source of investment finance. This conclusion is borne out by Chart 6, which presents ratios of net equity issuance to gross

domestic fixed investment for the United States, the United Kingdom, Japan, Canada, and Italy. Of these five developed economies, Canada has had the highest ratio of net equity issuance to gross domestic fixed investment over the past three decades. Aside from the United States, where net equity issuance has been very low relative to investment (and often negative), the ratio does not vary too widely over countries or across time: the ratio ranges from a United Kingdom low of 2.8 percent in the 1960s to a Canadian high of 7.2 percent in the 1980s.

The long-run U.S. record also fits well with the stage-of-development hypothesis. Although net equity issuance has been a relatively unimportant source of corporate finance in the United States during the past three decades, it played a much more important role in an earlier stage of the country's development, before World War II. Between 1901 and 1939, the proportion of gross domestic fixed investment financed by net equity issuance varied from 7 to 17 percent.

The stage-of-development hypothesis is also supported by a more detailed accounting of the recent experiences of several developing economies (Table 9). Although the four Asian economies under examination have grown rapidly over at least the past two decades, equity issuance has only recently begun to accelerate. During 1981-86, Malaysia had the highest issuance-investment ratio of the group at 3.9, a figure that is not unlike the G-7 norm of the past three decades. Equity issuance in these economies did not take off until the latter 1980s, at least two decades after these four economies had embarked on their rapid growth paths.

Stock market booms have frequently been the proximate cause of surges in equity issuance in both developed and developing countries. Increases in share prices lower the cost of equity financing for corporations and thereby provide strong incentives for firms to issue shares. In the United States, for example, equity issuance peaked at 17 percent of gross domestic fixed investment during 1923-29 as the NYSE rallied. In Korea and Taiwan, equity issuance peaked during 1989-90 as equity markets boomed and price-to-earnings multiples rose as high as 40 in Korea and 50 in Taiwan. Stock price movements have also played a role in Mexico's recent surge in equity issuance. Mexico's stock market opening in 1989, combined with policies to promote sustainable private sector growth, stimulated the demand for Mexican equity shares and thereby encouraged an increase in price-to-earnings multiples from 5 to 15 between 1988 and 1991.

Privatization has been a key factor underlying the recent surge in developing-country equity issuance. Malaysia's equity issuance peak of 1990, for example, coincided with the privatization of Syarikat Telekom Malaysia. In what constituted the largest flotation ever on the Kuala Lumpur Stock Exchange, more than $850 million in equity shares of Telekom were sold publicly in 1990. In Mexico also, the recent acceleration in equity issuance has been fed by privatization. Sales of Telemex shares by the Mexican government amounted to more than $3 billion between 1990 and 1992. More than two-thirds of these issues were made through international ADR sales.

Once initiated by surges in equity issuance, the process of capitalization growth in developing-country equity markets has the potential to become self-sustaining. Initial surges in equity issuance may well prime the pump for subsequent increases in equity issuance by increasing the potential investor base for domestic equity shares and thereby increasing market depth beyond a critical level. In the past, developing-country equity markets have tended to be thin markets, characterized by small numbers of traders; consequently, prices have been generally very sensitive to the impact

Table 9

Ratio of Equity Issuance to Gross Domestic Investment

	Taiwan	Korea	Malaysia	Thailand	Chile	Mexico	Argentina	Brazil
1966-75	—	—	2.5	—	—	—	—	—
1976-80	—	—	1.2	1.4	—	—	—	—
1981-86	1.9	2.0	3.9	1.3	—	—	—	—
1987	—	5.8	7.6	4.9	—	—	—	—
1988	—	20.9	4.2	2.7	—	—	—	—
1989	5.8	32.0	8.3	4.5	5.7	1.4	0.4	0.6
1990	51.7	4.8	23.1	6.1	4.6	0.6	1.9	0.6
1991	4.3	3.4	10.8	8.4	3.3	10.8	2.0	0.7
1992	2.4	1.9	13.9	4.9	7.6	8.6	—	1.0

Sources: International Finance Corporation staff estimates; International Monetary Fund, International Financial Statistics; country sources.

of individual traders' demand shifts. In deep markets, in contrast, transactors are so numerous that the uncorrelated demand shifts experienced by individual traders tend to offset each other and leave market prices unaffected. To the extent that shareholders are reluctant to participate in thin markets, thinness can lower the demand for shares and thereby inhibit equity issuance. In this way, thin equity markets can get caught in a cycle of low demand, low issuance, and lackluster capitalization growth.[27]

Government liberalization measures can potentially stimulate share demand and move an equity market from an equilibrium of thin trading and low issuance into an equilibrium of substantially higher trading and issuance. The recent experiences of several of the emerging equity markets under examination have conformed to this pattern. In particular, market openings and international equity offerings have increased the depth of trading in the shares of developing-country companies such as Telemex and appear to have thereby stimulated additional investor demand. But the international offering of Telemex ADRs had other important spillover effects. As international investors purchased Telemex ADRs, they accumulated information about the workings of the Mexican economy. Once these investors had made substantial investments in acquiring knowledge about the Mexican economy, they became more likely to invest in the equity shares of other Mexican firms. The dismantling of barriers to foreign investment and international offerings of blue-chip companies can thus pave the way for substantial increases in a market's investor base.

Turnover values and market breadth

Trading activity has increased substantially in developing-country equity markets over the past decade. The most prominent developing-country equity issues are now quite liquid and change hands as frequently as many developed-country issues listed on the NYSE or the London Stock Exchange. In an important sense, however, developing-country equity markets still lack the breadth of their more developed counterparts. High aggregate turnover values often reflect the high turnover values of a relatively small handful of issues. Outside this set of highly active issues, trading values decline greatly.

The value of turnover increased substantially in each of the nine emerging equity markets between 1981 and 1991 (Table 10). Trading exploded on Taiwan's exchange, increasing from $5.6 billion in 1981 to $365.2 billion in 1991. Trading values also increased by over 500 percent in Thailand, Korea, Mexico, and Argentina.

By 1991, the most active stocks in several of these markets appeared to be as liquid as the issues of a typical firm listed on the NYSE. The value of trading in Telebras, the Brazilian telephone company, was $3.4 billion during 1991 (Table 11). During the same year, on the Bombay Stock Exchange, turnover of the Associated Cement Company amounted to more than $3.2 billion. As a standard of comparison, the trading value of the average stock on the NYSE during the period was $334 million, or roughly 10 percent of the trading values of each of these two developing-country companies.

Listings on the NYSE have imparted increased liquidity to several developing-country stocks. Trading in Telemex shares, for example, amounted to $4.3 billion on the Mexican Bolsa in 1991. Meanwhile, the estimated value of trading in Telemex ADRs on the NYSE, where Telemex was the fourteenth most active issue during 1991, amounted to $8.4 billion. The ability of arbitragers to create and/or redeem Telemex ADRs in order to enforce price parity between Telemex ADRs on the NYSE and Telemex shares on the Bolsa implies that liquidity in one market translates into liquidity in the other. Consequently, a reasonable measure of Telemex's liquidity is the combined trading value in Telemex shares on the NYSE and the Bolsa. The combined trading value of $12.7 billion means that Telemex was one of the most liquid stocks in the world during 1991.

In an important respect, however, many of the devel-

Table 10
Value of Shares Traded
Millions of U.S. Dollars

	1981	1991	Percent Change
Argentina	454	4,824	963
Brazil	6,185	13,373	116
Chile	375	1,883	402
Mexico	4,181	31,723	659
India	6,693	24,295	263
Korea	3,721	85,464	2,197
Taiwan	5,677	365,232	6,334
Malaysia	3,498	10,657	205
Thailand	108	30,089	27,760
United States	415,760	2,254,983	442
Japan	223,835	995,939	345
Germany	13,670	818,603	5,888
Italy	10,850	43,307	299
United Kingdom	32,542	317,866	877
France	8,403	118,218	1,307

Notes: Value traded data refer to share turnover on domestic exchanges. Exchanges of American depository receipts on foreign markets are not included in the totals.
Sources: International Finance Corporation, *Emerging Stock Markets Factbook*, various issues; *Euromoney Guide to World Equity Markets*, 1992.

[27]For an in-depth analysis of this argument, see Marco Pagano, "Endogenous Market Thinness and Stock Price Volatility," *Review of Economic Studies*, vol. 56 (1989), pp. 269-88.

oping-economy stock markets lack breadth. In most emerging markets, trading values decrease substantially outside the small set of stocks with high trading values. A good measure of the breadth of a market's liquidity is obtained by taking the average trading value of stocks outside the ten most active. In Brazil, for example, the average value traded of stocks outside the top ten was $4 million, a very small fraction of the $3.4 billion figure for Telebras. India's markets also appear to have very little breadth by this measure: the average trading value of stocks less active than the top ten was only $2 million.

Of the Latin American markets under consideration, the Mexican Bolsa appears to have the greatest breadth. In Mexico, average turnover in 1991 for stocks outside the ten most active was $86 million, a figure that amounts to roughly 15 to 20 percent of the corresponding numbers for Japan ($427 million) and Germany ($593 million). By this measure, the Mexican stock market has much more breadth than the markets of Argentina, Brazil, and Chile, where average turnover values for stocks outside the ten most active did not exceed $7 million in 1991.

According to an alternative measure, however, the Mexican market has also lacked substantial breadth. Following the world stock market crash of October 1987, trading appears to have broken down for several of the market's most highly capitalized issues. Seven of the twenty-six stocks tracked by the IFC at the time did not trade at all on five or more trading days in November 1987, the month after the crash. In the months before the crash, most of these stocks had traded virtually every day. Apparently, the markets for these stocks were not deep enough to withstand the October 1987 shock, and liquidity consequently deteriorated.

But even during more placid times, many Mexican stocks do not trade for several days a month. During February-May 1992, for example, more than two hundred issues were listed on the Mexican Bolsa. Sixty-six of these issues were included in the IFC index for Mexico, largely on the basis of their liquidity and market capitalization. Of the sixty-six issues, thirty-three traded on fewer than 75 percent of the trading days during the period, while twenty-two traded on fewer than 50 percent of the trading days. That such a large proportion of issues trade infrequently on the Mexican Bolsa implies

Table 11

Average Value Traded: 1991

Millions of U.S. Dollars per Issue

	Among All Issues	Most Active Issue	Among Ten Most Active Issues	Among Other Issues
Argentina	28	729	373	7
Brazil	11	3,419	825	4
Chile	9	323	115	3
Mexico	152	4,309	1,462	86
India	4	3,210	1,160	2
Korea	125	—	—	—
Taiwan	1,653	—	—	—
Malaysia	33	—	—	—
Thailand	109	1,775	929	78
United States	334	38,790	16,925	310
Japan	473	20,655	10,058	427
Germany	1,227	92,449	42,922	593
Italy	124	—	—	—
United Kingdom	166	—	—	—
France	141	—	—	—

Average Share Turnover: 1991

Millions of Shares per Issue

Korea	6	144	99	5
Taiwan	801	8,454	3,614	668
Malaysia	38	505	293	30
United States	15	553	429	14

Sources: International Finance Corporation, *Emerging Stock Markets Factbook*, 1992; *Euromoney Guide to World Equity Markets*, 1992; New York Stock Exchange; and Federal Reserve Bank of New York staff estimates.

that the market lacks breadth.[28]

In theory, market thinness is associated with increased volatility.[29] Return volatility, however, also depends importantly on the nature of information flows into a market. The historically volatile economic environments of many of the world's developing countries tend to produce the type of information flows that generate volatile asset returns.

The economics of return volatility

An important difference that remains between emerging markets and their more developed counterparts is that, in general, return volatility remains much higher among emerging markets. This section documents cross-country differences in return standard deviations and identifies factors that explain these cross-country differences. These factors include the volatility of macroeconomic fundamentals, the currency denomination of returns, and the degree to which trading within a market is concentrated among a small handful of issues.

Volatility: the stylized facts

Some, but not all, of the developing-country indexes under consideration have exhibited high levels of excess-return variance relative to the NYSE index and the MSCI world, Europe, and Japan indexes (Chart 7).[30] During 1976-91, the four Latin American countries and Taiwan registered the highest standard deviations among the markets examined, with Argentina heading the list as the most volatile market in the sample. Malaysia, India, and Thailand, in contrast, have exhibited low excess-return volatility relative to the other developing countries in the sample. Return standard deviations in these equity markets, in fact, were not much higher than the standard deviation of Japanese returns during the sixteen-year period.

Even in its earlier stages of development, the NYSE did not exhibit the degree of volatility that has been seen in the four Latin American markets and Taiwan over the past sixteen years. Chart 7 shows that the standard deviation of monthly returns on the NYSE has been remarkably steady over the past two hundred years. Between 1802 and 1831, the standard deviation

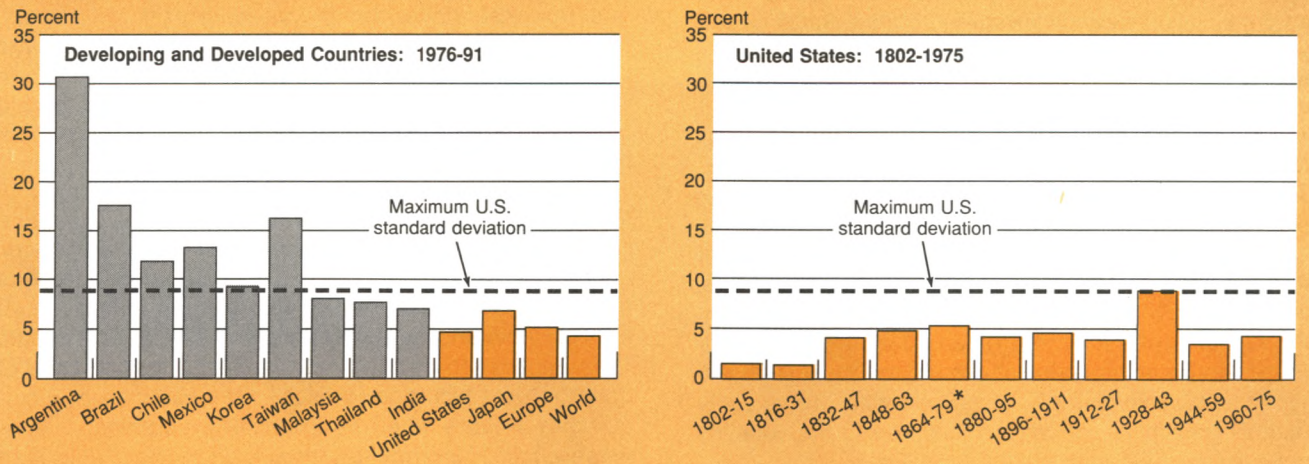
[28]The IFC has three main criteria for including stocks in its indexes: market capitalization, liquidity, and industry classification. In the case of Mexico, however, the IFC includes more than one class of stock for several companies. The fact that these classes are not chosen for inclusion on the basis of liquidity does not significantly modify the interpretation that only a relatively small group of shares trade continuously on the Mexican Bolsa.

[29]George Tauchen and Mark Pitts, "The Price Variability-Volume Relationship on Speculative Markets," *Econometrica*, vol. 51, no. 2 (March 1983), pp. 485-505.

[30]Unless otherwise noted, return standard deviations are dollar-denominated return standard deviations.

Chart 7

Standard Deviations of Monthly Returns



Sources: International Finance Corporation, Emerging Markets Data Base; Center for Research in Securities Prices; Morgan Stanley Capital International; William Schwert, "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990.

Note: Grey-shaded bars represent developing countries.

* During this period, standard deviation refers to rate of return calculated in British pounds.

was relatively low, hovering at roughly 1.5 percent. Volatility peaked during the 1928-43 period when the standard deviation of returns rose to 8.8 percent. Apart from these periods, however, standard deviations for the various periods under consideration remained within the narrow range of 3.5 percent to 5.3 percent.

Return volatility and macroeconomic fundamentals

That NYSE volatility exhibited no significant trend over the past two hundred years indicates that the high volatility exhibited between 1976 and 1991 by many of the emerging markets under examination cannot simply be attributed to their "stage of development." Consequently, the question arises, What causes some markets to display greater return volatility than others? Are returns more variable in countries in which economic fundamentals are more variable?

It appears that returns are more likely to be volatile in countries that pursue unstable monetary and exchange rate policies. The cross-country data, covering the period 1976-91, indicate that a statistically significant relationship exists between return volatility and the volatilities of inflation rates and real exchange rate changes (Chart 8). Equity returns were particularly volatile in the four Latin American countries under study: Argentina, Brazil, Chile, and Mexico. Rapid monetary expansion in these economies led to high and volatile rates of inflation. Furthermore, the region's governments—particularly those in Argentina and Mexico—often attempted to restore real exchange rate competitiveness by implementing large nominal exchange rate devaluations. This policy pattern, of course, bred substantial real exchange rate volatility. Frequent policy shifts generated considerable uncertainty regarding the future paths of domestic firms' input prices, output prices, sales, and therefore profitability. Since equity shares are claims on future corporate cash flows, volatile stock returns went hand-in-hand with volatile profit streams.

Additional evidence supports the notion that volatile stock returns are associated with volatile corporate profit streams. First, return volatility is closely tied to a direct measure of the volatility of corporate cash flows. Chart 8 plots the tight relationship between the standard deviation of equity returns and the standard deviation of dividend-per-share growth in U.S. dollars. Second, return volatility is correlated with the volatility of export growth, which in turn is linked to the volatility of corporate sales and therefore profits.

Return volatility: currency considerations

Another question is whether the high standard deviations of dollar-denominated returns among developing countries simply reflect the effects of converting local-currency returns into dollar returns through volatile nominal exchange rates. The answer appears to be negative. Of the seven developing economies listed in Table 12, only Mexico shows a standard deviation of dollar-denominated returns exceeding the standard deviation of local-currency returns by more than 3 percent. In Argentina and Brazil, in fact, dollar-denominated returns have had lower standard deviations than returns denominated in local currencies. In contrast, among countries belonging to the Organization for Economic Cooperation and Development, standard deviations of dollar-denominated returns have ranged between zero and 30 percent higher than standard deviations of local-currency denominated returns.

The difference between the variance of dollar-denominated and local-currency returns can be expressed as the difference between two covariances:

$$\text{VAR (dollar rate of return)} -$$

$$\text{VAR (local-currency rate of return)} =$$

$$\text{COV (rate of exchange rate appreciation, dollar rate of return)} -$$

$$\text{COV (rate of exchange rate depreciation, local-currency rate of return).}$$

The first covariance term on the right-hand side tends to exceed the second term when real shocks, as opposed to monetary shocks, are the predominant form of disturbance to an economy. Unanticipated government expenditure increases, tax cuts, and private investment booms typically cause the exchange rate to appreciate and increase dollar-denominated returns. In theory, these types of aggregate demand shock put upward pressure on interest rates, thereby inducing exchange rate appreciations. Simultaneously, these stimuli tend to increase corporate earnings, thereby increasing stock prices in both local-currency and dollar terms.[31]

By contrast, unanticipated monetary shocks tend to increase the covariance between the rate of exchange rate depreciation and local-currency returns. In theory, unanticipated monetary shocks would decrease interest rates and increase the local-currency prices of all assets, including equity shares and foreign exchange.

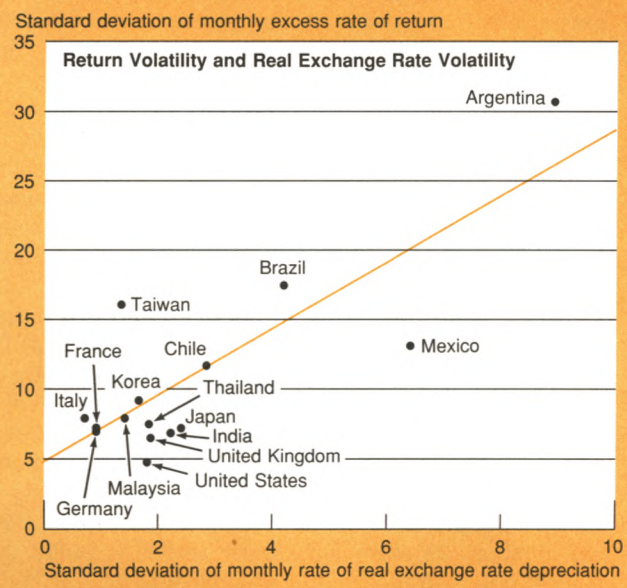
An implication of this analysis is that the variance of dollar returns will tend to exceed the variance of local-currency returns when real shocks predominate. Conversely, local-currency returns will be more volatile than dollar returns when monetary shocks predominate. The cross-country evidence given in the table accords well

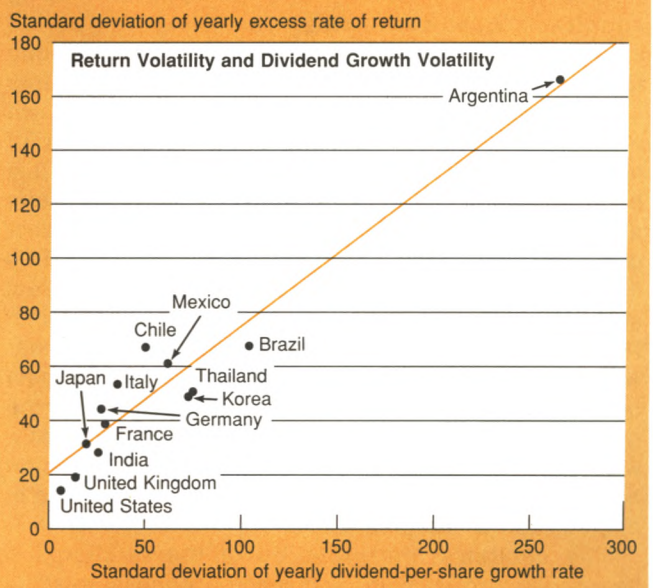
[31]Local-currency returns will increase provided that the positive effect of the increase in local-currency earnings is not totally offset by the negative effect of the unanticipated increase in interest rates. Of course, dollar returns may still rise even if this condition is not met.

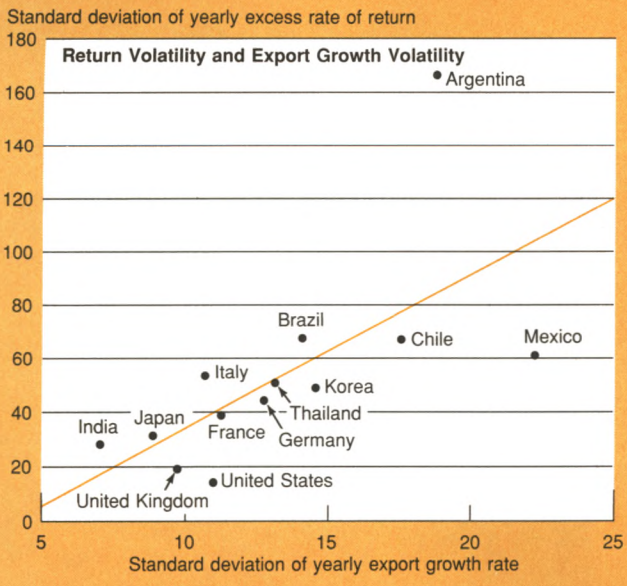
with this interpretation. In the cases of Argentina and Brazil, high-inflation countries where monetary shocks have presumably predominated, the second covariance term has exceeded the first, and the variance of dollar-denominated returns has been lower than the variance of returns denominated in local currency. In Italy—a high-inflation country by European standards—the two variances have been roughly equal, whereas in Ger-

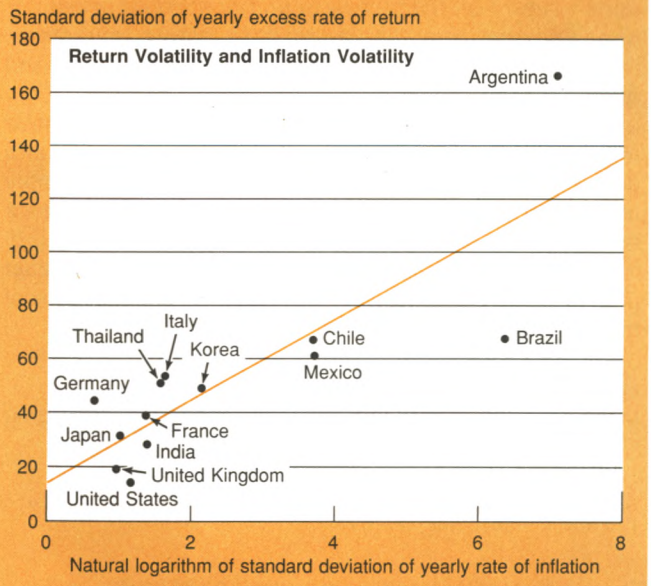
Chart 8

Macroeconomic Determinants of Return Volatility









Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International; International Monetary Fund, International Financial Statistics; Morgan Guaranty; Bank for International Settlements.

Note: Solid line represents ordinary least squares equation.

many and Japan—two low-inflation countries—the variance of dollar-denominated returns has exceeded the variance of local-currency returns.

Additional evidence in favor of this interpretation is found in the U.S. record under the greenback standard during 1862-78. The British pound of this period should be regarded as a "hard" currency, somewhat like the modern-day dollar, and the greenback should be considered a "soft" currency, akin to many developing countries' local currencies. The Civil War period between 1862 and 1865 is of particular interest. During this period, the standard deviation of U.S. equity returns in terms of the British pound was 8.4 percent, much higher than the 5.5 percent standard deviation of returns in local currency terms.[32] Thus, during this period, the first of the two covariance terms (the term associated with real shocks) was greater than the second (the term associated with monetary shocks).[33] This finding makes sense when one considers that real shocks must have been predominant during the period. News of Union successes (failures) during the Civil War would have increased confidence (pessimism) in both business prospects and prospects of a return to the gold standard at the pre–Civil War parity. Consequently, war news would have strengthened the correlation between equity returns in British pounds and the rate of appreciation of the greenback.

This section's interpretation of the relationship between return volatility and macroeconomic volatility does not turn on the choice of unit of account or numeraire. Observe that the ordering of equity markets in terms of return volatility does not appear to depend greatly on the currency denomination of returns. One lesson to be drawn from this finding is that the positive relationship between real exchange rate volatility and dollar-denominated return volatility does not simply reflect the pass-through of nominal exchange rate movements. Instead, real exchange rate volatility implies risk for firms whose relative input and product prices, and thus rates of profit, ride the roller coaster of the real exchange rate.

Return volatility and concentration

In seeking an explanation for differences in emerging markets' return volatility, one should also consider the relationship between market concentration and volatility. It seems logical that returns would be more volatile in markets in which market capitalization and turnover are concentrated among a small subset of stocks. In a highly concentrated market, the market index is not very well diversified because it largely represents only a small handful of firms. Because less diversified portfolios tend to be more volatile, one would expect more concentrated markets to be more volatile. Evidence in favor of this hypothesis is presented in a scatter-diagram of return volatility and trading concentration, where trading concentration is defined as the share of turnover attributable to the ten most active stocks in a given market (Chart 9). The relationship is positive and statistically significant. To be sure, returns in Argentina and Brazil are more volatile than the estimated relationship between return volatility and trading concentration would predict. These discrepancies make sense, however, because Argentina and Brazil have experienced such great macroeconomic volatility. Return standard deviations in Taiwan and Japan are also greater than the fitted relationship between return volatility and concentration would predict. These discrepancies can be explained by the speculative boom/crash cycles experienced by these countries during the period of analysis, 1985-91. Finally, it makes sense that low-inflation Germany has lower return volatility than market concentration alone would predict.

Table 12
Volatility of Dollar Returns Compared with Volatility of Local-Currency Returns

Country	Ratio of Standard Deviation of Returns in U.S. Dollars to Standard Deviation of Returns in Local Currency
Argentina	0.71
Brazil	0.76
Chile	1.03
Mexico	1.07
India	0.99
Korea	1.02
Thailand	1.02
Canada	1.12
France	1.17
Germany	1.16
Italy	1.00
Japan	1.30
United Kingdom	1.15

Sources: For the developing countries, data cover 1976-91 and are taken from the International Finance Corporation, Emerging Markets Data Base; for the developed countries, statistics cover 1980-88 and are taken from Sumner Levine, ed., *Global Investing* (Harper Business, 1992), p. 30.

[32]Data on greenback-gold exchange rates comes from Wesley C. Mitchell, *Gold, Prices, and Wages under the Greenback Standard* (University Press, 1908), pp. 288-338.

[33]Recall that the first covariance term should be interpreted as the covariance between (a) the rate of appreciation of the greenback relative to the British pound and (b) stock returns in terms of the British pound; and the second covariance term should be interpreted as the covariance between (a) the rate of depreciation of greenbacks relative to the British pound and (b) stock returns in terms of greenbacks.

Implications for international investors

The vast changes that have taken place in emerging markets over the past decade have important implications for international investors. Developing-country stocks, though volatile, are commonly thought to offer striking diversification benefits because of their impressive historical returns and the low monthly correlations between their returns and developed-country equity returns.[34] The diversification argument, however, is subject to two qualifications. The first concerns the use of historical monthly return correlations as indicators of correlation risk, a practice that tends to understate this risk. The second concerns the use of average historical returns as indicators of ex ante returns. This procedure is particularly suspect when applied to emerging markets because many of these markets have undergone important structural changes in recent years.

The diversification benefits of emerging market shares are likely to diminish as developing countries become more closely integrated with the global economy and correlations between the equity returns of developing and developed countries increase. While the strategy of portfolio diversification through the purchase of emerging market stocks may continue to offer substantial ex ante benefits, these benefits will tend to be more modest than indicated by analyses that employ historical monthly return correlations, which—as we have seen—are likely to underpredict future monthly return correlations.

Monthly return correlations also tend to understate the substantial interconnectedness of emerging and developed markets at the longer intervals that are relevant to many investors. As documented in an earlier section, correlations between emerging and developed markets tend to increase at intervals longer than one month.

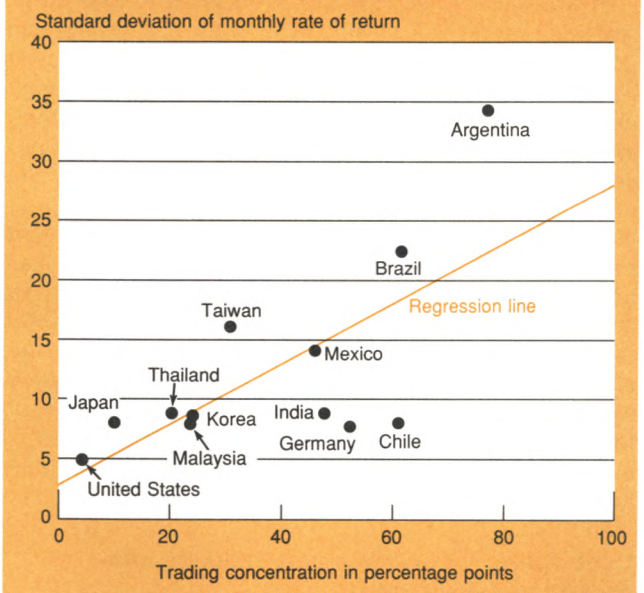
Inferences based on average historical returns can also be problematic. While historical return correlations are likely to underpredict future return correlations, historical return averages are likely to overpredict future return averages. The returns of several of the developing countries under study have been quite extraordinary in recent years. Earlier sections of this article showed that these returns have exceeded levels that can be explained by covariance risk and ex post macroeconomic performance; instead, the returns appear to reflect profound changes in economic structure that will probably not be repeated.

Historical returns are typically a poor guide for predicting future developing-country equity returns. The IFC total return index for Argentina, for instance, increased at an annualized rate of 100 percent during 1976-79, declined by more than 25 percent per year during 1980-83, and increased by more than 90 percent per year during 1988-91. Returns were unstable during the period because the country underwent several significant regime changes. In fact, most of the countries under consideration experienced significant upheavals during the period. Latin American economies generally boomed in the late 1970s, contracted with the onset of the debt crisis during the early 1980s, and prospered again in the early 1990s with the implementation of economic reforms. Taiwan and South Korea each experienced speculative stock market booms during 1986-89 only to see the bottom fall out.

In general, it is difficult to form estimates of expected returns based on historical data, and the common practice of using average historical returns to construct expectations of future returns has serious pitfalls. The following example illustrates one of these potential pit-

Chart 9

Trading Concentration and Volatility



Sources: International Finance Corporation, Emerging Markets Data Base; *Euromoney 1992 Guide to Equity Markets.*

Notes: Concentration ratio is the share of turnover attributable to the ten most active stocks in 1991. Standard deviations are calculated over 1985-91.

[34] A number of studies have been published in recent years that purport to demonstrate the potential investor gains from diversification into emerging equity markets. Three of the more recent examples include: Arjun Divecha, Jaime Drach, and Dan Stefek, "Emerging Markets: A Quantitative Perspective;" Jarrod Wilcox, "Taming Frontier Markets;" and Lawrence Speidell and Ross Sappenfield, "Global Diversification in a Shrinking World." All three articles appeared in the *Journal of Portfolio Management*, Fall 1992.

falls. Divecha and his coauthors make the sensible argument that investing in emerging markets can reduce risk.[35] Using data spanning the five-year period from April 1986 to March 1991, they calculate the sample means and variances of portfolios composed partly of a mix of stocks representing the MSCI world index and partly of a mix of stocks representing the IFC composite emerging market index. Chart 10 shows their results. The portfolio composed entirely of the MSCI stocks had an average monthly return of 0.5 percent and a standard deviation of 5 percent. A portfolio that was 80 percent invested in the MSCI stocks and 20 percent invested in the IFC stocks had an average return of 0.6 percent and a somewhat lower standard deviation.

When the time frame of analysis is expanded to the seven-and-a-half year period from January 1985 to July 1992, the return-variance locus moves dramatically. Suppose that an investor is prepared to use sample means, standard deviations, and correlations as proxies for ex ante values. The investor's calculation of the increased expected return of taking on an additional unit of risk would be greatly affected by the choice of sample period. The trade-off becomes much more favorable when data from the shorter period are used. Consequently, the investor's ultimate portfolio allocation may depend significantly on the time frame of analysis.

At first glance, the investor's decision to allocate at least 20 percent of wealth to emerging-market stocks does not appear to be very sensitive to the choice of time period. When data from either time span are used, emerging market stocks account for roughly 20 percent of the derived minimum-variance portfolio. This 20 percent share, however, is not consistent with a capital market equilibrium in which investors hold emerging-market equities in proportion to their current 5 to 6 percent weight in world capitalization. The most likely path to such an equilibrium involves increases in share prices and consequent declines in future expected returns as international demand for emerging market stocks increases. The problem for investors, of course, is to determine the extent to which recent equity portfolio inflows into emerging markets have already increased share prices and lowered expected future returns.

Conclusion: Emerging equity markets and economic development

Economic reforms in developing countries—including equity market openings, international equity offerings, and policies to stabilize prices and exchange rates—have encouraged large increases in foreign purchases of emerging-market equity shares in recent years. Privatization programs have played a particularly important role in this process, a fact that was underscored by the Argentine government's recent international offering of shares in the Argentine oil company YPF, which raised roughly $3 billion. Together, economic reforms and equity portfolio inflows have helped integrate developing-country equity markets with the global financial system. Price linkages between emerging and developed markets have tightened, and as emerging markets have matured, they have come to resemble more closely their developed-country counterparts.

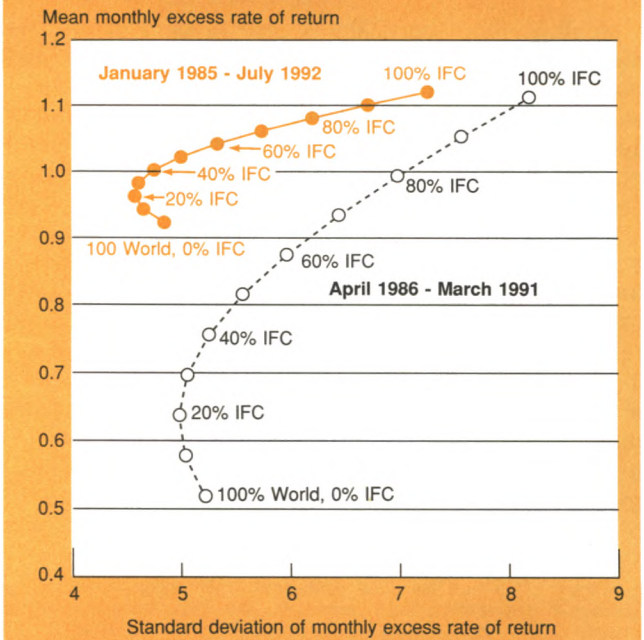
These findings raise the question of the possible contribution of equity markets to economic development. In recent years, a number of economists have argued that equity-based financial systems have put the Anglo-Saxon countries at a competitive disadvantage relative to the bank-dominated systems of Japan and Germany.[36] In particular, they have argued that equity-

[35]Divecha, Drach, and Stefek, "Emerging Markets: A Quantitative Perspective."

[36]See, for example, Ajit Singh, "The Stock-Market and Economic Development: Should Developing Countries Encourage Stock-Markets?" United Nations Conference on Trade and Development, Discussion Paper no. 49, October 1992.

Chart 10

Gains from Diversification



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International.

based systems tend to discourage long-term investment by producing short-term relationships between firms and their debt and equity holders. Some support for this view may be found in Japan, where investment decisions by firms with close ties to large banks are less sensitive to liquidity constraints than investment decisions by firms with weaker ties to large banks and a presumably greater reliance on credit markets.[37]

This line of argument, however, does not necessarily support the conclusion that developing countries should refrain from promoting equity market development. First, recourse to equity financing does not necessarily preclude equity stakeholders, including financial groups, from taking active and long-term roles in corporate management. Second, if promoting equity markets tends to loosen ties between commercial enterprises and banks, then some advantages may result. Although close relationships between commercial firms and banks may lessen the effects of liquidity constraints on firms' investment decisions, close ties can also increase the degree to which control over industrial activity is concentrated among a relatively small group of agents. And while close ties to a financial group may lessen an individual industrial concern's chances of going bankrupt, this advantage may come at the cost of reducing the economy-wide mobility of productive resources.

Equity markets may emerge as an important alternative to debt-based external finance for developing countries. To be sure, reliance on external financing through either equity portfolio inflows or debt inflows can expose countries to the risk of capital flight or speculative capital outflows. Nevertheless, the substitution of equity portfolio finance for debt finance reduces firms' vulnerability to earnings declines and interest rate increases. Unlike debt-service streams, which are contractually tied to interest rates, common stock dividends can be adjusted with some discretion. At the macroeconomic level, equity finance can help developing countries avoid the excessive reliance on debt accumulation that rendered many of them vulnerable to the interest rate increases of the early 1980s.

This article has shown that equity markets offer developing countries a potentially important source of investment finance. One lesson that the emerging economies of eastern Europe can draw from this experience is that even relative newcomers to the game can raise large amounts of cash through equity issuance, as China did during 1992 when it placed $654 million in shares with international investors.[38] A valuable source of funding awaits those countries that choose to develop their equity markets and encourage equity portfolio investment.

[37]See Takeo Hoshi, Anil Kashyap, and David Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, vol. 106, no. 1 (February 1991), pp. 33-60.

[38]Zhi Dong Kan, "Issues of B Shares in Shanghai and the Function of Domestic Securities Companies," *Shanghai Securities Market*, Swiss Bank Corporation, February 1993.

Treasury and Federal Reserve Foreign Exchange Operations

February-April 1993

The dollar depreciated modestly against most major currencies during the February-April period, but declined significantly against the Japanese yen amid concerns relating to the growing Japanese trade surplus. Over the period, the dollar declined 1.6 percent against the German mark, 10.9 percent against the Japanese yen, and 3.2 percent on a trade-weighted basis.[1]

On April 27, the U.S. monetary authorities intervened in the foreign exchange markets, purchasing $200 million against the yen in amounts shared equally by the Treasury and Federal Reserve.

Developments in dollar exchange markets

The Japanese yen appreciated throughout the period. Japanese trade data released on February 5 indicated that the 1992 Japanese current account surplus was materially higher than in 1991. Subsequent observations about the contribution that the exchange rate might make to correct Japan's widening trade surplus, and a perceived acquiescence to gradual yen appreciation by Japanese officials, contributed to the dollar's decline from its period high of ¥125.20 on February 2.

The yen's appreciation was particularly pronounced in February, when many market participants expected the Group of Seven (G-7) to announce support for a stronger yen following its meeting at the end of the month. However, the meeting did not result in a call for yen appreciation.

The yen's rise paused temporarily throughout most of March in response to indications that policy makers were focusing on the merits of revitalizing Japan's economy as a means both to address Japan's current account surplus and to promote more satisfactory economic performance globally. Consequently, market attention shifted to the progress the Japanese government was making in developing a new supplementary fiscal package to stimulate the Japanese economy as well as to the anticipated repatriation of funds by Japanese companies ahead of the fiscal year end.

The yen's rise resumed in late March. Comments by Japanese officials on March 31 that yen appreciation was inevitable and acceptable if it remained gradual, along with the April 13 announcement that the fiscal stimulus package of ¥13.2 trillion would allocate a larger than expected portion to immediate economic recovery, gave continued strength to the yen through April.

The dollar hit a historical low of ¥109.15 against the yen on April 27. Later that day, the U.S. monetary authorities purchased $200 million against the yen in operations coordinated with another monetary authority. U.S. officials also indicated that "[t]he Administration believes that exchange rates should reflect fundamentals, and attempts to artificially influence or manipulate exchange rates are inappropriate. Moreover, excessive volatility is counterproductive for growth. Therefore we

This report, presented by William J. McDonough, Executive Vice President and Manager of the System Open Market Account, describes the foreign exchange operations of the United States Department of Treasury and the Federal Reserve System for the period from February through April 1993. John W. Dickey was primarily responsible for preparation of the report.

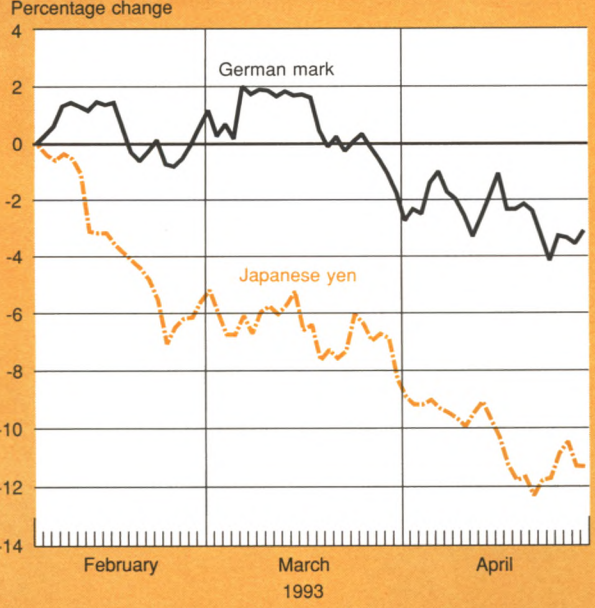
[1]The dollar's movements on a trade-weighted basis are measured using an index developed by the staff of the Board of Governors of the Federal Reserve System.

Chart 1

The Dollar against the German Mark and the Japanese Yen

Chart 2

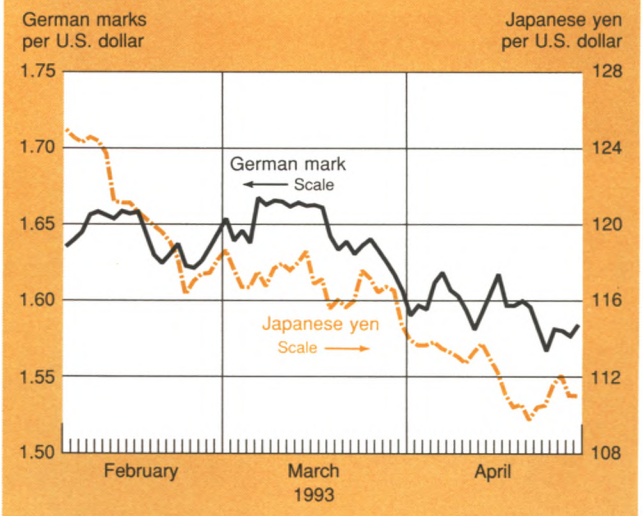
The Dollar against Selected Foreign Currencies



Notes: The chart shows the percentage change in daily rates for the dollar from February 1993 through April 1993. All figures are calculated from New York closing rates.

Chart 3

The Dollar against the German Mark and the Japanese Yen



are monitoring developments closely and stand ready to cooperate in exchange markets with our G-7 partners as conditions may warrant." In response, the dollar stabilized and then traded between ¥112.10 and

¥111.05 for the remaining days of the period.

The dollar/mark exchange rate was relatively stable. The dollar traded between DM 1.6730, reached on March 11, and DM 1.5640, reached on April 26.

The German Bundesbank reduced its official discount rate and its Lombard rate each by 100 basis points in a series of steps undertaken during the February-April period to stimulate the weakening German economy. Following official rate reductions, the mark depreciated slightly against many European currencies. Tensions within the European Exchange Rate Mechanism diminished, although the Spanish peseta faced repeated selling pressure.

Table 1

Federal Reserve Reciprocal Currency Arrangements

Millions of Dollars

Institution	Amount of Facility April 30, 1993
Austrian National Bank	250
National Bank of Belgium	1,000
Bank of Canada	2,000
National Bank of Denmark	250
Bank of England	3,000
Bank of France	2,000
Deutsche Bundesbank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	700
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements:	600
Dollars against Swiss francs	
Dollars against other authorized European currencies	1,250
Total	30,100

Other operations

The Federal Reserve and the Treasury's Exchange Stabilization Fund (ESF) each realized profits of $22.0 million from the sales of yen in the market. Cumulative bookkeeping or valuation gains on outstanding foreign currency balances as of the end of April were $4,152.0 million for the Federal Reserve and $3,221.8 million for the ESF.

The Federal Reserve and the ESF regularly invest their foreign currency balances in a variety of instruments that yield market-related rates of return and that have a high degree of liquidity and credit quality. A portion of the balances is invested in securities issued by foreign governments. As of the end of April, the Federal Reserve and the ESF held either outright or under repurchase agreements $9,376.6 million and $9,438.9 million, respectively, in foreign government securities valued at end-of-period exchange rates.

Chart 4

Short-Term Interest Rates for Selected Countries

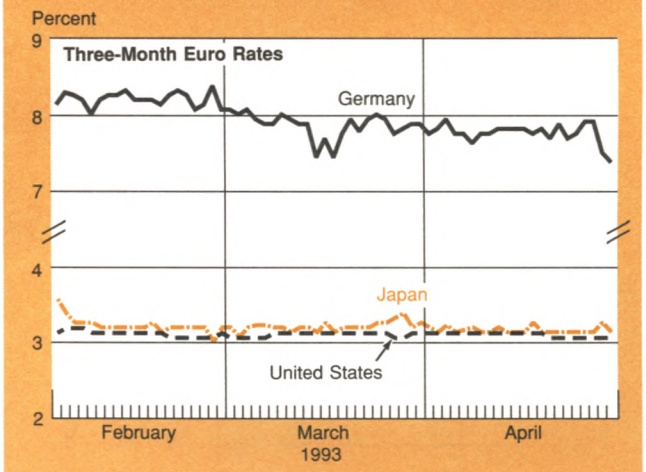


Table 2

Drawings and Repayments by Foreign Central Banks under Special Swap Arrangements with the U.S. Treasury

Millions of Dollars; Drawings(+) or Repayments(−)

Central Bank Drawing on the U.S. Treasury	Amount of Facility	Outstanding as of January 31, 1993	February	March	April	Outstanding as of April 30, 1993
Central Reserve Bank of Peru	470.0†	—	—	+470.0 −470.0	—	—

Note: Data are on a value-date basis. Components may not add to totals because of rounding.
†Represents U.S. Treasury's arrangement with Peru as part of a multilateral credit facility.

Table 3

Net Profits (+) or Losses (−) on United States Treasury and Federal Reserve Foreign Exchange Operations

Millions of Dollars

	Federal Reserve	U.S. Treasury Exchange Stabilization Fund
Valuation profits and losses on outstanding assets and liabilities as of January 31, 1993	+2,868.4	+1,749.9
Realized profits and losses February 1, 1993-April 30, 1993	+22.0	+22.0
Valuation profits and losses on outstanding assets and liabilities as of April 30, 1993	+4,152.0	+3,221.8

Note: Data are on a value-date basis.

In other operations, the Treasury, through the ESF, participated in a $900 million multilateral facility to assist Peru in repaying its arrears to international creditors. The Treasury's share of the facility was $470 million, established by a special arrangement with Peru on March 9. The total amount of the facility was drawn on March 18 and repaid in full on the same day. The facility expired on March 31.

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