Dynamics of the Recession and the Recovery

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By almost any yardstick, the U.S. economy performed magnificently during the last half of the 1990s and into early 2000. Paced by tremendous increases in the nation's capital stock, which helped boost productivity growth to rates not seen on a sustained basis since the 1950s and early 1960s, real GDP growth averaged a little more than 4 percent from 1995 to 2000. Moreover, inflation declined as output grew more rapidly than it had for many years.

Last year's recession was in many ways one of the most unusual in business-cycle history. Outside of manufacturing, which reached its peak in June 2000, the slowdown was much less pronounced and took longer to materialize. Hence, with some industries continuing to grow in 2001 even while others were pulling back, there was the feeling that the economy might skirt an official economic recession. However, forecasters, who had previously thought that a recession might be avoided, changed their outlook immediately after the terrible events of September 11. Suddenly, recession was a certainty. For example, the October Blue Chip consensus forecasts for the third and fourth quarters of 2001 were revised down to –0.4 percent and –1.3 percent, respectively, from the pre 9/11 forecasts of +1.3 percent and +1.6 percent. It was not until late November 2001, however, that the Business Cycle Dating Committee of the National Bureau of Economic Research determined that the nation's record-long business expansion had ended in March 2001.

To properly understand the dynamics of the last recession, we need first to identify the key characteristics of the record-long business expansion that preceded it. That is where I'll begin. I will then analyze the special characteristics of the recession to gain some insight into the likely characteristics of the expansion now getting under way. I will conclude with a discussion of two factors that I believe will be particularly important for the growth of real output over the years ahead.

Before proceeding, I want to emphasize that the views I express here are mine and do not necessarily reflect official positions of the Federal Reserve System. I thank my colleagues at the Federal Reserve Bank of St. Louis, especially Dan Thornton and Kevin Kliesen, for their comments, but I retain full responsibility for errors.

THE 1991-2001 ECONOMIC EXPANSION

The economic expansion of 1991-2001 was record setting. Besides its longevity—exactly 10 years—it will be remembered for three key features. The first was the increase in the structural—or trend—rate of labor productivity growth. The burst of productivity growth was, in large measure, due to significant business expenditures on fixed capital assets, particularly those in the information processing equipment and software category.

The second distinctive feature of the 1991-2001 expansion was a spectacular appreciation in financial asset prices. The Federal Reserve's Flow of Funds data show that the market value of corporate equities held by U.S. residents increased from $3.5 trillion at the end of 1990 to $20.3 trillion by the end of the first quarter of 2000. This increase, roughly a 21 percent annual

rate of gain, was phenomenal by historical standards when benchmarked against the size of the economy. During much of the post-World War II period, the market value of corporate equities as a percent of nominal GDP ranged from just under 40 percent to almost 100 percent. But from late 1990 to early 2000, this share skyrocketed from a little under 61 percent to nearly 210 percent. Of course, much of this boom was driven by excesses in tech stocks, but even the broad and comprehensive Wilshire 5000 Index saw extraordinary growth.

The third key development was the steady decline in inflation to a rate that approximates price stability. Though one could probably list several other important developments, I believe that these are the most important. Moreover, and more importantly for present purposes, the three characteristics of the late 1990s I've emphasized set the stage for the recession that we just went through.

CHARACTERISTICS OF THE 2001 RECESSION

One can point to several distinguishing characteristics of the 2001 recession. I am using the past tense because I am inclined to believe the recession is over. While it is possible that recent data are deceiving us, I believe that the recession most likely ended in December 2001 or January 2002. The final call will be with the Business Cycle Dating Committee of the National Bureau of Economic Research. If the recession ended in January, it will have lasted 10 months—just short of the 11-month average for post-World War II recessions. However, the recession was very mild. Real GDP declined only a modest 1.3 percent annual rate during the third quarter, and no other quarter experienced negative growth. Assuming that 2002:Q1 experienced reasonably solid growth, which seems likely, the four-quarter growth rate never dropped below zero. In contrast, the average peak-to-trough decline in real GDP during post-World War II recessions was about 2 percent.

In view of its mildness, some have asked whether we had a recession at all. The Business Cycle Dating Committee has indicated that it is not inclined to rescind its call. The event will be known by whatever name the National Bureau chooses to call it. I've called it the "Pluto Recession"—after the planet, not the dog. My moniker stems from the fact that astronomers argue over whether Pluto is really a planet. Some say it is closer to being a chunk of ice than a small planet—on the borderline, at best. Any borderline object is, by definition, borderline. Rather than engage in a useless debate resulting from a fuzzy dividing line, let's just call 2001 the year of the Pluto Recession.

This recession, like all previous post-World War II recessions, was dominated by a substantial swing in business fixed investment. After little growth during the fourth quarter of 2000 and the first quarter of 2001, business expenditures on capital goods—structures and equipment and software—fell sharply over the final three quarters of 2001. This investment bust, though, came on the heels of the investment boom of the latter half of the 1990s: From 1995 to 2000, investment in equipment, software, and structures grew at an average annual rate of 10.6 percent, much higher than the 3.9 percent rate from 1973 to 1995. Looking at the composition of the late 1990s surge in spending shows that firms chose to devote an increasing share of their capital budgets to purchases of high-tech capital: From 1995 to 2000, real investment in information processing equipment and software rose at an annual rate of 20.2 percent, whereas from 1973 to 1995 spending on these capital goods rose at a 13.2 percent rate. By the end of 2000, high-tech investment expenditures were roughly 37 percent of total business fixed investment, more than double the roughly 15 percent share seen in 1973. By contrast, the share of business fixed investment in structures declined from an all-time high of roughly 42 percent in early 1982, to just under 24 percent by early 2000.

The end product of this investment boom was a huge increase in the growth of U.S. manufacturing capacity. The capacity increase out-

stripped output growth for several years, leaving a gap of excess capacity, especially in the area of high-tech equipment such as computers and semiconductors. For example, from 1995 to 2000, while real GDP grew at an annual rate a bit above 4 percent, capacity in industrial machinery and equipment (including computers and office equipment) grew at an 11 percent rate. Capacity growth was higher yet in the semiconductor sector. The size and persistence of this gap between output growth and growth of manufacturing capacity was unprecedented for an expansion phase during the post-World War II period.

The surge in investment in information and telecommunications investment did yield a surge in labor productivity growth, as firms replaced outdated equipment with new equipment embodied with the latest technology. The boost in economic efficiency, accordingly, gave rise to sizable gains in real income, earnings, and profits. The latter two developments, of course, helped fuel the tremendous rise in equity prices—particularly those of technology firms. At some point, it appears that market participants decided that the pace of investment in high-tech capital goods had outstripped the long-term earnings prospects of many high-tech firms. As expectations were brought into alignment with long-term economic realities and firms re-evaluated their need for high-tech equipment, equity prices—particularly those reflected in the Nasdaq index—descended from their stratospheric level.

In contrast to the plunge in business fixed investment during the recession, residential fixed investment grew every quarter, except for the fourth quarter of last year. Typically, housing tends to turn down about nine months before the peak of the expansion, and then continues to contract for about six months into the downturn. In the 2001 recession, however, real residential fixed investment began to pick up before the cycle peak and remained strong. This is an interesting point because it shows that the recession was not linked to investment per se but instead to a particular component of investment.

I believe that one reason that housing fared so well during the recession was that, unlike typical recessions, long-term interest rates declined significantly in advance of the cycle peak. In the typical recession, long-term rates rise until the cycle peak, give or take a month or two. This time, however, the peak in the 10-year Treasury rate preceded the cycle peak by about 10 months. A significant portion of that decline in long-term interest rates was attributable to the market's conviction that inflation was not an issue, an understanding based on a monetary policy that has consistently pursued the objective of maintaining a low and stable rate of inflation. A measure of inflation expectations is the spread between the 10-year conventional and inflation-adjusted Treasury securities. That spread declined by about 70 basis points during the year prior to the recession's onset. As long-term interest rates came down following the spring of 2000, residential fixed investment received a significant boost. The boost was not sufficient to completely offset weakness in other sectors of the economy, particularly the manufacture of high-tech capital goods and structures, but was important in limiting the severity of the downturn in the aggregate economy.

Inventory investment almost always plays an important role in economic contractions. The 2001 recession was no exception. Indeed, the inventory cycle this time was as pronounced as any since World War II. The inventory-sales ratio, measured by the ratio of real inventories to real final sales, is perhaps the best measure of inventory behavior. This ratio tends to turn up about six months before the cycle peak, as firms accumulate unwanted goods when demand growth slows. Then, the ratio typically increases modestly for about three months into the recession. As firms liquidate excess stocks, the recession deepens. As inventories come into line with sales, the ratio begins to edge downward as the recession ends and the next expansion gains momentum.

In the 2001 recession, however, the inventory-sales ratio rose three months before the cycle peak and then declined. As the manufacturing sector began to weaken in mid-2000, firms seemed particularly eager to aggressively cull their stock

of inventories. This inventory draw-down continued in earnest into 2001, culminating in a $119 billion drop in inventory investment in the fourth quarter of 2001. This inventory liquidation, relative to real GDP, was the largest for any single quarter since World War II. In fact, the inventory liquidation over the four quarters of last year has not been seen since the 1948-49 recession.

It is really quite remarkable that the inventory liquidation was so large considering that the recession itself was so mild compared with one like 1981-82. As Chairman Greenspan has noted on several occasions, one possible explanation for the behavior of the inventory-sales ratio this time is that innovations in information technology and management processes allowed firms to adjust to the emerging slowdown quicker than in previous recessions.

The final distinguishing characteristic of the 2001 recession was the behavior of consumer spending. Economists and policymakers tend to pay particularly close attention to consumer spending because it is by far the largest component of aggregate output—encompassing roughly 70 percent of total GDP. What is often ignored is the relative stability of a large chunk of consumer spending: Roughly 88 percent of total consumer spending is on services and nondurable goods, which tend not to fluctuate a great deal quarter to quarter. The remaining 12 percent of consumer expenditures is spending on durable goods, which, because expenditure patterns often change quickly when real incomes and interest rates change, is relatively volatile. Durable consumption goods are really a form of household investment, and demand depends on many of the same basic determinants as does business demand for capital goods. As with residential investment during this recession, the behavior of consumer durables points to the special nature of the downturn in business investment.

On average, real consumer spending, otherwise known as real personal consumption expenditures, or PCE, peaks at the same time as the official NBER cycle peak. Of course, one reason for the coincident timing is that the NBER Cycle Dating Committee pays close attention to the monthly pattern of real consumer spending when determining cyclical turning points.

This time around, however, real PCE kept increasing throughout most of 2001—albeit at a modestly slower rate of growth—rather than declining early in the recession, as is usually the case. Evidently, consumers were not sufficiently persuaded to cut back on their expenditures to the degree that manufacturers were. Last year's tax cuts likely helped bolster household incomes and, hence, spending. In any event, in the fourth quarter, consumer spending came roaring back, surging at a 6.1 percent annual rate—a pace not seen for three and a half years. Much of the strength was concentrated in consumer durables, which rose at the astounding annual rate of 39.4 percent. In an average recession, real consumer durables expenditures decline about 3.5 percent. But between the first and last quarters of last year, consumer durables purchases rose by 10.8 percent. A key part of the story was new vehicle production, which surged in response to the exceptionally rich sales incentives offered by automotive manufacturers in the aftermath of September 11. These events were obviously unique to this recession.

A factor that I believe is important for understanding the strength in consumer spending during the last recession is the atypical behavior of short-term interest rates. Typically, short-term interest rates rise until the cycle peak and then decline substantially, usually until the neighborhood of the cycle trough. This time around, short-term interest rates began to decline about four months prior to the cycle peak. The reason was that policymakers responded much more quickly during this recession than during previous recessions. The FOMC began reducing its target for the federal funds rate three months before the cycle peak. Moreover, compared with previous recessions, the FOMC's rate cutting was very aggressive. The effective funds rate was reduced by 475 basis points from January to December.

Hence, it seems to me that the recession's comparative mildness is due in large part to better monetary policy. As I have just mentioned, the FOMC responds quickly and aggressively to signs

that the economy was weakening. But just as important, and perhaps more so, for some time now the FOMC has pursued a policy of reducing the long-run inflation rate to a level where concerns about inflation play a minor role in economic decisionmaking. This long-term policy has not only succeeded in fostering a significantly improved inflation outlook, but also has enhanced the Fed's credibility as an inflation fighter, thereby affording the FOMC considerable leeway to act aggressively to reduce the federal funds rate during this recession. Finally, because the market understands this process, long-term rates began to decline long before the FOMC acted to reduce the target federal funds rate. Long rates reflect anticipations of future short rates; the decline in long rates is evidence of market anticipations of what the FOMC did, at least in broad outline.

Monetary policy was not the only factor working to offset the economic downturn, as other economic forces were also at work. A key reason for the apparent strength of this recovery is the spectacular pace of labor productivity growth during the recession. Nonfarm productivity increased 2 percent during the 2001 recession; this performance was surpassed only by the exceptionally mild recession seen in 1969-70, and the milder-than-average 1948-49 recession. By contrast, productivity growth turned negative during the 1990-91 recession, though it did rise during the subsequent recovery.

WHAT WILL THIS RECOVERY LOOK LIKE?

As we have seen, one of the most striking aspects of the recession was the degree to which the contraction was concentrated in the business investment goods sector. Decomposing the contribution of real GDP growth, measured at an annual rate, over the last three quarters of 2001 shows that the roughly 0.2 percent growth in real GDP was apportioned in the following manner: real business fixed investment contributed –1.6 percentage points; real private inventory investment contributed –1.1 percentage points; real residential fixed investment was essentially flat; real PCE contributed +2.2 percentage points; the government sector contributed +0.9 percentage points; and real net exports contributed –0.2 percentage points.

To sum up, here is where the economy stands heading out of the recession: consumption is relatively strong; fixed investment is relatively weak; inventories are quite lean; housing was strong early in the recession, but tailed off during the fourth quarter of 2001. Moreover, there is little strength in foreign demand for U.S. goods and services.

While a decline in investment spending typically is an important factor in an expansion's demise, it is also usually an important factor pulling the economy out of most postwar recessions. The payoff from investment opportunities on proposed plant and equipment expenditures that appear dubious or speculative shortly before and during the recession, suddenly become more favorable during the recovery.

On average, four quarters after the trough of business activity, real fixed investment increases by about 13 percent. Interestingly, though, it is not a surge in business capital spending that is the catalyst, although growth is usually fairly robust (around 9 percent), but rather the key driver behind the surge in fixed investment spending early in a recovery is a spike in residential fixed investment: On average, real residential fixed investment spending is nearly 26 percent higher four quarters after the trough. Another driving force during most expansions is consumer purchases of durable goods. Spending on consumer durable goods typically increases by about 16 percent during the first four quarters of a recovery.

The question is whether the same pattern will hold during this recovery. I believe the typical pattern is unlikely to recur this time for several reasons. First, the strength of residential fixed investment spending during most of the recession suggests there is little pent-up housing demand on the part of households. Second, the recent rise in long-term interest rates will inevitably act to dampen the burst in new and existing home sales that we saw last year. Moreover, the home

ownership rate currently stands at nearly an all-time high of 68 percent. During the latter half of the 1990s, the housing industry benefited tremendously from a sharp rise in the home ownership rate, which had stayed roughly constant at 64 percent from 1985 to 1995. We don't readily know why home ownership rates began to accelerate. Certainly, the steady deceleration in inflation kept mortgage rates during the latter part of the 1990s considerably lower on average than they were during much of the 1970s and 1980s. The strength in housing may have been related in part to the surge in equity values, which afforded many households the wherewithal to buy rather than rent. In any event, it seems unlikely that residential investment will get a boost from this factor going forward.

The third factor, the outlook for business fixed investment, is harder to gauge. One possibility is that the rate of business fixed investment will be somewhat attenuated relative to the average postwar recovery. As I noted earlier, the tremendous rates of growth in business expenditures on equipment and structures seen during the latter half of the 1990s led to breathtaking increases in manufacturing capacity—particularly in the high-tech sector. Moreover, with the cost of equity capital much higher now than it was in the late 1990s, the relative cost of capital means that the breakeven point on proposed capital investment projects—the so-called "hurdle rate"—is appreciably higher today than, say, two or three years ago.

It is important to remember, however, that high-tech capital goods such as computers, servers, software, and telecommunications equipment tend to depreciate much faster than other types of capital goods. As a result, relatively faster rates of gross investment will be needed to keep the net investment rate constant. Moreover, business fixed investment is likely to get a boost from the fact that the real price of high-tech goods is likely to continue to decline somewhat, so that the hurdle rate for high-tech goods is likely to continue to decline. Finally, continuing opportunities for productivity gains from the application of new technology may sustain a high rate of investment.

With PCE growth still fairly robust, it is difficult to see how the economy can get a large boost from consumer spending, especially if, as some have suggested, consumers have truly become more conservative in the wake of 9/11. The inventory-sales ratio is very low, so the economy should get a significant boost as firms rebuild their inventories. All in all, however, I expect this recovery to be somewhat milder than the average recovery; the average following the eight post-World War II recessions excluding the short 1980 recession was about 7.5 percent real GDP growth for the first four quarters of recovery.

Going forward, then, the factors I have outlined above, along with the fact that this recession was extremely mild, suggest the prospects for a typical post-recession boom are not terribly favorable. There is, however, a competing consideration. Fiscal policy turned more expansionary last year, and monetary policy became, I believe, highly expansionary. Money growth was high and short-term interest rates were driven down to a low level. Expansionary policy may show up somewhere, or a little bit in lots of places. The result could be upside surprises in coming quarters.

SOME LONGER-RUN CONSIDERATIONS

The shape of the economy in coming years will depend critically on the rate of productivity growth. Everyone is now aware of just how important productivity growth was to the economy's performance from 1995 to 2001. Although there is much we do not understand about productivity growth, it appears that the structural, or long-run, growth rate of nonfarm labor productivity is about 2.5 percent. This is a sizable increase from the roughly 1.5 percent growth experienced from 1973 to 1995. Growth of the labor force adds another 1 percent to GDP growth; thus, a reasonable working assumption is that potential output should grow in the neighborhood of 3.5 percent. If productivity growth remains at this higher level,

the boost to the real incomes of future generations will be large.

The second issue is the long-term inflation rate. The economy's performance in recent years—both the high rate of growth in the 1990s and its resilience in the face of recession and the shock of September 11—is evidence of the payoff from sustained low inflation. The Federal Reserve is ultimately responsible for the trend rate of inflation, and I see no reason why past success on this front cannot be extended indefinitely. It is certainly true that maintaining low inflation is inherently easier than bringing inflation down. But success in maintaining low inflation will not come automatically—the Fed must not fall asleep at the switch.

SUMMING UP

As a member of the Federal Open Market Committee, I am always sensitive to developments that could threaten the nation's two main macroeconomic goals: price stability and sustained economic growth with full employment. While all too often these goals of growth and low inflation are seen as competing, in truth they are congruent. The experience of the 1990s should put to rest the notion that price stability is incompatible with low unemployment. The most important contribution monetary policy can make to a high rate of economic growth is to maintain a low and stable rate of inflation. By virtue of past success on the inflation front, in 2001, monetary policy was able to respond vigorously to forestall a deep recession and to lay the foundations for the recovery. Last year's policy actions, combined with the economy's natural dynamics, provide the ingredients for a solid recovery. The strength and duration of the expansion just now beginning, however, ultimately depend on policymakers remaining focused on keeping the inflation rate low and stable. As the economy settles into a pattern of sustained growth, policy will also adjust from recession-fighting mode to economic-growth mode. Unless forecasters are far off base in their view of the economy's prospects, in time short-term interest rates will rise to maintain a monetary policy consistent with long-run price stability. The timing of such rate increases is not something that can be planned in detail, but will depend on the arrival of information on the economy's progress and on possible risks to price stability.

Although no one can rule out surprises, the economy is stable and poised for higher growth. That is certainly a pleasant environment for policymakers, and it is nice to be able to end these remarks on that note.