

## **Roger W Ferguson, Jr: Factors influencing business investment**

Remarks by Mr Roger W Ferguson, Jr, Vice-Chairman of the Board of Governors of the US Federal Reserve System, at the Greater Issues Series, The Citadel, Charleston, South Carolina, 26 October 2004.

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Thank you for inviting me to speak today as part of the Citadel's Greater Issues Series. I will speak about one of the forces likely to shape developments in the U.S. economy. In past speeches, I have addressed the so-called jobless recovery, trade, global imbalances, and national saving. Today, I round out this series on fundamental issues by reviewing business capital investment - that is, spending by businesses on such things as machines, computers, and new buildings. Although it makes up only about 10 percent of gross domestic product, business investment is a vital element of the U.S. economy, with important implications for a variety of broader economic issues.

Investment has a large influence on the year-to-year fluctuations in economic activity. During the past six recessions, the drop in domestic investment has generally accounted for most of the decline in GDP. Business investment was a major factor in both the 1990s economic expansion and the subsequent recession. In fact, the decline in business outlays on investment goods in 2001 was even larger than the downturn in the overall economy. Although overall GDP edged down at an average annual rate of only 0.2 percent in the first three quarters of 2001, the decline in business investment subtracted nearly 2 percentage points from GDP growth over that period. Clearly, some insight into investment swings would enable us to better understand the economic cycles of recessions and expansions, which in turn have such a big effect on job creation, the budget deficit, and a host of other important issues.

Business investment also affects the broader economy through labor productivity - or output per hour of work. Over the past fifty years, the average hourly output of American workers has increased nearly 200 percent. According to the Bureau of Labor Statistics, more than one-third of this improved efficiency likely reflects increases in the use of capital goods. Over the past decade, efficiency gains due to increased capital expenditures have been especially pronounced. Because rising productivity is the primary means through which standards of living increase, capital investment is clearly an important part of the economic engine. Accordingly, an understanding of investment is critical for insight into both cyclical and longer-run economic developments.

In my discussion today, I want to address the outlook for the three categories of business investment: equipment and software, structures, and inventories. Forecasting business investment is complicated, however. Despite the importance of this subject, the policymakers, academics, and business economists who study it have limited knowledge regarding its behavior and the factors determining that behavior. By highlighting some of the thorny issues that need to be considered, I hope to provide a backdrop to help elucidate the likely performance of business investment in the quarters to come. Although forecasting involves considerable uncertainty, I think that the prospects for business investment over the next few quarters are, on balance, relatively positive. I should note, of course, that the comments that I make today reflect only my own views; they should not be taken to represent the views of my colleagues on the Board of Governors or in the Federal Reserve System.

### **Equipment and software**

The largest component of business investment is expenditures on new equipment and software. This category includes computers, routers and switches, machinery, aircraft, trucks, software, and a wide variety of other types of equipment that are used to produce goods and services. Decisions of business people regarding equipment and software investment are based on their assessment of business prospects, the nature of the capital goods themselves, and financing conditions. In short, potential purchasers of business equipment will need to assess a plethora of variables that are at best known only imperfectly. For economists who forecast investment, the task is even harder: Not only must we form opinions about all these variables, we must try to discern the business community's response to them.

Currently, demand for business products and services appears to be rising. In addition, interest rates remain low, and the business sector has ample cash on hand. Historically, such conditions have been

associated with increasing real business spending on equipment and software. At the moment, however, at least four additional factors are clouding our view.

First, after the trough of the last recession, businesses seemed more hesitant than usual to expand their productive capabilities. Concerns about terrorism, war, and corporate governance scandals may have made it harder for firms to have confidence that a robust and durable recovery was under way. With heightened uncertainty, many firms may have been reluctant to increase capital spending. The issue we face now, nearly three years since the trough, is whether this reluctance has abated.

The evidence we have for ongoing business hesitancy is suggestive but far from conclusive. One piece of evidence is found in the state of the "financing gap" - the difference between a firm's capital expenditures and its cash flow, or internal funds. In the past, the financing gap for nonfinancial corporations was almost always positive - that is, capital spending was larger than internal funds. Between 1991 and 2000, the financing gap rose from less than \$35 billion to a peak of more than \$300 billion. The rapid rise largely reflected sharp increases in capital expenditures in the telecommunications, high-tech, and transportation industries that greatly outstripped the increases in internally-generated funds. However, the financing gap fell abruptly in 2001 and 2002, turned negative last year, and has stayed below zero since then. This negative financing gap, which is widespread across industries, indicates that the business sector as a whole is generating enough cash to purchase capital expenditures without borrowing. In fact, because it has been negative for a while, the gap has contributed to the accumulation of a large cushion of liquid assets. Over 2003 and the first half of 2004, liquid assets in the nonfinancial corporate sector rose \$244 billion, or more than 20 percent, to \$1.3 trillion.

This news is good because it means that business balance sheets are in good shape and financial conditions are not holding back business investment. But the news is also troubling. Given the current low interest rates, the preference for holding financial assets over expanding operations suggests that businesses lack confidence in the future profitability of their potential ventures. The negative financing gap could very well be a sign that businesses remain cautious about the outlook - a condition that, unfortunately, can become a self-fulfilling prophesy.

A second factor that complicates the outlook for investment is the state of the computer sector. About 12 percent of business spending on equipment and software is for computer gear. Some of that spending is to equip new plants and new employees, but a large share of it is to replace old machines and outdated technology. Over the past few decades, we have seen technology advance rapidly, and businesses have purchased a large amount of high-tech equipment. More recently, the growth rate of business spending on computers has slowed - from about 40 percent last year to less than half that pace, on average, in the first two quarters of this year. One possible explanation is that we are seeing a deceleration in the pace of technical advancement. Technological progress affects business investment in primarily two ways. First, it changes how businesses organize their operations. Second, even innovations that do not spur an entirely new way of doing business can encourage equipment spending because some firms will choose to retire obsolete equipment more rapidly than they otherwise would. Accordingly, if the pace of progress slows, increases in business investment, particularly of high-tech goods, may also slow.

Of course, we cannot directly measure the pace of technological progress, but we can look at some indicators to help us judge. One indicator that economists often look at is prices, particularly "quality-adjusted prices" compiled by the Bureau of Labor Statistics and used by the Bureau of Economic Analysis to deflate nominal computer expenditures. Over time, these quality-adjusted prices tend to fall, as computers and related equipment become more and more powerful. Between 1992 and 2002, the quality-adjusted price of new computers fell at an annual rate of 18 percent. The speed at which these prices fall reflects mainly the pace of technological progress. Unfortunately, over the past several quarters, the rate of price decline slowed from that experienced during the preceding decade: Computer equipment prices fell just 9 percent at an annual rate in 2003 and the first half of 2004. Although we cannot be certain, at least some of this deceleration may represent some slowing in the rapid pace of technological improvement. Indeed, detailed data that we use in putting together the industrial production data suggest that the number of new PC models introduced this year has fallen markedly from the pace posted in the preceding few years, suggesting that the pace of innovation, at least in this one market, has slowed.

A third factor for economists considering the outlook for the business sector is the question of whether the existing stock of business equipment is too high. As the high-tech boom of the nineties was ending, many observers claimed that companies had been overly optimistic and had purchased too

many PCs and peripherals and laid too much fiber optic cable, resulting in an actual capital stock that exceeded the desired level for business. When such a "capital overhang" emerges, new investment spending tends to be curtailed for a while. Indeed, in 2001 and 2002, real outlays for equipment and software fell at an annual rate of nearly 6 percent.

Determining whether a capital overhang exists is difficult, and estimates of the size of overhangs are subject to considerable error. First, capital stocks are hard to measure; although we know the amount of new capital goods purchased, we can only roughly estimate the rate of economic depreciation and obsolescence. Consequently, we cannot know with certainty the level of the existing capital that is still available to be used. Second, we do not know how much capital firms would ideally like to employ because their expectations and production processes are always changing. Of course, we can estimate both actual and desired capital stocks, but these estimates are quite dependent on our assumptions, especially our assumptions about technological change. Based on the depreciation rates used by the Bureau of Economic Analysis, we estimate that the growth rate of the capital stock of equipment and software slowed from around 7 percent in 1999 and 2000 to about 2-1/2 percent in 2002, a slowdown large enough to substantially shrink most estimates of the capital overhang.

The final factor that complicates the outlook for equipment and software spending stems from the tax code. Currently, the partial-expensing provision in the tax law allows a firm to subtract a large fraction of the cost of new capital equipment from profits right away, rather than depreciating the cost over time, and thereby to lower its taxes. The partial-expensing provision, which provides an incentive to invest in new capital goods, will expire at the end of this year. The impending expiration is probably boosting investment spending in the second half of this year as firms rush to take the tax advantage before it disappears; however, at this point the evidence is not conclusive.

The anecdotal evidence on whether firms are responding to the partial-expensing provision is sparse and somewhat contradictory. According to a summary of commentary on current economic conditions prepared by the San Francisco Fed in September, a number of contacted firms planned increases in capital spending, yet there was no mention of partial expensing. In contrast, a recent special question in the Philadelphia Fed's Business Outlook Survey showed that about one-quarter of respondents thought that the tax provision was likely to boost their spending this year. The statistical evidence for a tax response is also inconclusive. Shipments of long-lived equipment (which should be more favorably affected than demand for short-lived equipment) have increased more than overall capital spending since the passage of the most recent version of the partial-expensing law - the pattern we would expect to see if businesses were taking advantage of the tax incentive. However, other explanations for this pattern are possible, and the difference between the long-lived and the short-lived categories is neither statistically significant nor terribly robust. The evidence that partial expensing is having an effect is not clear-cut, but my view is that capital spending is probably being influenced by the tax law and that its expiration in January will probably damp outlays in the early part of next year.

### **Nonresidential structures**

Besides spending on equipment and software, businesses also build and purchase nonresidential structures. Although this category - which includes factories, warehouses, shopping malls, oil wells, cell phone towers, fiber optic cable tunnels, office parks, and more - is only about 10 percent as large as the equipment and software category, it too can contribute to swings in GDP. In 2001 and 2002, expenditures for new business structures declined more than \$75 billion, subtracting nearly 1/2 percentage point from annual GDP growth on average in those two years. After having flattened out last year, spending in this sector appears to have turned up recently. Business outlays on structures rose 7 percent in the second quarter, and construction data indicate that the sector expanded further in both July and August.

Still, nonresidential structures are notoriously difficult to project with any certainty. Many sectors of the economy wax and wane along with the overall business cycle, but the structures sector tends to follow long cycles of its own. Although a weak economy is generally detrimental to spending in this category, expenditures often continue to increase well into an economic downturn, making forecasting difficult.

In addition, the nonresidential structures category includes a diverse set of buildings, and forecasting this sector requires keeping tabs on a wide variety of indicators. Purchases of one of the largest components, commercial buildings, tend to be associated with conditions in the retail sector. Retail rents rose 3.2 percent in the four quarters that ended in the second quarter, the fastest pace in four years, and the vacancy rate remains below 6 percent. Likewise, indicators for spending on drilling and

mining wells, which usually rise after a jump in oil and natural gas prices, look quite strong. However, the outlook for outlays on office buildings, which tend to be correlated with activity and hiring in the business services sectors as well as in the finance and insurance industries, is less upbeat: Office rents have continued to fall, and the vacancy rate, at 15 percent, remains elevated. The vacancy rate for industrial buildings, a sector that generally keeps pace with manufacturing activity, has flattened out around 10 percent over the past six quarters after having risen markedly for the preceding three years. Thus, at the moment, the various indicators are giving fairly mixed signals. However, the mixed signals are still an improvement over the almost uniformly negative tone of the markets for nonresidential structures a year or two ago. To me, they suggest that the nascent upturn in this sector is likely to continue.

### **Inventory investment**

So far I have discussed business fixed investment. Another important part of capital expenditures, however, is inventory investment. There are three types of inventory investment: materials and supplies, work in progress, and finished goods. In dollar terms, inventory investment is not large: From 1994 to 2003, it averaged about \$37 billion - less than 1 percent of GDP. However, because it can swing from a sizable positive as firms stockpile goods in one quarter to a pronounced negative when they clear out the warehouses in the next quarter, the change in business inventories is generally considered to be one of the most important categories for understanding business-cycle volatility.

The reasons that firms need to hold inventory stocks, unlike their reasons for investing in capital equipment and buildings, are not always obvious. For manufacturers, more than half of all inventories are held in the form of materials and supplies or as work in progress. These inventories are necessary, of course, to facilitate production. However, even inventories of finished goods are important. Businesses need to weigh the cost of running out of an item - perhaps forcing a customer to turn to a competitor - against the storage costs of carrying inventories from quarter to quarter. And, particularly in the retail sector, inventories of some goods - like clothing and cars - can spur sales because customers have the chance to try out different sizes or option packages before buying.

With so many reasons for holding inventories, inventory investment may appear about as difficult to predict as investment in equipment or structures. It is probably even more difficult. So far I have mentioned only the reasons for which businesses intentionally change their inventory holdings. But inventory swings are often the result of miscalculations on the part of business owners. If a particular product is unexpectedly popular, inventories get drawn down; if the product is unpopular, inventories pile up. The situation is complicated for economists who are trying to draw inferences from flows into and out of inventories. We need not only to figure out how much inventory businesses have wanted to hold but also to discern when they have been surprised by sales.

The difficulty of this task can be illustrated by the most recent period. In the second quarter of this year, businesses accumulated inventory stocks at a rapid pace, after having kept inventories relatively lean for several years. This acceleration in the pace of accumulation could mean that inventories had finally gotten too lean and that firms wanted to re-stock, or it could mean only that businesses were startled by the unexpectedly weak pace of demand for their products and that inventories piled up unintentionally. Answering this question is important for determining what is likely to happen to inventory building for the rest of the year.

How do we begin to gauge whether businesses wanted to rebuild inventories in the second quarter? One way is to look at the ratio of inventories to sales. In the nonfarm sector, this ratio has fallen nearly 25 percent in the past fifteen years, from 2.59 months' supply to 1.97 months' supply. Most likely this secular decline represents improvements in inventory management, possibly related to better technology. In 2003, the inventory-sales ratio fell especially sharply, dropping from 2.02 to 1.94, or about 4 percent. Part of the decline likely reflected improvements in inventory-management techniques. However, unless the pace of technological change has improved markedly, the drop in the inventory-sales ratio probably also reflected sales outstripping the cautious expectations of businesses. The implication is that inventories may have been a bit on the lean side in the first part of this year. If so, then some of the inventory accumulation in the second quarter may have been an intentional re-stocking of inventories that had become too lean.

Survey results from the Institute of Supply Management support this conjecture. For several years, a majority of respondents had said that their customers' inventories were too low. The most recent data, however, suggest that many supply managers have reassessed that view, and the mix of those who

think customers' inventories are lean has moved more in line with those who think stocks are excessive. Thus, the recent upturn in inventory investment does not seem to be pointing toward another problematic inventory cycle, with its accompanying need to drastically reduce production to eliminate unwanted stocks. At the same time, the bulk of stock rebuilding appears to be behind us so that inventories are unlikely to be a major spur to GDP growth in the near future.

## **Conclusions**

Today, I have highlighted some of the issues that continue to challenge economists in evaluating the outlook for business investment, an extremely important element in determining the outlook for the economy more broadly. With respect to investment in equipment and software, although we do not know with certainty just how rapidly technology is changing and how much businesses are expecting to sell and produce in the future, a number of indicators can help explain recent trends and likely developments. At this point, although there is uncertainty, these indicators on balance suggest that the outlook in this sector is relatively positive. Regarding nonresidential structures, the mixed indicators are a distinct improvement over the negative outlook of a few years ago. And, regarding business inventories, the recent upturn in inventory investment does not appear to be problematic, but it seems unlikely that further inventory investment will impart significant forward momentum to the economy.

In short, although the economy may not experience the outsized growth rates of high-tech equipment spending or other business investment seen in the late 1990s, the fundamental features of the current U.S. economy argue for solid increases in the capital expenditures needed to produce and facilitate sales. With steady contributions from business investment, GDP growth is likely to continue expanding at a good pace, leading to further job gains and increases in family incomes. And in the longer run, the expansion of the capital stock can be expected to continue improving the efficiency of the American worker and thus to lead to additional increases in the standard of living.