

# Investment in Recession and Recovery: Lessons from the 1980s

By George A. Kahn

Investment spending influences both the trend and cyclical components of economic growth. By adding to the capital stock or allowing the capital stock to depreciate, investment spending affects the economy's future capacity to grow. Because investment spending fluctuates with greater volatility and persistence than most other major components of gross national product (GNP), it can go a long way toward explaining the short-run fluctuations of output and employment. Thus, an understanding of the determinants of investment can lead to a better understanding of the determinants of economic growth and business cycles.

The unusual behavior of investment in the 1981-82 recession and the current economic recovery may help determine key factors in explaining investment spending. Few episodes of modern economic history provide as interesting a set of interacting variables. Declining

tax rates, lower inflation, high real interest rates, and a deep recession followed by a strong economic recovery have been associated with an unusually strong rebound in investment spending. Some analysts have attributed this rebound to reductions in corporate taxes.<sup>1</sup> Others have refuted the tax argument and focused on a combination of other factors. These factors include increased business and consumer confidence, lower capital goods prices, and strong expected GNP growth.

This article examines the unusual recent behavior of investment and considers alternative explanations for the investment boom. The article argues that most empirical evidence on the cause of investment's strength points toward a multiplicity of factors. The first section reviews investment's behavior since 1981 by component and in relation to historical patterns. The second section dis-

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<sup>1</sup> See, for example, John Makin, "The Budget Answer Lies in Spending Cuts Not Tax Boosts," *Business Week*, June 17, 1985, p. 22, and Maggie McConas, "Did Supply Side Incentives Work?" *Fortune*, November 26, 1984.

cusses theoretical factors that determine investment spending. The third section surveys empirical evidence on the importance of taxes as compared with other determinants of investment.

### **The recent behavior of investment in historical perspective**

Real business fixed investment boomed during the first six quarters of the current economic expansion. Its growth rate of 16.4 percent, between the last quarter of 1982 and the second quarter of 1984, greatly exceeded the average performance of 6.5 percent growth in the first six quarters of previous postwar recoveries. This strong growth in spending on plant and equipment came during a period in which real GNP grew at 7.1 percent, compared with the postwar average rate of 5.8 percent for the first six quarters of recovery. More recently, investment and overall economic growth have slowed somewhat. From the second quarter of 1984 to the second quarter of 1985, business fixed investment grew at an 8.4 percent annual rate while real GNP grew at a 1.9 percent rate. Even with the slowing of investment spending in the last two quarters, however, business fixed investment has experienced a period of unusually strong growth. This section explores the composition of that growth and compares it with investment behavior in previous business cycles.

Business fixed investment consists of business purchases of capital goods, excluding changes in inventories. It is composed of two major components—structures and equipment. The structures component includes private (nonresidential) new construction, construction and exploration expenditures for petroleum and natural gas drilling and mine shafts, commissions on the sale of structures, and net transfers of used structures from (or to) gov-

ernment. Major categories of structures spending are commercial, industrial, and other nonresidential buildings, public utilities, farm buildings, and mining exploration, shafts, and wells. Equipment spending refers to private purchases of producers' durable equipment. Major categories include office, computing and accounting machinery, electrical and communication equipment, autos, trucks, buses, and truck trailers, and instruments.

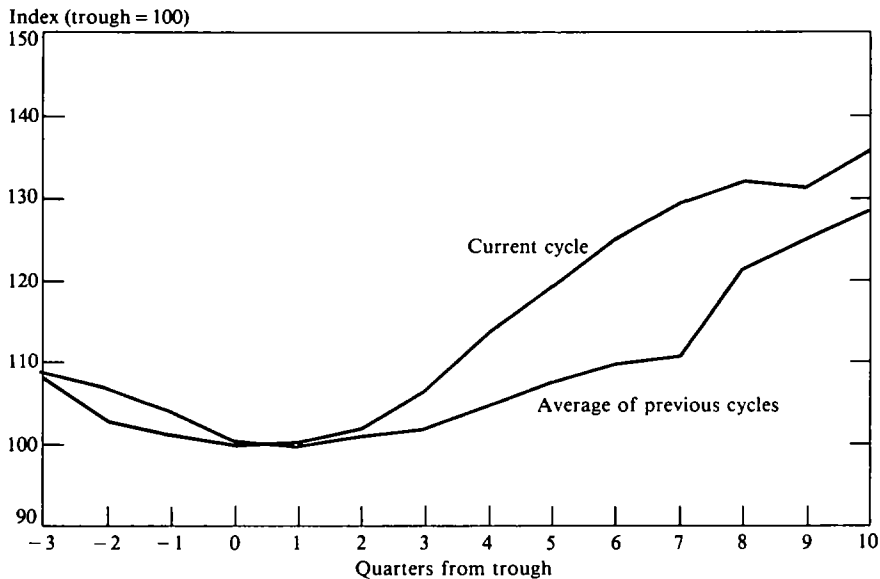
While total investment spending boomed after 1982, not all sectors shared equally in the recovery. The recovery of spending on business structures was slower, and the recovery of spending on business equipment was faster, than the increase in total investment.

#### *Total real business fixed investment*

Business fixed investment has been unusually strong in the current recovery. Chart 1 compares total business fixed investment in the current business cycle with an average of fixed investment in five previous postwar business cycles.<sup>2</sup> For the current cycle, the chart runs from 1982:Q2 to the recession trough in 1982:Q4, and from 1982:Q4 to 1985:Q2. The chart shows that while investment behaved in a fairly typical fashion in the 1981-82 recession, it rose more rapidly in the current recovery than was typical of previous recoveries. Because the data in the chart are index numbers based on the recession trough, the chart obscures the fact that the level of real business fixed investment in the current recovery did not catch up with its previous peak (1981:Q3) until 1983:Q4. In fact, real invest-

<sup>2</sup> The trough dates of the five previous cycles are 1954:Q2, 1958:Q2, 1961:Q1, 1970:Q4, and 1975:Q1. The 1981-82 recession trough occurred in 1982:Q4. Average data for the eighth, ninth, and tenth quarters from the trough of previous cycles represent four observations since the second cycle's recovery (trough in 1958:Q2) lasted only seven quarters.

**CHART 1**  
**Real business fixed investment**



Source: *Survey of Current Business*, Bureau of Economic Analysis. Obtained from Data Resources, Inc.

ment spending started out the current recovery at a point equal to only its 1978:Q3 level. Thus, while investment boomed in the recovery, it boomed from a depressed starting point and only recently caught up to its previous peak.

#### *Real business structures investment*

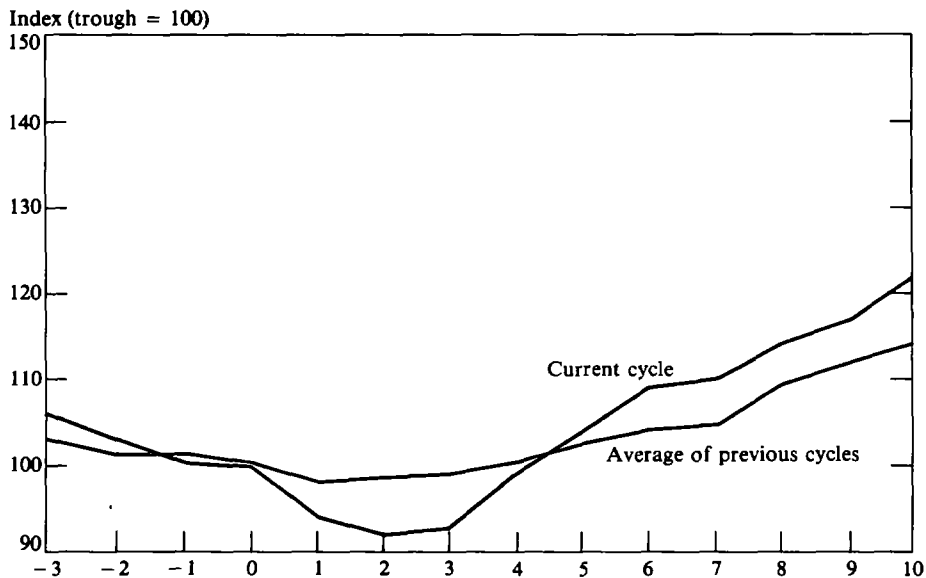
Business structures investment makes up the smaller share of business fixed investment. For example, investment in business structures accounted for 27.8 percent of total real business fixed investment in 1984. As is typical of previous cycles, investment growth in structures has been slower than growth for business fixed investment in general. Chart 2 compares real business structures investment in the current business cycle to that of an average of five previous postwar business cycles. It

reveals a fairly typical behavior of structures investment during the 1981-82 recession. However, in the first four quarters of the current expansion, investment in structures fell below the average of previous expansions, and, in the last six quarters, rose above the average of previous expansions.

Much of the recent strength in structures investment has come from commercial construction. Relative to real GNP, real commercial construction has climbed to all-time highs, while other nonresidential construction, including industrial, religious, educational, and public utility construction, has fallen off steadily from its peak in 1966.<sup>3</sup> As Chart 3 shows, from 1984:Q1 to 1985:Q2, commercial

<sup>3</sup> Along with the increase in commercial construction, however, office building vacancy rates have risen, from a low of about 3.5 percent in 1980 to about 15 percent in the first quarter of 1985.

**CHART 2**  
**Real business structures investment**



Source: *Survey of Current Business*, Bureau of Economic Analysis. Obtained from Data Resources, Inc.

construction was significantly higher than it was on average in the fourth through tenth quarters of previous recoveries. On the other hand, noncommercial structures construction (not shown), has behaved much the same as in previous recoveries.

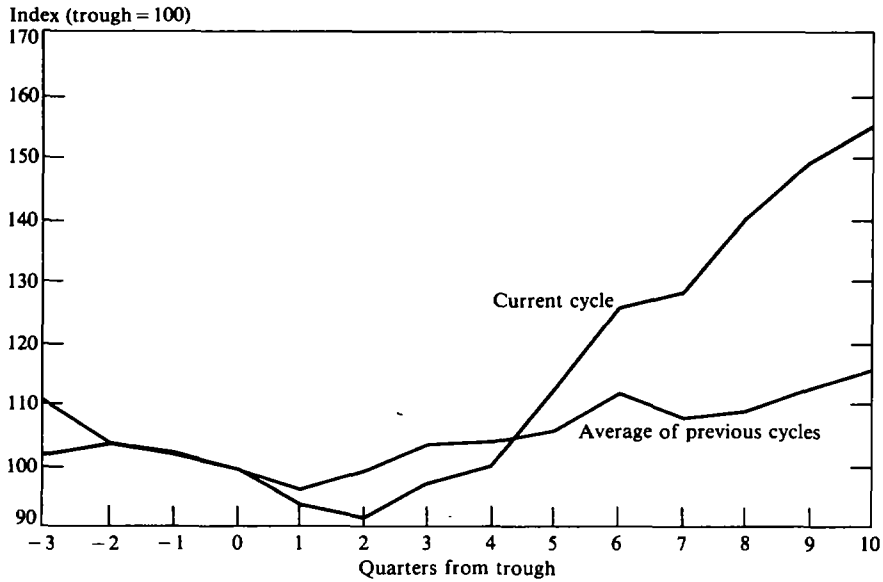
***Real business equipment investment***

Real business equipment investment accounts for the greater part of total real business fixed investment. For example, it accounted for 72.2 percent in 1984. As Chart 4 shows, it also accounts for much of the strength in business fixed investment since 1982. While investment in equipment fell somewhat faster in the early stages of the 1981-82 recession than is typical of postwar recessions, it also subsequently rose higher and faster. Between 1982:Q4 and 1984:Q3 it

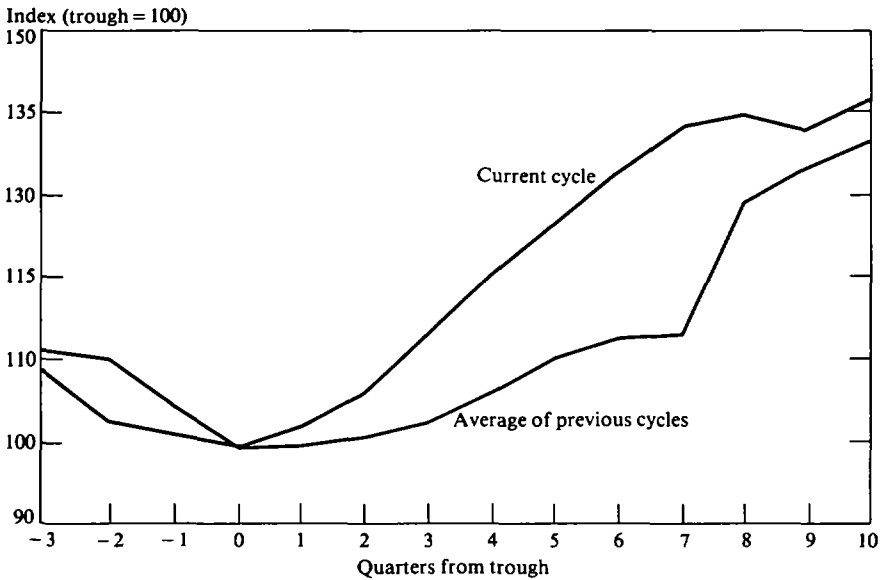
rose at a particularly fast 18.6 percent a year, as compared with an average annual rate of 13.8 percent in the comparable period of previous postwar recoveries.

Despite the overall strength in equipment investment since 1982, not all sectors have shared equally in equipment's recovery. While some types of equipment spending have boomed, others have not yet reached their peaks from the 1970s, and still others have remained quite depressed. Table 1 shows purchases of producers' durable equipment, disaggregated by type and measured in real dollars for 1984 (the second year of the current recovery) and an average of five second years of previous recoveries. The table shows that office, computing, and accounting machinery have become increasingly important as sources of equipment purchases. Also becoming more important, but growing at a slower rate, are

**CHART 3**  
**Business structures investment: commercial buildings**



**CHART 4**  
**Real business equipment investment**



Source: *Survey of Current Business*, Bureau of Economic Analysis. Obtained from Data Resources, Inc.

**TABLE 1**  
**Purchases of producers' durable equipment by type**  
 (Billions of 1972 dollars)

<u>Equipment Type</u>	<u>Average of 5 Previous 2nd Years of Recovery</u>	<u>1984</u>
Furniture and fixtures	2.4	5.3
Fabricated metal products	1.9	3.7
Engines and turbines	1.0	1.1
Tractors	1.7	2.7
Agricultural machinery	2.1	1.6
Construction machinery	2.0	2.1
Mining and oilfield machinery	0.9	2.3
Metalworking machinery	3.3	4.9
Special industry machinery	3.5	4.8
General industrial machinery	3.4	4.9
Office, computing, and accounting machinery	3.4	39.5
Service industry machinery	2.1	3.0
Electrical and communications equipment	8.4	24.2
Trucks, buses, and truck trailers	6.0	12.7
Autos	5.5	16.9
Aircraft	1.2	2.4
Ships and boats	0.9	0.6
Railroad equipment	1.3	1.0
Instruments	3.1	12.7
Other miscellaneous	1.7	3.0
Total	55.6	148.0

Source: Department of Commerce, *Survey of Current Business*, various issues

electrical and communications equipment, autos, and instruments.

Despite substantial real growth in the economy since 1948, some sectors of business equipment spending have actually declined from their postwar average in terms of constant dollar purchases. Among these are agricultural machinery, railroad equipment, and ships and boats. Other sectors of equipment spending rose higher in 1984 than in an average of previous recoveries, but grew at a much slower rate than growth in total business equipment. They include industrial, metal working and construction machinery, engines and turbines, and tractors.<sup>4</sup> While some of these structural shifts are the inevitable result

of changes in tastes and technology, others may be the result of such nonfundamental influences as differential tax incentives. Assessment of what underlies the uneven investment boom, therefore, requires an understanding of factors affecting business investment.

### **Factors in business investment**

Gross investment spending consists of two parts. One part is replacement investment, that is, spending merely to replace worn out plant

<sup>4</sup> For further discussion, see "The Capital Goods Recovery: Why Some Lag Behind—Part II," *Capital Goods Review*, Machinery and Allied Products Institute, May 1985.

and equipment. Any investment beyond replacement of worn out capital is net investment. Net investment increases the capacity of the economy to produce goods and services. Because net investment changes the size of the capital stock, most theories of investment spending try to explain net investment, treating replacement investment as a constant proportion of the capital stock.<sup>5</sup>

The demand for net investment is a derived demand. It results from consumers' and firms' demand for final and intermediate products and technological requirements for capital as an input to the production process. In deciding how much capital to acquire over a given period, firms evaluate the size of their capital stock relative to expected sales. If sales are expected to rise, more capital may be needed to produce the increased output demanded. If so, net investment results. If sales are expected to fall so that less capital is required, firms may not invest in new capital and may even allow their existing capital stock to depreciate without replacement.

In deciding how much capital to acquire, firms also consider cost. Investment projects will be undertaken only if they yield a stream of returns that, in discounted present value, exceeds the cost of financing. In measuring the cost of investment, firms must consider the influence of taxes, interest rates, inflation, and other variables. Thus, two main factors affect investment decisions—changes in expected sales, also known as the accelerator

effect, and the cost of capital. This section describes these factors in greater detail.<sup>6</sup>

### *The accelerator effect*

According to the accelerator principle, net investment depends directly on changes in expected sales. Thus when expected sales accelerate, investment increases. The accelerator relationship results from the assumption that firms try to maintain their capital stock at a constant multiple of expected sales. Assuming for the moment that firms keep their capital stock at desired levels every period, investment is simply the change in the desired capital stock. And since the desired capital stock depends on expected sales, investment depends on changes in expected sales. Because expected sales react with varied responses to such volatile variables as business and consumer confidence, net investment spending can be highly volatile. "Any random event—an export boom, an irregularity in the timing of government spending, or ... a revision of consumer estimates of permanent income"—can cause expected sales growth and investment to shift in the same direction.<sup>7</sup>

While the accelerator theory, in conjunction with a theory or assumption about the determination of expected sales, can explain some of the variation in investment spending, it is far too simple and incomplete a theory to explain most of investment behavior. While the theory is consistent with the near coincidence of peak investment years and peak years of real GNP growth (1950, 1956, 1960, 1966, 1973, and 1978) and the coincidence of investment slumps and real GNP growth troughs (1949, 1952, 1954, 1958, 1961, 1971, 1976, and

<sup>5</sup> For an alternative treatment of replacement investment in which firms do not replace worn out plant and equipment on a fixed schedule, see Martin Feldstein and David Foot, "The Other Half of Gross Investment: Replacement and Modernization Expenditures," *The Review of Economics and Statistics*, Vol. 53, no. 1, February 1971, pp. 49-58.

<sup>6</sup> The following discussion draws heavily on Chapter 14 of Robert Gordon, *Macroeconomics*, 3rd edition, Little, Brown and Company, Boston, 1984.

<sup>7</sup> J. M. Clark, "Business Acceleration and the Law of Demand," *Journal of Political Economy*, Vol. 25, March 1917, pp. 217-235, as quoted in Gordon, p. 448.

1982), the theory only partly explains year-to-year fluctuations in investment.<sup>8</sup> Two problems with empirical efforts to explain investment with a simple accelerator equation are variations in the timing and the size of the response of investment to changes in real sales (often proxied by real GNP). In other words, investment reacts to sales growth with a variable lag and an unstable coefficient.

The delay with which investment sometimes responds to changes in sales results from production lags and adjustment costs. These effects can be incorporated in the accelerator theory by relaxing the assumption that firms maintain their capital stock in every period at its desired level. If it takes time for investment projects to be completed or if costs rise as a result of carrying out investment projects too fast, firms will allow their actual capital stock to deviate from desired levels. Any change in desired capital will be made up only partially through current investment.

In addition to a lag structure, another way of generalizing the simple accelerator model is to allow a variable ratio of desired capital to expected sales. If the desired capital-expected sales ratio reacts systematically to changes in the cost of capital, an explanation emerges for variations in the size of the response of desired capital to expected sales growth.

#### *Cost of capital and the capital-sales ratio*

In a more general accelerator model, the desired capital-sales ratio varies with the real user cost of capital. When considering investment projects, firms evaluate the potential increase in revenue from adding to their existing stock of capital. Expressed as a percentage, this additional revenue, called the marginal product of capital (MPK), equals the

change in revenue divided by the cost of the investment project. As firms add more and more capital to their production process, the marginal product of capital declines because of diminishing marginal returns. Firms evaluate the merit of investment projects by comparing the marginal product of capital with the real user cost of capital. The user cost of capital is the added cost of operating new plant or equipment over some period. This cost is also expressed as a percentage of the cost of the investment project.

New investment projects will be undertaken up to the point where the marginal product of capital just equals the real user cost. If the marginal product of capital were greater than the real user cost, firms could increase profits by investing in new plant and equipment. But if the marginal product of capital were less than the real user cost, firms would make losses on marginal additions to their capital stock. If something happened to lower the real user cost of capital and firms had previously invested to the point where the marginal product of capital equaled user cost, firms would have a new incentive to invest in more capital. Thus, changes in the user cost of capital affect firms' desired capital-sales ratio and lead to fluctuations in investment demand. Where before only changes in expected sales influenced investment behavior, changes in user cost now also influence investment.

What determines the user cost of capital? Ignoring taxes for the time being, three factors affect user cost. First, there is an interest cost. Firms either pay interest on loans used to buy capital or forego interest by tying up funds in the purchase of capital goods. The higher the interest rate, the higher the user cost of capital and the lower the rate of investment. Second, there is a depreciation cost. Plant and equipment gradually wear out through normal use and need to be replaced. The cost of this

<sup>8</sup> Gordon, pp. 448-449.



wearing out of capital is the depreciation rate, which measures the amount per year a firm must invest simply to maintain its capital stock at a constant level of productivity. The faster capital depreciates, the higher its user cost. Third, there is an offset to user cost through inflation. As inflation raises the cost of new plant and equipment, it simultaneously raises the value of existing plant and equipment. Inflation, therefore, provides a capital gain that lowers the user cost of capital.

Taxes, acting independently or in conjunction with interest rates, depreciation, and inflation, add another dimension to user cost. There are four basic ways in which taxes influence user cost. One effect is through the corporate income tax. In a world with taxes, an investment project must earn a higher before-tax rate of return to provide investors the same after-tax rate of return. Thus, when the corporate income tax rises, firms pay a higher interest rate and incur a higher user cost of capital. Fewer investment projects provide a marginal product greater than user cost, causing investment to fall.<sup>9</sup> Another avenue of influence of taxes on user cost is the rate of depreciation. Because U.S. tax laws allow firms to deduct the value of their depreciating plant and equipment from their corporate income tax, the tax code influences user cost. If the government liberalizes depreciation allowances, as it did in 1954, 1962, 1964, and 1981, user cost falls and investment may rise.

A third way in which taxes affect user cost is through the investment tax credit. Since 1962, firms have been able to receive a credit on their corporate tax bill equal to a small proportion of investment on plant and equipment. This amount was 10 percent in 1983. Any investment tax credit directly reduces tax lia-

<sup>9</sup> The deductibility of interest payments partly offsets this effect by providing an incentive for savers to borrow to invest.

bilities and increases profits. Thus, an increase in the investment tax credit decreases user cost and tends to increase investment. Finally, with inflation, corporate taxes indirectly raise user cost. This effect results from the lack of indexing provisions in the tax code for the valuation of depreciation.<sup>10</sup>

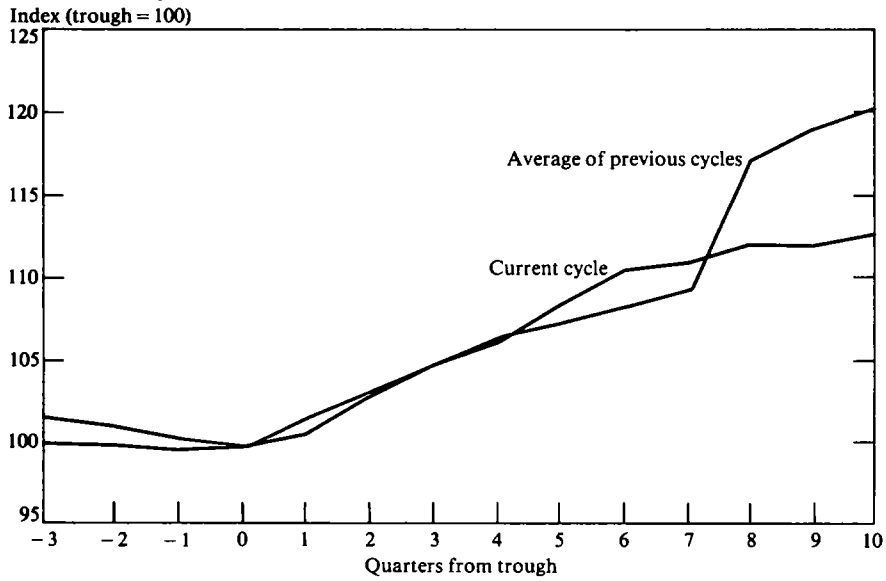
While the direct effects of user cost and expected sales changes on investment are theoretically known, there is more uncertainty about their relative importance and how they interact. Other things constant, increases in interest rates, economic depreciation rates, or effective tax rates raise user cost and depress net investment. Inflation raises user cost and lowers investment by interacting with an unindexed tax code, but lowers user cost and raises investment by providing capital gains. Finally, increases in expected sales growth, which are often associated with increases in real GNP growth, raise the desired capital stock and increase investment spending. Thus, when other things are constant, the effects on investment of expected sales (or GNP) growth and various components of user cost are known. But other things are seldom constant. When all factors of investment are changing at the same time, theory alone cannot determine their relative importance. The next section, therefore, reviews empirical evidence on the interaction of various factors of investment and their impact on investment behavior since 1981.

### **Explanations for the recent investment boom**

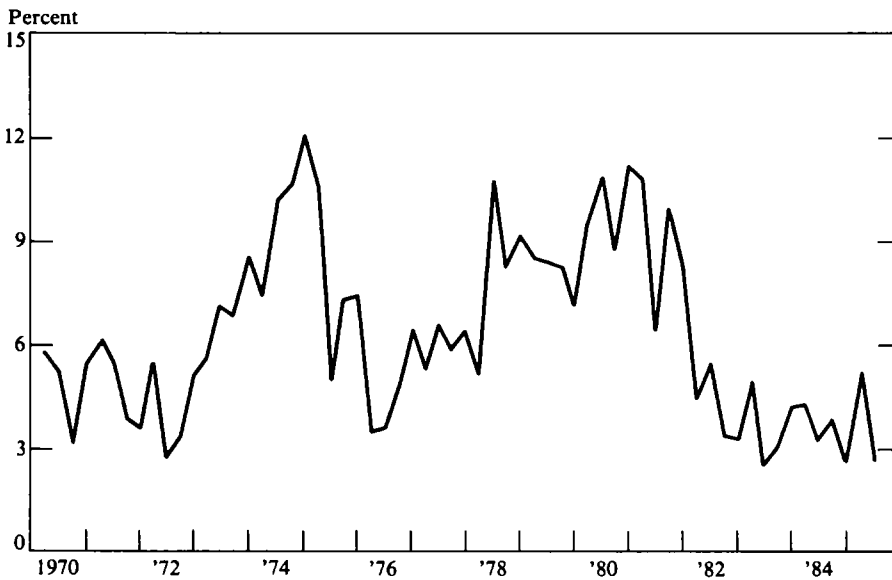
The unusually rapid growth of business investment after 1982 occurred simultaneously

<sup>10</sup> There is also a lack of indexing in the tax code for the valuation of inventories. Because inventory valuation affects cash flow, the lack of indexing of inventories to inflation may raise user cost and reduce investment.

**CHART 5**  
**Real gross national product**

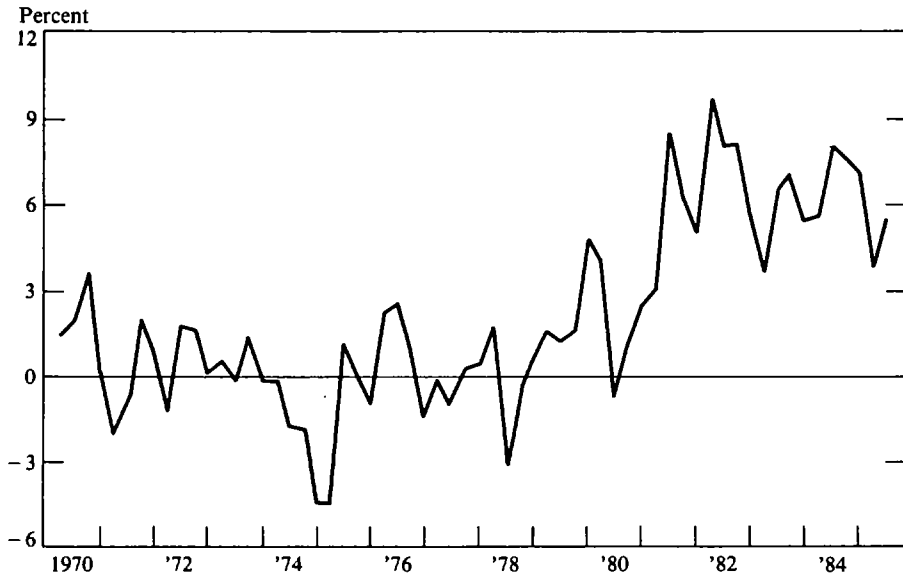


**CHART 6**  
**Inflation (growth rate of the GNP deflator)**



Source: *Survey of Current Business*, Bureau of Economic Analysis. Obtained from Data Resources, Inc.

**CHART 7**  
**Real interest rate**



Source: Yield on Treasury securities at constant one-year maturity minus annual percentage change of the GNP implicit price deflator. Yield from Board of Governors.

with rapid real GNP growth, falling inflation, and a high level of real interest rates. Furthermore, investment boomed shortly after the introduction of tax legislation designed specifically to stimulate investment spending. This section looks at the behavior of key variables since 1981 relative to their historic norms, describes the tax legislation introduced in 1981 and 1982, and reviews the methods and findings of recent investment studies.

Charts 5 through 7 track the recent behavior of real GNP growth, inflation, and interest rates relative to past behavior. Chart 5 compares quarterly real GNP growth in the current business cycle with its growth in an average of five previous postwar business cycles. As a proxy variable for changes in expected sales growth, increases in real GNP growth should be associated with rising investment. But while investment has been unusually strong since 1982, real GNP growth—as shown in

Chart 5—has been fairly typical of previous postwar business cycles. Thus, growth in real GNP alone probably cannot explain recent investment behavior.<sup>11</sup>

Chart 6 shows quarterly changes in the implicit GNP deflator. By this measure, inflation has fallen dramatically since 1980. But because inflation affects investment in two offsetting ways, it is not clear what effect lower inflation has had on investment. Inflation raises the value of existing capital while, for tax purposes, lowering the value of depreciation.<sup>12</sup> Thus, lower inflation has a theoretically ambiguous impact on investment.

<sup>11</sup> In the accelerator model, the level of investment depends on growth in GNP. The rate of changes in investment, therefore, depends on the change in the growth rate of GNP. Because, in the early stages of the current recovery, the change in GNP growth was higher than average, GNP growth probably explains part of the investment boom.

<sup>12</sup> Inflation also lowers, for tax purposes, the value of inventories. See footnote 9.

Finally, Chart 7 shows real interest rates on one-year U.S. Treasury bills, a variable that should move closely with long-term real interest rates. Theoretically, the real interest rate should measure the difference between market rates of interest and expected inflation. But because expected inflation cannot be observed, actual inflation is used instead. Chart 7, therefore, only approximates the recent behavior of real interest rates. In light of apparently high real interest rates since 1980, it is surprising that investment spending was so strong. According to the theory developed in the previous section, high real interest rates imply a high user cost of capital. A high user cost of capital, in turn, reduces the number of investment projects that can be profitably undertaken. Thus, looking at interest rates alone, investment spending should have been weak.

In addition to high real interest rates, low inflation, and typical real GNP growth, two tax cuts potentially influenced the course of investment since 1980. The Economic Recovery Tax Act (ERTA) of 1981 introduced an accelerated cost recovery system that reduced the period over which assets could be depreciated for tax purposes, increased the investment tax credit on eligible assets, and liberalized rules governing the transfer of tax benefits from one party to another. In 1982, the Tax Equity and Fiscal Responsibility Act (TEFRA) reversed some aspects of ERTA and liberalized others. Among the new rules affecting business, "the scheduled acceleration in depreciation write-offs due in 1985 and 1986 was repealed, a 'basis adjustment' was adopted to offset part of the investment tax credit, and the safe-harbor leasing laws were repealed and replaced by a somewhat liberalized version of the pre-1981 leasing laws."<sup>13</sup>

<sup>13</sup> Leonard Sahling and M. A. Akhtar, "What Is Behind the

TEFRA's main effect was to restrict the equipment tax benefits contained in ERTA. These benefits, however, had not been very great in the first place. According to the theory developed in the previous section, tax law changes such as the combination of ERTA and TEFRA should reduce user cost and stimulate investment.<sup>14</sup>

What were the relative importance of various factors influencing investment, such as high real interest rates, low inflation, rapid GNP growth, and tax incentives after 1982? Two principal views have emerged. One view attributes the investment boom mainly to the tax cuts of 1981 and 1982. The other view downplays the importance of tax cuts and attributes the boom to a combination of factors.

The view that tax cuts stimulated investment after 1981 has been put forward by John Makin and Raymond Sauer.<sup>15</sup> They argue that tax cuts more than offset high real interest rates and, together with strong real GNP growth, produced a vigorous investment recovery. Their analysis is based on a model in which investment depends directly on actual and prospective changes in output and inversely on actual and prospective changes in user cost. Rather than estimate user cost, however, they prefer the proxy measure of changes in the ratio of federal debt to GNP. This is because, they claim, actual user cost "typically displays too little quarter-to-quarter movement to identify reliable parameter estimates of its impact on

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Capital Spending Boom?" *Quarterly Review*, Federal Reserve Bank of New York, Winter 1984-85, p. 25.

<sup>14</sup> For a discussion of the sensitivity of investment to alternative tax incentives, see David Berson and V. Vance Roley, "Business Fixed Investment in the 1980s: Prospective Needs and Policy Alternatives," *Economic Review*, Federal Reserve Bank of Kansas City, February 1981, pp. 3-16.

<sup>15</sup> John Makin and Raymond Sauer, "The Effect of Debt Accumulation on Capital Formation," *Studies in Fiscal Policy*, American Enterprise Institute Working Paper No. 1, November 1984.

capital formation.”<sup>16</sup> The debt-to-GNP ratio, they claim on the other hand, is a valuable indicator of the level of real interest rates and the effective marginal tax rate on income from capital.<sup>17</sup>

Makin and Sauer’s model tracks investment very well for the 1960:Q1 to 1982:Q3 sample period.<sup>18</sup> As a test of the role of the 1981-82 tax cuts, the authors forecast their model out-of-sample from 1982:Q4 to 1984:Q2 and beyond. Because ERTA was enacted only shortly before the end of the sample and TEFRA was enacted after the end of the sample, the implied reduction in expected marginal user cost would probably not have been captured by the debt-to-GNP ratio. Thus the model would be expected to underpredict investment after 1982. Because, in fact, the model does underpredict investment, it adds support to the idea that tax changes had a strong influence on investment. “While systematic effects of user cost changes on capital formation are difficult to detect in lengthy time series studies such as ours, sharp exogenous changes in user cost resulting from tax code changes do appear to produce significant deviations of investment from its projected path.”<sup>19</sup>

Most other recent investment studies contradict the view that tax cuts were the primary cause of the investment boom. Barry Bosworth directly attacks the view by looking at the differential impact of tax reductions on various

types of investment spending.<sup>20</sup> For each of 19 categories of producers’ durable equipment and two types of structures, he estimates an accelerator equation for the period from 1958 to 1980. He then uses these equations to forecast investment by sector from 1980 to 1984. Finally, he relates the cumulative error from each equation during 1983 and 1984 to changes in the user cost of capital and various components of the user cost. He finds that office equipment (mainly computers) and automobiles bought by business accounted for 93 percent of the rise in business spending between 1979 and 1984. But he also finds that “the tax changes were of little benefit for purchases of autos, and that they actually increased the tax rate on computers.”<sup>21</sup>

If not taxes, what then induced the increased investment in autos and equipment? According to Bosworth, a sharp decline in their relative—or inflation-adjusted—prices. During the first half of the 1980s, for example, the price deflator for producers’ durable equipment rose at less than half the general rate of inflation. Furthermore, relative to price rises in the nonfarm business sector, equipment prices dropped 11 percent between 1980 and 1984.

Another piece of the puzzle, according to Bosworth, is the behavior of business structures. As noted in the first section, commercial construction rose sharply in 1983 and 1984 while other construction, such as that for industrial buildings, actually declined. Both types of structures, however, had the same tax treatment throughout the period. Bosworth reconciles this anomaly by suggesting that investment in commercial construction is less risky than industrial construction. Commercial structures, he claims, are less specialized and,

<sup>16</sup> Makin and Sauer, p. 12.

<sup>17</sup> Makin and Sauer justify this claim on the basis of Olivier Blanchard, “Current and Anticipated Deficits, Interest Rates, and Economic Activity,” *European Economic Review*, June 1984, pp. 7-27.

<sup>18</sup> Makin and Sauer, p. 12.

<sup>19</sup> Makin and Sauer, pp. 11-12. Another implication of the Makin-Sauer model is that as tax cuts eventually raise the debt-to-GNP ratio, they potentially lead to higher real interest rates, inflation, and future taxes. Thus tax cuts large enough to raise the debt-to-GNP ratio raise the user cost of capital and eventually lower investment.

<sup>20</sup> Barry Bosworth, “Taxes and the Investment Recovery,” *Brookings Papers on Economic Activity*, 1985:1, pp. 1-38.

<sup>21</sup> “Was the Investment Recovery Really a Supply-Side Miracle?” *Business Week*, July 29, 1985, p. 14.

therefore, easier to sell. As a result, financing is easier to obtain for commercial projects through borrowing. The higher leveraging of commercial projects, combined with the tax deductibility of interest payments, gave structures a greater effective reduction in tax rates. In some cases, these factors may have resulted in a net subsidy to commercial real estate investment.

Another approach to determining the cause of the strong investment recovery is to examine the investment sectors of large econometric models. While most large models, including those of Data Resources, Inc., the Board of Governors of the Federal Reserve System, the University of Michigan, and Wharton, all underestimate investment spending, even after allowing for tax code changes and using actual values for the determinants of spending,<sup>22</sup> there is one exception. In a study conducted at the Federal Reserve Bank of New York, two standard models fairly accurately forecast investment after 1981.<sup>23</sup> Specifically, the study forecast investment spending out-of-sample and found that the two models—a version of the Bureau of Economic Analysis model and an old version of the Federal Reserve Board-MIT-Pennsylvania (FMP) model—performed about as well after 1981 as before 1981. More to the point, their performance was about the same after the tax policy changes as they were before.

The difference between the New York Federal Reserve Bank study and other large econometric models is the treatment of an unobserved variable—the real cost of funds. Most large models imply a rise in the real cost of funds as a result of the rise in nominal interest rates and the fall in inflation. This rise in the

cost of funds more than offsets the fall in real capital goods prices and cuts in taxes. The New York Federal Reserve study, however, differs in its adjustment of nominal interest rates for inflation. Unlike other studies, it also combines debt and equity finance costs into a single measure of the cost of funds. As a result, the real cost of funds in the New York Federal Reserve study rises only slightly during the 1980-84 period and, after adjusting for declining taxes and capital goods prices, actually declines.<sup>24</sup>

While the New York Federal Reserve Bank study suggests no structural change in the behavior of investment after the 1981-82 tax cuts, it does suggest that ERTA and TEFRA significantly reduced the user cost of capital below what it would otherwise have been. "But judged in terms of the FMP model, these tax changes appear to have contributed only about one-fifth of the 1983-84 growth in capital spending."<sup>25</sup> The greater part of the boom in capital spending, the authors go on to say, came from the personal tax cuts under ERTA, which stimulated actual and expected sales, and the sharp drop in interest rates in 1982.

One final piece of evidence casting doubt on the view that tax cuts held primary responsibility for the investment boom comes from comparative international studies. A National Bureau of Economic Research (NBER) study recently found that countries with higher effective taxes on income from capital also have higher growth in nonfinancial corporate capital.<sup>26</sup> Of the countries examined, West Germany had the highest overall effective tax on

<sup>22</sup> Bosworth, p. 7.

<sup>23</sup> Sahling and Akhtar, pp. 19-20. While the New York Federal Reserve Bank study predicts the change in investment fairly well, it makes the same (rather large) level error that other models make in the 1981-84 period.

<sup>24</sup> Bosworth, pp. 9-10.

<sup>25</sup> Sahling and Akhtar, pp. 19-20.

<sup>26</sup> Mervyn King and Don Fullerton, "The Taxation of Income From Capital: A Comparative Study of the U.S., U.K., Sweden and West Germany—Comparisons of Effective Tax Rates." National Bureau of Economic Research Working Paper No. 1073, February 1983, Chapter 7.6, p. 6.

income from capital and the highest capital growth rate. Sweden was second in both categories, and the United States was third. The United Kingdom had the lowest overall effective tax on income from capital and the lowest capital growth rate. On the other hand, because this evidence does not establish causality in either direction, it could simply be the result of slower growing countries reacting to their slow growth by providing investment incentives which reduce overall effective tax rates.

### **Summary and conclusions**

Investment spending has boomed since the beginning of the current economic expansion, but not all types of investment have shared equally in the recovery. Spending on commer-

cial construction and certain types of business equipment—computers and automobiles, for example—take most credit for the unusually strong growth in business fixed investment. While some analysts have claimed that the tax cuts of 1981-82 were responsible for the unusual strength of investment, most empirical evidence points toward a multiplicity of factors. These include lower user cost resulting from declining capital goods prices and from the sharp drop in nominal interest rates in 1982. These factors also include expected sales growth resulting from increased consumer confidence and from personal tax cuts. Thus, while the business tax cuts contributed to the growth in investment spending after 1982, they probably were not responsible for business investment's unusual strength.