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Chapter Author: Martin S. Feldstein

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6 Tax Rules and Business Investment

Martin Feldstein

The current proposals to eliminate the investment tax credit and to modify other aspects of business taxation have brought renewed attention to the question of how sensitive business investment is to changes in tax rules. Critics of the tax changes proposed by the administration and of those enacted by the House of Representatives charge that they would significantly depress productive investment in business plant and equipment. The defenders of these proposals argue in reply that investment is relatively insensitive to tax rules, depending instead on capacity utilization and business confidence.

This paper reviews new statistical evidence that the share of gross national product (GNP) devoted to net investment in plant and equipment is quite sensitive to tax-induced changes in the profitability of such investment.[1] The specific quantitative analysis implies, for example, that the tax bill passed by the House of Representatives in December 1985 would reduce overall net investment in plant and equipment by approximately 10%, with larger reductions in equipment and smaller reductions in investment in structures. Over time, this reduction in net investment would reduce the capital stock and gross investment by even larger percentages. As a result, the eventual reduction in gross investment would be approximately as large as the increase in tax revenue that would result from the proposed changes in corporate tax rules. To state this conclusion in different words, the estimates imply that the increased tax revenue would eventually come entirely at the expense of reduced investment.

Martin Feldstein is the George F. Baker Professor of Economics at Harvard University and the president of the National Bureau of Economic Research.

1. The evidence is presented in Feldstein and Jun (1987).

Statistical analysis of the effects of taxation on investment is, of course, made difficult by the complexity of the investment process. Individual corporate investment decisions reflect a myriad of considerations. In addition to tax rules and financing costs, individual investment decisions respond to technological changes, market opportunities, capacity utilization pressures, and long-term corporate strategies. No statistical model can begin to incorporate all of these complexities.

My own strategy of research in this area therefore has been to focus on aggregate investment and to study several alternative simple models that "let the data speak for themselves." Looking at total business investment rather than the specific investments of individual firms or industries minimizes the importance of the very specific (and generally unobservable) factors that influence particular investment decisions. Although particular industries or types of investment may be unusually strong at a certain time, this will generally be balanced within the overall aggregate by other investments that are relatively weak. Thus oil industry investments may be depressed at the present time, but investments in industries that compete with foreign imports are likely to become relatively strong because of the recent decline in the dollar. Similarly, while computer-related investments were relatively strong in the first half of the 1980s, this was balanced by the unusually weak activity in those industries that were then hurt by the very strong dollar. These specific factors tend to be submerged in the overall aggregate level of investment, which responds to factors that are common to most industries and most types of investments.

Studying alternative simple specifications provides a way of judging whether the estimates are robust to what is inevitably a substantial simplification. The statistical analysis summarized in this paper considers two ways of measuring the impact on business investment of tax-induced changes in profitability. The first method relates investment to the net of tax profitability of existing corporate capital. The second method relates investment to the difference between the after-tax profitability of new investments and the cost of debt and equity capital to the firm. Although the two methods are conceptually and operationally quite different, they provide similar estimates of the effect on investment of changing tax rules.

The analysis discussed in this paper deals with the ratio of net nonresidential fixed investment to GNP. Nonresidential fixed investment is the investment that corporations and noncorporate businesses make in plant and equipment. Every type of nonfinancial investment other than inventories and land is included. In 1985, nonresidential fixed investment was approximately $475 billion. The Department of Commerce estimates that nearly three-fourths of this amount was required

to replace the capital stock that is lost through actual depreciation during the year. Thus net nonresidential fixed investment was $133 billion.

Table 6.1 presents data on the ratios of investment to GNP since 1955.[2] The distinction between gross and net investment is clearly important. The ratio of gross investment to GNP has been rising since the mid-1960s, even though the net investment ratio declined by nearly one-third over that same period. The reason for this difference is that economic depreciation (i.e., the difference between gross and net investment) as a share of GNP has been rising. This increase in relative depreciation has occurred for three reasons: the size of the capital stock rose relative to GNP, the share of equipment in the capital stock rose (which raises depreciation because equipment depreciates more rapidly than structures), and the nature of the equipment shifted to more rapidly depreciating types of assets such as computers.

Net investment is the economically important concept because it is net investment that determines the growth of the nation's capital stock. Moreover, a change in net investment eventually causes a corresponding change in the total capital stock and thus in both depreciation and

Table 6.1 **Ratios of Investment to GNP**

Years	Net Investment	Gross Investment
1955–59	.026	.093
1960–64	.025	.091
1965–69	.042	.106
1970–74	.034	.105
1975–79	.027	.104
1980–84	.029	.115
1979	.037	.115
1980	.030	.112
1981	.032	.116
1982	.023	.113
1983	.022	.111
1984	.037	.125
1985[a]	.040	.130

[a]Data for 1985 refer to the first three quarters only at a seasonally adjusted annual rate.

2. The data in table 6.1 and all other data presented and used in this paper are based on the national income and product accounts (NIPA) available in the fall of 1985 when the research was completed. The December 1985 benchmark revisions of the national income and product accounts are not reflected in any of the current analysis since information on the net capital stock, net investment, and other key variables was not available by the end of 1985. The data for 1985 refer to only the first three quarters of the year since data for the fourth quarter are not available on the old NIPA basis.

gross investment. Therefore, the analysis in this paper focuses on net investment.

The data in table 6.1 show that net nonresidential fixed investment has averaged only 3.0% of GNP during the three decades from 1955 through 1984. The period began with investment at an even lower level of only about 2.5% of GNP, a condition that contributed to the Kennedy tax bill and the introduction of the investment tax credit. Net investment rose to over 4% of GNP in the second half of the 1960s (reaching a peak of 4.7% in 1966) and then declined to 3.4% of GNP in the first half of the 1970s and only 2.7% of GNP in the second half of the decade. In the 1980s, investment was initially just slightly above 3% of GNP, then declined during 1982 and 1983 to only 2.2% of GNP before rising to 3.7% in 1984 and 4.0% in 1985. At 4.0% of GNP, the 1985 level of net investment was only exceeded in four other years during the past three decades and always at a time when the level of capacity utilization was substantially higher than it was in 1985.

6.1 Investment and the Net Rate of Return

One way of assessing the impact of tax rules on investment is to examine the relationship between investment and the real net-of-tax rate of return earned on the capital invested in the nonfinancial corporate sector. Table 6.2 presents data on the ratio of net nonresidential

Table 6.2 **The Rate of Investment and the Net Rate of Return**

Year[a]	Investment-GNP Ratio (1)	Net Rate of Return (2)	Capacity Utilization (3)
1955–59	.026	.033	.824
1960–64	.025	.042	.808
1965–69	.042	.060	.080
1970–74	.034	.037	.826
1975–79	.027	.028	.796
1980–84	.029	.029	.773
1979	.037	.032	.842
1980	.030	.026	.846
1981	.032	.019	.793
1982	.023	.029	.783
1983	.022	.030	.703
1984	.037	.041	.740
1985[b]	.040	.054	.808

[a]All variables in col. 2 and 3 are lagged one year. Thus, capacity utilization 1965–69 refers to average capacity utilization in 1964–68.

[b]Investment for 1985 refers to the first three quarters at a seasonally adjusted rate.

fixed investment to GNP (col. 1), the net-of-tax return on nonfinancial corporate capital (col. 2), and the rate of capacity utilization (col. 3). Since statistical studies generally indicate that there is a lag of twelve to eighteen months in the response of investment to changes in its determinants, rate of return and capacity utilization in table 6.2 are shown with a one-year lag; thus capacity utilization for 1955–59 actually refers to the average capacity utilization rate in the period 1954–58.

The starting point for calculating the net-of-tax rate of return variable is the pretax return on nonfinancial corporate capital. Joosung Jun and I constructed this measure as the ratio of profits (with economic depreciation and an inventory evaluation adjustment) plus net interest payments to the value of the corresponding corporate capital stock at replacement cost. To obtain the net rate of return, shown in column 2, we subtract from this the ratio to the capital stock of the taxes paid by the corporations, their shareholders, and their creditors to federal, state, and local governments.[3] Thus, the net rate of return reflects variations in the pretax profitability of capital and in the overall effective tax rate.

A high value of the net return on nonfinancial corporate capital should make this type of investment more attractive relative to other potential uses of funds such as owner-occupied housing, government debt, real estate syndications, and overseas investment. A comparison of columns 1 and 2 shows that there has been a strong association between the variations in this net return and the concurrent variations in the ratio of investment to GNP. The net rate of return was highest in the second half of the 1960s (6.0%) when the investment-GNP ratio was highest (4.2%) and lowest in the second half of the 1970s (2.8%) when the investment-GNP ratio was lowest (2.7%). During the first half of the 1980s, the annual values of the net rate of return rose to a quite strong 5.4%, roughly paralleling the rise in the investment-GNP ratio to 4.0%.

Virtually all of the increase in the net rate of return since the late 1970s has resulted from tax legislation and from the reduction in the rate of inflation. The fall in inflation has been important because the high inflation rate of the late 1970s increased effective tax rates by eroding the value of depreciation and producing artificial capital gains. The pretax real rate of return fluctuated from year to year but was essentially the same in 1983–84 as it had been five years earlier.

One reason for the year-to-year variations in profitability is the cyclical fluctuation in capacity utilization shown in column 3. Such cyclical fluctuations in capacity utilization are also a direct and inde-

3. A complete description of this calculation is presented in Feldstein and Jun (1986).

pendent cause of variations in investment activity. The statistical models that I have estimated allow for the separate effects of net profitability and of capacity utilization. These statistical models, described fully in Feldstein and Jun (1986), show that the combination of the real net rate of return and the rate of capacity utilization explains most of the year-to-year variation in the ratio of net investment to GNP. Figure 6.1 shows the actual annual ratios of net investment to GNP (the solid line) and the value predicted by a model that relates the investment-GNP ratio to the net profitability of column 2 and the capacity utilization of column 3 in table 6.2 (the broken line).

What is particularly important is the statistical evidence that there is a strong and independent relation between investment and the real net rate of return of the previous year. A typical example of the estimated relation implies that each one-percentage-point increase in the real net rate of return on nonfinancial corporate capital raises the investment-GNP ratio by 0.4 percentage points.

Although this can only approximate an average relationship over the entire thirty-year period, it is interesting to note how well it explains major shifts in the investment ratio. Consider, for example, the sharp fall in investment between the high of 4.2% of GNP in 1965–69 and the 2.7% of GNP a decade later, a decline of 1.5% of GNP. Between these same dates, the net return fell from 6.0% to 2.8%, a fall of 3.2%. Applying the overall estimate that each percentage point change in the rate of return alters the investment ratio by 0.4 percentage points im-

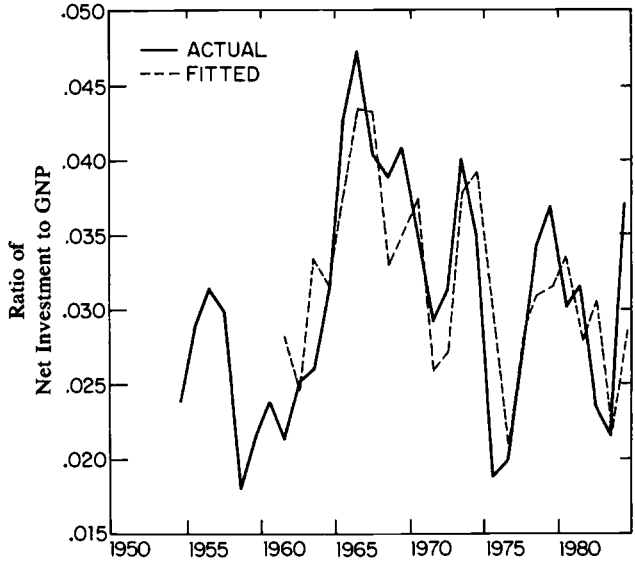

Fig. 6.1 Return over cost model

plies a decline in the investment-GNP ratio of 1.3 percentage points. Thus the decline in the rate of return between the late 1960s and the late 1970s can account for more than 85% of the fall in the investment-GNP ratio.

The predictions of the net return analysis also fit well with the experience of the 1980s. The investment-GNP ratio rose from 3.3% in 1979–81 to 3.9% in 1984–85, an increase of nearly 20%. The corresponding lagged measures of the real net rate of return rose from 2.6% to 4.8%, implying a 0.9-percentage-point rise in the investment-GNP ratio, while the decline in capacity utilization implied a 0.1-percentage-point fall in the investment-GNP ratio. Thus the actual increase in investment was slightly less than the increase predicted on the basis of the stronger investment incentive implied by the sharp rise in the real net rate of return.

The analysis also provides a basis for making a rough calculation of how investment would respond to future changes in tax rules such as those proposed by the administration in May 1985 or the ones enacted by the House of Representatives in December 1985. The administration's proposal would raise corporate tax liabilities by about 25%. The proportional decrease in personal taxes on capital income would be much smaller. The relation between investment and the real net rate of return implies that the administration plan would reduce the investment-GNP ratio by about 4% of its average over the past three decades.

Over time, the lower net investment would mean a smaller capital stock and therefore lower replacement investment as well. In the end, gross investment would be reduced by somewhat more than 4% of what it would be under current law. At the 1988 level of GNP, this would be equivalent to a reduction of $20–$25 billion in gross investment, just about the amount of revenue that would be raised by the net increase in the taxation of capital. In short, the ultimate effect of the proposed tax change would be to reduce gross investment by an amount equal to the rise in the tax on capital. All of the increased revenue would come out of reduced investment.

The tax plan passed by the House of Representatives would eventually raise corporate taxes by about twice as much as the administration plan. Its effect would therefore be to reduce investment by about twice as much as the administration plan. Again, the analysis implies that all of the increased revenue would eventually come out of reduced investment.

6.2 Profitability and the Cost of Capital

As I emphasized at the beginning of this paper, any economic model represents a substantial simplification and, as such, can lead to incor-

rect inferences. The only way to draw reliable inferences is to use a variety of alternative models that involve different simplifying assumptions. If the different approaches lead to the same conclusion, that conclusion can be held with greater confidence.

With this in mind, I have related the investment-GNP ratio to the difference between corporate profitability and the cost of funds. More specifically, I measured after-tax corporate profitability by the maximum real net return that corporations can afford to pay to providers of debt and equity capital for funds invested in a "standard investment" in plant and equipment. This measure of profitability is altered by changes in tax rules (the corporate and personal tax rates, depreciation schedules, and the investment tax credit) and by changes in projected inflation. Column 2 of table 6.3 shows the behavior of this profitability measure since 1961.

The incentive to invest depends on the difference between the net profitability of investment and the actual cost of funds to corporations, that is, the real net-of-tax returns that the firm must pay on debt and equity capital. Column 3 of table 6.3 presents the calculated values of the real cost of funds since 1961.

The potential real net return was quite high in the mid-1960s (reaching 6.7%), was eroded by the interaction of inflation and depreciation rules in the 1970s, and then rose sharply after passage of the 1981 Economic Recovery Tax Act. Although the real cost of funds was also substan-

Table 6.3 **The Rate of Investment and the Net Rate of Return over Cost**

Year[a]	Investment-GNP Ratio (1)	Maximum Potential Real Net Return (2)	Real Cost of Funds (3)	Maximum Potential Return Minus Cost of Funds (4)
1961–64	.026	.050	.033	.017
1965–69	.042	.059	.041	.018
1970–74	.034	.051	.036	.015
1975–79	.027	.056	.040	.016
1980–84	.029	.068	.050	.018
1979	.037	.059	.052	.007
1980	.030	.061	.053	.008
1981	.032	.059	.047	.012
1982	.023	.072	.053	.019
1983	.022	.075	.053	.022
1984	.037	.075	.046	.029
1985[b]	.040	.073	.060	.013

[a]All variables in col. 2–4 are lagged one year. Thus, capacity utilization 1965–69 refers to average capacity utilization in 1964–68.

[b]Investment for 1985 refers to the first three quarters at a seasonally adjusted rate.

tially higher in recent years than it had been before, the difference between the potential real return on investments in plant and equipment and the cost of funds for those investments (presented in col. 4 of table 6.3) doubled between the final years of the 1970s and the first three years after the 1981 legislation.

My statistical analysis with Joosung Jun shows that each one-percentage-point increase in the difference between the real net return and the cost of funds raises the investment-GNP ratio by about 0.3 percentage points. This estimate implies that the increase in the difference between the real net return and the cost of funds since the beginning of the decade can account for about two-thirds of the rise in investment since that date. In short, this model, like the previous one, indicates a very substantial effect of the changing tax rules on the incentive to invest in plant and equipment. Figure 6.2 compares the actual investment-GNP ratio with the ratios predicted by a combination of the capacity utilization rate and the difference between profitability and the cost of funds.

The administration's 1985 tax proposal would reduce the potential net return on equipment quite substantially and raise the net return on structures. On balance, the potential net return on the average combination of plant and equipment would decline only slightly, implying a relatively modest reduction in the overall investment-GNP ratio (although probably a quite substantial effect on equipment investment).

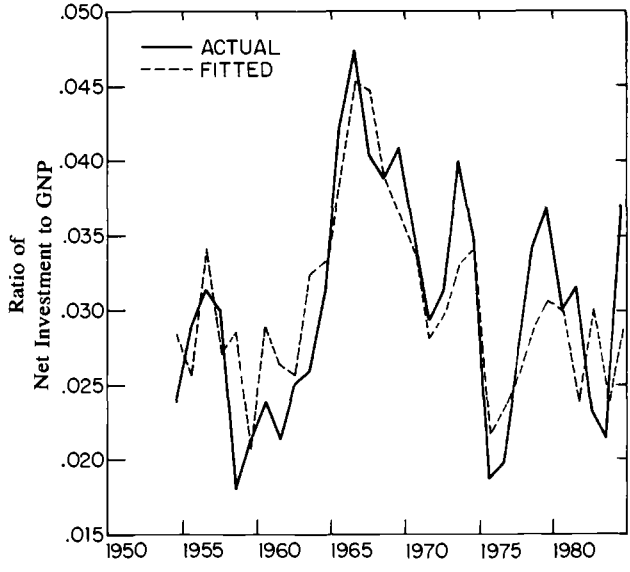

Fig. 6.2 Net return model

In contrast to this small effect of the administration's tax proposal, the House bill implies that the potential real net return would fall by 1.4 percentage points, about 20% of its current value. Our statistical analysis implies that this would reduce the ratio of net investment to GNP by about 0.4% of GNP or some 15% of its three-decade average. This implies that the near-term reduction in investment would be equal to about half of the increase in corporate tax revenue. The resulting decline in the growth of the capital stock would eventually reduce gross investment by 15%, an amount equal to some 1.5% of GNP or 50% more than the increased revenue that would result from the House bill's proposed increase in corporate taxes. In other words, the eventual effect of the House bill would be to reduce fixed nonresidential investment by $1.50 for every dollar of additional tax revenue collected from businesses.

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