NBER WORKING PAPER SERIES

DID ACRS REALLY CAUSE STOCK PRICES TO FALL?

Andrew B. Lyon

Working Paper No. 2990

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 1989

This paper is based in part on research in my Ph.D. dissertation completed at Princeton University. I would like to thank David Bradford, Don Fullerton, Harvey Rosen, and Robert Schwab for helpful suggestions. The research is part of NBER's research program in Taxation. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

NBER Working Paper #2990
May 1989

DID ACRS REALLY CAUSE STOCK PRICES TO FALL?

ABSTRACT

This paper tests the hypothesis that the introduction of the Accelerated Cost Recovery System in 1981 caused a reduction in stock prices by reducing the value of existing capital. A second hypothesis that these depreciation changes benefited firms by increasing the return from new investment is also examined. Stock returns during the period surrounding enactment of this legislation are evaluated with data on capital stock and investment for over 800 firms. The empirical results suggest that neither hypothesis is an important determinant of cross-sectional differences in returns during this period. Differences in stock returns are in the direction predicted by the second hypothesis, but the relationship is not statistically significant. A test of the joint effects of both hypotheses operating simultaneously is supported by the data, but this relationship is also not statistically significant.

Andrew B. Lyon
Bureau of Business and
Economic Research and
Department of Economics
University of Maryland
College Park, Maryland 20742

The net cost of purchasing depreciable assets, that is, the gross price paid for an asset less the present value of depreciation allowances and the investment tax credit, was reduced substantially for nearly all assets by the Accelerated Cost Recovery System (ACRS) provisions of the Economic Recovery Tax Act of 1981. The popular or "traditional" view of these changes is that the lower net cost of investment goods results in higher profits for the firms that purchase these goods. In opposition to the traditional hypothesis, others argue (notably, Alan Auerbach and Laurence Kotlikoff (1983) and Martin Feldstein (1981)) that these tax changes reduce the value of existing assets. This is because existing assets are not eligible for the more favorable depreciation provisions, yet they must compete against the cheaper, new investment in output markets. This view will be referred to as the Auerbach-Kotlikoff-Feldstein (A-K-F) hypothesis.

Feldstein (1981) maintains that a large stock market decline in the two months following the passage of the 1981 Tax Act is evidence that these investment incentives reduce firm value:

> The fundamental reason for the decline in share prices is that the new accelerated tax depreciation rules apply only to new investments and not to the existing stock of plant and equipment... [T]he accelerated depreciation for new investment will lower product prices and therefore reduce the future net earnings on the old stock of plant and equipment. This lower profitability translates directly into lower share values.

Lyon (1989) presents a model of the firm with adjustment costs where the introduction of investment incentives need not reduce firm value. With adjustment costs, capital in place today can allow the firm to earn an excess return on new investment. At the same time, expansion of the capital stock through positive net investment lowers output prices and reduces the value of the existing capital stock. Combining these two effects, the change in the total value of the firm is the present value of any excess returns on new investment, less any decline in value of existing assets. Without a precise understanding of the degree to which adjustment costs allow excess returns on new investment to persist, the net effect of the tax change on the total value of the firm is ambiguous.

The A-K-F and traditional hypotheses both represent extreme assumptions on the nature of adjustment costs. Under the A-K-F hypothesis, no adjustment costs exist so that no rents are earned on new investment. Under the traditional hypothesis, infinite marginal costs of adjustment for gross investment in excess of depreciation prevent an expansion of the capital stock. In this case, rents are earned on replacement investment, yet the value of existing capital is unchanged.

Feldstein's evidence in support of the A-K-F hypothesis is based on the decline in value of the average firm. His analysis does not consider cross-sectional differences in the composition of firms' capital stocks and the different changes in firm value implied by these different capital stocks.

Thomas Downs and Hassan Tehranian (1988) provide a better test of the A-K-F hypothesis by examining differences in stock returns across three different industries during consideration of the 1981 legislation. Their evidence supports the A-K-F hypothesis, but unfortunately they do not test the traditional hypothesis with their data.[1]

Here, I attempt to provide a more general test of both hypotheses by examining cross-sectional differences in returns for over 800 firms traded on the New York Stock Exchange for which firm-specific data on capital stock are available. In addition to examining a large number of firms in many different industries, this study also examines capital stock in each industry in fine detail. Because the tax law prior to 1981 differentiated among different types of equipment in important ways, the decline in value implied by the A-K-F hypothesis varies greatly for different types of equipment. This study calculates predicted changes in value for 32 different types of equipment and structures.

Drawing on Feldstein's observation of the large stock market decline following passage of the 1981 Tax Act, this study examines only the two-month period of July and August 1981 surrounding the passage of this legislation. The empirical findings of this study find little evidence in support of the A-K-F hypothesis during this period. Other tests find that changes in firm value are in the direction predicted by the traditional hypothesis, but this relationship is not statistically significant. A test of the simultaneous operation of both hypotheses is also supported by the data, but again the relationship is not statistically significant.

The next section provides an empirical formulation of the traditional hypothesis and the A-K-F hypothesis. Section 2 presents the empirical results. The final section offers possible explanations for the lack of significant support for either hypothesis.

1. Empirical Specification of the Traditional and A-K-F Hypotheses

This section provides a framework for modeling the change in the value of the firm predicted by the traditional hypothesis and the A-K-F hypothesis. The first two parts of this section examine the predictions of these hypotheses for a single representative asset.

In the third part of this section, calculations are made for the two hypotheses for 32 types of equipment and structures. These asset-specific price changes are matched with industry and firm data on the ownership of these assets to provide estimates of the expected changes in firm value predicted by the two hypotheses.

1.1 The Traditional Hypothesis

The benefit of the tax change according to the traditional hypothesis can be calculated using the following model. Let the present value of depreciation allowances for one dollar of new capital under the old tax law be Z_0, worth τZ_0 after taxes for a firm with a statutory tax rate of τ. Let the present value of depreciation allowances on one dollar of new capital under the new law be Z_1. A change in the investment tax credit for an asset from the rate ITC_0 to ITC_1 may also be considered. Under the old law, the net cost of purchasing an asset with a one dollar gross purchase price is

$$1 - ITC_0 - \tau Z_0 . \qquad (1)$$

Under the new law, assuming no change in the statutory corporate tax rate, the net cost of purchasing the asset is

$$1 - ITC_1 - \tau Z_1 . \qquad (2)$$

The purchaser of one dollar of capital benefits from the tax change by the reduction in the net cost of the asset, γ, where

$$\gamma = (ITC_1 - ITC_0) + \tau(Z_1 - Z_0). \qquad (3)$$

Because the change in the value of credits and depreciation allowances differs among assets, the total benefit to a firm will differ according to the mix of assets purchased. For example, to calculate the savings to a firm on investment in a given year, the average saving on a unit of investment for the firm is multiplied by the firm's total investment in that year. The expected saving from future investment would be appropriately discounted to reflect the present value of the savings accruing to the firm from the tax change.

This simple model assumes that the gross cost of purchasing a new asset is unchanged by the tax law, which is consistent with the assumption that capital goods may be produced at a constant marginal cost. Standard economic analysis assumes that under these conditions investment would expand in assets or sectors with higher after-tax rates of return until any differential in rates of return were eliminated.

1.2 The Auerbach-Kotlikoff-Feldstein Hypothesis

The A-K-F hypothesis assumes that under the new tax law a marginal investment earns the economy's required after-tax rate of return. Therefore, if the net cost of purchasing a new asset declines, the value of an identical existing asset must decline in order to compete against the new asset.

The decline in the value of an existing asset is slightly more complicated to calculate because two possible values for the existing asset must be considered.

One value is the value of the asset assuming that it is kept by its current owner. The second value is its price if it were resold. These two values may differ if a new owner of the used asset is eligible for depreciation allowances different from those of the original owner. The new value of the asset is assumed to be the greater of these two possible values.

Under the 1981 Act, used assets may be depreciated by a second owner as if the asset were new, where the basis is the price paid by the second owner. With accelerated depreciation schedules and depreciation based on historical cost, a purchaser of the used asset is likely to receive greater depreciation benefits than those that remain to the original owner. Therefore, the value of the used asset to a second owner is greater than the value of the asset to the original owner.

The original owner, however, is liable for recapture taxes on any difference between the sales price of the used asset and the remaining basis of the asset. Additionally, the original owner may be liable for recapture of the investment tax credit. If recapture taxes are greater than the difference in the value of the used asset to a second owner and the value to the original owner, then it is not advantageous to resell the asset.

The decision to resell an asset is sensitive to the age and economic depreciation rate of the asset, as well as to the different recapture treatment of equipment and structures. Auerbach and Kotlikoff (1983) show that for equipment resale is not profitable, while for structures resale is profitable in most instances. For a 10-year-old structure, the advantage from reselling the asset versus holding it is approximately two percent of the asset's gross value.[2] However, this calculation ignores any transaction costs associated with selling the structure and costs associated with relocation. Such costs may be substantial for industrial structures and certain commercial property. Additionally, this calculation ignores the taxation of capital gains on appreciated land on which the structure is located. In the remainder of the paper, it is assumed that it is never advantageous to resell any assets.

When an asset is not resold, the asset declines in value by the amount γ given by eq. (3). One unit (net of depreciation) of a used asset is assumed to produce the same physical output as one unit of an identical new asset. Therefore, the value of the used asset is equal to the net cost of a unit of new capital, plus any remaining depreciation benefits on the used asset. Because the net cost of a unit of new capital declines by γ from the tax change, the value of the unit of used capital declines by the same amount.

The change in the total value of a firm predicted by the A-K-F hypothesis is equal to the value of γ for an average unit of capital owned by the firm multiplied by the value of the firm's capital stock.

1.3 Changes in Firm Valuation

The benefit provided by the purchase of a new asset predicted by the traditional hypothesis is equal to the decline in value of the asset predicted by the A-K-F hypothesis when the asset is not resold. Both values are given by γ in eq. (3). Each hypothesis uses γ in a different manner, however, so that the changes in firm value predicted by the hypotheses do not have the same absolute value.

Table 1 lists 32 types of equipment and structures in column 1 and presents estimates of the price change γ for each asset in column 2. Each γ is calculated from asset-specific tax parameters described in columns 3 through 8. Tax lifetimes under the old law for each of the assets, shown in column 3 of the table, are taken from Fullerton and Henderson (1985). In most cases these lifetimes represent the shortest lives allowed under the Asset Depreciation Range provisions of the prior law, except where a longer permissible life was more advantageous due to eligibility for a larger investment tax credit. The present value of depreciation allowances under old law Z_0 is shown in column 4 for each asset.[3] The investment tax credit under old law ITC_0, shown in column 5, is based on the tax lifetime given for each asset.

The lifetimes of the assets under the 1981 law are given in column 6. The present value of depreciation allowances for equipment and public utility property are calculated using the 1981-1984 schedule,[4] which was made "permanent" by the 1982 law.[5] The present value of depreciation allowances Z_1 under the 1981 law is given in column 7 and the investment tax credit ITC_1 is given in column 8.

Using these values, the price change γ is given per dollar of capital (measured at gross replacement cost) in column 2. It is found that per dollar of equipment, γ ranges from a low of 1.4 cents for aircraft to a high of 9.1 cents for ships and boats.[6] For structures, assuming no resale, γ ranges from 3.4 cents for mining shafts and wells to over 15 cents for commercial buildings and hospitals. The value of γ for public utility property ranges from 2.8 cents to 6.3 cents.

Since firms employ a variety of assets, the value of γ for an average asset owned or purchased by the firm is a weighted average of the various price changes for the different assets. Under the traditional hypothesis, to calculate the savings to the firm provided by the tax change on an average unit of investment by the firm, it is necessary to know the flow of gross investment by the firm in each of the different capital assets. Under the A-K-F hypothesis, to calculate the decline in the value of an average unit of capital owned by a firm, it is necessary to know the amount of the firm's capital stock in each of the different assets.

A detailed data set on the capital stock of the 32 types of equipment and structures by industry has been constructed by Dale Jorgenson.[7] These data are used to calculate the average price change per dollar of depreciable capital stock, $\bar{\gamma}$, predicted by the A-K-F hypothesis for each of 44 industries. The average benefit per dollar of investment in depreciable assets predicted by the traditional hypothesis is assumed to be equal to the capital stock-weighted value $\bar{\gamma}$.[8] It is assumed that all firms in a given industry have the same value of $\bar{\gamma}$.

Given these data, and information from COMPUSTAT on gross total investment and net plant by firm, two variables are constructed to represent the change in value to each firm predicted by the two hypotheses.

The variable TRAD is defined as

$$\text{TRAD} = \bar{\gamma}\ (I/V), \tag{4}$$

where I is gross total investment and V is total assets as reported for each firm by COMPUSTAT in 1981. The traditional hypothesis predicts that the benefit to each firm from the 1981 tax law is positively related to the variable TRAD.

The variable AKF is defined as

$$\text{AKF} = \bar{\gamma}\ (NP/V), \tag{5}$$

where NP is the net stock of plant and equipment reported for each firm by COMPUSTAT. The variable AKF represents the percentage decline in value of the firm predicted by the A-K-F hypothesis.

The variables TRAD and AKF are calculated for 1070 firms in 42 of the 44 industries defined by Jorgenson. Average values by industry of these variables and $\bar{\gamma}$ are reported in table 2. The retail trade industry (number 42) and the finance, insurance, and real estate industry (number 43) have the two highest values of $\bar{\gamma}$, reflecting the industries' high usage of commercial buildings relative to equipment. The finance, insurance, and real estate industry, however, has large investments in nondepreciable assets, such as land and cash equivalents, so that the decline in the value of the industry as represented by AKF is smallest for this industry. The retail trade industry's large investments in inventories similarly moderates the value of AKF for this industry.

The water transportation industry (number 32) has a high value of $\bar{\gamma}$ due to its extensive use of ships and boats, which were shown in table 1 to have the largest γ among equipment. Because this industry does not have large stocks of other assets, it has one of the highest values of the variable AKF.

2. Empirical Procedures and Results

The House and Senate separately approved the 1981 tax act in late July, both houses approved the conference version during the first week of August, and President Reagan signed the legislation the following week. In July and August 1981 the value-weighted market returns of the New York Stock Exchange were 0.1 percent and -5.6 percent, respectively. Here, I examine whether cross-sectional differences in returns during this period followed the pattern predicted by the traditional or the A-K-F hypotheses.

The sample of firms are those traded on the New York Stock Exchange, with complete returns for the 70-month period beginning March 1978 and ending December 1983, and for which COMPUSTAT data are available. Firms were dropped from this sample if they were foreign,[9] oil and gas producers or refiners,[10] or public utilities.[11] After obtaining stock return information and making these exclusions, there remain 820 and 875 firms for which the variables TRAD and AKF are calculated, respectively.

A version of the Capital Asset Pricing Model (CAPM) is estimated using monthly data for the period from March 1978 to December 1983. The average monthly excess return, δ, for the two-month period of July and August 1981 is calculated for each of the firms.

The traditional hypothesis is examined by the cross-sectional regression

$$\delta = a + b\ (TRAD) + \mu, \tag{6}$$

where δ is a vector of excess returns across firms and the vector TRAD consists of the variable defined in eq. (4) for all firms. A significant positive estimate of b would support the traditional hypothesis.

The A-K-F hypothesis is tested by the cross-sectional regression

$$\delta = a + b\ (AKF) + \mu, \tag{7}$$

where the vector AKF consists of the variable defined in eq. (5) for all firms. The A-K-F hypothesis predicts b will be negative.

Finally, both hypotheses are tested simultaneously with the regression

$$\delta = a + b_1(\text{TRAD}) + b_2(\text{AKF}) + \mu. \tag{8}$$

A finding of $b_1 > 0$ and $b_2 < 0$ would support both hypotheses. This might occur if firms benefited from the tax change to the extent that they undertake new investment, but the value of their existing assets declines due to the expansion of the capital stock.

OLS estimates of eqs. (6) through (8) are presented in table 3. The estimated coefficient of TRAD in eq. (6) is positive as the traditional hypothesis predicts, but it is not significant. The coefficient of AKF in eq. (7) is positive, the opposite sign predicted by the A-K-F hypothesis, but it also is not significant. Eq. (8) finds that testing both hypotheses simultaneously results in a positive coefficient for TRAD and a negative coefficient for AKF, supporting the joint effects of each hypothesis, but the estimated coefficients remain insignificant.[12]

The low R^2 in each of the equations and lack of significance of the estimated parameters indicate that neither theory is an important determinant of cross-sectional differences in stock returns during this period.

Additional tests of the two hypotheses were conducted using seemingly unrelated regression models to control for possible cross-correlation of the dependent variable.[13] These estimates resulted in conclusions similar to those from the OLS regressions.

3. <u>Discussion</u>

This study does not find significant support for either the traditional hypothesis or the A-K-F hypothesis in explaining changes in firm valuation following the passage of the Economic Recovery Tax Act of 1981. The different procedures used to test the two hypotheses all yield similar findings. It is not clear whether the failure to find significant support for either hypothesis is due to the non-existence of the forces described by either hypothesis, the possible offsetting effects of the two hypotheses, limitations in the data, or other factors that may have interfered with the empirical tests of the two hypotheses. Several possible reasons for failing to find support for either hypothesis are explored here.

The passage of the Economic Recovery Tax Act of 1981 by both houses in late July 1981 was believed to be an important event in the formation of this legislation. Because this period marked the beginning of a decline in the stock market, later claimed by Feldstein to be the result of the accelerated depreciation provisions, it was thought important to test the two hypotheses during this period.

Unfortunately, July 1981 also marked the beginning of the eighth post-war recession in the United States. The stock market typically declines at the beginning of a recession, and the declines measured at the beginning of this recession do not appear unusual. To control fully for the cross-sectional effects of the recession on stock returns may require the use of a model more sophisticated than the CAPM.

The passage of ERTA resulted in large personal income tax reductions in addition to the ACRS provisions. The personal tax cuts were three to four times larger than the reduction in business taxes from the ACRS provisions. If the personal tax cuts favored certain industries, such as consumer goods, these effects may obscure any changes resulting from ACRS.

The findings here are very different from those of Lyon (1989) who examined four separate changes to the investment tax credit between 1966 and 1971. That study found strong support for the traditional hypothesis. Industries with intensive investment in equipment are predicted by the traditional hypothesis to benefit from increases in the investment tax credit. In contrast, structure-intensive industries are predicted by the traditional hypothesis to benefit relatively more from the 1981 tax changes. Competitive pressures and adjustment costs may differ among these industries.

Further, the price elasticities of supply for structures and equipment may be different. If the short-run supply curve for structures is less elastic than for equipment, perhaps due to scarce land for new structures, less of the benefit of the tax incentives predicted by the traditional hypothesis will go to the purchasers of new structures. These same considerations would lessen the decline in value of existing structures predicted by the A-K-F hypothesis.

Finally, problems of a more technical nature in testing the two hypotheses should be noted. Tests of the traditional hypothesis and A-K-F hypothesis require accurate estimates of expected future investment and current capital stock by asset for firms. The proxies for the expected change in firm value are sensitive not only to the total amount of investment or capital stock of a firm, but also to its composition by each different type of asset. In this study, an estimated industry average is used for each firm. The reduction in the net purchase cost of an asset provided by the 1981 tax law, as shown in table 1, varied greatly by asset. Small differences in the weights applied to each asset or the level of disaggregation may result in large differences in the proxies.[14]

For example, Downs and Tehranian in their test of the A-K-F hypothesis for three industries predict that the food industry should decline in value least, with successively greater declines in paper products and then stone, clay, and glass. The variable AKF calculated for these same industries in table 2 predicts smaller declines in stone, clay, and glass than in paper products.

Tests of both hypotheses are also sensitive to the construction of γ, which in turn relies on accurate estimates of the present value of depreciation allowances before and after ACRS, and calculation of the benefits of reselling assets. Roger Gordon, James Hines, and Lawrence Summers (1987) show that through the use of installment sales or the timing of resale in years that the firm had tax losses, recapture liability could be diminished from that assumed in this study. They also report IRS data showing that more than one-third of the structures placed in service in 1981 and 1982 did not make use of the most accelerated methods. Both of these factors would tend to diminish the decline in value of existing structures.

In summary, there are many possible reasons for failing to find support for either the traditional or A-K-F hypotheses. To some extent the coincidence of the recession and the large personal income tax reductions of the 1981 Act may be responsible for this finding. If, however, the differences in the findings between this study (or that of Downs and Tehranian) and Lyon (1989) are due to the effects of the tax changes on a different set of industries or a different set of assets, these findings may be important. Much further empirical research still remains to be undertaken to understand the effects of these investment incentives on investment and the effects of these incentives on the wealth of owners of existing assets.

ENDNOTES

1. Cutler (1988) examines the effects of the 1986 Tax Reform Act on stock prices. These changes are more difficult to model since both corporate tax rates and depreciation allowances and credits were modified by the Act.

2. For a representative structure with a 35-year tax life under pre-ACRS rules and a 15-year tax life under ACRS, the decline in value of the structure from eq. (3) is 12 percent. For a 10-year-old structure, the gain from resale is approximately 2 percent, leaving the owner with a net loss of 10 percent. This calculation assumes that the structure has an economic depreciation rate of .03, the historical rate of inflation is .08, and the nominal after-tax discount is .10. The advantage to resale declines with the age of the structure. Further details of these calculations are provided in Auerbach and Kotlikoff (1983) and Lyon (1986).

3. This present value is calculated under the assumption that the asset is purchased in the middle of the tax year and depreciation allowances are discounted using a 10 percent nominal after-tax interest rate. The present value is calculated in continuous time. It is assumed that under the old law, equipment and public utility property are depreciated using double-declining balance with a switch to straight-line, and structures are depreciated using the 150 percent declining balance method with a switch to straight-line.

4. This schedule approximates 150 percent declining balance with a switch to straight-line. Depreciation allowances for structures are calculated using the 175 percent declining balance method with a switch to straight-line. The 1982 law introduced a provision that reduced the basis for depreciation by 50 percent of the investment tax credit claimed for the asset. This provision is not incorporated in these calculations.

5. The original 1981 law provided 175 percent declining balance depreciation with a switch to straight-line for equipment placed in service in 1985 and double declining balance for equipment placed in service after 1985. If the 1981 law was thought to be permanent, asset prices may have fallen in a way that reflected these future changes in depreciation schedules. The 1982 law repealed the changes to be made in 1985 and thereafter. Here, it is assumed that the 1981-1984 depreciation schedule is the "permanent" schedule. Of course, even this assumption is a bit strong considering that depreciation schedules were lengthened in 1984, 1985, and, more significantly, in 1986.

6. Auerbach and Kotlikoff (1983) mistakenly calculate γ for a representative unit of equipment as 10.5 cents. This is actually the approximate value of $Z_1 - Z_0$ for the asset that they consider. This value must be multiplied by the tax rate τ to yield γ. As a result of this error, their estimate of the aggregate decline in the value of equipment from ACRS is overstated by more than 50 percent.

7. Using capital flow tables on the amount of investment in each asset and applying economic rates of depreciation to past investment, Jorgenson has constructed estimates of the net stock of each of the 32 assets present in each of 44 industries for 1977. This data set is explained in more detail in Fraumeni and Jorgenson (1980).

8. Ideally, the average benefit per dollar of investment should be calculated using investment weights. Capital-stock weights underweight investment in faster depreciating assets if the capital stock of all assets expands at the same growth rate. This bias would make it more likely to reject tests of the traditional hypothesis, but would not affect tests of the A-K-F hypothesis.

9. Foreign firms were excluded because their returns during this period are not expected to be significantly affected by changes in U.S. tax law.

10. Oil firms were excluded because a takeover struggle for one oil producer is believed to have been responsible for a significantly positive excess return of 11 percent for other firms in this industry in July and August 1981. As shown in table 2, the oil firms (industries 5 and 17) have high values of TRAD and AKF. Given these firms' large returns during the two-month period of the tax change, the exclusion of these firms tends to weaken support for the traditional hypothesis and strengthen support for the A-K-F hypothesis. It is felt, however, that inclusion of these firms may incorrectly bias the results in the opposite direction.

11. Electric and gas public utilities were omitted from the study due to their special regulated nature. Tax provisions for these utilities are designed to prevent regulators from passing on the benefits provided by accelerated depreciation and the investment tax credit to utility consumers. In addition, a separate provision of the 1981 Act provided for reduced taxation of certain dividends paid by utilities and reinvested by their investors. This provision might be expected to increase the return to utility stocks during this time period in a way not related to the tested hypotheses.

12. WLS estimates, with weights inversely proportional to the standard error of δ, resulted in very similar parameter estimates.

13. These estimates are reported in Lyon (1986).

14. The study by Lyon (1989) is less sensitive to changes in the weights of different types of equipment, provided the total weight of all equipment is unchanged. This is because the investment tax credit was essentially the same for most equipment and zero for most structures.

References

Auerbach, Alan J. and Laurence J. Kotlikoff. "Investment versus Savings Incentives: The Size of the Bang for the Buck and the Potential for Self-Financing Business Tax Cuts," in Laurence Meyer, ed., ***The Economic Consequences of Government Deficits.*** Boston: Kluwer-Nijoff Publishing, 1983, pp. 121-149.

Cutler, David M. "Tax Reform and the Stock Market: An Asset Price Approach." ***American Economic Review*** 78 (1988): 1107-1117.

Downs, Thomas and Hassan Tehranian. "Predicting Stock Price Responses to Tax Policy Changes." ***American Economic Review*** 78 (1988): 1118-1130.

Feldstein, Martin. "The Tax Cut: Why the Market Dropped." ***The Wall Street Journal***, November 11, 1981, p. 26.

Fraumeni, Barbara M. and Jorgenson, Dale W. "The Role of Capital in U.S. Economic Growth, 1948-1976," in George M. von Furstenberg, ed., ***Capital, Efficiency, and Growth.*** Cambridge, Mass.: Ballinger, 1980, pp. 9-250.

Fullerton, Don and Yolanda Kodrzycki Henderson. "Long Run Effects of the Accelerated Cost Recovery System." ***Review of Economics and Statistics*** 67 (1985): 363-372.

Gordon, Roger H., James R. Hines, Jr., and Lawrence H. Summers. "Notes on the Tax Treatment of Structures," in Martin Feldstein, ed., ***The Effects of Taxes on Capital Accumulation***. Chicago: University of Chicago Press, 1987, pp. 223-254.

Lyon, Andrew B. "How Do Stock Prices Change when Corporate Tax Laws Change? An empirical Analysis of the Effect of Tax Laws on the Value of the Firm." Unpublished Ph.D. dissertation, Princeton University, 1986.

Lyon, Andrew B. "The Effect of the Investment Tax Credit on the Value of the Firm." ***Journal of Public Economics***, forthcoming 1989.

Table 1

Tax Parameters and Possible Asset Price Changes

			PRIOR LAW			1981 LAW		
	(1) ASSET	(2) PRICE CHANGE	(3) TAX LIFE	(4) Z	(5) ITC	(6) TAX LIFE	(7) Z	(8) ITC
1	Furniture and fixtures	.026	8.00	0.756	0.10	5	0.814	0.10
2	Fabricated metal products	.049	10.00	0.707	0.10	5	0.814	0.10
3	Engines and turbines	.074	12.48	0.654	0.10	5	0.814	0.10
4	Tractors	.021	5.00	0.840	0.067	5	0.814	0.10
5	Agricultural machinery	.026	8.00	0.756	0.10	5	0.814	0.10
6	Construction machinery	.026	7.92	0.758	0.10	5	0.814	0.10
7	Mining and oil field machinery	.023	7.68	0.765	0.10	5	0.814	0.10
8	Metalworking machinery	.051	10.16	0.704	0.10	5	0.814	0.10
9	Special industry machinery	.051	10.16	0.704	0.10	5	0.814	0.10
10	General industry equipment	.047	9.84	0.711	0.10	5	0.814	0.10
11	Office and computing machinery	.026	8.00	0.756	0.10	5	0.814	0.10
12	Service industry machinery	.029	8.24	0.750	0.10	5	0.814	0.10
13	Electrical machinery	.048	9.92	0.709	0.10	5	0.814	0.10
14	Trucks, buses, and trailers	.021	5.00	0.840	0.067	5	0.814	0.10
15	Autos	.020	3.00	0.905	0.033	3	0.891	0.06
16	Aircraft	.014	7.00	0.783	0.10	5	0.814	0.10
17	Ships and boats	.091	14.40	0.617	0.10	5	0.814	0.10
18	Railroad equipment	.069	12.00	0.663	0.10	5	0.814	0.10
19	Instruments	.032	8.48	0.744	0.10	5	0.814	0.10
20	Other equipment	.028	8.16	0.752	0.10	5	0.814	0.10
21	Industrial buildings	.097	28.80	0.370	0	15	0.580	0
22	Commercial buildings	.152	47.60	0.250	0	15	0.580	0
23	Hospital buildings	.153	48.00	0.248	0	15	0.580	0
24	Other nonfarm buildings	.105	30.90	0.351	0	15	0.580	0
25	Railroads	.041	24.00	0.477	0.10	15	0.567	0.10
26	Telephone and telegraph	.028	21.60	0.506	0.10	15	0.567	0.10
27	Electric light and power	.028	21.60	0.506	0.10	15	0.567	0.10
28	Gas	.063	19.20	0.539	0.10	10	0.676	0.10
29	Other public utilities	.052	17.60	0.562	0.10	10	0.676	0.10
30	Farm	.079	25.00	0.409	0	15	0.580	0
31	Mining shafts and wells	.034	6.80	0.753	0	5	0.826	0
32	Other nonbuilding facilities	.094	28.20	0.376	0	15	0.580	0

Table 2

Possible Industry Changes in Valuation

	(1) INDUSTRY	(2) $\bar{y}$	(3) TRAD	(4) AKF
1	Agricultural production	.042	.0006	.0036
2	Agricultural services, forestry, and fisheries	.038	n.a.	n.a.
3	Metal mining	.098	.0106	.0463
4	Coal mining	.048	.0050	.0263
5	Crude petroleum and natural gas extraction	.070	.0141	.0416
6	Nonmetalic mining and quarrying, except fuel	.048	.0030	.0256
7	Construction	.038	.0068	.0107
8	Food and kindred products	.079	.0068	.0257
9	Tobacco manufactures	.080	.0044	.0179
10	Textile mill products	.077	.0055	.0253
11	Apparel and other fabricated textile products	.075	.0031	.0123
12	Lumber and wood products	.073	.0070	.0386
13	Furniture and fixtures	.079	.0054	.0288
14	Paper and allied products	.067	.0072	.0346
15	Printing, publishing, and allied industries	.082	.0061	.0247
16	Chemicals and allied products	.065	.0056	.0256
17	Petroleum and coal products	.089	.0110	.0410
18	Rubber and miscellaneous plastic products	.066	.0046	.0232
19	Leather and leather products	.087	.0048	.0177
20	Stone, clay, and glass products	.073	.0058	.0341
21	Primary metal industries	.078	.0056	.0304
22	Fabricated metal industries	.071	.0052	.0191
23	Machinery, except electrical	.072	.0081	.0239
24	Electrical machinery, equipment, and supplies	.072	.0067	.0255
25	Motor vehicles and motor vehicle equipment	.066	.0092	.0257
26	Transportation equipment, except autos	.083	.0052	.0184
27	Instruments	.072	.0077	.0239
28	Miscellaneous manufacturing industries	.074	.0048	.0202
29	Railroads and railway express service	.055	.0037	.0321
30	Street, railway, bus lines, and taxi service	.023	.0016	.0078
31	Trucking service, warehousing, and storage	.027	.0044	.0142
32	Water transportation	.091	.0126	.0628
33	Air transportation	.018	.0024	.0125
34	Pipelines, except natural gas	.052	n.a.	n.a.
35	Services, incidental to transportation	.048	.0129	.0311
36	Telephone and miscellaneous communication services	.038	.0048	.0311
37	Radio broadcasting and television	.084	.0089	.0269
38	Electric utilities	.033	.0037	.0274
39	Gas utilities	.063	.0080	.0395
40	Water, sanitary, and other utilities	.094	.0108	.0662
41	Wholesale trade	.066	.0028	.0132
42	Retail trade	.104	.0042	.0204
43	Finance, insurance, and real estate	.137	.0003	.0011
44	Services	.078	.0084	.0280

Table 3

Relationship Between Excess Security Return δ
and the Expected Change in Firm Value

Equation	Hypothesis	TRAD	AKF	R^2
(6)	Traditional	0.410 (0.90)		.001
(7)	A-K-F		0.151 (1.01)	.001
(8)	Combination	0.621 (1.02)	-0.117 (0.52)	.001

t-statistics in parentheses