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CORPORATE PAYOUTS AND THE TAX PRICE OF CORPORATE RETENTIONS: EVIDENCE FROM THE UNDISTRIBUTED PROFITS TAX OF 1936-1938

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ABSTRACT

Many provisions of the U.S. tax code affect corporate decisions to pay out or retain earnings. Most studies of these effects have examined the effects of dividend and capital gains taxes on payouts. Relatively few studies have considered the effects of corporate taxes on retentions. In the early 1900s, the United States experimented with several corporate taxes on retentions. These taxes increased the price of corporate retentions, thereby encouraging corporate payouts. This paper studies the response of corporations to the most significant of these experiments -- the Undistributed Profits Tax of 1936-1938.

While the U.S. no longer directly taxes corporate retentions, our study provides empirical results relevant to two recent policy debates. First, to the extent that corporate payouts did respond significantly to a change in the corporate price of retentions, we can learn more about the implicit prices corporations place on internal funds. These estimates enable us better understand the effects of government policies designed to encourage corporate reinvestment. Second, our study provides evidence relevant to several recent proposals designed to resolve managerial agency problems. These proposals require managers to pay out their "free" cash flows as a way of committing not to waste financial capital. The Undistributed Profits Tax of 1936-1938 had a similar goal. Its maximum marginal tax rate of 27 percent on corporate retentions gave managers strong incentives to pay out retained earnings.

We study the effects of the Undistributed Profits Tax on corporate payouts using a panel data set on 26 large petroleum companies. These data have a number of advantages, not the least of which is the relative homogeneity of petroleum firms' investment opportunities. We find that on average corporate payout policies did respond significantly to the surtax in 1936, the first year of the tax. There was much less of a response in 1937, and practically none in the last year, 1938. The smaller payouts in 1937 and 1938 suggest that managers were able to find margins other than dividends through which they could reduce their tax burden. These other margins included the short-term manipulation of expenses and delays in recognizing revenues. These responses suggest that managers place a relatively high valuation on internal versus external funds. They also suggest that proposals that would require managers to pay out free cash flows must resolve an important incentive problem -- how to get managers to reveal fully what cash flows are "free." Finally, our results document the importance of recognizing behavioral responses to taxes. That is, firms may respond to changes in relative tax prices by finding other margins by which they can reduce their tax burdens.

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1. Introduction

Many provisions of the U.S. tax code affect corporate decisions to pay out or retain earnings. Most studies of these effects have examined the effects of dividend and capital gains taxes on payouts. Relatively few studies have considered the effects of corporate taxes on retentions. In the early 1900s, the United States experimented with several corporate taxes on retentions. These taxes increased the price of corporate retentions, thereby encouraging corporate payouts. This paper studies the response of corporations to the most significant of these experiments -- the Undistributed Profits Tax of 1936-1938.

While the U.S. no longer directly taxes corporate retentions, our study provides empirical results relevant to two recent policy debates. First, to the extent that corporate payouts did respond significantly to a change in the corporate price of retentions, we can learn more about the implicit prices corporations place on internal funds. These estimates enable us better understand the effects of government policies designed to encourage corporate reinvestment. Second, our study provides evidence relevant to several recent proposals designed to resolve managerial agency problems. These proposals require managers to pay out their "free" cash flows as a way of committing not to waste financial capital (see for example Jensen, 1986, 1988, 1989). The Undistributed Profits Tax of 1936-1938 had a similar goal. Its maximum marginal tax rate of 27 percent on corporate retentions gave managers strong incentives to pay out retained earnings.

We study the effects of the Undistributed Profits Tax on corporate payouts using a panel data set on 26 large petroleum companies. These data have a number of advantages, not the least of which is the relative

homogeneity of petroleum firms' investment opportunities. We find that on average corporate payout policies did respond significantly to the surtax in 1936, the first year of the tax. There was much less of a response in 1937, and practically none in the last year, 1938. The smaller payouts in 1937 and 1938 suggest that managers were able to find margins other than dividends through which they could reduce their tax burden. These other margins included the short-term manipulation of expenses and delays in recognizing revenues. These responses suggest that managers place a relatively high valuation on internal versus external funds. They also suggest that proposals that would require managers to pay out free cash flows must resolve an important incentive problem -- how to get managers to reveal fully what cash flows are "free." Finally, our results document the importance of recognizing behavioral responses to taxes. As noted by Scholes and Wolfson (1988) and others, agents will often respond to changes in relative tax prices by finding other margins by which they can reduce their tax burdens.

2. The Undistributed Profits Tax of 1936-1938

The Undistributed Profits Tax of 1936-1938 was a tax on corporate retentions. The idea of such a tax was not new. The United States experimented with small undistributed profits surtaxes in the Revenue Laws of 1913, 1916, and 1918. These earlier taxes were prompted by distributive concerns. The 1918 tax, for example, was represented to the public as a tax designed to prevent wealthy individuals from sheltering their income in corporations. During the 1920s, there were debates about the merits of permanent taxes on corporate retentions, culminating in a formal proposal by the National Tax Association in 1927 for a tax on

retentions (see the discussion of this tax in Thorp and George, 1937). This tax was never passed.

Debates over taxes on corporate retentions continued into the 1930s. It was during this period that new undistributed profits taxes were proposed. Proponents of these new taxes argued that they were necessary because managers were wasting funds. For instance, Berle and Means (1932) and others argued that managers had incentives to use internal funds on suboptimal projects. Berle emphasized this point again in the preface to the 1967 edition of The Modern Corporation and Private Property. Support for significant undistributed profits taxes materialized early in the Roosevelt Administration. Acccording to economic advisor Rexford Tugwell (1933, p. 206, emphasis added):

> In general, the principle invoked would be to drive corporate surplus into the open investment market; for most of the trouble comes from self allocation occurring within a single organization ... [Funds] would have to seek reinvestment through the regular channels, and a concern's plans for expansion would be subject to check in the investment market.

Thus, there is excellent evidence that proponents of an undistributed profits tax believed that it would have a disciplining effect comparable to that in modern payout proposals.

Despite historical precedents and public debates over taxes on corporation retentions, the Undistributed Profits Tax of 1936-1938 appears to have been largely unanticipated.[5] No reference was made to it in President Roosevelt's budget messages of June 1935, or January 1936. The proposal was formally made by the President in a special message to Congress on March 3, 1936, in which he announced the need for the tax as a revenue-raising device.[6] His initial proposal was for the surtax to be permanent. However, strong opposition by Congress and lobbying efforts by business groups made a permanent tax politically risky. The

Undistributed Profits Tax survived in its original form through 1937. By 1938, legislative amendments reduced the effective surtax rate substantially. The tax expired formally in December 1939, in accordance with the Revenue Act of 1938. At the time, most observers seemed to agree that the tax only had a significant effect on payouts in 1936 and 1937 (see Thorp and George, 1937; Kendrick, 1937; and Lent, 1948).

The general structure of the surtax was as follows. The surtax was applied to after-corporate-tax net income. The surtax was graduated, with marginal tax rates that depended on the firm's retention rate. The marginal rates ranged from 7 percent for firms paying out more than 90 percent of their adjusted net income, to 27 percent for firms paying out less than 40 percent of adjusted net income.[7] As with most taxes, there were loopholes and variances. Three types of "relief" were allowed. Any firm with: (i) net income less than $50,000; (ii) covenants in financial contracts (signed prior to May 1, 1936) which restricted or proscribed dividend payments; or (iii) sinking-fund requirements for future debt repayment was exluded. (Only one of the last two exemptions could be applied for by any given firm.) Some types of companies were also explicitly exempt. These included corporations in receivership, commercial banks, and insurance companies.

As a technical matter, firms could circumvent payment of additional cash dividends by distributing certain types of stock dividends (see Rolbein, 1939). Firms, however, had to claim that such "dividends" increased the effective claims of shareholders. That is, dividends could be issued by distributing common stock to preferred stockholders and vice versa.[8] Taxable stock dividends (i.e., those that could be used to avoid payment of the surtax) accounted for only 0.75 percent and 0.85 percent

of total dividends in 1936 and 1937 respectively. They were only 0.4 percent of total dividends of corporations earning more than $5 million (see Lent, 1948).[9]

Since corporations could largely escape the surtax by increasing dividends or other distributions, it is somewhat surprising that the tax raised a substantial amount of revenue. In 1936 and 1937, the surtax raised $145 and $176 million, respectively, compared to normal corporate income tax revenues of $950 and $1,100 million.[10] The uneven distributive burden of the surtax also poses a puzzle. In 1936, 57.5 percent of corporate tax returns reported no net income and hence no surtax due. A total of 7.5 percent of returns paid a marginal surtax rate of at least 17 percent (see the Statistics of Income for 1936). Of the remainder, 22.1 percent (accounting for 37.3 percent of net income) paid no surtax. Conversely, a nontrivial fraction of firms paid surtax tax rates on retentions that exceeded their corporate income tax rate.

To summarize, the Undistributed Profits Tax was a largely unanticipated tax with rates that affected the relative price of dividends and retained earnings. Although firms had several margins, such as dividends and increased expenses, on which they could minimize their tax burden, some firms nonetheless paid large amount of tax.

3. Responses of Petroleum Firms to the Surtax

While the Undistributed Profits Tax favored corporate payouts, it is unclear to what extent corporations responded to the tax by paying out retained earnings. At the macroeconomic level, dividends did increase in 1936 and 1937, relative to 1935 and 1938 (see Table 1), and significant amounts of new external finance were raised. However, those years were also ones in which one would expect increased dividend payments since

earnings also increased substantially. Evidence suggesting that the tax did affect dividends payments remains anecdotal (see the review in Lent, 1948). Early statistical studies by McIntyre (1939), Guthmann (1940), and Lent (1948) were inconclusive. Poterba (1987), however, has estimated that the average marginal tax rate on undistributed profits was 8 percent (compared to the typical marginal corporate income tax rate of 15 percent.)

3.1 The Petroleum Industry and the Tax

We peopose to study the effects of the tax on corporate payouts using panel data on petroleum firms. We focus on a single industry so that we can better control for unobservable economic conditions that might affect payout decisions. We study the petroleum industry for several reasons. The industry is a large of the U.S. economy. Most petroleum firms have the same investment and earnings opportunities. Finally, the petroleum industry serves as an archetype for discussing agency problems (see for example Jacobs, 1986; Jensen, 1986; and Wolfson, 1985).

We assembled complete dividend and earnings data on a sample of 26 petroleum firms from 1924-1965. We begin in 1924 with the industry's recovery from World War I. We ended in 1965 because of consolidations and changes in oil and gas accounting conventions. Most of our data came from Studley and Shupert's Oil Industry Composite, data from company annual reports: the CCH Capital Changes Reporter, Moody's Industrial Manual; and, after 1933, from 10-K reports filed with the Securities and Exchange Commission.

Table 2 provides brief descriptions of the twenty-six firms in our sample. The companies vary in size from relatively small firms, such as

Barnsdall or Shamrock, to very large firms, such as Socony-Vacuum (now Mobil) or Standard Oil of New Jersey (now Exxon) in absolute terms, all of these firms were large by industry and world standards.

Table 3 provides information on the sample firms' surtax payments and their payouts. The first column for each year reports the actual payout rates (dividends divided by after-tax accounting earnings). Columns 2 and 3 report the firms' realized surtax rates (surtax payments divided by the surtax base) and the ratio of surtax payments to earnings. The last column estimates the ex ante marginal tax rate on retentions assuming that it did not responsed to the tax. These ex ante marginal rates were calculated from second-order autoregressive forecasts of dividends and earnings fit over the period 1926-1935.[11]

The differences between the estimated marginal and actual average tax rates provide a rough measure of firms' responses to the tax. The data indicate that although many firms had substantial corporate income tax liabilities in 1936 and 1937, some paid little undistributed profits tax.

3.2 Modeling Dividend Responses to the Surtax

To measure how much dividends changed in response to the tax, we require a model of dividend payout. The issue of why corporations pay dividends despite their apparent tax cost has been debated extensively in the public finance literature. Most empirical models of dividends we Lintner's (1956) partial adjustment model.[12] Poterba and Summers (1985) and Poterba (1987) provide detailed surveys of alternative models of corporate payout policies.

In their own model, Poterba and Summers (1985) explain dividends with a shareholder valuation model. They incorporate shareholders'

valuations of dividends into dividend equations by making the required rate of return depend on the payout ratio (dividends relative to earnings).[13] In their model, the cost of capital -- i.e., the amount the firm must provide its shareholders with a return after taxes of ρ -- is

$$r = \frac{\rho(d^*)}{(1 - \tau)[(1 - \theta)d^* + (1 - c)(1 - d^*)]}, \tag{1}$$

where τ, θ, and c are the tax rates on corporate income, dividends, and capital gains. At the optimal payout ratio, d^*, $\partial r/\partial d = 0$, which implies

$$\frac{\rho'(d^*)}{\rho} = \frac{1}{d^* + (1 - c)/(c - \theta)}.$$

If we denote the elasticity of the required return with respect to the payout ratio by ω (i.e., $\omega = \rho'(d)d/\rho(d)$), then the desired payout ratio d^* is determined by

$$d^* = \left(\frac{\omega}{\omega - 1}\right)\left(\frac{1 - c}{\theta - c}\right). \tag{2}$$

When shareholders value dividends, $\omega < 0$. When dividends are a residual in corporate accounts, $\omega = 0$, and the desired payout rate is zero. This view, is sometimes referred to as the "tax capitalization" or "trapped equity" view of dividends.[14] Allowing for an undistributed profits tax (at a constant rate u) changes this desired payout to

$$d^* = \left(\frac{\omega}{\omega - 1}\right)\left(\frac{(1 - c)(1 - u)}{\theta - c - u(1 - c)}\right). \tag{3}$$

We can convert equation (3) to a log-linear relationship between dividends and earnings by taking natural logarithms of both sides:

$$\ln D^* = \alpha + \ln \phi + \ln E^*, \tag{4}$$

In this equation, we observe dividends and perhaps the tax price variable, ϕ; however, we do not observe either α or economic earnings, E^*. While we parameterize $\rho(d^*)$, we do not know E^*. Most empirical models assume that $E^* = E$, where E is accounting earnings. Here we allow for an imperfect association between accounting earnings and economic earnings by assuming that accounting earnings imperfectly adjust to current economic earnings.[15] Specifically, we assume for convenience the simple adjustment process

$$\ln E_t = \ln E_{t-1} + (1/\lambda)(\ln E_t^* - \ln E_{t-1}) + \eta_t. \qquad (5)$$

The parameter λ controls rate of adjustment of economic to accounting earnings. The error η_t contains accounting measurement errors. Notice that when $\lambda = 1$ and the variance of η is zero, we obtain the conventional Lintner dividend model.

Equation (5) relates economic earnings to a smoothed version of accounting earnings. It implies

$$\ln E_t^* = \lambda \ln E_t + (1 - \lambda)\ln E_{t-1} + \psi_t.$$

Substituting this expression into the steady-state expression (4) yields

$$\ln D^* = \alpha + \ln \phi + \beta \ln E(\lambda)_t + \xi_t, \qquad (6)$$

Equation (6) shows that dividends respond to current earnings and past information on earnings. While it contains observable quantities, we have by construction introduced into the dividend equation a smoothed earnings variable which is correlated with the error term. Thus, in what follows we estimate equation (6) by instrumental-variable techniques.

Theoretical models of dividends such as (2) generally do not have simple dynamic properties away from their steady states. Following Poterba (1987), we allow for short-run departures from (6), with an error correction process. We assume that dividends deviate from their steady-state relationship according to the first-order serial correlation process,

$$\xi_t = \gamma \xi_{t-1} + \psi_t, \tag{7}$$

with $|\gamma| < 1$. This specification generalizes the above dividend model by allowing persistence in the shocks to accounting earnings. Substituting this stochastic specification into (6) gives our final model of dividends:[16]

$$\begin{aligned} \ln D_t^* &= \alpha + \ln \phi_t + \beta \ln E(\lambda)_t + \xi_t \\ &= \beta_0 + \beta_1 \ln D_{t-1} + \beta_3 \ln \phi_t + \beta_4 \ln \phi_{t-1} + \beta_5 \ln E(\lambda)_t \\ &\quad + \beta_6 \ln E(\lambda)_{t-1} + \psi_t. \end{aligned} \tag{8}$$

This equation is a general version of Lintner's partial adjustment model.[17] In addition to lagged dividends, current tax prices, and current earnings, it contains lagged information on earnings.

3.3 Tax Changes and Dividends

To estimate the model, we require an appropriate measure of the tax price ϕ. We do not observe the shareholders' relative tax price of dividends since this depends on the distribution of the shareholder marginal tax brackets by firm. As an approximation, we use for each firm the series constructed by Poterba (1987). It is a weighted average of tax prices for different U.S. shareholder income classes. This measure assumes that the effective accrual tax rate on capital gains is one-fourth

of the statutory rate (see Feldstein, Poterba, and Dicks-Mireaux 1983; and Poterba, 1987).

In what follows, we allow the effects of the Undistributed Profits Tax to differ between 1936 and 1937. Based on the anecdotal evidence in section 2, we expect to find a much smaller response in 1937, as firms found other margins on which to reduce their tax liabilities. We do not include an effect for 1938, because by then the tax had little effect on firms' payouts. For convenience, we assume the tax parameter is linear in these effects. Specifically, we assume

$$\phi_t = LNTAX_t + \beta_{36}LNMAR_{36} + \beta_{37}LNMAR_{37},$$

where LNTAX is $\ln(1 - c) - \ln(\theta - c)$, and $LNMAR_i$ is the projected marginal tax rate in year i.

4. Estimates of Dividend Responses

Table 4 reports information on dividend payments by each firm from 1935 to 1938. Most of the firms increased dividends per share in 1936 and 1937 (relative to 1935), and decreased them in 1938.

We estimate equation (8) separately for each firm. We chose not to pool the data and use a systems estimator because specification tests rejected imposing the constraint that firms' responses to tax and earnings changes were the same.[18] Preliminary inspection of the data and more formal specification tests also led us to make two additional changes to equation (8). First, because Wald tests indicated that lagged tax effects and lagged smoothed earnings did not improve the fit of the model, we only report specifications that set $\beta_4 = \beta_7 = 0$. Second, during the Great Depression, a number of our firms had zero or negative earnings. To remove negative or zero values, we took a three-year moving

average of earnings. Although this procedure does not fit the precise form of the logarithmic partial adjustment model of the previous section, it does succeed in improving the overall model fits. Because this smoothing may also introduce additional measurement error, we use instrumental variables for smoothed earnings.[19]

Table 5 contains the instrument-variable results for the partial-adjustment version of equation (8). The variable LNMAR represents the log of one minus the ex ante marginal undistributed profits tax rate. We also estimated the basic dividend model with separate coefficients for LNMAR in 1936 and 1937. These specification allow arbitrary responses of dividends to the surtax (i.e., these specification allow the elasticity of payout with respect to the tax price to differ between 1936 and 1937).

The estimated elasticities of dividends with respect to earnings in Table 5 are in general greater than those obtained in other recent firm-level partial adjustment models (e.g., McDonald and Soderstrom, 1986) or in aggregate time-series data. We attribute this result to both our smoothing of accounting earnings and our use of instrumental variables. We obtain statistically significant elasticities of payout with respect to the shareholder tax price for Barnsdall, Continental, Phillips, Richfield, Socony Vacuum, and Union. Of the companies with insignificant or negative elasticities, many are owned by other corporations or tax-favored institutions rather than individual shareholders.[20] For these firms, it is perhaps not surprising that we do not find a response to a weighted-average tax price measure.

We precisely estimated elasticities of payouts with respect to the ex ante (corporate-level) tax price of retentions for Barnsdall, Creole, Gulf, Humble, Lion, Midcontinent, Ohio, Shell, Socony-Vacuum, South Penn,

and Standard Oil of California, Indiana, and Ohio. Of these firms, Barnsdall, Gulf, Lion, Midcontinent, Shell, Socony-Vacuum, and Standard Oil of California, Indiana, and Ohio all show a significantly greater payout in 1936, compared to 1937. Table 6 reports the implied percentage responses of dividends with respect to a one-percentage-point change in the Undistributed Profits Tax rate. The estimated responses are substantial, owing both to the large ex ante marginal tax rates on retentions and the perception that the tax was temporary.

In evaluating the overall fit of our dividend models and in thinking about the high growth of earnings in the middle to late 1930s, we considered whether firms asymmetrically responded to changes in earnings by allowing the earnings coefficient to differ according to whether industry earnings were above or below trend. We chose industry earnings so that our decomposition was uniform across firms and unaffected by the peculiarities of any one firm's accounting conventions.[21]

Table 7 reports the results for the revised model. In this table, the coefficient on the dummy variable E^{+} represents the increase in dividends when industry earnings were above trend. The interaction term, $\ln E^{+} = E^{+} * \ln E^{*}$, represents the additional response of dividends to earnings when earnings were above their trend. On average, we find greater responses of dividends to earnings when industry earnings were above their trend. There is, however, little shift in the dividend process, holding earnings constant. We note that even allowing for the asymmetric earnings effects, our estimated payout responses to the Undistributed Profits Tax change very little.

In summary, we find evidence of substantial dividend responses to the surtax for most of the firms in our sample. For 1936, the low ex post

average surtax payments for the majority of our firms are plausibly explained by increased payout in response to the tax. However, ex post undistributed profits tax payments are again low on average in 1937 -- a year in which earnings growth is strong, and our estimated dividend response to the tax are low. To reconcile these findings, one must look to other possible responses by managers to increases in the price of retentions.

5. Non-Dividend Margins and the Undistributed Profits Tax

Chroniclers of corporate saving patterns during the period have noted that not all firms responded to the Undistributed Profits Tax by increasing dividends (see especially Dobrovolsky, 1951). In some cases, firms made adjustments on other margins. For example, some "small" firms were better able to increase expenses for management compensation (see Dobrovolsky, 1951; Lutz, 1945; Koch, 1943; and Merwin's, 1942, discussion of the machine tool industry). While it is difficult to measure directly the extent to which firms reduced their earnings through increasing expenses rather than pay dividends, there is excellent evidence that suggests that this type of behavior was pervasive. Thorp and George (1937) analyzed Dun and Bradstreet surveys of managers' reactions to the surtax. For the 1936-1937 period, almost half of the 618 manufacturing corporations in the survey reported that they increased expenses in response to the surtax. This number almost surely understates the actual percentage. Thorp and George also reported: "The most noteworthy feature is that firms give credit to the Undistributed Profits Tax for the increase in salaries, wages, and bonuses so widely publicized during the past year" (p. 14). Finally, the survey evidence suggests that the greatest increases in expenses occurred in 1937, indicating that managers

may have had to increase dividends in the short run, but that in the longer run they had a preference for spending funds internally. Such behavior is consistent with our estimated surtax effects.

The oil and gas firms in our sample paid extraordinarily low surtaxes in comparison to their normal corporate income taxes. There were several exceptions, including Pure (recovering from a period of losses) and Richfield (which emerged from receivership in 1937). The year 1937 was one of strong earnings growth for the industry, yet, despite the surtax on retentions, dividends only rose proportionately with earnings. The industry average payout ratio was 47.1 percent in 1936 and 47.8 percent in 1937, compared with 94.7 percent and 96.2 percent in those years for the manufacturing sector as a whole (see Dobrovolsky, p. 15). That oil company dividends were not increased further in 1937 -- while ex post surtax payments were small -- suggests other margins for tax minimization. Anecdotal evidence supports a number of possibilities.[22] One potentially important mechanism for reducing retention is increased capital expenditures for drilling; such expenditures could be expensed both for normal tax and surtax purposes. The Undistributed Profits Tax lowered the opportunity cost of internal funds for drilling.

While we could not obtain drilling expenditures by firm, we constructed a consistent series on oil wells drilled (industry-wide) over the period from 1927 to 1965. In Table 8, we report results of a regression of the log of wells drilled on its lags, the log of the relative price of oil, and dummy variables for 1936 and 1937.[23] Apart from the dummy variables, this type of specification has been used to explain drilling activity (see e.g., Rice and Smith, 1977). The two specifications imply a long-run elasticity of drilling with respect to the rela-

tive price of about unity. The estimated coefficients on the dummy variables are both positive; the most sizable (and statistically significant) effects came in 1937, with a 20 to 30 percent increase in wells drilled. This finding suggests further that managers preferred to maintain control over funds rather than pay them out.

6. Conclusions

This paper considered the effects of a change in the relative tax price of retentions on the incentives of firms to alter their payout policies. The relatively large U.S. petroleum firms in our sample on average paid very little undistributed profits tax, even though they faced high ex ante marginal tax prices (up to 27 percent of retentions). We found that many firms responded to these high ex ante rates by significantly increasing their dividend payouts in 1936, and less significantly in 1937. Thus, for many firms the tax appeared to have the desired effect, at least in the first year. There was also anecdotal and indirect evidence from drilling statistics suggest, however, that managers ultimately sought to reduce their tax burdens using other margins. This finding suggests that there can be important behavioral responses to changed in the prices of corporate retentions. In practice, the consequences of changing the tax price of retentions, or of simply forcing managers to pay out excess funds, need not guarantee that what is truly in excess will be paid out.

NOTES

1. Poterba's (1987) study provides a notable exception.
2. See for example Feldstein (1970), Gordon and Bradford (1980), Auerbach (1984), Poterba and Summers (1985), Poterba (1987), and the review in Auerbach (1983).
3. See for example Easterbrook (1984), Jensen (1986), and the review in Varian (1988). Economists have studied problems associated with managerial discretion in corporate control for some time (e.g., Berle and Means, 1932).
4. For example, Jensen (1986) has suggested that investor use debt service to force managers to pay out cash flows.
5. See for example Blakey and Blakey (1936) and Lent (1948, Chapter 1).
6. Just prior to this date, in United States v. Butler, the Supreme Court invalidated the processing taxes levied to underwrite the cost of the Agricultural Adjustment Act. President Roosevelt intended the tax to supplant the existing Corporate Income Tax, Excess Profits Tax, and Capital Stock Tax, but Congress kept all of the taxes to ensure that the necessary revenue would be raised (see Thorp and George, 1937).
7. Here adjusted income is net taxable income less normal tax and interest on certain U.S. government obligations.
8. The U.S. Supreme Court later invalidated credits for common stock dividends issued to common shareholders, which were not quantitatively important. See Helvering v. Sprouse and Strassburger v. Helvering.
9. Stock dividends were not a tiny percentage of total dividends for the oil firms in our sample.

10. See Statistics of Income for 1936 and 1937.

11. The piecewise-linear retention tax schedule corresponds to the following:

% Retained	Tax Rate (%)
≤ 10	7
10-20	12
21-40	17
41-60	22
> 60	27

12. Partial adjustment models usually fit dividend series well; typically, however, the estimated response of actual to desired dividends are implausibly large -- an the order of ten to fifteen years. See Lintner (1956), Brittain (1966), Fama and Babiak (1968), McDonald and Soderstrom (1986), and the review in Marsh and Merton (1987).

13. Gertler and Hubbard (1988) consider a model in which financial contracts and corporate payout policies are determined endogenously by agency problems. Funds are obtained both from insiders' net worth and from outside finance. The larger is insiders' net worth relative to the size of firm projects, the lower is the cost of capital to the firm, ceteris paribus. Paying out "outsiders' cash" from existing projects (which can take the form of a dividend) similarly lowers the return required on the projects proposed by the insiders.

14. See Auerbach (1979), Bradford (1981), and King (1977). Under this view, permanent changes in tax rates will not affect payout changes, although temporary changes may.

15. The accounting literature emphasizes that expenses such as depreciation and accruals distort the economic meaning of earnings numbers.

16. The serial correlation process imposes implicit common factor restrictions on the coefficients in (7).

17. This model is similar in spirit to logarithmic partial adjustment models that have been estimated before, aside from the form of the earnings terms. It also can be related to a form of error-correction model used by Poterba (1987). Specifically, subtracting lagged dividends from both sides of the equation and letting Δ denote the discrete change operator, gives an error-correction form of (8)

$$\Delta \ln D_t^* = \beta_0 + (\beta_1 - 1)\ln D_{t-1} + \beta_3 \Delta \ln \phi_t + \beta_5 \Delta \ln E(\lambda)_t + (\beta_4 - \beta_3)\ln \phi_{t-1} + (\beta_6 - \beta_5)\ln E(\lambda)_{t-1} + \psi_t.$$

18. A conventional error components model would contain well over 300 variance-covariance parameters and 130 coefficients, exceeding the capacity of our computing equipment. The unbalanced panel design would also make estimation difficult.

19. Instruments for ln E* include (twice) lagged log dividends, LNTAX, LNMAR, the log of the price of oil, the log of the GNP deflator, trend earnings, and two lags of the log of wells drilled.

20. Companies in this group include Creole and Humble (with controlling interest held by Standard Oil of New Jersey), Gulf (with large holdings by Mellon family interests), Midcontinent (with increasing ownership by Sunray toward the end of the sample), Shell (controlled by Royal Dutch interests), and Sun (owned in large part by the Pew Foundation, a charitable trust).

21. Specifically, we regressed the natural logarithm of smoothed industry earnings on a time trend.

22. For example, Barnsdall declared a special bonus for all employees in 1937, and a number of firms raised compensation to officers and directors. Extraordinary expenses to set up various benefit plans

were made in 1937 by Amerada, Socony-Vacuum, and Standard Oil of California.

23. Data on the price of oil and drilling operations come from Twentieth Century Petroleum Statistics, 1987.

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Table 1
Corporate Distributions and External Finance, 1935–38
(Millions of current dollars)

Year	Cash Dividends Paid	External Finance: Bonds	Long-Term Issues Stocks	Total
1935	$ 5940	$ 323	$ 70	$ 393
1936	7379	817	353	1170
1937	7514	769	409	1178
1938	5013	803	67	870

Source: Commercial and Financial Chronicle Series,
Statistical Abstract of the United States, various issues.

Table 1

Descriptions of Oil Companies in the Sample

Amerada Corporation (P).	Incorporated under the laws of Delaware, February 7, 1920, as a holding company and owns the entire capital stock of the Amerada Petroleum Corp., the Alabama Exploration Co., and the Amerada Refining Corp.
Atlantic Refining Company (R).	Incorporated in Pennsylvania, April 29, 1870. Company is one of the largest manufacturers of lubricating oils, gasoline, and other petroleum products in the world. It markets its products extensively in the United States, and also does a large export business. Control was held by the Standard Oil interests from 1874 to time of dissolution of the Standard Oil group in 1911. Company is now operated independently. (Merged with Richfield in 1965).
Barnsdall Corporation (P).	Incorporated November 13, 1916, in Delaware as Pittsburgh Investment Co; name changed in 1919. The company was organized to take over the estate of T.N. Barnsdall. The Barnsdall Corporation. The company is engaged in oil production; refining divisions were spun off in 1931. (Merged with Sunray Oil Corp. in 1950.)
Continental Oil Company (P).	Successor to Marland Oil Co., incorporated in Delaware, October 8, 1920. Pursuant to a plan of consolidation, consummated in June 1929, Marland changed its name to Continental Oil Co. (Delaware). Under the terms of its charter, the firm is a holding company, and may also engage as an operating company in all phases of the company in all phases of the oil and gas business. The company and its subsidiary and affiliated companies constitute a complete unit in the oil industry, producing, transporting, refining, and marketing petroleum and its products, and also producing, transporting, and marketing natural gas.

Table 1 (Continued)

Descriptions of Oil Companies in the Sample

Creole Petroleum Corporation (P).	Incorporated in Delaware March 30, 1920, as Creole Syndicate. The name was changed in 1928. Standard Oil of New Jersey has a controlling interest. The company is engaged in developing oil lands in Venezuela.
Gulf Oil Corporation of Pennsylvania (I).	Incorporated under the laws of Pennsylvania, August 9, 1922, as successor to the Gulf Oil Corporation, incorporated in 1900 in New Jersey. The company holds all of the capital stock in numerous subsidiaries in all segments of the petroleum industry. It operates oil fields and pipelines in the United States, Mexico, and Venezuela.
Humble Oil and Refining Corporation (P).	Incorporated in Texas on June 21, 1917, as successor to Humble Oil Co. (organized in 1911) and other concerns. Standard Oil of New Jersey has a controlling interest. Though primarily a producer, the company covers all phases of the oil business. (Absorbed into Standard Oil of New Jersey in 1957.)
Lion Oil Refining Company (R).	Incorporated in Delaware, October 27, 1923, to acquire the properties of the Lion Oil and Refining Company (Arkansas), organized in 1922. Company produces, transports, refines, and sells crude petroleum and byproducts. (Acquired by Monsanto in 1955).
Mid-Continent Petroleum Corporation (R).	Incorporated July 9, 1917, in Delaware as Cosden and Company -- name changed to Mid-Continent in 1925. The company is engaged in the refining of crude oil, and owns the Cosden Pipe Line Co. (Absorbed into Sunray DX in 1955).
Ohio Oil Company (P).	Incorporated August 1, 1887, in Ohio, to acquire lands in the Lima Oil fields of Ohio and Indiana. Though primarily a producer, the company later acquired pipeline and marketing interests. (Name changed to Marathon in 1962).

Table 1 (Continued)

Descriptions of Oil Companies in the Sample

Phillips Petroleum Company (I).	Incorporated in Delaware, June 13, 1917. The company is engaged in all branches of the oil business including the production of crude oil, natural gas, and casinghead gasoline.
Pure Oil Company (I).	Incorporated in Ohio, April 21, 1914, as the Ohio Cities Gas Co. -- name changed in 1920. Pure is a holding and operating company, engaged in producing, transporting, refining, and marketing of petroleum and its products. (Merged with Union Oil in 1965.)
Richfield Oil Corporation (R).	Incorporated in Delaware August 2, 1926, to acquire the capital stock of United Oil Co. and several additional petroleum companies. The original company and subsidiaries were engaged in producing, refining, and marketing of oil and gasoline. The company went into receivership in 1931. In November 1936, it was reorganized and reincorporated in Delaware as Rio Grande Oil Corporation; the name was changed to Richfield Oil Corporation in December 1936. (Merged with Atlantic Refining, 1965.)
Shamrock Oil and Gas (P).	Incorporated in Delaware, August 9, 1929, to produce oil, gas, and casinghead gasoline.
Shell Union Oil Corporation (I).	Incorporated in Delaware, February 8, 1922, as a holding company to consolidate properties of Royal Dutch-Shell and Union Oil Co. of Delaware in the Mid-Continent and California fields. In 1924, the company sold its holdings of Union Oil Co. of California. The company engaged in phases of the oil business.

Table 1 (Continued)

Descriptions of Oil Companies in the Sample

Sinclair/Consolidated Oil Corporation (I).	Incorporated in New York, September 23, 1919, as Sinclair Consolidated Oil Corporation, as a consolidation of Sinclair Oil and Refining Corp., Sinclair Gulf Corp., and Sinclair Consolidated Oil Corp. (old company). The name was changed to Consolidated Oil Corp. in 1932. The company is active in all segments of the petroleum industry.
Skelly Oil Company (I).	Incorporated in Delaware, August 20, 1919, to acquire oil properties of W.G. Skelly and associates. Chief products: crude oil and all of its trade name for natural gas compressed to liquidity in steel cylinders, designed for fuel in communities where artificial or natural gas is not available.
Socony-Vacuum Oil Company (R).	Incorporated in New York on August 10, 1982, by trustees of Standard Oil Trust as Standard Oil Co. of New York. In 1899, the company was acquired by Standard Oil Co. of New Jersey, which held it until the dissolution decree in 1911. The company merged with Vacuum Oil Co. (New York) in 1931. (Name changed to Socony Mobil Oil Co. in 1955, and to Mobil Oil Corp. in 1966.)
South Penn Oil Company (P).	Incorporated in Pennsylvania May 1, 1889, for the purpose of producing oil and gas. The chief products are crude petroleum, natural gas, and compression gasoline. (Name changed to Pennzoil in 1963.)
Standard Oil Company of California (I).	Incorporated January 27, 1926, in Delaware to acquire all properties of Standard Oil Co. (a California corporation incorporated in 1879 as as Pacific Coast Oil Co. and name changed in 1906 to Standard Oil Co.), including stock on hand and ownership in subsidiary companies, and to acquire all lands and oil producing properties and leases owned by Pacific Oil Co. The company is authorized to engage in all branches of the oil industry.

Table 2 (Continued)

Descriptions of Oil Companies in the Sample

Standard Oil Company of Indiana (R).	Incorporated June 18, 1889, in Indiana as a holding company. In 1917, the charter was amended so that the company could engage directly in the activities oil business. The company is a complete unit in production, refining, transporting, and marketing of petroleum products.
Standard Oil Company of New Jersey (I).	Incorporated in New Jersey on August 5, 1982; was originally organized in Ohio in 1870 as the Standard Oil Company. The present home was adopted in 1892. Owing to the drastic changes brought about by the dissolution decree of 1911, the history of the company actually dates from the culmination of the disintegration in 1912. As originally organized, the company engaged directly or through subsidiaries in the production, refining, and distribution of petroleum and petroleum products. In 1927, the company discontinued direct operations, and limited its functions to those of a holding company.
Standard Oil Company of Ohio (R).	Incorporated on January 10, 1870, under the laws of Ohio. The company was controlled by Standard Oil Co. of New Jersey until the decree of dissolution of the Standard Oil group in 1911. The company is active in all segments of the petroleum industry.
Sun Oil Company (R).	Incorporated in New Jersey, May 2, 1901, as Sun Co., succeeding Sun Oil Co., incorporated under Ohio laws in 1893 and founded in 1886. The name was changed to Sun Oil Company in 1922. The company is engaged in all branches of the oil industry, including the production and distribution of petroleum and petroleum products.

Table 1 (Continued)

Descriptions of Oil Companies in the Sample

Texas Corporation (I).	Incorporated in Delaware, August 26, 1976, to acquire stock of the Texas Co. (Texas), which was dissolved April 20, 1927. Domestic and foreign subsidiaries of the latter are now all owned by Texas Corp. The company has the power to hold stock of other corporations and to engage in production, storage, transportation, purchase, and sale of petroleum and its products. It operates primarily as a holding company, and has established companies to market its products in most regions of the world. (Name changed to Texaco in 1959.)
Tidewater Associated Oil Company (R).	Incorporated in Delaware, March 5, 1926, with a perpetual charter to engage in the production, refining, transportation, and sales of petroleum and petroleum products, and to hold stocks of other corporations. The company is a holding company. In 1926, it acquired control of the Tidewater Oil Co. through an exchange of common stock, and likewise acquired control of the Associated Oil Co. by exchange of common stock.
Union Oil Company of California (I).	Incorporated October 17, 1890, in California as a consolidation of Hardison and Stewart Oil Co., Sespe Oil Co., and Torrey Canon Oil Co. The company is engaged in production, transportation, refining, and marketing of crude oil and its products.

Note: Company descriptions were taken from various issues of Moody's Industrial Manual during the 1930s. Moody's Stock Surveys periodically classified companies by their primary activity. "I," "P," and "R" denote "integrated," "producing," and "refining," respectively.

Table 3

Ex Post Tax Burdens from the Undistributed Profits Tax, 1936-1937
(Sample of Petroleum Firms)

Company	1936 Payout Ratio	1936 Ex Post Tax Rate	1936 Surtax to Earnings	1936 Ex Ante Marginal Tax Rate	1937 Payout Ratio	1937 Ex Post Tax Rate	1937 Surtax to Earnings	1937 Ex Ante Marginal Tax Rate
Amerada	80%	0%	0%	17%	67%	0%	0%	17%
Atlantic	45	0.08	0.05	27	27	0.04	0	27
Barnsdall	78	0	0	7	116	0	0	7
Continental	61	0	0	12	50	0	0	7
Creole	41	0	0	27	63	0.11	0.04	27
Gulf	26	*	*	27	29	*	*	27
Humble	39	0	0	27	38	0	0	17
Lion	50	7.2	3.6	17	67	1.8	0.6	17
Mid-Continent	44	0	0	22	53	11.9	5.6	17
Ohio	49	0	0	12	55	0	0	27
Phillips	60	0	0	22	51	0	0	17
Pure	0	0	0	0	9	0.04	0.036	17
Richfield	0	0	0	0	71	0.2	0.06	27
Shamrock	0	0	0	27	0	0	0	27
Shell	15	0	0	7	63	0	0	7
Skelly	0	0	0	7	23	0.64	0.49	7
Socony-Vacuum	36	3.1	2.0	7	33	3.8	2.5	7
South Penn	78	0	0	7	80	0	0	7
Standard (CA)	67	0	0	7	63	0	0	7
Standard (IN)	78	1.4	0.28	7	63	2.0	0.74	7
Standard (NJ)	54	1.2	0.81	7	44	0.7	0.5	7
Standard (OH)	36	13.1	8.4	17	34	9.4	6.2	17
Sun	26	11.8	8.7	12	22	10.0	7.8	12
Texas	37	1.6	1.0	7	48	2.9	1.5	7
Tidewater	26	0.021	0.016	7	48	0	0	7
Union	72	0	0	7	54	0	0	7

Source: Authors' tabulations based on company data. An asterisk (*) indicates that information on surtax payments is not available. The estimation of the ex ante marginal tax rate on retentions follows the procedure outlined in the text.

Table 4

Firm Dividend Changes During Undistributed Profits Tax

Firm	Dividends per Adjusted Share (% Change) 1935		1936		1937		1938	
Amerada	2.49	(-0.8)	2.47	(-0.8)	2.43	(-1.6)	2.47	(-1.7)
Atlantic	4.97	(-0.8)	6.03	(21.2)	4.85	(-19.5)	4.93	(1.7)
Barnsdall	0.24	(+)	1.02	(323.0)	1.23	(20.1)	1.25	(1.7)
Continental	1.07	(76.8)	1.53	(42.7)	1.79	(16.7)	1.22	(-31.7)
Creole	0.25	(+)	0.61	(147.9)	1.20	(96.7)	1.22	(1.7)
Gulf	0.00	(0.0)	1.82	(+)	2.40	(31.6)	2.44	(1.7)
Humble	3.69	(-1.0)	5.48	(48.7)	7.19	(31.1)	7.31	(1.7)
Lion	0.00	(0.0)	0.88	(+)	1.65	(88.1)	1.12	(-32.4)
Mid-Continent	0.46	(-22.9)	1.38	(197.5)	1.80	(31.1)	0.72	(-60.1)
Ohio	0.75	(-33.9)	1.45	(93.4)	2.41	(66.5)	0.48	(-80.0)
Phillips	1.61	(22.8)	3.07	(90.5)	3.45	(12.1)	2.56	(-25.8)
Pure	0.00	(0.0)	0.00	(0.0)	0.30	(+)	0.00	(+)
Richfield	0.00	(0.0)	0.00	(0.0)	0.30	(+)	0.61	(102.2)
Shamrock	0.00	(0.0)	0.00	(0.0)	0.00	(0.0)	0.00	(0.0)
Shell	0.00	(0.0)	0.31	(+)	1.20	(290.5)	0.85	(-29.4)
Skelly	0.00	(0.0)	0.00	(0.0)	1.79	(+)	1.22	(-31.6)
Socony-Vacuum	0.46	(-50.7)	1.06	(132.5)	1.20	(12.3)	0.76	(-36.4)
South Penn	9.66	(-6.2)	20.44	(111.6)	26.57	(30.0)	13.14	(-50.5)
Standard (CA)	1.23	(0.8)	1.46	(19.0)	2.39	(64.1)	1.70	(-28.8)
Standard (IN)	1.22	(-2.8)	2.91	(139.4)	2.75	(-5.6)	1.22	(-55.7)
Standard (NJ)	1.53	(0.4)	2.43	(58.6)	2.99	(23.0)	1.82	(-39.0)
Standard (OH)	0.00	(0.0)	9.68	(+)	6.98	(-27.9)	5.16	(-26.1)
Sun	1.96	(11.2)	2.05	(4.1)	2.11	(3.3)	2.35	(11.3)
Texas	1.34	(-0.7)	2.01	(49.3)	3.20	(59.2)	2.68	(-16.1)
Tidewater	0.30	(+)	0.50	(65.2)	1.43	(183.9)	1.22	(-14.5)
Union	1.23	(-0.8)	1.22	(-0.8)	1.67	(36.6)	1.46	(-12.4)

Source: Authors' calculations based on the sample of firm data described in the test. A (+) indicates that the previous year's dividend was nil, so that a percentage change could not be calculated.

Table 5

Responses of Dividends to Changes In Earnings and Tax Prices

Firm	Constant	$\ell n\ D_{-1}$	$\ell n\ E^*$	LNTAX	LNMAR	1936	1937	$\bar{R}^2$
Amerada	0.062	0.729	0.242	-0.044	0.070	-	-	0.98
	(0.148)	(0.093)	(0.082)	(0.072)	(0.659)			
	0.062	0.728	0.243	-0.043	-	-0.002	0.139	0.98
	(0.151)	(0.095)	(0.083)	(0.073)		(0.925)	(0.919)	
Atlantic Refining	-0.539	0.366	0.621	0.048	-0.040	-	-	0.88
	(0.351)	(0.075)	(0.095)	(0.125)	(0.720)			
	-0.556	0.366	0.624	0.052	-	-0.714	0.625	0.88
	(0.352)	(0.075)	(0.095)	(0.125)		(0.990)	(0.984)	
Barnsdall	-2.64	-0.554	1.53	1.49	-7.45	-	-	0.83
	(0.839)	(0.359)	(0.363)	(0.535)	(3.84)			
	-1.67	0.026	1.11	0.901	-	-17.4	-5.39	0.89
	(0.794)	(0.380)	(0.344)	(0.500)		(5.22)	(3.21)	
Continental	-1.70	-0.264	1.40	0.654	0.148	-	-	0.93
	(0.377)	(0.114)	(0.164)	(0.226)	(1.94)			
	-1.76	-0.262	1.40	0.695	-	-0.344	2.51	0.93
	(0.387)	(0.115)	(0.166)	(0.235)		(2.06)	(3.70)	
Creole	0.103	0.532	0.539	-0.247	-1.80	-	-	0.93
	(0.480)	(0.110)	(0.175)	(0.392)	(1.15)			
	0.108	0.530	0.541	-0.252	-	-1.68	-1.93	0.93
	(0.450)	(0.114)	(0.179)	(0.402)		(1.46)	(1.52)	
Gulf	-0.505	0.206	0.785	-0.200	-2.22	-	-	0.95
	(0.473)	(0.103)	(0.119)	(0.317)	(1.10)			
	0.211	1.04	-0.036	-0.074	-	-13.7	-0.806	0.99
	(0.204)	(0.085)	(0.087)	(0.130)		(1.11)	(0.473)	
Humble	0.100	0.198	0.744	-0.369	-0.934	-	-	0.97
	(0.159)	(0.123)	(0.124)	(0.066)	(0.334)			
	0.104	0.190	0.751	-0.375	-	-1.20	-0.619	0.99
	(0.162)	(0.125)	(0.127)	(0.067)		(0.575)	(0.330)	

Table 5 cont.

Firm	Constant	ℓn D_{-1}	ℓn E*	LNTAX	LNMAR	1936	1937	$\bar{R}^2$
Lion	-0.491	0.392	0.609	0.018	-5.45	-	-	0.98
	(0.320)	(0.132)	(0.132)	(0.198)	(0.860)			
	-0.624	0.347	0.665	0.083	-	-6.34	-4.74	0.98
	(0.329)	(0.134)	(0.130)	(0.200)		(1.08)	(1.01)	
Mid-Continent	0.776	0.377	0.332	-0.751	-3.57	-	-	0.92
	(0.392)	(0.185)	(0.155)	(0.258)	(1.04)			
	0.774	0.382	0.329	-0.749	-	-3.61	-3.57	0.92
	(0.408)	(0.207)	(0.166)	(0.270)		(1.26)	(1.41)	
Ohio	-0.896	-0.261	1.56	-0.655	-4.80	-	-	0.73
	(1.13)	(0.179)	(0.349)	(0.663)	(2.29)			
	-0.744	-0.252	1.54	-0.731	-	-8.75	-4.44	0.72
	(1.19)	(0.178)	(0.347)	(0.673)		(2.83)	(2.27)	
Phillips	-0.850	0.090	0.976	0.386	0.148	-	-	0.87
	(0.348)	(0.084)	(0.128)	(0.211)	(0.908)			
	-0.885	-0.087	0.978	0.412	-	-0.164	0.887	0.86
	(0.356)	(0.085)	(0.129)	(0.216)		(1.03)	(1.42)	
Pure	-1.74	0.244	1.20	0.111	4.56	-	-	0.76
	(1.10)	(0.272)	(0.511)	(0.392)	(4.25)			
	-1.14	0.402	0.904	-0.052	-	6.99	-2.05	0.79
	(1.13)	(0.281)	(0.530)	(0.387)		(5.35)	(6.45)	
Richfield	-1.94	-0.744	1.45	1.05	13.08	-	-	0.82
	(0.623)	(0.438)	(0.423)	(0.384)	(5.33)			
	-1.94	-0.744	1.45	1.05	-	-	13.08	0.82
	(0.623)	(0.438)	(0.423)	(0.384)			(5.33)	
Shamrock	-2.11	0.147	1.15	1.14	-0.572	-	-	0.94
	(1.42)	(0.324)	(0.484)	(0.945)	(1.55)			
	-2.11	0.147	1.15	1.14	-	-	-0.572	0.94
	(1.42)	(0.324)	(0.484)	(0.945)			(1.55)	
Shell	0.388	0.386	0.520	-0.550	-15.4	-	-	0.98
	(0.217)	(0.072)	(0.073)	(0.170)	(3.24)			
	0.534	0.871	0.084	-0.444	-	-42.8	-11.25	0.99
	(0.212)	(0.181)	(0.166)	(0.166)		(10.0)	(11.95)	

Table 5 cont.

Firm	Constant	ℓn D_{-1}	ℓn E*	LNTAX	LNMAR	1936	1937	$\bar{R}^2$
Skelly	-1.22	0.340	0.796	0.061	0.871	-	-	0.93
	(0.767)	(0.227)	(0.280)	(0.393)	(8.39)			
	-0.222	0.658	0.376	-0.219	-	7.71	-26.8	0.99
	(0.315)	(0.094)	(0.116)	(0.157)		(3.36)	(4.04)	
Socony - Vacuum	-0.703	0.441	0.581	0.237	-3.75	-	-	0.90
	(0.255)	(0.141)	(0.142)	(0.125)	(1.45)			
	-0.638	0.496	0.536	0.207	-	-7.40	-1.01	0.91
	(0.252)	(0.141)	(0.14)	(0.123)		(3.32)	(2.95)	
South Penn	1.77	0.180	0.370	-0.394	-5.32	-	-	0.86
	(0.396)	(0.178)	(0.138)	(0.115)	(2.37)			
	1.78	0.172	0.374	-0.396	-	-4.95	-5.59	0.85
	(0.413)	(0.190)	(0.144)	(0.118)		(3.45)	(3.22)	
Standard (CA)	-0.210	0.383	0.494	0.077	-2.52	-	-	0.97
	(0.118)	(0.115)	(0.090)	(0.061)	(1.36)			
	-0.198	0.391	0.486	0.072	-	-4.44	-0.616	0.97
	(0.116)	(0.113)	(0.088)	(0.060)		(1.89)	(1.88)	
Standard (IN)	-0.204	0.551	0.348	-0.001	-6.96	-	-	0.86
	(0.250)	(0.201)	(0.156)	(0.115)	(2.03)			
	0.023	0.813	0.167	-0.109	-	-12.6	-1.56	0.88
	(0.248)	(0.211)	(0.159)	(0.114)		(2.05)	(3.41)	
Standard (NJ)	-0.211	0.671	0.335	0.051	-3.10	-	-	0.94
	(0.227)	(0.090)	(0.089)	(0.107)	(1.47)			
	-0.220	0.674	0.336	0.055	-	-4.67	-1.52	0.94
	(0.229)	(0.091)	(0.090)	(0.109)		(2.05)	(3.41)	
Standard (OH)	-2.85	-0.412	1.88	-0.249	-3.90	-	-	0.91
	(0.644)	(0.149)	(0.239)	(0.218)	(1.14)			
	-0.960	0.561	0.598	-0.008	-	-11.29	0.866	0.98
	(0.372)	(0.135)	(0.189)	(0.104)		(1.03)	(1.28)	
Sun	-0.170	0.743	0.215	-0.028	0.012	-	-	0.98
	(0.182)	(0.084)	(0.079)	(0.057)	(0.623)			
	-0.171	0.742	0.215	-0.028	-	-0.047	0.070	0.98
	(0.185)	(0.085)	(0.081)	(0.058)		(1.53)	(0.875)	

Table 5 cont.

Firm	Constant	$\ell n\ D_{-1}$	$\ell n\ E^*$	LNTAX	LNMAR	1936	1937	$\bar{R}^2$
Texas Company	-0.208	0.795	0.187	0.172	-2.77	-	-	0.97
	(0.247)	(0.103)	(0.082)	(0.178)	(2.47)			
	-0.204	0.795	0.186	0.170	-	-2.42	-3.13	0.96
	(0.252)	(0.105)	(0.083)	(0.182)		(2.96)	(3.03)	
Tidewater	0.749	0.751	-0.480	-0.605	-14.2	-	-	0.55
	(1.28)	(0.112)	(0.469)	(0.664)	(14.2)			
	0.793	0.749	-0.498	-0.627	-	-8.19	-20.0	0.53
	(1.30)	(0.114)	(0.477)	(0.675)		(19.9)	(19.9)	
Union	-0.340	0.247	0.479	0.188	-0.469	-	-	0.84
	(0.139)	(0.161)	(0.097)	(0.083)	(1.97)			
	-0.332	0.257	0.472	0.184	-	0.164	-1.15	0.84
	(0.140)	(0.165)	(0.100)	(0.085)		(2.64)	(2.75)	

Note: Standard errors are in parentheses. The equations were estimated by two-stage least squares, as described in the text.

Table 6

Estimated Percentage Response of Dividends to a
-One-Percentage-Point Change in Undistributed Profits Tax Rate

Firm	Estimated Response in Dividends (%)
Amerada	0
Atlantic	0.30
Barnsdall	5.99
Continental	-0.32
Creole	2.26
Gulf	3.04
Humble	1.31
Lion	5.52
Mid-Continent	4.78
Ohio	6.88
Phillips	0.16
Pure	Not meaningful
Richfield	Not meaningful
Shamrock	Not meaningful
Shell	9.65
Skelly	Not meaningful
Socony-Vacuum	3.28
South Penn	4.86
Standard (CA)	2.23
Standard (IN)	9.42
Standard (NJ)	3.02
Standard (OH)	11.70
Sun	0
Texas	3.13
Tidewater	2.33
Union	0.18

Note: The estimated responses are calculated using information on the tax price elasticity from Table 5 and the ex ante marginal tax rate from Table 3.

Table 7

Responses of Dividends to Changes in Earnings and Tax Prices
(Asymmetric Responses to Earnings Changes)

Firm	Constant	$\ell n\ D_{-1}$	$\ell n\ E^*$	E^+	$E^+\ \ell n\ E^*$	LNTAX	LNMAR	$\bar{R}^2$
Amerada	0.053	0.695	0.289	0.030	-0.043	-0.042	0.096	0.97
	(0.241)	(0.136)	(0.123)	(0.308)	(0.108)	(0.158)	(0.713)	
Atlantic	-0.967	0.301	0.802	-0.110	-0.057	0.153	-0.220	0.88
	(0.389)	(0.080)	(0.118)	(0.675)	(0.194)	(0.156)	(0.735)	
Barnsdall	-0.195	0.196	0.039	0.102	0.634	-0.026	-5.57	0.86
	(1.28)	(0.435)	(0.696)	(0.219)	(0.249)	(0.814)	(3.74)	
Continental	-1.89	-0.204	1.30	-0.692	0.396	0.879	0.278	0.95
	(0.343)	(0.105)	(0.151)	(0.337)	(0.177)	(0.224)	(1.72)	
Creole	0.270	0.481	0.646	0.409	-0.261	-0.454	-1.65	0.92
	(0.538)	(0.131)	(0.228)	(0.576)	(0.304)	(0.475)	(1.24)	
Gulf	-0.221	-0.203	1.27	2.34	-0.889	-0.841	0.814	0.93
	(0.552)	(0.226)	(0.253)	(1.28)	(0.425)	(0.466)	(2.02)	
Humble	0.928	0.243	0.420	-0.440	0.224	-0.487	-1.02	0.99
	(0.370)	(0.116)	(0.174)	(0.189)	(0.078)	(0.094)	(0.296)	
Lion	-0.352	0.273	0.480	-0.079	0.207	-0.031	-4.58	0.98
	(0.332)	(0.128)	(0.142)	(0.150)	(0.100)	(0.208)	(0.919)	
Mid-Continent	0.951	0.203	0.238	-0.364	0.378	-0.878	-3.73	0.95
	(0.398)	(0.246)	(0.123)	(0.306)	(0.118)	(0.313)	(0.829)	
Ohio	-0.901	-0.206	1.51	-0.848	0.294	-0.549	-5.83	0.71
	(1.16)	(0.205)	(0.421)	(1.39)	(0.635)	(0.707)	(2.78)	
Phillips	-1.05	-0.106	1.04	-1.11	0.415	0.541	-0.123	0.92
	(0.289)	(0.077)	(0.124)	(0.501)	(0.239)	(0.189)	(0.742)	
Pure	-2.98	0.118	1.58	-1.48	0.691	0.801	5.96	0.69
	(1.85)	(0.354)	(0.782)	(1.71)	(0.919)	(0.869)	(5.30)	
Richfield	-2.64	-1.25	1.82	-0.223	0.294	1.49	18.8	0.69
	(1.38)	(0.489)	(0.853)	(0.363)	(0.421)	(0.860)	(11.5)	

Table 7 cont.

Firm	Constant	$\ell n\ D_{-1}$	$\ell n\ E^*$	E^+	$E^+\ \ell n\ E^*$	LNTAX	LNMAR	$\bar{R}^2$
Shamrock	-3.21 (1.67)	-0.191 (0.402)	1.67 (0.613)	0.509 (0.346)	-0.255 (0.288)	1.63 (1.08)	1.36 (2.25)	0.93
Shell	0.623 (0.227)	0.223 (0.107)	0.688 (0.103)	0.419 (0.256)	-0.319 (0.146)	-0.803 (0.201)	-8.97 (4.56)	0.99
Skelly	-1.38 (0.997)	0.116 (0.314)	1.17 (0.428)	-2.06 (0.694)	-0.746 (0.228)	-0.302 (0.445)	9.98 (10.52)	0.93
Socony - Vacuum	-0.928 (0.365)	0.342 (0.170)	0.753 (0.190)	-0.060 (0.278)	-0.071 (0.183)	0.358 (0.205)	-3.05 (2.62)	0.93
South Penn	1.36 (0.792)	0.127 (0.172)	0.387 (0.173)	-1.95 (0.872)	0.584 (0.227)	-0.025 (0.315)	-4.52 (2.37)	0.87
Standard (CA)	-0.025 (0.178)	0.446 (0.144)	0.452 (0.118)	0.390 (0.231)	-0.184 (0.107)	-0.070 (0.115)	-2.07 (1.64)	0.97
Standard (IN)	-0.556 (0.232)	0.501 (0.214)	0.462 (0.179)	-1.01 (0.322)	0.414 (0.182)	0.241 (0.102)	-8.76 (1.62)	0.88
Standard (NJ)	-0.458 (0.353)	0.577 (0.117)	0.468 (0.126)	-0.292 (0.461)	0.046 (0.180)	0.206 (0.218)	-2.81 (2.60)	0.94
Standard (OH)	-2.36 (0.678)	-0.098 (0.186)	1.38 (0.298)	-3.00 (1.03)	0.767 (0.266)	0.256 (0.284)	-4.25 (1.180)	0.91
Sun	-0.476 (0.283)	0.573 (0.138)	0.397 (0.140)	-0.037 (0.212)	-0.022 (0.073)	0.024 (0.100)	-0.003 (1.17)	0.98
Texas Company	-0.305 (0.259)	0.733 (0.110)	0.227 (0.088)	-0.516 (0.347)	0.187 (0.138)	0.279 (0.194)	-2.91 (2.50)	0.97
Tidewater	4.49 (2.04)	0.591 (0.137)	-1.52 (0.720)	4.10 (1.85)	-2.04 (1.18)	-3.35 (1.35)	-13.23 (14.09)	0.56
Union	-0.319 (0.201)	0.262 (0.201)	0.518 (0.123)	0.117 (0.308)	-0.164 (0.215)	0.173 (0.141)	-0.171 (2.08)	0.83

Note: Standard errors are in parentheses. The equations were estimated by two-stage least squares, as described in the text.

Table 8

Drilling, Prices, and the Undistributed Profits Tax

Dependent Variable: £n (Wells Drilled)							
Constant	£n $Wells_{-1}$	£n $Wells_{-2}$	£n Relative Price	£n Relative $Price_{-1}$	1936	1937	$\bar{R}^2$
6.19	0.461	-0.087	0.513	--	0.200	0.290	0.88
(1.12)	(0.139)	(0.124)	(0.093)		(0.140)	(0.140)	
3.42	0.722	-0.066	0.785	-0.527	0.105	0.190	0.93
(1.06)	(0.122)	(0.098)	(0.098)	(0.093)	(0.113)	(0.113)	

Note: Standard errors are in parentheses.