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TAX DISTORTIONS TO THE CHOICE OF ORGANIZATIONAL FORM

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ABSTRACT

Income from corporate and noncorporate firms is treated very differently under the tax law. To what degree do firms change their form of organization in response? Since the relative tax treatment depends on the tax bracket of the investor, the answer will vary by the bracket of the owners. To estimate the role of taxes, we estimate what size the nontax advantage to incorporating must take in each industry so that forecasted choices for organizational form, aggregated over investors in different tax brackets, are consistent with the aggregate evidence. While these nontax costs can be large, noncorporate activity tends to be concentrated in industries where these costs are small, leading to little excess burden from the tax distortion to organizational form.

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Tax Distortions to the Choice of Organizational Form

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Income from an incorporated firm is treated very differently than income from an unincorporated firm under U.S. tax law. Corporate income is fully taxable under the corporate income tax, and partially taxable under the personal income tax, whereas noncorporate income faces only the personal income tax. Given the progressivity of personal income tax rates, the relative tax treatment of corporate vs. noncorporate income depends in large part on the identity of the owners. To what degree does the distribution of firms across forms of organization respond to these differences in tax treatment? What are the efficiency costs that result from the tax-induced changes in the forms of organization chosen by firms?

In two recent papers, Gravelle and Kotlikoff (1989,1990) used simulation models to estimate the degree to which firms' choices of organizational form should have changed due to differences between the corporate rate and a representative personal tax rate,[1] and forecast that the effects have been very large. MacKie-Mason and Gordon (1991) examined empirically the degree to which the observed fractions of business income or business assets in corporate and noncorporate firms has changed over time in response to changes in the average tax rates faced on corporate vs. noncorporate income. Income and assets clearly shifted in response to changing tax incentives, but the estimated effects were small.

The difference in average tax rates, however, provides a poor summary of the tax distortions to organizational form choices. Under existing tax incentives, the noncorporate sector should consist of firms with tax-losses owned by investors in high tax brackets and

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[1] For a much earlier discussion of the tax distortion to organizational form, see Feldstein and Slemrod (1980).

very profitable firms owned by investors in low tax brackets. As a result, a tax change that narrows the distribution of personal tax rates while leaving the average tax rate unchanged would reduce the tax advantage faced by all noncorporate firms. The level and distribution of the taxable rate of return across firms also matters, since tax distortions matter only to the extent that there is income subject to tax.

In this paper, we develop the theory of the equilibrium allocation of assets between corporate and noncorporate firms more fully. Under a variety of simplifying assumptions, we are able to estimate the behavioral effects of the differential tax treatment of corporate and noncorporate income from aggregate data on assets and income of corporate and noncorporate firms, and from information on the distribution of assets across individual tax brackets. The basic intuition is as follows: Investors trade off any tax savings from investing in a noncorporate firm, given their tax bracket, with the nontax costs of doing so. Given some assumed size of the nontax costs of operating in the noncorporate form, we model the optimal portfolio holdings in noncorporate firms for investors in each tax bracket. We can then infer how high the nontax costs must have been to make the forecasted aggregate noncorporate holdings in each industry match the observed holdings.[2] We describe the formal model implementing this intuition in section 1, and derive the resulting empirical estimates in section 2. On average, the estimated nontax costs of noncorporate ownership are positive and sizable — a representative firm would pay costs each year equal to almost 4% of its equity value by being noncorporate vs. corporate.[3] In section 2, we also discuss the consistency of our estimates of the nontax costs of operating in noncorporate form with forecasts from the theoretical literature on organizational forms.

In section 3, we use our estimates to explore the implications of eliminating the separate corporate tax and instead making each shareholder's share of corporate income taxable under his/her personal income tax, as occurs with noncorporate firms. On average, the efficiency gains from the resulting changes in organizational form are forecasted to be only

[2] The data we use come from the Statistics of Income publications of the Internal Revenue Service in the U.S.

[3] Since noncorporate activity is concentrated in industries where these costs are lower, however, a representative *noncorporate* firm has only a 1.66% lower rate of return by remaining noncorporate.

about 6% of the taxes initially collected on business income. In contrast, Gravelle and Kotlikoff (1989) estimate the efficiency cost from differential taxation to be about 120% of initial tax revenue.

We relied on many simplifying assumption in the analysis. In section 4, we discuss possible biases that may result, and report some estimates of the magnitude of these biases. The main findings of the paper are summarized in section 5.

1. Model of the Equilibrium Allocation across Organizational Forms

The model has two–periods.[4] In the first period, firms choose their form of organization and individuals invest in ownership shares in firms. In the second period, firms earn a random return on their investments, taxes are paid both by firms and by individual owners on this income, and the owners consume what is left net of taxes.

There are I different industries in the economy, each with a constant–returns–to–scale production technology. For each dollar invested in a diversified set of corporations in industry i, the resulting economic income earned in the second period is a random variable $\tilde{Y}_i^*$, while the resulting taxable income is denoted by $\tilde{Y}_i$. (The ex ante distribution of returns is assumed to be the same for all corporations in an industry.) Let $\tilde{X}_i$ denote the difference, $\tilde{Y}_i^* - \tilde{Y}_i$. Corporations are subject to a corporate tax at rate τ, implying corporate tax payments of $\tau\tilde{Y}_i$ in the second period. The net income earned on this investment is therefore $\tilde{Y}_i^* - \tau\tilde{Y}_i = \tilde{Y}_i(1-\tau) + \tilde{X}_i$.[5]

Investors could instead invest the same dollar in the noncorporate sector in industry i. The rate of return earned by noncorporate firms will differ to the extent that nontax factors put noncorporate firms at an economic disadvantage. In addition, given the lack of public trading of shares in noncorporate firms and the fact that partnerships are required to refile with the state if their ownership structure changes, investors would find it much more

[4] Our results would immediately generalize to a multiperiod setting as long as there are no transactions costs of changing organizational form, so that the decision problem is time separable. For a discussion of the implications of transactions costs for our analysis, see section 4.

[5] Not having a convincing theory explaining dividend payments, in spite of the tax disadvantage of paying dividends, or one explaining capital gains realizations in spite of the tax disadvantage faced, we ignore personal taxes on this corporate income.

difficult to obtain a diversified portfolio of noncorporate firms in the industry. To capture these effects, we assume that the economic income earned in the second period on a dollar invested in the first period in the noncorporate sector in industry i equals $\tilde{Y}_i^* - C_i + \tilde{\epsilon}_i$. Here, C_i measures the nontax costs of using the capital in the noncorporate sector,[6] while $\tilde{\epsilon}_i$ captures the added risk from having a less well-diversified portfolio. By assumption, $\tilde{\epsilon}_i$ has variance σ_i^2, and is independent of all other random variables in the model. For simplicity, the definition of taxable income is assumed to be the same for corporate and noncorporate firms,[7] except that the nontax costs, C_i, of operating in the noncorporate sector are assumed to be fully tax-deductible. We assume that $\tilde{\epsilon}_i$ is in the form of capital gains, and ignore any resulting tax liabilities. Therefore, the resulting taxable income in the second period is $\tilde{Y}_i - C_i$. If the individual owner of this income is in tax bracket m_b, then the resulting net-of-tax income is $\tilde{Y}_i^* - C_i + \tilde{\epsilon}_i - m_b(\tilde{Y}_i - C_i) = (1 - m_b)(\tilde{Y}_i - C_i) + \tilde{X}_i + \tilde{\epsilon}_i$.

Individual investors make their investment decisions in the first period. In this period, individuals can invest in corporate or noncorporate shares in any industry, or else in a risk-free asset earning a real rate of return $r_z - \pi$, and a taxable rate of return of r_z.[8] Denote the amount invested in corporate (noncorporate) capital in industry i by investors in tax bracket b by α_{ci}^b (α_{ni}^b). Allocation decisions are made so as to maximize a mean-variance utility function: $U = f(\bar{I}_b, \text{var}(\tilde{I}_b))$, where $\tilde{I}_b$ is the outcome for second-period income for investors in tax bracket m_b, and $\bar{I}_b$ is its expectation. Following the standard assumptions, $f_1 > 0$, $f_2 < 0$, $f_{11} < 0$, and $f_{22} < 0$. In addition, we assume that investors cannot go short when investing in either sector — short sales would allow individuals to go short in one organizational form and long in the other, arbitraging the tax difference while facing risk only due to $\tilde{\epsilon}_i$. Such tax arbitrage is not seen to our knowledge in practice.

In equilibrium, the distribution of organizational forms that businesses choose should equal the distribution desired collectively by individual investors. In particular, businesses

[6] C_i need not be positive. While C_i may be stochastic, we are not in a position given our data to allow for this added complication.

[7] For further discussion, see section 4.

[8] In the empirical work, we set r_z equal to the nominal Treasury Bill rate and π equal to the inflation rate.

should allocate themselves across the alternative forms of organization in each industry until the market values the returns from a dollar of additional investment in each form at a dollar, i.e. when the marginal Tobin's q equals one. In the theoretical derivation, we measure the returns relative to the cost of the underlying investment so as to impose the equilibrium condition that q equals one.

How then do individuals facing tax rate m_b divide their portfolios between corporate and noncorporate firms in industry i? Since the above assumptions are basically those of the capital-asset-pricing model, the first-order conditions characterizing the solution are standard. Starting from the individual's equilibrium portfolio consider the effects of investing a dollar more in the corporate sector in industry i. If he already owns positive corporate equity, then by the envelope theorem he would be just indifferent to a further marginal investment; if he owns no such equity, then a marginal investment must be a net loss. After correcting for risk and taxes, the gain from a further corporate investment under the above assumptions, net of the alternative risk-free rate of return, would be measured by

$$\bar{Y}_i(1-\tau)+\bar{X}_i-((1-m_b)r_z-\pi)-G_b\text{cov}[(1-\tau)\tilde{Y}_i+\tilde{X}_i,\tilde{I}_b]\leq 0. \tag{1a}$$

where $G_b \equiv -2f_2/f_1$ measures the individual's degree of risk aversion. Similarly, the net gain from a further noncorporate investment would satisfy

$$(\bar{Y}_i-C_i)(1-m_b)+\bar{X}_i-((1-m_b)r_z-\pi)-G_b\text{cov}[(1-m_b)\tilde{Y}_i+\tilde{X}_i+\tilde{\epsilon}_i,\tilde{I}_b]\leq 0. \tag{1b}$$

If in equilibrium, the individual invests in noncorporate but not corporate firms in industry i, then equation (1b) holds with equality and (1a) with a strict inequality. Combining these two equations and simplifying we find that

$$(\tau-m_b)\left[\bar{Y}_i-G_b\text{cov}(\tilde{Y}_i,\tilde{I}_b)\right]>(1-m_b)C_i+G_b\alpha_{ni}^b\sigma_i^2, \tag{2}$$

where the last term follows from our assumption that each $\tilde{\epsilon}_i$ is uncorrelated with all other random variables in the model. In words, the left-hand side equals the certainty-equivalent tax savings from investing the funds in a noncorporate rather than a corporate firm in industry i while the right–hand side measures the nontax costs plus the extra risk-bearing costs of investing further in the noncorporate rather than the corporate sector. When the individual chooses not to invest at all in corporate firms in industry i, the tax savings must outweigh the nontax and extra risk–bearing costs that result from a noncorporate investment. In contrast, if in equilibrium the individual invests in only corporate firms in the industry, then the sign of the inequality in equation (2) would be reversed and α_{ni}^{b} would equal zero in the equation. Equation (2) would be satisfied with equality at the chosen α_{ni}^{b} if the individual invests in both corporate and noncorporate shares in industry i in equilibrium.

A given investor will normally choose different organizational forms in different industries, and these choices will vary by investor. These results immediately follow from inspection of equation (2):

1) When the nontax or extra risk–bearing costs of noncorporate investments are higher, fewer investors will invest in noncorporate firms.

2) Noncorporate firms in industries where the certainty–equivalent income is positive (negative) will be relatively most attractive to investors in the lowest (highest) tax brackets. Ownership of noncorporate firms with positive (negative) taxable income should therefore be concentrated among investors in relatively low (high) tax brackets. In combination, this implies that the fraction of assets held in noncorporate form by investors in tax bracket b will be a U–shaped function of the marginal tax rate in that tax bracket.

3) An increase in the absolute value of the certainty–equivalent taxable income $\bar{Y}_i - G_b\text{cov}(\tilde{Y}_i, \tilde{I}_b)$ makes noncorporate capital more attractive to investors, since tax savings for those who invest in such firms become larger relative to any nontax and risk–bearing costs.[9] The result is a U–shaped relation between the certainty–equivalent taxable income generated in the industry and the fraction of the assets of the industry held in noncorporate form, a fraction we denote by F_i.

These nonmonotonic relations between personal tax rates or taxable rates of return and the attractiveness of noncorporate investments make any analysis problematic that is based

[9] When $\bar{Y}_i - G_b\text{cov}(\tilde{Y}_i, \tilde{I}_b)$ is positive (negative), investors would be in low (high) tax brackets.

on average figures, such as those in Gravelle and Kotlikoff (1989,1990) or MacKie–Mason and Gordon (1991).

2. Estimation of Nontax Benefits of Incorporating

The consistency of this theory with the data can be tested in a variety of ways. The data we rely on come primarily from the U.S. IRS Statistics of Income data files, and cover the years 1970, and 1972–86.[10] These publications report aggregate income statements and some balance sheet data for corporate and noncorporate firms, in all cases at least at the 1–digit industry level in each year. Given the nature of the U.S. tax law, the noncorporate sector comprises a diverse set of firms. Noncorporate firms with a single owner could report their income on Schedule C (proprietorship income), schedule E (rental income), or schedule F (farming income).[11] Noncorporate firms with multiple owners (partnerships) are reported separately on the tax forms. There is an additional form of organization in the U.S., a subchapter–S corporation, that is taxed the same as other noncorporate forms but that has limited liability as do ordinary corporations.[12] Since these firms face the same tax treatment as noncorporate firms, we include them in the noncorporate sector in our study.

From these data we imputed the market value of both the corporate and the noncorporate equity held each year by individuals in a form taxable under the personal income tax.[13] To do so, we started by constructing data on the aggregate market value of corporate and noncorporate equity, then subtracted off equity holdings not subject to the personal income tax, e.g. equity held in pension plans. Several complications were faced

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10 Unfortunately, the government's archive tape for 1971 was constructed improperly, making it unreadable.

11 Unfortunately, the I.R.S. did not report information on schedule F income after 1980, so that our sample for the farming industry consisted of 1970 and 1972–80.

12 S corporations face severe limits on the number and kind of owners they can have, however, limiting their economic importance.

13 Our theory focuses on the allocation of shares taxable under the personal income tax, so we confine our empirical analysis to these shares.

in the process. First, market values of equity are observed only for publicly-traded corporations. For other corporations and for partnerships, only the book value of equity used for accounting purposes is observed; here, we assumed that the ratio of the market value to the book value among these firms is the same as that for publicly-traded corporations in the same industry.[14]

Since the corporate shares not held by other corporations own the entire corporate sector, the market value of the assets in the corporate sector should equal the value of these outside shares alone. To measure the value of outside shares, we estimated the size of the cross-holdings of equity among publicly traded corporations in each industry,[15] then subtracted this value from the market value of all shares outstanding in each industry. These corrected market value figures were used in the above procedure.

In order to delete equity holdings not subject to the personal income tax, e.g. owned by defined-contribution pension plans or by foreigners, we used Federal Reserve *Flow of Funds* data on these other holdings.[16] The resulting estimates of the fraction of equity, F_i, held in noncorporate form in each industry, averaged across the sample period, are reported in column 1 of Table 1, while the average value of F_i in each year is reported in column 1 of Table 2.

The next step was to calculate the taxable rates of return, $\bar{Y}_i$, earned within the corporate sector. For a given industry in a given year, we set $\bar{Y}_i$ equal to the ratio of the taxable income reported by corporations to our estimate of the market value of corporate equity for these firms, before any of the above corrections. Expected taxable rates of return, $\bar{Y}_i$,

[14] In some years, the partnership data includes book assets but not book equity. In these years, we interpolated figures for book debt by multiplying the observed interest payments in that year by the average ratio of book debt to interest payments in the adjoining years in that industry. For some noncorporate forms, only the income statement is observed; here, we assumed that the ratio of depreciation deductions to market value is the same as for publicly-traded corporations. In a few years, depreciation deductions were missing as well. In these cases, values were imputed using depreciation deductions in adjoining years.

[15] Corporations own shares in other corporations both directly (e.g. shares in their subsidiaries) and indirectly (e.g. shares used to fund their defined-benefit pension plans). The value of shares held directly were estimated based on the dividends that corporations report receiving, under the assumption that the payout rate on these shares equals the aggregate payout rate in the industry as a whole. Estimates of the value of shares held in defined-benefit pension plans were constructed using data from the Federal Reserves' *Flow of Funds* and from Kotlikoff and Smith (1983).

[16] Since this data source does not break down share holdings by industry, we had to assume that such holdings were fully diversified.

were then estimated based on a regression of the ex post values against lagged data.[17] The resulting estimates for $\bar{Y}_i$ by industry, averaged over the sample period, are reported in column 2 of Table 1. Overall, these estimates seem quite reasonable, except that for the mining industry.[18]

We also attempted to construct equivalent estimates of the taxable rates of return, $\bar{Y}_i - C_i$, within the noncorporate sector. Our hope had been to subtract these figures from those for $\bar{Y}_i$ to construct a direct estimate of C_i. Unfortunately, the resulting figures for $\bar{Y}_i - C_i$ were not credible. For example, the resulting estimate of the average yearly expected taxable rate of return in the service sector during the sample period was 165%! The likely explanation is that noncorporate firms often include labor income of the owners in their reported taxable income, rather than paying it out separately as wages. Although the tax treatment would be the same, there may be nontax reasons for retaining labor income, e.g. to provide internal financing given the presence of credit constraints.

We next constructed data on the total equity holdings, W_b, of investors in each tax bracket b in each year. This was done based on samples of individual tax returns in each year.[19] For investors in each tax bracket, we had data on their dividends from corporate holdings, and their income from each type of noncorporate holdings, as reported on tax schedules C, E, and F. In each case, we allocated the aggregate value for each type of asset held directly by individuals, as estimated above, across tax brackets in proportion to the income from that type of asset reported by individuals in that tax bracket.[20] Then W_b was set equal to the total equity holdings of investors in tax bracket b.

[17] Specifically, an ARMA(1,1) process was assumed for each of the variables being forecast, except that the lagged value of the rate of return for the entire corporate sector was included in addition in the regression. In one case, the moving average term was not included because the estimate was outside the stable region.

[18] The several sharp jumps in oil and other mineral prices during our sample period resulted in large windfalls to this industry.

[19] We would like to thank the Center for Tax Policy Research at the University of Michigan for providing these data to us.

[20] This was done separately for income from corporate dividends, proprietorships, rental property, farms, and subchapter S corporations. For each noncorporate form of income, we estimated separately the value of equity in firms reporting losses vs. profits, and allocated each across tax brackets in proportion to the amount of losses (profits) from this noncorporate form reported by individuals in that tax bracket.

Everything else equal, the theory forecasts that the fraction noncorporate in an industry should be a U–shaped function of the certainty–equivalent taxable income generated in that industry, with the minimum fraction noncorporate being in industries with no certainty–equivalent taxable income. To calculate the risk premium for $\tilde{Y}_i$ in each industry, we first estimated the market β for $\tilde{Y}_i$ in each industry by regressing $\tilde{Y}_i$ against the return on the S&P 500, using annual data for the period 1970–86. We then multiplied this estimate of β by an estimate for the risk premium on the market portfolio of 6.8%, derived from the estimates reported in Table 4.5c in Merton (1980) for the period 1966–78, in order to derive an estimate of the risk premium for $\tilde{Y}_i$. The resulting certainty–equivalent values of the $\tilde{Y}_i$, averaged over our sample period, are reported in column 3 of Table 1. Since almost all the certainty–equivalent values were positive, we simply tested to see whether there was a positive correlation between these values and F_i among those observations where the certainty–equivalent values were positive. The resulting correlation was in fact positive, but equal to only 0.016.[21] This one-dimensional test ignores, however, variation in the C_i across industries, or variation in C_i, the tax law and the wealth distribution across time.

Before proceeding, note in comparing columns 2 and 3 that there is almost no risk premium attributed to the taxable return $\tilde{Y}_i$ — almost the entire risk premium in corporate equity is attributed to the nontaxable component, $\tilde{X}_i$. For simplicity, in the rest of the analysis we will therefore assume that $\tilde{Y}_i$ is risk free, so that the certainty–equivalent value of $\tilde{Y}_i$ will be measured by $\bar{Y}_i$.

We next turn to testing directly the consistency of the forecasts from equation (2) with the data. The basic intuition behind our strategy is as follows: In equilibrium, equations (1ab) determine the amounts α^b_{ci} and α^b_{ni} invested by investors in each tax bracket b in corporate and noncorporate equity in industry i. We observe the total amount of assets in each industry i invested in the noncorporate sector, an amount we denote by E^n_i. Then, given the observed E^n_i, the C_i would be chosen such that

$$\sum_{b=1}^{\infty} \alpha^b_{ni} = E^n_i \tag{3}$$

[21] This correlation is calculated deleting the figures for the mining industry. Rates of return for mining during 1974–1980 were such outliers that they dominated the results.

for each industry i. This solution procedure is done separately in each year.

In order to estimate the α^b_{ni} using equations (1b), we start with data on $\bar{Y}_i$, τ, π, and the various tax rates. In addition, we set $\tilde{I}_b$ equal to the investor's total return from corporate and noncorporate equity, $\sum_i[\alpha^b_{ci}(\bar{Y}_i(1-\tau)+\tilde{X}_i)+\alpha^b_{ni}(\bar{Y}_i(1-m_b)+\tilde{X}_i+\tilde{\epsilon}_i)]$.[22] The covariances among the various $\tilde{X}_i$ were estimated using data from the CRSP files on daily corporate rates of return in each industry, pooling data from that year and the previous year.

We saw no convincing way to estimate the size of the extra idiosyncratic variance, σ^2_i, faced when investing in noncorporate shares. In most of our results, we simply assumed that noncorporate income was roughly twice as risky as corporate income. In particular, we set σ^2_i equal to the variance of the return on the market portfolio of corporate stocks, which we estimated to equal .034. As a sensitivity test, we also report some results where σ^2_i is twice as large.

Market clearing conditions were then used to estimate the $\bar{X}_i$ and the G_b. In particular, the individual's budget constraint,

$$\sum_i(\alpha^b_{ci}+\alpha^b_{ni}) = W_b. \tag{4a}$$

gives us enough information in effect to estimate each of the G_b, given the observed W_b. In addition, the forecasted aggregate demand for equity in each industry, both corporate and noncorporate, was set equal to the total amount of equity in the industry owned by individuals, according to the data. Denote this observed amount by E_i. Then,

$$\sum_b(\alpha^b_{ci}+\alpha^b_{ni}) = E_i, \tag{4b}$$

giving us enough information in effect to estimate the $\bar{X}_i$.

Since $\sum_b W_b$ must equal $\sum_i E_i$, however, equation (5b) adds only $n-1$ new conditions. The additional condition we impose in order to estimate all of the $\bar{X}_i$ is that the resulting

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[22] In general, the probability distribution of future consumption $\tilde{I}_b$ in equations (1ab) can be affected by many factors other than the returns on corporate and noncorporate equity owned directly, e.g. uncertain labor earnings or risk in the value of nonfinancial and other financial assets. We capture the effects of these other sources of risk only implicitly by choosing the value of G_b to rationalize the observed portfolio choices.

estimate for the expected rate of return on the market portfolio, which we denote by $\bar{R}$, be consistent with the historical evidence. To solve for the theoretical relation characterizing $\bar{R}$, we first divide all terms in equation (1a) by G_b and sum over those tax brackets $\{b_i\}$ that own corporate equity in industry i, giving

$$\bar{Y}_i(1-\tau) + \bar{X}_i = r(1-m_i^*) - \pi + \gamma_i \text{cov}(\tilde{X}_i, \sum_{b \in \{b_i\}} \tilde{I}_b). \tag{5}$$

Here, $\gamma_i = 1/[\sum_{b\in\{b_i\}}(1/G_b)]$ and $m_i^* = \gamma_i[\sum_{b\in\{b_i\}}(m_b/G_b)]$. Let $E_i^c \equiv E_i - E_i^n$ denote the value of corporate equity in industry i. Then if we weight equation (6) by E_i^c, sum over i, and divide through by $\sum_i E_i^c$, we find that

$$\bar{R} \equiv (\sum_i [(1-\tau)\bar{Y}_i + \bar{X}_i]E_i^c)/\sum_i E_i^c = r(1-m^*) - \pi + \Omega, \tag{6}$$

where $m^* = \sum_i E_i^c m_i^* / \sum_i E_i^c$ and where Ω is a similarly weighted average of the risk-premium terms in equation (5). In using historical data to construct an estimate for the right-hand side of equation (6), giving the extra condition needed to estimate the $\bar{X}_i$, we used the model to estimate m^*, and used Merton's estimate of 6.8% for the market risk premium, Ω.

The only remaining unknowns in equations (1ab) are the objective of the study, C_i. Equation (3) was used to identify these terms. The resulting estimates for C_i for each industry, averaged over this period, are reported in column 4 of Table 1. Except for the figure for the mining industry, where taxable profits were incredibly high due to the windfalls during the 1970's,[23] these numbers look quite reasonable. Among the other industries, the annual nontax cost, C_i, measuring the difference in the yearly pre-tax rates of return between corporate and noncorporate firms, ranges from a high of just over .04 in the manufacturing, trade, and services industries to a low of -.011 in the finance/insurance/real estate industry. Compared to our estimates of the expected taxable rate of return, $\bar{Y}_i$, or the estimate of about .105 for the expected economic rate of return in the corporate sector found in Feldstein and Summers (1978), all these figures are large in economic terms.

[23] Ignoring the years most affected by the "oil shocks," 1974–80, the average C_i in mining was only .033.

The extra marginal costs of choosing a noncorporate form also include the extra risk-bearing costs, however. The weighted averages of the extra risk-bearing costs, $G_b\alpha_{ni}^b\sigma_i^2$, weighting the value in each tax bracket by its ownership share α_{ni}^b, were calculated and added to the nontax costs, C_i. The resulting figures for the combined marginal costs of choosing a noncorporate form are reported in column 5 of Table 1. Comparing the two columns we see that risk-bearing costs play a minor role, at least given the assumed values of the σ_i^2. To test the sensitivity of our results to the values of σ_i^2, we recalculated our estimates doubling the assumed values of the σ_i^2 to .068. These estimates are reported in columns 6 and 7. The combined marginal costs of the noncorporate form change relatively little, so our results are not very sensitive to the assumed values of the σ_i^2. This occurs because the greater riskiness of noncorporate investments is offset by the slightly smaller values of the C_i now needed to rationalize the observed choices.

There have been various theoretical articles in recent years, notably Fama and Jensen (1983ab), discussing how nontax factors affect the relative attractiveness of corporate and noncorporate forms of organization. Ours is the first study we know of that provides direct estimates of the size of these nontax factors. To what degree are our estimates consistent with these theoretical discussions? The key starting point in these discussions is that equity in noncorporate firms is much less liquid, and ends up being owned primarily by close personal associates of those running the business. While this concentrated ownership minimizes the potential problems arising from separation of ownership from control, it imposes higher risk-bearing costs and limits the amount of capital that can be raised easily to the wealth of the close associates of those running the business. These costs should be higher in industries where firms are larger, making access to capital markets more important; they should also be higher in industries that face greater diversifiable risk, risk that should impose no real cost on (publicly traded) corporations but that will likely be costly for owners of noncorporate firms to bear.

To judge the consistency of our estimates with the theory, we regressed C_i against two variables intended to capture each of these factors. The first, denoted by v_i, was defined to equal the average equity value per firm in the industry, including both noncorporate and corporate firms, measured in billions of 1982 dollars. The larger is v_i the more costly should be the lack of access to capital markets for noncorporate firms, leading to a higher value of the nontax costs C_i of operating in noncorporate form. The second, denoted by s_i, was defined to equal the root-mean-squared-error of the regression each year of the daily rate of return of NYSE firms in that industry against the market rate of return.[24] This variable measures the size of diversifiable risks in each industry; when these risks are more important, the noncorporate form should be less attractive, making C_i larger. In fact, we found that

$$C_i = .021 + .047v_i + 0.97s_i,$$

$$(.014)\ (.021)\ \ (1.69)$$

with an R^2 of .04 and standard errors reported in parentheses. Both coefficients do turn out to have the expected sign, that for v_i is statistically significant, and both are large in economic terms. An increase in v_i by one standard deviation, for example, increases C_i by .0155. The observed values of s_i are normally around .003 but range as high as .016, suggesting somewhat smaller but still important potential effects on C_i.

In column 2 of Table 2, we report the weighted average estimate of C_i in each year, weighted by the equity outstanding in each industry. One explanation for the observed variation over time would be changes in regulations affecting the relative attractiveness of corporate vs. noncorporate forms of organization. There were two important regulatory changes during this period. One, occurring in 1976, was the introduction of "at–risk" rules for partnerships which restricted the deductibility of losses, thereby making noncorporate forms less attractive. In addition, in 1982 several regulations affecting subchapter S corporations were relaxed, making this noncorporate form more attractive.[25] While the average values of C_i are higher in the last half of the 1970's and lower in the 1980's, consistent with these forecasts, the change in each case appears to occur a year preceding the forecasted date. Consistent with this observation, we see a sharp growth in the size of F_i starting in 1985, appearing to anticipate the tax changes that were enacted in 1986 affecting tax

24 Since we made no attempt to measure variation in σ_i by industry in the above calculations, the estimates for C_i would capture any variation in risk-bearing costs across industries.

25 There were also less important regulatory changes in 1973 and 1983. Neither was found to matter much in the tests reported in MacKie–Mason and Gordon (1991). Given our limited data, we restrict our discussion to the two major regulatory changes.

years starting in 1987.[26] If firms face important costs of changing organizational form, then they would have an incentive to anticipate coming changes in the tax and regulatory code. Our observations suggest they in fact do so.

3. Implications of Partnership Tax Treatment of Corporate Income

Economists have long advocated eliminating the corporate tax and instead making each shareholder pay tax on his/her share of corporate income under the personal income tax.[27] In many countries, this outcome is approximated through use of dividend imputation schemes.

In this section, we use our model estimates to forecast the efficiency consequences of the changes in organizational form that would result from introducing such a tax reform in the U.S. Specifically, we examine the alternative tax system under which corporate taxable income, $\bar{Y}_i$, is taxed at the personal tax rate of the owner, m_b, rather than at the corporate tax rate. Under such a tax system, following the logic used in deriving equation (2) we find that investors in tax bracket m_b would invest in noncorporate firms until[28]

$$(1 - m_b)C_i + G_b \sigma_i^2 \alpha_{ni}^b \leq 0, \tag{2a}$$

where the inequality would be strict when $\alpha_{ni}^b = 0$. It follows immediately that there would be no investment in the noncorporate form in any industry i in which $C_i > 0$. If $C_i < 0$, however, then each investor would choose α_{ni}^b such that equation (2a) holds with equality. Any further investment in industry i would then be in corporate equity.[29]

26 Certainly, the huge realizations of capital gains by individuals that occurred in 1986 would be consistent with this reading.

27 For one such proposal, see McLure (1979).

28 For simplicity, we assume here that corporate investment remains positive in each industry in equilibrium — when there is no corporate investment, equation (1b) would be used instead to determine the equilibrium value of α_{ni}^b. We tested the importance of this simplification for the last few years of our sample, estimating the equilibrium portfolio choices for all investors, holding aggregate capital in each industry constant, and obtained quite similar results.

29 Note that even under this tax system taxes affect the organizational form decision, discouraging use of the noncorporate form. This occurs due to our assumption that the gain from noncorporate investments (when C_i is negative) is taxable, but that the offsetting cost due to the extra risk is not shared with the government. In principle, reallocating these idiosyncratic risks from noncorporate investments through the tax system could result in an efficiency gain, making noncorporate investment more attractive. Achieving this would require a more extensive tax reform than the one considered here, however.

We calculate the efficiency consequences of allocating an amount of capital $E_i^n \equiv \sum_b \alpha_{ni}^b$ to noncorporate rather than corporate firms by aggregating the changes in certainty–equivalent individual incomes plus the change in tax revenue. The drop in tax revenue plus the drop in expected income of individuals is measured simply by the aggregate nontax costs, $E_i^n C_i$, while the increase in aggregate risk–bearing costs is given by $.5\sigma_i^2 \sum_b G_b(\alpha_{ni}^b)^2$. The drop in these combined costs in response to the shift to partnership tax treatment of corporate income measures the efficiency gain from this tax reform resulting from the changes in organizational form per se.[30] In order to aid in the interpretation of the resulting figures, we reexpress them as a percent of the tax revenue that would have been collected had the entire industry been corporate.[31]

We averaged the resulting figures across time for each industry and report them in column 8 of Table 1, and across industries for each year and report them in column 3 of Table 2. Averaged across the full sample, the increase in efficiency due to changes in organizational form is only 6.1% of the initial tax revenue from these firms. This estimate seems quite consistent with the very limited responsiveness of organizational form decisions to taxes found by MacKie–Mason and Gordon (1991), and is in sharp contrast to the estimates of the potential efficiency gain from changing organizational form decisions of roughly 120% of tax revenue reported in Gravelle and Kotlikoff (1989). Our estimates do differ dramatically by industry and fluctuate over time, suggesting the importance of omitted factors (some of which we discuss below). In farming, for example, before the tax reform on average 87% of capital was invested in noncorporate firms. Since our estimate of C_i for this industry is positive in all but one year, except in that year all of these firms should choose to incorporate under the proposed tax reform according to the theory, resulting in an estimated efficiency gain which is one and a half times the revenue collected from this industry.

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30 Such a tax-reform would affect aggregate efficiency in a variety of other ways. In particular, it would cause real capital to be reallocated across industries, cause a shift between investments in bonds vs. real capital, cause a change in the allocation of risks across tax brackets, and cause a change in total savings. We did not attempt to model the productive sector, savings behavior, or equilibrium output prices, so were not in a position to forecast these other efficiency implications of the tax reform.

31 If actual corporate tax payments in year t in industry i were T_{it}, then we projected that revenue would have been $T_{it}/(1 - F_i)$ had all firms in the industry been corporate.

It may seem surprising that in 1972 efficiency falls due to the changes in organizational form induced by this hypothetical tax reform. To understand this, note that this reform results in too few firms choosing the noncorporate form when C_i is negative. In the absence of taxes, assets should be invested in noncorporate form until $C_i = G_b\sigma_i^b\alpha_{ni}^b$, but under the partnership tax treatment noncorporate investment occurs until $(1 - m_b)C_i = G_b\sigma_i^b\alpha_{ni}^b$. Under the existing tax law, tax distortions are more pervasive, and would normally lead to a larger fraction of capital invested in the noncorporate form. As a result, the existing law can in principle result in more efficient choices, and in 1972 according to our estimates in fact does so.

4. Possible biases in the estimates of C_i

Many simplifying assumptions were used above in deriving estimates of the nontax costs of not incorporating. In this section we examine how our estimates are likely to change when some of these assumptions are relaxed. In some cases, tests for the size of possible biases are described, and at the end of the section we estimate their importance.

Allowing for Heterogeneity in C_i within an Industry

So far, we have assumed that the nontax costs, C_i, of noncorporate form are the same for all equity invested in a given industry. If C_i varies across firms within an industry, then those firms with the lowest values of C_i would be the ones that become noncorporate. Our procedure would still estimate the correct value of C_i for the marginal noncorporate firm, but would overestimate the aggregate efficiency loss of the tax distortions to organizational form, implying that our efficiency cost estimates are upper bounds.

Allowing for Heterogeneity in $\bar{Y}_i$

Another implicit assumption made above is that all firms in a given industry earn the same taxable rate of return on their capital. Yet 1–digit industries are very heterogeneous. For example, our estimates of $\bar{Y}_i$ were normally positive, yet certain subindustries, e.g. real estate and oil and gas drilling, have consistently generated negative taxable income, making them appropriate as investments for those in high tax brackets. Given heterogeneity of $\bar{Y}_i$

within an industry, the noncorporate sector in each industry should be composed of those firms with either very positive or very negative values of $\bar{Y}_i$.

Ignoring the possible presence of heterogeneity in $\bar{Y}_i$ within an industry causes us to underestimate the value of C_i. To see this, consider the case in which the average $\bar{Y}_i$ is positive. Given heterogeneity in $\bar{Y}_i$, the value of $\bar{Y}_i$ for the marginal noncorporate firm owned by low tax bracket investors in theory should exceed that for any remaining corporate firm. Yet we used the mean value for $\bar{Y}_i$ among corporate firms in estimating C_i, and a smaller value of $\bar{Y}_i$ leads to a smaller estimate of C_i. In addition, when some noncorporate firms are in fact owned by those in high tax brackets, fewer noncorporate firms are owned by low bracket investors than we estimate, requiring an increase in C_i to rationalize this outcome.

Differences in Reported Income of Corporate and Noncorporate Firms

So far, we have assumed that a firm's taxable income is unchanged if it changes its organizational form, other than due to the extra real costs, C_i, of operating in noncorporate form. Reported taxable income can change for other reasons, however.

To begin with, income reported by noncorporate firms may well include labor as well as capital income earned by the proprietors/partners. Since the two are treated the same for tax purposes, the presence of labor income does not affect the theoretical story, though it convinced us not to make use of the noncorporate income data.

In addition, corporations have some ability to shift reported income between the firm and its employees and between the firm and its shareholders, so as to reduce their combined tax payments. Loans from the party facing the low tax rate to the party facing the high tax rate would be one device that can be used for this purpose. These tax gains from income shifting were ignored in the above derivation, causing us to overestimate the size of C_i. The resulting bias to our estimate of C_i, should be larger the larger the absolute value of the difference between the corporate rate and the personal rates faced by employees and shareholders. To test for this bias, we measured the tax difference by $\Delta t \equiv \text{abs}(\tau - \max(m_b))$, on the assumption that corporate shareholders and top executives are primarily in the top tax bracket, and examine below its relation to our estimates of C_i.

Another source of potential bias arises from differences in the explicit tax provisions affecting corporate vs. noncorporate firms. Corporations, for example, face more liberal rules affecting the payment of tax-free fringe benefits to their employees. Everything else equal, this provision makes the corporate form more attractive, creating an upward bias in our estimate of C_i. We have also ignored the effects of personal taxes on corporate dividends, potentially leading to a downward bias in the C_i.

Another difference in the explicit tax provisions in the two sectors is in the treatment of capital gains. Until 1986, the General Utilities doctrine enabled corporations with some effort to avoid the corporate level tax on capital gains, so that the gains would be taxed only under the personal income tax and at the same rate faced on noncorporate gains. Assuming that corporations made full use of the General Utilities doctrine, the tax treatment of capital gains would therefore not be affected by the choice of organizational form. Under this assumption, we did not include capital gains in our measure of noncorporate income, and through use of the General Utilities doctrine they would not be included in observed corporate income. To the extent that corporations could not make full use of the General Utilities doctrine, however, there would be an additional tax advantage to the noncorporate form leading us to underestimate the offsetting nontax costs.

No-Loss-Offset Provisions

In the above analysis, we assumed implicitly that firms would receive tax refunds if their taxable income were negative in a year. Technically, this is not allowed for any firm. Noncorporate owners, however, can use losses to offset other income, while corporations with losses can merge with corporations with profits. Neither strategy is equivalent to full-loss offset, however.

To the extent that a firm faces a binding restriction on the deductibility of its losses, then its marginal tax rate is zero rather than the statutory rate. Since corporations are more likely to face such binding restrictions, given that noncorporate owners can deduct losses against other income, our procedure likely underestimates the tax advantage of the noncorporate form for firms with tax losses, and therefore underestimates C_i. In years when tax losses are important, this bias should be larger. To test for this, we examine below the relation between C_i and the fraction of capital in an industry each year owned by firms earnings tax losses, a fraction we denote by L_i.

Transactions Costs When Firms Change Organizational Form

Our model of the choice of organizational form for a firm is entirely static, and so we implicitly assumed no tax or nontax costs of changing organizational form. There are clearly tax implications, however, of changing organizational form. In particular, all accrued capital gains must be realized and taxes paid on them when a firm shifts from corporate to partnership form.[32] While new firms are not affected directly by these provisions, they would take into account the possible desire to change organizational forms in the future when deciding initially what form to choose. These penalties for changing organizational form should therefore reduce the extent to which firms respond to temporary tax changes, and slow the aggregate response even to permanent changes. When the size of the noncorporate sector is increasing, this increase would be slower than we forecast, causing us to overestimate the size of C_i, and conversely when the noncorporate sector is shrinking. We therefore expect a positive relation between C_i and ΔF_i, and test for this below.

Recapture provisions and other transactions costs can also complicate the analysis for firms that face changing tax liabilities over time even if the tax law is unchanging. An example would be a firm engaged in oil exploration, with heavy drilling and development expenses for its first few years of operations, and no taxable income until recovered oil is sold on the market. Such a firm would have negative values for $\bar{Y}_i$ during these initial years, and positive values later when the oil is marketed. If there were no transactions costs, then the firm would change organizational form over time, based on the size of $\bar{Y}_i$ at each date. In fact, this has been the practice in the oil and gas drilling sector — these firms generally start as partnerships and incorporate once their income turns positive. This behavior is commonly observed among new firms, which generally face tax losses during their first few years of existence and taxable profits later.

If transactions costs are important, however, then firms should consider the tax implications of their choice of organizational form over a longer time horizon. To the extent

[32] No such provisions apply if the corporation instead shifts to a subchapter-S corporate form.

that $\bar{Y}_i$ or the tax law changes within this horizon, then expectations of future values affect current decisions, complicating the analysis.

Regression Results

Based on the above discussion, we expect C_i to be larger when Δt is large (corporations then have more opportunity for tax arbitrage), when ΔF_i is large (due to adjustment costs, the marginal noncorporate firm should have a higher C_i when the noncorporate sector is growing), and when L_i is small (corporations have more difficulty taking full advantage of tax losses). In addition, v_i and s_i should both have positive effects on C_i based on the Fama-Jensen discussion. Finally, the regulatory changes discussed above lead to the forecast that C_i should go up starting in 1976, and should drop starting in 1982. To test for this, we include two dummy variables: one that equals one from 1976 on and zero otherwise, and a second that equals one starting in 1982.

The resulting coefficient estimates are reported in Table 3. All the coefficients have the expected signs. The coefficients of v_i and s_i are now somewhat larger and more significant than in the earlier regression. The dummy variables capturing regulatory changes both have coefficients that are large in magnitude, suggesting that such regulatory changes can have powerful effects on incentives. For example, while the mean C_i over time was .038, the coefficients imply that the regulatory changes in 1976 increased its value by .023 whereas those in 1982 more than offset this change leading to a net drop of $-.018$ below the value prior to 1976.

While the three coefficients capturing possible biases all have the right sign, none are near to being statistically significant and none have coefficients that are large enough to be of economic interest, giving us more confidence in our estimates of C_i. Several possible sources of bias were not tested for, however.

5. Conclusions

The differential tax treatment of corporate and noncorporate income under existing U.S. law creates an incentive for firms with extreme taxable rates of return to become noncorporate and be owned by investors in extreme personal tax brackets. In particular, investors in high tax brackets face a tax incentive to invest in noncorporate firms generating tax losses (tax shelters), so that the tax losses can be deducted against the top personal tax rates rather than against the lower corporate rate. Similarly, investors in low tax brackets have an incentive to own noncorporate firms generating substantial taxable income, so that this income is taxed at these low personal rates rather than at the higher corporate rate. The degree to which firms choose not to incorporate, to obtain these potential tax savings, depends on the size of any nontax costs (benefits) of organizing a firm in noncorporate form.

We estimated the size of nontax costs needed to reconcile the observed fraction of firms choosing the noncorporate form with the fraction that would be forecasted to do so by the theory. On average the estimated nontax costs were sizable, equaling each year roughly 3.8% of a representative firms' equity value. The size of these nontax costs varied substantially by industry, however. As forecast by Fama and Jensen (1983ab), the nontax costs of operating in noncorporate form tended to be larger in industries where firms are riskier and where firms need to raise more capital from the market. The size of these nontax costs also varied substantially over time as would be expected given the changing regulatory treatment of corporate and noncorporate firms.

In spite of the large average size of these nontax costs, the efficiency gains from removing the differential tax treatment appear to be small. The estimated efficiency gains from changes in organizational form upon shifting to a partnership tax treatment of corporate income equal only about 6% of initial business tax payments. This occurs because noncorporate firms are concentrated in industries where nontax costs appear to be low. Our estimate seems quite consistent with the very limited responsiveness of organizational form decisions to taxes found by MacKie-Mason and Gordon (1991), and is in sharp contrast to the efficiency gain of roughly 120% of tax revenue estimated by Gravelle and Kotlikoff (1989).

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Table 1: Estimated values by industry.

	1	2	3	4	5	6	7	8
		Corporate	Cert. equiv.	$\sigma_i^2 = 0.034$		$\sigma_i^2 = 0.068$		Efficiency
	Fraction	Expected	Corp. expected	Noncorporate	Noncorp. non-tax	Noncorporate	Noncorp. non-tax	Cost per $
Industry	Noncorporate	Return	Return	non-tax cost	plus risk cost	non-tax cost	plus risk cost	Tax Revenue
Agri,Farm,Fish	0.87	0.132	0.129	0.025	0.032	0.021	0.028	1.491
Mining	0.30	0.286	0.288	0.132	0.136	0.127	0.130	0.245
Constrct	0.46	0.099	0.097	0.023	0.027	0.018	0.022	0.247
Mfg	0.04	0.118	0.114	0.042	0.042	0.038	0.038	0.0143
Trans	0.04	0.075	0.073	0.017	0.017	0.014	0.014	0.0149
Trade	0.28	0.143	0.138	0.041	0.047	0.030	0.036	0.173
Finance	0.39	0.063	0.058	-0.011	0.005	-0.035	-0.019	0.0188
Services	0.39	0.121	0.117	0.041	0.045	0.038	0.042	0.223

Notes: σ_i^2 is the additional nondiversifiable risk associated with noncorporate equity. The efficiency cost (column 8) is calculated using $\sigma_i^2 = 0.034$.

Table 2: Estimated values by year.

Year	1 Fraction Noncorporate	2 Wtd. Avg. Noncorporate Non-tax Cost	3 Efficiency Cost per $ Tax Revenue
1970	0.23	0.0158	0.0723
1972	0.31	-0.0163	-0.0132
1973	0.22	0.0216	0.0557
1974	0.22	0.0278	0.0338
1975	0.18	0.0526	0.0911
1976	0.22	0.0649	0.116
1977	0.21	0.0379	0.0718
1978	0.21	0.0424	0.0613
1979	0.19	0.0454	0.0668
1980	0.22	0.0542	0.130
1981	0.22	0.0155	0.0424
1982	0.18	0.0230	0.0655
1983	0.21	0.0122	0.0708
1984	0.21	0.0127	0.0491
1985	0.27	-0.0103	0.0119
1986	0.28	0.00739	0.115

Table 3: Estimated biases in calculation of non-tax cost of noncorporate form.
Dependent variable: Estimates of non-tax cost, C_i

Variable	Coefficient	Std. Error	t-ratio	$P > \|t\|$
Equity/firm, v_i	.0718	.0251	2.863	0.005
Loss fraction, L_i	-.037818	.0712243	-0.531	0.597
Change in fraction noncorp, ΔF_i	.0040552	.0866285	0.047	0.963
Tax spread, Δt	.0003917	.0002654	1.476	0.143
Regime 2, 1976–	.0235862	.0154247	1.529	0.129
Regime 3, 1982–	-.0418131	.0163561	-2.556	0.012
Diversifiable risk, s_i	1.825251	2.09737	0.870	0.386
Intercept	-.0035013	.0280074	-0.125	0.901

Notes: The regression has 114 observations, one for each of eight industries for each of the 16 years 1970–1986 (except 1971). The R^2 was 0.17.