HOW TAXES TRANSFORM CORPORATE ACQUISITIONS INTO ASSET ARBITRAGE

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I. INTRODUCTION

Numerous studies of the wave of corporate acquisitions of the 1980s are unanimous in reporting large gains to target shareholders—not merely on average, but in the great majority of cash-for-stock acquisitions (hereafter CSAs). While the evidence concerning shareholders of acquiring firms varies between small gains and small losses, the implied effect on the combined equity of acquiring and acquired firms is unambiguously positive and substantial.[1] Moreover, since there is reason to believe that empirical estimates understate gains to shareholders of acquiring firms (Asquith et al. 1987; Magenheim and Mueller, 1988; Roll, 1988; Schipper and Thompson, 1983), the true combined gains are most likely larger than those reported. The predominance of abnormal shareholder gains in CSAs, a central feature of the passing takeover epidemic, remains a puzzle. Previous researchers successfully identify a number of synergies that contribute to those gains; but those synergies, taken separately or jointly, do not match the magnitude and frequency of this phenomenon. They do not explain the absence of a substantial percentage of acquisitions generating only a small combined gain or, in view of uncertainty and transaction costs, a combined loss. How can CSAs

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affect share prices so favorably without having corresponding effects on operating income or tax exposure?

This paper puts forward and tests a hypothesis that intercorporate CSAs generate large predictable gains by eliminating the personal-tax wedge in the target firms. We argue that under a tax system as ours, where individual investors are taxed separately from the corporations they own, CSA is inter alia a profitable arbitrage. This argument is based on the familiar idea that the burden of personal taxation creates a wedge between the price of the target's tangible and intangible net assets (i.e., assets less debt liabilities) in the market for corporate assets, and the lower price of those assets in the stock market. *We argue that an acquiring corporation performs an arbitrage by replicating the target's operating cash flows at a reduced investment cost. Cost reduction is achieved by purchasing the target's assets indirectly, through the stock market. The gross arbitrage gain generated equals the target's preacquisition personal-tax wedge removed by the CSA.* The portion of that gain received by the target's shareholders is measured by the price premium paid for their stock; the remainder shows up as an increase in the acquirer's post-corporate-tax asset capitalization, translated to a smaller increase in the post-personal-tax value of the acquirer's stock. The posttax gains received by the equityholders of both firms are at the expense of taxpayers at large.

The proposed hypothesis is *not* based on tax incentives of the parties involved, and is therefore not a tax arbitrage. At most, the acquirer is assumed to respond to the opportunity to purchase a target's assets at a bargain price, through the stock market. At the least, the acquirer is assumed to imitate the successful behavior of other firms. Through their differential effects on asset values, personal taxes play a passive role in creating the opportunity for arbitrage.

The proposed hypothesis has received only a limited attention in the literature. It is analyzed by Bierman (1985), Coyne (1986), King (1986), and Petruzzi (1983), and offered preliminary testing with mixed results by Auerbach and Reishus (1988b), King (1989), and Petruzzi (1983). We believe that the main barrier to effective testing of this hypothesis by previous writers lies in the common views that CSA is inherently also a real investment (Auerbach and Reishus, 1988b; King, 1989; Petruzzi, 1983) and a tax-effective distribution for the acquirer, such as stock repurchase (Auerbach and Reishus, 1988b; Bagwell and Shoven, 1988; Bierman, 1985; Franks et al., 1988; King, 1986; Petruzzi, 1983).[2] Our analysis reveals that these views have no basis in theory. Furthermore, contrary to the claim that CSA is an efficient real investment, there is evidence that gainful CSAs are often followed by decreased earnings per share, or by a divestiture of the assets acquired. Contrary to the view that CSA is a tax-effective distribution for the acquirer, we observe that CSAs are often financed by borrowing, and that management buyouts—a most gainful subset of CSAs—rely heavily on costly borrowing. We also observe that the acquiring corporate shells set up in management buyouts have no earnings to distribute.

Much of this paper is devoted to setting up the framework for testing our

hypothesis. Our objective is to establish what Gilson et al. (1988) call a "strong claim of tax favoritism," by pricing the CSA transaction and quantifying the relevant gains. This is accomplished after first identifying the source of gains ("weak claim") and then demonstrating that CSA has no substitutes in generating those gains ("semistrong claim"). Our preliminary tests strongly confirm the proposed hypothesis on a sample of 79 intercorporate acquisitions occurring during the early 1980s.

Our results reveal that the combined pretax gain averages 71% of the target's estimated preacquisition personal-tax wedge. The statistical relationship between the two variables is highly significant and stable. The evidence shows nearly equal pretax rates of return for target's and acquirer's shareholders, confirming Roll's (1988) conjecture on synergy and gain sharing. The evidence of a significant and substantial gain to the acquirer's shareholders is also consistent with previous studies estimating dollar gains (Asquith et al., 1983, 1987; Dennis and McConnell, 1986; Malatesta, 1983). Of the combined pretax arbitrage gain, 53% goes to the target's shareholders, where it may be subject to capital gains tax, and the remaining 47% goes to the acquirer, where it is reduced by the personal-tax wedge of that firm, and a delayed payment of capital gains tax. Given that the target's shareholders pay capital gains tax, their portion of the combined posttax arbitrage gain is 56%, compared with 44% received by the acquirer's shareholders. To the latter, the acquisition gain has an attached cost. There is evidence that part of the typical transaction is a transfer payment of $25–$30 million, the average minimum amount required to entice most of the target's shareholders to sell. This fixed payment to the target's shareholders is added on top of their share in the combined arbitrage gain. Finally, there is tentative evidence that a greater concentration of institutional ownership in the acquirer leads to a greater gain received by that firm's shareholders.

The remainder of this paper is set up as follows. The proposed arbitrage hypothesis is numerically illustrated in Section II, translated first into a theoretical model in Section III, and then into an empirical model in Section IV. The data are described in Section V, and the empirical results in Section VI. Additional testable propositions for further research are discussed in Section VII, and implications of the arbitrage hypothesis for public policy are considered in Section VIII.

II. A NUMERICAL EXAMPLE

In the presence of personal taxes on corporate source income, the post-corporate-tax cash flows generated by the target are divided three ways: interest, distribution to shareholders, and taxes on both forms of income. Consistently, the post-corporate-tax value of the corporation's tangible and intangible assets, including the value of any future rent, is shared by three claimants: creditors, shareholders, and the government. After subtraction of the value of debt claims and the government's interest tax claims from both sides of the valuation-based balance sheet, the reduced balance sheet shows on one side the firm's *net asset value*, and

on the other the sum of the discounted value of personal-tax payments on distributions to shareholders and the market value of the firm's stock. Hence, the discounted value of distribution tax payments may be viewed as a *tax wedge* between the firm's pre-personal-tax net asset value and its smaller post-personal-tax equity market value.[3] The firm's *entire* asset value as viewed at the corporate level is the capitalization of its entire cash flows net of the *corporate*-tax impact, as those assets are priced to be paid for with post-corporate-tax funds. Given that the corporate tax is uniform across corporations competing for those assets, the value equals the price at which the firm's assets would be sold as a package in the market for corporate assets. The firm's *net* asset value referred to throughout this paper equals the firm's entire asset value less its debt liabilities.

The claimed opportunity for arbitrage requires the assumption that effective personal-tax rates be sufficiently high to offset the lesser of round-trip transaction costs of acquisition followed by divestiture, or one-way acquisition transaction costs plus any negative effects created by the combination of the two firms.[4] To focus on the arbitrage mechanism, we assume in the following example the absence of transaction costs and real or financial synergies. This assumption is relaxed in our empirical model.

Consider a nongrowth target firm T having a post-corporate-tax net asset value of \$1,000 and a corresponding pre-personal-tax equity value of \$1,000. (Alternatively, we may assume the absence of corporate tax and debt, so that net assets equal total assets.) A nongrowth potential acquirer P has a net asset value of \$10,000 (\$2,000 in cash and \$8,000 in other assets) and a corresponding pre-personal-tax equity value of \$10,000. If all future earnings of both firms are to be distributed and subjected to a pre-1987 40% dividend tax (Peterson et al., 1985) the stocks of these firms would have the corresponding market values of $\$1{,}000(1 - 0.4) = \$600$ and $\$10{,}000(1 - 0.4) = \$6{,}000$. These values reflect the assumption of no growth, and therefore no impact of capital gains tax. The values claimed by the Treasury are the discounted streams of dividend tax payments to be generated by the two firms, \$400 and \$4,000 respectively.[5] The preacquisition valuation-based balance sheets of the parties involved are illustrated below:

Preacquisition Balance Sheets

CORPORATION T (DERIVED)

Net assets	1,000	Equity	1,000

CORPORATION P (DERIVED)

Cash	2,000		
Other net assets	8,000	Equity	10,000

SHAREHOLDERS OF T (OBSERVED)

Stock T	600	Equity	600

SHAREHOLDERS OF P (OBSERVED)

Stock P	6,000	Equity	6,000

TREASURY (DERIVED)

Dividend tax wedge in T	400		
Dividend tax wedge in P	4000	Equity	4,400

Now assume that without the foreknowledge of shareholders of either firm, firm P proceeds to acquire for $900 cash the entire stock of firm T, paying $300 in premium. If the acquisition is financed internally, the consolidated post acquisition balance sheet of firm P shows a decrease of $900 in cash, offset by an increase of $1,000 in assets originating in firm T. The latter change is based on the assumption that the burden of corporate taxation, if any, is unique to the assets, and does not change with the owners' identity.

Since firm T's assets have a fair market value of $1,000, firm P's $900 investment in those assets has a net present value of $100, so that firm P replicates the operating cash flows of firm T at a reduced investment cost! On a *pre-personal-tax* basis, the combined gross arbitrage gain is the sum of $300 in premium received by the target's shareholders, and the $100 increment in the acquirer's net assets. The combined gross gain of $400 equals the preacquisition personal-tax wedge of the target eliminated by the acquisition. This gain is produced by the opportunity to purchase the target's assets indirectly through the stock market, rather than directly in the market for corporate assets. A direct purchase of the target's assets at any price would generate a zero combined gain; an indirect purchase of the same assets through the stock market, at any price, would generate a $400 joint gain. (Note that this gain would be eliminated by an additional personal tax burden if the acquirer were to finance the transaction by issuing stock):

Postacquisition Balance Sheets

CONSOLIDATED CORPORATION P

Cash	1,100		
Assets of T	1,000		
Other net assets	8,000	Equity	10,100

SHAREHOLDERS OF T

Cash for fair value		600			
Cash premium	300				
Less: tax	(48)	252	Equity		852

SHAREHOLDERS OF P

Stock of P	6,060	Equity	6,060

TREASURY

Capital gains tax, T shareholders	48		
Dividend tax wedge in P	4,040	Equity	4,088

The *post–personal-tax* net gains of the shareholders of both firms are diminished by personal taxation of their share in the $400 gross gain. The target's shareholders must pay without delay tax on any capital gains realized. Following Poterba (1986), our example is based on a pre-1987 capital gains tax rate of (0.4)

(0.4) = 0.16 assumed to be imposed on a gross gain of $300 over and above a cost base of $600. The net gain of the acquirer's shareholders is calculated by applying a personal-tax wedge at the ordinary rate of 0.4 to the incremental net asset value of $100.[6] The statement of asset changes summarizes the net effects on the three parties involved: The combined posttax shareholder gain of $300 (1 − 0.16) + $100 (1 − 0.4) = $312 equals the net decrease in their discounted tax payments. The combined net arbitrage gain is at the expense of taxpayers at large:

Statement of Asset Changes

T shareholders:	Cash premium	300
	Less: Capital gains tax	(48)
	Net gain	252
P shareholders:	Increased net assets	100
	Less: Dividend tax burden	(40)
	Net gain	60
Treasury:	Decreased dividend tax in T	(400)
	Increased capital gains tax in T	48
	Increased dividend tax in P	40
	Net loss	(312)

III. CSA MODEL

A. Corporate Valuation with Taxes

Our corporate acquisition model follows Marcus et al. (1986), who extend the Gordon–Miller–Modigliani growth model to analyze the interaction of growth and taxes under the U.S. tax system. Although those models do not incorporate risk explicitly, this is not a drawback in the present context. Our theoretical model abstracts from all acquisition synergies including those based in risk factors; various synergies are allowed for in the empirical model.

- V = preacquisition firm's equity market value, a discounted value of post-personal-tax distributions
- A = preacquisition value of the firm's tangible and intangible net assets, a discounted value of the firm's earnings *after* corporate tax
- E = economic earnings *before* tax, accrued at the end of the year
- b = firm's reinvestment ratio, the periodic investment as a fraction of pretax earnings E
- e = fraction of b financed internally by retention
- g = nominal growth rate of earnings, dividends, and price per share

r = shareholders post-personal-tax nominal opportunity rate of return for equal-risk investment
t_k = marginal and average rate of corporate income tax
t_p = shareholders' average marginal tax rate on "unearned" personal income, including dividends (approximating reality, it is assumed that all distributions are by cash dividends)[7]
t_c = shareholders' average marginal tax rate on realized capital gains
i = stock's average holding period measured in years, assumed to begin ex-dividend.

The shareholders of a fixed-leverage firm undergoing constant perpetual growth perceive the following posttax dividend in year j: $E\,(1 - eb - t_k)\,(1 - t_p)(1 + g)^{j-1}$. With annual ex-dividend trading, the capital gains tax in year j is $t_c V g\,(1+g)^{j-1}$, and the firm's equity market value is

$$V = \frac{E(1-eb-t_k)\,(1-t_p)}{r-g} - V\,\frac{t_c g}{r-g} \qquad \text{(subject to } r > g \geq 0\text{)}.$$

With an i-year holding period ($i \geq 1$), the discounted value of capital gains tax payments becomes $Vt_c[(1+g)^i - 1]/[(1+r)^i - (1+g)^i]$, so that the firm's implicit equity value is

$$V = \frac{E(1-eb-t_k)\,(1-t_p)}{r-g} - V\,\frac{t_c[(1+g)^i - 1]}{(1+r)^i - (1+g)^i}\,.$$

An explicit formula for the firm's equity market value is obtained by solving this equation for V:

$$V = \frac{E(1-eb-t_k)\,(1-t_p)}{r-g}\;\frac{1}{y} \tag{1}$$

where

$$y = 1 + \frac{t_c[(1+g)^i - 1]}{(1+r)^i - (1+g)^i}\,. \tag{2}$$

The *pre*-personal-tax value of the corporation's net assets and their equilibrium price in the market for corporate assets is derived from (1) by setting the personal tax rates at zero:

$$A = \frac{E(1-eb-t_k)}{r-g}\,. \tag{3}$$

Based on the relationship between (1) and (3), this unobservable value can be imputed from the observable posttax equity market value by

$$A = V\,\frac{y}{1-t_p}\,. \tag{4}$$

This value is net of the impact of the corporate tax, and it includes tangible as well intangible assets such as the discounted value of future rents. Based on (4), the target's preacquisition personal-tax wedge W is defined by $W = A - V = V[y/(1-t_p) - 1]$.

B. Gross Arbitrage Gains

Assume now that this corporation becomes a target for CSA by another, under whose ownership the acquired assets are subject to the same corporate- and personal-tax impact unique to those assets. In the absence of transaction costs and real or financial synergies, including tax synergies, the maximum price that can be offered by the acquirer for the target's stock, assuming internal financing, is the value A stated by (3). The minimum cash price acceptable to the target's marginal shareholders is the value V stated by (1) plus compensation for any additional tax liability arising from the transaction itself. Depending on the price at which the stock was originally acquired, the target's shareholders may be taxed immediately on the unanticipated capital gain caused by the acquisition, as well as on early realization of capital gains accrued prior to the acquisition. The arbitrage hypothesis states that the target's preacquisition personal-tax wedge W is eliminated by asset consolidation, generating an equal gross gain that shows up as increments in the target's equity ΔV and the acquirer's net assets ΔA^*, namely,

$$\Delta V + \Delta A^* = W = V[y/(1-t_p) - 1] \tag{5}$$

(hereafter an asterisk identifies the acquirer). This combined gross arbitrage gain is proportional to the target's equity and net asset values, but independent of the acquirer's size. Per dollar equity of the target [see Amihud (1989) and Asquith (1983)], this gain is directly related to the rates of personal taxes and the growth, inversely related to the rate of interest and the holding period, but independent of the corporate tax rate if that rate is unaffected by the acquisition.

C. Net Arbitrage Gains

The combined aggregate post-personal-tax gain is the sum $\Delta V(1-t_c) + \Delta V^*$, reflecting the assumptions that the unexpected gain realized by the selling shareholders is subject to an immediate capital gains tax, whereas the incremental tax burden borne by the acquirer's shareholders is implicit in the incremental market value of their holding. The aggregate posttax gain received by the target's shareholders is

$$\Delta V(1-t_c) = QW(1-t_c), \tag{6}$$

and that received by the acquirer's shareholders

$$\Delta V^* = (1-Q)W\left[\frac{1-t_p}{y}\right] - \Delta V^*\left[\frac{t_c}{i^*}\right]\frac{1-(1+r^*)^{-i^*}}{r^*}, \tag{7}$$

where, based on (5), $Q = \Delta V/W$ and $1-Q = \Delta A^*/W$ are the fractions of the combined gross gain received by the selling shareholders and the acquiring firm, respectively. The first term in (7) contains the ratio $(1-t_p)/y = V/A$ (Asquith et al., 1987) reflecting the assumption that the gross gain received by the acquirer, which is automatically invested in the acquired assets, is subject to the tax wedge associated with those assets when held by the target. Any assumption to the contrary would imply the presence of another tax synergy provisionally assumed not to exist. The second term is a discounted value of additional payments of capital gains tax, which the acquirer's shareholders are expected to make when gradually realizing the incremental gain ΔV^*. Consistent with our valuation model, the incremental capital gain is assumed to be realized in equal annual portions $\Delta V/i^*$ over i^* years due to a constant turnover of ownership. Equation (7) is an implicit expression of ΔV^*, which may be stated explicitly as

$$\Delta V^* = (1-Q)W\left(\frac{1-t_p}{y}\right)\left[1+\left(\frac{t_c}{i^*}\right)\frac{1-(1+r^*)^{-i^*}}{r^*}\right]^{-1} \tag{8}$$

showing how the acquirer's incremental net asset value $(1-Q)W$ is translated into an incremental posttax equity market value ΔV^*.

Based on (6) and (8), the combined net aggregate gain

$$\Delta V(1-t_c)+\Delta V^* = W\Big\{Q(1-t_c) + (1-Q)$$
$$\left(\frac{1-t_p}{y}\right)\left[1+\left(\frac{t_c}{i^*}\right)\frac{1-(1+r^*)^{-i^*}}{r^*}\right]^{-1}\Big\} \tag{9}$$

is expressed as a product of the pretax gain W and the combined tax factor in braces. Unequal incremental tax burdens borne by the shareholders of the two firms imply that the combined incremental tax burden and therefore the combined posttax gain depend on the manner in which the gross gain is divided between the acquiring firm and the selling shareholders.

IV. TESTABLE HYPOTHESES

Left out of the model are other real and financial synergies, personal-tax loopholes and transaction costs, which may jointly augment or diminish the gross arbitrage gain generated by the acquisition. The contribution of these factors is considered in our empirical tests of this model. The design of a testing procedure must be concerned with three issues: empirical definition of the target's tax wedge, measurement of the value created by the acquisition, and empirical distinction between the arbitrage gain and various synergies and transaction costs.

Target's tax wedge. This value is calculated based on (5), using independent estimates of t_p and y based on (2), as detailed below.

Value created. The observation time window should be wide enough to include stock price run-ups prior to the first public announcement of the impending acquisition (Comment, 1986; Jarrell and Poulsen, 1987), but as narrow as possible to exclude unrelated price fluctuations. Since the initiative for acquisition comes from the acquirer and may be a part of a long-term acquisition plan, any period designed to satisfy the second requirement may be too short to include the entire effect on the acquirer's stock (Magenheim and Mueller, 1988; Schipper and Thompson, 1983). Mandelker (1974), Ellert (1976), and Langetieg (1978) find that information concerning impending acquisitions leaks out starting at least four months prior to the first public announcement. Conservatively, for all firms we use price quotations dating six months before that event. The postacquisition equity value of the acquirer is measured based on its stock price on the date the final agreement was announced. That date is used to ensure that the price reported reflects certainty of the acquisition and the resulting gain. The acquisition value of the target is the price paid for its entire stock.

Arbitrage gain versus other effects. An increasing number of researchers measure the acquisition gain in dollars, not rates (Amihud, 1983; Asquith, 1983; Asquith et al., 1983, 1987; Dennis and McConnell, 1986; Langetieg, 1978; Malatesta, 1983). A reason often cited in defense of this approach is that large dollar gains may show up as low rates of return for acquirers, which tend to be larger than targets (Roll, 1986). In our sample, the preacquisition average equity size of the acquirers is almost six times that of the targets, $610 million compared with $107 million, respectively. But our main reason for measuring gains in dollars rather than rates is to ensure consistent results when testing our hypothesis separately and jointly for acquirers and targets. To isolate the contribution of the acquisition to price changes over the observation time window, we follow the standard procedure of deflating those changes by the market effect measured separately for each firm by its beta. (A simpler procedure deflating changes by a single market index produced similar results.)

Combined gains. Our central hypothesis is that the combined gross gain from acquisition originates with and is equal to the personal-tax wedge of the target. This hypothesis is tested by a set of linear regressions in which the dependent variable is the combined gross gain and the independent variables are the target's tax wedge and a set of dummy variables. Regressions are of the general form

$$\Delta V + \Delta A^* = \sum_j a_j D_j + \sum_k b_k D_k V[y/(1-t_p) - 1] + e, \qquad (10)$$

where ΔV is the net-of-market increment in the target's stock value and ΔA^* the increment in the acquirer's net asset value over the observation time window, D_j are intercept dummies, D_k are slope dummies, and e is an error term. The

unobservable ΔA^* is expressed in terms of observable variables by substituting ΔA^* for $(1-Q)W$ in (8) and solving for ΔA^*:

$$\Delta A^* = \Delta V^* \left(\frac{y}{1-t_p} \right) \left[1 + \left(\frac{t_c}{i^*} \right) \frac{1-(1+r^*)^{-i^*}}{r^*} \right],$$

where ΔV^* is the net-of-market increment in the acquirer's stock value and the remaining variables are estimated independently (see below). The target's tax wedge, appearing on the right-hand side of (10), is based on the right-hand side of (5).

Different versions of (10) estimate different subsets of the coefficients a_j and b_k to test the stability of the main relationship under study and determine its interaction with other factors. To interpret the results concerning our central hypothesis, consider the basic version of (10):

$$\Delta V + \Delta A^* = a + bV[y/(1-t_p) - 1] + e. \tag{11}$$

In this equation, a significant slope coefficient of $0 < b \leq 1$ would be interpreted as a confirmation of the arbitrage hypothesis. The literature contains no competing hypothesis claiming positive relationship between the target's tax wedge or entire equity size and the acquisition's combined gross gain. Consistent with our hypothesis, a significant $1 - b > 0$ would be attributed to any of the following factors: (a) overstated tax wedge caused by ignoring personal-tax loopholes affecting the preacquisition target value; (b) partial shareholder anticipation of the acquisition as of our observation date; (c) adverse real or financial effects of the acquisition unaccounted for; and (d) proportional transaction costs. A significant and feasible $a < 0$ would be consistent with our hypothesis, indicating fixed transaction costs. A significant $b > 1$ would indicate the importance of real or financial synergies correlated with the tax wedge, which contribute to the acquisition gain but are not accounted for by our model. An insignificant $b \gtrless 0$ or a significant $b < 0$ would be inconsistent with our hypothesis, whereas a significant $a > 0$ would be hard to reconcile with it.

Equations (10) and (11) may suggest the risk of spurious correlation due to the presence of V and ΔV on the right- and left-hand side, respectively. The underlying stochastic process safeguards against this risk. Since the total equity value of a stock differs from the stock price only by a scale factor, general independence of the *change* in a stock's total value over any period from the stock's value in the beginning of that period is ensured by a similar independence in the underlying stock price change. This relationship ensures, in turn, that any significant departure from independence around the time of the acquisition can be fully attributed to that event. The only potential difficulty arising from regressing dollar values as opposed to rates concerns the second moment of the distribution. It stems from the fact that *random* dollar variations over the observation time window may be positively correlated with the size of the company, causing heteroscedasticity in the regression residuals. If present, this

phenomenon would be dealt with using a standard procedure (Judge et al., 1982; Weisberg, 1980).

Additional factors. The results obtained from (11) may be due in part to unspecified factors remaining outside our basic model. We use (10) to test for the influence of the following factors.

Intercept dummy variables

- year of acquisition: testing structural stability over time.
- acquisition type (horizontal, vertical, or conglomerate): tracing monopoly or efficiency gains versus diversification gains.

Slope dummy variables

- high/low (above/below median) percentage of institutional ownership in both firms: tracing influence of transaction costs and information asymmetry.
- high/low acquirer's percentage of cash increase during the year preceding the acquisition: tracing tax-effective distribution gains.
- high/low target's preacquisition growth rate: tracing influence as per the hubris hypothesis (Roll, 1986).
- high/low target's ratio of (gross fixed assets)/(total assets) or (accumulated depreciation)/(total assets): tracing gains from stepping-up assets' book values due to improved information on assets' market value (Summers, 1981), and tax saving via increased depreciation.

The use of dummy variables to represent factors not specified in our theoretical model is aimed at identifying missing variables, and should not be interpreted as a test of competing hypotheses. This approach allows us to test the effect of rate variables in an equation specified in dollars.

Gain sharing. The portion of the combined gross gain received by each firm's shareholders can be expressed as a function of the target's tax wedge by rewriting (10) separately for each firm. The target's shareholders gain according to

$$\Delta V = \sum_j a'_j D_j + \sum_k b'_k D_k V[y/(1-t_p) - 1] + e, \tag{12}$$

and the acquirer's shareholders according to

$$\Delta A^* = \sum_j a''_j D_j + \sum_k b''_k D_k V[y/(1-t_p) - 1] + e. \tag{13}$$

With one exception, the interpretation of (12) and (13) follows closely that of (10) and (11). In the basic equation for the combined gain, we postulated $a < 0$ due to transaction costs jointly borne by the two firms. In contrast, for the target we postulate $a > 0$ as a condition for enticing inframarginal shareholders to sell. We therefore postulate $a < 0$ for the acquirer.

V. DATA

A. The Sample

Our data are borrowed from Coyne (1986). Of the 9000 mergers and acquisitions reported in *Mergerstat* (W.T. Grimm & Co.) for the four years 1981–1984, we seek all CSAs between publicly held domestic corporations on which there is sufficient information. We are unaware of any evidence to suggest that CSAs of the early 1980s systematically differed from those of the late 1980s. Our sample is reduced to 79 CSAs (see Appendix) after excluding the following partially overlapping categories:

- over 5100 acquisitions involving a privately held target;
- about 3500 divestitures, typically cash-for-assets transactions;
- about 1200 acquisitions involving a foreign party;
- stock-for-stock acquisitions;
- CSAs where one of the parties was in financial distress;
- CSAs by a private buyer;
- CSAs on which there is incomplete data;
- CSAs in excess of $1.5 billion.

Seven multibillion CSAs lying far apart of the remaining sample are excluded to prevent them from dominating our dollar-based equation. Those acquisitions are too few to be considered separately. The final sample includes repeated acquisitions by two of the firms, since those are compatible with our hypothesis.[8]

In principle, our hypothesis is not limited to firms included in the sample, but should apply to the entire population of CSAs among domestic corporations, including closely held ones. Over the sampling period, that population consisted of thousands of acquisitions.

B. The Main Variables

Only the following variables enter regression equation (11) directly or indirectly. The *preacquisition equity values of the two firms* (V, V^*) are measured by multiplying the closing price by the number of shares outstanding on a given date. Price quotations are taken from the *Daily Stock Record* (Standard & Poor). The *acquisition value of the target* is measured by the actual price paid for the

target's entire stock as reported in *Mergerstat*. The *postacquisition value of the acquirer* is measured by the acquirer's closing market value on the date the final agreement was announced. The *holding period* (i, i^*) is calculated as the average share value outstanding divided by the annual trading volume. Poterba (1986) argues that the holding period is unique to each stock and is affected by its growth rate and other variables. The *posttax discount rate* (r, r^*) depends on the general level of interest rates and the relative risk of the individual firm. To account for both effects, we use the ex post figure of the actual preacquisition posttax rate of return earned by shareholders. The effect of personal taxes is netted out by using "market" tax rates for dividends and capital gains (see below). The *target's share growth rate* (g) is measured on earnings per share, which display a more stable growth than the price per share, but a less stable growth than dividends per share. The use of earnings avoids the obscuring effect of an unknown dividend policy, and the effect on the share price of changes in the general level of uncertainty and market interest rates. Based on Peterson et al. (1985), we assume a pre-1987 *dividend tax rate* (t_p) of 40%. Consistent with the findings of Poterba (1986), we use a compatible pre-1987 effective *capital gains tax rate* (t_c) of 16%, which is four tenths of 40%. The same rates are used above in the numerical example.

VI. Empirical Results

A. The Tax Wedge and the Combined Gross Gain

Regressions testing our central hypothesis regarding the combined aggregate pretax gain are reported in Table 1, beginning with the basic version following Equation (11).[9] In regression C1, the slope coefficient of the target's tax wedge is highly significant both statistically ($t = 4.747$) and economically, consistent with our claim that the combined gross gain originates with and is equal to the target's personal-tax wedge. With a point estimate of 0.71, this coefficient shows that the gain generated by the typical acquisition amounts to seven tenths of the tax wedge eliminated from the target, its claimed source. The 29% of the wedge unaccounted for is a significant rate, indicating the influence of mitigating factors such as proportional transaction costs (documented by *Mergerstat*), and/or acquisition-related poor management and diseconomies of scale and scope (Herman and Lowenstein, 1988), preacquisition personal-tax loopholes (Miller and Scholes, 1978), and partial anticipation of the event (Comment, 1986; Jarrell and Poulsen, 1987). Also consistent with our hypothesis is a small and insignificant constant of $1.9 million, a result interpreted as evidence for the absence of a major deadweight loss due to fixed transaction costs.

The incremental influence of factors left outside our theoretical model is determined in regressions C2–C4. Due to multicollinearity and consistent with our objective, the slope dummies in regressions C2 and C3 are entered in residual

Table 1. Combined Pretax Gain As Dependent Variable[a]

Independent Variable	*Regression*	*C1*	*C2*	*C3*	*C4*
Slope					
Tax wedge		0.711	0.711	0.727	0.386
		(4.747)	(6.042)	(5.989)	(1.880)
Target's institutional ownership (%)			−0.786	−1.079	
			(−2.386)	(−3.170)	
Acquirer's institutional ownership (%)			1.156	1.153	
			(4.020)	(3.784)	
Differential institutional ownership (%)					0.541
					(2.246)
Acquirer's cash			−0.338	−0.169	
			(−1.063)	(−0.481)	
Target's growth rate			−0.088		
			(−0.195)		
Target's fixed assets			0.643		
			(1.242)		
Target's depreciation			0.016		
			(0.069)		
Intercept					
Constant		1.868	1.868	−28.444	9.009
		(0.057)	(0.072)	(−0.558)	(0.280)
1982				−0.817	
				(−0.675)	
1983				80.412	
				(1.339)	
1984				60.059	
				(0.990)	
Horizontal				−2.521	
				(−0.048)	
Vertical				−0.000	
				(−0.331)	
Adjusted R^2		0.216	0.516	0.501	.255
Observations: 79					

[a]Numbers in parentheses are *t*-values.

form, using a two-stage procedure. The residuals of each variable are calculated by first regressing each slope dummy on the tax wedge. The dummy residual coefficients estimated by this procedure measure only influence that is orthogonal to that of the tax wedge, and cannot be interpreted as coefficients calculated on the variables themselves or their interaction dummies. The overall contribution of the slope dummies employed in regression C2 is measured by an increase in the adjusted R^2 from 0.22 to 0.52, a change due mainly to two variables.

The only two significant variables are the percentages of institutional ownership in the two firms, variables that approximate the concentration of ownership in general. Although the size of a residual coefficient has no intuitive meaning, its sign and level of significance do. The conflicting signs of the two coefficients show that the combined gain is directly related to the concentration of ownership in the acquirer, but inversely related to that in the target. This result is intuitively appealing. Greater concentration of acquirer's ownership may be associated with better information and lower transaction costs; greater concentration of target's ownership may mean better information and greater bargaining power, and therefore more protracted and costly negotiations. This issue is further examined below.

The residual slope dummy representing a change in the acquirer's preacquisition cash position is insignificant and has a wrong (negative) sign, offering no support to the popular claim that CSA is a tax–effective distribution for the acquirer (Auerbach and Reishus, 1988a; Bagwell and Shoven, 1988; Bierman, 1985; Franks et al., 1988; King, 1986). This conclusion is based on the argument that a gain from this source to the acquirer's shareholders would not be offset by a loss to the target's owners. The distribution claim aside, we would expect a nonnegative coefficient of this variable vis-à-vis the combined gain.

The residual slope dummy for the target's growth rate has an insignificant positive sign, consistent with but only weakly supportive of the hubris hypothesis (Roll, 1986).

The residual slope dummies for the target's ratios of gross fixed assets and accumulated depreciation are both insignificant. Only the former has a positive sign, consistent with the hypothesis that the step-up of assets' values generates corporate-tax saving (Auerbach and Reishus, 1988a,b; Kaplan, 1989).

Regression C3 replaces some of the insignificant slope dummies by a set of intercept dummies in an attempt to identify additional factors influencing the results in regressions C1 and C2. Regression C3 lends further support to our hypothesis by demonstrating stability of the tax wedge coefficient. Additional details are as follows.

The year-of-acquisition intercept dummies do not reflect a clear trend, suggesting the validity of combining in the same sample acquisitions observed over the four years 1981–1984.

The acquisition-type intercept dummies are insignificant but bear the right signs. As in previous studies, horizontal and vertical combinations generate smaller gains than conglomerate ones (Gordon and Yagil, 1981; Wansley et al., 1983). The coefficients of the residual slope dummies in regression C3 closely resemble those in regression C2 interpreted above.

Regression C4 focuses on the interaction between concentration of ownership and the process of generating the arbitrage gain. The two institutional dummies appearing in regressions C2 and C3 are replaced by a new interaction dummy created by identifying an above-/below-median difference in the percentage of

institutional ownership (i.e., acquirer's percentage less target's percentage). The new variable enters side by side with the tax wedge variable, in full value rather than residual form. According to the results, both variables are significant. The implied tax wedge coefficient is 0.39 for acquisitions with a below-median difference in the percentage of institutional ownership, and 0.39 + 0.54 = 0.93 for those with an above–median difference in that ratio. The unweighted average of the two estimates is (0.39 + 0.93)/2 = 0.66, close to the estimates of regressions C1–C3. These results are consistent with the role played by the two institutional residual dummies in regressions C2 and C3, the only difference being a larger but insignificant constant. All three regressions indicate the important influence of ownership concentration on the efficiency with which a target's tax wedge can be translated into arbitrage gain.

B. The Target's Gross Gain

Separate tests of our hypothesis conducted on targets are reported in Table 2. Regression T1, the basic version of (12), shows a highly significant tax wedge slope coefficient of 0.38 (t = 7.341). This coefficient constitues 0.38/0.71 = 53% of the combined gross gain coefficient estimated in regressions C1 and C2, implying that approximately half of the gross gain goes to the targets's shareholders. A large positive regression constant of $27.7 million ($t$ = 2.669) stands in contrast to the small and insignificant constant estimated in regressions C1 and C2 for the combined gain. The constant estimated here is therefore largely a transfer payment received by the target's shareholders—a fixed payment necessary to induce sale by inframarginal shareholders. This payment increases the fraction of the gain received by the target's shareholders above 53%. The increase in the adjusted R^2 from 22% (regression C1) to 40% may be a result of the greater precision with which we measure shareholders' gain for the target than for the acquirer (see Section IV), and therefore for both firms jointly.

Comparison of regressions T2 and T3 with C2 and C3 reveals another difference. The residual slope dummy for the acquirer's preacquisition cash position is again negative, but now highly significant. A possible explanation for this is that a greater liquidity for the acquirer expedites the bidding process, thereby lowering the final price. (Regression T4 is analyzed below along with regression P4 of Table 3.)

C. The Acquirer's Gross Gain

Regressions P1 and P2 of Table 3, based on (13), reveal a highly significant tax wedge coefficient of 0.33 (t = 2.413, 2.754) for the acquirer's net asset gain measured separately. This coefficient represents 0.33/0.71 = 47% of the combined gross gain estimated in regressions C1 and C2, implying that about half of that gain goes to the acquirer's shareholders. Consistent with regressions T1 and

Table 2. Target's Pretax Gain As Dependent Variable[a]

Independent Variable	*Regression*	*T1*	*T2*	*T3*	*T4*
Slope					
Tax wedge		0.380	0.380	0.368	0.398
		(7.341)	(8.869)	(8.854)	(5.431)
Target's institutional ownership (%)			−0.118	−0.130	
			(−0.982)	(−1.111)	
Acquirer's institutional ownership (%)			0.500	0.619	
			(4.785)	(5.926)	
Differential institutional ownership (%)					−0.030
					(−0.348)
Acquirer's cash			−0.442	−0.350	
			(−3.827)	(−2.899)	
Target's growth rate			0.075		
			(0.458)		
Target's fixed assets			0.147		
			(0.782)		
Target's depreciation			−0.005		
			(−0.056)		
Intercept					
Constant		27.726	27.726	38.799	27.332
		(2.669)	(3.225)	(2.221)	(2.616)
1982				1.036	
				(2.497)	
1983				7.278	
				(0.354)	
1984				−7.142	
				(−0.341)	
Horizontal				−37.827	
				(−2.097)	
Vertical				0.000	
				(0.298)	
Adjusted R^2		0.404	0.592	0.625	0.397
Observations: 79					

[a]Numbers in parentheses are *t*-values.

T2, this result confirms Roll's (1988) conjecture that synergy gains from acquisitions are likely to be equally divided between buyer and seller. Our finding of a significant gain to the acquirer's shareholders is also consistent with previous studies estimating dollar gains as opposed to rates of return (Amihud, 1989; Asquith, 1983; Langetieg, 1978).

A large negative regression constant of $25.9 million ($t = -0.929, -1.060$) is statistically insignificant, but fully consistent with the constants of regressions

Table 3 Acquirer's Pretax Gain As Dependent Variable[a]

Independent Variable *Regression*	*P1*	*P2*	*P3*	*P4*
Slope				
Tax wedge	0.332	0.332	0.358	−0.011
	(2.413)	(2.754)	(2.979)	(−0.060)
Target's institutional ownership (%)		−0.699	−0.949	
		(−1.984)	(−2.812)	
Acquirer's institutional ownership (%)		0.656	0.534	
		(2.229)	(1.767)	
Differential institutional ownership (%)				0.571
				(2.612)
Acquirer's cash		0.104	0.181	
		(0.321)	(0.517)	
Target's growth rate		−0.163		
		(−0.353)		
Target's fixed assets		0.496		
		(0.936)		
Target's depreciation		0.020		
		(0.087)		
Intercept				
Constant	−25.858	−25.858	−67.244	−18.323
	(−0.929)	(−1.060)	(−1.330)	(−0.683)
1982			−1.853	
			(−1.544)	
1983			73.134	
			(1.228)	
1984			67.651	
			(1.116)	
Horizontal			35.305	
			(0.676)	
Vertical			−0.000	
			(−0.437)	
Adjusted R^2	0.058	0.277	0.298	0.124
Observations: 79				

[a]Numbers in parentheses are *t*-values.

and C1 and C2 and T1 and T2. It measures the average transfer payment made by the acquirer to induce sale by inframarginal shareholders. This payment decreases the fraction of the gain received by the acquirer's shareholders below 47%. The decreased significance of the regression constant, as the decreased R^2, may be attributed to measurement difficulties unique to the acquirer. As pointed out in Section IV, we are unable to measure accurately the gain to the acquirer's shareholders because on that side of the transaction there is often partial anticipa-

tion of the event (Comment, 1986; Jarrell and Poulsen, 1987; Magenheim and Mueller, 1988; Schipper and Thompson, 1983), and because of price fluctuations over the observation window due to events anticipated beyond the acquisition (Herman and Lowenstein, 1988).

Finally, consistent with regressions C3 and T3, regression P3 reveals a positive although insignificant coefficient for the residual slope dummy denoting the acquirer's cash position. If the interpretation provided above is valid, a positive coefficient here means that a cash-rich acquirer pays less for the acquired stock and gains more from the acquisition than a cash-poor one.

Following regression C4, in regressions T4 and P4 we test for the effects of differential ownership concentration on the gross gain generated by the tax wedge. Based on regression C4, we argue above that where the acquirer–target difference in ownership concentration is above the median, the combined gain is significantly larger. Based on regressions T4 and P4, we also argue that the same ownership relationship causes an increase in the absolute and relative gross gain received by the acquirer's shareholders.

Consider the following evidence. The institutional difference slope dummy in regression T4 has a negligible and insignificant coefficient, implying that a tax wedge coefficient of 0.40 (t = 5.431) holds for the target's shareholders regardless of the difference in ownership concentration. In contrast, regression P4 shows for the acquirer a small but insignificant tax wedge coefficient along with a large and significant coefficient of 0.57 (t = 2.612) for the institutional difference dummy. It follows that a near-zero tax wedge coefficient holds for the acquirer's shareholders where the difference in ownership concentration is below the median, compared with a high tax wedge coefficient of about 0.56 where the ownership concentration variable is above the median. Put differently, regressions T4 and P4 indicate that an increase in the acquirer–target ownership concentration difference causes no change in the compensation of the target's shareholders, but a dramatic increase in that of the acquirer's shareholders. These results lead to two tentative conclusions: (a) The acquisition gain received by the target's shareholders is market determined and independent of any informational advantage or disadvantage of those shareholders. (b) The gain received by the acquirer's shareholders is enhanced by better information and control over management actions.

D. Gainsharing before and after Tax

The combined pretax gain function estimated by regression C1 is linear in the target's tax wedge (b = 0.71) and approximately homogeneous (a = \$1.9 million). The target's gain function estimated by regression T1 is also linear in the tax wedge (b' = 0.38), with a significant positive constant (a' = \$27.7 million). Consistently, the acquirer's gain function estimated by regression P1 is linear in the same variable (b'' = 0.33), with an insignificant negative constant

($a'' = \$-25.9$ million). Since the gain functions of targets and acquirers are not homogeneous, the estimated fraction of the arbitrage gain received by each party depends on the absolute size of the target's tax wedge, a magnitude closely associated with the target's equity size. This effect, which should be more pronounced the smaller the acquisition, makes a general statement about gain sharing strictly valid only at the margin. Such a statement is nevertheless approximately correct for medium and large acquisitions, and this was the basis for claiming above that the percentage of the combined gross gain received by shareholders of the targets and acquirers is $b'/b = 0.53$ and $b''/b = 0.47$, respectively.

Gain sharing on a posttax basis depends on the personal-tax exposure of the two groups of shareholders. Based on the pre-1987 tax regime, if targets' shareholders paid capital gains tax on the entire gain they received, and gains received by acquirers were subject to the full tax wedge estimated in our sample, targets' shareholders received a fraction $b'(1-t_c) / [b'(1-t_c) + b'' \Delta V^* / \Delta A^*] = 0.56$ of the combined posttax gain, compared with a fraction $1 - 0.56 = 0.44$ received by acquirers' shareholders.

VIII. Implications for Further Research

This study undertakes preliminary direct testing of the CSA arbitrage hypothesis, leaving unexplored its numerous implications. This section offers a partial list of immediate implications summarized under 14 propositions, provided without a formal proof. These propositions shed further light on the arbitrage transaction and can be used as a basis for additional testing of the central hypothesis.

Proposition 1. Only the acquisition of a corporate target generates arbitrage gain.

The corporate form of ownership of the target is a necessary condition for the coexistence of two market prices for the firm's net assets—one in the corporate asset market and another in the stock market. The difference between the two prices is, dollar for dollar, the source of the gain.

Proposition 2. The gain is not reversed by divestiture.

The arbitrage does not require a real investment. To avoid any risk, the acquirer can arrange to buy the target's stock for cash and simultaneously contract to divest the acquired assets.

Proposition 3. Only CSA can generate the arbitrage gain.

To the extent that corporate and personal tax burdens are unique to a firm's assets, *stock-for-stock* acquisition is a gain-neutral exchange of post-personal-tax values, leading to consolidation of assets and liabilities of two firms. In our example the target's shareholders would exchange $600 of stock in their firm for $600 of stock in the consolidated acquirer. Similarly, a *cash-for-assets* corporate acquisition (divestiture) is a gain-neutral exchange of post-corporate-tax assets. The acquirer in our example would pay $1,000 in cash for the target's assets, changing the asset composition of both firms but not the asset value of either.

These implications are supported by evidence of only "small" normal gains and losses in stock-for-stock acquisitions (Asquith et al., 1987; Huang and Walking, 1987; Travlos, 1987; Wansley et al., 1983) as in cash-for-assets divestitures (Hite et al., 1987; Jain, 1985; Klein, 1985; Rosenfeld, 1984; Sickerman and Pettway, 1987). The widespread use of voluntary divestitures alongside CSAs suggests the possibility that the former are a by-product of the latter. Gain-neutral divestitures may support the tax arbitrage process by allowing acquirers to reverse uneconomic agglomerations caused by gainful CSAs.

Proposition 4. The combined posttax gain is always positive if the corporate tax burden remains unchanged.

The positive gross gain generated by eliminating the personal-tax wedge in the target is only partially offset by personal taxation of shareholders at tax rates below unity. This conclusion holds regardless of the relative personal-tax wedge in the two corporations prior to the acquisition and the manner in which the gross gain is divided between the acquirer and the target's shareholders. However, the *size* of the combined net gain does depend on how the gross gain is divided to the extent that the latter is taxed differently to the shareholders of the two firms. Note that if personal taxation is the same in both firms, *external* equity financing would eliminate the arbitrage gain by adding a layer of personal taxation to the incremental stock. Indeed, no gain would be generated if the same individual investors were to buy the target's stock directly.

Proposition 5. CSA gains are likely to peak when the personal tax rates are near the 50% level.

This relationship is easy to demonstrate in the special case of CSA between two nongrowth corporations subject to the same burden of corporate and personal taxation, where personal dividend income and capital gains are subject to the same tax rate t. Under these conditions, the combined gross gain per dollar of the target's net assets is t, and the combined net gain is approximately $t(1-t)$. This expression is maximized under $t = 0.5$. The net gain is not directly affected by the corporate tax rate.

Proposition 6. Management buyout is a CSA.

The acquirer can be an established real firm, or a shell formed to carry out the acquisition. Indeed, empirical studies show that gains realized in management buyouts by the target's shareholders are uniformly high, and generally of the same order of magnitude as those generated by interfirm CSAs (Amihud, 1989; Kaplan, 1989; Lehn and Paulsen, 1988; Torabzadeh and Bertin, 1987). Scholes and Wolfson (1988) interpret the increase in the relative frequency of management buyouts in the mid-1980s as evidence of superior efficiency in extracting tax gains. The source of gain proposed here is a case in point.

Proposition 7. The acquirer can substitute own and borrowed funds.

Other effects notwithstanding, the use of borrowed funds does not affect the dollar size of the combined arbitrage gain, but may affect the rate of return earned by the acquirer's shareholders. Given the dollar gain received by the acquiring firm, the rate of return to its shareholders increases linearly with the amount of old or new debt raised for the occasion by that firm.

Proposition 8. The target's debt decreases the combined gain.

Whether financed by borrowing or own funds, stock repurchase by the target decreases dollar for dollar the target's net assets, causing a proportional decrease in the target's personal-tax wedge and therefore in the potential CSA gross gain. This claim is consistent with the evidence that potential targets often repurchase their own stock to fend off acquisition. (Bagwell and Shoven, 1988).

Proposition 9. The combined gain is independent of the relative firm size.

The combined gross acquisition gain equals the target's preacquisition personal-tax wedge, regardless of the asset or equity size of the acquirer. If the two firms have the same debt-equity ratio and the price premium ratio is set, an increase in the target's relative size would increase the posttax rate of return earned by the acquirer's shareholders.

Proposition 10. Intercorporate stock ownership is a substitute for full consolidation.

As noted by Bierman (1985), if the two corporations can be consolidated for tax purposes, the CSA generates the same combined gross gain per dollar investment regardless of the final disposition of the target's stock. Under current U.S. tax law, this can be accomplished by acquiring a controlling interest of over 80% in

the target's stock. Unlike an outright CSA, a controlling stock ownership prevents any claims against the target's assets from spreading to other assets held by the acquirer. Ownership of less than 80% has the disadvantage of an added layer of taxes imposed on intercorporate dividends and capital gains. Under current U.S. law, these taxes might only partially offset the gross gain from such an investment since the added tax wedge is apparently narrower than the target's personal-tax wedge avoided. Against the disadvantage of an added layer of taxes, a smaller percentage of ownership spread among a greater number of targets can be acquired more economically by paying a smaller price premium on each stock. Hence, short of seeking a controlling interest, the acquirer is better off as a small shareholder of other corporations.

Proposition 11. CSA is not a tax-effective distribution by the acquirer.

Contrary to claims by King (1986) and Petruzzi (1983), and consistent with evidence reported by Auerbach and Reishus (1988b) and Franks et al. (1988), CSA cannot be used by an acquirer as a tax-effective distribution, like stock repurchase, because it is not a distribution.

Consider first a scenario of no personal taxation. Under voluntary stock repurchase, the firm's periodic earnings are divided equally and exclusively among the firm's shares. Shares repurchased by the firm generate a cash return that equals the per share capital gain accruing to the remaining shares. In contrast, if the same earnings were used instead to acquire the stock of a target at a premium, the capital gain created by that premium would represent a one-way transfer to outsiders. In the absence of personal taxes to create a tax wedge in the target, that transfer would not be offset by an arbitrage gain, in effect causing the acquirer to donate some of its earnings to another firm's shareholders. More important, CSA would not qualify even as a poor distribution method since the target's shareholders, assumed to be in equilibrium before the acquisition, would reinvest in stock rather than spend the proceeds of their stock sale.

The introduction of personal taxes does not change the essence of this argument. The premium paid in buying the target's stock is still a transfer to outsiders, now associated with a profitable financial investment due to the elimination of the personal-tax wedge from the target. The target's shareholders are still presumed to reinvest in stock the cash proceeds generated by the acquisition, this time paying a penalty of capital gains tax on any gain realized. Again, since the cash paid by the acquirer returns to the producing sector, there is no net distribution to the consuming sector.

As pointed above, our criticism of the view that CSA is a tax-effective distribution is supported by evidence that these transactions are often financed by borrowing, and that management buyouts, where the acquiring corporate shell has no accumulated earnings to distribute, are among the most profitable CSAs.

Proposition 12. CSA is compatible with stock repurchase by either firm.

Contrary to claims by King (1986) and Petruzzi (1983), stock repurchase by the acquirer complements rather than substitutes CSA. A switch of the acquirer from periodic cash dividend to stock repurchase would not change the gross gain from any CSA, but increase the acquirer's shareholders net gain by decreasing their own personal-tax wedge. In our example, the net gain to those shareholders would be greater than \$60 if the incremental personal-tax burden were smaller than \$40.

A switch of a firm to periodic distribution via stock repurchase makes it a less attractive target for CSA by decreasing its personal-tax wedge and, in the same proportion, the potential combined gross and net arbitrage gains. This effect is distinct from the common phenomenon of a one-time stock repurchase aimed at fending off acquisition, possibly by decreasing the target's net assets (see Proposition 8).

Proposition 13. CSA by a proprietary can be gainful.

The form of business ownership is likely to affect the firm's pretax cash flows and asset value. If the target is optimally owned as a corporation, acquisition by a proprietary may not generate arbitrage gain. If nontax factors are ignored, the opportunity for tax arbitrage depends on the relationship between the preacquisition *corporate*-tax impact in the target and the potential tax impact associated with the target's assets under proprietary ownership. If the former is greater, acquisition by a proprietary would generate a sufficiently large combined gain to benefit the old and new owners on a post-personal-tax basis. However, if the latter is greater, the CSA would generate a loss. If the present regime of corporate taxation in the United States would continue indefinitely, a nongrowth corporate target would be expected to pay an average tax rate of 0.34, and have a corporate-tax wedge of \$0.34 per dollar of new assets. Since the proprietary-tax wedge associated with the same assets would be \$0.28, CSA of a corporation by a proprietary would generate a small combined gross gain of \$0.34 − \$0.28 = \$0.06. This capital gain would be further taxed at the personal level.

Proposition 14. The arbitrage gain is not eliminated by the imputation tax method.

Unlike the classical tax method used in the United States, whereby shareholders' personal taxation is independent of the corporation taxation, under the imputation method used in Canada and Great Britain, shareholders receive full or partial credit for taxes paid at the corporate level. Under the most favorable conditions, such a method completely eliminates the separate impact of the *corporate* tax, leaving intact the personal-tax wedge between the corporation's net asset value

and stock market value, and with it the gain from intercorporate CSA. King's (1986) claim that the gain from CSA would be eliminated by full imputation is valid only for an acquisition by a proprietary. As argued under Proposition 13, CSA by a proprietary would generate a loss if the proprietary-tax impact is greater than that of the corporate tax to be eliminated.

VIII. Policy Implications

The main implications of our hypothesis for public policy stem from the argument that all intercorporate CSAs inadvertently cause a shift of tax burden from assets held by the target to taxpayers at large. This unintended subsidy of CSAs is inherent to the way in which corporate-source income is taxed to individual shareholders. As argued above, it would not be removed by eliminating the separate corporate income tax. Short of eliminating the personal taxation of corporate-source income, it could be removed only by taxing CSAs or banning them altogether.

In theory, this subsidy would be reversed by imposing on the acquirer a lump-sum tax matching the personal-tax wedge stripped from the target's net assets. If the target's unique personal-tax wedge could be precisely measured, such a policy would selectively eliminate the arbitrage gain and the equivalent tax shift without affecting other private or social consequences of CSAs. In practice, overtaxation due to error would have a social cost to the extent that CSA is the most economic form of corporate acquisition. That possibility must be evaluated as part of the decision whether to impose a CSA tax.

A total ban on CSAs would be tantamount to a prohibitive tax. Such a measure could be justified only on the basis of evidence or a strong presumption that, in terms of other effects, acquisition by exchange of assets or liability claims has no significantly higher social costs than CSA. If our hypothesis is valid, the predominance of CSAs during the 1980s cannot be cited as evidence for the inferior social value of competing forms of acquisition.

Our conclusion siding with Bierman (1985), that intercorporate stockholding generates a gain similar to that of CSA, invites a reconsideration of the present policy toward this practice. Under current U.S. law, corporations are discouraged from holding noncontrolling interest in other corporations by means of Section 561 of the Internal Revenue Code, and by partial taxation of income derived from such an investment. Since Section 561 is virtually unenforceable, the presence of an implicit subsidy of intercorporate stockholding depends largely on the applicable tax rates. As argued under proposition 10, the subsidy of a controlling intercorporate ownership is equivalent to that of CSA prorated by the percentage of ownership. The present subsidy of a noncontrolling interest might be only partially offset by the added layer of taxes, since the wedge created by those taxes is apparently narrower than the target's personal-tax wedge avoided. In view of the potential social value of intercorporate stockholding and

the absence of good substitutes, especially for noncontrolling ownership, the preferred policy may be to reverse the subsidy by setting the tax rates paid by the investing corporation at the level of the *individual* tax bracket dominating the stock market. The same policy would be appropriate for controlling and noncontrolling interests. Unlike the potential treatment of CSAs, this procedure would not require an estimate of the unique personal-tax wedge of each investment target.

APPENDIX: THE SAMPLE

Acquired Company	*Acquiring Company*
Ludlow Corp.	Tyco Labs
Kirsch Co.	Copper Industries
Richardson Co.	Witco Chemical
Danly Machine	Ogden Corp.
Hobart Co.	Dart & Kraft
Buffalo Forge Co.	Ampco-Pittsburgh
U.S. Filter Co.	Ashland Oil Co.
Lightolier Inc.	Bairnco Corp.
Western Gear Corp.	Bucyrus-Erie Co.
Teleprompter Corp.	Westinghouse Electric
Garfinckel, Brooks Brothers	Allied Stores
Gray Drug Stores Inc.	Sherwin-Williams
Financial Federation	Great Western Savings & Loan
Dial Corp.	Northwest Bancorp.
United Republic Investors	Monumental Corp.
Magic Investment	Baldwin-United Corp.
Treadway Companies	Fairlanes Inc.
Marmon Group Inc.	Trans Union
Tyler Inc.	Reliance Universal
Sperry & Hutchinson	Baldwin-United Corp.
General Steel	Lukens Steel
Gino's	Marriott
National Health Co.	National Medical Enterprises
Transport Life	American Can
First S&L Shares Inc.	Golden West Financial
Brasscraft	MASCO
Exchange Bank	NCNB
Means Services	ARA Inc.
Keuffel & Esser	Kratos Inc.
Midwestern Distributing	Leasway Transport
AZL	TOSCO
STSC	Continental Telecom
Technicolor Inc.	McAndrews & Forbes
Chemineer	Interpace
Sav-A-Stop	Consolidated Foods
Burns International	Borg-Warner
American Welding	Hoover Universal
Torin	Clevepak

Acquired Company	*Acquiring Company*
Associated Coke	Coca-Cola
ABA Industries	General Defense
Fred James Inc.	Transamerica
Pinkerton Inc.	American Brands
Lane Bryant	Limited Inc.
Bekins International	Minstar Inc.
Evans-Aristocrat Inc.	MASCO
ITEK	Litton Industries
Belco Petroleum	Internorth Inc.
Graniteville Inc.	Southeast Public Inc.
Frank's Nursery	General Host Inc.
Northwest Energy Inc.	Williams Corp.
Bangor Punta Inc.	Lear Sigler
Stokely-Van Camp	Quaker Oats
Voyager Group	American Can Co.
Esquire Inc.	Gulf & Western Co.
Telco Oilfield Services	SONAT Inc.
HMW Co.	Clabir Inc.
Stecher Traung Schmidt	International Paper
Gas Service Co.	Kansas Power & Light
Mathematica	Martin-Marietta
Suburban Propane	National Distributors
Lenox Inc.	Brown-Forman Inc.
CFS Continental	Staley
Abe Schrader	INTERCO
Jonathon Logan	United Merchants
Jensen	Nortek
Realex	Calmar
Vulcan	AMPCO-Pittsburgh
Omark	Blount
Warner Electric and Brake	Dana
Chemtronics	Interlake
Flowertime	General Host
Miller–Wohl	Petrie Stores
Minnesota Fabrics	Lucky Stores
Tymshare	McDonnell Douglas
Core Labs	Litton Industries
Health Care Retirement	Owens–Illinois
American Motor Inns	Prime Motor Inns
AEGIS	Minstar
AVGO	Textron

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NOTES

1. For a comprehensive list of pre-1986 studies supporting this statement see Jensen and Ruback (1983) and Dennis and McConnell (1986). Recent studies are listed by Herman and Lowenstein (1988), Jarrell and Poulsen (1989), and Magenheim and Mueller (1988).

2. One exception is Coyne's (1986) empirical study, which strongly supports our hypothesis.

3. There are two reasons for our focus on equity and net assets as opposed to total market value and total assets. First, the claimed source of arbitrage gain is the firm's equity and net assets. Second, there is consistent evidence that the firm's creditors do not systematically lose or gain from CSAs (Dennis and McConnell, 1986; Lehn and Paulsen, 1988).

4. The assumption of substantial effective personal-tax rates is theoretically challenged by a number of authors (Constantinides, 1983; Miller and Scholes, 1978; Stiglitz, 1983), but empirically confirmed by others (Feenberg, 1981; Peterson et al., 1985; Poterba, 1986).

5. The discounted value of tax claims is measured in terms of opportunity cost to shareholders, not to the Treasury.

6. The exposition is simplified by ignoring an additional payment of capital gains tax, which the acquirer's shareholders are expected to make when eventually realizing gains accrued at the time of the acquisition. A tax in the amount (acquirer's equity premium) (0.16) = \$60(0.16) = \$9.60 has a smaller present value depending on the shareholders' dominant holding period and discount rate. This factor is considered in detail in Section IV.

7. As argued in Section VII, the analysis below could be based instead on the assumption of permanent distribution via periodic stock repurchase or liquidation dividend.

8. We did not distinguish between acquisitions initiated with a tender offer and those without it. Asquith et al. (1987) produce evidence that this factor does not affect the gain from acquisitions after controlling for the form of payment and transaction size.

9. Using the Bartlett and Goldfeld–Quandt tests in this and subsequent regressions, we reject in all cases the hypothesis of a significant departure from homoscedasticity. In particular, the residual variance does not increase with the dollar size of the tax wedge.

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