

# An Empirical Analysis of the Choice of Payment Method in Corporate Acquisitions During 1980 to 1990

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*This paper estimates two limit Tobit models (Maddala, 1983, pp. 160-162) of the choice of payment method in acquisitions from 1980 to 1990. The estimates support hypotheses that the choice of payment method depends on the financial condition of the acquiring firm, whether the acquisition is hostile, and the extent that the acquiring firm is owned by insiders. Consistent with Friedman's (1982) analysis of the period, the results also suggest that Federal Reserve procedures from 1979 to 1982 induced structural changes in acquisition financing.*

## INTRODUCTION

Recent evidence suggests that the payment method used to acquire a target firm is relevant for stockholder wealth. Stockholders of both acquiring and target firms generally earn higher excess returns when cash (from debt or internal sources) is used. Wansley, Lane, and Yang (1983) and Huang and Walkling (1987), for example, find that stockholders of target firms earn excess returns of approximately 30 percent in cash acquisitions and 15 percent in stock acquisitions. Wansley, Lane, and Yang (1987) and Travlos (1987) find that stockholders of acquiring firms earn normal returns or positive excess returns in cash acquisitions, but lose approximately 1.5 percent in stock acquisitions.<sup>1</sup>

Although the influence of the payment method used in acquisitions on stockholder wealth is recognized widely, researchers only recently have attempted to investigate and identify factors that determine why a firm selects cash or stock. Amihud, Lev, and Travlos (1990), for example, examine the role of insider ownership. Consistent with insider control arguments advanced by Harris and Raviv (1988) and Stulz (1988), the probit estimates of Amihud *et al.* (1990) imply that the probability of cash financing increases with the insider ownership fraction of the acquiring firm. Other notable studies include Hansen (1987) who finds evidence that the probability of a stock offer increases with the total liabilities of the acquiring firm and Chaney, Lovata, and Philipich (1991) and Yook, McCabe, and Shoemaker (1992) who conclude that asymmetric information and tax variables are important. Carlton, Guilkey, Harris, and Stewart (1981) in an early study report

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<sup>1</sup> Franks, Harris, and Mayer (1988) compare the relationship between the payment method and changes in stockholder wealth for acquisitions announced in the United States and the United Kingdom. While their findings for U.S. firms and U.K. target firms are similar to those of the studies cited previously, they find that acquiring firm stockholders earn normal returns in the U.K. regardless of the payment method used to finance the acquisition.

that acquiring firms have similar accounting and financial characteristics regardless of the payment method.<sup>2</sup>

The present paper estimates models of the choice of payment method in acquisitions from 1980 to 1990. The paper provides additional evidence on insider control, asymmetric information, tax, and financial condition hypotheses and tests several hypotheses not previously considered by empirical payment method studies. The latter include hypotheses concerning the role of managerial resistance and the impact of U.S. monetary policies from 1979 to 1982.

Our hypothesis concerning managerial resistance is based on the work of Morck, Shleifer, and Vishny (1988) who find that the motivation for a takeover often determines its mood. Morck *et al.* (1988) hypothesize that synergistic mergers tend to be friendly while disciplinary takeovers tend to be hostile. This suggests a role for managerial resistance in the choice of payment method. Because many stock offers require shareholder approval that would give target firm managers more time to mount a successful defense, one would expect hostile bids to involve cash payments.<sup>3</sup>

A second issue is that the sample period 1980 to 1990 overlaps an exceptional period for the U.S. economy. As documented by Friedman (1982), Evans (1984), and others, the monetary policy procedures in place from 1979 until late 1982 led to unprecedented interest rate volatility and generally disrupted behavioral relationships in financial markets. For example, Friedman (1982, p. 731) reports "the evidence provided by an empirical model of nonfinancial business corporations' long-term borrowing behavior shows a significant break between the post-October 1979 experience and the relationships that prevailed over the prior two decades." Friedman's (1982) analysis suggests a shift away from debt financing. Consequently, acquisition financing during this period may not reflect a normal pattern of behavior, but may have been a response to a policy experiment.

## HYPOTHESIS DEVELOPMENT

The choice of payment method in corporate acquisitions reflects the relative costs of stock and cash financing. To the extent that the costs of stock financing outweigh the costs of cash financing, the propensity to use cash should be large. Financial theory and previous empirical research suggest that the relative costs can be explained by at least five hypotheses (not mutually exclusive):

- Insider control;
- Financial condition;
- Asymmetric information;
- Tax aspects; and
- Monetary policy.

<sup>2</sup> Amihud *et al.* (1990) examine 160 acquisitions completed between 1980 and 1983. Carlton *et al.* (1983) study 45 acquisitions from 1976 to 1977, while Hansen (1987) supplements the 45 acquisitions covered in Carlton *et al.* with 61 acquisitions that occurred during 1978. Chaney *et al.* (1991) examine 123 acquisitions announced between 1971 and 1978, and Yook *et al.* (1992) examine 167 acquisitions between 1981 and 1986.

<sup>3</sup> The *New York Stock Exchange Corporate Governance Rules* state that a firm generally must obtain shareholder approval before issuing common stock in any transaction that increases the number of voting shares by 20 percent or more.

### INSIDER CONTROL HYPOTHESIS

Following Amihud *et al.* (1990), we hypothesize that the choice of payment method depends on the insider ownership fraction of the acquiring firm. Financial theory suggests that the maintenance of insider control can raise the propensity to use cash financing for two reasons. First, cash financing avoids the reduction in voting rights and consequent loss of control incurred by stock financing (Harris and Raviv, 1988; Stulz, 1988). Second, Stulz (1988) argues that new debt may be associated with new loan covenants that make the firm less attractive to corporate raiders. Therefore, owner-managers that value control may prefer cash financing to reduce the threat of a hostile takeover.<sup>4</sup> Amihud *et al.* (1990) report empirical evidence consistent with these arguments.

Another relevant control issue is the extent to which target firm managers resist takeover.<sup>5</sup> While previous payment method studies generally have not distinguished friendly and hostile bids, we hypothesize that hostile bidders prefer cash because cash offers are faster to implement. New York Stock Exchange rules often require shareholder approval before securities can be issued in a stock acquisition. The process of obtaining such approval, however, provides target firm managers time to mount a successful defense by merging with a white knight, for example.

### FINANCIAL CONDITION HYPOTHESIS

Our second hypothesis is that the choice of payment method depends on the financial condition of the acquiring and target firms. The costs of financing a given acquisition with cash include increased interest payments and bankruptcy risk. New debt and the depletion of cash and other liquid assets can be especially costly for firms already burdened by existing debt. Such firms may find stock financing relatively cheaper. Three broad measures of financial risk are free cash flow (Jensen, 1986), leverage, and liquidity.<sup>6</sup> Small values of free cash flow and liquidity and large values of leverage indicate a slack poor firm where new debt is likely to increase bankruptcy risk significantly. This suggests that the propensity to use cash financing decreases as free cash flow and liquidity decrease or as financial leverage increases. Financial slack proxies for the target also are included in the model because the acquiring firm can use the target's unused borrowing capacity to help service the debt incurred from the acquisition (Fortier, 1989).

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<sup>4</sup> Owners-managers may value control for several reasons. First, managers may believe that their firm is undervalued and represents a good investment opportunity. Second, managers may prefer insider control as an effective way to reduce the agency costs of equity (Jensen and Meckling, 1976). Third, managers may view insider control as a way to deter corporate raiders and protect their investment in firm-specific human capital (Harris and Raviv, 1988; Stulz, 1988). Alternatively, insider ownership may be a function of firm size (Demsetz and Lehn, 1985). In a large firm, for example, insider ownership may be constrained by managers' wealth and risk aversion.

<sup>5</sup> The preference of target firm managers to retain control could be based on asymmetric information (i.e., the target firm managers believe that the bidder's offer is too low). Target firm managers may reject a fair bid, however, simply because they do not want to lose their jobs. In responding to a hostile takeover, target managers will consider not only the potential gain on their common stock, but also the impact on their investment in firm-specific human capital (Harris and Raviv, 1988; Stulz, 1988).

<sup>6</sup> Jensen (1986) defines *free cash flow* as the cash that remains after managers accept all positive net present value projects and make all distributions to stockholders. Jensen (1986) argues that free cash flow is an agency problem because managers often use it to invest in low return projects and acquisitions.

### **ASYMMETRIC INFORMATION HYPOTHESIS**

Asymmetric information is a third potential determinant of the choice of payment method. Hansen (1987) argues that stock can have value as a contingent pricing mechanism if target firm shareholders believe the firm is undervalued. This benefit is foregone, however, if cash financing is adopted. The Hanson model implies that the contingent pricing mechanism is more important (and, therefore, cash financing is costlier) the larger the target is relative to the acquiring firm. Another possibility is that acquiring firm managers believe that their firm is overvalued and, therefore, prefer stock financing (Myers and Majluf, 1984).<sup>7</sup>

### **TAX ASPECT HYPOTHESIS**

Tax aspects also can affect the choice of payment method. The acquiring firm has two choices. First, the acquiring firm can carryover the target firm's assets at book value and use any tax credits and loss carryforwards of the target firm. In this case stock financing must be used. Alternatively, the acquiring firm can step-up the basis of the target firm's assets and report high depreciation expenses, lower taxes, and higher cash flows. In this case either cash or stock financing can be used. As a result, the greater the potential step-up in the target firm's assets, the larger are the tax benefits associated with cash financing.<sup>8</sup>

The tax status of the target firm shareholders also has implications for the payment method. While shareholders incur an immediate tax liability in a cash offer, taxes are deferred in a stock swap until the stock is sold. To compensate target firm shareholders, however, acquiring firms offer higher premiums in cash acquisitions. The tax distinction does not apply to tax-exempt institutional investors. Consequently, one would expect firm managers to find a stock offer more attractive when institutional holdings are low.<sup>9</sup>

### **MONETARY POLICY HYPOTHESIS**

Finally, changes in monetary policy can have a significant impact on interest rates and credit availability which, in turn, can affect the choice of payment method. For example, rising interest rates and tighter credit markets may raise concerns about liquidity and make cash financing a less attractive option. Our sample includes the subperiod 1980 to 1982, an unusually disruptive period for the U.S. economy in general and U.S. financial markets in particular. The effects of monetary policy actions were at the source of this disruption. The Federal Reserve adopted new operating procedures in October 1979 that emphasized reserves instead of interest rates because of concerns over inflationary pres-

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<sup>7</sup> Consistent with this prediction, Kolodny and Suhler (1985), Mikkelsen and Partch (1986), Asquith and Mullins (1986), and Masulis and Korwar (1986) find that stockholders earn negative abnormal returns when issues of seasoned equity are announced.

<sup>8</sup> Prior to the passage of the 1986 Tax Reform Act the step-up in the depreciable basis was not taxed at the corporate level. The 1986 act, however, eliminated some of the tax benefits associated with cash offers.

<sup>9</sup> Peterson and Peterson (1991) find that acquiring firms pay higher premiums in taxable transactions in which institutional ownership of the target firm is low. They hypothesize that higher premiums are required to compensate individual shareholders for incurring an immediate tax liability. Institutional investors are often tax exempt.

tures.<sup>10</sup> The new procedures remained in place until late 1982 and were augmented with credit controls in 1980. These actions severely curtailed credit availability (Mains, 1980, p. 687; Mayer, 1989) and dramatically increased the month-to-month variability of interest rates to unprecedented levels (Friedman, 1982; Tatom, 1984). Friedman (1982, p. 730) reports a significant downward shift during 1979 in regression equations of new corporate bond issues. He suggests that the uncertainty created by the interest rate variability may have induced the shift. We hypothesize that policy actions during 1980 to 1982 increased the propensity of acquiring firms to use stock rather than cash.

## ECONOMETRIC SPECIFICATION

### TWO LIMIT TOBIT MODEL

The observed choice of payment method, PM, is defined as the fraction of the acquisition financed with cash. There are three types of observations: PM has a lower limit at zero (all stock), an upper limit at one (all cash), and a continuum of possible values between zero and one (mix of cash and stock). To capture these features we adopt the two limit Tobit model (Maddala, 1983, pp. 160-162). One advantage of this model is that acquisitions financed by a mix of cash and stock are a natural outcome of the specification. In contrast, the probit models adopted by previous studies require classifying each acquisition as either all cash or all stock. The two limit Tobit model takes the form:

$$PM_i^* = X_i\beta_i + u_i,$$

where:

$$\begin{array}{lll} PM_i & = & 1 \text{ if } PM_i^* \geq 1, & \text{all cash;} \\ PM_i & = & PM_i^* \text{ if } 0 < PM_i^* < 1, & \text{mix of cash and stock;} \\ PM_i & = & 0 \text{ if } PM_i^* \leq 0, & \text{all stock; and} \\ i & = & 1, \dots, n. \end{array}$$

The observable variables are  $PM_i$  and  $X_i$ . The model specifies that  $PM_i$  is determined by an underlying latent variable  $PM_i^*$  which is an index of the propensity to use cash financing in the  $i$ th acquisition. In contrast to  $PM_i$ , the index  $PM_i^*$  has an unrestricted range of possible values. The value that  $PM_i^*$  takes determines the sample observation  $PM_i$  as follows. When  $PM_i^* \geq 1$ ,  $PM_i = 1$  is observed (when the propensity to use cash is sufficiently large, the acquisition is financed with all cash); when  $0 < PM_i^* < 1$ ,  $PM_i = PM_i^*$  is observed (the acquisition is financed with a mix of cash and stock); when  $PM_i^* \leq 0$ ,  $PM_i = 0$  is observed (when the propensity to use cash is sufficiently small, the acquisition is financed with all stock).

The model specifies that  $PM_i^*$  is determined by a vector of explanatory variables  $X_i$ , a vector of unknown coefficients  $\beta$ , and a random error term  $u_i$ . The index  $PM_i^*$  reflects the

<sup>10</sup>For a more detailed description of the Federal Reserve procedures see Poole (1982).

relative costs of stock and cash financing in the  $i$ th acquisition. Our specification of explanatory variables is:<sup>11</sup>

$$\begin{aligned}
 X = & [1, \text{OWN}^A, \text{HOSTILE}, \text{CASHFLOW}^A, \text{CASHFLOW}^T, (\text{DEBT}/\text{MKT})^A, \\
 & \quad \quad \quad + \quad \quad \quad + \quad \quad \quad + \quad \quad \quad + \quad \quad \quad - \\
 & (\text{DEBT}/\text{MKT})^T, (\text{NWC}/\text{MKT})^A, (\text{NWC}/\text{MKT})^T, (\text{MKT}/\text{BK})^A, \text{PRED}^*(\text{MKT}/\text{BK})^A, \\
 & \quad \quad \quad - \quad \quad \quad + \quad \quad \quad + \quad \quad \quad - \quad \quad \quad - \\
 & \text{MKT}^T/\text{MKT}^A, \text{INOWN}^T, (\text{MKT}/\text{BK})^T, \log(\text{SALES}^A), \log(\text{SALES}^T)] \\
 & \quad \quad \quad - \quad \quad \quad + \quad \quad \quad + \quad \quad \quad ? \quad \quad \quad ?
 \end{aligned}$$

The expected sign of the coefficient is given below each variable; the superscripts A and T distinguish variables of the acquiring firm from variables of the target firm.

The first two variables,  $\text{OWN}^A$  and  $\text{HOSTILE}$ , support the *insider control* hypothesis. Following Amihud *et al.* (1990) we include the insider ownership fraction of the acquiring firm,  $\text{OWN}^A$ , and hypothesize that managers who value control (i.e.,  $\text{OWN}^A$  is large) prefer cash rather than stock financing. In contrast to a cash offer, a stock swap would reduce management's ownership fraction of the acquiring firm. Consequently, the expected sign on  $\text{OWN}^A$  is positive.

$\text{HOSTILE}$  is a dummy variable that equals one if there is managerial resistance (a rejected offer) and equals zero otherwise. We hypothesize that hostile bidders prefer cash because cash offers are faster to implement; therefore, the expected sign on  $\text{HOSTILE}$  is positive.

The following variables support a *financial condition* hypothesis: free cash flow divided by equity market value ( $\text{CASHFLOW}^A$  and  $\text{CASHFLOW}^T$ ), long-term debt divided by equity market value ( $(\text{DEBT}/\text{MKT})^A$  and  $(\text{DEBT}/\text{MKT})^T$ ), net working capital divided by equity market value ( $(\text{NWC}/\text{MKT})^A$  and  $(\text{NWC}/\text{MKT})^T$ ), and equity market value divided by equity book value,  $(\text{MKT}/\text{BK})^A$ . These variables are proxies of financial slack. The financial condition hypothesis suggests that the propensity to use cash financing decreases as  $\text{CASHFLOW}$  and  $\text{NWC}/\text{MKT}$  decrease or as  $\text{DEBT}/\text{MKT}$  increases; therefore, the expected signs on  $\text{CASHFLOW}$  and  $\text{NWC}/\text{MKT}$  are positive, and the sign of  $\text{DEBT}/\text{MKT}$  is negative. The market to book ratio,  $(\text{MKT}/\text{BK})^A$ , is a proxy for the growth opportunities of the acquiring firm. Previous research has found that the propensity to use cash financing is related inversely to the acquiring firm's growth rate (Chaney *et al.*, 1991; Yook *et al.*, 1992). This finding is consistent with the hypothesis that low growth acquiring firms (low  $(\text{MKT}/\text{BK})^A$ ) generate large free cash flows that are used to finance acquisitions (Jensen, 1986).

The following variables support the *asymmetric information* hypothesis: the interaction of earnings predictability and the market to book ratio ( $\text{PRED}^*(\text{MKT}/\text{BK})^A$ ) and the equity market value ratio of the target and acquiring firm ( $\text{MKT}^T/\text{MKT}^A$ ). Myers and

<sup>11</sup>We also hypothesize that the propensity to use cash financing is related inversely to two other variables:  $\text{YIELD}$  (an index of yields to maturity on selected bonds of the same rating as the bonds of the acquiring firm) and the default risk premium ( $\text{YIELD}$  minus the value of a composite index of yields to maturity of U.S. Treasury notes and bonds). The coefficients of these two variables are not statistically significant. Because the inclusion of these two variables severely reduces the sample size (many of the sample firms do not have debt securities listed in *Standard & Poor's Bond Guide*), they are deleted from the model.

Majluf (1984) argue that managers use stock financing when they believe that their firm's stock is overvalued. One indicator of overvaluation is the market to book ratio  $(MKT/BK)^A$ . Because  $(MKT/BK)^A$  is also an indicator of growth, it is consistent with both the asymmetric information and financial condition hypotheses. The use of  $(MKT/BK)^A$  as an indicator of overvaluation, however, assumes that earnings are unpredictable. For this reason, we multiply  $(MKT/BK)^A$  by a predictability index,  $PRED$ . Unlike  $(MKT/BK)^A$ , the interaction variable  $PRED * (MKT/BK)^A$  provides a measure of overvaluation that takes earnings predictability into account. Earnings predictability,  $PRED$ , equals 100 minus the Value Line earnings predictability index. The Value Line earnings predictability index ranges from 5 (lowest predictability) to 100 (highest predictability). Therefore, a large value of  $PRED$  indicates that the acquiring firm's earnings are difficult to predict (e.g., if the Value Line index equals 5,  $PRED$  equals 95). Because one would expect overvaluation to be most likely when  $(MKT/BK)^A$  and  $PRED$  are large, the expected sign on  $PRED * (MKT/BK)^A$  is negative.

The expected sign on  $MKT^T/MKT^A$  is also negative. Under the assumption that asymmetric information exists between acquiring firm managers and target firm shareholders, Hansen (1987) argues that a stock swap has value as a contingent pricing mechanism. This value is greater, however, the larger the target is relative to the acquiring firm (i.e., the larger  $MKT^T/MKT^A$ ).

The following variables support a *tax aspects* hypothesis: the fraction of institutional ownership ( $INOWN^T$ ) and the market to book ratio of the target firm ( $(MKT/BK)^T$ ). The expected sign on  $INOWN^T$  is positive. Financial theory suggests that acquiring firms generally pay higher premiums in cash rather than stock acquisitions because individual shareholders incur an immediate tax liability in a cash transaction. In a stock swap the gain is tax deferred. We therefore hypothesize that acquiring firms will prefer stock transactions when individual shareholder ownership is large (low  $INOWN^T$ ). Because institutional investors are often tax exempt, the tax effect is less important when  $INOWN^T$  is large. The expected sign on  $(MKT/BK)^T$  is positive. The greater the potential step-up in the target firm's assets, the larger are the tax benefits associated with cash financing (Yook *et al.*, 1992).

Finally, as in Amihud *et al.* (1990), we use a variety of variables to control for the size of the firms. The variables  $SALES^A$  and  $SALES^T$  denote the sales of the acquiring and target firms for the year prior to the acquisition. Amihud *et al.* (1990) find  $SALES^T$  to be related significantly to the propensity to use cash financing, but find  $SALES^A$  statistically insignificant. Acquisition theory, however, does not appear to predict the effects of these variables and, consequently, their expected signs are uncertain.

### THE IMPACT OF MONETARY POLICY ON THE MEDIUM OF EXCHANGE

To examine the *monetary policy* hypothesis, the following structural change model<sup>12</sup> is used:

<sup>12</sup>Preliminary tests for structural change are conducted using  $\chi^2$  tests for equality of several proportions (Lapin, 1990, p. 525). A  $\chi^2$  test rejects the null hypothesis that the proportions of cash, stock, and mixed offers completed between 1980 and 1982 are equal to the proportions of cash, stock, and mixed offers during 1983 to 1990 ( $\chi^2 = 17.3$ , which is significant at the 1 percent level). In response to a reviewer's suggestion that the 1986 Tax Reform Act may have impacted acquiring firms' choice of payment method, a  $\chi^2$  test is used to compare the periods 1983-1986 and 1987-1990. The null hypothesis that the proportions of cash, mixed, and

Subperiod I (1980-1982)

$$PM_i^* = \beta_0^I + X_i \beta_1^I + u_i, \sigma_i^2(\alpha^I) = \exp(\alpha_0^I),$$

Subperiod II (1983-1990)

$$PM_i^* = \beta_0^{II} + X_i \beta_1^{II} + u_i, \sigma_i^2(\alpha^{II}) = \exp(\alpha_0^{II}),$$

where:

$$\begin{aligned} PM_i &= 1 \text{ if } PM_i^* \geq 1, & \text{all cash;} \\ PM_i &= PM_i^* \text{ if } 0 < PM_i^* < 1, & \text{mix of cash and stock; and} \\ PM_i &= 0 \text{ if } PM_i^* \leq 0, & \text{all stock.} \end{aligned}$$

This model allows the tight credit markets and high interest rate variability of 1980-1982 to affect the choice of payment method in several different ways. The model allows the intercepts, slopes, and variances to differ in the two periods.

If the events of 1980-1982 affected the response of the choice of payment method to the explanatory variables, for example, we would expect  $\beta_1^I \neq \beta_1^{II}$ . Another possibility is that the events of 1980-1982 induced a one time shift in favor of stock financing without affecting the response to the explanatory variables, in which case we would expect  $\beta_0^I < \beta_0^{II}$  and  $\beta_1^I = \beta_1^{II}$ .

#### HETEROSCEDASTICITY AND MULTICOLLINEARITY

To allow for possible heteroscedasticity, we use initially a heteroscedastic version of the two limit Tobit that specifies the variance of the disturbance  $u_i$  as:

Subperiod I (1980-1982)

$$\sigma_i^2(\alpha^I) = \exp(\alpha_0^I + \alpha_1^I(NWC/TA)_i^A),$$

Subperiod II (1983-1990)

$$\sigma_i^2(\alpha^{II}) = \exp(\alpha_0^{II} + \alpha_1^{II}(NWC/TA)_i^A),$$

where:

$$\alpha^j = (\alpha_0^j, \alpha_1^j), j = I, II, \quad = \text{An unknown parameter vector; and}$$

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stock offers are equal across these two periods can not be rejected at conventional levels ( $\chi^2$  equals 2.3). Finally, a  $\chi^2$  test fails to reject the null hypothesis that the proportions of hostile and friendly bids during 1980-1982 equals the proportions of hostile and friendly bids during 1983-1990 ( $\chi^2 = 0.3$ ). This suggests that the increased use of cash during the mid to late 1980s is not related to an increase in hostile takeover activity for Fortune 500 acquiring firms.

$(NWC/MKT)_i^A$  = The acquiring firm's net working capital divided by market value.<sup>13</sup>

Several different versions of the model are estimated by maximum likelihood. In none of the versions, however, could the null hypothesis of homoscedasticity ( $\alpha_1^I = \alpha_1^{II} = 0$ ) be rejected at conventional levels of significance. This result also holds when  $(NWC/TA)^A$  is replaced in  $\sigma_1^2(\alpha)$  with  $CASHFLOW^A$  and  $HOSTILE$ . Therefore we assume  $\alpha_1^I = \alpha_1^{II} = 0$ .

Multicollinearity is another potential problem. One of the most troubling consequences of multicollinearity is that small changes in the specification can produce large changes in the estimation results. To address this, we examine the sensitivity of our results to changes in the specification. For example, we estimate several versions of the model with different combinations of financial slack and size variables. The results are insensitive to these changes. This suggests that multicollinearity is not a serious problem in our application.

## ESTIMATION OF THE TWO LIMIT TOBIT MODEL SAMPLE

The sample consists of observations on 261 acquisitions completed between 1980 and 1990. The announcement dates range from August 1979 to September 1990. The initial sample contains all target firms identified in *Mergers and Acquisitions* that were acquired by *Fortune* 500 companies. An acquisition is included only if the value of the transaction exceeds \$10 million. Acquisitions also are excluded if the target firm is not publicly traded. For the full sample, the choice of payment method breaks down as follows: 158 all cash, 39 mix of cash and stock, and 64 all stock. Table 1 breaks down the choice of payment method for each year and provides cumulative percentages. The first half of the sample period (1980-1984) contains about 44 percent of the cash acquisitions, 60 percent of the stock, 72 percent of the mixed, and 52 percent of the total acquisitions. Details of the data selection process and variable construction are provided in an appendix.

Table 2 reports the means and standard deviations of the variables used in this study for the full sample and for each of the payment methods. Preliminary tests of differences in the means for our model variables are performed using t-tests and Kruskal-Wallis tests. While the signs of the differences are consistent with the hypotheses for most of the 17

<sup>13</sup>Because  $PM_i^* = x_i\beta + u_i$ ,  $\sigma_1^2(\alpha)$  can be interpreted as the conditional variance (given  $x_i$ ) of the propensity to use cash financing. The motivation for this specification of  $\sigma_1^2(\alpha)$  is the greater discretion in the choice of payment method allowed by greater liquidity. Consequently, the expected sign of  $\alpha_1$  is positive. A test for the presence of heteroscedasticity can be performed by testing the parametric restriction  $\alpha_1 = 0$ .

The implications of heteroscedasticity for the estimation of limited dependent variable models such as the Tobit have been analyzed by Maddala and Nelson (1975), Hurd (1979), Arabmazer and Schmidt (1981), Kiefer and Skoog (1984), and Yatchew and Griliches (1985). [Also see the surveys of Maddala (1983) and Godfrey (1988).] Failure to account for heteroscedasticity generally has more severe consequences for limited dependent variable models than for the standard multiple regression model.

**Table 1—Distribution of Acquisitions (cumulative percentages)**

| Year  | Cash         | Stock       | Mixed       | Total        |
|-------|--------------|-------------|-------------|--------------|
| 1980  | 14<br>(8.8)  | 8<br>(12.5) | 7<br>(17.9) | 29<br>(11.1) |
| 1981  | 9<br>(14.5)  | 8<br>(25.0) | 4<br>(28.2) | 21<br>(19.2) |
| 1982  | 8<br>(19.6)  | 9<br>(39.1) | 8<br>(48.7) | 25<br>(28.7) |
| 1983  | 10<br>(25.9) | 8<br>(51.6) | 6<br>(64.1) | 24<br>(37.9) |
| 1984  | 28<br>(43.7) | 5<br>(59.4) | 3<br>(71.8) | 36<br>(51.7) |
| 1985  | 21<br>(56.9) | 3<br>(64.1) | 5<br>(84.6) | 29<br>(62.8) |
| 1986  | 26<br>(73.4) | 6<br>(73.4) | 1<br>(87.2) | 21<br>(75.5) |
| 1987  | 14<br>(82.3) | 6<br>(82.8) | 1<br>(89.7) | 21<br>(83.5) |
| 1988  | 14<br>(91.1) | 4<br>(89.1) | 0<br>(89.7) | 18<br>(90.4) |
| 1989  | 9<br>(96.8)  | 4<br>(95.3) | 3<br>(97.4) | 16<br>(96.5) |
| 1990  | 5<br>(100)   | 3<br>(100)  | 1<br>(100)  | 9<br>(100)   |
| Total | 158          | 64          | 39          | 261          |

variables, statistically significant (at the 10 percent level) support is found only for the financial condition, insider control, and asymmetric information hypotheses. The difference in the means for cash and stock financing are of the correct sign and significant (for at least one test) only for the variables CASHFLOW<sup>A</sup>, (DEBT/MKT)<sup>T</sup>, (MKT/BK)<sup>A</sup>, and HOSTILE. (CASHFLOW<sup>A</sup> and (DEBT/MKT)<sup>T</sup> support the financial condition hypothesis, HOSTILE supports the insider control hypothesis, and (MKT/BK)<sup>A</sup> supports both the asymmetric information and financial condition hypotheses.)

#### TOBIT MODEL RESULTS<sup>14</sup>

The tests of structural change in Table 3 tend to support the hypothesis that the monetary policy actions of 1980-1982 induced a shift from cash financing. The first test in Table 3 is a joint test for differential intercepts, slopes, and disturbance variances over the two periods 1980-1982 and 1983-1990. The p-value for this test is only 0.2 percent; consequently, the null hypothesis of no structural change is rejected at any reasonable level of significance. This result is consistent with either differential intercepts, slopes, variances, or some combination and warrants more testing. The remaining three tests in Table 3 reveal that the null hypothesis of common slopes can be rejected only at levels of significance greater than 25 percent (test 2), while null hypotheses of common intercepts and variances can be rejected at more conventional levels (tests 3 and 4). We therefore limit the reported estimates to models that impose common slopes in the two periods.

<sup>14</sup>The log-likelihood functions are maximized by a program written in the SAS procedure *Proc IML*; the program uses the quadratic hill-climbing algorithm of Goldfeld, Quandt, and Trotter (1966).

**Table 2—Means and Standard Deviations**

| Variable*                          | **    | Full Sample      | Cash             | Stock            | Mixed            |
|------------------------------------|-------|------------------|------------------|------------------|------------------|
| OWN <sup>A</sup>                   |       | 6.811<br>(12.23) | 7.461<br>(13.44) | 6.596<br>(11.68) | 4.533<br>(6.756) |
| INOWN <sup>T</sup>                 |       | 29.6<br>(19.6)   | 29.4<br>(19.4)   | 30.2<br>(19.8)   | 29.7<br>(19.9)   |
| CASHFLOW <sup>A</sup>              | tt    | 396.6<br>(783.7) | 465.3<br>(939.4) | 268.4<br>(395.8) | 328.7<br>(494.4) |
| CASHFLOW <sup>T</sup>              |       | 62.11<br>(186.6) | 66.38<br>(218.8) | 42.75<br>(118.3) | 76.55<br>(127.7) |
| (MKT/BK) <sup>A</sup>              | tt,kw | 1.726<br>(1.038) | 1.657<br>(0.997) | 2.004<br>(1.178) | 1.546<br>(0.878) |
| (MKT/BK) <sup>T</sup>              | kw    | 2.311<br>(4.847) | 2.400<br>(5.971) | 2.549<br>(2.637) | 1.564<br>(1.099) |
| PRED                               |       | 57.37<br>(29.43) | 56.42<br>(29.65) | 59.45<br>(28.57) | 57.82<br>(30.47) |
| (DEBT/MKT) <sup>A</sup>            | kw    | 1.086<br>(1.068) | 1.109<br>(1.078) | 0.994<br>(1.205) | 1.141<br>(0.759) |
| (NWC/MKT) <sup>A</sup>             | kw    | 0.222<br>(0.128) | 0.219<br>(0.131) | 0.250<br>(0.129) | 0.187<br>(0.104) |
| (DEBT/MKT) <sup>T</sup>            | kw    | 0.942<br>(1.188) | 0.872<br>(0.775) | 0.956<br>(1.863) | 1.200<br>(1.157) |
| (NWC/MKT) <sup>T</sup>             |       | 0.324<br>(0.195) | 0.334<br>(0.186) | 0.333<br>(0.235) | 0.271<br>(0.144) |
| NETDEBT <sup>A</sup>               |       | 0.168<br>(0.235) | 0.159<br>(0.241) | 0.169<br>(0.252) | 0.202<br>(0.175) |
| NETDEBT <sup>T</sup>               |       | 0.174<br>(0.522) | 0.132<br>(0.261) | 0.259<br>(0.955) | 0.207<br>(0.209) |
| HOSTILE                            | tt,kw | 0.264<br>(0.442) | 0.335<br>(0.473) | 0.063<br>(0.244) | 0.307<br>(0.467) |
| SALES <sup>A</sup>                 | tt    | 5819<br>(9249)   | 6841<br>(11201)  | 3998<br>(4332)   | 4667<br>(4951)   |
| SALES <sup>T</sup>                 |       | 966.5<br>(2428)  | 967.6<br>(2876)  | 572.7<br>(918.6) | 1608<br>(2023)   |
| MKT <sup>T</sup> /MKT <sup>A</sup> |       | 0.252<br>(0.462) | 0.238<br>(0.529) | 0.204<br>(0.250) | 0.388<br>(0.418) |

\* Accounting variables are in \$ million

\*\* Univariate test results

tt = significant (10 percent level) difference in means for cash and stock based on t-test (unequal variances);  
kw = same based on Kruskal-Wallis test

Table 4 reports maximum likelihood estimates of two versions of the two limit Tobit model. The version in column 1 (version 1) allows for differential intercepts and variances, while the version in column 2 (version 2) imposes common intercepts and variances over the two periods. In version 1 the estimated intercept for 1980-1982 is about 30 percent smaller than the intercept for 1983-1990, and the estimated disturbance variance for 1980-1982 is about 60 percent smaller than that for 1983-1990. These differences are statistically significant (tests 3 and 4 of Table 3). Therefore, the monetary policy actions of 1980 to 1982 appear to have induced a temporary shift from cash financing.

**Table 3—Likelihood Ratio Tests of Structural Change**

Subperiod I (1980-1982)

$$PM_t^I = \beta_0^I + X_t \beta_1^I + u_t, \sigma_t^2(\alpha^I) = \exp(\alpha_0^I),$$

Subperiod II (1983-1990)

$$PM_t^{II} = \beta_0^{II} + X_t \beta_1^{II} + u_t, \sigma_t^2(\alpha^{II}) = \exp(\alpha_0^{II}).$$

## Test

## 1. Differential Intercepts, Slopes, and Variances

$$H_0: \beta_0^I = \beta_0^{II}, \beta_1^I = \beta_1^{II}, \alpha_0^I = \alpha_0^{II} \text{ against}$$

$$H_a: \beta_0^I \neq \beta_0^{II} \text{ or } \beta_1^I \neq \beta_1^{II} \text{ or } \alpha_0^I \neq \alpha_0^{II}$$

$$L.R\text{-statistic} = 38.46, \text{ d.f.} = 17, \text{ p-value} = 0.2 \text{ percent}$$

## 2. Differential Slopes

$$H_0: \beta_0^I = \beta_0^{II} \text{ against } H_a: \beta_0^I \neq \beta_0^{II}$$

$$L.R\text{-statistic} = 18.2, \text{ d.f.} = 15, \text{ p-value} = 25.2 \text{ percent}$$

## 3. Differential Intercepts

$$H_0: \beta_0^I = \beta_0^{II} \text{ against } H_a: \beta_0^I \neq \beta_0^{II}$$

$$L.R\text{-statistic} = 16.72, \text{ d.f.} = 1, \text{ p-value} = 0.004 \text{ percent}$$

## 4. Differential Variances

$$\alpha_0^I = \alpha_0^{II} \text{ against } H_a: \alpha_0^I \neq \alpha_0^{II}$$

$$L.R\text{-statistic} = 3.8, \text{ d.f.} = 1, \text{ p-value} = 5.12 \text{ percent}$$

This result is consistent with the downward shift reported by Friedman (1982, p. 730) in regression equations of new corporate bond issues.

The estimates of versions 1 and 2 are otherwise similar. Both sets of estimates generally agree with the theoretical arguments underlying the explanatory variables. In each case the expected signs are obtained for 11 of the 15 variables, and the estimates with wrong signs are all statistically insignificant. The statistically significant variables are  $OWN^A$ ,  $CASHFLOW^A$ ,  $(MKT/BK)^A$ ,  $HOSTILE$ , and  $SALES^T$ . The estimates for  $OWN^A$  are positive and significant at the 10 percent level which corroborates the findings of Amihud *et al.* (1990): the maintenance of insider control raises the propensity to use cash financing. Therefore, the incorporation of additional explanatory variables and differential intercepts and variances does not alter the evidence on insider ownership.

The estimate for  $CASHFLOW^A$  is positive and significant which suggests that the propensity to use cash financing is greater for slack rich firms, at least when financial slack is measured by the acquiring firm's free cash flow. None of the financial slack variables for the target firm is significant. We find no support for the notion that the target firm's unused borrowing capacity is an important consideration in the choice of payment method.

**Table 4—Maximum Likelihood Estimates of Two Limit Tobit Models, Sample Period 1980-1990**

| Variables                          | Sign | Version 1<br>Differential Intercepts<br>and Variances |                     | Version 2<br>Common Parameters<br>for Both Periods |                     |
|------------------------------------|------|-------------------------------------------------------|---------------------|----------------------------------------------------|---------------------|
|                                    |      | Estimate                                              | t-ratio             | Estimate                                           | t-ratio             |
| Monetary Policy                    |      |                                                       |                     |                                                    |                     |
| Intercept 1980-1982                |      | 4.620                                                 | 1.912 <sup>b</sup>  | -                                                  | -                   |
| Intercept 1983-1990                |      | 6.412                                                 | 2.521 <sup>a</sup>  | -                                                  | -                   |
| Intercept 1980-1990                |      | -                                                     | -                   | 4.294                                              | 1.676 <sup>b</sup>  |
| Insider Control                    |      |                                                       |                     |                                                    |                     |
| OWN <sup>A</sup>                   | +    | 0.006                                                 | 1.433 <sup>c</sup>  | 0.015                                              | 1.286 <sup>c</sup>  |
| HOSTILE                            | +    | 1.991                                                 | 3.776 <sup>a</sup>  | 2.211                                              | 3.809 <sup>a</sup>  |
| Financial Condition                |      |                                                       |                     |                                                    |                     |
| CASHFLOW <sup>A</sup>              | +    | 0.001                                                 | 1.721 <sup>b</sup>  | 0.001                                              | 1.689 <sup>b</sup>  |
| CASHFLOW <sup>T</sup>              | +    | 0.001                                                 | 0.279               | 0.001                                              | 0.428               |
| (DEBT/MKT) <sup>A</sup>            | -    | -0.149                                                | -0.713              | -0.071                                             | -0.324              |
| (DEBT/MKT) <sup>T</sup>            | -    | 0.043                                                 | 0.290               | 0.029                                              | 0.183               |
| (NWC/MKT) <sup>A</sup>             | +    | -1.283                                                | -0.781              | -0.980                                             | -0.613              |
| (NWC/MKT) <sup>T</sup>             | +    | 0.227                                                 | 0.222               | 0.208                                              | 0.199               |
| (MKT/BK) <sup>A</sup>              | -    | -0.471                                                | -2.159 <sup>b</sup> | -0.349                                             | -1.739 <sup>b</sup> |
| Asymmetric Information             |      |                                                       |                     |                                                    |                     |
| PRED*(MKT/BK) <sup>A</sup>         | -    | -0.001                                                | -0.191              | -0.000                                             | -0.002              |
| MKT <sup>T</sup> /MKT <sup>A</sup> | -    | 0.123                                                 | 0.261               | 0.069                                              | 0.111               |
| Tax Aspects                        |      |                                                       |                     |                                                    |                     |
| INOWN <sup>T</sup>                 | +    | -0.647                                                | -0.594              | 0.360                                              | 0.318               |
| (MKT/BK) <sup>T</sup>              | +    | 0.023                                                 | 0.543               | -0.002                                             | -0.046              |
| Size                               |      |                                                       |                     |                                                    |                     |
| log(SALES <sup>A</sup> )           | ?    | -0.245                                                | -0.907              | -0.104                                             | -0.355              |
| log(SALES <sup>T</sup> )           | ?    | -0.308                                                | -1.620 <sup>c</sup> | -0.406                                             | -1.974 <sup>b</sup> |
| Variances                          |      |                                                       |                     |                                                    |                     |
| 1980-1982                          |      | 2.069                                                 | 1.938 <sup>b</sup>  | -                                                  | -                   |
| 1983-1990                          |      | 5.003                                                 | 2.941 <sup>a</sup>  | -                                                  | -                   |
| 1980-1990                          |      | -                                                     | -                   | 8.499                                              | 1.481 <sup>c</sup>  |
| Log-likelihood                     |      | -215.214                                              |                     | -225.462                                           |                     |

<sup>a</sup>Significant at the 1 percent level based on a one sided test

<sup>b</sup>Significant at the 5 percent level based on a one sided test

<sup>c</sup>Significant at the 10 percent level based on a one sided test

Consistent with the work of Chaney *et al.* (1991) and Yook *et al.* (1992), the estimate for the market to book ratio, (MKT/BK)<sup>A</sup>, is negative and significant; the propensity to use cash financing varies inversely with the growth opportunities of the acquiring firm (as proxied by (MKT/BK)<sup>A</sup>). To the extent that (MKT/BK)<sup>A</sup> can be regarded as an indicator of overvaluation, this result is also consistent with the hypothesis of Myers and Majluf (1984) that managers use stock financing when they believe that their firm's stock is overvalued. The negative sign on the estimate for PRED\*(MKT/BK)<sup>A</sup> suggests that overvaluation has a greater impact on the choice of payment method when asymmetric information is present, but this estimate is not statistically significant in any versions of the model.

The estimate for the managerial resistance dummy, HOSTILE, is positive and significant at the 1 percent level in both versions of the model. The distinction between friendly and hostile bids, which has not been considered by previous payment method studies, appears to be important for the choice of payment method. This result is consistent with our hypothesis that hostile bidders prefer cash offers because they are faster to implement and make it more difficult for target firm managers to mount a successful defense.<sup>15</sup>

## CONCLUDING REMARKS

Researchers only recently have attempted to investigate and identify factors that determine the choice of payment method in acquisitions. The present paper offers new empirical evidence based on an analysis that augments insider ownership with other factors and that addresses the issues of structural change and heteroscedasticity.

The results indicate that an acquiring firm's choice of payment method is generally governed by insider control, financial condition, and monetary policy considerations. Insider ownership and managerial resistance (where the acquisition was hostile) are found to be statistically significant. The statistically significant factors also include the acquiring firm's financial slack variables, namely free cash flow and the net debt ratio of Asquith and Mullins (1986) and Bruner (1988) (see footnote 15), and the acquiring firm's market to book ratio which serves as a proxy for growth opportunities. Asymmetric information and tax aspects, on the other hand, appear to have minimal impact: the acquiring firm's earning predictability (a proxy for asymmetric information), as well as target firm institutional ownership and market to book ratios are statistically insignificant.

The estimates and likelihood ratio tests indicate a structural change from cash financing from 1979 to 1982 and are consistent with the empirical analysis of the corporate bond market by Friedman (1982). Many previous studies have examined the 1979-1982 episode, but none have done so in the context of acquisition financing. The episode is characterized by monetary policy procedures that include credit controls and unprecedented interest rate volatility. Our results suggest that the actions of the Federal Reserve can be relevant for the choice of payment method in acquisitions.

## REFERENCES

1. Arabmazer, A., and P. Schmidt, "Further Evidence on the Robustness of the Tobit Estimator to Heteroscedasticity," *Journal of Econometrics*, 17 (1981), pp. 253-258.
2. Amihud, Y., B. Lev, and N.G. Travlos, "Corporate Control and the Choice of Investment Financing: The Case of Corporate Acquisitions," *Journal of Finance*, 45 (1990), pp. 603-616.
3. Asquith, P., and D.W. Mullins, "Equity Issues and Offering Dilution," *Journal of Financial Economics*, 15 (1986), pp. 61-90.

<sup>15</sup>The models in Table 4 also are estimated using the net debt ratios (NETDEBT<sup>A</sup> and NETDEBT<sup>B</sup>) of Asquith and Mullins (1986) and Bruner (1988) as alternative financial slack variables. DEBT/MKT and NWC/MKT are replaced in the models with NETDEBT for both the acquiring and target firms. The results are available on request from the authors. In contrast to the estimates for (DEBT/MKT)<sup>A</sup> and (NWC/MKT)<sup>A</sup> in Table 4, we find that NETDEBT<sup>A</sup> is statistically significant. As in Table 4, however, none of the financial slack variables for the target firm are significant and none of the conclusions regarding the other variables are altered.

Another modification that we tried is dividing net working capital and long-term debt by total assets rather than by equity market value. This modification did not affect the conclusions.

4. Bruner, R.F., "The Use of Excess Cash and Debt Capacity as a Motive for Merger," *Journal of Financial and Quantitative Analysis*, 23 (1988), pp. 199-218.
5. Carlton, W.T., D.K. Guilkey, R.S. Harris, and J.F. Stewart, "An Empirical Analysis of the Role of the Medium of Exchange in Mergers," *Journal of Finance*, 38 (1983), pp. 813-826.
6. Chaney, P.K., L.M. Lovata, and K.L. Philipich, "Acquiring Firm Characteristics and the Medium of Exchange," *Quarterly Journal of Business and Economics*, 30 (1991), pp. 55-69.
7. Demsetz, H., and K. Lehn, "The Structure of Corporate Ownership: Causes and Consequences," *Journal of Political Economy*, 93 (1985), pp. 1155-1177.
8. Evans, P., "The Effects on Output of Money Growth and Interest Rate Volatility in the United States," *Journal of Political Economy*, 92 (1984), pp. 204-222.
9. Fortier, D.L., "Hostile Takeovers and the Market for Corporate Control," Federal Reserve Bank of Chicago, *Economic Perspectives* (January/February 1989), pp. 2-16.
10. Franks, J.R., R.S. Harris, and C. Mayer, "Means of Payment in Takeovers: Results in the United Kingdom and the United States," in A.J. Auerbach (ed.), *Corporate Takeovers: Causes and Consequences* (Chicago, IL: University of Chicago Press, 1988).
11. Friedman, B.M., "Federal Reserve Policy, Interest Rate Volatility, and the U.S. Capital Raising Mechanism," *Journal of Money, Credit and Banking*, 14 (1982), pp. 721-745.
12. Godfrey, L.G., *Misspecification Tests in Econometrics* (Cambridge, Cambridge University Press, 1988).
13. Goldfeld, S.M., R.E. Quandt, and H.F. Trotter, "Maximization by Quadratic Hill-Climbing," *Econometrica*, 34 (1966), pp. 541-551.
14. Hansen, R.G., "A Theory for the Choice of Exchange Medium in Mergers and Acquisitions," *Journal of Business*, 60 (1987), pp. 75-95.
15. Harris, M., and A. Raviv, "Corporate Control Contests and Capital Structure," *Journal of Financial Economics*, 20 (1988), pp. 55-86.
16. Huang, Y., and R.A. Walkling, "Target Abnormal Returns Associated With Acquisition Announcements: Payment, Acquisition Form, and Managerial Resistance," *Journal of Financial Economics*, 19 (1987), pp. 329-349.
17. Hurd, M., "Estimation in Truncated Samples When There is Heteroscedasticity," *Journal of Econometrics*, 11 (1979), pp. 247-258.
18. Jensen, M., "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, 76 (1979), pp. 323-329.
19. Jensen, M., and W.H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics* (1976), pp. 305-360.
20. Kiefer, N.M., and G.R. Skoog, "Local Asymptotic Specification Error Analysis," *Econometrica*, 52 (1984), pp. 873-885.
21. Kolodny, R., and D.R. Suhler, "Changes in Capital Structure, New Equity Issues, and Scale Effects," *Journal of Financial Research*, 9 (1985), pp. 127-136.
22. Lapin, L.L., *Statistics for Modern Business Decisions* (New York: Harcourt Brace Jovanovich, 1990).
23. Lehn, K., and A. Poulsen, "Free Cash Flow and Stockholder Gains in Going Private Transactions," *Journal of Finance*, 44 (1989), pp. 771-787.
24. Maddala, G.S., and F.D. Nelson, "Specification Errors in Limited Dependent Variable Models," NBER working paper 96 (1975).
25. Maddala, G.S., *Limited-Dependent and Qualitative Variables in Econometrics* (Cambridge: Cambridge University, 1983).

26. Mains, N.E., "Recent Corporate Financing Patterns," *Federal Reserve Bulletin* (September 1980), pp. 683-690.
27. Masulis, R.W., and A.N. Korwar, "Seasoned Equity Offerings: An Empirical Investigation," *Journal of Financial Economics*, 15 (1986), pp. 91-118.
28. Mayer, W.J., "Estimating Disequilibrium Models With Limited A Priori Price-Adjustment Information," *Journal of Econometrics*, 41 (July 1989), pp. 303-320.
29. Mikkelsen, W.H., and M.M. Partsch, "Valuation Effects of Security Offerings and the Issuance Process," *Journal of Financial Economics*, 15 (1986), pp. 31-60.
30. Morck, R., A. Shleifer, and R.W. Vishny, "Characteristics of Targets of Hostile and Friendly Takeovers," in A.J. Auerbach (ed.), *Corporate Takeovers: Causes and Consequences* (Chicago, University of Chicago Press, 1988).
31. Myers, S., and N.S. Majluf, "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics*, 13 (1984), pp. 187-221.
32. Peterson, D.R., and P.P. Peterson, "The Medium of Exchange in Mergers and Acquisitions," *Journal of Banking and Finance*, 15 (1991), pp. 383-405.
33. Poole, W., "Federal Reserve Operating Procedures," *Journal of Money, Credit and Banking*, 14 (1982), pp. 575-596.
34. Stulz, R.M., "Managerial Control of Voting Rights," *Journal of Financial Economics*, 20 (1988), pp. 25-54.
35. Tatom, J.A., "Interest Rate Variability: Its Link to the Variability of Monetary Growth and Economic Performance," *Federal Reserve Bank of St. Louis Review*, 66 (1984), pp. 31-47.
36. Travlos, N.G., "Corporate Takeover Bids, Method of Payment, and Bidding Firms' Stock Returns," *Journal of Finance*, 42 (1987), pp. 943-963.
37. Wansley, J.W., W.R. Lane, and H.C. Wang, "Abnormal Returns to Acquired Firms by Type of Acquisition and Method of Payment," *Financial Management*, 12 (1983), pp. 16-22.
38. Wansley, J.W., W.R. Lane, and H.C. Wang, "Gains to Bidder Firms in Cash and Securities Transactions," *Financial Review*, 22 (1987), pp. 403-414.
39. Yatchew, A., and Z. Griliches, "Specification Error in Probit Models," *Review of Economics and Statistics*, 18 (1985), pp. 134-139.
40. Yook, K.C., G.M. McCabe, and P.A. Shoemaker, "The Role of Taxes in Corporate Acquisitions: Effect of Tax Shields on the Choice of Method of Payment," *Southern Business Review*, 18 (1992), pp. 54-70.

## DATA APPENDIX

The sample consists of observations on 261 acquisitions completed between 1980 and 1990. The initial announcement dates, which are obtained from the *Wall Street Journal Index*, range from August 1979 to September 1990. The sample is restricted to acquisitions in which the acquiring firm is a *Fortune* 500 company in the year prior to the acquisition, the value of the acquisition exceeds \$10 million, and the target firm's stock is publicly traded. The acquisitions are identified in *Mergers and Acquisitions*. Data on all variables except  $OWN^A$ ,  $INOWN^T$ ,  $PRED$ , and  $HOSTILE$  are from *Moody's Industrial Manual*; Compustat tapes, and *Mergers and Acquisitions*;  $OWN^A$  and  $PRED$  are from the *Value Line Investment Survey*;  $INOWN^T$  is from *Standard & Poor's Stock Guide*; and  $HOSTILE$  is from articles in the *Wall Street Journal*. The variables are defined as follows:

|                                                    |   |                                                                                                                                                                                                                                                                    |
|----------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PM<br>(payment method)                             | = | The amount of cash paid divided by the acquisition price;                                                                                                                                                                                                          |
| $OWN^A$<br>(insider ownership)                     | = | The percentage of the acquiring firm's stock held by insiders at the acquisition announcement date;                                                                                                                                                                |
| $INOWN^T$<br>(institutional ownership)             | = | The percentage of the target firm's stock held by institutions two months before the acquisition announcement date;                                                                                                                                                |
| $CASHFLOW^A$<br>(free cash flow of acquiring firm) | = | (Earnings before interest, depreciation, and taxes less preferred and common stock dividends) divided by (equity market value at the year end before the acquisition date). See Lehn and Poulsen (1989);                                                           |
| $CASHFLOW^T$                                       | = | Free cash flow of the target firm;                                                                                                                                                                                                                                 |
| $(MKT/BK)^A$<br>(market to book ratio)             | = | Acquiring firm's equity market value at the year end prior to the acquisition announcement date divided by equity book value;                                                                                                                                      |
| $(MKT/BK)^T$                                       | = | Market to book ratio of target firm;                                                                                                                                                                                                                               |
| $PRED^A$<br>(earnings predictability index)        | = | A rank of firm earnings predictability from the <i>Value Line Investment Survey</i> , ranging from 5 (lowest) to 100 (highest). $PRED^A$ equals 100 minus the earnings predictability of the acquiring firm prior to the acquisition announcement date;            |
| $HOSTILE$                                          | = | Zero-one indicator of managerial resistance to the initial takeover bid (not necessarily the bid made by the successful acquiring firm). Managerial resistance includes outright rejection of a bid, filing of lawsuits, or attempts to merge with a white knight; |
| $(NWC/MKT)^A$<br>(net working capital ratio)       | = | The acquiring firm's net working capital at the year end prior to the acquisition announcement date divided by equity market value;                                                                                                                                |

|                                                         |   |                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $(NWC/MKT)^T$                                           | = | Net working capital ratio of target firm;                                                                                                                                                                                                                                                                                                       |
| $(DEBT/MKT)^A$<br>(debt ratio)                          | = | Acquiring firm's long-term debt divided by equity market value at the year end prior to the acquisition announcement date;                                                                                                                                                                                                                      |
| $(DEBT/MKT)^T$                                          | = | Debt ratio of the target firm;                                                                                                                                                                                                                                                                                                                  |
| $MKT^T/MKT^A$<br>(size of target relative to acquiring) | = | The target firm's equity market value divided by the acquiring firm's equity market value. Equity market value is equal to the price per share at the year end before the acquisition date multiplied by the number of outstanding shares;                                                                                                      |
| $SALES^A$                                               | = | Sales of the acquiring firm at the year end prior to the acquisition announcement date;                                                                                                                                                                                                                                                         |
| $SALES^T$                                               | = | Sales of the target firm at the year end prior to the acquisition announcement date;                                                                                                                                                                                                                                                            |
| $NETDEBT^A$<br>(net debt ratio)                         | = | The acquiring firm's net debt divided by the sum of its common equity, preferred stock, and net debt. Net debt equals the sum of short-and long-term debt minus cash, cash equivalents, and marketable securities. Common equity is measured by market values, and preferred stock and net debt are measured by book values (Bruner, 1988); and |
| $NETDEBT^T$                                             | = | Net debt ratio of the target firm. (Both NET-DEBT ratios are measured at the year end prior to the acquisition announcement date.)                                                                                                                                                                                                              |