The transformed model addresses potential causation and endogeneity problems that may exist in the relationship between the payout policy and institutional ownership. Firm fixed effects are differenced out. Institutional ownership changes predate payout policy changes indicating causation. I control for previous payout policy changes. This decreases the probability that coefficients for changes in institutional ownership are simply a result of previous payout policy changes. Potentially endogenous independent variables are instrumented to control for endogeneity.

I was able to use the first lag of independent policy and institutional variables in all my regressions as an instrument. In the difference GMM model, efficiency can be improved by including additional lags. Including the additional lags introduces new information which is useful to the model. In conventional two-stage least squares regressions, including additional lags shrinks the sample size which means additional efficiency comes at a steep cost. Difference GMM does not suffer from this trade-off. In difference GMM, additional lags can be included as instruments when available without shrinking the sample size. Therefore, it is generally preferable to include as many lags as instruments as possible. I use this tactic.

Unfortunately, problems can result from including too many lags as instruments. Too many instruments can result in over-identification of the model invalidating its results. Therefore, if tests indicate that a model is over-identified, I reduce the number of lags used until the tests no longer indicate that the model is over-identified.

I employ two important tests of difference GMM model validity which are strongly recommended by Roodman (2009): the Hansen-Sargan *J*-test and the Arellano-Bond test for second-order autocorrelation in differenced residuals. For both tests, a higher *p*-value indicates a valid model while *p*-values of less than 0.10 indicate an invalid model.

The null hypothesis of the Hansen-Sargan *J*-test is that the instruments as a group are exogenous. A rejection of this null hypothesis indicates an invalid model. Therefore, I do not use any model in which the *p*-value for the *J*-test is less than 0.10.

The *J* statistic’s ability to detect over-identification can be weakened by too many instruments. A general rule of thumb is that the number of firms in the panel should outnumber the number of instruments used in a difference GMM regression. The minimum number of firms for any of my regressions is 1,489, while the maximum number of instruments is 208 indicating that the *J* statistic should retain its ability to detect over-identification in all of these regressions.

AR(1) autocorrelation in differenced residuals is expected. This is because the difference between an error term (εit) and the error term from the year before (εit-1) is expected to be related to the difference between the error term from the year before (εit-1) and the error term from two years before (εit-2) because both differences contain the error term from the year before (εit-1). The Arellano-Bond test for second-order autocorrelation is more important because AR(2) autocorrelation indicates an invalid model. The null hypothesis is that there is no autocorrelation. Therefore, I do not use any models in which the null is rejected at the 10% level.

*4.3 Summary Statistics*

Table 2 displays selected firm characteristics for my sample. Panel A includes all firms in the sample and panel B includes only firms that have a payout (either dividends or stock repurchases or both). Statistics are shown for two time periods, 1990 – 1997 and 1998 – 2005, and for the total sample. Means are shown and medians are shown in parentheses below.

Some patterns appear in the data for all firms and in firms with a payout. Institutional investor ownership (*Inst*) increases over time. Firm size (*MktCap*) and *q* increase from the first time period to the next as well. Retained earnings to total equity (*LifeCycle*), a proxy for firm life-cycle, indicates that firms included in the sample are less mature in later years. The median of firm retained earnings to total equity is positive. This demonstrates that firms are mature enough to have earned positive earnings during their lifetime in most firm-years. In contrast, average retained earnings to total equity is negative indicating a skewness towards the large minority (over 38%) of the firm-years with negative retained earnings.

Firms with a payout have higher institutional ownership, a larger size and a lower *q* than those without a payout. Firms that have a payout have a higher median and slightly lower mean in retained earnings to total equity.

Table 2. Summary Statistics

Panel A: All Firms

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Years* | *N* | *Inst* | *MktCap* | *LifeCycle* | *q* | *CashFlow* |
| 1990 - 1997 | 37 492 | 28.9% | 2 106 | -0.69 | 2.81 | -0.16 |
|  |  | (23.6%) | (163) | (0.29) | (1.85) | (0.01) |
| 1998 - 2005 | 42 398 | 33.3% | 4 891 | -0.53 | 4.68 | -0.39 |
|  |  | (25.8%) | (350) | (0.18) | (1.86) | (0.01) |
| Total | 79 890 | 31.3% | 3 603 | -0.61 | 3.81 | -0.28 |
|  |  | (24.6%) | (239) | (0.24) | (1.85) | (0.01) |
| Panel B: Firms with a Payout |
| 1990 - 1997 | 13 934 | 37.9% | 4 858 | 0.46 | 2.07 | 0.03 |
|  |  | (38.0%) | (547) | (0.64) | (1.75) | (0.04) |
| 1998 - 2005 | 15 716 | 42.8% | 10 806 | -1.49 | 2.22 | 0.02 |
|  |  | (43.9%) | (1146) | (0.57) | (1.75) | (0.04) |
| Total | 29 650 | 40.5% | 8 030 | -0.57 | 2.15 | 0.02 |
|  |  | (40.4%) | (816) | (0.61) | (1.75) | (0.04) |
| Panel C: All Firms |
| *Years* | *Div* | *Repurch* | *PayIncr* | *PayDecr* | *RepIncr* | *RepDecr* |
| 1990 - 1997 | 0.81% | 0.60% | 24.80% | 18.70% | 13.66% | 12.79% |
| 1998 - 2005 | 0.66% | 1.04% | 24.57% | 20.65% | 17.56% | 16.58% |
| Total | 0.73% | 0.83% | 24.67% | 19.78% | 15.82% | 14.89% |
| Panel D: Firms with a Payout |
| 1990 - 1997 2.21% 1.64% 65.60% 33.06% 35.82% 21.84%1998 - 2005 1.80% 2.82% 64.70% 34.83% 45.65% 26.90% Total 2.00% 2.26% 65.10% 34.04% 41.29% 24.66%Panels A and B, show means on the first row and medians in parentheses on the second row. In Panels C and D, means are shown. |
|
|
|

\* indicates two-tailed significance at 5%.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table 3. Correlations | *Payout* | *Repurch* | *Inst* | *MktCap* | *LifeCycle* | *q* |
| *Repurch* | 0.6528\* |  |  |  |  |  |
| *Inst* | 0.0801\* | 0.0957\* |  |  |  |  |
| *MktCap* | 0.0539\* | 0.0332\* | 0.0865\* |  |  |  |
| *LifeCycle* | 0.0008 | 0.0004 | 0.0013 | 0.0009 |  |  |
| *q* | -0.0025 | -0.0023 | -0.0135\* | -0.0019 | 0.0013 |  |
| *CashFlow* | 0.0032 | 0.0024 | 0.0232\* | 0.0023 | -0.0008 | -0.4194\* |

Table 2 also displays summary statistics for payout-related variables in Panels C and D. Only means are shown because medians are zero for almost all of the variables. As expected, all payout variables are lower in Panel C, which includes all firms, than in Panel D, which only includes firms that have a payout. Consistent with (Fama & French, 2001), dividends to assets (*Div*) goes down over time as repurchases to assets (*Repurch*) goes up. Total payout increases (*PayIncr*) outnumber total payout decreases (*PayDecr*). The percentage of firms increasing repurchases per share (*RepIncr*) is higher than the percentage of firms decreasing repurchases per share (*RepDecr*). A correlation table for selected firm variables is presented in Table 3.

**5. The Effect of Institutional Owners on Total Payouts**

According to the agency-based free cash flow theory, current institutional owners positively influence future total payouts (dividends and repurchases). Institutional investor ownership and payout levels are almost certainly

endogenously related. Firms with higher payout levels tend to have higher institutional ownership levels, so I need to combat the effect that this endogenous relationship has on my analysis. Therefore, I test the effect that changes in institutional ownership have on subsequent changes in payouts rather than looking at their levels.

To test the effect that changes in institutional ownership have on changes in payouts in the subsequent year, the following firm and year fixed effects model is estimated.

*Payoutit*  *Yeart*  *Firmi*  *Instit*1 *Controlit*1 *it*

(3)

*Payoutit* represents the firm’s payout to asset ratio. *Yeart* represents year fixed effects and *Firmi* represents firm fixed effects. *Inst*i*t-1* is the percentage of the firm’s shares owned by institutional investors. *Control*i*t-1* represents a vector of time-varying firm level control variables (*q*, debt, stock turnover, retained earnings to total equity, logarithm of market capitalization, ROA, insider ownership, insider ownership squared, and logarithm of revenue), and *εit* is the error term.

The independent variables are measured as the change from year *t* – 2 to year *t* – 1. The dependent payout variable is measured as the change from year *t* - 1 to year *t*.

Table 4. Institutional Ownership and Payouts

|  |  |  |  |
| --- | --- | --- | --- |
| (1) | (2) | (3) | (4) |

|  |  |
| --- | --- |
| All Firms | All Firms |
| *Payout* | *Payout* |
| -0.0005\*\*\* | 0.0106\*\*\* (2.75)-0.0004\*\*\* |

|  |  |  |
| --- | --- | --- |
| *Inst q* | No Payout at year *t* - 2 | Payout at year *t* - 2 |
| *Payout* | *Payout* |
| 0.0072\*\* | 0.0182 |
| (2.19) | (1.63) |
| -0.0002\*\* | -0.0063\*\*\* |
|  | (3.21) | (3.16) | (2.03) | (2.68) |
| *Debt* | -0.0114\*\*\* | -0.0115\*\*\* | -0.0031\*\* | -0.1961\*\*\* |
|  | (3.08) | (3.01) | (2.21) | (4.64) |
| *Turnover* | 0.0000 | -0.0000 | 0.0000 | -0.0043\*\* |
|  | (0.56) | (0.33) | (0.27) | (2.13) |
| *LifeCycle* | -0.0000 | -0.0000 | -0.0000 | -0.0000\* |
|  | (0.95) | (1.05) | (0.15) | (1.82) |
| *MktCap* | 0.0081\*\*\* | 0.0073\*\*\* | 0.0031\*\*\* | 0.0456\*\*\* |
|  | (6.48) | (6.58) | (3.11) | (6.16) |
| *ROA* | -0.0012\*\* | -0.0012\*\* | -0.0003 | -0.0395\*\*\* |
|  | (2.16) | (2.25) | (1.03) | (3.10) |
| *Insider* | -0.0196\* | -0.0205\* | -0.0141 | -0.0271 |
|  | (1.88) | (1.95) | (1.63) | (1.01) |
| *Insider2* | 0.0137 | 0.0146 | 0.0158\* | 0.0189 |
|  | (1.29) | (1.36) | (1.72) | (0.68) |
| *Revenue* | -0.0014 | -0.0015 | -0.0018 | -0.0090 |
|  | (1.19) | (1.24) | (1.32) | (1.64) |
| Observations | 45 418 | 44 933 | 25 794 | 19 096 |
| Firms | 7782 | 7759 | 6239 | 4244 |
| R-squared | 0.06 | 0.16 | 0.34 | 0.17 |

Robust t statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

This table reports estimates of firm and year fixed effect regressions of changes (from year *t* - 1 to *t*) in total payout divided by book value of assets (*Payout*). All independent variable values are calculated as changes in that independent variable from year *t* - 2 to *t* - 1. Regressions 1 and 2 include all firms. Regression 3 includes only firms that had no payout in year *t* - 2 and regression

4 includes only firms that had a payout in year *t* - 2.

Table 4 reports on the effect that a change in institutional ownership has on the subsequent year’s total payout to assets ratio (*Payout*). The first regression only uses the control variables as independent variables. The statistically significant coefficients indicate that payouts increase as *q* decreases, debt decreases, market capitalization increases, and return on assets decreases. Payouts also increase for small decreases in insider ownership. Control variable results remain largely consistent throughout the regressions reported in the table.

The second regression includes the variable (*Inst*) representing the change in the percentage of institutional ownership. The statistically significant coefficient shows that an increase in institutional ownership leads to an increase in payout levels in the subsequent year.

Statistical significance is important to my analysis, but practical (or economic) significance is as well. Therefore, I use an example to give some perspective as to the magnitude of the effect of institutional ownership on payouts. For this example, I use a hypothetical firm with an institutional ownership percentage of 40% and a payout to assets ratio of

1.900%. These values are quite close to the sample median for firms with payouts. It is important to note for this analysis that the institutional ownership percentage is measured from 0% to 100% (or 0 to 1). Using the coefficient in the second regression (0.0106), a rise from 40% to 50% institutional ownership should lead to an addition of 0.106% to the payout ratio, all else being equal. In this example, the firm’s payout ratio would subsequently increase from 1.900% to 2.006%.

Table 5. Institutional Ownership, Payouts and, Investment Opportunities

|  |  |  |  |
| --- | --- | --- | --- |
|  | Low *q* | Medium *q* | High *q* |
| *Payout* | *Payout* | *Payout* |
| *Inst* | 0.0173\* | 0.0188\*\*\* | 0.0080 |
|  | (1.91) | (2.97) | (1.07) |
| *CashFlow* | -0.0016 | -0.0059\* | 0.0051\*\*\* |
|  | (1.15) | (1.72) | (3.28) |
| *q* | 0.0058\*\* | -0.0021\*\*\* | -0.0004\*\*\* |
|  | (2.15) | (2.60) | (2.76) |
| *Debt* | -0.0132 | -0.0296\*\*\* | -0.0033\* |
|  | (1.42) | (2.61) | (1.95) |
| *Turnover* | -0.0000 | -0.0014\*\*\* | -0.0009\*\* |
|  | (0.12) | (2.86) | (2.44) |
| *LifeCycle* | -0.0000 | 0.0000 | -0.0000 |
|  | (0.94) | (0.81) | (0.31) |
| *MktCap* | 0.0046\* | 0.0209\*\*\* | 0.0073\*\*\* |
|  | (1.74) | (5.06) | (4.07) |
| *ROA* | 0.0019 | -0.0031 | -0.0057\*\*\* |
|  | (0.28) | (0.55) | (3.80) |
| *Insider* | -0.0119 | -0.0435\*\* | 0.0047 |
|  | (0.40) | (2.12) | (0.30) |
| *Insider2* | 0.0094 | 0.0416\* | -0.0154 |
|  | (0.34) | (1.95) | (0.72) |
| *Revenue* | -0.0023 | -0.0063 | 0.0003 |
|  | (0.60) | (1.24) | (0.24) |
| Observations | 13004 | 18829 | 12403 |
| Number of Firms | 3971 | 5504 | 3793 |
| R-squared | 0.25 | 0.25 | 0.42 |

Robust t statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

This table reports estimates of firm and year fixed effect regressions of changes (from year *t* - 1 to *t*) in total payout divided by book value of assets (*Payout*). All independent variable values are calculated as changes in that independent variable from year *t* - 2 to *t* - 1. Sample firms used in regressions 1, 2, and 3 include only Low, Medium and High *q* firms, respectively. Low, Medium and High *q* groups include the lowest three, middle four, and highest three *q* deciles from year *t* -

1, respectively. Deciles are formed on a yearly basis.

Institutional ownership percentages are higher in firms with payouts than in firms without payouts. Therefore, the results discussed thus far could be influenced by the tendency of institutional investors to invest more in firms that had a payout. To attenuate that influence, the third regression only uses firms that did not have a payout in year *t* – 2. Regression 3 shows that institutional owners have a significantly positive effect on future payouts in firms that did not have a payout in the previous year. The fourth regression shows that an increase in institutional ownership leads to an increase in payouts among firms that had a payout in the previous year as well. In this case, the t-statistic shows that the coefficient falls just a little short of the 10% significance level (with a p-value of 0.103).

Table 6. Institutional Ownership, Payouts, and Free Cash Flow

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1)Low *CashFlow* | (2)Medium *CashFlow* | (3)High *CashFlow* |
| *Payout* | *Payout* | *Payout* |
| *Inst* | 0.0003 | 0.0093\* | 0.0271\*\* |
|  | (0.04) | (1.86) | (2.14) |
| *CashFlow* | -0.0008 | -0.0002 | 0.0005 |
|  | (0.90) | (0.10) | (0.35) |
| *q* | -0.0003 | -0.0008\*\* | -0.0025\*\*\* |
|  | (1.50) | (2.42) | (3.24) |
| *Debt* | -0.0003 | -0.0643\*\*\* | -0.0788\* |
|  | (0.54) | (4.54) | (1.75) |
| *Turnover* | -0.0000 | -0.0006\*\* | -0.0027 |
|  | (0.19) | (2.17) | (1.63) |
| *LifeCycle* | -0.0000 | -0.0000 | 0.0000 |
|  | (0.08) | (0.48) | (1.00) |
| *MktCap* | 0.0033 | 0.0076\*\*\* | 0.0260\*\*\* |
|  | (1.60) | (5.26) | (4.76) |
| *ROA* | 0.0003 | -0.0009 | -0.0217\*\*\* |
|  | (0.37) | (0.17) | (2.61) |
| *Insider* | -0.0075 | -0.0129 | -0.0229 |
|  | (0.25) | (0.80) | (1.33) |
| *Insider2* | 0.0010 | 0.0089 | 0.0155 |
|  | (0.03) | (0.53) | (0.80) |
| *Revenue* | -0.0010 | -0.0038\*\* | -0.0061 |
|  | (0.62) | (1.98) | (0.81) |
| Observations | 11014 | 18905 | 14317 |
| Number of Firms | 4530 | 5591 | 4457 |
| R-squared | 0.47 | 0.43 | 0.25 |

Robust t statistics in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

This table reports estimates of firm and year fixed effect regressions of changes (from year *t* - 1 to *t*) in total payout divided by book value of assets (*Payout*). All independent variable values are calculated as changes in that independent variable from year *t* - 2 to *t* - 1. Sample firms used in regressions 1, 2, and 3 include only Low, Medium and High *CashFlow* firms, respectively. Low, Medium and High *CashFlow* groups include the lowest three, middle four, and highest three *CashFlow* deciles from year *t* - 1, respectively. Deciles are formed on a yearly basis.

According to agency-based theory, institutional investors should not only encourage higher payouts, they should encourage higher payouts primarily in firms with poor investment opportunities. I test this prediction using *q* as a proxy for investment opportunities. I sort the sample of firms each year into investment opportunity deciles.