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The Effect of Repeal of the Capital Gain Preference on Venture-Backed Companies

James R. Hamill and Inder Khurana

The 1986 Tax Reform Act eliminated preferential tax treatment of capital gains. Proposals to reinstate the preference suggest that risky new investment will suffer without favorable treatment of investment returns. Others have argued that capital for risky new ventures is largely supplied by tax-exempt institutions, who are expected to be indifferent to the taxation of realized gains. This study evaluates the effects of the repeal of preferential capital gains taxation on venture backed firms. The results show negative abnormal returns for sample firms following the Senate's vote to repeal the capital gain preference. The returns were more negative for firms with a high debt-to-assets ratio, suggesting a more adverse effect for firms relying on equity finance for future capital needs. Sample firms were expected to be particularly sensitive to the tax change, and the results may not be generalizable to other forms of risky investment.

I. INTRODUCTION

The 1986 Tax Reform Act (TRA) changed the rate structure applicable to corporate and noncorporate taxpayers, reducing the maximum marginal tax rate and altering the progressivity of the tax system. The TRA also eliminated the long standing preferential treatment of net capital gains. The effect that the elimination of the capital gain preference will have on capital availability for risky new ventures has been an issue of recent debate among policy makers. In this study, we test the effects of TRA's repeal of preferential capital gain treatment on investors' willingness to assume risk in the context of firms backed by venture capital. Specifically, this study measures the effect of repeal of the capital gain preference on share prices of venture backed firms and

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evaluates the differential impact across venture backed firms. The results suggest that preferential treatment of capital gains reduces the required risk-adjusted returns of firms that rely on venture capital for growth.

The Revenue Reconciliation Act of 1993 (RRA'93) increased the maximum tax rate to 39.6 percent, effective January 1, 1993, while maintaining a statutory maximum rate of 28 percent for net capital gains. The RRA'93 also introduced a 50 percent exclusion for stock that has been held for at least five years in qualifying small businesses (capitalization not in excess of $50 million). The preferential treatment of net capital gains for tax years beginning in 1993 is not as favorable as for pre-1987 years, in which all taxpayers received a 60 percent exclusion for net capital gains and without the need to satisfy a five-year holding period. Proponents of tax-favored treatment of capital gains were generally unenthused by the RRA'93 changes. Thus, the impact of RRA'93 on sample firms is expected to be less than that of TRA because not all investment will qualify for the exclusion.

II. THEORETICAL BACKGROUND: TAXES AND RISK TAKING

Theoretical research examining the effect of the tax structure on the demand for risky investment has generated ambiguous predictions, due to an inability to specify the appropriate investor utility function. While theory predicts that the tax system will effect risky investment behavior, the direction is not clear. The absence of a strong theoretical economic foundation increases the need for empirical evidence that would be pertinent to researchers and policy makers considering tax-based investment incentives, including the reinstatement of a capital gain preference for all forms of investment.

Theoretical research examining the effect of the tax structure on risk-taking behavior has included the effects of three factors: the tax rate (generally modelled as a movement from no tax to the introduction of a specified tax); the nature of the tax as proportional or progressive in relation to income; and whether the investor is permitted full loss offset, limited loss offset, or no loss offset from the investment.

Domar and Musgrave (1944) note that the introduction of an income tax may affect investment behavior through a change in the ratio of return to risk, and through a desire to generate additional income to offset the effects of the tax. Mossin (1968) and Stiglitz (1969), using an expected utility model and assuming risk-averse investors, show an increase in the tax rate leads the investor to substitute risky investment for a risk-free investment in an attempt
to compensate for some of the loss of income caused by the tax. Since wealth changes, it is necessary to consider Pratt-Arrow measures of relative and absolute risk aversion. With full loss offset, risk taking will always increase with an increase in a proportional tax. With no loss offset the effects are ambiguous with risk taking expected to increase at low tax rates and decrease at high rates. Because the current tax law limits the ability to offset losses to $3,000 per year, the Mossin and Stiglitz model produces ambiguous predictions of the effects of TRA on risk taking.

Fellingham and Wolfson (1978) observe that investors may be risk neutral over some relevant range of after-tax wealth, but the institutional friction of a tax will lead to induced risk aversion over pre-tax returns. Using this framework for consideration of a risk averse (quadratic) utility function, they analyze both proportional and progressive rate structures. Taxation affects risk taking in two ways. First, it reduces the dispersion of pre-tax returns, unambiguously increasing the demand for risky assets (dispersion-reduction effect). Second, it reduces the investor's wealth position (wealth-reduction effect). The impact of the wealth reduction effect is ambiguous, dependent on local measures of relative and absolute risk aversion. A progressive tax system is shown to generate ambiguous predictions for any measures of risk aversion. However, ceteris paribus, the demand for a risky asset should decrease for an increase in the progressivity of the system.

The theoretical work, to date, has failed to provide clear predictions of the effects of the tax structure on investment behavior. In addition to the inability to observe investor utility functions, it is not clear whether the tax system can be characterized as progressive or proportional, or whether the system provides a practical constraint on full loss offset.

**Current Policy Debate**

Although theory is ambiguous, the effect of preferential capital gain taxation on risk-taking behavior has been frequently debated in the policy arena. Bygrane and Timmons (1992, p. 262) state that "within the venture capital industry, it is almost universally believed that the federal capital gains tax rate is the most important influence on the flows of venture capital." The most frequent argument against the need for a capital gain preference to stimulate risky new investment is that the venture capital industry is dominated by tax-exempt investors that would be indifferent to the taxation of investment returns. This has been documented by Poterba (1989) and others with respect to outside providers of funds after the early stages of growth of
a new venture. However, the National Venture Capital Association reports that taxable investors provide the majority of early-stage financing, with tax-exempt investors coming into the market in later stages (Walker & Bloomfield, 1989). Proponents of the need for tax-favored treatment of capital gains contend that RRA'93 is not likely to stimulate new risky investment because most capital gains are still taxed at a 28 percent rate. Qualifying for a 50 percent exclusion requires a five-year holding period and is limited to regular corporations with capitalization not in excess of $50 million. Prior to 1987, all taxpayers qualified for a 60 percent exclusion for net capital gains provided a one-year holding period was satisfied.

With the diverse group of investors providing funds to risky new ventures, it is not clear what the effect of capital gains tax policy will be. There is some evidence that changes in capital gains taxes can affect equity values (Amoako-Adu, Rashid, & Stebbins, 1992), but no direct evidence on the effect on venture backed firms. Given the dearth of theoretical and empirical guidance, and the importance of this issue to policy makers, research that illuminates the effects of tax law changes on the price of risky investment will be an important contribution to tax policy literature.

Venture Capital Financing

Start-up firms that are backed by venture financing must generally rely on the venture financiers to fund their growth through distinct "rounds" of financing (Camp & Sexton, 1992). As the firm grows, the entrepreneur trades a progressively larger share of the equity of the venture for the funding needed for growth. On average Coopers and Lybrand (1986) found that entrepreneurs surrendered 37 percent of the equity during the first round of financing, and cumulatively 50 percent and 58 percent during the second and third rounds, respectively.

In an analysis of the venture-capital market, Sahlman (1990) indicates that approximately two-thirds of organized venture capital funds are provided by private limited partnerships. The venture investors most commonly acquire convertible preferred stock that is held for an average of 4.9 years. Norton and Tenenbaum (1992), in a survey of venture capital firms, show that common stock investments are atypical because the venture capitalist prefers a priority claim to firm assets. Although a venture capitalist's preferred stock often does not provide for a current dividend, a dividend can be paid at the discretion of the Board of Directors, and the venture capitalist typically controls the Board. Further, preferred stock dividend payments are typically
cumulative, providing the investor with a priority claim for unpaid dividends. A typical organized venture fund invests in only 12 projects each year selected from 1000 proposals. Discount rates can be as high as 70 percent for start-up stages, and typically range between 25 and 35 percent for initial public offerings (Sahlman, 1990).

At the time that a firm is initially taken public, the market is expected to price the firm’s securities on the assumption that required future financing will be available at some expected price. Sahlman (1990) indicates that venture capitalists exercise control over investments by staging the commitment of capital, and that “each company begins life knowing that it has only enough capital to reach the next stage.” Neeley (1992) documents that early-stage firms suffer more from liquidity shortfalls than do established firms because of differential access to capital markets. Thus, early-stage firms can be expected to be more adversely affected by tax law changes that affect the availability of credit. Norton and Tenenbaum’s (1992) survey data also demonstrate that venture capitalists are sensitive to expected tax law changes.

If TRA affected the price of private risky investment, then the market would revise its expectations of the cost or availability of future financing in the post-TRA era. Presumably, no financing will be available at the price the venture backed firm is willing to pay, or financing will be available at a higher price than initially expected. Either of these alternatives might also cause the firm to restructure its financing plans, which can be costly.

**Research Hypotheses**

Litzenberger and Ramaswamy (1979) empirically find that stocks with greater tax exposure tend to sell at lower prices and greater than expected pre-tax returns. Higher than expected pre-tax returns are demanded by the market to offset the greater tax exposure and provide equivalent after-tax returns of equally risky stocks with different tax exposures. Thus the pricing of initial public offerings (IPO) made by venture backed firms prior to the TRA repeal of the capital gain preference is expected to incorporate the cash flow consequences of a favorable tax treatment for capital gains.

To the extent that elimination of the capital gain preference discouraged private risk taking behavior, security returns of venture backed firms should be negative at the time of deliberations and public announcements relating to the repeal of the preference. Stated in terms of the first research hypothesis:
H1: Security prices of venture backed firms are reduced following announcements that increase the probability of repeal of the capital gain preference.

Poterba (1989) reports that in addition to equity finance, venture backed firms often use debt and other sources of capital. Based on 1976 data, he finds that debt accounts for 70 percent of the capitalization of start-up enterprises. Sahlman (1990) and Neeley (1992) find that venture capitalists typically use preferred equity financing. If venture financing is expected to be the source of future funds, it is expected that venture backed firms must rely more on equity rather than other sources of financing for future growth. The decline in stock prices at the time a tax law change adversely affects equity finance is expected to be a direct function of the capital structure at the time of the change.

Neeley (1992) also finds that the venture capitalist's preference for equity finance is related to the expected future tax rate, suggesting a reluctance to offer equity financing when tax changes are detrimental to equity gains. Venture firms are then expected to be more adversely affected by the repeal of the capital gain preference the higher the ratio of debt to assets. This is because firms with a relatively high debt to assets ratio have lower equity capitalization and must rely more heavily on future sources of equity finance. The capital gain repeal will then force them to seek alternative methods of financing or to obtain equity capital at a higher cost, if the cost of equity increased post-TRA. Stated in terms of the second research hypothesis:

H2: Ceteris paribus, the security price response of venture backed firms following announcements that increase the probability of repeal of the capital gain preference will be directly related to the debt-assets ratio.

Research Design

This study uses an interrupted time series design in order to study the effects of repeal of the capital gain preference on venture-backed firms.

Sample Selection

The study is based upon a sample of 181 venture backed firms that made initial public offerings from 1983 to 1985 as part of first round financing. The
Table 1
Sample Reconciliation

<table>
<thead>
<tr>
<th>1983</th>
<th>1984</th>
<th>1985</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial sample as identified from the Venture Capital Journal</td>
<td>121</td>
<td>53</td>
<td>46</td>
</tr>
<tr>
<td>Less stock return data unavailable on CRSP tapes</td>
<td>16</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Less financial statement data unavailable on Compustat</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Final Sample</td>
<td>101</td>
<td>44</td>
<td>36</td>
</tr>
</tbody>
</table>

1983–1985 period is selected because we are interested in firms that are in the early stages of venture financing and that will be heavily dependent on future availability of capital for growth. The time period for the IPO predates the legislative discussions of TRA, which occurred throughout the 1986 calendar year.

The initial sample was selected from the Venture Capital Journal. Firms were then deleted based upon availability of financial statement data on Compustat tapes and stock return data on the Center for Research in Security Prices (CRSP) daily tapes. Compustat and CRSP have a selection bias in favor of larger firms. It was expected that changes in capital gains tax policy would have a more detrimental effect on smaller firms, and the use of CRSP and Compustat firms would not bias in favor of supporting the research hypothe-

Table 2
Descriptive Statistics on Firm-Characteristics of Final Sample$^{1,2}$

\[
\begin{array}{cccc}
\text{Standard} & N & \text{Mean} & \text{Deviation} & \text{Median} \\
\hline
\text{Net Sales} & 181 & 67.80 & 95.33 & 28.14 \\
\text{Net Income} & 181 & 1.32 & 7.77 & 0.95 \\
\text{Total Debt} & 181 & 27.17 & 53.10 & 9.45 \\
\text{Total Assets} & 181 & 60.23 & 78.09 & 30.97 \\
\text{Return on Assets} & 181 & -6.90 & 27.00 & 2.50 \\
\text{Return on Equity} & 181 & 27.30 & 416.80 & 4.70 \\
\text{Debt:Asset Ratio} & 181 & 0.37 & 0.23 & 0.32 \\
\text{Market:Book Ratio} & 174 & 1.77 & 16.99 & 2.43 \\
\end{array}
\]

Notes:  
$^1$Monetary amounts are in millions  
$^2$All amounts are based on fiscal year 1985 financial statements
ses. Of the 181 firms in the final sample, 101 firms underwent the IPO in 1983, 44 in 1984, and 36 in 1985. Sample tests were conducted with the full sample from 1983 and then the individual firms from 1984 and 1985 to determine if results could be biased by the large number of 1983 firms. Eighty-three percent of the final sample firms are listed on NASDAQ. Using two (four)-digit SIC codes, 33 (85) industries were represented in the final sample. Table 1 shows a reconciliation of the full sample with the firms included in sample tests.

Table 2 shows descriptive statistics for sample firms.

Selection of Event Dates

Legislative histories, *Tax Notes* and the *BNA Daily Tax Report* were used to prepare an extensive chronicle of events related to the passage of TRA. Since this study was interested in the effects of the repeal of the capital gain preference, event dates were selected to isolate discussions of capital gain repeal and to assess dates that would affect the probability of passage of the capital gain repeal. This event date selection was designed to minimize the confounding effects of the general effect of TRA on sample firms.

We identify four key event periods affecting the probability of repeal of the capital gain preference. Each event period is two days in length, covering the day of the event and the succeeding trading day. The dates selected are:

1. May 2 and 3, 1986—Senate Finance Committee Chairman Packwood introduces a reform measure that offers rates of 15 and 27 percent and the first mention of repeal of the capital gain preference since November 1984 Treasury proposals. The administration and some committee members do not approve of the capital gain repeal;
2. May 7 and 8—Packwood gets approval from the committee for his earlier proposal, including repeal of the capital gain preference;
3. May 29 and 30—Packwood announces that he intends to stand firm on capital gains repeal, and 31 Senators support a no amendment proposal. Senator Cranston attempts to gather support for retention of the capital gain preference; and
4. June 24 and 25—the Senate, by a 97-3 vote, passes a bill that eliminated the capital gain preference.
Methodology

The hypotheses are tested by forming an equally-weighted portfolio of sample firms and estimating the abnormal return of the portfolio during the $k$th event's announcement period. The abnormal return is estimated over 206 trading days ending October 23, 1986, using the following return generating process.

$$\tilde{r}_t = a_0 + b_0 \tilde{r}_{mt} + \sum Z_k D_{kt} + \epsilon_t$$

where

- $\tilde{r}_t$ = Return on an equally-weighted portfolio of common stock on day $t$.
- $\tilde{r}_{mt}$ = Return on the CRSP value-weighted index on day $t$.
- $D_{kt}$ = one for the announcement period of the $k$th event concerning the repeal of the capital gain preference, and zero otherwise.
- $\epsilon_t$ = Residuals for the portfolio on day $t$.
- $a_0$ = Estimated average intercept.
- $b_0$ = Estimated average beta for contemporaneous market variable.
- $Z_{kt}$ = Estimated abnormal portfolio return during event $k$.
- $t$ = 1, 2, . . . 206 days.
- $k$ = 1, 2, 3, and 4.

The advantage of forming a portfolio is that tests of the average market reaction are sensitive to both contemporaneous cross-dependencies in the error term and cross-sectional heteroscedasticity in those error terms.

II. RESULTS

Results of the test of a nonzero effect (on average) on the stockholders of sample firms around each event are reported in Table 3. Column three of this table shows the average abnormal returns for each event estimated from an equally-weighted portfolio of sample firms. Event 4 has the most negative parameter estimate, with an average abnormal return of $-0.53$ percent. The $t$-statistic reflecting the significance of the average abnormal returns is significant at the $\alpha = 0.05$ level. This event date is when the Senate defeated a proposal to retain a capital gain preference, and likely signalled that the final tax bill will not contain a capital gain preference. Consistent with Hypothesis 1, sample firms experience negative returns on this event. To test for the
sensitivity of results to the predominance of 1983 IPOs, weighted portfolio regression is repeated using IPOs for 1984 and 1985 only, with no significant differences in the results.

None of the other three events approach significance at the $\alpha = 0.10$ level, suggesting there is no evidence of significant changes in expectations for the sample of venture-backed firms. At the time of the other events, there is still some uncertainty of the status of capital gain repeal, and a Senate amendment has been offered to retain the preference.

Thus, the absence of significance for three of the four dates may not be surprising given the disapproval that initially greeted the Packwood proposals. The market apparently adjusted only when the repeal of the capital gain preference was certain. To strengthen the link between the Event 4 results and the future financing needs of the sample firms, we conducted an additional analysis by firm capital structure.

Table 4 presents summary statistics of the abnormal returns of individual firms for Event 4. The median debt-to-asset ratio obtained from the financial statements immediately preceding January 1, 1986, is used to classify firms into high versus low debt groups. The mean abnormal returns reported in Table 2 indicate systematic differences in the abnormal returns of high and low debt firms. The $F$-statistic used to test the significance of the difference between the portfolio returns of the high and low debt firms indicates that high debt firms have significantly lower abnormal returns than low debt firms, each calculated for Event 4. The Wilcoxon signed-rank test also indicates significant negative returns for the high debt firms around Event 4.$^6$

<table>
<thead>
<tr>
<th>Event</th>
<th>Number of Trading Days</th>
<th>Parameter Estimate</th>
<th>t-Statistic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0.14</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>0.12</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>-0.11</td>
<td>-0.45</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>-0.53</td>
<td>-2.07**</td>
<td></td>
</tr>
</tbody>
</table>

Notes: $^a$Event 1 is May 2/3, 1986. Event 2 is May 7/8, event 3 is May 29/30, and event 4 is June 24/25. $^{**}$Significant at the .05 level using a two-tailed test.
### Table 4
Summary Statistics of Individual Abnormal Returns (in percent) by Firm Type for Event 4

<table>
<thead>
<tr>
<th>Firm Type</th>
<th>N</th>
<th>Mean</th>
<th>0.25</th>
<th>0.50</th>
<th>0.75</th>
<th>Percent Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Debt</td>
<td>90</td>
<td>-0.84</td>
<td>-2.32</td>
<td>-0.72</td>
<td>0.18</td>
<td>70***</td>
</tr>
<tr>
<td>Low Debt</td>
<td>91</td>
<td>-0.21</td>
<td>-1.40</td>
<td>-0.27</td>
<td>0.77</td>
<td>56</td>
</tr>
</tbody>
</table>

Notes:  
*a* Firm type is based upon the median debt-to-asset ratio in the financial statements immediately preceding January 1, 1986.  
*b* Mean abnormal return for event 4.  
***Significant at the 0.01 level using one-tailed Wilcoxon signed-rank test.

## III. CONCLUSIONS AND POLICY IMPLICATIONS

In this study, we found evidence that venture-backed firms experienced negative abnormal returns when the Senate voted to approve a bill repealing preferential treatment for net capital gains. Venture-backed firms were expected to be particularly sensitive to changes in the taxation of capital gains, because they relied heavily on entrepreneurial risk-taking. In addition to finding evidence of an adverse effect for the entire sample of venture-backed firms, we found firms with a relatively high ratio of debt to assets to be the most adversely affected. This was consistent with the greater need for future sources of equity financing for such highly levered firms. The results of this study supported the view that investment in particularly risky ventures was sensitive to the taxation of capital gains. Sample firms were selected because they were expected to be particularly sensitive to the taxation of capital gains. Thus, the results may not be generalizable to other forms of risky investment. Future research could evaluate the effects of preferential tax treatment on the returns of other assets.

## ACKNOWLEDGMENT

Professor Hamill acknowledges financial assistance received from the Price Waterhouse Foundation.
NOTES

1. The exact effect on the progressivity of the system is an empirical issue. See Keifer (1986) for an estimate of the effects of the Senate Finance Committee bill.

2. Absolute risk aversion is measured as $R_a(Y) = U''(Y) / U'(Y)$, where $a = \text{the amount invested in the risky asset and } Y = \text{the final wealth position}$. Increasing absolute risk aversion means that as wealth increases, the amount invested in the risky asset decreases (i.e., risk aversion increases with wealth increases). Relative risk aversion is measured as $R_r(Y) = -U''(Y)Y / U'(Y)$, where $r = \text{return on the risk-free asset}$. Increasing relative risk aversion means that as wealth increases, the proportion of wealth held in the risky asset decreases.

3. The difficulty in securing financing from organized venture financiers suggests a strong demand for other sources of financing. Even if a majority of organized funds are comprised of tax-exempt investors, taxable investors are expected to be a significant source of funds for projects not approved by the organized funds.

4. For example, the firm can issue interest-bearing convertible debentures that provide an income stream to the capital provider with the opportunity to later acquire an equity interest in the firm. Alternatively, venture capitalists might fund firms that are capable of producing sufficient current cash flow to pay dividends on the preferred stock. Scholes, Wilson, and Wolfson (1990) and Collins and Shackelford (1991) provide evidence of capital structure responses to tax law changes.

5. Scholes and Wolfson (1992) note that there was considerable doubt in early 1986 regarding the fate of specific provisions of TRA. Similarly, Tax Notes (1986) reported that the status of compromise legislation was "fragile" unless Senate Finance Committee Chairman Packwood and House Ways and Means Committee Chairman Rostenkowski could agree how to raise corporate taxes to ensure revenue neutrality in the compromise plan. This suggested more narrow "event windows" than would be typical for a tax act, and assisted in mitigating the effects of non-tax variables in interpreting research results.

6. Once again, no differences were found when the sample was limited to 1984 and 1985 IPO firms.

REFERENCES


