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Reverse LBO Underpricing: Information Asymmetry Or Price Support?

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Abstract

Most studies attribute the underpricing of initial public offerings of equity securities to the ex ante uncertainty resulting from the information differential between the firm going public and the market. Ruud (1991,1993), however, proposes that underpricing could result from underwriter price support in the early after-market. In this paper we examine firms that were once public, went private via leveraged buyout and then went public again. It is reasonable to expect that since these reverse LBOs (RLBOs) were once publicly traded, they should have less of an information differential with the market than firms going public for the first time. Our tests indicate that there is little or no information asymmetry between RLBOs and the market. We find that RLBO initial returns are more consistent with price support than with information asymmetry.

1. Introduction

Considerable evidence exists that initial public offerings of equity (IPOs) are underpriced(1). Until recently most studies attributed the underpricing of IPOs to the ex-ante uncertainty resulting from differential information between either issuers and underwriters or between classes of investors(2). Ruud (1991,1993), however, proposes that underpricing of IPOs could exist because of underwriter price support in the after-market. According to Ruud, the presence of underwriter support could censor the negative tail of the returns distribution in the early after-market period resulting in a positively skewed leptokurtic distribution during that period. The gradual removal of price support then permits the distribution to return to its expected symmetric shape.

Comments and Questions concerning this article should be sent directly to the authors.

In this paper we investigate whether the underpricing of reverse LBOs (RLBOs) is due to differential information, price support, or a combination of both factors. Reverse LBOs are firms that were once publicly held, went private via a leveraged buyout, and were then taken public again. It is reasonable to expect that these RLBOs, given the fact that they were once publicly traded, have a lower degree of information asymmetry than firms that go public for the first time. In an early study of RLBOs or "second" IPOs (SIPOs), Muscarella and Vetsuypens (1989a) conclude that SIPOs are underpriced but, because their degree of information asymmetry is less than that of IPOs, their underpricing is also commensurately less. Whereas Muscarella and Vetsuypens' findings are consistent with a lower degree of information asymmetry for RLBOs, they do not explicitly test for the presence of information asymmetry or for the possibility that

RLBO underpricing could be driven by a competing theory. Our findings in this paper support those of Muscarella and Vetsuypens that RLBOs are significantly less underpriced than IPOs. However, with regard to the reason for RLBO underpricing, our results are more consistent with the arguments of price support by underwriters than those of information asymmetry.

We find that variables that proxy for information asymmetry and have been successful in explaining IPO underpricing have virtually no explanatory power in the case of RLBOs. On the other hand, we find considerable statistical evidence that underwriters intervene in the early after-market to support RLBO prices. The remainder of the paper is organized as follows: In section II we briefly review extant theories of IPO underpricing. Section III contains a description of the data and the empirical results, and section IV concludes.

2. Theories of Underpricing

With the exception of Ruud (1991,1993), theories advanced to explain the underpricing phenomenon are predominantly based on asymmetric information. Baron (1982), proposes that underwriters' information about the new issue market is superior to that of issuing firms. Consequently, and under the assumption that issuers are unable to monitor their efforts, the underwriters have an incentive to underprice in order to minimize their risk in selling the entire amount committed to outside investors. Beatty and Ritter (1986) show, however, that underpricing caused by the investment banker's superior information is temporary at best since a consistent policy of significant underpricing could result in loss of the issuer's business to competitors.

In a theory of adverse selection, Rock (1986) suggests that the abnormal return from underpricing is the compensation required by uninformed investors to prevent them from leaving the market. In Rock's model there are two groups of investors - the informed and the uninformed. The informed subscribe to only 'good' issues whereas the uninformed subscribe randomly. Thus, on average, the uninformed investors suffer from the winner's curse and, absent some form of compensation, will exit the market. If informed investors are unable to exhaust the supply of issues, uninformed investors are needed in the market and underpricing becomes the incentive for them to remain. Beatty and Ritter (1986), Johnson and Miller (1988) and Muscarella and Vetsuypens (1989b) all find support for the adverse selection hypothesis.

Tinic (1988) proposes that, if underwriters and issuers face a potential legal liability from investors believing they have been misled into a nonprofitable endeavor, they may underprice in order to have a 'buffer' against litigation.

A new line of arguments in the underpricing literature (Welch 1988, Allen and Faulhaber 1989, and Grinblatt and Hwang 1989) suggests that underpricing is employed by issuers as a signal of market potential. According to these theories, underpricing is a cost borne by issuers to entice potential investors to collect information on the firm and establish its true value in the secondary market. A high quality firm will, consequently, underprice more because once its true value is established, it can "cash in" by obtaining a higher price for subsequent offerings. The initial cost of underpricing is thus offset by the benefits of future offerings.

In a distinct departure from the theories of asymmetric information that advocate a deliberate decision to underprice, Ruud (1991,1993) advances the view that initial high IPO returns stem from underwriter price support in the IPO market. Such support may be achieved by the underwriter placing a standing purchase order at or slightly below the offer price. Price support effectively limits the number of negative returns and censors the negative tail of the initial returns distribution, possibly producing positive mean initial returns even if offering prices are set at the true expected market value. The Securities Act of 1934 permits underwriters to legally intervene in order to support IPO prices, ostensibly to stabilize the price and minimize underwriter losses from temporary price pressure during the selling period(3). That stabilization by underwriters is not an uncommon phenomenon is documented by Hess and Frost (1982). Ruud (1993) reports that 57 percent of the seasoned equity offerings in the Hess and Frost data sample (274 issues between January 1, 1975 and March 1, 1977) were stabilized.

3. Data and Results

In this section we first examine the evidence in favor of the price support theory for RLBO underpricing. We then test for the presence of information asymmetry in order to determine whether RLBO underpricing is attributable to a combination of both factors.

The sample consists of 120 RLBOs that went public from 1984 through 1990. Data on the firms, the offer price, offer date and offer size were obtained from the Security Data Company, Inc., New York. The names of the underwriters were taken from the Directory of Corporate Financing. Returns data were obtained from the 1990 CRSP tapes for NYSE/AMEX as well as NASDAQ firms. Decriptive sample statistics are presented in Table 1.

A. Statistical evidence of price support

As in Ruud (1993), returns are measured $\log(P_t/P_0)$ where P_t is the market price at time t and P_0 is the offering price. The distributions of cross-sectional returns for one day, five days, ten days, fifteen days, twenty days and twenty-five days are plotted in Figures 1 through 6. Descriptive statistics for these distributions are presented in Table 1. From Figure 1 it may be seen that the one day distribution is not only peaked but also skewed to the right. The skewness and peakedness diminishes with time and, by day twenty-five, the returns distribution appears much more symmetric. To reinforce these observations, in Table 2, the null hypothesis that the log returns are drawn from a normal distribution is rejected by the Kolmogorov-Smirnov test(4,5) at the one percent level for the one-day, five-day, and ten day distributions and at the five percent level for the fifteen day distribution. Normality cannot be rejected at the five percent level for the twenty and twenty-five day distributions. These results, together with Figures 1 through 6, suggest that the early returns distributions are left censored but become symmetric with time. Also, in Table 2 the mean of the returns distribution declines with time and the difference between mean and

Table 1.

A: Frequency distribution of RLBOs between 1984 and 1990

Year	Number of Offerings
1984	2
1985	15
1986	39
1987	36
1988	6
1989	10
1990	12
Total	120

B: Selected descriptive statistics

	Mean	Median	Minimum	Maximum	Std. Dev.
Offer Price($)	12.29	11.88	1.67	25.00	4.26
Offer Size(MM$)	43.82	29.98	5.88	250.00	45.19

FIGURE 1 - Day 1 Returns (%)

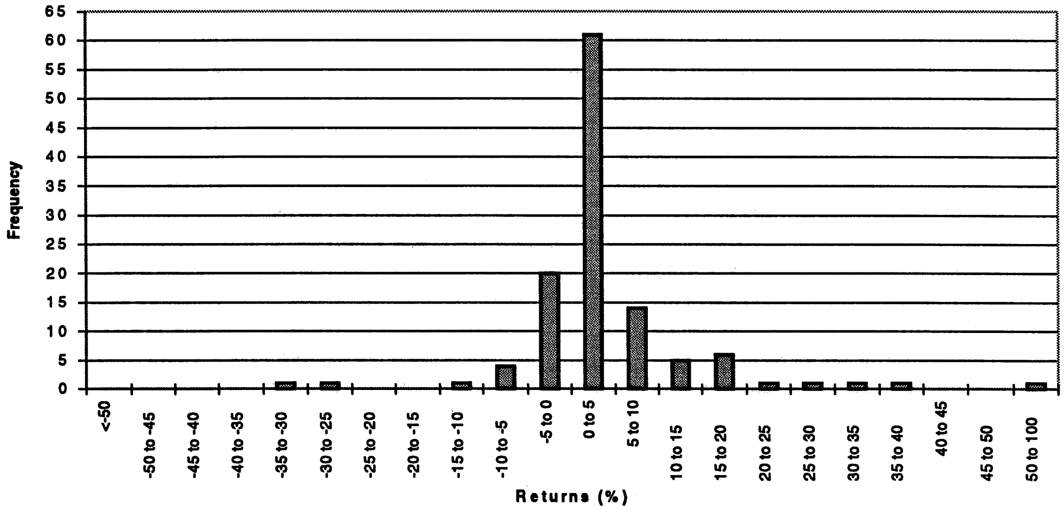

FIGURE 2 - Day 5 Returns (%)

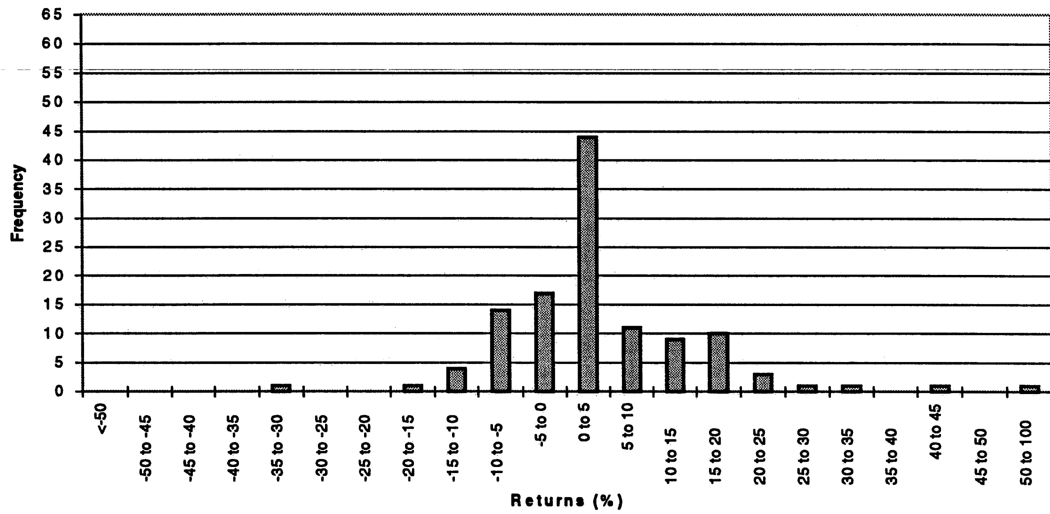

FIGURE 3 - Day 10 Returns (%)

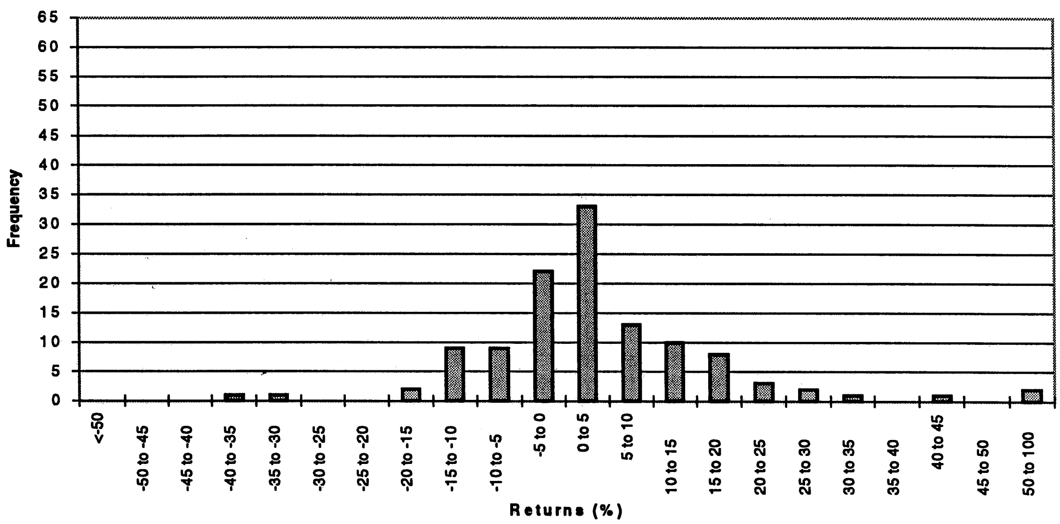

FIGURE 4 - Day 15 Returns (%)

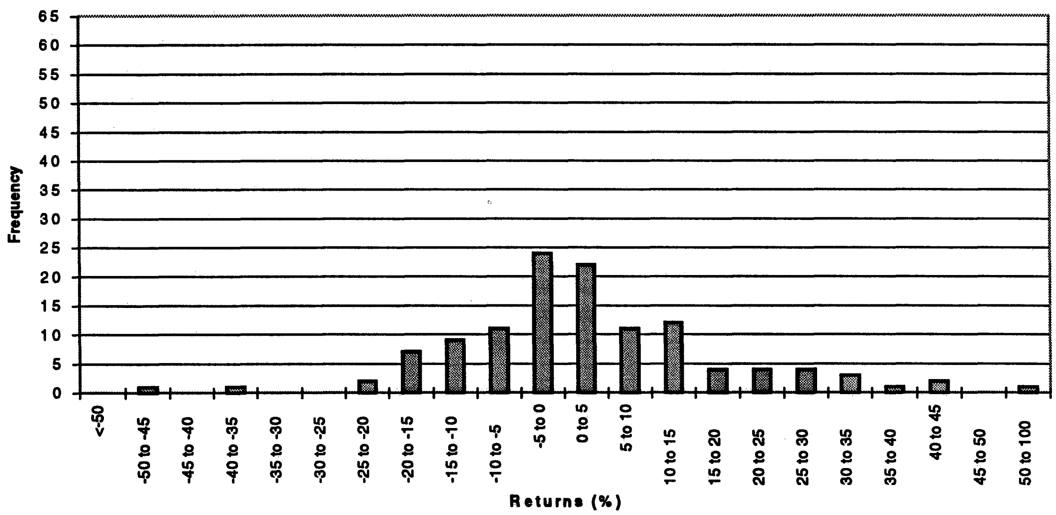

FIGURE 5 - Day 20 Returns (%)

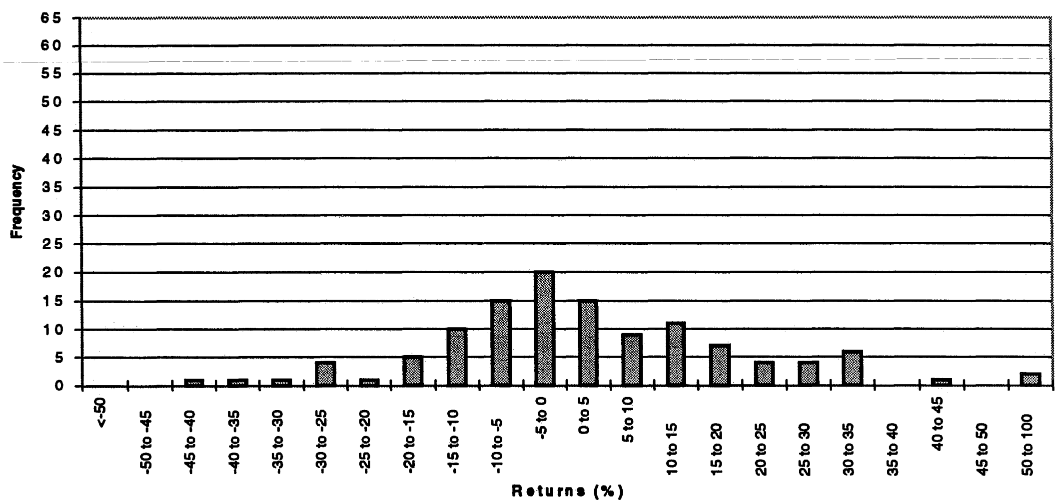

FIGURE 6 - Day 25 Returns (%)

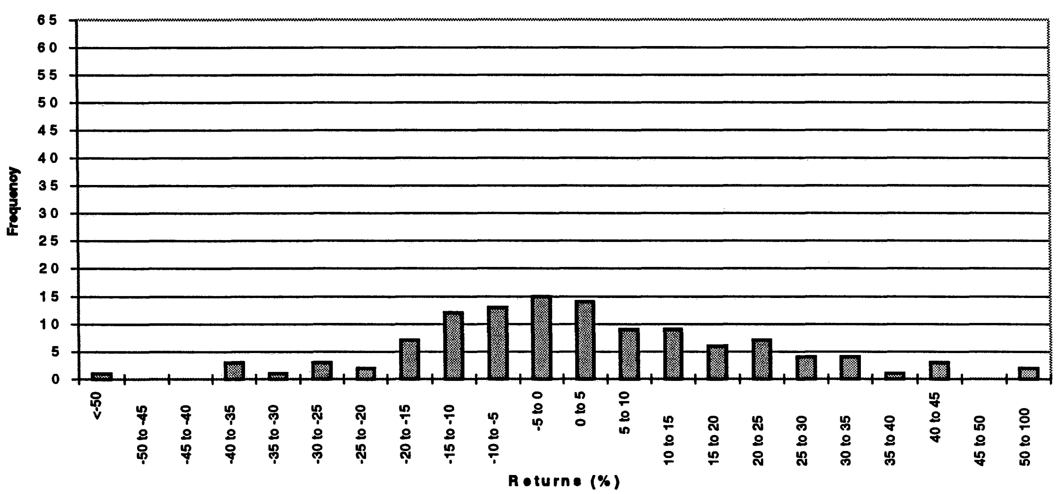

Table 2.

Distribution of Log Returns: $R_t = \log(P_t/P_0)$
N = 120

	Day 1	Day 5	Day 10	Day 15	Day 20	Day 25
Mean	0.0398	0.0386	0.0345	0.0301	0.0267	0.0203
Median	0.0115	0.0172	0.0118	0.0086	0	0
Minimum	-0.3011	-0.3011	-0.3638	-0.4700	-0.4655	-0.7397
Maximum	0.7419	0.7178	0.7178	0.7178	0.7178	0.6931
Std. Dev.	0.1062	0.1184	0.1398	0.1591	0.1759	0.2033
Skewness	2.7332	1.9487	1.4884	0.7788	0.6508	0.0869
Kurtosis	20.9210	12.5413	9.3165	6.3412	4.7915	4.1910
Normality	***	***	***	**	CR	CR

*** Normality rejected at a = 1%
** Normality rejected at a = 5%
CR Unable to reject normality at a = 5%

median diminishes, consistent with the returns distribution becoming more symmetric. Moreover, the skewness approaches zero with time, indicating the return of symmetry. Further, in keeping with the gradual removal of price support, the range of the negative tail of the distribution moves from -0.30 on day one to -0.74 on day twenty-five, whereas the positive tail, since there is no upside intervention, hardly moves at all (0.742 on day one to 0.693 on day twenty-five). Since initial price support truncates the negative tail of the returns distribution, excessive peakedness, or leptokurtosis, can be expected around zero. Once again in Table 2 the decline in kurtosis with time suggests the gradual removal of price support.

It is arguable that multi-day returns converge to a normal distribution due to the central limit theorem and independently of any other effects such as the removal of price support. This warrants a comparison of one-day returns measured as $\log(P_t/P_{t-1})$ at various points following the RLBO. These results are in Table 3. The evidence is consistent with the gradual removal of price support. By day five the one-day returns distribution has a median of zero and a mean that fluctuates randomly about zero as does the skewness, suggesting the return to symmetry. The one-day distributions are highly leptokurtic, but this is consistent with empirical findings on the distribution of returns (see Fama 1965).

Table 3.

Distribution of Log Returns: $R_t = \log(P_t/P_{t-1})$
N = 120

	Day 1	Day 5	Day 10	Day 15	Day 20	Day 25
Mean	0.0398	-0.0024	0.0023	-0.0041	0.0027	0.0007
Median	0.0115	0	0	0	0	0
Minimum	-0.3011	-0.1044	-0.0770	-0.1092	-0.1018	-0.0592
Maximum	0.7419	0.0909	0.1011	0.0749	0.1088	0.0671
Std. Dev.	0.1062	0.0265	0.0261	0.0267	0.0323	0.0209
Skewness	2.7332	-0.2349	0.7828	-0.1369	0.3512	0.0417
Kurtosis	20.9210	6.1915	6.6575	5.4617	4.8801	4.6172
Normality	***	***	***	***	***	**

*** Normality rejected at a = 1%
** Normality rejected at a = 5%

Further evidence of price support is obtained by examining offerings with zero initial returns that subsequently become negative. In our sample there are 23 firms that have initial one day returns of zero (see Table 5). Of these, 2 firms (8.7%) have negative returns on day two, 7 (30%) have negative returns, on day three, 10 (43%) have negative returns by day five and 11 (48%) have negative returns by day ten following the RLBO. These findings are consistent with the gradual removal of underwriter price support.

B. Tobit analysis

If underwriter price support censors the negative tail of the initial returns distribution, then returns in the negative tail will not be observed and, concomitantly, the observed mean is not the true mean of the distribution. The class of econometric models used to estimate the parameters of censored data are known as tobit models(6). Conditional on information that the sample is censored, the tobit model uses maximum likelihood to estimate the sample mean. Under the assumption that underwriter support censors the returns sample's one-day return at zero, the true mean may estimated using the following model:

$$R_i^* = m + e_i \qquad (1)$$

where $e_i \sim N(0,s^2)$

and $R_i = R_i^*$ if $R_i^* > 0$, $R_i = 0$ if $R_i^* <= 0$

where R_i is the observed return, R_i^* is the true (unobservable if $<= 0$) return, m is the true mean to be estimated with observed data, and e_i is the random error. Results of the tobit analysis are in Table 4. For purposes of comparison, arithmetic results are included with the tobit results. The tobit mean one-day return is -0.0163 but this is not significantly different from zero. In comparison, the arithmetic mean is 0.0398 and significantly different from zero at the 1% level. These results suggest that RLBOs may not actually be underpriced but that the observed underpricing may be due to a left-censored returns distribution caused by underwriter price support.

C. Tests for information asymmetry

In order to compare our results with those of Muscarella and Vetsuypens (1989a), we tabulate average daily raw returns (measured as $(P_t - P_0)/P_0$) for the twenty trading days following the offer date in Table 5. These are consistent with those found by Muscarella and Vetsuypens (1989a) in that they are considerably less than those for IPOs(7,8), which supports the hypothesis that the ex ante uncertainty due to information asymmetry is less for RLBOs than for IPOs. To determine the extent to which the underpricing of RLBOs is attributable to information asymmetry, we estimate the regression:

$$UNPR_i = a_0 + a_1LSIZE_i + a_2SD20_i + a_3RPT_i + a_4NSIC_i + e_i$$

Table 4.

Tobit and arithmetic mean estimates for one-day returns of RLBOs
N = 120

	Tobit mean	Arithmetic mean
Mean	- 0.0163	0.0398
Std. Error	0.0166	0.0098
t-Statistic	0.9800	4.0700***

*** Significant at a = 1%

where ($UNPR_i$) is the log of the first day's return for the RLBOs in the sample. The explanatory variables proxy for the degree of information asymmetry and control for the underwriter certification effect. The motivation for these variables is discussed below.

LSIZE: The log of the offering size. Previous studies(9) have shown that offer size, which proxies for uncertainty and the degree of information asymmetry, is negatively related to the initial return, despite there being no clear theoretical explanation for this finding.

SD20: The standard deviation of twenty-day after-market returns. Ritter (1984) uses this variable to proxy for ex ante uncertainty about an issue, as do Barry et al (1990) and Johnson and Miller (1988). They find a positive relation between underpricing and after-market volatility, consistent with the information asymmetry theories of underpricing.

RPT: Underwriter reputation. Following Carter and Manaster (1990), we rank underwriters on a scale from 0 to 9 with the highest-prestige underwriters at 9 and the lowest at 0. Under the certification hypothesis, prestigious underwriters have more to lose in reputational capital if they misprice and, consequently, issues underwritten by them should more accurately reflect true value. Thus, the more prestigious the underwriter, the less should be the underpricing.

NSIC: Number of firms with the same four-digit SIC code as the RLBO. Kale (1992) conjectures that the degree of informational asymmetry will be negatively correlated with the degree of competition in the market for the issue. He argues that if there are many firms already in the same industry, the industry will have been intensively investigated by the market and, consequently, any informational advantage possessed by insiders with regard to the future prospects of the firm is likely to be less significant. Therefore the degree of underpricing would be lower for firms with more competition.

The results of these regressions(10)are in Table 6. We find that very little of the variation in initial returns is explained by the explanatory variables, individually or together. The only explanatory variable with marginal significance is the underwriter reputation dummy, RPT, which controls for the certification effect. The coefficient has the hypothesized negative sign and implies that more prestigious underwriters are associated with less underpriced RLBOs. This result is consistent with Carter and Manaster (1990). The size and volatility variables which have been consistently significant in IPO studies(11) appear to have no explanatory power. The competition variable, NSIC, fares no better than size and volatility in explaining the variation in initial underpricing. These results indicate that, unlike IPOs, RLBOs have little or no ex ante uncertainty caused by information asymmetry when they go to the market. To the extent the information differential between the firm and the market in the case of RLBOs is so low, our results support the assertion of Muscarella and Vetsuypens (1989a) that RLBOs have less information asymmetry than IPOs. However, in the absence of information asymmetry for RLBOs and in light of our earlier results in favor of price support, we conclude that the underpricing of these firms is consistent with the hypothesis of underwriter price support.

4. Conclusion

In this paper we examine a sample of 120 firms that were publicly traded, were taken private in leveraged buyouts and then went public again (RLBOs). Underpricing when these firms go public for the second time could be the result of information asymmetry between the firm and the market or due to underwriter price support in the after-market. Our results indicate that there is very little information asymmetry between the firm and the market in the case of RLBOs, and are consistent with the hypothesis that initial positive RLBO returns are due to underwriter price support.

Implications For Future Research

Reverse leveraged buyouts are entities

Table 5.

Mean Daily Raw Returns for the First Twenty Days following RLBO Offerings

Day	Daily Return	t-stat.	Cumulative Return	Positive: Zero: Negative
1	0.0428	3.51***	0.0428	68:23:29
2	0.0030	0.91	0.0458	45:28:47
3	0.0017	0.74	0.0475	41:36:43
4	0.0013	0.59	0.0488	39:41:40
5	-0.0032	-1.28	0.0456	36:31:53
6	-0.0007	-0.44	0.0449	38:42:40
7	-0.0035	-1.35	0.0414	33:39:48
8	-0.0018	-0.75	0.0396	36:39:45
9	-0.0008	-0.33	0.0388	35:45:40
10	0.0025	1.04	0.0413	45:35:40
11	0.0022	1.22	0.0435	39:40:41
12	-0.0005	-0.15	0.0430	42:31:47
13	-0.0041	-1.78	0.0389	35:34:51
14	0.0022	1.05	0.0411	40:37:43
15	-0.0042	-1.75	0.0369	31:38:51
16	-0.0023	-1.01	0.0346	33:34:53
17	-0.0029	-1.53	0.0317	33:41:46
18	0.0018	0.75	0.0335	36:36:49
19	-0.0029	-0.85	0.0306	38:30:52
20	0.0028	0.93	0.0334	39:37:44

*** Significant at a = 1%

Table 6.

Regression Results
N = 120

Model: $UNPR_i = a_0 + a_1 LSIZE_i + a_2 SD20_i + a_3 RPT_i + a_4 NSIC_i + e_i$

a_0	a_1	a_2	a_3	a_4	R^2	F
0.0319 (0.18)	0.0003 (0.03)				0.001	0.001
0.0291 (1.21)		0.3107 (0.35)			0.001	0.122
0.1117 (2.37)			-0.0107* (-1.66)		0.024	2.75*
0.0432 (3.63)				-0.0002 (-1.00)	0.001	1.01
-0.079 (-0.4)	0.0129 (1.03)	0.0492 (0.05)	-0.0144* (-1.85)	-0.0002 (-0.81)	0.040	1.13

$UNPR_i$ = Day 1 Log Return for Firm i
$LSIZE_i$ = Log of Offering Size for Firm i
$SD20_i$ = Standard Deviation of 20-day returns for firm i
RPT_i = Underwriter Reputation (0=lowest, 9=highest)
$NSIC_i$ = Number of firms in the same industry as the issuing firm
* Significant at 10%.

that have received little scrutiny in the finance literature. Even the theoretical arguments that are applied to RLBOs come mainly from the literature on Initial Public Offerings. While these theories are, to some extent, applicable to RLBOs, other than intuitive reasoning there is no explicit theoretical basis, for example, why information asymmetry should be less for RLBOs than for IPOs. At the empirical level, while some work has been done, it would no doubt help clarify matters if a larger sample or a longer time frame could be examined.

Endnotes

1. See, for example, Smith (1986), Carter and Manaster (1990) and Ritter (1984).
2. See Baron (1982), Rock (1986), Beatty and Ritter (1986), Tinic (1988), Welch (1988), Allen and Faulhaber (1989) and Grinblatt and Hwang (1989). These are discussed briefly in the next section.
3. This paragraph draws heavily from Ruud (1993) where the regulatory and legal aspects of the 1934 Securities Act as well as the mechanics of price support are discussed at length.
4. Similar results were also obtained by the parametric skewness-kurtosis test.
5. The intent is not to demonstrate that the returns distribution is normal, but rather that it is symmetric.
6. See Maddala (1983).
7. For the sample in this study, the first day's mean daily return is 4.28%, compared to 2.04% found by Muscarella and Vetsuypens. The difference could be due to the fact that their sample runs from 1983 through July 1987, while ours runs from 1984 through 1990. Even in the overlapping period 1984-1987, the number of RLBOs in their sample is not the same as that in ours.
8. Ritter (1984) finds a mean one-day return of 48.4% during the "hot issue" market of 1980, and a mean one-day return of 16.3% during the remainder of the 1977-82 period. Ruud (1993) finds a more modest 6.38% return during the 1982-83 period. For the 1978-87 period and using a larger sample, Barry et al (1990) find a 7.47% mean return for 1120 non-venture-capital-backed IPOs, and 8.43% mean return for 430 venture-capital-backed IPOs.
9. See Ritter (1984), Chalk and Peavy (1990).
10. We also estimated these regressions using the raw one-day return as the dependent variable. The results were similar to those in Table 5 and are not reported here.
11. For example, Barry et al (1990), Johnson and Miller (1988).

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