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ACCOUNTING BETAS – AN EX ANTI PROXY FOR RISK WITHIN THE IPO MARKET

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Abstract

Several studies in the past established an association between market and accounting betas. Most of the previous studies are performed using a sample of large established firms for which both accounting and market betas can be computed. In our study, market betas cannot be computed due to the data limitations associated with private firms. Thus, a direct measure of the association between the two betas is impossible. However by relying on the relationship that exists between market betas and the underpricing of the IPOs, we are able to establish the linkage between market and accounting betas. Through this linkage, our results confirm that accounting betas are associated with market betas within the IPO market. Therefore, accounting betas can be used as an ex anti measure for the riskiness of firms entering into the IPO market.

INTRODUCTION

There is an ongoing analysis of the association between market and accounting betas as measures of risk. In 1969, Ball and Brown produced one of the earliest research papers examining the degree of association between market and accounting measures of risk is similar to later studies in that it focuses on large established firms. Ball and Brown (1969), evaluating the ability of accounting numbers to convey information about the risk of the firm to market participants, concluded that 35 to 40 percent of the cross-sectional variability in systematic risk can be explained by the co-movement in the accounting income of firms. Since Ball and Brown's study, researchers continue to validate this linkage. Even though the subsequent studies differ with regard to the degree of association between accounting and market betas, they all agree that such an association does exists.

In a research report justifying the use of accounting betas as proxies for market betas when market data is unattainable, Kulkarni, Powers, and Shanon (1991) establish a technique for establishing a linkage of accounting betas and the divisional hurdle rate of a multi-product firm. This linkage lays the foundation for our analysis within the IPO market. Therefore as a continuation of this line of research, we undertake this study to answer the following question: Can market (systematic) risk within the field of initial public offerings (IPOs) be proxied with accounting data that reflects only the historical performance of the firm?

To the best of our knowledge, this study is the first to examine whether the accounting beta is useful for assessing the risk of firms going public for the first time (i.e., when evaluating initial public offerings). One of the shortcomings of this line of IPO research is that we cannot compute a market beta for privately held firms.[1] Therefore, it is impossible to directly test the association between market and accounting beta for the privately held firms within our analysis. However, we do test whether the accounting beta conveys any ex anti information about the risk of the privately held firm to investors within the IPO market and find that an association does in fact exist.

Our study documents this statistically significant association between accounting betas and the underpricing of IPOs implying that there is an association between market and accounting betas for the privately held firms. Extrapolating on this linkage, we offer support that accounting betas can be considered a good proxy for the systematic risk of firms involved in the IPO process. Therefore, this study is very important for several reasons. As mentioned previously, it is the first paper to our knowledge that employs accounting betas to assess the risk of firms undergoing initial public offerings (IPOs). Second, the number of firms in our sample is quite high compared with

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the data bases used in prior studies. And third, different market indices are used to generate accounting betas where some of the previous studies used only the accounting return of their sample as a proxy for the market index.[2]

The literature review presented in the next section provides an overview of the results of previous studies that examine the association between market and accounting betas as well as a brief discussion of the controversy surrounding using beta as a measure of risk. In addition to providing a linkage to prior research, an overview of IPOs underpricing and its relation with systematic risk is documented. Section II outlines our selection criteria and an overview of the data. This is followed in Section III with a synopsis of the methodology and Section IV that profiles our results. Finally, Section V presents the conclusion to our paper.

LITERATURE REVIEW

Researchers on the association between market and accounting betas differ with regard to the degree of association between the two betas, but they all agree that such an association does exist. We attribute this variability to one or more of the following factors: a) differences in the definition of accounting earnings used; b) the differences in the market indices applied as proxies for the true market; and c) the differences in the time horizons analyzed.

Accounting and Market Betas

Since most of the data required for calculating systematic risk is market-related, a stock beta coefficient based on market information is called a market beta in order to differentiate it from an accounting beta which is based entirely on accounting data, primarily financial statements. The conjecture within our analysis is that the accounting beta is a proxy for the market beta when market data is not available as is the case with initial public offerings.

Many of the earlier studies examine the relationship between market betas and several accounting variables including debt to equity ratio, dividends, growth, and accounting beta empirically. For instance, Ball and Brown (1969) evaluate the ability of accounting measures of risk (operating income, net income, and earnings per share) to convey information about the risk of the firm to the market. Applying regression analysis on a sample of 261 firms over the period 1946-66, they conclude that at approximately 35 to 40 percent of the cross-sectional variability in the systematic risk can be explained by the comovement in the accounting income of firms.

Beaver, Kettler, and Scholes (1970), another empirical study, examine whether accounting variables (payout ratio, growth, leverage, liquidity, size, earning variability, and accounting beta) can be viewed as surrogates for the total variability of market return. The Beaver, *et. al* (1970) study, based on a sample of 307 firms for two periods 1947-56 and 1957-65, find that the degree of association between accounting and market betas is 44 and 23 percent within the two periods respectively. The results are greatly increased when analyzed on a portfolio basis (i.e., the association increases to 68 and 46 percent respectively).

Gonedes (1973) examines whether the evidence provided by the studies of Ball and Brown (1969) and Beaver, et al (1970), regarding the correlation between market-based and accounting-based estimates of systematic risk, is valid. Applying regression analysis to a sample of 99 firms randomly chosen from those listed on the New York Stock Exchange, Gonedes finds a statistically significant relationship between market-based and accounting-based estimates of systematic risk but at a much lower level. Gonedes explains the differences to the market deflator of accounting earnings used. The studies of Ball and Brown (1969) and Beaver, et al (1970) use the market value of common equity to deflate accounting earnings versus his usage of the book value of total assets. The prior practice makes accounting betas generated by this technique impure accounting betas.

In order to account for the differences in the results of the studies mentioned above, Beaver and Manegold (1975) examine the degree of association between the market and accounting betas under three different specifications (accounting earnings are divided by the market value of common stock, earnings as a percentage of total assets, and accounting earnings deflated by the book value of common equity). Using a sample of 254 firms whose stocks are traded in the New York Stock Exchange, Beaver and Manegold (1975) point out that at the single security level, only 20 percent of the variation in market beta are explained by the variation in accounting beta. Moreover, the correlation between accounting beta and market beta varies according to the factors used to deflate the accounting return. Accounting betas based on returns calculated by the net income to the market value of the firm exhibit a higher correlation with the market betas than do accounting betas based on net income to total assets or net income to book value of common equity.

Ismail and Kim (1989) examine the association between market and accounting betas using four definitions of income (income available to common equity, income available to common plus depreciation, income available to common plus depreciation and deferred taxes, and cash flows generated from continuous operation) deflated by market value of the common equity. Employing a sample of 272 firms over the period 1967 to 1985, they find a significant relationship between market beta and accounting beta using all four-income definitions. Consistent with prior studies, the association is stronger at the portfolio level than it is at the individual level.

In a later study investigating the relationship between the accounting and market betas that is directly applicable to our study, Kulkarni, Powers, and Shanon (1991) suggest a technique based on accounting beta for calculating a divisional hurdle rate for a division in a multi-product firm. Since market data does not exist for the divisions of a multi-product firm, Kulkarni, et al use the accounting beta for each division to calculate the hurdle rate for that division. To reduce the estimation errors of accounting betas when a limited sample of data is used, they use a portfolio of similar product lines to estimate accounting betas for each division. They conclude that even though the market takes into consideration other variables besides the accounting beta in estimating risk when market data is not available, accounting beta is a good proxy for market beta.

Karels and Sackley (1993) studying the association between market and accounting betas base their study on a sample of 71 U.S. commercial banks using two measures of return to compute accounting beta: return deflated by total assets and return deflated by stockholder equity and various market indices generated from the COMPUSTAT and the Center for Research in Security Prices (CRSP) databanks. They find an association between the accounting beta and market beta ranging from thirty to sixty percent depending on the market index they employ. The results are sensitive to the length of the period used to compute market and accounting betas: the longer the period, the less significant the correlation between the market and accounting betas.

Beta as a Measure of Risk

The concept of beta as a measure of systematic risk is widely used by academics and practitioners. Despite this usage, some researchers cast doubt on beta as the sole risk factor to explain the expected return on securities. For instance, Fama and French (1992, 1996) reduce the importance of beta as the sole measure of risk by advocating a different model that can draw the relation between risk and return based on factors other than beta. The factors of their model are: a) the excess return on the market; b) the return on a portfolio of small stocks minus the return on a portfolio of a large stocks; and c) the return on a portfolio of high-book-to-market stocks minus the return on a portfolio of low-book-to-market stocks. They argue that their model can capture most of the CAPM anomalies.[3] Fama and French assert that their model explains the expected return on stocks with respect to the three factors mentioned above better than the model which is based only on beta.

On the other hand, MacKinlay (1995) and other researchers, argue that the conclusion that additional risk factors are required besides beta to explain the risk-return tradeoff, as in the Fama and French model, is premature. MacKinlay also argues that the Fama and French model cannot explain the deviation from the CAPM. Black (1993) presents harsher criticism of the Fama and French model; he considers the multi-factor model to be a result of "data mining" or fishing. Moreover, the model has no theoretical background base. Black argues that the positive relationship between the expected return and beta still holds. Also, he attributes the slope of the line relating expected return to beta, which might be flatter than that expected by the CAPM, to the borrowing restrictions. These restrictions are caused by the firms themselves because many firms avoid the high leverage which might cause a lower rating from the rating agencies. Despite the controversy surrounding the use of beta as a measure of risk, beta is still the most important factor for quantifying a firm's risk.

Systematic Risk and IPO's Underpricing

In the past two decades, many researchers have presented evidence of underpricing of initial public offerings (IPOs). The annual underpricing, measured by the first day return of the new stocks, on average, exceeds 15 percent. This percentage represents a one day return generated from participating in the IPOs (assuming that investors purchase stocks in every IPO). Several theoretical models have been presented in the literature to explain and justify the underpricing of IPOs. One prominent model is presented by Rock (1986) and its extension by Beatty and Ritter (1986). The theory suggest that the degree of IPOs underpricing is associated with the ex ante uncertainty (risk) of the IPOs after market clearing price.[4] Since the ex ante uncertainty is not observable, proxies for it must be employed. Several variables in the literature are used as proxies for ex ante uncertainty.

One of the variables used as a proxy for ex ante uncertainty is the standard deviation of the IPO's daily return in the after market. Ritter (1984) found a significant relationship between the standard deviation of the IPOs' daily return, which is a total risk measure, and the IPOs' underpricing. The standard deviation of the daily return is an ex post factor, which is available only after the new firms are public. Even though Ritter (1984) used the standard deviation of the daily return of the IPOs as a proxy for ex ante uncertainty, he preferred the use of individual risk over the standard deviation. But the difficulty of computing the individual risk of IPOs, and the high correlation between individual and total measure of risk prompt him to employ the standard deviation of the daily return.

On the other hand, Beaver et al (1970) reported that there is positive correlation between systematic risk and the individual risk components of the firm. For example, firms that have great systematic risk are characterized by a large variance in their individual risk. Clarkson and Thompson (1990) argue that whenever there is little information regarding certain firms, those firms are perceived by investors as being riskier because of the lack of certainty concerning the exact parameters of their return distributions. Clarkson and Thompson examined 198 IPOs from 1976 to 1985 and found that the systematic risk (beta) for their sample decreased in several periods subsequent to the date of offering. The arrival of new information reduces the uncertainty about the newly traded firms and their systematic risk. This shows how the systematic risk is correlated with the uncertainty about firms. Since the individual risk is a good proxy for ex ante uncertainty of the IPOs and that individual risk is correlated with systematic risk, it implies that systematic risk is a good proxy for ex ante uncertainty of the IPOs and thereby would have a positive relationship with underpricing. The larger the systematic risk is of a certain IPO the higher the ex ante uncertainty regarding its market clearing price then the higher the underpricing for that IPO.

If systematic risk is observable, it can be used as a proxy for the ex ante uncertainty. However, we know that firms with no history in the market, such as IPOs, lack some of the parameters needed to calculate systematic risk. Therefore, we should look for an ex ante observable proxy for systematic risk. The systematic risk proxy we employed in this paper is the accounting beta. So in order to show the correlation between accounting and market betas, we need to show that there is positive association between accounting beta and underpricing. Showing that the above underlying relationship between accounting beta and underpricing exists implies that accounting beta is correlated with market beta for the IPOs. Unlike previous studies, which show the degree of association between market and accounting betas, in this study we cannot show the degree of correlation between the two betas because market beta for the private firms cannot be computed. Thus our purpose in this paper is to examine whether or not there is an association between market and accounting betas. It is a joint hypothesis that there is significant relationship between systematic risk and IPOs' initial return, and that the accounting beta is correlated with systematic risk.

DATA

From January 1990 through June 1995, 2708 companies conducted initial public offerings in the United States. The majority of these companies are U.S. based firms, but a small percentage of the total are classified as foreign firms. The sample for this study is drawn from the above population of IPOs based on the following criteria: a) domestic firms only;[5] b) firm commitment contracts;[6] c) first time offerings (Spin-offs, where the parent company allows a subsidiary of the company to be traded separately, are excluded. Thus our study includes only firms, which have never been traded publicly and have never been part of a larger firm.); d) common stock offerings only (Common stocks with warrants attached are excluded.); e) NASDAQ listing at the time of the offering;[7] f) S1 filing SEC registration form;[8] g) a copy of the prospectus must be available; and h) the financial statements for the most recent five years prior to the public offer must be reported in the prospectus. A sample of 701 firms satisfied these criteria.

Summary statistics for these 701 firms are reported in Table 1 including average age of the firms (12.5 years) and variability in firm size. For instance, the coefficient of variation for sales is 0.73 (i.e., mean sales divided by standard deviation of sales = $69,719,000 / $95,901,000). Measures of assets and equity also show a wide variation around the mean. Sources for our data include (i) Prospectuses: Laser/D disk from Disclosure Inc. and the Security and Exchange Commission (SEC), (ii) Identifying IPOs: Going Public: The IPO Reporter, and (iii) Company specific data: Securities Data Company (SDC) New Issues, Disclosure disk/New Issues, and COMPUSTAT database.

TABLE 1
Summary Statistics

	Age at the offer	Sales the year prior to the offer	Total assets in the year prior to the offer	Common equity after the offer
Size	701	701	701	701
Mean	12.5	69719	54544	31724
Std Dev	12.9	95901	108807	28509
Median	8	37589	23707	25500
Skewness	3.98	4.18	6.90	2.67

Note: All factors except age are in 1000's

METHODOLOGY

The accounting beta is computed in a way that is analogous to the computation of the market beta (i.e., historical accounting earnings for each IPO are regressed against the accounting earnings for the market). The model is as follows:

Equation 1

$$R_{it}^{A} = \alpha + \beta_i^{A} R_{mt}^{A} + u_i$$

The coefficient of the above regression, β_i^{A}, is the accounting beta for the i^{th} IPO. Both the accounting returns for the firm (R_{it}^{A}) and the accounting return for the market (R_{mt}^{A}) are proxied by two alternative definitions of income: income before extraordinary items deflated by total assets (i.e., Accounting Return = Income Before Extraordinary Items / Total Assets) and income divided by total assets (i.e., Accounting Return = Net Income / Total Assets).[9] Income before extraordinary items represents the income of the IPO firm after income taxes and minority interest but before common or preferred dividends. Income from discontinued operations and extraordinary items are not included in the first income definition. The second definition of income used (net income) represents the income or loss by a firm after all expenses and losses have been deducted from the revenue. This item accounts for the income and losses from the discontinued operation and from the extraordinary items.[10]

In addition to the two definitions of return, it is necessary to define the market in order to calculate the accounting beta. As previously mentioned within our selection criteria, we limited our sample to include only NASDAQ or NASD OTC firms since our sample consists primarily of small firms making initial public offerings for the first time in their operating history. Because of their small size, it is appropriate to choose NASDAQ or NASD OTC as a proxy for the market since generally NASDAQ includes small and midsize firms that cannot be listed on the New York and American Stock Exchanges. This does not mean that all firms listed in NASDAQ are small or midsize firms. Some large corporations, such as Microsoft and Intel that are eligible to be listed on New York Stock Exchange, chose to remain a NASDAQ listing.

But even the characteristics of the firms listed on the NASDAQ and the OTC are different.[11] The OTC includes firms, which are smaller and more speculative than firms listed on NASDAQ. By using three proxies for the market (the NASDAQ, the OTC, and a combination of the two), it can be determined whether IPOs are strongly related to the OTC, which includes mostly small and very speculative firms, or to the NASDAQ, which includes relatively bigger and less risky firms. Table 2 shows the number of firms listed on the NASDAQ and the OTC over the sample period 1985 through 1994. For example in 1994, the NASDAQ exchange represented 5216 firms, while the NASD OTC market was comprised of only 722 firms.

Both measures of return mentioned earlier are computed as a value-weighted return for each of our three market proxies and are summarized in Table 3. To determine whether the means of the NASDAQ and NASD OTC markets differ, we calculate an unpaired t-test. The p-values show that the means for the two markets are statistically

different at the 5% level of significance under both definitions of income (i.e., 0.001 and 0.005 p-values for return on the market using income before extraordinary items and using net income respectively).

TABLE 2
Number of Firms in Each Market

Year	NASDAQ	OTC	Both Mkts.
1985	2663	960	3623
1986	2824	1091	3915
1987	2860	1181	4041
1988	2865	1240	4105
1989	2875	1280	4155
1990	3064	1199	4263
1991	3339	1074	4413
1992	3831	936	4767
1993	4822	842	5664
1994	5216	722	5938

Note: All data is based on COMPUSTAT. In COMPUSTAT database, NASDAQ is represented by Exchange 3 and OTC is represented by Exchange 10. Both markets are combined to form a third market proxy. The number of firms in this table for each year can differ from that generated from COMPUSTAT database by ten to thirty firms because firms with no available data for the income figure are dropped when the income values for these firms are not available. The inclusion of these firms in the calculation will reduce the return value.

TABLE 3
Return by Market Proxies

Year	Return on Market Using Income Before Extraordinary Items			Return on Market Using Net Income		
	NASDAQ	OTC	Both Mkts.	NASDAQ	OTC	Both Mkts.
1985	.0181	.0088	.0166	.0184	.0082	.0168
1986	.0157	.0014	.0132	.0170	.0008	.0141
1987	.0179	.0056	.0156	.0186	.0076	.0165
1988	.0210	-.003	.0164	.0212	-.003	.0169
1989	.0189	-.023	.0126	.0191	-.027	.0122
1990	.0138	-.013	.0105	.0151	-.018	.0111
1991	.0140	.0101	.0137	.0141	.0109	.0138
1992	.0128	.0057	.0122	.0151	.0175	.0153
1993	.0117	.0092	.0112	.0139	.0090	.0130
1994	.0173	.0139	.0166	.0181	.0160	.0176

Note: The return on the market is computed using the two measures of accounting return by deflating the total income (based on the two definitions of income) of all firms by the total assets of all firms.

One of the key problems with using accounting beta as a proxy for the market beta and thereby systematic risk is that some of the firms undergoing IPOs have relatively short histories of operation and therefore few earning observations are available for the regression analysis. Even when a firm undergoing an IPO has a long history of operations, the firm is not required by the SEC to disclose accounting data for more than the five years prior to the public offering. Therefore, as reported within the selection requirements, we limit our sample to firms with their latest five years of operations summarized within the prospectus.[12]

RESULTS

Accounting betas are calculated for the firms using two measures of return and three market proxies, which results in a total of six combinations. As mentioned earlier, the return for each firm is regressed against the return for the market proxy to calculate the accounting betas. There were a total of 4,206 regressions performed, reflecting all combinations of our specifications (701 firms times 2 measures of return times 3 market proxies).

After computing the accounting betas, we test the association of the accounting betas with the initial returns of the IPOs which are measured as the difference between the offering price and the closing bid price at the end of the offering date. A significant relationship implies that ex anti accounting betas are good proxies for the systematic risk of the represented firm. As mentioned earlier, it is impossible for us to directly measure the degree of association between market and accounting betas because market betas cannot be calculated for private firms.

In order to test whether or not there is a direct relationship between the initial return and the accounting beta, Ordinary Least Square (OLS) regression is utilized. The firm's initial return is the dependent variable and systematic risk represented by accounting beta is the explanatory variable as shown in equation 4.

Equation 2

$$Initial\ Return_i = \alpha_0 + \alpha_1 Acc.Beta_i + u_i$$

where,

$Initial\ Return_i$ = (Closing price at the end of the offering day - Offering price) / Offering price
$Acc.Beta_i$ = accounting beta for the i^{th} IPO

A high (low) accounting beta is a proxy for a high (low) risk firm as perceived by potential investors. Since risk and return are highly correlated, a higher beta should be associated with higher underpricing of the initial public offering and therefore a higher return to the investor as compensation for the risk undertaken. Table 4 summarizes the characteristics of the key variables: the initial return and the accounting beta, where the accounting betas were segmented by both income definitions and market proxies. For instance, the mean return for the sample firms is 12.9 percent and the mean accounting betas are -6.51, 1.28, and -9.18 respectively for the NASDAQ, OTC, and combined markets using income before extraordinary items. Due to the manner in which the accounting betas are calculated (i.e., using the return from an existing small stock index--NASDAQ, OTC, or combined markets--as a proxy for the market to regress against the returns from the individual IPO's returns which typically are excessive compared to the average returns found within the marketplace), the generated values may seem extreme. The key concept is the relative relationship of the accounting betas within the IPO market, not as a comparison to the market beta ($\beta_M = 1$).

The results of all six regressions representing the six accounting betas (from the two definitions of income and the three proxies for the market) support the existence of a positive relationship between underpricing of IPOs and accounting betas. All regressions are statistically significant at the 5% level. But because the presence of heteroscedasticity is expected, any conclusions based on these initial regression results is suspect. Heteroscedasticity is anticipated for three reasons. First, with cross sectional data, heteroscedasticity is generally the rule rather than the exception. Second, heteroscedasticity is an implication of Rock's (1986) model in which higher risk offerings may not only have higher initial return but also have greater variability of the initial returns since there is more uncertainty about the aftermarket price for risky offerings. And finally, most if not all previous studies of IPOs' underpricing, report the existence of heteroscedasticity.

In the presence of heteroscedasticity, the OLS estimator is unbiased but no longer efficient. Nonetheless, the variance of the estimator is biased, and in general, it is hard to tell whether the bias of the real variance is upward or downward. The bias depends on the nature of the relationship between the variance of the error term and the

explanatory variable. Thus, if the relationship between the error term variance and the explanatory variable is positive (negative), the variance of the coefficient or estimator is biased downward (upward). Hence, any test for significance of a result with the presence of heteroscedasticity is misleading. Therefore, we need to correct for the heteroscedasticity in order to be able to draw a meaningful conclusion from our results.

TABLE 4
Summary Statistics for Initial Return and Accounting Betas

	Initial Return	Accounting Betas Using Income Before Extraordinary Items			Accounting Betas Using Net Income		
		NASDAQ	OTC	Both Mkts.	NASDAQ	OTC	Both Mkts.
Size	701	701	701	701	701	701	701
Mean	12.9	-6.51	1.28	-9.18	-4.60	0.89	3.52
Std Dev	18.7	69.1	17.0	83.5	82.5	13.3	95.2
Median	6.96	-1.113	0.189	-1.188	-0.936	0.123	1.114
Skewness	2.17	-0.060	2.756	-0.903	-0.788	1.797	-1.902

Note: Column 2 presents statistics for the initial return for the sample of 701 firms. Statistics in columns 3, 4 and 5 represent three accounting betas based on the specified income in these columns and the three market proxies. The same applies to columns 6, 7 and 8.

In our sample, firms with higher systematic risks (higher accounting betas) not only have greater initial returns than firms with lower risk but they also have considerably higher variability in the initial return among themselves. In order to have an efficient parameter estimate we should account for the dispersion of the initial return among each risk class. The Weighted Least Squares (WLS) assigns less weight for firms characterized by both high risk and great variable initial return. On the other hand, firms characterized by low risk and less variable initial return are assigned higher weight by the WLS.

In this study, we assign weights similar to that used by Beatty and Ritter (1986) and are based on the revenue (*SALE)* of the IPOs for the full year prior to going public. Both sides of the regression equation are multiplied by *ln (SALE+1000)*. We use a scaling factor of 1000 since some firms within our sample have zero sales. We selected *SALE* as a weighting factor because we are assuming firms with high sales are less risky than those with low sales or no sales at all. Therefore, the risky firms that have greater variability of initial return are more likely to have lower sales; thus, they are given less weight than the less risky firms with higher sales' volume. Because our sample spans five and half years, we express *SALE* in terms of 1989 purchasing power.

The new results, after we correct for heteroscedasticity, are presented in Table 5. In Panel A of Table 5, when we measure accounting returns using income before extraordinary items, we find that there is a positive relationship between the accounting beta and the initial return of the IPOs. The three coefficients representing NASDAQ, NASD OTC and both markets combined are all significant at the 10% level or less using a one-tailed test. Since we are not advocating that the accounting betas be used in isolation, their small explanatory power should not be a cause for concern. The accounting beta is just one additional factor to weigh the riskiness of one IPO to another.

Panel B of Table 5 reports the results of the regressions when net income is employed in measuring accounting return. All coefficients are positive for the three market proxies and all are statistically significant at the 5% level. The statistically significant results provide additional support for the existence of a positive relationship between initial return and accounting beta.

TABLE 5
Regression Results After Correcting for Heteroscedasticity Using Accounting Betas as Proxy for Systematic Risk

NO.	Market	Variable	Coefficient	Std.Error	t-Statistic	R^2	Adj. R^2
Panel A. Accounting Beta Using Income Before Extraordinary Items							
1	**NASDAQ**	Acc.Beta	0.017	0.010	1.661	0.0054	0.0026
2	**OTC**	Acc.Beta	0.110	0.044	2.457	0.0100	0.0072
3	**Both Mkts**	Acc.Beta	0.028	0.009	3.037	0.0145	0.0117
Panel B. Accounting Beta Using Net Income							
4	**NASDAQ**	Acc.Beta	0.026	0.009	2.952	0.0138	0.0110
5	**OTC**	Acc.Beta	0.133	0.057	2.340	0.0093	0.0064
6	**Both Mkts.**	Acc.Beta	0.021	0.008	2.550	0.0107	0.0079

Note: In this table we regress the weighted initial return of each firm in our sample with respect to the ln(SALE+1000) = weight, and the firm's weighted accounting beta. Six regressions were performed representing six betas for each firm. Panel A shows the results using accounting beta based on income before extraordinary items for the three market proxies (NASDAQ, OTC and the combination of both markets). Panel B presents the regression results where net income is used to compute accounting betas. All results for the six regression equations are obtained by allowing for the intercept. It is acceptable to perform the above regressions through the origin. It is reported by Kennedy (1990 p.105) that most researchers in these cases, where transforming the data usually create an estimating equation without an intercept term, include the intercept term. This practice does little harm and could be of potential value of preventing the bias that arises when a relevant independent variable is omitted.

CONCLUSION

From the above analysis, it can be concluded that there is a direct relationship between accounting beta and the initial return of the IPOs. This relationship is significant whether we use income before extraordinary items or net income in measuring accounting return. Additionally, the relationship is significant whether it is based on NASDAQ, NASD OTC or both markets combined as proxies for the market. This presence of a significant relationship between our proxy for systematic risk (i.e., the accounting beta) and initial return suggests that there is an association between systematic risk and initial return of the IPOs. Thus, accounting betas can be used as an ex anti measure of the riskiness of firms entering into the IPO market. As we mentioned earlier, we cannot find the degree of association between accounting beta and market beta for the IPOs because market betas cannot be computed for private firms.

ENDNOTES

1. Calculating market and accounting betas after the firm has gone public is possible but not relevant to the study undertaken. We are looking at ex anti information to gage the riskiness of an IPO offering. Testing portfolios of IPOs would produce results more consistent with prior research, but our goal is to offer help in ordering the riskiness of individual IPOs.

2. Beaver and Mangold (1975) use the total accounting return on the 254 firms in their sample as proxy for the market. Using the return on all firms in the sample as a market proxy may create some upward bias when calculating accounting betas. The return of an individual firm in that sample will be highly correlated with the average return of all firms in the sample.

3. The market is supposed to be efficient; however, there are some irregularities in the market. Because these irregularities are consistent and of such a large order of magnitude to affect the prediction of the CAPM, researchers call them market anomalies. Some of these anomalies are January effect, size affect, high E/P ratio and so on. In all of these anomalies returns are more than that expected by the CAPM. For more details, see Banz (1981), Basu (1977) and Keim (1983).

4. Ex ante uncertainty is not the systematic risk measured by beta, but it is the uncertainty regarding the real market clearing prices of the IPOs. Investors know the offering price but are unable to predict with certainty the market clearing price, which could be higher or lower than the offering price. This lack of knowledge about the market clearing prices is called ex ante uncertainty.

5. In spite of the fact that information required in the registration form is the same for U.S. and foreign firms, we believe that the differences in the tax, accounting and judicial systems between the U.S. and many foreign countries prompt investors to be negatively biased toward these firms. This bias will show in the offering and the market clearing prices for these foreign firms. To avoid any bias in our results, we elect to exclude these firms from our sample.

6. Most of the previous IPOs' studies are based on firms conducting initial public offering using firm commitment contract. A commitment contract is when underwriter agrees upon a certain price to buy all the shares offered by the issuing firm. The issuing firm receives all the proceeds from the offering regardless whether or not the underwriter will be able to sell all shares in the future. The other kind of contract is the best effort contract where underwriter acts as a selling agent for the issuing firm. If underwriter can not sell all the shares offered, he will not be held accountable for the unsold portion of the offer.

7. Most of the IPOs are small in size thereby the majority of them are listed on NASDAQ. Only a few IPOs are directly listed on American or New York stock exchanges and those firms are usually large and well-established firms. To avoid any bias might occur from considering large firms, we exclude these large firms from our study.

8. There are different forms to be filed by new issues. S1 is the most comprehensive registration form. Firms using this form must provide two years of audited balance sheets and three years of audited statement of income and cash flow if available. Moreover, firms registered using the S1 form must provide selected financial data and supplementary financial information, which includes at least five years of financial statements. The inclusion of five years of financial statements makes it possible for us to calculate accounting beta based on relatively long history of operation. It should be noted that not all firms filing S1 forms have a long history of operation; therefore, the above data requirement depends on the availability. Other filing forms such as SB-1 and SB-2 do not require the inclusion of relatively long historical financial data. For these form, only one year audited balance sheet and two years of audited statement of income and cash flow are required.

9. One problem pertinent to the accounting return is that not all firms have a fiscal year ending December 31. Therefore, an adjustment must be made. Our procedure is such that if the firm has a fiscal year ending in any month from January to June, the return is considered for the prior year. But if the fiscal year for a firm ends in any month from July to December, we consider the return for the current year. For example, if the year in question is 1992 and a certain firm has fiscal year ending February, the accounting return is considered for the year 1991. On the other hand if the fiscal year ends in August, the return is considered for the year 1992. See Ball and Brown (1969), Gonedes (1973), and Beaver and Manegold (1975).

10. The two definitions of income, Income Before Extraordinary Items and Net Income, correspond to COMPUSTAT data items 18 and 172 respectively. As was mentioned before, Beaver and Manegold (1975) use the total accounting return on the 254 firms in their sample as a proxy for the market. Using the return on all firms in the sample as a market proxy may create some upward bias when calculating accounting betas. The return of an individual firm in that sample will be highly correlated with the average return of all firms in the sample.

11. NASDAQ is represented by Exchange 3 in COMPUSTAT while NASD OTC pink sheet is represented by Exchange 10. Pink sheet refers to thinly traded over-the-counter stocks that are not on NASDAQ. These stocks are considered more speculative than those on the NASDAQ exchange. In the rest of the analysis, "OTC" stands for NASD OTC.

12. But why limit the regression analysis to five years? Some would argue that the more observations we have, the lower is the sampling error. On the other hand, we can argue that while having more observations is advantageous, some of these observations could be affected by the different structural forms or conditions the firm faces in its span of operation. Many firms change their accounting procedures, such as switching from LIFO to FIFO, in dealing with their inventories. Other firms change the way they calculate depreciation. Such changes affect the accounting data; hence, using fewer annual observations helps to avoid having observations generated under different accounting methods or under different structural conditions. It is suggested by some researchers (see for example Jacob, 1971) that if annual data is used to calculate the market model parameters (CAPM), the optimal number of observations included in the regression model ranges from five to ten. Because of the similarity between the model used to compute market beta and the model used to calculate accounting beta, using five annual observations of accounting data can be acceptable for calculating accounting beta.

REFERENCES

1. Ball, R. and P. Brown, "Portfolio Theory and Accounting Theory," *Journal of Accounting Research* 7, 1969, pp. 300-323.

2. Banz, Rolf W., "The Relationship Between Return and Market Value of Common Stocks," *Journal of Financial Economics* 9, 1981, pp. 3-18.

3. Barefield, M. and E. Comiskey, "The Differential Association of Forecast Error and Earning Variability With Systematic Risk," *Journal of Business Finance and Accounting* 6, 1979, pp. 1-8.

4. Basu, S., "Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis," *Journal of Finance* 32, 1977, pp. 663-682.

5. Beatty, R. and J. Ritter, "Investment Banking, Reputation, and the Underpricing of Initial Public Offerings," *Journal of Financial Economics* 20, 1986, pp. 213-232.

6. Beaver, B. and J. Manegold, "The Association Between Market-Determined and Accounting-Determined Measures of Systematic Risk: Some Further Evidence," *Journal of Financial and Quantitative Analysis* 10, 1975, pp. 213-284.

7. Beaver, B., P. Kettler and M. Scholes, "The Association Between Market Determined and Accounting Determined Risk Measures," *The Accounting Review* 45, 1970, pp. 654-682.

8. Black, F., "Beta and Return," *Journal of Portfolio Management* 20, 1993, pp. 8-18.

9. Blann, J. and B. Balachandran, "An Empirical Test of the Statistical Association of Market Risk and Financial Accounting Allocation," *Journal of Business Finance and Accounting* 15, 1988, pp. 101-113.

10. Bowman, G., "The Theoretical Relationship Between Systematic Risk and Financial (Accounting) Variables," *Journal of Finance* 34, 1979, pp. 617-630.

11. Butler, K.C., R.M. Mohr and R.R. Simonds, "The Hamada and Conine Leverage Adjustments and the Estimation of Systematic Risk for Multisegment Firms," *Journal of Business Finance and Accounting* 18, 1991, pp. 885-901.

12. Clarkson, P.M. and R. Thompson, "Empirical Estimates of Beta When Investors Face Estimation Risk," *Journal of Finance* 45, 1990, pp. 431-453.

13. Clarkson, P.M., "The Underpricing of Initial Public Offerings, Ex Ante Uncertainty, and Proxy Selection," *Accounting and Finance* 34, 1994, pp. 67-78.

14. Cohen, K. and Others, "Estimating And Adjusting For The Intervaling Effect Bias In Beta," *Management Science* 29, 1983, pp. 135-148.

15. Derstine, R. and R.Huefnr, "LIFO-FIFO, Accounting Ratios and Market Risk," *Journal of Accounting Research* 12, 1974, pp. 216-234.

16. Eskew, R., "The Forecasting Ability or Accounting Risk Measures: Some Additional Evidence," *The Accounting Review* 54, 1979, pp. 107-118.

17. Fama, E. and K. French, "Multifactor Explanations of Asset Pricing Anomalies," *Journal of Finance* 51, 1996, pp. 55-84.

18. Fama, E. and K. French, "The Cross-Section of Expected Stock Returns," *Journal of Finance* 47, 1992, pp. 427-465.

19. Gonedes, N., "Evidence on the Information Content of Accounting Massages: Accounting-Based and Market-Based Estimate of Systematic Risk," *Journal of Financial and Quantitative Analysis* 8, 1973, pp. 407-444.

20. Granger, C. and Newbold, P., "R^2 and the Transformation of Regression Variables," *Journal of Econometrics* 4, 1976, pp. 205-210.

21. Harris, R., T. O'Brien and D. Wakeman, "Divisional Cost-of-Capital Estimation for Multi-Industry Firms," *Financial Management* 18, 1989, pp. 74-84.

22. Hill, N. and B. Stone, "Accounting Betas, Systematic Operating Risk, and Financial Leverage: A Risk Composition Approach to the Determinants of Systematic Risk," *Journal of Financial and Quantitative Analysis* 15, 1980, pp. 595-637.

23. Ibbotson, R. and J. Jaffee, "Hot Issues Market," *Journal of Finance* 30, 1975, pp. 1027-1042.

24. Ismail, B. and M. Kim, "On the Association of Cash Flow Variables With Market Risk: Further Evidence," *Accounting Review* 64, 1989, pp. 125-136.

25. Jacobs, N.L., "The Measurement of Systematic Risk for Securities and Portfolios: Some Empirical Results," *Journal of Financial and Quantitative Analysis* 6, 1971, pp. 815-833.

26. Karels, G.V. and W.H. Sackley, "The Relationship Between Market and Accounting Betas for Commercial Banks," *Review of Financial Economics* 2, 1993, pp. 59-72.

27. Keim, Donald B., "Size Related Anomalies and Stock Return Seasonality: Further Empirical Evidence," *Journal of Financial Economics* 12, 1983, pp. 13-32.

28. Kulkarni, M.,M. Powers and D. Shannon, "The Use of Segment Earnings Betas in the Formation of Divisional Hurdle Rates," *Journal of Business Finance and Accounting* 18, 1991, pp. 497- 512.

29. MacKinlay, C., "Multifactor Models do not Explain Deviation From the CAPM," *Journal of Financial Economics* 38, 1995, pp. 3-28.

30. Mear, R. and M. Firth, "Risk Perceptions of Financial Analysts and the Use of Market and Accounting Data," *Accounting and Business Research* 18, 1988, pp. 335-340.

31. Ritter, J., "The 'Hot Issue' Market of 1980," *Journal of Business* 57, 1984, pp. 215-240.

32. Rock, K., "Why New Issues are Underpriced," *Journal of Financial Economics* 15, 1986, pp. 187- 212.

33. Smith, K., "The Effect of Intervaling Estimating Parameters of the Capital Assets Pricing Model," *Journal of Financial and Quantitative Analysis* 13, 1978, pp. 313-332.

34. Spindel, F., "Financial Statement Requirements of Acquired Businesses in Connection with Initial Public Offerings," *CPA Journal* 58, 1988, pp. 91-93.

35. Titman, S. and B. Trueman, "Information Quality and the Valuation of New Issues," *Journal of Accounting and Economics* 8, 1986, pp. 159-172.