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The Association Between Investment Opportunity Set Proxies and Realized Growth

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1. INTRODUCTION

A number of recent studies in accounting and finance, including Smith and Watts (1992), Gaver and Gaver (1993), and Skinner (1993) examine the association between proxies for the investment opportunity set (IOS), and financing, dividend, compensation, and accounting policies. Relying mainly on intuitive arguments these studies use different proxies for the unobservable IOS. Future growth is an implication of IOS, and we evaluate various proxies for IOS on the basis of their association with realized growth. In conducting our analysis, we assume that investment opportunities, on average, lead to actual investment and therefore affect realized growth within the three- to five-year period we examine.

We use the ex-post growth in book values during the three years subsequent to a base year as our growth measure. However, we evaluate the sensitivity of our findings using alternative growth measures such as asset and sales growth, calculated over three-

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and five-year periods.[1] We perform the analysis using annual samples consisting of all Compustat firms with available data centered on 1978 through 1991 as base years. This allows us to evaluate the consistency of results across the periods and thus reduce the possibility of incorrect inference due to temporal sampling variation.

Using association with realized growth as the benchmark, we find that the book-to-market ratio is a valid growth proxy. Consistent with the results of Smith and Watts (1992), we find that among the commonly used proxies, the book-to-market ratio is the one most highly correlated with future growth. This result holds for all the book-to-market measures, namely book to market value of assets and equity, Tobin's *Q*, and also the ratio of book value of property, plant and equipment to market value of assets. This finding is important because it suggests that simpler proxies are as effective as the more difficult-to-calculate Tobin's *Q*. However, we fail to document a consistent relation between realized growth and the earnings-price ratio, another commonly used measure of expected growth. Capital expenditures (deflated by book value of assets, but not by market value of assets) are associated with growth, but we fail to find a consistently positive association between R&D intensity and growth. Therefore R&D intensity may not be as good a growth proxy as is the book-to-market ratio. As for the policy variables, dividend payout and dividend yield are lower for high-growth firms, as expected. However, realized book value growth and leverage measures are significantly positively associated, contrary to expectations.

Our results should help researchers in constructing appropriate growth proxies. They also help to interpret the findings in previous studies that are not robust to the choice of the growth proxy. For example, Smith and Watts (1992) find that several of their regression coefficients become insignificant when they use the earnings to price ratio instead of the ratio of book to market value of assets as the growth proxy. Our results suggest that the lack of significance of those coefficients could be attributable to the fact that earnings to price ratio is not a good growth proxy.

The remainder of the paper is organized as follows. The investment opportunity set and its proxies are described in Section 2, followed by a section documenting sample selection

and variable definitions. In subsequent sections, the association between investment opportunity set proxy variables and policy variables and realized growth are explored using univariate approach and multivariate approaches, and a final section discusses conclusions and implications.

2. THE INVESTMENT OPPORTUNITY SET AND ITS PROXIES

Myers (1977) introduced the term 'investment opportunity set' (IOS) to refer to the extent to which firm value depends on future discretionary expenditures by the firm. Thus IOS refers not only to traditional investment opportunities such as the right to explore for minerals, but also to other discretionary expenditures such as the extent of brand advertising required in future to ensure the success of the firm. In general, the firm's investment opportunity set will depend on firm-specific factors such as physical and human capital in place, as well as on industry-specific and macro-economic factors. Because the firm's investment opportunity set consists of projects which allow the firm to grow, the investment opportunity set can be thought of as the growth prospects of the firm.

Several proxies have been used in the accounting and finance literature to capture Myers' idea of the IOS. They can be classified into three types: price-based proxies, investment-based proxies, and variance measures. The price-based proxies are: market to book value of equity, MVE/BVE (Collins and Kothari, 1989; Lewellen, Loderer and Martin, 1987; and Chung and Charoenwong, 1991); book to market value of assets, A/V (Smith and Watts, 1992); Tobin's Q (Skinner, 1993); earnings to price ratios, E/P (Kester, 1984; Chung and Charoenwong, 1991; and Smith and Watts, 1992); ratio of property, plant, and equipment to firm value, PPE/V (Skinner, 1993); and ratio of depreciation to firm value, DEP/V (Smith and Watts, 1992). The price-based proxies rely on the idea that if growth prospects of the firm are at least partially impounded in stock prices, then growth firms will have higher market values relative to assets in place. The investment-based proxies are: the ratio of R&D to assets, R&D/A (Gaver and Gaver, 1993); sales, R&D/S (Skinner, 1993); and firm values, R&D/V (Smith and Watts, 1992); and ratio of capital

expenditures to value, CAPX/V (Smith and Watts, 1992). These proxies rely on the idea that a high level of investment activity is positively related to the investment opportunity set of the firm. R&D is itself an investment, and is also is expected to create further investment opportunities for firms. Variance measures include the variance of returns (Gaver and Gaver, 1993; and Smith and Watts, 1992), and asset betas (Skinner, 1993). These measures rely on the idea that options become more valuable as the variability of returns on the underlying asset increases. While most of the above-mentioned studies use the measures singly, Gaver and Gaver combine their measures into a composite measure using factor analysis.

Findings in previous studies have not been entirely robust to the choice of the proxy. For example, Smith and Watts find that several of their regression coefficients become insignificant when the earnings to price ratio is used as an IOS proxy instead of A/V. When they use R&D/V, many regression coefficients similarly become insignificant, and one (coefficient of IOS proxy in a regression with the existence of a bonus plan as the dependent variable) changes in sign. Gaver and Gaver's reported correlations among their IOS proxies are generally of the expected sign, but several of them are insignificant (e.g., between MVE/BVE and R&D/A or variance of returns). Similarly, in Skinner's logit regression of goodwill method choice on IOS proxies, the coefficients on R&D/S and Tobin's *Q* are of opposite signs. Thus an evaluation of the association between IOS proxies and realized growth can help researchers interpret findings of studies involving the IOS construct.

We use the percentage change in book value measured over a three-year period as our growth measure. This measure is consistent with the Ohlson model that has recently received attention in accounting (Bernard, 1993; and Ohlson, 1995), in which firm value arises from the firm's ability to earn above normal returns on book value. We note that this measure may be affected by merger and acquisition activities. The impact of merger activity depends on the accounting method used for the transaction; if pooling is used, book value is retroactively restated to reflect the transaction and therefore growth measures reflect the actual book value growth of the combined firm. If purchase accounting is used, book value growth (as well as other growth

measures) are potentially overstated depending on the type of consideration given in the transaction – the greatest overstatement occurs for purchase-type transactions in which common stock constitutes all or a large part of the consideration. This type of transaction is relatively uncommon, since most purchase transactions involve cash rather than stock, and most transactions involving stock tend to be accounted for as poolings-of-interests. The net effect is that although book value growth may be contaminated by merger and acquisition activity, we believe the noise from this source is not likely to result in a substantial loss of power in our tests.

The three-year period for our tests is used because preliminary analysis yielded similar but slightly weaker results using growth measured over five years. However, as a check of robustness of our findings we repeated our analysis of the associations between financial statement variables and growth using alternative growth measures calculated over three- and five-year periods. Our results were generally similar for sales, asset, and book value growth. However, the associations were much weaker for earnings growth. It would seem that the articulation of earnings and book value should lead to similar results for these two growth measures. However, earnings growth and book value growth are not monotonic, since it is possible to have positive book value growth even when there is negative earnings growth, as long as earnings remain positive and exceed the firm's dividend payments. We believe that the weak associations between IOS measures and earnings growth could be attributable to measurement problems such as the greater variability of earnings and the relatively high frequency of negative reported earnings.

3. SAMPLE SELECTION AND VARIABLES

(i) Sample Selection

The data used in this study consists of 14 annual samples from 1978 to 1991. Each sample consists of all firms for which market value and financial statement information are available on the Standard and Poor's Compustat Primary-Supplementary-Tertiary, Full Coverage, or Research files.[2] Regulated utilities (SIC codes

49XX) and financial institutions (SIC codes 6XXX) are excluded from the samples. The resulting annual samples include a minimum of 2,945 firms (1978) and a maximum of 4,039 firms (1987).

(ii) Variable Definitions

We generally follow previous studies in measuring the IOS proxies and financing, dividend, and compensation variables. The variables are defined in Table 1. For consistency we define all book-to-market measures with market values in the denominator – they are all thus expected to be negatively correlated with realized growth. For completeness we include ratios of capital expenditures to both market and book values of assets, although Smith and Watts use only the market value deflator. The variance of total returns is calculated for each firm using annual data over the entire 1978 to 1994 period, following the approach in Gaver and Gaver (1993).[3]

The financing policy variable is leverage, and dividend policy is measured by yield and payout. According to Myers' and Jensen's (1986) arguments, high growth firms should have lower debt. High growth firms are also expected to have lower dividend payout and yield and more stock-based compensation (Smith and Watts, 1992; and Gaver and Gaver, 1993). Our compensation policy variable differs from those of Gaver and Gaver – we use a dummy variable available in Compustat indicating whether the company has any employee stock option plans, while Gaver and Gaver use the level of compensation for the five highest paid officers, along with dummy variables for bonus plans and performance plans, all obtained from proxy statements. We choose not to include these additional compensation variables in our analysis because the effort involved in collecting the data would have required substantial reduction of the sample size. In addition, the strongest results in previous studies are for option plans.

(iii) Descriptive Statistics

Descriptive statistics for our samples are presented in Table 2 on a pooled basis. The variables with earnings in the denominator

Table 1

Variable Definitions

Variable Name	*Description*	*Compustat Data Items*
Panel A: Investment Opportunity Set Proxy Variables		
Price-based proxies		
V	Market value of equity plus book value of debt	$(25x199) + 6 - 60$
A/V	Ratio of book-to-market value of assets	$6 \div V$
BVE/MVE	Ratio of book-to-market value of equity	$60 \div (25x199)$
PPE/V	Ratio of book value of PPE to firm value	$8 \div V$
TOBIN-*Q*	Tobins-*q*, the ratio of replacement value of assets to market value	$((8xD) + (6 - 8)) \div V$, where D is the increase in the nonresidential GNP deflator over the mean age of PPE, calculated as $((7 - 8) \div 103)$
DEP/V	Ratio of depreciation expense to value	$103 \div V$
E/P	Earnings-price ratio	$58 \div 199$
Investment-based proxies		
R&D/V	Ratio of R&D expense to firm value	$46 \div V$
R&D/A	Ratio of R&D expense to total assets	$46 \div 6$
R&D/S	Ratio of R&D expense to sales	$46 \div 12$
CAPX/V	Ratio of capital additions to firm value	$128 \div V$
CAPX/A	Ratio of capital additions to asset book value	$128 \div 6$
Variance measures		
VARRET	Variance of total return	$\mathrm{Var}[(24x25)(24x25)_{-1} + (26x25) + 19 + 15] \div [6_{-1}60_{-1} + (24x25)_{-1}]$
BETA	Market model beta	Based on 36 monthly observations obtained from Center for Research in Security Prices data.

Table 1 (Continued)

Variable Name	*Description*	*Compustat Data Items*
Panel B: Financing, Dividend and Compensation Policy Variables		
D/E	Book debt to equity ratio	$(6 - 60 - 130) \div (60 + 130)$
D/A	Book debt to asset ratio	$(6 - 60 - 130) \div 6$
D/MVE	Market debt to equity ratio	$(6 - 60 - 130) \div ((25x199) + 130))$
DPAY	Dividend payout ratio	$26 \div 58$
DYLD	Dividend yield	$26 \div 199$
OPT	Dummy variable equal to one if firm has shares reserved for option plans, zero otherwise	215†

Note:
† Item 215 includes options issued but not yet exercised plus options reserved for future issuance. As a result, a nonzero value for OPT indicates that the company has an approved option plan, but not necessarily that options have been issued pursuant to the plan. Unfortunately, this variable was recently added to Compustat databases so it is available only for years after 1984.

(e.g., DPAY) all have large numbers of missing observations due to the incidence of negative earnings figures; firm-year observations with negative earnings were coded as missing for these variables. In order to reduce the effect of outliers on results, variables were coded as missing if they were more than five standard deviations away from the annual sample means; this procedure affected less than one percent of the observations for any variable in any year, but results in different numbers of available observations among the variables.

4. UNIVARIATE ANALYSIS

(i) IOS Proxies

Table 3 presents the annual rank correlations between variables of interest and realized book value growth for 20 portfolios of firms formed by ranking on realized book value growth each year. That is, within each year, firms were ranked based on realized book value growth over the three succeeding years ($BGRO_{+3}$); the 5% of firms with the highest book value growth in the three

Table 2

Descriptive Statistics

	N	*Mean*	*Std. Dev.*	*Median*	*25 Percentile*	*75 Percentile*
Realized Growth:						
$AGRO_{+3}$	51249	0.085	0.232	0.068	−0.028	0.177
$SGRO_{+3}$	50312	0.096	0.297	0.073	−0.021	0.178
$IGRO_{+3}$	28582	0.140	0.422	0.097	−0.082	0.276
$BGRO_{+3}$	46441	0.088	0.265	0.071	−0.031	0.179
IOS Proxy Variables:						
A/V	51128	0.788	0.347	0.801	0.538	1.022
BVE/MVE	49409	0.841	0.727	0.649	0.363	1.086
PPE/V	51201	0.271	0.225	0.213	0.099	0.382
TOBINS-Q^{-1}	50202	0.919	0.466	0.890	0.585	1.189
DEP/V	50947	0.036	0.031	0.029	0.015	0.047
E/P	36434	0.094	0.076	0.077	0.048	0.119
RD/V	51068	0.015	0.028	0.000	0.000	0.019
RD/S	50700	0.134	1.926	0.000	0.000	0.026
RD/A	51245	0.028	0.059	0.000	0.000	0.030
CAPX/V	50149	0.057	0.057	0.043	0.020	0.079
CAPX/A	50155	0.081	0.077	0.059	0.030	0.106
VARRET	48363	0.345	0.862	0.093	0.038	0.255
BETA	36867	1.183	0.571	1.162	0.827	1.520
Policy Variables:						
D/E	49472	1.705	3.234	1.004	0.509	1.784
D/A	51454	0.527	0.395	0.512	0.344	0.659
D/MVE	51330	1.403	2.594	0.668	0.252	1.511
DPAY	36421	0.269	0.759	0.104	0.000	0.331
DYLD	51381	0.015	0.027	0.000	0.000	0.024
OPT	31284	0.494	0.500	0.000	0.000	1.000

years following year t were placed in portfolio 1 for year t, the next highest 5% in portfolio 2, and so on. The means of book value growth and of the variables of interest were calculated for each portfolio for that year, and the Spearman rank correlation between the portfolio means of book value growth and the variables of interest were then calculated and included in the table. This procedure was repeated for each year from 1978 to 1991. Significance for the mean correlation over the entire sample period is assessed using t-statistics calculated after applying the Newey-West (1987) correction for serial correlation, a necessary correction since the correlations are calculated over three-year overlapping periods.

Table 3

Rank Correlation of Realized Book Value Growth with IOS Proxy Variables and Policy Variables

	Predicted Sign	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*Mean*	*t-statistic*	*+/-*
IOS Proxy Variables:																		
A/V	–	−0.93	−0.92	−0.76	−0.58	−0.76	−0.69	−0.80	−0.84	−0.78	−0.75	−0.87	−0.91	−0.97	−0.83	−0.815	−23.92	0/14
BVE/MVE	–	−0.98	−0.96	−0.90	−0.74	−0.84	−0.71	−0.92	−0.96	−0.90	−0.84	−0.90	−0.97	−0.98	−0.88	−0.893	−34.63	0/14
PPE/V	–	−0.85	−0.80	−0.62	−0.46	−0.90	−0.82	−0.89	−0.80	−0.50	−0.53	−0.65	−0.78	−0.89	−0.73	−0.729	−17.61	0/14
TOBINS-Q	–	−0.94	−0.87	−0.75	−0.57	−0.70	−0.63	−0.72	−0.83	−0.75	−0.75	−0.82	−0.88	−0.95	−0.86	−0.788	−20.56	0/14
DEP/V	–	−0.93	−0.87	−0.72	−0.56	−0.95	−0.90	−0.96	−0.94	−0.78	−0.70	−0.83	−0.87	−0.97	−0.82	−0.843	−27.66	0/14
E/P	–	−0.50	−0.46	−0.19	−0.17	−0.51	0.28	0.14	0.30	0.13	-0.02	0.12	−0.47	−0.59	−0.51	−0.174	−1.53	5/9
RD/V	+	0.49	0.25	0.02	0.26	0.17	−0.52	−0.56	−0.65	−0.74	−0.75	−0.46	−0.39	−0.33	−0.64	−0.275	−1.71	5/9
RD/A	+	0.62	0.79	0.50	0.56	0.43	0.15	−0.04	−0.03	−0.23	−0.13	0.05	0.37	0.27	0.02	0.238	1.97	10/4
RD/S	+	0.41	0.59	0.26	0.03	0.23	−0.21	−0.40	−0.25	−0.15	−0.33	−0.23	0.13	0.31	0.16	0.040	0.36	8/6
CAPX/V	+	0.11	−0.33	−0.47	−0.79	−0.75	−0.59	−0.80	−0.62	−0.33	−0.41	−0.35	−0.55	−0.69	−0.55	−0.509	−6.71	1/13
CAPX/A	+	0.93	0.91	0.64	0.26	0.04	0.33	0.43	0.73	0.54	0.59	0.70	0.68	0.52	0.61	0.564	6.85	14/0
VARRET	+	0.36	0.37	0.44	0.23	0.17	0.09	0.09	0.07	0.04	0.05	0.12	0.21	0.26	0.20	0.190	1.61	14/0
BETA	+	0.40	0.39	0.49	0.32	0.12	−0.22	−0.26	0.12	0.32	−0.07	0.30	0.46	0.46	0.31	0.224	1.62	11/3
Policy Variables:																		
D/E	–	0.21	0.20	0.29	0.37	0.53	0.51	0.55	0.54	0.34	0.21	0.38	0.36	0.36	0.47	0.381	8.94	14/0
D/A	–	0.27	0.24	0.32	0.52	0.70	0.69	0.66	0.72	0.80	0.76	0.66	0.49	0.42	0.78	0.575	8.33	14/0
D/MVE	–	−0.74	−0.82	−0.87	−0.73	−0.44	0.26	−0.48	−0.43	0.00	−0.66	−0.79	−0.51	−0.59	−0.68	−0.535	−6.01	2/12
DPAY	–	−0.72	−0.93	−0.78	−0.80	−0.62	−0.68	−0.78	−0.71	−0.53	−0.65	−0.83	−0.77	−0.91	−0.72	−0.746	−25.24	0/14
DYLD	–	−0.64	−0.60	−0.52	−0.35	−0.46	−0.24	−0.25	−0.35	−0.22	−0.21	−0.25	−0.58	−0.81	−0.63	−0.437	−6.32	0/14
OPT	+	–	–	–	–	–	–	0.12	−0.22	0.13	0.29	0.17	0.48	0.53	0.59	0.262	1.17	7/1

Univariate results for the investment opportunity set proxy variables, presented in Table 3, show that all of the price-based investment opportunity set proxies (A/V, BVE/MVE, PPE/V and Tobin's Q^{-1}) are significantly negatively correlated with subsequent book value growth, as expected. Surprisingly, the earnings to price ratio (calculated only for firms with positive earnings) does not exhibit significant correlation with subsequent realized growth, contrary to expectations that this measure should be lower for high-growth firms. Additional analysis (not reported in the table) indicates that growth firms have higher returns on assets in the previous years. Thus a possible explanation for the lack of association between E/P ratios and growth is that although growth firms have fewer assets-in-place relative to firm value, those assets-in-place produce a higher income stream than those of non-growth firms; these two offsetting effects equalize the mean E/P ratios for growth firms and non-growth firms.

R&D spending appears to be only weakly and inconsistently correlated with realized growth. This result is surprising in view of the strong intuitive grounds for expecting a positive association between R&D intensity and growth. This result was identical for other growth measures as well – assets, sales, and earnings – with inconsistent and generally weak correlations across the annual samples. Similarly, a subset of the samples was adjusted for median industry levels of the R&D ratios, and the result of no apparent relation between R&D intensity and realized growth was unaffected.

Several explanations are possible for the lack of relationship between R&D spending and realized growth. If firms with high R&D intensity continue to increase R&D expenditures over the three-year measurement horizon, growth of income and book value may be understated because of rules requiring expensing of R&D. However, this problem does not influence sales growth, for which similar results were obtained. Alternatively, R&D may result in cost savings rather than new products in some industries, or it may take longer than three to five years for R&D to translate into new product sales and growth. We did find R&D/A and R&D/S to be correlated with discretionary expenditures (defined as the sum of capital expenditures, advertising, and R&D) over the subsequent three years, deflated

by assets in the base year. This evidence is consistent with a relation between R&D and Myers' definition of growth as the extent to which firm value depends on future discretionary expenditure by the firm. However, the evidence is also consistent with mere serial correlation in R&D expenditures, rather than a causal relation between current R&D and future discretionary expenditures–no consistent relation is found when R&D is excluded from discretionary expenditures. Overall, we conclude that R&D intensity does not proxy for growth as well as the book-to-market IOS proxies do.

Correlations for the two capital expenditure measures are statistically different from zero, but in opposite directions. While CAPX/A is positively correlated with growth, as expected, CAPX/V appears to be negatively correlated with growth. This negative correlation could be attributable to the use of a market value measure in the denominator of CAPX/V, causing the ratio to behave more as a book-to-market measure than as a measure of investment activity. This may also account for the negative (but insignificant) correlation between R&D/V and growth. The volatility measures beta and the variance of total returns are not significantly associated with realized growth.

(ii) Financing, Dividend, and Compensation Policy Variables

Univariate results for the variables which measure the financing, dividend and compensation policies of the firm presented in Table 3 show, contrary to expectations, that the debt-to-equity ratio (D/E) and debt-to-assets ratio (D/A) are significantly positively correlated with realized book value growth. However, both D/E and D/A are strongly *negatively* correlated with sales and asset growth, as expected (not reported in the table).

The market-value-based measure of leverage (D/MVE) is negatively correlated with subsequent growth. As discussed earlier in connection with the capital expenditure variables, the variables with market value in the denominator and book value measures in the numerator, as with D/MVE, may be highly correlated with the book-to-market measures and may not be useful measures of non-book-to-market constructs.

Both of the dividend measures, the payout ratio (DPAY) and the market-value-based measure, yield (DYLD), are negatively

correlated with realized growth, as expected. This is a stronger result than in Gaver and Gaver (1993), who find a difference in dividend yield, but not payout. As discussed above, the results for ratio variables with market value denominators (e.g., dividend yield) should be viewed with suspicion because they may behave like book-to-market measures; in this case, the confirmatory result for DPAY provides credibility for the observed negative correlation.

The use of option plans is positively correlated with realized growth, although the association is not statistically significant. The positive correlation is slightly stronger (average coefficient significant at the 5% level) when sales or assets are used to measure growth.

In addition to the univariate tests reported in Table 3, we also considered the relative explanatory power of the variables using partial correlations with growth after controlling for book-to market. Although many of the variables exhibit partial correlations which are consistent in sign over the sample period, the potential explanatory power of most of the variables incremental to the explanatory power of BVE/MVE (the book-to-market measure used as the partial variable) seems to be quite low. For example, the capital expenditure variables seem to be essentially uncorrelated with growth after controlling for the book-to-market measure. Of the other variables, dividend yield (DYLD) has the largest average partial correlation with growth after controlling for book-to-market. This implies that a classification model which includes both book-to-market and dividend yield may provide a better growth proxy than market-to-book alone.

5. CONCLUSION

The results in this paper show that variables which incorporate book and market measures (book-to-market value of assets and equity, Tobin's-Q^{-1}, and ratios of fixed assets and depreciation expense to market value) are consistently negatively correlated with realized growth, which can be viewed as a benchmark proxy for the IOS. Capital investment activity as measured by the ratio of capital expenditures to assets is positively correlated with

realized growth. However, we find that ratios of R&D to sales, assets, or market value do not exhibit a consistent or strong association with realized book value growth. It appears that R&D intensity, as measured by these variables, do not proxy for growth as well as the book-to-market variables we examine. Also, we find that the E/P ratio, often cited as a measure of growth expectations, exhibits no consistent association with realized growth. Multivariate analysis suggests that dividend policy may reveal some incremental information about the firm's growth prospects relative to book-to-market measures alone, but that the other variables examined seem to show little promise for constructing a multivariate growth proxy.

NOTES

1 Results using these growth measures can be obtained upon request from the authors.

2 The Primary-Supplementary-Tertiary files include the largest US firms, as well as large non-US firms with shares represented by American Depository Receipts; most of these firms are listed on the New York or American Stock Exchanges. The Full Coverage file includes mostly smaller firms which trade on the NASDAQ system. The Research file consists of firms removed from the other files for any reason.

3 In addition to the total return variable used by Gaver and Gaver, we also ran tests using the variance of common stock returns using daily and monthly observations, with similar results.

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