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ROBIN GREENWOOD and SAMUEL G. HANSON*

ABSTRACT

We show that characteristics of stock issuers can be used to forecast important common factors in stocks' returns such as those associated with book-to-market, size, and industry. Specifically, we use differences between the attributes of stock issuers and repurchasers to forecast characteristic-related factor returns. For example, we show that large firms underperform after years when issuing firms are large relative to repurchasing firms. While our strongest results are for portfolios based on book-to-market (i.e., *HML*), size (i.e., *SMB*), and industry, our approach is also useful for forecasting factor returns associated with distress, payout policy, and profitability.

IT IS WELL KNOWN THAT FIRMS that issue stock subsequently earn low returns relative to other firms. Loughran and Ritter (1995) find that firms issuing equity in either an IPO or a SEO underperform significantly post-offering. Loughran and Vijh (1997) show that acquirers in stock-financed mergers later underperform. Conversely, Ikenberry, Lakonishok, and Vermaelen (1995) find that firms repurchasing shares have abnormally high returns. Fama and French (2008a) and Pontiff and Woodgate (2008) synthesize these results using a composite measure of net stock issuance: they show that the change in split-adjusted shares outstanding is a strong negative predictor of returns in the cross-section. The relation between share issuance and returns has also been documented at the market level: Baker and Wurgler (2000) show that, when aggregate equity issuance is high, subsequent market-level returns are low. A lively recent literature debates whether these patterns should be interpreted as evidence of a corporate response to mispricing, or, alternately, whether these patterns are fully consistent with market efficiency.[1]

In this paper we show that corporate equity issuance can be used to forecast characteristic-based factor returns. We show that firms issue prior to periods

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[1] See Baker, Taliaferro, and Wurgler (2006), Butler, Grullon, and Weston (2005), Carlson, Fisher, and Giammarino (2006), Frazzini and Lamont (2008), Lamont and Stein (2006), and Lyandres, Sun, and Zhang (2008).

when other stocks with similar characteristics perform poorly, and repurchase prior to periods when other firms with similar characteristics perform well. Our empirical approach is to use differences between the characteristics of recent stock issuers and repurchasers—which we call "issuer–repurchaser spreads"—to forecast returns to long–short factor portfolios associated with those characteristics. In our baseline results, issuer–repurchaser spreads significantly forecast characteristic-based factor returns in seven cases: book-to-market, size, nominal share price, distress, payout policy, profitability, and industry. Our strongest and most robust results, however, are for book-to-market and size—that is, issuer–repurchaser spreads are useful for forecasting the *SMB* and *HML* factors. We also obtain strong forecasting results for industry-based portfolios.

In presenting these results, we are not just repackaging the known relationship between firm-level equity issuance and stock returns. For instance, if one takes the underperformance of net issuers as a primitive fact, then it might not be surprising to find that *HML* performs well when many growth firms have recently issued stock, or likewise, when many value firms have repurchased stock. This concern turns out to be easy to address: similar to Loughran and Ritter (2000), we construct long–short characteristic portfolios that exclude the issuing and repurchasing firms. We achieve essentially similar results using these "issuer-purged" portfolios, that is, net issuance forecasts the returns of nonissuing firms with similar characteristics.

In short, we demonstrate that characteristics of stock issuers—in particular, which types of firms are issuing stock in a given year—can be used to forecast important common factors in stock returns such as those associated with book-to-market, size, and industry. This is important since *HML*, *SMB*, and industry affiliation have proved useful in explaining common variation in stock returns as well as (in the case of *HML* and *SMB*) explaining the cross-section of average returns (Fama and French (1993, 1996)). Other than Cohen, Polk, and Vuolteenaho (2003) and Teo and Woo (2004), we do not know of other papers that have had much empirical success forecasting factor returns.

How should we interpret these forecasting results? We consider three classes of explanations. In the first class of explanations, the results are mechanical: the act of issuing stock is assumed to directly lower required stock returns. For instance, because equity issues have the effect of de-levering a firm's assets, required stock returns fall mechanically post-issuance due to a classic Modigliani and Miller (1958) effect. A variation of this explanation is that issuance causes lower returns because firms convert growth options into assets in place when they invest. Because growth options are riskier than installed assets, required returns fall post-issuance (Carlson, Fisher, and Giammarino (2004, 2006)). However, these explanations are unable to account for our results because issuer–repurchaser spreads forecast characteristic returns for firms that *do not issue or repurchase* and hence are not subject to these mechanical effects.

A second potential explanation is that issuance responds to time-variation in rationally required returns. This interpretation is natural once one recognizes that issuance may proxy for investment and that firm characteristics may proxy for loadings on priced risk factors. Specifically, when the rationally determined price of risk associated with some factor declines (e.g., *SMB*), firms with large loadings on this factor (e.g., small firms) will invest more. Such investment will be partially financed by raising additional equity. Thus, the characteristics of equity issuers might contain information about rationally time-varying factor risk premia.

A third explanation is that firms issue and repurchase shares to exploit time-varying characteristic mispricing. For instance, characteristic-based expected returns may fluctuate due to time-varying investor enthusiasm for different themes such as "internet" or "small" stocks. Firms endowed with an overvalued characteristic with low expected returns might exploit this by selling shares or undertaking stock-financed acquisitions. This activity benefits existing long-term shareholders at the expense of short-term investors who buy overpriced shares. Likewise, firms endowed with an undervalued characteristic may decide to repurchase existing shares. Firms may have an advantage in undertaking such transactions because, in contrast to many institutional investors, they are not engaged in performance-based arbitrage that limits investors' willingness to make contrarian bets (Shleifer and Vishny (1997); Stein (2005)).

Discriminating between the second and third explanations is difficult because theories of time-series variation in expected returns are quite flexible. Furthermore, there is little reason to believe that only a single channel is operational—both time-variation in rationally required returns and mispricing may play a role in explaining the patterns we observe. However, we show that the data reject one literal version of the second explanation. This is because, absent mispricing, issuance responds to changes in expected returns only because equity is used to finance investment. This means that the *way* investment is financed (using equity, debt, or retained earnings) should not be informative about future stock returns. Thus, under the null of no mispricing, differences in characteristics of firms with high and low levels of investment (the "investment–noninvestment spread") should be stronger return predictors than the issuer–repurchaser spread, that is, investment should be a better forecaster of returns than issuance.

In univariate regressions, investment-based characteristic spreads have some limited ability to predict characteristic-level returns. However, in horse races with our issuer–repurchaser spreads, the issuer–repurchaser spreads generally remain significant while the investment-based spreads often enter with the wrong sign. While this is promising for the mispricing explanation, we sound several notes of caution. First, capital expenditures may fail to capture the full range of *planned* investments. For example, with high adjustment costs, firms may issue equity when rationally required returns decline. But, because it may take time for firms to fully invest the proceeds from equity issuance, we may not observe capital expenditures right away. Furthermore, we cannot rule out alternatives in which firms optimally de-lever—for reasons unrelated to timing—when rationally required returns fall.

Irrespective of whether one favors the second or third explanation, our results show that characteristic-level issuance forecasts characteristic-related stock returns. In this sense, firms can be said to have timed characteristic-based factor returns ex post. In the last section of the paper, we ask what fraction of the underperformance of recent stock issuers can be explained by such timing. If firms respond only weakly to time-varying expected characteristic returns, factor timing might be relatively unimportant from a corporate finance standpoint even if it is useful for forecasting factor returns. However, our estimates suggest that at least one-fifth of the underperformance of recent share issuers is due to characteristic-based factor timing, so our results are also of broader interest for corporate finance.

Section I motivates our empirical strategy. Section II describes the construction of our characteristic issuer–repurchaser spread measures. In Section III, we use issuer–repurchaser spreads to forecast returns. Section IV discusses alternate explanations of these findings. Section V evaluates the economic importance of characteristic-based factor timing from the standpoint of corporate finance. Section VI concludes.

I. Empirical Strategy

We develop a simple framework to motivate our empirical strategy that uses patterns in share issuance to identify time-variation in the expected returns on characteristic-based factors.

We assume that expected firm-level stock returns are given by the conditional model

$$E_{t-1}[R_{i,t}] = \alpha_{t-1} + \beta_1 \cdot X_{i,t-1} + \beta_2 \cdot (T_{t-1} \times X_{i,\,t-1}) + \mu_{i,t-1}, \tag{1}$$

where $X_{i,t-1}$ denotes firm i's characteristic and T_{t-1} reflects time-series variation in the conditional expected return associated with that characteristic.[2] It makes no difference if time-series variation in expected characteristic returns reflects movements in rationally required returns, or, alternately, whether this variation reflects mispricing. In the first case, it is natural to assume that characteristic $X_{i,t-1}$ is related to the firm's loading on some risk factor whose price of risk (T_{t-1}) varies over time. In the second case, equation (1) represents the idea that investor sentiment is associated with different themes during different periods. In this case, themes attach to attributes such as "internet," "profitable," "large stocks," or "high dividend yield," and so on.

To keep matters simple, we write equation (1) as a function of a single characteristic. Without loss of generality, we also assume that $E[T_{t-1}] = 0$, so that β_1 represents the average cross-sectional effect of $X_{i,t-1}$ (e.g., the average premium associated with size), and that $X_{i,t-1}$ and T_{t-1} are independent. We also assume that $\mu_{i,t-1}$ is identically and independently distributed over time and across firms, with mean zero and variance σ_u^2. This term captures the idea that

[2] Baker and Wurgler (2006) call this a "conditional characteristics" model of expected returns.

expected returns can only partially be explained by the characteristic under investigation.[3]

We assume that corporations issue stock when expected returns are low and repurchase when expected returns are high. Thus, net stock issuance (*NS*) is given by

$$NS_{i,t-1} = -E_{t-1}[R_{i,t}] + \varepsilon_{i,t-1}, \tag{2}$$

where $\varepsilon_{i,t-1}$ is independently distributed over time and across firms. We assume a unit elasticity of net issuance with respect to expected returns for simplicity only. Equation (2) can be interpreted within a fully rational paradigm in which firms invest more and hence issue more equity when rationally required returns fall. Equation (2) can also be interpreted as capturing the idea that managers derive benefits from issuing overpriced equity (and likewise, from repurchasing underpriced equity).[4]

The term ε in equation (2) captures the idea that equity issuance is a noisy signal of expected returns. For instance, in a fully rational model, firms might experience offsetting shocks to investment opportunities when required returns change so investment will not move one-for-one with expected returns. Furthermore, equity issuance is only a noisy signal of investment because it reflects a series of uninformative decisions about how investment should be financed. There are also many reasons why firms might not issue or repurchase shares in response to perceived mispricing. Specifically, as explored in Stein (1996), the impact of any perceived mispricing on equity issuance depends on whether the firm is financially constrained (e.g., whether it is costly to deviate from target leverage) and on the slope of the demand curve for the firm's stock. As a result, some firms might like to exploit mispricing, but cannot or do not for idiosyncratic reasons.[5] Under this interpretation, the larger is the variance of ε, the smaller is the role of market timing in explaining net stock issuance.

Substituting (1) into (2), we have

$$NS_{i,t-1} = -[\alpha_{t-1} + \beta_1 \cdot X_{i,t-1} + \beta_2 \cdot (T_{t-1} \times X_{i,t-1}) + \mu_{i,t-1}] + \varepsilon_{i,t-1}. \tag{3}$$

[3] We do not need to assume anything about the average return premium associated with a given characteristic or how this premium arises. For example, Daniel and Titman (1997) argue that the average returns associated with book-to-market can be explained by firms' characteristics rather than their covariances (i.e., factor loadings), while Davis, Fama, and French (2000) use an extended data set from 1929 to 1997 and argue that this result is specific to a shorter sample. Either of these perspectives is consistent with our identification strategy.

[4] As long as mispricing eventually reverts, such opportunistic issuance benefits long-term shareholders at the expense of short-term shareholders who buy the mispriced securities. Shleifer and Vishny (2003) and Baker, Ruback, and Wurgler (2007) discuss this point in greater detail.

[5] First, financially constrained firms may be unable to repurchase shares in response to perceived undervaluation (Hong, Wang, and Yu (2008)). Second, if the firm is already sitting on cash or paying large dividends, investors may interpret an SEO as a clear signal that the firm is overvalued. Since the firm then faces a steep demand curve for its stock, announcing a large SEO would significantly lower the share price, defeating the initial purpose of issuing stock. For instance, Microsoft did not undertake an SEO during the Internet boom even though Steve Ballmer remarked that "There is such an overvaluation of technology stocks, it is absurd" (Reuters, September 23, 1999).

Equation (3) says that issuance responds to market-wide, characteristic-specific, and firm-specific expected returns. Now consider a univariate *cross-sectional* regression of issuance in period t–1 on characteristics $X_{i,t-1}$: $NS_{i,t-1} = \theta_{t-1} + \delta_{t-1} \cdot X_{i,t-1} + \varepsilon_{i,t-1}$. The slope coefficient from this regression is

$$\delta_{t-1} = -(\beta_1 + \beta_2 \cdot T_{t-1}), \tag{4}$$

which is the conditional expected return associated with $X_{i,t-1}$. Assuming that β_1 and β_2 are fixed, the time series of cross-sectional regression coefficients δ_{t-1} will reveal time-variation in characteristic expected returns T_{t-1}. The intuition here is straightforward: while the relationship between expected returns and individual firm issuance and repurchase decisions will be noisy, the full cross-section of net stock issuance may contain valuable information about characteristic-level expected returns.

The benefit of this approach is best illustrated by the following example. Suppose we are interested in forecasting Google's return for the coming year. Following the literature on the cross-section of expected stock returns, we might assemble information on Google's characteristics (e.g., book-to-market, size, dividend yield, profitability, industry, etc.) and construct a forecast under the assumption that each characteristic is associated with some average return in the cross-section. However, the previous discussion suggests a refinement. We can use the net issuance of firms that have the same characteristics as Google to back out the conditional expected return associated with these characteristics. Such information is captured by δ_{t-1}.

A simple implementation of this idea is to compute differences between the characteristics of issuers (firms with high $NS_{i,t-1}$) and repurchasers (firms with low $NS_{i,t-1}$); the time series of these differences should negatively forecast returns associated with that characteristic. We adopt this implementation in Section III.

One might wonder whether our approach is capable of generating information that is not already contained in a firm's own net stock issuance. In other words, why not simply look at Google's issuance as opposed to the issuance of firms like Google? To understand why, consider a panel regression of stock returns on lagged values of firm characteristics, interactions of the lagged characteristic with our cross-section-based estimate of characteristic expected returns (T_{t-1}), and lagged firm net issuance

$$R_{i,t} = a_t + b_1 \cdot X_{i,t-1} + b_2 \cdot (T_{t-1} \times X_{i,t-1}) + c \cdot NS_{i,t-1} + u_{i,t}. \tag{5}$$

Does the knowledge of T_{t-1} help forecast stock returns beyond a firm's own net issuance? We have

$$b_2 = \beta_2 \frac{\sigma_\varepsilon^2}{\sigma_\mu^2 + \sigma_\varepsilon^2}, \tag{6}$$

so b_2 will be nonzero as long as $\sigma_\varepsilon^2 > 0$. Thus, our estimates of time-varying characteristic expected returns will have incremental forecasting power so long as individual firm net issuance is a noisy signal of expected returns.

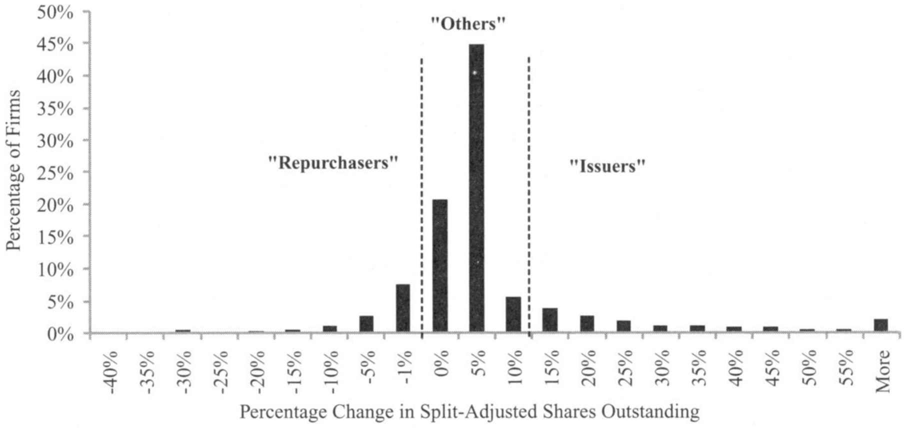

Figure 1. Distribution of split-adjusted share growth. The distribution of percentage changes in split-adjusted shares outstanding in fiscal 1984. Repurchasers are seasoned firms that reduce split-adjusted shares outstanding by more than 0.5% during the fiscal year. Issuers are seasoned firms that increase shares outstanding by more than 10% during the fiscal year. These breakpoints are indicated using dashed lines below. Seasoned firms that are not classified as issuers or repurchasers are classified as "others." The figure does not include new lists, which may have undefined share growth in their first year.

II. Issuer–Repurchaser Characteristic Spreads

The previous section suggests that, if we measure the extent to which net issuers are disproportionately endowed with a certain characteristic, then this should provide information about the conditional expected returns associated with that characteristic. We do this for 11 characteristics, as well as a set of industry-related attributes.

A. Calculation

Following Fama and French (2008a), we define net stock issuance (*NS*) as the change in log split-adjusted shares outstanding from Compustat (CSHO × AJEX).

In December of year *t*–1, we divide all firms into *New lists*, *Issuers*, *Repurchasers*, and *Others* (i.e., nonissuers) based on share issuance in year *t*–1. The category *New lists* comprises firms that listed during year *t*–1 (these firms have *Age* less than one in December of year *t*–1). Since many of the characteristics we study cannot be defined for new lists, we discard these firms from our baseline measures. The remaining seasoned firms are divided into three categories: *Issuers* have *NS* greater than 10%, *Repurchasers* have *NS* less than –0.5%, and *Others* have *NS* between –0.5% and 10%. Since we are using a composite net issuance measure, issuers include firms completing SEOs, stock-financed mergers, and other corporate events that significantly increase shares outstanding (e.g., large executive compensation schemes). Figure 1 illustrates the breakdown of *NS* into these three groups by showing the histogram of net issuance of public firms in 1984. Table I summarizes the breakdown by year. Between 1962 and 2006, an average 6.6% of firms were new lists, 12.4% were issuers, and 13.5% were repurchasers.

Table I also shows the average net issuance for firms in each group. Among issuers, average net issuance hovered near 20% during the 1960s and 1970s, trended upwards during the 1980s, and reached a peak of 43.9% in 1993, before declining somewhat since the early 1990s. Repurchasers have bought back between 3% and 7% of shares, on average, since the early 1970s; however, there has been a modest trend toward smaller repurchases in recent years. Due to growth in executive compensation, the average value of *NS* among nonissuers has risen slightly from 1.1% in 1973 to 2.0% in 2006 (Fama and French (2005)).

Our objective is to measure time-series variation in the composition of issuers and repurchasers. Let $X_{i,t-1}$ denote firm i's value of (or cross-sectional decile for) characteristic X in year t–1. We define the issuer–repurchaser spread for characteristic X as the average characteristic decile of issuers minus the average characteristic decile of repurchasers:

$$ISSREP_{t-1}^{X} = \frac{\sum\limits_{t \in Issuers} X_{i,t-1}}{N_{t-1}{}^{Issuers}} - \frac{\sum\limits_{i \in Repurchasers} X_{i,t-1}}{N_{t-1}{}^{Repurchasers}}, \qquad (7)$$

where cross-sectional X-deciles for each year are based on NYSE breakpoints. For instance, if we consider size (*ME*), then $ISSREP_{t-1}^{ME} = 1$ indicates that issuing firms were on average one size decile larger than repurchasing firms in year t–1.

Although in principle our approach could be applied to *any* characteristic, we limit ourselves to traits that have appeared in previous work and, more importantly, can be measured reliably since the 1960s. We define characteristic issuer–repurchaser spreads for book-to-market equity (*B/M*); size (*ME*); a number of size-related characteristics: nominal share price (*P*), age, beta (β), idiosyncratic volatility (σ), distress (*SHUM*) proxied using the Shumway (2001) bankruptcy hazard rate, and dividend policy (*Div*); and several other characteristics that are featured in literature on the cross-section of stock returns: sales growth ($\Delta S_t/S_{t-1}$), accruals (*Acc/A*), and profitability (E/B). Because of their prominence in the asset pricing literature, we always present results for book-to-market and size first before turning to the other characteristics.

The detailed construction of each characteristic is described in the Appendix. All characteristics except for dividend policy are measured using NYSE deciles; dividend policy is a dummy variable that takes a value of one if the firm paid a cash dividend in that year. We follow the Fama and French (1992) convention that accounting variables are measured in the fiscal year ending in year t–1 and market-based variables are measured at the end of June of year t.

The issuer–repurchaser spread captures the tilt of net issuance with respect to a given characteristic. A few alternate constructions could capture the same intuition. One obvious alternative would be to compare characteristics between

Table I

Stock Issuers, Nonissuers, and Repurchasers 1962–2006

The first appearance of a company on CRSP is classified as a new list. Issuers are seasoned firms that increase shares outstanding by more than 10% during the fiscal year. Repurchasers are seasoned firms that reduce split-adjusted shares outstanding by more than 0.5% during the fiscal year. Seasoned firms that are not classified as issuers or repurchasers are classified as "others." The right-hand columns show the mean change in split-adjusted shares outstanding for firms in each group. Changes in firm shares outstanding are winsorized at the 0.5 and 99.5% levels.

	Counts by Firm Type					Mean Change in Shares Outstanding (%)		
Fiscal Year	All Firms	New Lists	Issuers	Repurchasers	Others	Issuers	Repurchasers	Others
1962	1,033	331	31	73	598	22.1	−3.0	0.8
1963	1,149	41	67	110	931	27.1	−3.2	0.8
1964	1,240	61	57	132	990	22.5	−2.7	0.9
1965	1,330	68	74	132	1,056	27.0	−3.1	0.9
1966	1,426	62	92	162	1,110	20.5	−2.6	1.0
1967	1,515	75	145	78	1,217	25.8	−3.1	1.2
1968	1,650	105	276	71	1,198	26.1	−2.9	1.5
1969	1,823	147	254	110	1,312	24.5	−2.5	1.7
1970	1,960	95	165	188	1,512	23.4	−2.6	1.4
1971	2,060	100	174	144	1,642	21.6	−3.0	1.3
1972	2,848	771	209	168	1,700	20.2	−2.7	1.3
1973	3,379	52	245	592	2,490	19.8	−3.9	1.1
1974	3,396	31	146	611	2,608	18.2	−4.5	0.7
1975	3,756	61	192	536	2,967	18.9	−4.8	0.7
1976	3,832	92	224	473	3,043	19.3	−5.9	0.8
1977	3,771	78	241	504	2,948	19.1	−6.2	0.9
1978	3,742	97	279	443	2,923	21.3	−5.9	1.1
1979	3,718	102	320	486	2,810	21.6	−5.6	1.1
1980	3,787	197	407	432	2,751	23.7	−5.5	1.2
1981	3,961	302	551	408	2,700	26.4	−5.1	1.4
1982	4,027	129	481	521	2,896	27.7	−5.9	1.1
1983	4,312	386	776	351	2,799	27.8	−5.5	1.4
1984	4,424	274	654	545	2,951	33.2	−6.8	1.3
1985	4,368	224	552	573	3,019	30.8	−6.5	1.3
1986	4,512	409	714	499	2,890	32.4	−6.0	1.3
1987	4,663	369	743	770	2,781	33.7	−5.8	1.4
1988	4,575	203	588	917	2,867	36.0	−5.7	1.2
1989	4,494	216	572	735	2,971	33.9	−5.3	1.2
1990	4,456	223	536	863	2,834	33.9	−5.5	1.2
1991	4,478	307	658	627	2,886	37.9	−5.0	1.2
1992	4,736	407	919	430	2,980	39.6	−4.4	1.5
1993	5,646	649	1,076	506	3,415	43.9	−4.5	1.7
1994	5,967	551	1,028	731	3,657	42.3	−4.7	1.6
1995	6,146	544	1,096	782	3,724	37.7	−4.4	1.6
1996	6,518	758	1,323	907	3,530	40.8	−4.9	1.8
1997	6,354	490	1,286	955	3,623	37.9	−4.9	1.8
1998	5,906	367	1,079	1,163	3,297	36.9	−5.1	1.8
1999	5,697	474	956	1,460	2,807	33.8	−5.7	1.8
2000	5,485	413	1,044	1,422	2,606	35.2	−5.6	2.1

(*continued*)

Table I—*Continued*

Fiscal Year	Counts by Firm Type: All Firms	New Lists	Issuers	Repurchasers	Others	Mean Change in Shares Outstanding (%): Issuers	Repurchasers	Others
2001	4,961	124	772	1,017	3,048	33.1	−5.1	1.9
2002	4,626	115	590	901	3,020	29.7	−4.2	1.7
2003	4,440	119	627	766	2,928	30.4	−4.3	1.7
2004	4,408	233	755	606	2,814	31.7	−3.7	2.1
2005	4,318	233	599	766	2,720	32.1	−4.0	2.1
2006	4,218	219	612	886	2,501	30.6	−4.5	2.0

new lists and existing firms. Underlying this would be the idea that a firm's decision to go public is affected by the conditional expected returns associated with its characteristics. Not surprisingly, spreads based on the characteristics of new lists are correlated with measures we compute in (7).[6]

Although we examine a variety of characteristics, one might expect our approach to work better for some characteristics than others. One issue is that, in order for $ISSREP^X$ to forecast returns associated with characteristic X, any time-variation in expected returns must be sufficiently persistent for managers to be able to act on it. Thus, we would be surprised to find firms timing their issuance to exploit short-lived signals about expected returns such as one-month reversal. By contrast, we would be less surprised to find firms responding to changes in expected returns of more persistent characteristics such as B/M, size, or industry. A second issue is that, in order for there to be meaningful time-variation in expected returns, the characteristic should correspond to some salient dimension along which investors categorize stocks.[7] Consistent with these intuitions, our strongest and most robust results tend to be for B/M, size, and industry.

When using the issuer–repurchaser spreads to forecast returns, we primarily focus on the 1972 to 2006 period, thus forecasting returns for 1973 to 2007, although we always show results for the full 1963 to 2007 period as well. Our focus on the later data is for two reasons. First, we worry that characteristic

[6] We achieve many of the same results if we instead define a "new list-minus-repurchaser" spread constructed analogously to our main predictor. However, for several of the characteristics we consider, the new list characteristic series is noisier than our SEO-based series, driven by a few years in which the number of new lists is quite small.

[7] Investor categorization is likely to be important if time-variation in expected characteristic returns is due to mispricing. For instance, Barberis and Shleifer (2003) develop a model in which investors categorize stocks into styles and allocate funds amongst styles by extrapolating past performance, resulting in style-level mispricing. Among the characteristics listed above, book-to-market, size, dividend payout policy, and industry stand out as being highly relevant for investor categorization—for example, there are mutual funds dedicated to each of these categories: if characteristic expected returns fluctuate due to rational time-variation in required returns, then characteristic returns must be correlated with investor marginal utility. However, this condition might plausibly be met for salient firm characteristics such as B/M, size, and industry.

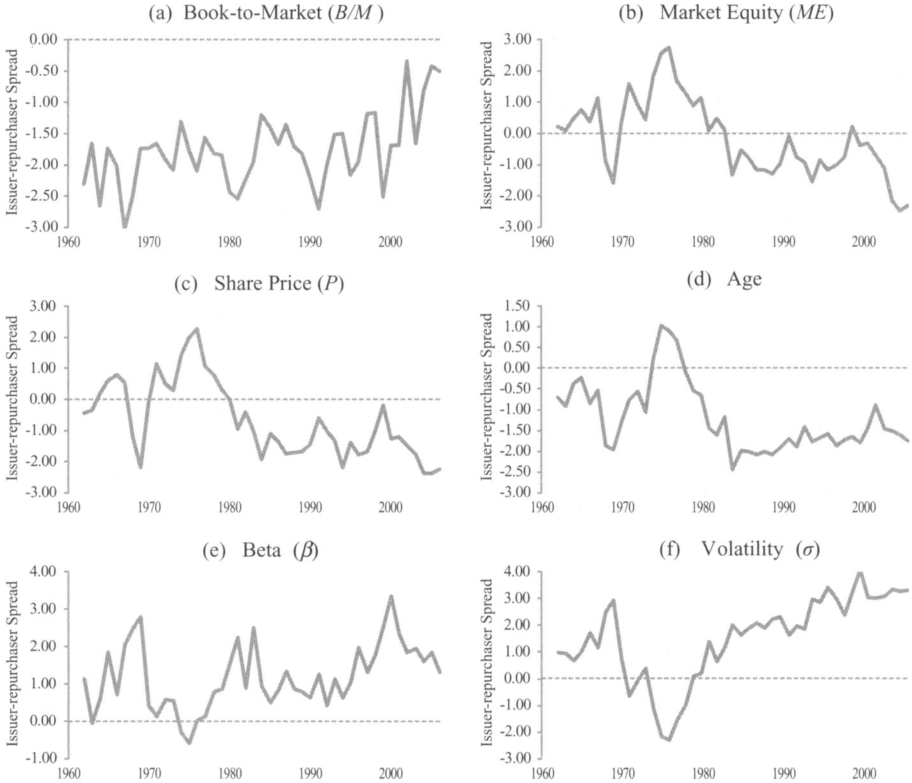

Figure 2. Issuer–repurchaser spreads 1962–2006. We plot the difference between the average characteristics of stock issuers and stock repurchasers. Firm characteristics include the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All characteristics except for dividend policy are measured by their NYSE decile rank; dividend policy is a dummy variable that takes a value of one if the firm paid a dividend in that year.

spreads are contaminated by changes in the CRSP universe due to the introduction of NASDAQ data in December 1972. Second, Pontiff and Woodgate (2008) and Fama and French (2008b) find that net share issuance does not predict returns prior to 1970 and 1963, respectively. Bagwell and Shoven (1989) point out that repurchases surged after 1982. Fama and French (2005) argue that share issuance has become far more widespread post-1972, while Fama and French (2008c) show that net issuance was more responsive to valuations (*B/M*) in their 1983–2006 subsample than from 1963–1982.

B. Discussion

Figure 2 plots and Table II summarizes issuer–repurchaser spreads for each characteristic. Panel A of Table III lists the average cross-sectional

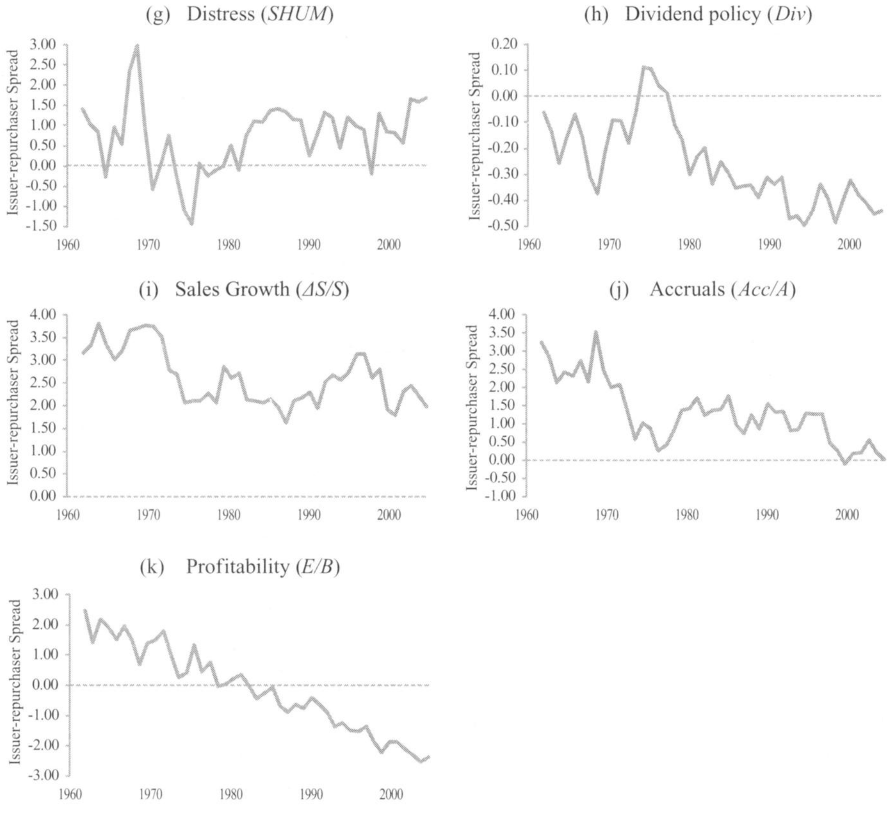

Figure 2. *Continued.*

correlations between our 11 characteristics (in decile form) and Panel B of Table III summarizes the time-series correlations between the 11 issuer–repurchaser spreads.

From Table II, the average value of the issuer–repurchaser spread for book-to-market is −1.78 deciles and is always negative, as issuers are disproportionately growth firms throughout the sample. More importantly for our purposes, Panel A of Figure 2 shows that the issuer–repurchaser spread for book-to-market exhibits significant time-series variation. The spread starts out low during the "tronics" fad of 1962 and is low again during the boom of 1967–1968. The spread is high during the bear market of the early to mid-1970s, but declines during the late 1970s and the IPO boom of the early 1980s. The spread begins to rise in 1983 and remains high throughout the remainder of the 1980s. It then drops sharply during the technology bubble in 1999, before rising significantly afterwards.

The issuer–repurchaser spread for size is close to zero on average. That is, there has been little *unconditional* size tilt in stock issuance. However, there is significant time-series variation. As shown in Panel B of Figure 2,

Table II

Summary Statistics

This table shows the mean, median, standard deviation, and extreme values of issuance, firm characteristics, and returns. To be included in the sample, the firm must (1) report positive book equity in the fiscal year ending in calendar year *t*–1 and (2) have CRSP market equity in June of year *t*. Panel A summarizes net stock issuance (*NS*) defined as the percentage change in split-adjusted shares outstanding from Compustat from year *t*–2 to *t*–1. Panel B summarizes firm characteristics as defined in the Appendix. All continuous variables in Panels A and B are winsorized in each cross-section at the 0.5% and 99.5% levels. Panel C summarizes issuer–repurchaser spreads. The issuer–repurchaser spread for characteristic *X* is the difference between the mean NYSE decile of *X* between stock issuers and repurchasers in that year. Panel D summarizes investment–noninvestment spreads. The investment–noninvestment spread for characteristic *X* is the difference between the average NYSE decile of *X* between top quintile investment firms and bottom quintile investment firms. Panel E summarizes value-weighted long–short portfolio returns based on the characteristics summarized in Panel B. The construction of these long–short returns follows the Fama and French (1993) procedure for constructing HML and is described in detail in the text.

	N	Mean	Median	*SD*	Min	Max
Panel A: Net Stock Issuance (Firm-years)						
Net stock issuance (*NS*)%	172,693	8.08	0.51	28.59	−35.49	499.23
Panel B: Characteristics (Firm-Years 1962–2006)						
Book-to-Market (*B/M*)	175,111	0.90	0.67	0.87	0.01	12.18
Size (*Log(ME)*)	175,111	4.49	4.34	2.13	−3.23	13.17
Price (*P*)	175,111	18.08	13.25	17.48	0.06	168.50
Age	175,111	13.27	8.42	14.07	0.00	81.00
Beta (β)	169,172	1.13	1.03	1.03	−4.23	7.40
Volatility (σ)%	169,172	13.03	10.87	8.45	2.20	80.35
Distress (*SHUM*)%	155,336	1.99	0.25	7.39	0.00	98.75
Dividend Policy (*Div*)	172,424	0.47	0.00	0.50	0.00	1.00
Sales Growth ($\Delta S/S_{t-1}$)%	170,039	14.57	10.70	37.72	−216.56	316.11
Accruals (*Acc/A*)%	147,346	−2.42	−3.02	11.14	−57.06	63.88
Profitability (*E/B*)%	172,477	0.65	10.27	47.97	−647.90	298.53
Panel C: Issuer–Repurchaser Spreads (Annual 1962–2006)						
B/M (High–Low)	45	−1.78	−1.75	0.58	−3.05	−0.35
ME (High–Low)	45	−0.16	−0.32	1.23	−2.48	2.76
P (High–Low)	45	−0.67	−1.03	1.22	−2.40	2.28
Age (High–Low)	45	−1.21	−1.47	0.83	−2.45	1.03
β (High–Low)	45	1.18	1.05	0.88	−0.60	3.34
σ (High–Low)	45	1.50	1.83	1.57	−2.33	4.07
SHUM (High–Low)	45	0.73	0.83	0.84	−1.45	2.98
Div (Payer–Nonpayer)	45	−0.26	−0.31	0.16	−0.50	0.11
$\Delta S/S_{t-1}$ (High–Low)	45	2.62	2.57	0.61	1.62	3.82
Acc/A (High–Low)	45	1.30	1.27	0.87	−0.12	3.53
E/B (High– Low)	45	−0.15	−0.06	1.40	−2.53	2.47

(*continued*)

Table II—*Continued*

	N	Mean	Median	SD	Min	Max
Panel D: Investment-Based Characteristic Spreads (Annual 1962–2006)						
B/M (High–Low)	45	−1.33	−1.17	0.55	−2.41	−0.43
ME (High–Low)	45	1.18	1.09	0.50	0.39	2.13
P (High–Low)	45	1.00	0.95	0.51	0.12	1.92
Age (High–Low)	45	−0.25	−0.26	0.48	−1.21	0.77
β (High–Low)	45	0.17	0.15	0.58	−1.18	1.93
σ (High–Low)	45	−0.33	−0.45	0.71	−1.32	2.14
SHUM (High– Low)	45	−0.88	−0.83	0.50	−2.18	0.55
Div (Payer–Nonpayer)	45	0.04	0.05	0.08	−0.20	0.15
$\Delta S/S_{t-1}$ (High–Low)	45	1.36	1.37	0.58	−0.15	2.57
Acc/A (High–Low)	45	−1.41	−1.41	0.50	−2.40	−0.18
E/B (High–Low)	45	1.23	1.19	0.48	0.33	2.00
Panel E: Characteristic-Based Portfolio Returns (Monthly% July 1963–June 2008)						
B/M (High–Low)	540	0.44	0.42	2.95	−13.94	13.95
ME (High–Low)	540	−0.22	−0.04	3.18	−22.38	17.13
P (High–Low)	540	0.04	0.12	3.06	−18.88	9.62
Age (High–Low)	540	−0.01	−0.08	3.96	−15.99	19.33
β (High–Low)	540	0.17	0.07	2.79	−17.23	16.49
σ (High–Low)	540	0.07	−0.03	4.72	−18.60	31.16
SHUM (High–Low)	540	−0.14	−0.12	2.93	−9.44	10.80
Div (Payer–Nonpayer)	540	−0.08	0.04	4.35	−21.45	16.36
$\Delta S/S_{t-1}$ (High–Low)	540	−0.09	−0.07	2.17	−7.35	9.62
Acc/A (High–Low)	540	−0.29	−0.36	1.65	−5.59	6.32
E/B (High–Low)	540	0.10	0.07	2.26	−15.70	11.02

issuance was tilted toward small firms in the late 1960s and toward large firms during the "nifty-fifty" period of the early 1970s, when large firms were popular with investors. The spread appears slightly countercyclical, increasing modestly during each of the recessions in our sample with the exception of the 1980–1982 recession.

As shown in Panel B of Table III, the issuer–repurchaser spreads for size, price, age, beta, idiosyncratic volatility, and dividend policy are all strongly correlated, with pairwise correlations ranging from 0.44 to 0.97 in magnitude. Panel C of Figure 2 shows that the issuer–repurchaser spread for share price closely tracks the spread for size. Weld et al. (2009) and Baker, Greenwood, and Wurgler (2009) point out that size and price are strongly correlated in the cross-section. Greene and Hwang (2009) suggest that investors classify stocks based on their nominal share price.

Panel D of Figure 2 shows that the issuer–repurchaser spread for age also tracks the spread for size, particularly during the first half of the sample. Consistent with Loughran and Ritter (2004), who find little change in the age of IPO firms from 1980 to 1998, the age spread has been relatively constant since the early 1980s. However, there is a small shift toward older issuers after the collapse of technology stocks in 2000.

Table III

Correlations among Characteristics and Issuer–Repurchaser Spreads

Panel A shows the average cross-sectional correlations between firm characteristics. Firm characteristics include the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All variables are measured as NYSE deciles, except for dividend policy, which is a dummy variable taking a value of one when a firm paid a dividend. Panel B shows the time-series correlation among issuer–repurchaser spreads based on the same set of characteristics.

	B/M	*ME*	*P*	*Age*	β	σ	*SHUM*	*Div*	$\Delta S/S_{t-1}$	*Acc/A*	*E/B*
Panel A: Average Cross-sectional Correlations between Characteristics											
Value & Size:											
B/M	1.00										
ME	−0.22	1.00									
Size-related:											
P	−0.22	0.76	1.00								
Age	0.17	0.42	0.34	1.00							
β	−0.15	−0.03	−0.09	−0.11	1.00						
σ	−0.08	−0.52	−0.54	−0.37	0.36	1.00					
SHUM	0.27	−0.63	−0.64	−0.26	−0.01	0.32	1.00				
Div	0.09	0.42	0.48	0.36	−0.22	−0.58	−0.27	1.00			
Other characteristics:											
$\Delta S/S_{t-1}$	−0.29	0.06	0.10	−0.19	0.11	0.06	−0.10	−0.07	1.00		
Acc/A	−0.10	−0.04	0.00	−0.08	0.05	0.01	0.00	−0.01	0.25	1.00	
E/B	−0.41	0.28	0.36	0.01	0.02	−0.19	−0.31	0.22	0.33	0.19	1.00

(*continued*)

Table III—*Continued*

	B/M	*ME*	*P*	*Age*	β	σ	*SHUM*	*Div*	$\Delta S/S_{t-1}$	*Acc/A*	*E/B*
Panel B: Time-Series Correlations between Issuer–repurchaser Spreads											
Value & Size:											
B/M	1.00										
ME	−0.45	1.00									
Size-related:											
P	−0.40	0.97	1.00								
Age	−0.15	0.85	0.87	1.00							
β	−0.04	−0.44	−0.51	−0.45	1.00						
σ	0.27	−0.89	−0.88	−0.83	0.68	1.00					
SHUM	0.25	−0.83	−0.80	−0.71	0.45	0.72	1.00				
Div	−0.25	0.88	0.9	0.85	−0.58	−0.94	−0.65	1.00			
Other characteristics:											
$\Delta S/S_{t-1}$	−0.33	0.19	0.23	0.11	0.08	−0.08	0.10	0.12	1.00		
Acc/A	−0.45	0.16	0.19	0.02	−0.07	−0.17	0.19	0.26	0.72	1.00	
E/B	−0.55	0.65	0.67	0.51	−0.38	−0.67	−0.26	0.73	0.58	0.76	1.00

The issuer–repurchaser spreads for beta and volatility are highly correlated in the time series ($\rho = 0.68$). While the issuer–repurchaser spread for beta is usually positive, Panel E shows that issuance was particularly tilted towards high beta firms during the late 1960s, early 1980s, and late 1990s. The issuer–repurchaser spread for volatility is always positive and has trended steadily upwards since the late 1970s.

The issuer–repurchaser spread for distress in part reflects the previous results for size and volatility. Our distress measure is the bankruptcy hazard rate estimated by Shumway (2001) and reflects a linear combination of size, volatility, past returns, profitability, and leverage. As shown in Panel G of Figure 2, issuers typically face higher bankruptcy risks than repurchasers. Issuance was tilted towards firms with high bankruptcy risk during the late 1960s and early 1970s, with the pattern reversing in the mid-1970s. Not surprisingly, there is some tendency for the issuer–repurchaser spread for distress to decline during recessions.

The issuer–repurchaser spread for dividend policy is highly correlated with the spreads for size and age. This series is also 50% correlated with the Baker and Wurgler (2004) dividend premium. This is not surprising given the cross-sectional correlation between net issuance and market-to-book ratios.

The issuer–repurchaser spread for sales growth is always positive, indicating that issuers have higher sales growth than repurchasers on average. Panel I of Figure 2 suggests that issuance was particularly tilted toward firms with high sales growth during the late 1960s and early 1970s, the early 1980s, and again in the late 1990s. The issuer–repurchaser spread for accruals is typically positive and is highly correlated with the issuer–repurchaser spread for sales growth ($\rho = 0.72$). Last, consistent with the findings in Fama and French (2004), Panel K of Figure 2 shows that there is a steady downward trend in the profitability of issuers relative to repurchasers.

III. Results

In this section, we use issuer–repurchaser spreads to forecast characteristic returns. We also consider an adjustment to our baseline methodology that allows us to consider industry-related characteristics.

A. Long–Short Portfolio Forecasting Regressions

Our main prediction is that the long–short portfolio for a given characteristic will underperform following periods when the issuer–repurchaser spread is high. Table IV shows the results from our baseline forecasting regression:

$$R_t^X = a + b \cdot ISSREP_{t-1}^X + u_t, \tag{8}$$

where R^X denotes the return on a portfolio that buys firms with high values of characteristic X and sells short firms with low values of X. The construction of these factor portfolios follows the Fama and French (1993) procedure for

Table IV

Forecasting Characteristic Returns

This table shows regressions of monthly long–short portfolio returns on lagged values of the issuer–repurchaser spread for the corresponding characteristic, controlling for contemporaneous returns on the market (*MKTRF*), the Fama–French factors (*HML* and *SMB*) and a momentum factor (*UMD*):

$$R_t^X = a + b \cdot ISSREP_{t-1}^X + c \cdot MKTRF_t + d \cdot HML_t + e \cdot SMB_t + f \cdot UMD_t + u_t.$$

The univariate regressions in Panel A are estimated excluding the controls. The sample period includes monthly returns from July 1963 to June 2008. The long–short portfolios are formed based on firm characteristics: the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All characteristics except for dividend policy are measured as their NYSE decile rank; dividend policy is measured by a dummy variable that takes a value of one if the firm paid a dividend in year t–1. Monthly returns between July of year t and June of year t+1 are matched to the issuer–repurchaser spread in year t–1. Since $ISSREP_{t-1}$ is only refreshed annually, standard errors are clustered by 12-month blocks running from July t to June t+1. t-statistics are in brackets.

	Panel A: Univariate				Panel B: Multivariate			
	1963–2007		1973–2007		1963–2007		1973–2007	
	b	[t]	b	[t]	b	[t]	b	[t]
Value & Size:								
B/M	−0.713	[−2.69]	−0.815	[−2.29]	−0.631	[−2.65]	−0.761	[−2.50]
ME	−0.214	[−1.60]	−0.316	[−3.65]	−0.312	[−2.72]	−0.404	[−5.04]
Size-related:								
p	−0.260	[−3.18]	−0.336	[−4.03]	−0.099	[−1.30]	−0.082	[−1.21]
Age	−0.134	[−0.95]	−0.113	[−0.78]	−0.119	[−1.39]	−0.081	[−0.99]
β	−0.270	[−0.96]	−0.401	[−1.24]	−0.261	[−1.83]	−0.303	[−1.80]
σ	−0.078	[−0.51]	−0.127	[−0.96]	−0.066	[−0.76]	−0.043	[−0.50]
SHUM	−0.381	[−1.68]	−0.624	[−2.93]	−0.170	[−1.29]	−0.218	[−1.79]
Div	−1.407	[−1.13]	−2.332	[−2.27]	−0.795	[−1.17]	−1.301	[−1.92]
Other characteristics:								
$\Delta S/S_{t-1}$	0.075	[0.59]	−0.198	[−0.79]	0.170	[1.30]	0.058	[0.32]
Acc/A	−0.021	[−0.23]	−0.088	[−0.64]	−0.031	[−0.38]	−0.079	[−0.53]
E/B	−0.133	[−1.69]	−0.224	[−1.86]	−0.110	[−1.12]	−0.163	[−1.12]

constructing *HML*.[8] For example, if the characteristic in question is *B/M*, then R^X is simply the return on the Fama and French *HML* portfolio. For the size (*ME*) characteristic, R^X is negative one times *SMB*. We follow the usual timing convention that issuer–repurchase spreads for fiscal years ending in calendar

[8] Firms are independently sorted into Low, Neutral, or High groups of X using 30% and 70% NYSE breakpoints, and into small or big groups based on the NYSE size median. We compute value-weighted returns within these six size-by-X buckets. The long–short factor return for characteristic X is $R^X = \frac{1}{2}(R_{BH} - R_{BL}) + \frac{1}{2}(R_{SH} - R_{SL})$, where, for instance, R_{BH} is the value-weighted return on big, high-X stocks. For size, we use $R^{ME} = -SMB$, while for dividend policy we use $R^{Div} = (R_{Pay} - R_{NoPay})$, where, for instance, R_{Pay} is the value-weighted return on dividend-paying stocks.

year t–1 are matched to monthly returns between July of year t and June of year t+1. In these monthly regressions, the $ISSREP^X$ predictor is measured annually, so standard errors are clustered by portfolio formation year.

Panel A of Table IV shows the results of this univariate forecasting regression for the 1963 to 2007 and 1973 to 2007 sample periods. Our central prediction is confirmed for many of the characteristics we consider, with the strongest and most consistent results for book-to-market and size. For example, using returns between 1963 and 2007, Table IV shows that, when issuers have high book-to-market relative to repurchasers, subsequent returns to *HML* are poor. Likewise, when issuers are particularly small relative to repurchasers, subsequent returns on *SMB* are low. Considering both the 1963 to 2007 and 1973 to 2007 periods, our issuer–repurchaser spreads forecast the returns of all characteristic portfolios in the expected direction, with a single exception. In the later 1973 to 2007 sample, we obtain statistically significant results for book-to-market (*B/M*), size (*ME*), price (*P*), distress (*SHUM*), payout policy (*Div*), and profitability (*E/B*).

The predictability we document is economically significant. For example, the coefficient –0.713 in the first row and column of Table IV implies that, when the issuer–repurchaser spread for *B/M* rises by one decile, *HML* returns fall by 71 bps per month in the following year. Thus, a one standard deviation increase in $ISSREP^{B/M}$ of 0.58 is associated with a 41 bps decline in monthly *HML* returns. One may wish to compare these effects to the mean and standard deviation of characteristic portfolio returns shown in Table I. As can be seen, 41 bps is large relative to the average monthly *HML* return of 44 bps and its monthly standard deviation of 295 bps. Similar calculations show that the estimates in Table IV imply economically meaningful predictability for size (*ME*), price (*P*), β, distress (*SHUM*), dividend policy (*Div*), and profitability (*E/B*).

In Panel B, we add controls for contemporaneous (monthly) realizations of market excess returns, *HML*, *SMB*, and *UMD*, and thus we effectively use $ISSREP^X$ to forecast the four-factor α of the long–short characteristic portfolios. (We do not include *HML* as a control in the regressions for *B/M* because the dependent variable is *HML*. Similarly, we do not include *SMB* as a control in the *ME* regression because the dependent variable is minus *SMB*.) While these results are generally similar to those from the univariate specifications in Panel A, there are some minor differences. For instance, in the 1973 to 2007 sample period the result for profitability (*E/B*) is no longer significant once we add the four-factor controls; however, the result for β is now borderline significant ($t = -1.80$). We find that the 11 issuer–repurchaser spreads are *jointly* significant forecasters of characteristic returns at greater than the 1% level. However, our most consistent and robust results are for book-to-market and size.[9]

[9] Specifically, we estimate a system of 11 forecasting regressions by OLS and perform an F-test that the coefficients on all the issuer–repurchaser spreads are jointly zero. This test takes into account the correlation of residuals across the forecasting regressions. The p-values for the

Why do the results for characteristics other than book-to-market and size sometimes weaken when we include the four-factor controls? In some cases, this is because the other characteristic is tightly linked to size or book-to-market in the cross-section. Most notably, our ability to forecast returns associated with price (*P*), which is closely related to size, is diminished considerably once we control for contemporaneous realizations of *SMB*. This is not surprising given that the returns on the price-sorted portfolio are 95% correlated with *SMB* returns. Notwithstanding the controls, the ability to forecast the returns of some characteristic-based portfolios remains. In the last column in Table IV, for example, characteristic spreads for β, distress (*SHUM*), and dividend policy (*Div*) are still useful for forecasting returns, despite the tight link between these characteristics and both size and *B/M* in the cross-section and over time. Furthermore, the issuer–repurchaser spreads for the other nine characteristics are jointly significant even in the presence of four-factor controls in Panel B.

B. Issuer-Purged Forecasting Regressions

One concern with the results presented so far is that we might simply be repackaging the net issuance anomaly in characteristic space. This would work as follows. Suppose we take the negative relationship between net stock issues (*NS*) and future returns as a primitive fact. Consider a year in which the issuer–repurchaser spread for characteristic X is high. The long side of the high-X minus low-X portfolio in that year is likely to contain a higher than usual number of issuers and, to the extent that *NS* and X each contain independent information about future returns, we would expect below average returns to the portfolio in that year. Thus, instead of time-varying characteristic expected returns, our results could reflect a time-varying loading on the net issuance anomaly.

Following the approach in Loughran and Ritter (2000), we can address this concern by forecasting the returns to "issuer-purged" characteristic portfolios computed using only the set of nonissuing firms. Specifically, while $ISSREP^{X}$ is calculated as before, the characteristic returns are now based on the subset of seasoned firms where *NS* is between –0.5% and 10%. The cross-sectional breakpoints used when computing the issuer-purged factors are the same as those used for the standard or unpurged factors.

Table V shows these results. As expected, the results are weaker for several characteristics, suggesting that our initial findings in Table IV may be partially picking up the direct effect of issuance. However, in the 1973 to 2007 period, the correlation between the issuer–repurchaser spread and subsequent returns

F-tests that all issuer repurchase spreads are jointly zero are 0.4% (1963 to 2007) and 0.0% (1973 to 2007) in the univariate specifications from Panel A and 0.4% (1963 to 2007) and 0.0% (1973 to 2007) in the multivariate specifications from Panel B. If we exclude B/M and ME from the F-test that the coefficients on all the issuer–repurchaser spreads are jointly zero, the p-values for the remaining system of nine regressions are 5.3% (1963–2007) and 0.2% (1973–2007) in the univariate specifications from Panel A and 13.2% (1963–2007) and 6.6% (1973–2007) in the multivariate specifications from Panel B.

Table V

Forecasting Issuer-Purged Characteristic Returns

This table shows regressions of monthly long–short portfolio returns on lagged values of the issuer–repurchaser spread for the corresponding characteristic, controlling for contemporaneous returns on the market (*MKTRF*), the Fama–French factors (*HML* and *SMB*), and a momentum factor (*UMD*)

$$R_t^X = a + b \cdot ISSREP_{t-1}^X + c \cdot MKTRF_t + d \cdot HML_t + e \cdot SMB_t + f \cdot UMD_t + u_t.$$

The long–short portfolios are computed using only the subset of seasoned firms that did not issue or repurchase stock in the prior fiscal year. The univariate regressions in Panel A are estimated excluding the controls. The sample period includes monthly returns from July 1963 to June 2008. Firm characteristics include the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All characteristics except for dividend policy are measured as their NYSE decile rank; dividend policy is measured by a dummy variable that takes a value of one if the firm paid a dividend in that year. Monthly returns between July of year t and June of year t+1 are matched to the issuer–repurchaser spread in year t–1. Since $ISSREP_{t-1}$ is only refreshed annually, standard errors are clustered by 12-month blocks running from July t to June t+1. t-statistics are in brackets.

	Panel A: Univariate Forecasts of Purged Returns				Panel B: Multivariate Forecasts of Purged Returns			
	1963–2007		1973–2007		1963–2007		1973—2007	
	b	[t]	b	[t]	b	[t]	b	[t]
Value & Size:								
B/M	−0.607	[−2.42]	−0.678	[−2.02]	−0.514	[−2.29]	−0.609	[−2.10]
ME	−0.223	[−1.61]	−0.338	[−3.71]	−0.311	[−2.60]	−0.415	[−4.88]
Size-related:								
P	−0.233	[−2.71]	−0.325	[−3.53]	−0.082	[−1.14]	−0.081	[−1.17]
Age	−0.034	[−0.29]	−0.004	[−0.03]	−0.009	[−0.14]	0.029	[0.43]
β	−0.187	[−0.70]	−0.317	[−1.04]	−0.179	[−1.28]	−0.220	[−1.35]
σ	−0.007	[−0.05]	−0.053	[−0.45]	0.007	[0.10]	0.028	[0.37]
SHUM	−0.372	[−1.56]	−0.669	[−2.65]	−0.151	[−1.18]	−0.248	[−2.16]
Div	−0.667	[−0.54]	−1.494	[−1.50]	−0.096	[−0.15]	−0.584	[−0.94]
Other characteristics:								
$\Delta S/S_{t-1}$	0.162	[1.25]	0.009	[0.03]	0.235	[1.94]	0.234	[1.19]
Acc/A	0.040	[0.44]	0.023	[0.15]	0.033	[0.38]	0.031	[0.19]
E/B	−0.003	[−0.05]	−0.064	[−0.71]	0.024	[0.32]	0.001	[0.00]

remains negative in 9 out of 11 cases, and significant or marginally significant in 5 cases: book-to-market, size, price, distress, and payout policy. In summary, the issuance and repurchase decisions of firms contain information that can be used to forecast returns of nonissuers with similar characteristics.

C. Industry Characteristics

We have not yet considered industry-based returns, although industry is undoubtedly a salient firm characteristic. Industry membership is inherently categorical, and thus does not map neatly into our baseline methodology, which requires us to assign high or low values of a characteristic to each stock (e.g., there is no sense in which a firm is a "high" or a "low" retailer).

We adapt our approach to study the expected returns associated with industry characteristics and estimate pooled monthly forecasting regressions of the form

$$R_{j,t} = a_t + b \cdot NS_{j,t-1} + c \cdot BM_{j,t-1} + d \cdot ME_{j,t-1} + e \cdot MOM_{j,t-1} + f \cdot \beta_{j,t-1} + u_{j,t}. \tag{9}$$

In equation (9), $R_{j,t}$ is the value-weighted return to stocks in industry j. As in the previous section, industry returns are issuer-purged: we use only the subset of seasoned firms that did not issue or repurchase stock in the prior fiscal year. The lagged independent variables include the value-weighted averages of *NS* and *BM* for stocks in that industry, the log market capitalization of stocks in that industry (*ME*), the industry's cumulative returns between months t–13 and t–2 (*MOM*), and the industry's market beta (β). Our baseline specifications are estimated with month fixed effects (a_t), so the identification is from cross-industry differences in net issuance.[10] We also present specifications that add industry fixed effects. Standard errors are clustered by month to account for the cross-sectional correlation of industry residuals.

To estimate equation (9), we require an appropriate definition of industry. We follow the common practice in academic studies of using the 48 industries identified by Fama and French (1997).[11] Many of these industry definitions correspond to those that investors use to classify stocks. For example, there are mutual funds with mandates based on communications, utilities, and petroleum and natural gas, all of which occupy distinct Fama–French industries.

The results of estimating equation (9) are shown in Table VI. The table shows that the issuance and repurchase decisions of firms in a given industry forecast the returns to nonissuers in the same industry. The estimate of –0.019 in the first column implies that, if industry *NS* increases by one percentage point, the returns to nonissuers in the same industry decline by 1.9 basis points per month during the following year. Alternately, a one standard deviation increase in industry *NS* of 5.44% lowers industry returns by 11 bps per month or 1.33% per year. In Panel B we estimate equation (11) replacing the right-hand-side variables with their industry ranks (i.e., 1 through 48). This yields even stronger evidence that industry net issuance is negatively related to future returns. Overall, the results in Table VI suggest that industry-level net issuance contains information about industry-level expected returns.

[10] We obtain similar results using the Fama–MacBeth (1973) procedure, albeit with slightly diminished significance. The pooled estimator with time fixed effects is a weighted average of the coefficients from monthly cross-sectional regressions. However, the panel estimator efficiently weights these cross-sections (e.g., periods with greater cross-industry variance in *NS* receive more weight), whereas Fama–MacBeth assigns equal weights to all periods.

[11] Chan, Lakonishok, and Swaminathan (2007) compare the Fama and French (1997) classifications to Global Industry Classification Standard (GICS)–based classifications commonly used by practitioners. Although they find that GICS-based classifications are slightly better, the Fama and French (1997) classifications perform reasonably.

Table VI

Forecasting Issuer-Purged Industry Returns

This table shows estimates of pooled panel regressions forecasting monthly industry-level stock returns

$$R_{j,t} = a_t + b \cdot NS_{j,t-1} + c \cdot BM_{j,t-1} + d \cdot ME_{j,t-1} + e \cdot MOM_{j,t-1} + f \cdot \beta_{j,t-1} + u_{j,t},$$

where R is the value-weighted return to stocks in industry j. Industry returns are constructed using only the subset of seasoned firms that did not issue or repurchase stock in the prior fiscal year. The independent variables, all lagged, include the value-weighted averages of net share issuance (*NS*) and book-to-market ratio (*BM*) for stocks in that industry, the log market capitalization of stocks in industry j (*ME*), the industry's cumulative returns between months t–13 to t–2 (*MOM*), and the industry's market beta (β). Industry definitions follow Fama and French (1997). All regressions include month fixed effects and standard errors are clustered at the month level. In Panel A, all right-hand-side variables are continuous. In Panel B, all right-hand-side variables are measured by their industry ranks. The table only reports the coefficient b and its associated t-statistic.

Panel A: NS = value-weighted industry net share issuance								
	1964–2007				1973–2007			
b	−0.019	−0.020	−0.024	−0.019	−0.015	−0.015	−0.020	−0.017
[t]	[−2.16]	[−2.23]	[−2.42]	[−2.03]	[−1.57]	[−1.66]	[−1.93]	[−1.68]
Month Effects:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects:	No	No	Yes	Yes	No	No	Yes	Yes
Controls:	No	Yes	No	Yes	No	Yes	No	Yes
R-squared:	0.494	0.497	0.495	0.498	0.491	0.493	0.492	0.494

Panel B: NS = Rank of value-weighted industry net share issuance								
	1964–2007				1973–2007			
b	−0.835	−0.752	−1.194	−0.914	−0.755	−0.695	−1.227	−0.973
[t]	[−2.74]	[−2.60]	[−3.46]	[−2.75]	[−2.25]	[−2.13]	[−3.05]	[−2.51]
Month Effects:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effects:	No	No	Yes	Yes	No	No	Yes	Yes
Controls:	No	Yes	No	Yes	No	Yes	No	Yes
R-squared:	0.495	0.497	0.495	0.498	0.491	0.493	0.492	0.494

D. Robustness Issues in Time-Series Regressions

Below we describe the results of a number of robustness tests. To save space, we describe the results here and tabulate the results in the Internet Appendix.[12]

The first set of concerns relates to measurement of issuer–repurchaser spreads. We obtain broadly similar results if (1) net issuance is derived from CRSP data as in Pontiff and Woodgate (2008); (2) issuer–repurchaser spreads are redefined as the difference in raw characteristics between issuers and repurchasers (in contrast with characteristic deciles); (3) we use different cutoffs

[12] See http://www.afajof.org/supplements.asp for untabulated results described in this section.

for partitioning issuers, repurchasers, and nonissuers; (4) we use a "characteristic net issuance spread," defined as the difference in average *NS* (or *NS* decile) between firms with high and low values of X; and (5) we use the coefficient from a cross-sectional regression of *NS* (or *NS* decile) on characteristic X (or X decile). We also conduct an exercise using the characteristics of SEO issuers based on SDC data. Specifically, we construct an alternate $ISSREP^X$ series in which issuers are restricted to firms undertaking an SEO listed in SDC (thus omitting stock-financed acquirers for example), but repurchasers are based on Compustat. The results are similar despite a far shorter sample.[13]

A second set of concerns relates to the measurement of returns themselves. We obtain similar results if we instead use the returns to portfolios that are long (short) stocks in decile 10 (1) of characteristic X (in contrast to the size-balanced long–short portfolios that we use as a baseline). We also obtain similar results with equal-weighted portfolios.

A third set of concerns relates to potential controls in our forecasting regressions. Our portfolio-level tests already include contemporaneous *HML*, *SMB*, *UMD*, and the market excess return. Our results are robust to controlling for lagged characteristic returns. Thus, the predictability we identify is distinct from the style-level reversal and momentum documented in Teo and Woo (2004). Our results are also robust to controlling for the "characteristic value spread," defined as the difference between the average book-to-market of high X and low X stocks following Cohen et al. (2003). While value spreads help to forecast characteristic returns, these tests show that $ISSREP^X$ contains information over and above that contained in book-to-market ratios. Adding a time trend to the controls strengthens the results for several characteristics by eliminating a secular trend in our measure (e.g., in β and σ). However, the result for profitability, which trends strongly over time, is weakened by the inclusion of a trend. Finally, since we previously noted a small cyclical component to some of the $ISSREP^X$ series, we estimate specifications in which we include a simple recession dummy as a control. The results are qualitatively unchanged by this addition.

A fourth set of concerns relates to the composition of firms that respond to variation in expected characteristic returns. For instance, Fama and French (2008c) suggest that opportunistic financing has increased markedly for small firms since 1982. Reassuringly, we obtain similar results if issuer–repurchaser spreads are based on the value-weighted averages of characteristic deciles among issuers and repurchasers as opposed to the equal-weighted averages. A related question is whether the characteristic return predictability that we document is present mainly among small or large firms. We find that, while the effects are typically strongest for small firms, $ISSREP^X$ has some forecasting power for long–short characteristic portfolios for both large and small stocks.

[13] In this case, we only measure the characteristics of issuers starting in 1982. We also experiment with restricting the sample to SEOs in which some secondary shares were sold (i.e., managerial sales of stock). See the Internet Appendix for details.

Fifth, one may wonder whether our forecasting results are driven by the issuer side of the issuer–repurchaser spread, or by the repurchaser side. We can decompose the spread into these two pieces (issuers minus others and others minus repurchasers). Both issuance and repurchase activity contribute to the predictability shown in Table IV.

A final set of concerns is related to "pseudo-market timing" bias (Shultz (2003)). If issuers behave in a contrarian fashion so that issuer–repurchaser spreads increase when characteristic returns are high, one may worry that our results are driven by an aggregate pseudo-market-timing bias of the sort described in Butler et al. (2005). As pointed out by Baker et al. (2006), this is simply a form of small-sample bias studied in Stambaugh (1999). The bias is most severe when the predictor variable is highly persistent and innovations to the predictor are correlated with return innovations. We compute bias-adjusted estimates of b and appropriate standard errors following Amihud and Hurvich (2004). It turns out that the bias is quite small for all characteristics since our issuer–repurchaser spreads are not too persistent and, more importantly, are not strongly related to past characteristic returns.

E. Panel Estimation

Here we estimate panel specifications that follow directly from Section II. Specifically, we forecast firm-level stock returns using estimates of time-varying characteristic mispricing. The panel technique should yield similar results to those shown in Tables IV and V, with the benefit that we can now directly control for a host of return predictors at the firm level. For example, we can control for the possibility that our forecasting results are simply picking up a book-to-market effect aggregated to the characteristic level (this would be the case if managers used the book-to-market ratio as the summary measure of overvaluation in determining whether to issue or repurchase stock). Thus, the regressions that follow serve as a further robustness check.

Even ignoring the additional control variables, we might expect there to be some small differences from the results in Tables IV and V. For one, the panel estimation allows us to control for the direct effects of net issuance—rather than simply throwing out issuers and repurchasers altogether. In addition, because the panel weights all firms equally, it puts more weight on small firms where one might expect to find stronger evidence of characteristic predictability.

We start by measuring time-series variation in the net issuance tilt with respect to each characteristic. For each characteristic X in each year t–1, we estimate a cross-sectional regression of net issuance on the characteristic decile

$$NS_{i,t-1} = \theta_{t-1} + \delta^X_{t-1} \cdot X_{i,t-1} + \varepsilon_{i,t-1}. \tag{10}$$

This procedure yields a series of 45 estimates (between 1962 and 2006) of δ^X. Conceptually, δ^X captures the same idea as the issuer–repurchaser spread (*ISSREP*^{X}) and, for most characteristics, the two measures are highly correlated over time. For example, the correlation between the issuer–repurchaser spread for size and the corresponding δ^{ME} time series is 0.79.

Using this time series of δ^X, we estimate annual firm-level panel regressions of the form

$$R_{i,t} = a_t + b_1 \cdot X_{i,t-1} + b_2 \cdot \left(\delta^X_{t-1} \times X_{i,t-1}\right) + c \cdot NS_{i,t-1} + d'z_{i,t-1} + u_{i,t}. \quad (11)$$

The right-hand side includes lagged values of net issuance, lagged values of the characteristic, and interactions of the characteristic with the issuance tilt δ^X. We include year fixed effects (a_t) so as to focus on cross-sectional patterns in stock returns. We include $NS_{i,t-1}$ in all specifications in order to control for the direct relationship between net issuance and stock returns. To the extent that we obtain a negative coefficient on the interaction term, b_2, it suggests that firms' issuance behavior contains information about future characteristic returns. Standard errors are clustered by year to account for the cross-sectional correlation of residuals.

Table VII shows these results, which confirm our earlier conclusions. Characteristic issuance tilts predict stock returns for the following attributes: book-to-market, size, price, and distress. Accruals, age, and dividend policy all attract t-statistics greater than 1.60. In Panel B, we re-estimate the panel regression (11) for each characteristic, additionally controlling for firm-specific size, book-to-market, momentum, and beta. As shown in the table, these results are quite similar to those shown in Panel A.

IV. Discussion

In this section, we consider potential explanations for our results. We start with purely mechanical explanations, which can easily be ruled out. We then turn to the more difficult question of whether the results imply that firms are responding to rationally time-varying required returns, or, alternatively, whether firms are timing variation in characteristic-level mispricing. Our objective is not to conclude in favor of one explanation or the other—there is little reason to think that the results can be best explained by one channel alone. Instead, we try to understand what types of explanations could be permissible given the data.

A. Mechanical Explanations

We start with purely mechanical explanations in which the act of issuing stock is assumed to directly lower required stock returns. The simplest version of this story follows directly from the Modigliani and Miller (1958) theorem. Holding constant investors' required return on assets, the ratio of debt to total assets falls when firms issue equity so investors' required return on equity falls mechanically. Eckbo, Masulis, and Norli (2000) argue that this deleveraging effect can explain why issuers generally underperform postissuance. Baker and

Table VII

Two-Stage Panel Forecasts of Characteristic Returns

In the first stage, we estimate annual cross-sectional regressions of net issuance *NS* on characteristic decile *X*

$$NS_{i,t-1} = \theta_{t-1} + \delta_{t-1}^{X} \cdot X_{i,t-1} + \varepsilon_{i,t-1}.$$

The first-stage regressions yield a series of annual estimates of δ^X, the issuance tilt with respect to characteristic X. In the second stage, we run a panel regression of annual stock returns on lagged values of net issuance, lagged values of the characteristic, interactions of the characteristic with issuance tilt δ^X, and a year fixed effect (a_t)

$$R_{i,t} = a_t + b_1 \cdot X_{i,t-1} + b_2 \cdot \left(\delta_{t-1}^{X} \times X_{i,t-1}\right) + c \cdot NS_{i,t-1} + \mathrm{d}'\mathrm{z}_{i,t-1} + u_{i,t}.$$

The table shows estimates of b_2, the coefficient on the interaction term from the second stage. In Panel B, the panel regressions also include controls for lagged β, book-to-market, size, and momentum. The sample period includes annual returns from 1963 to 2007. Annual returns from July of year t and June of t+1 are matched to characteristics in year t–1. Firm characteristics include the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All characteristics except for dividend policy are measured as their NYSE decile rank; dividend policy is a dummy variable that takes a value of one if the firm paid a dividend in that year. Standard errors are clustered by year with the corresponding t-statistics in brackets.

	Panel A: Baseline Panel Results				Panel B: Controls for β, *B/M*, Size, and Momentum			
	1963–2007		1973–2007		1963–2007		1973–2007	
	b_2	[t]	b_2	[t]	b_2	[t]	b_2	[t]
Value & Size:								
B/M	−0.977	[−2.99]	−1.053	[−2.91]	−1.005	[−3.19]	−1.068	[−3.03]
ME	−0.859	[−2.08]	−0.863	[−2.05]	−0.757	[−1.88]	−0.771	[−1.86]
Size-related:								
P	−0.822	[−2.14]	−0.810	[−2.04]	−0.677	[−1.83]	−0.670	[−1.73]
Age	−0.228	[−1.80]	−0.212	[−1.60]	−0.217	[−1.74]	−0.205	[−1.58]
β	−1.154	[−1.45]	−1.171	[−1.43]	−0.961	[−1.16]	−1.012	[−1.20]
σ	−0.774	[−1.42]	−0.777	[−1.39]	−0.619	[−1.16]	−0.645	[−1.19]
SHUM	−1.537	[−2.13]	−1.527	[−2.08]	−1.421	[−2.04]	−1.425	[−2.01]
Div	−0.572	[−1.65]	−0.574	[−1.61]	−0.499	[−1.46]	−0.506	[−1.44]
Other characteristics:								
$\Delta S/S_{t-1}$	−0.216	[−1.15]	−0.218	[−1.12]	−0.241	[−1.34]	−0.247	[−1.32]
Acc/A	−0.331	[−1.79]	−0.340	[−1.79]	−0.272	[−1.43]	−0.281	[−1.44]
E/B	−0.491	[−1.22]	−0.542	[−1.30]	−0.404	[−1.06]	−0.487	[−1.25]

Wurgler (2000) argue that the effects on leverage are too small to explain the relationship between aggregate equity issuance and market returns.

Turning to our forecasting results for characteristic-based factor returns, we can rule out this explanation quite easily because our issuer–repurchaser spreads forecast the returns of firms that *do not issue* stock. Nonissuers share characteristics with issuing firms, but do not experience changes in leverage and thus should not experience any mechanical changes in required returns. In Table V, for example, where we forecast issuer-purged factor returns, the coefficients on $ISSREP^X$ are virtually unchanged from the baseline regressions shown in Table IV for both *B/M* and size. This conclusion is reinforced by our panel regressions in Table VII where we forecast returns controlling for each firm's individual issue and repurchase decisions.

A subtle variation of the Modigliani and Miller (1958) leverage effect is put forth by Carlson et al. (2004, 2006). They argue that stock issuers experience lower returns post-issuance because firms extinguish growth options when they decide to invest. These growth options act as a form of leverage: investment, much like option exercise, unlevers the position. Thus, if the underlying cash flows associated with the growth option are riskier, the required return on equity should fall upon exercise. This theory can help explain the general underperformance of SEOs because SEOs often precede investment. We do not dispute the potential importance of this channel in explaining the returns to issuers more generally. However, this channel cannot explain our forecasting results because we forecast the returns of *nonissuers*, which do not experience changes in operating leverage.

B. Time-Variation in Rationally Required Returns

A second potential explanation for our results is that issuance is a noisy proxy for investment that responds to changes in rationally required returns. Specifically, suppose that some risk factor has a time-varying price of risk, and that a given characteristic X is positively correlated with loadings on a particular risk factor. Consider what happens when the price of risk falls. Firms with high values of the characteristic (and hence high loadings on the risk factor) experience the largest declines in their required returns. These firms will raise their investment the most, financing some portion of this by issuing equity. Furthermore, if investment responds on the extensive margin as well (i.e., some firms that did not invest now choose to invest), then the factor loading and characteristic value for the marginal investing firm will rise.

More formally, suppose there is a single risk factor and that required returns are given by $E_{t-1}[R_{i,t}] = R_f + \beta_i\lambda_{t-1}$ where β_i is firm i's factor loading and λ_{t-1} is the positive, time-varying price of risk for exposure to this factor. Suppose all firms have access to projects that require an outlay of I at t–1 and yield $E[C]$ in expectation at t; these projects differ only in their risk as captured by β_i. Firm i invests at t–1 if $I \leq E[C]/E_{t-1}[R_{i,t}]$ or $\beta_i \leq \beta^*_{t-1} = (E[C]/I - R_f)/\lambda_{t-1}$. Note that the factor loading of the marginal investing firm, β^*_{t-1}, and the average investing firm, $E[\beta_i \mid \beta_i \leq \beta^*_{t-1}]$, are both decreasing in the price of risk, λ_{t-1}. Assuming that X_i is positively correlated with β_i, the average value of X among investing firms will also be decreasing in λ_{t-1}. If we interpret this explanation literally, then, in the absence of mispricing, investment should drive out issuance in a return forecasting regression. Intuitively, issuance is simply a noisy proxy for investment because it also reflects uninformative decisions about how investment should be financed.[14]

We can implement this idea empirically by constructing time series that compare the characteristics of high investment firms with the characteristics of low investment firms.[15] We define the investment–noninvestment spread for X as the difference between the average X-decile of firms in the top NYSE quintile of investment and the average X-decile of firms in the bottom NYSE quintile of investment:

$$INVNONINV_{t-1}^{X} = \frac{1}{N_{t-1}^{HighInvest}} \sum_{i \in HighInvest} X_{i,t-1} - \frac{1}{N_{t-1}^{LowInvest}} \sum_{i \in LowInvest} X_{i,t-1} \quad (12)$$

For example, $INVNONINV_{t-1}^{ME} = 1$ indicates that high investment firms were on average one size decile larger than low investment firms in year t–1. To measure investment in equation (12), we use capital expenditures over assets (*CAPX/A*), although we get similar results if we construct *INVNONINV* using debt growth (see the Internet Appendix).[16]

In Table VIII we first use the investment–noninvestment spread to forecast returns to characteristic-based portfolios:

$$R_t^X = a + c \cdot INVNONINV_{t-1}^{X} + u_t. \quad (13)$$

The results are mixed. For the full 1963 to 2007 sample period, only nominal share price is significant. And, for many characteristics, the coefficient has the wrong sign. The results are slightly more promising in the 1973 to 2007 period. For instance, the coefficient for size is now significant in Panel A and is marginally significant in Panel B. Overall, however, the ability of these investment-based measures to forecast characteristic-based factor returns is fairly limited.

Table VIII next shows bivariate horse-race regressions, in which we use both $INVNONINV^X$ and our $ISSREP^X$ variable to forecast characteristic-based

[14] This prediction is derived more formally in the Internet Appendix, where we present a model that allows for both time-series variation in rationally required returns as well as temporary mispricing. In the model, investment and stock issuance are both negatively related to future stock returns. However, net issuance is also impacted by shocks to target capital structure that are not informative about future stock returns. Thus, in the complete absence of mispricing, stock issuance is driven out in a horse race with investment. This is because issuance contains no additional information about expected returns, and because it also reflects a series of uninformative decisions about how investment should be financed. By contrast, both investment and share issuance would be useful for forecasting returns if there are movements in rationally required returns as well as temporary mispricing.

[15] Our investment spread is related to the investment factor in Lyandres et al. (2008).

[16] Investment can be funded using debt, equity, or internal funds, but firms would favor equity over debt when equity was perceived to be overvalued. Thus, debt growth can be interpreted as residual investment after netting out the portion that is funded by equity. A related construction is to use asset growth as a measure of investment, which combines equity- and debt-funded investment. These results are also shown in the Internet Appendix.

Table VIII
Forecasting Characteristic Returns Using Issuer–Repurchaser Spreads and Investment-Noninvestment Spreads

This table shows time-series regressions of monthly long–short portfolio returns on lagged values of the issuer–repurchaser spread and lagged values of the investment–noninvestment spread for the corresponding characteristic:

$$R_t^X = a + c \cdot INVNONINV_{t-1}^X + u_t,$$
$$R_t^X = a + b \cdot ISSREP_{t-1}^X + c \cdot INVNONINV_{t-1}^X + u_t.$$

The issuer–repurchaser spread is the difference between the average characteristic decile of issuers and repurchasers. The investment–noninvestment spread is the difference between the average characteristic decile of high and low investment firms. High investment firms are defined as those in the top NYSE quintile and low investment firms are those in the bottom NYSE quintile. Investment is capital expenditures over assets. The sample period includes monthly returns from July 1963 to June 2008. The long–short portfolios are formed based on firm characteristics: the book-to-market (*B/M*) ratio, size (*ME*), nominal share price (*P*), age, CAPM beta (β), residual volatility (σ), the Shumway bankruptcy hazard rate (*SHUM*), dividend policy (*Div*), sales growth ($\Delta S/S$), accruals (*Acc/A*), and profitability (*E/B*). All characteristics except for dividend policy are measured as their NYSE decile rank; dividend policy is measured by a dummy variable that takes a value of one if the firm paid a dividend in year *t*–1. Monthly returns between July of year *t* and June of year *t*+1 are matched to the issuer–repurchaser spread in year *t*–1. Since $ISSREP_{t-1}$ and $INVNONINV_{t-1}$ are only refreshed annually, standard errors are clustered by 12-month blocks running from July *t* to June *t*+1. *t*-statistics are in brackets.

	1963–2007						1973–2007					
	Univariate (*INVNONINV* only)		Multivariate (*ISSREP* and *INVNONINV*)				Univariate (*INVNONINV* only)		Multivariate (*ISSREP* and *INVNONINV*)			
	c	[*t*]	*b*	[*t*]	*c*	[*t*]	*c*	[*t*]	*b*	[*t*]	*c*	[*t*]
Value & Size:												
B/M	0.116	[0.32]	−0.734	[−2.72]	0.203	[0.60]	0.053	[0.13]	−0.837	[−2.32]	0.162	[0.43]
ME	−0.311	[−0.89]	−0.229	[−1.42]	0.058	[0.14]	−0.708	[−2.01]	−0.332	[−3.19]	0.063	[0.16]
Size-related:												
P	−0.520	[−2.32]	−0.213	[−1.40]	−0.154	[−0.39]	−0.769	[−3.27]	−0.254	[−1.47]	−0.272	[−0.57]
Age	−0.246	[−0.95]	−0.152	[−1.07]	−0.275	[−1.07]	−0.292	[−1.02]	−0.136	[−0.93]	−0.322	[−1.13]
β	0.407	[1.29]	−0.366	[−1.36]	0.553	[1.65]	0.227	[0.72]	−0.465	[−1.48]	0.375	[1.12]
σ	0.266	[1.23]	−0.185	[−1.07]	0.471	[1.74]	0.056	[0.35]	−0.189	[−1.12]	0.276	[1.12]
SHUM	0.379	[1.26]	−0.367	[−1.68]	0.334	[1.17]	0.379	[1.17]	−0.597	[−3.00]	0.259	[0.90]
Div	0.072	[0.04]	−1.685	[−1.33]	1.498	[0.79]	−1.501	[−0.90]	−2.393	[−2.06]	0.328	[0.18]
Other characteristics:												
$\Delta S/S_{t-1}$	0.067	[0.42]	0.061	[0.42]	0.049	[0.27]	0.056	[0.32]	−0.204	[−0.78]	0.066	[0.36]
Acc/A	−0.156	[−1.10]	−0.011	[−0.12]	−0.153	[−1.07]	−0.140	[−1.02]	−0.032	[−0.22]	−0.122	[−0.83]
E/B	−0.322	[−1.16]	−0.109	[−1.27]	−0.105	[−0.33]	−0.448	[−1.47]	−0.170	[−1.10]	−0.177	[−0.46]

factor returns:

$$R_t^X = a + b \cdot ISSREP_{t-1}^X + c \cdot INVNONINV_{t-1}^X + u_t. \tag{14}$$

Recall that, under the null hypothesis where *all* time-variation in expected returns is due to movements in rationally required returns, $ISSREP^X$ is simply a noisy proxy for $INVNONINV^X$, so $ISSREP^X$ should be driven out in the horse race. However, for nearly every characteristic, the coefficient b on $ISSREP^X$ from the horse race in (14) is nearly identical to its value in the univariate regression shown in Table IV. For example, for the 1963 to 2007 sample period, we have $b = -0.713$ for book-to-market and -0.214 for size in Table IV, versus $b = -0.734$ and -0.229 in Table VIII. Interestingly, the coefficient c on $INVNONINV^X$ is no longer significant for a single characteristic and actually goes in the wrong direction for many characteristics.

Taken at face value, Table VIII suggests that it is difficult to explain our results within a fully rational framework, that is, one in which there is never any characteristic mispricing. At the same time, these results certainly do not suggest that all time-variation in expected characteristic returns is due to mispricing; they merely suggest that mispricing may be part of the story.

However, we are reluctant to rule out purely rational explanations of our findings for a few reasons. One concern is that these explanations link required returns to investment *plans*, but there may be a short gap between investment plans and realized investment (e.g., Lamont (2000)). To address this concern, we can look at firms' future investment rates. Specifically, we can construct $INVNOINV^X$ based on *future* capital expenditures, and run the same horse race as shown in Table VIII. These results are similar (see the Internet Appendix) in that the coefficients on $ISSREP^X$ are virtually unchanged compared to the univariate specifications in Table IV. However, one might still worry that issuance is a better proxy for investment plans than future investment itself. Furthermore, we cannot rule out alternatives in which firms optimally delever—for reasons unrelated to timing—when rationally required returns fall.

C. Characteristic Mispricing

A third explanation is that firms issue and repurchase shares to take advantage of time-varying characteristic mispricing. Under this explanation, characteristic-based expected returns may vary over time, perhaps stemming from time-varying investor enthusiasm for different themes. Firms endowed with an overvalued characteristic can exploit this by selling shares or undertaking stock-financed acquisitions. These market-timing activities benefit firms' existing long-term shareholders at the expense of short-term investors.

Is the idea that managers take advantage of time-varying characteristic mispricing reasonable? Perhaps, since 67% of the CFOs surveyed by Graham and

Harvey (2001, p. 216) claim that "the amount by which our stock is undervalued or overvalued by the market" influences whether the firm issues equity. Similarly, Brav et al. (2005, p. 508) report that the most popular explanation for why their firm repurchased stock (cited by 87% of repurchasing CFOs) is that their "stock is a good investment, relative to its true value." Thus, managers *say* they try to issue when the price is too high and repurchase when it is too low, so their actions might be useful for inferring times when certain characteristics are being mispriced.

Still, it seems unlikely that managers would have an advantage relative to sophisticated investors in forecasting characteristic returns (e.g., Butler et al. (2005)). However, firms need not have an informational advantage. Instead, they may have an institutional advantage in exploiting certain forms of mispricing. Specifically, sophisticated investors are often subject to limits of arbitrage that decrease their willingness to make large contrarian bets (Shleifer and Vishny (1997), Stein (2005)). By contrast, the logic of Modigliani and Miller (1958) suggests that firms can respond aggressively to mispricing. For instance, if a firm issues shares and its stock continues to rise, the firm does not face capital withdrawals. By contrast, if an institutional investor shorts a stock that continues to rise, the investors may face significant withdrawals.

As noted earlier, the mispricing explanation is most plausible for characteristics that are both salient and somewhat persistent over time. If a characteristic is not salient to investors, it is not likely to be used to categorize stocks, which is a plausible necessary condition for characteristic-level mispricing (Barberis and Shleifer (2003)). If the characteristic is not persistent (e.g., one month reversal), it would be quite surprising to find corporate issuance responding to time-varying mispricing, given the considerable costs and time delays inherent in share issuance. Interestingly, *B/M*, size, and industry—the characteristics for which we obtain the strongest results—stand out as being both persistent and highly relevant for investor categorization. However, given their salience, these characteristics also readily lend themselves to risk-based explanations, so this does not favor mispricing-based explanations over risk-based explanations, or vice versa.

D. Summary

Our evidence on issuer-purged portfolios cuts against purely mechanical explanations. However, it is quite difficult to discriminate between risk-based and mispricing-based explanations of our findings and there is little reason to believe that only a single channel is relevant. Further, while the evidence in Table VIII suggests that it may be difficult to explain our results within a fully rational framework, hinting that mispricing may play some role, we are unable to rule out fully rational explanations. Thus, although the exact interpretation of our findings must await future work, it seems clear that corporate issuance can be said to have timed characteristic-based factor returns on an ex post basis.

V. Evaluating the Importance of Characteristic Return Timing for Corporate Issuance

What fraction of the underperformance of net issuers more generally can be explained by such "characteristic timing"? This question is important regardless of whether the results are best explained by risk, mispricing, or both. We can address this question by modifying the approach in Daniel et al. (1997). Specifically, we decompose the return to a long–short strategy based on net stock issuance into three components: the return in excess of the return on firms with similar characteristics ("characteristic selectivity"), the return associated with the long-run average characteristics of the net issuance portfolio ("average style"), and the return associated with the timing of those characteristics ("characteristic timing").[17]

Each year we form a portfolio that is long (short) firms in the lowest (highest) NYSE decile of net stock issuance. Motivated by our earlier findings, we limit our matching characteristics to book-to-market and size. We match each firm in this portfolio to one of 25 size and book-to-market benchmark portfolios. To construct these benchmarks, firms are first grouped by NYSE size quintile, and then within each size quintile, we sort firms into book-to-market quintiles. The benchmark portfolios include only seasoned firms that did not issue or repurchase stock in the prior year.

Following Daniel et al. (1997), characteristic selectivity (*CS*) is the difference between the portfolio return and the weighted return on the matched benchmark portfolios. Let $w_{b,t-1}$ denote the total portfolio weight of firms matched to benchmark b at time t–1. The average style (*AS*) and characteristic timing (*CT*) components of the portfolio return are:

$$AS_t = \sum_b \overline{w}_b R_t^b, \tag{15}$$

$$CT_t = \sum_b (w_{b,t-1} - \overline{w}_b) R_t^b, \tag{16}$$

where $\overline{w}_b$ denotes the time-series mean of w_b. The average style term reflects the performance on a benchmark portfolio that captures the *average* size and *B/M* composition of the *NS* portfolio. The characteristic timing component reflects deviations of the current size and *B/M* composition of the portfolio from its long-run average.[18]

We report the results of this decomposition in Table IX. Each row decomposes the return on the net stock issuance portfolio into CS, AS, and CT components. We show results for both value- and equal-weighted portfolios based on *NS*. The first column shows the average return to the long–short *NS* strategy. For

[17] Note that we use the term "characteristic timing" here not to imply anything about whether issuance reflects corporate timing of mispricing or, alternately, responses to changes in required returns.

[18] Our measure captures the ability of issuers to time characteristics at both short and long horizons, whereas the measure used in the mutual fund literature is primarily designed to capture timing ability at shorter horizons.

Table IX

The Economic Significance of Size and Book-to-Market Timing for Corporate Issuance

This table shows Daniel et al. (1997)-type decompositions of the returns to portfolios that are long low net issuance stocks and short high net issuance stocks. The portfolios are long stocks in the lowest NYSE net issuance decile and short stocks in the highest net issuance decile. Each stock in the portfolio is matched to one of 25 benchmark portfolios based on size and book-to-market. These benchmark portfolios are constructed using only the subset of seasoned firms that did not issue or repurchase stock in the prior fiscal year. The characteristic selectivity (*CS*) return is the difference between the portfolio return and the weighted return on the matched benchmarks portfolios. The average style (*AS*) return is the return on a benchmark portfolio that reflects the average size and *B/M* composition of the net issuance portfolio. The characteristic timing (*CT*) return captures deviations of the current size and *B/M* composition of the portfolio from its long-run average. The table shows results for both value- and equal-weighted portfolios based on net issuance, both for the full 1963 to 2007 sample and the 1973 to 2007 subperiod. *t*-statistics are in brackets. In each panel, the right-most column shows the fraction of the total return to the long–short net issuance portfolio that is due to characteristic timing.

	1963–2007								1973–2007							
			% per annum								% per annum					
	R	=	CS	+	AS	+	CT	CT/R	R	=	CS	+	AS	+	CT	CT/R
VW	9.23		7.39		−0.08		1.92	0.208	9.05		7.26		−0.09		1.89	0.209
	[4.42]		[4.56]		[0.30]		[2.24]		[3.73]		[3.78]		[0.32]		[2.04]	
EW	11.25		7.41		2.14		1.69	0.150	12.14		7.90		2.27		1.97	0.162
	[5.67]		[5.01]		[4.12]		[2.92]		[5.06]		[4.42]		[3.64]		[3.13]	

the value-weighted *NS* strategy, the 9.23% annual return can be decomposed into a 7.39% characteristic selectivity return, an –0.08% average style return, and a 1.92% characteristic timing return. Thus, approximately 21% of the forecasting ability of *NS* in the cross-section comes from firms' ability to time book-to-market and size characteristics. The results for the equal- and value-weighted portfolios are similar.

It is interesting to contrast the findings in Table IX with studies of mutual fund performance (i.e., Daniel et al. (1997), Wermers (2000)). These studies find that mutual funds have very small or even slightly negative characteristic timing ability. The contrast between these studies and our findings for issuing firms is consistent with the view that corporations may have a comparative advantage over professional investors in exploiting certain forms of broad-based mispricing, or in taking exposure to certain priced risk factors. This advantage may be greatest when mispricing converges slowly or is associated with undiversifiable risk. It is plausible that these conditions could be satisfied for several of the most salient characteristics we consider, including size, book-to-market, and industry.

VI. Conclusion

We show that share issuance forecasts characteristic-based factor returns. Firms issue equity prior to periods when other stocks with similar characteristics perform poorly, and repurchase prior to periods when other firms with similar characteristics perform well. Our strongest results are for portfolios based on book-to-market (i.e., *HML*), size (i.e., *SMB*), and industry.

Our findings have implications for the large literature that studies the stock market performance of SEOs, IPOs, and recent acquirers. In many of these studies, researchers purge the returns of event firms of book-to-market and size effects. Our findings suggest that this methodology may be too conservative, since, for example, low market-to-book firms issue stock just prior to periods when low market-to-book firms in general are going to perform poorly. More broadly, event studies that compare the performance of sample firms to firms matched on characteristics will omit any returns coming from event firms' timing of those characteristics.

Appendix: Characteristic Definitions

Where applicable, we provide in parentheses the relevant Compustat data items from the Fundamentals Annual file. When matching to returns in July of year t to June of $t+1$, we follow the Fama and French (1992) convention that accounting variables are measured as of fiscal year ending $t-1$, and market-based variables (ME, P, β, σ, as well as the market-based components of *SHUM*) are measured as of June of year t. However, we label all of these characteristics as year $t-1$ for notational convenience.

Book-to-market equity (*B/M*): Book equity is stockholder's equity, plus balance sheet deferred taxes (item *TXDB*) and investment tax credits (*ITCB*) each when available, minus preferred stock. For stockholder's equity we use item *SEQ* when available; if *SEQ* is missing, we use the book value of common equity (*CEQ*) plus the book value of preferred stock (*PSTK*); finally, we use total assets (*AT*) minus total liabilities (*LT*) minus minority interest (*MIB*). For preferred stock we use redemption value (*PSTKRV*), liquidation value (*PSTKL*), and book value (*PSTK*) in that order. We divide book equity for fiscal years ending in year $t-1$ by the value of market equity at the end of December in year $t-1$ from CRSP.

Sales Growth ($\Delta S_t/S_{t-1}$): Sales growth is the log change in sales (*SALE*).

Accruals (*Acc/A*): Following Bergstresser and Philippon (2006), we define accruals as

$$(Acc/A)_t = \frac{(\Delta CurrAssets_t - \Delta Cash_t) - (\Delta CurrLiab_t - \Delta STDebt_t - \Delta TaxesPayable_t) - Deprec_t}{(A_t + A_{t-1})/2},$$

where current assets is Compustat item *ACT*, cash is item *CHE*, current liabilities is item *LCT*, taxes payable is item *TXP*, and depreciation is item *DP*.

Size: Size is market equity (*ME*) at the end of June in year t.

Price: Price is the nominal price per share at the end of June in year t.

Age: Age is number of years since the first appearance of a firm (PERMCO) on CRSP measured to the nearest month.

Beta (β) and Volatility (σ): Beta and volatility are estimated from a trailing 24-month CAPM regression. We require that a firm have valid returns for at least 12 of the previous 24 months.

Distress (*SHUM*): We use the bankruptcy hazard rate estimated by Shumway (2001), $SHUM = \exp(H)/(1 - \exp(H))$, where

$$H = -13.303 - 1.982 \cdot (NI/A) + 3.593 \cdot (L/A) - 0.467 \cdot RELSIZE \\ - 1.809 \cdot (R - R_M) + 5.791 \cdot \sigma,$$

NI/A is net income over period-end assets, L/A is total liabilities over assets, *RELSIZE* is the log of a firm's market equity divided by the total capitalization of all NYSE and Amex stocks, $R - R_M$ is the firm's cumulative return over the prior 12 months minus the cumulative return on the value-weighted NYSE/Amex index, and σ is the volatility of residuals from a trailing 12-month market-model regression.

Dividends (*Div*): *Div* is a dummy variable equal to one for dividend payers (firms for which $DVPSXF > 0$) and zero for nonpayers.

Profitability (*E/B*): Earnings (*E*) is income before extraordinary items available to common stockholders (*IBCOM*) plus income statement deferred taxes (*TXDI*) when available. Income is scaled by average book equity, where book equity is as defined above.

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