Can Managers Forecast Aggregate Market Returns?

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ABSTRACT

Previous studies have found that the proportion of equity in total new debt and equity issues is negatively correlated with future equity market returns. Researchers have interpreted this finding as evidence that corporate managers are able to predict the systematic component of their stock returns and to issue equity when the market is overvalued. In this article we show that the predictive power of the share of equity in total new issues stems from pseudo-market timing and not from any abnormal ability of managers to time the equity markets.

A CONTROVERSIAL AND IMPORTANT ISSUE among financial economists is whether corporate managers accurately time the market when they issue new securities. At the firm level, researchers typically address this question by examining the long-run performance of stocks following equity issues. Although there is empirical evidence supporting the idea that managers are able to sell overpriced securities during initial public offerings (IPOs) and seasoned equity offerings (SEOs) (see Ritter (1991), Loughran and Ritter (1995), and Spiess and Affleck-Graves (1995)), several recent studies challenge these results.[1]

Adding to this controversy, a recent article by Baker and Wurgler (2000) finds evidence that managers can time not only the idiosyncratic component of their returns but also the systematic component. Specifically, these authors find that, in-sample, the share of equity in total new issues (equity share) is strongly negatively correlated with future aggregate equity market returns. Taken at face value, these findings have important implications because they suggest that markets are unable to allocate capital efficiently even in the aggregate.[2]

[1] For example, Brav and Gompers (1997), Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), Mitchell and Stafford (2000), Gompers and Lerner (2003), and Li and Zhao (2003) find weak or no evidence that IPOs or SEOs underperform the market on a risk-adjusted basis.

[2] In addition, this result is surprising because even professional money managers are not able to consistently beat the market (see, for example, Jensen (1968) and Gruber (1996)).

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In this article we propose an efficient markets explanation for managers' seeming ability to time the aggregate market based on Schultz's (2003) pseudo-market timing hypothesis. Schultz argues that since firms are more likely to issue equity after their stock prices have increased, there is a spurious ex post relation between a firm's equity issues and its equity price. As a result, what appears to be prescient timing by managers in event time is simply a reaction by firms to current market conditions. One important implication of this hypothesis is that if markets are ex ante efficient, abnormal long-run underperformance is observed ex post in event time, but not in calendar time. This occurs because the heaviest periods of equity issuance (and hence a large proportion of observations in event time) happen at market peaks. These peaks are obvious ex post, but are ex ante unpredictable if markets are efficient.

Although Schultz's (2003) pseudo-market timing argument seems to explain the well-documented fact that underperformance of equity issuers is much greater when measured in event time rather than in calendar time, one might expect the results in Baker and Wurgler (2000) to be impervious to Schultz's critique because their results are based on a *calendar time approach*. However, as we show in this article, the intuition of the pseudo-market timing hypothesis extends from the firm level in event time to the aggregate level in calendar time. The reason for this is that the aggregate equity share tends to be high at market peaks and low at market troughs ex post. As a result, systematic changes in equity prices can induce a spurious relation between aggregate equity issues and aggregate returns when the relation between these two variables is measured ex post, as in the case of in-sample regressions. Since previous results are based on coefficients estimated using the entire sample, they do not make clear whether the negative relation between the equity share and future market returns is the result of *aggregate* pseudo-market timing or real managerial timing.

In this paper we argue that aggregate pseudo-market timing is most likely to occur around large market shocks. The reason for this is that if equity issues are positively correlated with current equity prices, then equity issues should go down during unexpected market declines, making the preshock equity issuance look relatively high just before and the postshock equity issuance look relatively low just after the market crashes. Consistent with this prediction, we find that the negative relation between the equity share and future market returns over the period 1927 to 2002 is completely driven by the strong positive correlation between market prices and the equity share surrounding the two structural breaks in U.S. economic activity identified by Perron (1989)—the Great Depression (1929 to 1931) and the Oil Crisis of the early 1970s (1973 to 1974). Specifically, we find that excluding these events from our analysis causes the in-sample predictive ability of the equity share to vanish. These results cast doubt on managerial timing ability because they indicate that the only source of the in-sample predictability comes from two unpredictable economic shocks.

Furthermore, supporting the aggregate pseudo-market timing hypothesis, we find that the equity share has no in-sample predictive power after the Oil Crisis of 1973 to 1974. This result is surprising because one might expect to

find more evidence of managerial timing during this period. One reason for this is that the development of the Nasdaq National Market System enabled a larger set of firms to issue public equity at earlier stages in their life cycles (see Fama and French (2003)), creating greater opportunity for managers to time equity markets. Another reason is that most of the evidence consistent with firm-level managerial timing is from the post-Nasdaq era (see Gompers and Lerner (2003)).

We also distinguish between the aggregate pseudo-market timing hypothesis and the managerial timing hypothesis by examining the relation between future market returns and changes in both aggregate debt and equity issues. According to the managerial timing hypothesis, managers should strategically substitute debt for equity when they expect high future returns, and vice versa. In contrast, aggregate pseudo-market timing suggests no such substitution and predicts that both debt and equity are positively related to current market conditions. Contrary to the implications of the managerial timing hypothesis, we find that average future returns after periods of high growth in equity issues and low growth in debt issues are not significantly different from those after periods of low growth in equity issues and high growth in debt issues. That is, managers do not appear to strategically shift from equity to debt (debt to equity) prior to high (low) future market returns. However, consistent with aggregate pseudo-market timing, we find that changes in both debt and equity are driven by changes in *current* market conditions.

Finally, we test whether the equity share has out-of-sample predictability. The aggregate pseudo-market timing hypothesis suggests that the equity share and future market returns should be correlated in-sample (ex post analysis) but not in out-of-sample tests (ex ante analysis) because market peaks and troughs are only known ex post. If markets are efficient, then under this hypothesis, the equity share should not have any predictive power out-of-sample. Consistent with aggregate pseudo-market timing, we find that the equity share in total issues does not have any out-of-sample predictive power. Specifically, we find that a model using the equity share as a predictor of future market returns does not outperform a naïve model that includes only a constant term. This finding is robust to changes in the frequency of the data, preestimation period, out-of-sample estimation technique, model specification, loss function, and definition of market returns. Thus, it does not appear that the equity share can be used to forecast future returns in real time.

Our findings shed light on whether markets are able to efficiently allocate capital. Overall, our results are consistent with aggregate pseudo-market timing and market efficiency, and raise serious doubts that managers are able to predict market upturns and downturns and to time equity issues accordingly. These findings are important because they suggest that the in-sample predictive power of variables that are contemporaneously correlated with market conditions may stem from aggregate pseudo-market timing.

The article proceeds as follows. Section I presents a description of our sample and a replication of previous in-sample tests. Section II presents evidence on aggregate pseudo-market timing. Section III examines additional implications

of both the aggregate pseudo-market timing hypothesis and the managerial timing hypothesis. Section IV reports the results of the out-of-sample analysis, including the results from several robustness tests. Section V concludes the paper.

I. Sample

Our data include aggregate new equity issues and debt issues over the period 1927 to 2001. These data are gathered from Jeffrey Wurgler's web page (http://pages.stern.nyu.edu/w̃urgler/data/equity%20share.xls) and the *Federal Reserve Bulletin*.[3] Following Baker and Wurgler (2000), we define the equity share in total new issues as

$$S_t = \frac{e_t}{e_t + d_t},\qquad(1)$$

where e_t is aggregate new equity issues and d_t is aggregate new debt issues at time t.

According to the managerial timing hypothesis, this variable should be negatively correlated with future market returns because managers tend to issue more equity and less debt prior to periods of low future market returns, and to issue less equity and more debt prior to periods of high future market returns.

We collect aggregate annual equity returns through 2002 from Center for Research in Security Prices (CRSP) . The variable *VWCRSP* is the annual return on the CRSP value-weighted portfolio and *EWCRSP* is the annual return on the CRSP equally weighted portfolio. We convert nominal returns to real returns using the Consumer Price Index from Ibbotson Associates (2003). Table I displays the characteristics of the variables used in our analysis. Consistent with earlier studies, we find that equity issues comprise, on average, 21% of total new issues.

To ensure that the results in Baker and Wurgler (2000) hold in our updated and extended sample, we replicate their results by estimating the parameters of a regression model where the annual equity market returns at time t are a function of the share of equity issues in total issues at time $t − 1$. Following the methodology in Baker and Wurgler, we standardize S to have zero mean and unit variance. The results from this analysis are reported in Table II. This table shows that the coefficient on S is negative as well as economically and statistically significant. These results are robust to whether we use *VWCRSP* or *EWCRSP* as a dependent variable. Consistent with the prior evidence, these findings suggest that managers issue more (less) equity relative to debt when they perceive that aggregate equity market prices will decline (increase) in the future. However, both the managerial timing and aggregate pseudo-market timing hypotheses predict this in-sample relation, and so based on these results, we cannot distinguish between these two hypotheses.

[3] We update some of the observations in Baker and Wurgler's (2000) sample to incorporate recent revisions made by the *Federal Reserve Bulletin*. We also extend the sample of equity share data to include the period 1997 to 2001.

Table I
Summary Statistics

This table reports summary statistics for the equity share in total new issues and equity market returns over the period 1927 to 2001. *S* is the equity share in total new issues. *VWCRSP* is the annual return on the CRSP value-weighted portfolio. *EWCRSP* is the annual return on the CRSP equally weighted portfolio. *VWCRSP* and *EWCRSP* are converted to real returns using the Consumer Price Index from Ibbotson Associates (2003).

	Mean	*SD*	5th Percentile	Median	95th Percentile
$S_t = e_t/(e_t + d_t)$	0.210	0.110	0.070	0.190	0.400
$VWCRSP_{t+1}$	0.081	0.205	−0.253	0.109	0.405
$EWCRSP_{t+1}$	0.133	0.309	−0.341	0.159	0.579

Table II
The In-sample Predictive Power of the Share of Equity Issues in Total Issues

This table reports estimates of regressions relating equity market returns to the equity share in total new issues (*S*). The sample spans the period from 1927 to 2001. *VWCRSP* is the annual return on the CRSP value-weighted portfolio. *EWCRSP* is the annual return on the CRSP equally weighted portfolio. *VWCRSP* and *EWCRSP* are converted to real returns using the Consumer Price Index from Ibbotson Associates (2003). *S* is standardized to have zero mean and unit variance. The standard errors of the coefficients have been adjusted for heteroskedasticity.

β_0	$t(\beta_0)$	β_1	$t(\beta_1)$	$\bar{R}^2$
		Panel A: $VWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$		
0.0810[a]	3.62	−0.0643[a]	−3.11	0.086
		Panel B: $EWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$		
0.1330[a]	4.05	−0.1190[a]	−3.57	0.137

[a]Denotes significantly different from zero at the 1% level.

II. Pseudo-Market Timing and Structural Economic Events

A. Aggregate Pseudo-Market Timing

In this section we argue that pseudo-market timing can occur in calendar time around large market shocks. As we explain above, since equity issues are positively correlated with equity prices, equity issues fall during market declines. As a result of this, *S* looks relatively high (low) just before (after) the market crashes, which creates the illusion that managers are predicting future market returns. Thus, according to this argument, we should expect to see an ex post relation between market returns and equity issues during major unexpected macroeconomic events, much like the pseudo-market timing described by Schultz (2003).

To test this prediction, we examine the relation between equity issues and market returns surrounding two large negative structural shocks to economic

activity identified by Perron (1989), the Great Depression and the Oil Crisis of the early seventies. These two periods are natural experiments for distinguishing aggregate pseudo-market timing from any real ability of managers to time the market, since both periods are inherently unpredictable. As a result, any evidence of predictability surrounding these events is unlikely to be driven by managerial timing. However, finding that the relation between S and future market returns is driven by these unexpected events would be consistent with pseudo-market timing.

To see the effect that these economic shocks had on equity issues, consider Figures 1 and 2, which plot the equity share of new issues and an equity price index for the years surrounding both the Great Depression (Figure 1) and the 1973 Oil Crisis (Figure 2). Notice that during these periods, there is a positive and significant contemporaneous correlation between S and the equity price index (the correlation between the aggregate market index and S is 0.80 during the Great Depression and 0.45 during the Oil Crisis).[4] Given this relation around these major economic events, such high and low periods of issuance appear to predict market returns, but we argue that this is simply an example of aggregate pseudo-market timing. That is, since managers are more likely to issue equity when stock prices have risen, and less likely to issue equity when prices have declined, it is not surprising that S is relatively high just before the market crashes and relatively low just after.

We document in a number of ways that the in-sample evidence of managerial timing is an artifact of aggregate pseudo-market timing. First, we replicate the in-sample analysis from Table II, excluding the events most likely to induce aggregate pseudo-market timing—the market crashes that followed the Great Depression of 1929 (1929 to 1931) and the Oil Crisis of 1973 (1973 to 1974). The results, presented in Table III, suggest that the predictive power of S critically depends on these two economic periods. While these 5 years comprise only a small fraction of our sample, removing them completely eliminates the in-sample statistical significance of the predictive power of equity share for both equally weighted and value-weighted returns.[5] That is, based on 93% of the observations in our sample, managers are not able to time the equity market.

These results indicate that the in-sample evidence supporting the managerial timing hypothesis relies on the assumption that managers correctly predicted the Great Depression and the Oil Crisis. However, it seems unlikely that managers were able to forecast these catastrophic events. For example, the Oil Crisis was triggered by the surprise attack by Arab countries against Israel, which initiated the Yom Kippur War. This event was so unexpected that it took even the Israelis by surprise. In addition, Dominguez, Fair, and Shapiro (1988) find that even using modern time-series techniques and modern historical data that were not available in 1929, forecasters could not have predicted the Great

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[4] The share of equity in total new issues declines after the first year of both economic shocks. The reason for this is that both events started late in the calendar year (October).

[5] We also test models that allow for time-varying expected returns during these periods, as well as variation in the coefficient on S. In all of these specifications, we find no evidence that S has in-sample predictive power in noncrisis periods.

VWCRSP

EWCRSP

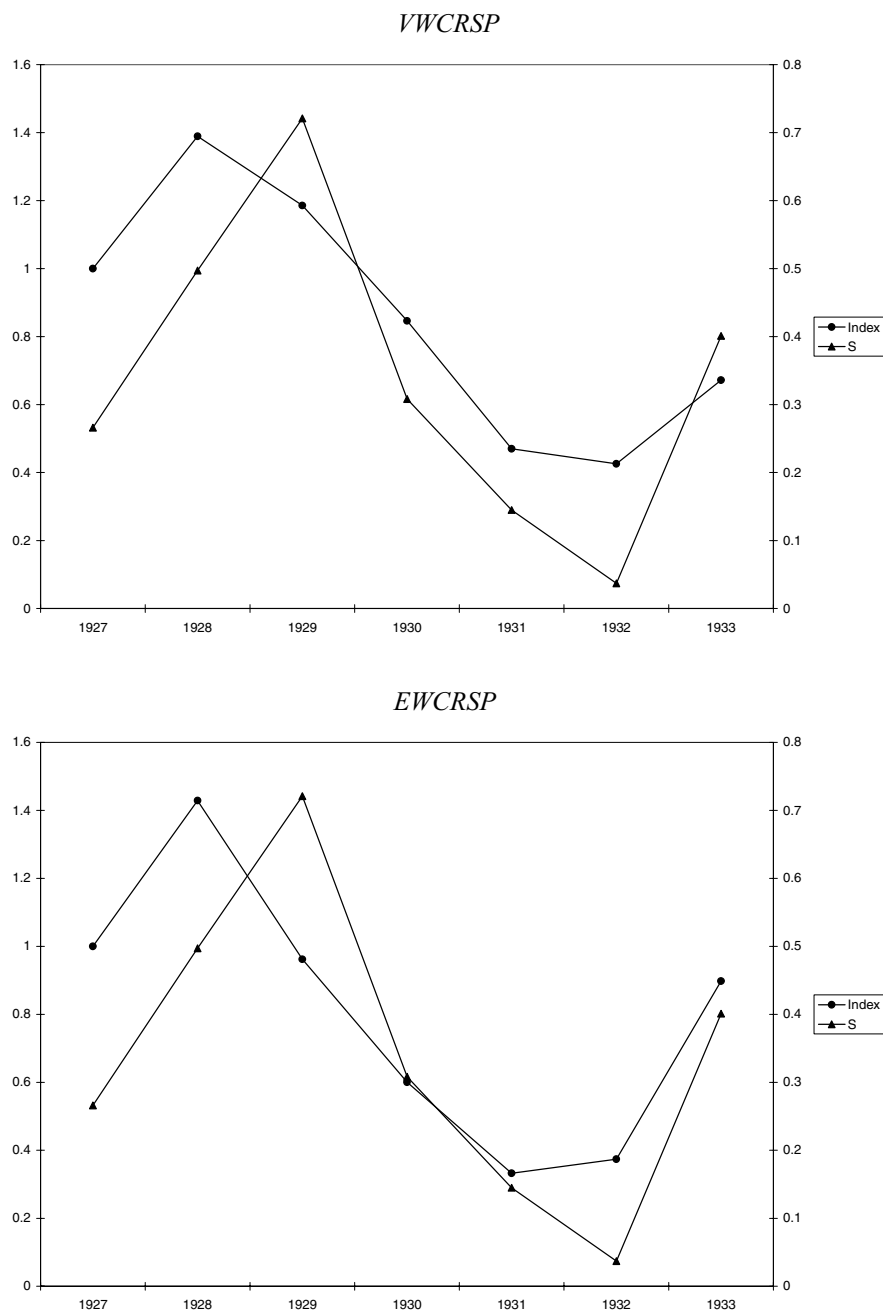**Figure 1. The relation between an equity market index and the share of equity in total new issues around the Great Depression of 1929.** This figure depicts the relation between an equity market index and the share of equity in total new issues around the Great Depression of 1929. The price index is set equal to 1 at the beginning of the period. The left axis denotes the index level; the right axis denotes the level of *S*.

VWCRSP

EWCRSP

Figure 2. The relation between equity market returns and the share of equity in total new issues around the Oil Crisis of 1973. This figure depicts the relation between an equity market index and the share of equity in total new issues around the Oil Crisis of 1973. The price index is set equal to 1 at the beginning of the period. The left axis denotes the index level; the right axis denotes the level of *S*.
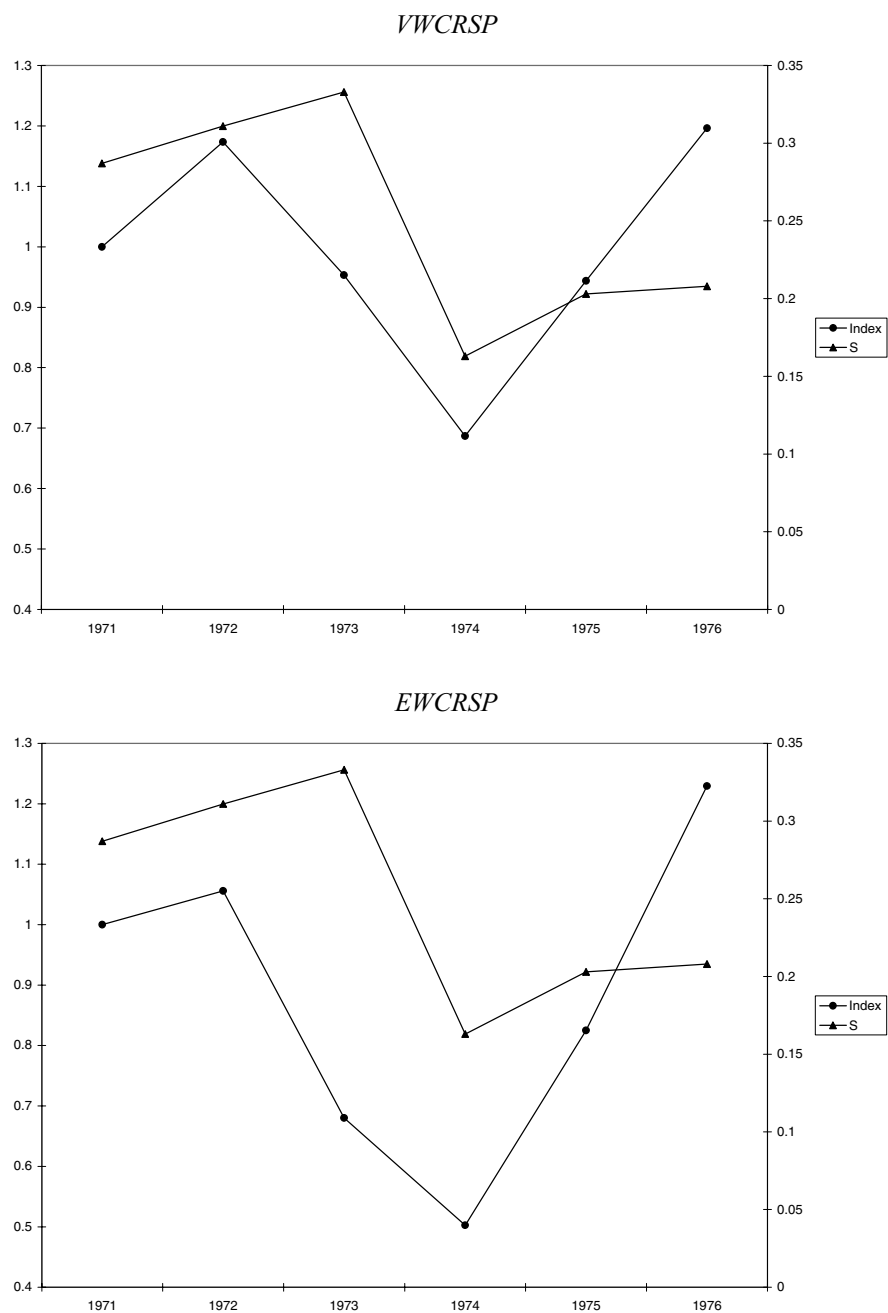
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Table III

The Relation Between Equity Market Returns and the Share of Equity in Total New Issues Excluding the Effect of Large Economic Shocks

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This table reports estimates of regressions relating equity market returns to the equity share in total new issues (S), excluding the market crashes that followed the Great Depression of 1929 and the Oil Crisis of 1973. The sample spans the period from 1927 to 2001, excluding the periods from 1929 to 1931 and from 1973 to 1974. *VWCRSP* is the annual return on the CRSP value-weighted portfolio. *EWCRSP* is the annual return on the CRSP equally weighted portfolio. *VWCRSP* and *EWCRSP* are converted to real returns using the Consumer Price Index from Ibbotson Associates (2003). S is standardized to have zero mean and unit variance. The standard errors of the coefficients have been adjusted for heteroskedasticity.

β_0	$t(\beta_0)$	β_1	$t(\beta_1)$	$\bar{R}^2$
	Panel A: $VWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$			
0.1066[a]	4.98	−0.0206	−0.88	−0.002
	Panel B: $EWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$			
0.1683[a]	5.02	−0.0653	−1.61	0.037

[a]Denotes significantly different from zero at the 1% level.

Depression or its consequences. This evidence casts serious doubts on the managerial timing hypothesis.

B. Further Evidence of Aggregate Pseudo-Market Timing

We also consider a set of smaller systemic shocks and investigate the relation between market returns and equity issues at the monthly frequency. To accomplish this, we identify ten events between 1936 and 2002 (including the oil embargo of 1973) that arguably would have been difficult for corporate managers to predict. These events, detailed in Table IV, generally relate to wars and terrorist attacks, but also include the stock market crash of 1987, the Russian debt crisis in 1998, and President Eisenhower's heart attack in 1955. These events are, admittedly, chosen in an ex post and ad hoc fashion. However, even ex post, we think it is difficult to argue that corporate managers could have anticipated these events with accuracy.[6]

Table IV describes the ten events and the characteristics of market returns and capital issues for 6 months before and after each of the events. We collect monthly data on new equity and debt issues from the *Federal Reserve Bulletin* and monthly market returns from CRSP. Column 1 of Table IV shows that, for all ten events, there is a large market decline in the month of the event (the mean average return is negative 14.4%). Coincident with the decline in market prices, we also find that for seven of the ten events, there is a large decline in the equity share of new issues during the 6 months following the event, as compared

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[6] Some may argue that events like the October 1987 crash and the 1998 Russian debt crisis could have been predicted. Nevertheless, our results are robust to the exclusion of either or both events.

Table IV

Changes in Aggregate Debt and Equity Issues Surrounding Unanticipated Events

This table presents an analysis of aggregate debt and equity issues surrounding ten unanticipated events or shocks that had a negative effect on market prices. The market return for each event period represents the real equally weighted CRSP return for the month when the event occurred. Pre- and postevent periods are defined as the 6-month period prior to or following the event month. Changes in equity and debt (Columns 5 and 6) are calculated as the percentage of change in average equity or debt issues from the 6-month pre- to postevent periods. The *p*-values (presented in parentheses below average differences) are based on *t*-tests of the null hypothesis that the differences are equal to zero across the ten observations.

| Unanticipated Event | Month | Year | Market Return (1) | 6-Month Average Equity Share (S) | | Difference (4) = (3)−(2) | % Change in Equity Issues (5) | % Change in Debt Issues (6) |
				Pre-event (2)	Post-event (3)			
1. German invasion of France	May	1940	−0.269	0.163	0.057	−0.106	−0.286	0.033
2. Japanese attack of Pearl Harbor	December	1941	−0.088	0.134	0.158	0.024	−0.073	−0.113
3. Beginning of the Korean War	June	1950	−0.079	0.309	0.213	−0.096	−0.047	0.025
4. President Eisenhower's heart attack	September	1955	−0.012	0.302	0.242	−0.060	−0.065	0.000
5. Kent State shootings	May	1970	−0.093	0.280	0.199	−0.081	−0.025	0.040
6. Oil embargo	October	1973	−0.181	0.278	0.241	−0.037	0.005	0.035
7. Stock market crash	October	1987	−0.274	0.221	0.126	−0.095	−0.107	−0.015
8. Iraq invades Kuwait	August	1990	−0.117	0.135	0.053	−0.082	−0.129	0.000
9. Russian debt crisis	August	1998	−0.197	0.161	0.084	−0.077	−0.077	0.004
10. September 11th	September	2001	−0.132	0.092	0.108	0.017	0.008	−0.010
Average			−0.144	0.208	0.148	−0.059	−0.080	−0.001
						(0.002)	(0.016)	(0.994)
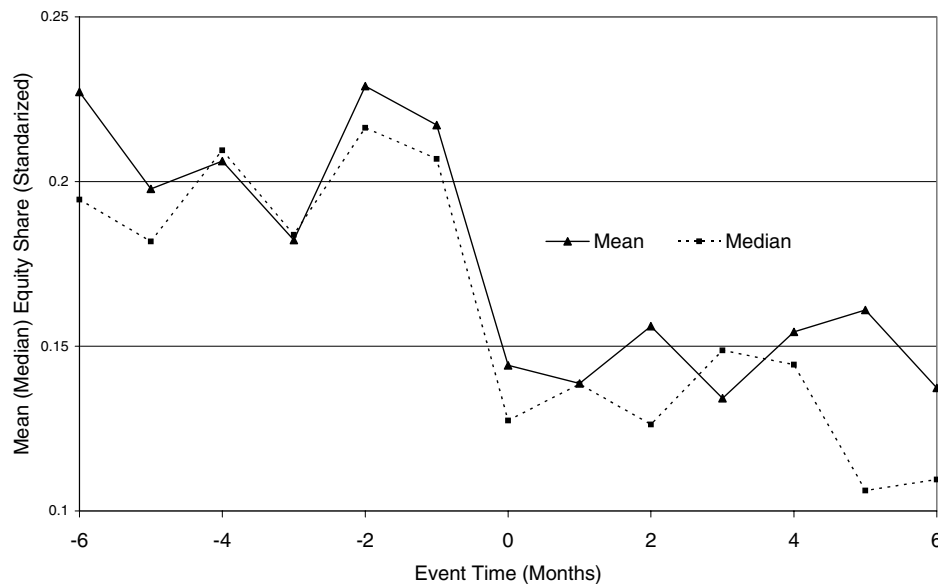
Figure 3. The behavior of the equity share surrounding unanticipated events. This figure depicts changes in the equity share surrounding ten unanticipated events or shocks that had a negative effect on market prices. The event periods are: May 1940 (German invasion of France), December 1941 (Japanese attack on Pearl Harbor), June 1950 (beginning of the Korean War), September 1955 (President Eisenhower's heart attack), May 1970 (Kent State shootings), October 1973 (Oil embargo), October 1987 (stock market crash), August 1990 (Iraq invades Kuwait), August 1998 (Russian debt crisis), September 2001 (Terrorist attacks of September 11th).

to the 6 months preceding the event (see Figure 3). The average decline in the equity share across the ten events is 5.9-percentage points (a 28% decline from the preshock mean of 0.21) and is statistically significantly different from zero at the 1% confidence level. In addition, when we look at the components of the equity share separately (Columns 5 and 6 of Table IV), we find that the large decline in the equity share is driven not by a strategic substitution between debt and equity, but rather by a higher sensitivity of equity issues to current equity market conditions. This is consistent with aggregate pseudo-market timing.

The relationship between the equity share of new issues and future market returns surrounding these ten events seemingly provides strong evidence of managerial timing.[7] However, this cannot be the case unless managers are able to both correctly predict such events and to quickly substitute capital issues (at the monthly frequency) away from debt toward equity in anticipation of low future returns. Since these events seem inherently unpredictable, we argue that aggregate pseudo-market timing provides a more satisfactory explanation for the observed relationship. Thus, our evidence points to an efficient markets

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[7] We find strong in-sample evidence for a linear relationship between the equity share and future returns surrounding these events.

explanation for the seemingly strong ability of corporate managers to forecast aggregate equity returns and time their issues accordingly.

C. The Post-Nasdaq Evidence

In addition to the event analysis, we also estimate the in-sample performance of S for the subsample from 1975 to 2002. We choose this period for three reasons. First, the period is free from the economic shocks identified by Perron (1989) that generate aggregate pseudo-market timing. Second, this period incorporates the introduction of the Nasdaq National Market System in 1973, which allowed a much larger set of firms to issue equity at earlier stages in their life cycles (see Fama and French 2003), so there may be a greater opportunity for managers to time equity markets during this period. Finally, since most of the evidence consistent with managerial timing at the firm level is from the post-Nasdaq era (see Gompers and Lerner (2003)), we should expect the relation between the equity share and future returns to be stronger during this period.

Contrary to the predictions of the managerial timing hypothesis, Table V shows that during the period 1975 to 2002 there is no evidence that S has predictive power in-sample. In fact, the adjusted R^2 is negative for regressions using either equally weighted or value weighted returns. These results are also consistent with the hypothesis that the strong in-sample evidence is driven by outliers that induce aggregate pseudo-market timing.[8]

Our findings highlight how pseudo-market timing may affect inferences about market efficiency beyond what Schultz (2003) demonstrates. Even when measuring aggregate returns in calendar time, the possibility of aggregate pseudo-market timing exists around significant macroeconomic events. Our results serve as a reminder that structural breaks or other significant economic phenomena can have a large effect on the properties of time-series data over long horizons.

III. Managerial Timing, Aggregate Pseudo-Market Timing, and the Substitution Hypothesis

To further distinguish whether the negative relation between the equity share and future aggregate equity returns stems from aggregate pseudo-market timing or managerial timing, we test additional implications of these two hypotheses. According to the managerial timing hypothesis, when managers think that the stock market is overvalued, they strategically substitute equity for debt, and when they think that the stock market is undervalued, they strategically substitute debt for equity. Aggregate pseudo-market timing, on the other

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[8] We also test the predictive power of S surrounding the "internet bubble" years of the late 1990s. For the seven observations between 1996 and 2002, there is a *positive* and statistically significant relation between S and future market returns. This analysis suggests that managers, at least during this period, prefer equity financing prior to periods of high returns and avoid equity before periods of low returns. This result stands in sharp contrast to the predictions of the managerial timing hypothesis.

Table V
The Relation Between Equity Market Returns and the Share
of Equity in Total New Issues: The Post-Nasdaq Evidence

This table reports estimates of regressions relating equity market returns to the equity share in total new issues (*S*) over the period from 1975 to 2001. *VWCRSP* is the annual return on the CRSP value-weighted portfolio. *EWCRSP* is the annual return on the CRSP equally weighted portfolio. *VWCRSP* and *EWCRSP* are converted to real returns using the Consumer Price Index from Ibbotson Associates (2003). *S* is standardized to have zero mean and unit variance. The standard errors of the coefficients have been adjusted for heteroskedasticity.

β_0	$t(\beta_0)$	β_1	$t(\beta_1)$	$\bar{R}^2$
		Panel A: $VWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$		
0.0941[a]	3.08	−0.0036	−0.14	−0.0379
		Panel B: $EWCRSP_t = \beta_0 + \beta_1 S_{t-1} + \mu_t$		
0.1370[a]	3.69	−0.0009	−0.02	−0.0384

[a]Denotes significantly different from zero at the 1% level.

hand, asserts that managers simply raise new capital when the market is performing well. In this case, both debt and equity should generally move in the same direction as the market (though equity may be more sensitive to stock market levels). Overall, managerial timing implies that the equity share is driven by a substitution between debt and equity in anticipation of future returns, while aggregate pseudo-market timing implies that the equity share varies with current market conditions as both debt and equity issues respond in the same direction to changes in market prices.

To distinguish between these competing explanations for the relationship between market returns and capital issues, we examine the equity and debt components of the equity share separately. Since aggregate debt and equity issues are nonstationary, we focus on annual percentage changes in debt and equity issues (which have better statistical properties than the levels). We form four portfolios of observations from our time-series based on whether changes in debt and equity issues were above or below the median change. Our four portfolios—high debt and high equity, low debt and high equity, high debt and low equity, and low debt and low equity—each have a comparable number of observations (18 or 19 in each).

Panel A of Table VI presents the average contemporaneous returns for each of the four portfolios. Comparing the first two columns, we find that average aggregate annual market returns are significantly larger when there are large increases in equity issues. For example, when changes in debt issues are high (Row 2 of Panel A), there is a statistically significant 16-percentage point difference in aggregate returns when changes in equity issues are large, relative to when changes in equity issues are small. Similarly, large increases in debt issues are also contemporaneously positively associated with market returns, although this relation is weaker. Thus, both debt and equity issues tend to increase when market prices rise, and to decrease (or increase by less) when

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Table VI
Comparison of Returns Based on Changes in Debt and Equity

This table presents average annual CRSP value-weighted returns for four subsamples of the period from 1927 to 2002. Subsamples are formed based on whether the percentage of change in aggregate debt and equity issues in each year is above (high) or below (low) the time-series medians of changes in debt and equity, respectively. Each subsample has either 18 or 19 observations. The averages presented in each cell are the equally weighted means of current returns (Panel A) or returns in the following year (Panel B). The *p*-values (reported in parentheses below differences) are based on two-tailed *t*-tests for differences in means.

		%Δ Equity$_t$		Difference
		Low	High	(*p*-Values)
Panel A: Average Current Returns (*t*)				
%ΔDebt$_t$	Low	−0.003	0.1165	0.1196 (0.100)
	High	0.0317	0.1943	0.1626 (0.001)
	Difference (*p*-values)	0.0348 (0.566)	0.0778 (0.243)	
Difference between low debt/low equity and high debt/high equity				0.1913 (0.001)
Panel B: Average Future Returns (*t* + 1)				
%ΔDebt$_t$	Low	0.0879	0.0645	0.0234 (0.734)
	High	0.1060	0.0491	0.0569 (0.399)
	Difference (*p*-values)	0.0180 (0.814)	0.0155 (0.791)	
Difference between high debt/low equity and low debt/high equity				0.0414 (0.523)

market prices fall. Comparing years in which changes in both debt and equity are low (low debt/low equity) with years when changes in both debt and equity issues are high (high debt/high equity) gives the largest difference in average annual returns (19.13 percentage points; *p*-value = 0.001). Consistent with the predictions of aggregate pseudo-market timing, these results suggest that both debt and equity tend to move with current market conditions.

Panel B of Table VI presents average aggregate future (the following year) annual market returns for the same four portfolios. According to the managerial timing hypothesis, managers should shift away from debt toward equity issues when they think that the market is overvalued and future market returns will be low, and vice versa. Thus, the managerial timing hypothesis predicts that future returns for the low-debt/high-equity portfolio should be significantly lower than for the high-debt/low-equity portfolio. However, we find no statistically significant difference in future returns for these portfolios. We also find no differences based on changes in equity or debt alone. These results are inconsistent with the managerial timing hypothesis.

Overall, the results from our analysis of the components of the aggregate equity share are consistent with our other results. We find direct support for aggregate pseudo-market timing explanations for the variation in equity and debt issues and no support for the hypothesis that managers substitute between issues of debt and equity based on expectations of future market returns. These tests provide support for an efficient markets explanation of managers' seeming ability to time the market.

IV. The Out-of-Sample Predictive Power of the Share of Equity Issues in Total Issues

A. *Methodology and Empirical Results*

One important implication of the aggregate pseudo-market timing hypothesis is that the equity share and future market returns should be correlated in-sample (ex post analysis) but not in out-of-sample tests (ex ante analysis) because market peaks and troughs are only known ex post if markets are efficient. Thus, the pseudo-market timing hypothesis does not predict any out-of-sample relationship.

In this section, we exploit this empirical prediction and use out-of-sample methods to evaluate the forecasting ability of the equity share in total new issues. These methods help us assess the predictive ability of the equity share, explicitly accounting for the fact that managers have access to historical data only when they try to forecast future equity market returns.[9]

To assess the out-of-sample forecasting ability of the equity share, we use the conditional predictive ability approach in Giacomini and White (2003).[10] In this approach, we simply compute the one-step-ahead errors that would prevail under the two different models that we consider and then test which model makes larger errors on average.[11] That is, we compare the out-of-sample forecasting ability of a model that uses S as a predictor (conditional model)

$$R_{Et} = \beta_0 + \beta_1 S_{t-1} + \mu_t \tag{2}$$

to the forecasting ability of a model that only contains a constant (unconditional model)

$$R_{Et} = \beta_0' + \mu_t', \tag{3}$$

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[9] Out-of-sample estimation is a standard methodology used to determine the forecasting ability and economic significance of a predictive variable (see for example, Meese and Rogoff (1983), Akgiray (1989), Keim and Stambaugh (1986), Pesaran and Timmermann (1995), Bossaerts and Hillion (1999), and Goyal and Welch (2003)).

[10] We also examine the out-of-sample predictive power of the equity share using the methodology in Chao, Corradi, and Swanson (2001). We use this alternative methodology because, like the conditional predictive ability approach used in Giacomini and White (2003), it does not assume that the unrestricted model is the true data-generating process under the null. Consistent with our main out-of-sample results, this analysis indicates that the equity share has no out-of-sample predictive ability.

[11] This is also closely related to the approach followed by Goyal and Welch (2003).

where R_E is the annual return on the CRSP value-weighted (*VWCRSP*) or equally weighted (*EWCRSP*) portfolio. In this specification, the restricted naïve model in equation (3) relies only on an estimate of the historical equity premium.

Since expected returns and asset-pricing model parameters vary over time (see, for example, Ferson and Harvey (1991)), we calculate the out-of-sample forecast error of each model, assuming that the parameters of the model are time-varying. Following Giacomini and White (2003), we use a rolling scheme to allow for time variation in the parameters. Thus, the forecast at time t is based on parameters estimated using a fixed-length window of past observations.[12] To ensure that our results are not sensitive to the size of the pre-estimation window, we perform the out-of-sample tests using windows of several different lengths.

To measure the forecasting ability of each model, we calculate the out-of-sample forecast error of each model using the following equations:

$$f_c = [R_{Et} - \beta_{0,t-1} - \beta_{1,t-1}S_{t-1}] \tag{4}$$

and

$$f_u = \left[R_{Et} - \beta'_{0,t-1}\right] \tag{5}$$

where f_c and f_u are the out-of-sample forecast errors for the conditional model (equation (2)) and unconditional model (equation (3)), respectively, $\beta_{0,t-1}$ and $\beta_{1,t-1}$ are the estimated parameters from equation (2), using only a fixed window of past observations, and $\beta'_{0,t-1}$ is the estimated parameter from equation (3) using only a fixed window of past observations.

Using these forecast errors, we calculate the annual differences in squared errors:

$$d_{\text{SE}} = f_C^2 - f_U^2 \tag{6}$$

and the annual differences in absolute deviation:

$$d_{\text{AD}} = |f_C| - |f_U|. \tag{7}$$

We then calculate the differences in mean squared errors (MSE) and mean absolute deviation (MAD) between the conditional model and the unconditional model by calculating the time-series averages of d_{SE} and d_{AD}, respectively. We expect these average differences to be negative if S is a good predictor of future returns.

To assess the statistical significance of the differences in MSE and MAD, we calculate *p*-values using the Wald-type test in Giacomini and White (2003) and

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[12] We also calculate the out-of-sample forecast errors of each model using a recursive scheme, where the forecast at time t is based on the parameters estimated using observations 1 through $t-1$. Our results are qualitatively the same.

bootstrapped *p*-values.[13] The bootstrapped *p*-values are calculated following these steps:

1. We randomly select observations from the sample of annual differences in squared errors (d_{SE}) and absolute deviation (d_{AD}), with replacement.
2. We calculate the time-series averages of the differences in MSE and the MAD from the bootstrapped sample.
3. We repeat steps (1) and (2) 10,000.   **Q1**
4. Using the simulated distribution, we calculate the *p*-value of the test statistics.

Thus, our out-of-sample analysis tests which model, on average, makes larger errors. This conditional approach following Giacomini and White (2003) has several advantages over alternative methods (e.g., West (1996), and Clark and McCracken (2001)) and leads to test statistics with well-defined distributions and better small-sample properties.

It is important to note that in a forecasting regression such as $y_{t+1} = \alpha + \beta^* x_t + \varepsilon_{t+1}$, the null hypothesis of unconditional tests is that $\beta^* = 0$. However, this is not a direct test of the efficient market hypothesis nor is it the test of interest for an investor. Investors are concerned about whether they can forecast future returns using the information available *at the time of the forecast,* whether or not β^* is different from zero in population. That is, β^* could be different from zero, but because of parameter uncertainty, the unrestricted model could make larger errors than the restricted model. The conditional approach overcomes this limitation because it is designed to examine which model gives better out-of-sample forecasts.

Finally, in the case of nested models (which we study in this article), unconditional tests assume under the null hypothesis that the unrestricted model is the true data-generating process (see Chao, Corradi, and Swanson (2001), Corradi and Swanson (2002), and Giacomini and White (2003)). That is, these tests implicitly assume that the unrestricted model cannot underperform the restricted model. However, in the presence of parameter uncertainty, the unrestricted model can underperform the restricted model (as we find in this article), so unconditional tests tend to be misspecified when the unrestricted model generates bad forecasts.[14] The conditional approach does not suffer from

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[13] In addition to the bootstrapping technique discussed below, we also construct bootstrap estimates based on a procedure similar to the one in Nelson and Kim (1993), Kothari and Shanken (1997), Killian (1999), and Rapach and Wohar (2003). All our results are qualitatively similar. However, since this approach relies on the assumption that our data-generating process is well specified and dynamically stable under the null hypothesis of no predictability, the conditional approach that we use in this paper is more robust.

[14] For example, the encompassing test proposed by Clark and McCracken (2001) sometimes rejects the hypothesis that the restricted model encompasses the unrestricted model even when the mean squared error (MSE) of the restricted model is smaller than the MSE of the unrestricted model (Rapach and Wohar (2003) document several such instances). This phenomenon could be explained by the fact that the encompassing test assumes that the difference in MSE can only be the result of the restricted model performing poorly, and not the result of parameter uncertainty.

this problem because it does not assume that the unrestricted model is the true data-generating process.

The results of our out-of-sample tests are reported in Table VII. Consistent with the prediction of aggregate pseudo-market timing, the results in this table indicate that S has no out-of-sample predictive power. Table VII shows that the mean squared errors from the conditional model (MSE_C) are not significantly smaller than those from the unconditional model (MSE_U). This result is independent of the period that we use to calculate the initial parameter values and whether we use value-weighted or equally weighted returns. The differences in MSE and MAD are not significantly different from zero, except in two cases where the difference in MSE is *positive* and significant. That is, in the only situations where we find a significant difference, the naïve model outperforms the model that includes S. The evidence in Table VII indicates that S has no out-of-sample predictive power, further supporting the predictions of aggregate pseudo-market timing.

B. Robustness Tests

We perform a series of robustness checks in this subsection. The results from this analysis indicate that the empirical findings documented in this section are robust to changes in the frequency of the data, out-of-sample estimation technique, model specification, loss function, and definition of market returns.

B.1. Power of the Out-of-sample Tests

It is possible that our out-of-sample tests do not have enough power to reject the null hypothesis because we lose observations when we estimate the initial parameters. However, this is unlikely, since even when we lose less than 14% of the total sample to estimate the initial parameters (initial preestimation period from 1928 to 1937), we still find no evidence that S has out-of sample predictive power. In addition, even if our results were driven by the lack of power in our tests, Table VII shows that in most cases, the naïve model generates smaller forecast errors than the conditional model. Thus, the hypothesis that S improves our forecast can be rejected in most cases with high statistical power for a test of any reasonable size.

However, to further investigate this issue, we collect monthly data on new equity and debt issues over the period 1936 to 2001 from the *Federal Reserve Bulletin*. By increasing the number of observations, we are able to improve the power of our tests without any related loss in size. We start the sample in 1936 for consistency since, over the period 1930 to 1935, the monthly data on equity issues and debt issues do not include refundings. We aggregate the monthly data into semiannual and quarterly data, which generates a sample of 134 semiannual observations and another of 268 quarterly observations.[15] We

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[15] We aggregate the monthly data into semiannual and quarterly data to take into account the fact that it takes time to place securities in the market. However, our conclusions are unaffected if we use monthly data.

Table VII
The Out-of-Sample Predictive Power of the Share of Equity Issues in Total Issues

This table compares the out-of-sample forecasting ability of the following conditional model:

$$R_{Et} = \beta_0 + \beta_1 S_{t-1} + \mu_t$$

to the forecasting ability of the following unconditional model:

$$R_{Et} = \beta'_0 + \mu'_t$$

where R_E is the annual return on the CRSP value-weighted (*VWCRSP*) or equally weighted (*EWCRSP*) portfolio, and S is the equity share in total new issues. *VWCRSP* and *EWCRSP* are converted to real returns using the Consumer Price Index from Ibbotson Associates (2003). To measure the forecasting ability of each model, we calculate the out-of-sample forecast error of each model using a rolling scheme. Under this scheme, the forecast at time t is based on parameters estimated using only a fixed window of past observations. Using the forecast errors, we calculate the annual differences in mean squared error (MSE) and mean absolute deviation (MAD) between the model that includes S (conditional model) and the model that excludes S (unconditional model). MSE_C (MAD_C) is the average annual mean squared error (mean absolute deviation) of the model that includes S. MSE_U (MAD_U) is the average annual mean squared error (mean absolute deviation) of the model that excludes S. The size of the pre-estimation window is the number of observations used in the pre-estimation period.

Initial Preestimation Period	Size of the Preestimation Window	Average β_1		Mean	p-values	Bootstrapped p-Values
Panel A: Dependent Variable: *VWCRSP*						
1928–1937	10	−1.01	$\text{MSE}_C - \text{MSE}_U$	0.0087	0.1353	0.0374
			$\text{MAD}_C - \text{MAD}_U$	0.0193	0.1127	0.0371
1928–1947	20	−0.77	$\text{MSE}_C - \text{MSE}_U$	0.0011	0.8067	0.3953
			$\text{MAD}_C - \text{MAD}_U$	0.0043	0.6517	0.3288
1928–1957	30	−0.81	$\text{MSE}_C - \text{MSE}_U$	−0.0015	0.7668	0.3727
			$\text{MAD}_C - \text{MAD}_U$	−0.0043	0.6825	0.3270
1928–1967	40	−0.79	$\text{MSE}_C - \text{MSE}_U$	0.0033	0.5256	0.2540
			$\text{MAD}_C - \text{MAD}_U$	0.0076	0.5624	0.2779
1928–1977	50	−0.70	$\text{MSE}_C - \text{MSE}_U$	0.0042	0.3310	0.1641
			$\text{MAD}_C - \text{MAD}_U$	0.0030	0.8189	0.4115
Panel B: Dependent Variable: *EWCRSP*						
1928–1937	10	−1.79	$\text{MSE}_C - \text{MSE}_U$	0.0116	0.4029	0.1741
			$\text{MAD}_C - \text{MAD}_U$	0.0117	0.5730	0.2730
1928–1947	20	−1.49	$\text{MSE}_C - \text{MSE}_U$	−0.0022	0.8415	0.4089
			$\text{MAD}_C - \text{MAD}_U$	−0.0086	0.6505	0.3122
1928–1957	30	−1.56	$\text{MSE}_C - \text{MSE}_U$	−0.0033	0.7964	0.3816
			$\text{MAD}_C - \text{MAD}_U$	−0.0077	0.7142	0.3463
1928–1967	40	−1.49	$\text{MSE}_C - \text{MSE}_U$	0.0084	0.5786	0.2843
			$\text{MAD}_C - \text{MAD}_U$	0.0071	0.7755	0.3970
1928–1977	50	−1.27	$\text{MSE}_C - \text{MSE}_U$	0.0150	0.1675	0.0904
			$\text{MAD}_C - \text{MAD}_U$	0.0147	0.5446	0.2742

collect aggregate quarterly and semiannual equity returns through 2002 from
CRSP and convert nominal returns to real returns using the monthly Consumer
Price Index from the U.S. Department of Labor.

As with the annual data, we find evidence (not reported in a table) that
the equity share can predict future market returns based on in-sample tests.
However, these results also vanish in out-of-sample tests. Thus, even using a
considerably larger sample, we do not find any evidence that the equity share
has out-of-sample predictive ability.

B.2. Alternative Loss Function

In subsection IV.A we find no evidence that the equity share has out-of-sample
predictive power when we use the MSE and the MAD, suggesting that the equity
share does a poor job of predicting the level of future returns. However, man-
agers may only have information about the direction of the future changes in
prices but not about the levels. To investigate this possibility, we use a direction-
of-change loss function. This function, which penalizes models when they fail
to predict the sign of the change, is equal to

$$\text{DOC} = \begin{cases} 1 & \text{if sign}(R_{E,t}) \neq \text{sign}(f_t) \\ 0 & \text{otherwise} \end{cases}, \tag{8}$$

where $R_{E,t}$ is the annual return on the CRSP value-weighted or equally
weighted portfolio at time t, and f_t is the out-of-sample forecast error at time t.

Since this loss function only requires that the model predicts the sign of the
market return and not the magnitude, it is less demanding than the MSE and
the MAD. However, our results (not reported) indicate that the model using the
equity share to predict the sign of future market returns does not perform better
than the naïve model. These results raise serious concerns about the usefulness
of the information conveyed by the equity share, because they suggest that the
equity share cannot even predict the direction of the changes in future market
prices.

B.3. Alternative Model Specification

If managers are trying to dynamically time the market, it is possible that
the *changes* in the equity share may contain better information about future
market returns than the levels. For example, a change in the equity share from
0.1 to 0.5 may contain more information about future returns than a change
from 0.6 to 0.65, even though the level of the equity share in the first situation
is smaller than in the second.[16]

To investigate this possibility, we compare the out-of-sample performance of
a model using the changes in the equity share as a predictive variable to the

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[16] Relying on changes may also reduce the effect of any nonstationarity in the level of the equity
share.

performance of a naïve model that includes only a constant term. The results from this analysis (not reported in a table) indicate that the changes in the equity share do not predict future market returns. Once again, our tests find no evidence of out-of-sample predictability.

C. Out-of-Sample Predictability and Look-Ahead Bias

In this subsection, we test whether look-ahead bias can explain why the equity share does not have predictive power in out-of-sample tests. A look-ahead bias can occur whenever data that are not currently available is used to make predictions about the future. In this sense, the econometrician is statistically "cheating" by peeking ahead to see what happens later in the sample, and then going back, armed with information about future data points, to make predictions in the past.

To examine whether uncertainty about the relation between the equity share of new issues and future stock market returns may induce a look-ahead bias, we investigate the time-series properties of the estimated coefficients on $S(\beta_1)$ from the regression results of equation (2). Figure 4 presents a time-series plot of β_1 estimated from the regressions used to perform the out-of-sample tests.[17] Notice that the coefficient varies substantially over time. For example, when using *EWRET*, in 1946 the estimate of β_1 is roughly 1.5, while it is less than -5.0 in the early 1980s. The solid horizontal line in Figure 4 represents the in-sample coefficient estimate based on the full sample and the dotted horizontal lines represent the associated 99% confidence intervals. In both panels, over half of the rolling regression coefficient estimates fall outside the 99% confidence intervals from the in-sample regressions. Thus, there is considerable uncertainty as to what the value of the parameter is at any point in time. As a result, it may be difficult for the managers or investors to make use of S in forecasting market returns in real time.

V. Conclusion

The findings in this article provide an efficient markets explanation for the seeming ability of corporate managers to time aggregate market returns. We show that aggregate pseudo-market timing drives the in-sample relationship between equity issues and future stock market returns. Specifically, we find that the in-sample evidence of predictability depends critically on the periods of the Great Depression and the Oil Crisis of the early 1970s—two large economic shocks that were inherently unpredictable. Consistent with aggregate pseudo-market timing, these economic shocks induce a spurious calendar time relationship between equity issues and ex post future returns.

Our results also suggest that managers do not strategically substitute between debt and equity to time the market. We find that debt and equity issues

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[17] The coefficients of β_1 reported in Figure 4 are different from the coefficients reported in previous tables, because we do not standardize S in order to avoid a look-ahead bias.

Coefficient of *S* when the dependent variable is *VWRET*

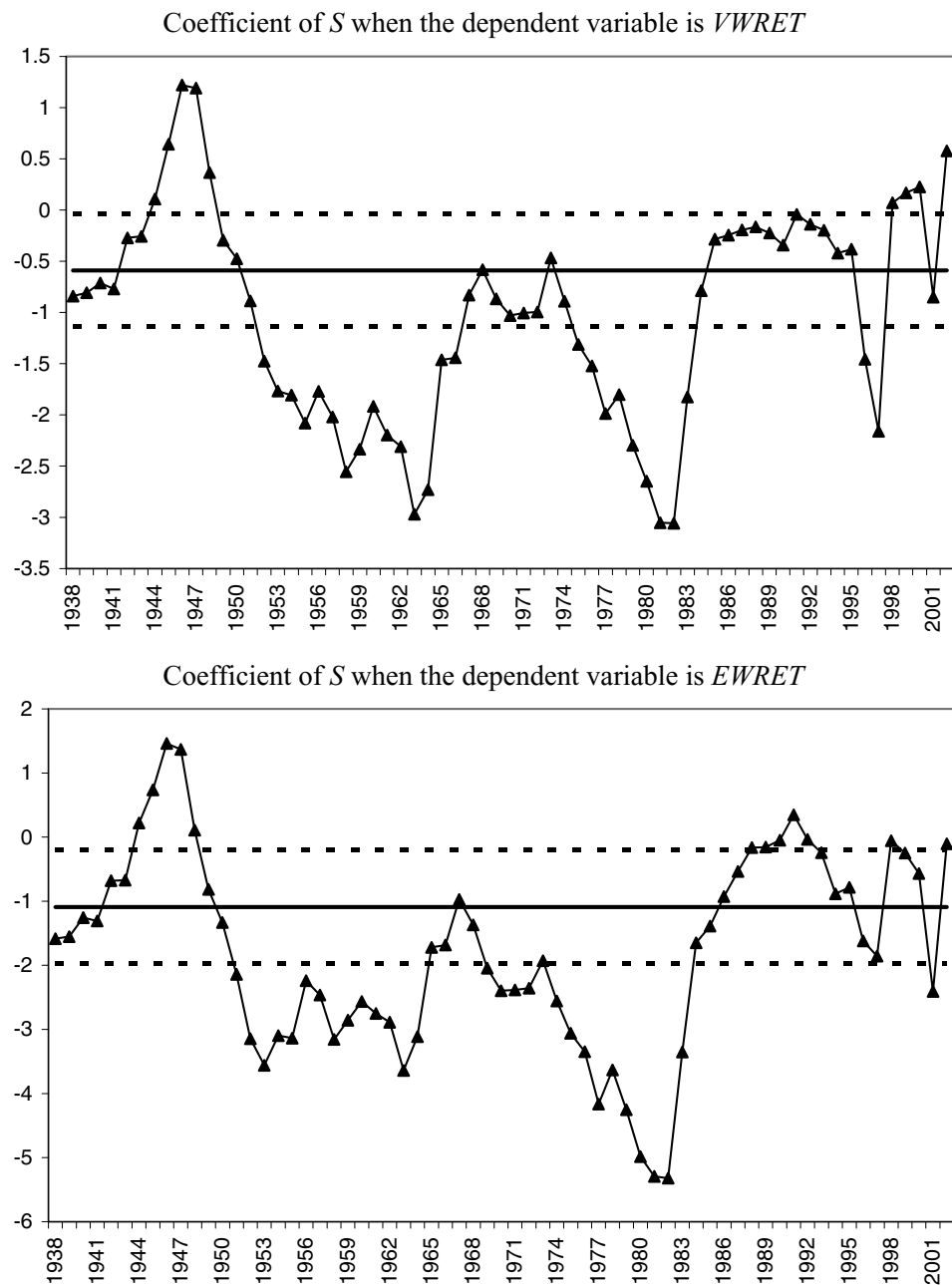Coefficient of *S* when the dependent variable is *EWRET*

Figure 4.   The behavior of the coefficient of the share of equity in total new issues over time. This figure depicts the behavior of the coefficient of the share of equity in total new issues over the period 1938 to 2002. The coefficient is estimated using a rolling window of 10 years. The solid flat line represents the in-sample coefficient estimate of *S* based on the full sample and the dotted flat lines represent the associated 99% confidence intervals.

are correlated with current market conditions, but there appears to be little strategic substitution between debt and equity as managerial timing ability would predict. Finally, we document that the aggregate share of equity in new issues has no out-of-sample predictability. As a result, we are unable to reject the hypothesis that aggregate pseudo-market timing explains the relation between equity issues and market returns.

Our findings reinforce an important result from the literature on predictive regressions—in-sample predictability does not provide prima facie evidence of inefficient markets (see, for example, Pesaran and Timmermann (1995), Bossaerts and Hillion (1999), Stambaugh (1999), Brennan and Xia (2002), Lewellen and Shanken (2002), Goyal and Welch (2003), Simin (2002), and Ferson, Sarkissian, and Simin (2003)). In addition, our results complement a number of recent empirical studies (see Brav and Gompers (1997), Brav, Geczy, and Gompers (2000), Eckbo, Masulis and Norli (2000), Mitchell and Stafford (2000), Gompers and Lerner (2003), and Li and Zhao (2003)) that find weak or nonexistent underperformance after IPOs or SEOs. These results, combined with our findings, cast serious doubt on the notion that managers can systematically sell overpriced equity.

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Queries

Q1   Author: The sentence "We repeat steps (1) and (2) . . ." is not clear. Please clear.

Q2   Author: Please update references Corradi and Swanson, 2002, Fama and French, 2003, and Goyal and Welch, 2003.