Lectures 7

Capital Structure and Behavioral Finance

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Irrational Investors and Capital Structure

Optimal Financing Policy: Market timing facts

Two very robust **facts** are:

1) Large inter-temporal fluctuations in fraction of total external finance raised via equity.
   - Volume of SEOs and IPOs correlated with high valuations IPOs, SEOs underperform by about 30% over 5 years post issue (Loughran and Ritter (1995))
   - Repurchases coincide with low valuationLoughran and Ritter (1995):

2) Firms tend to issue equity after their own share price has gone up relatively to the market as a whole.

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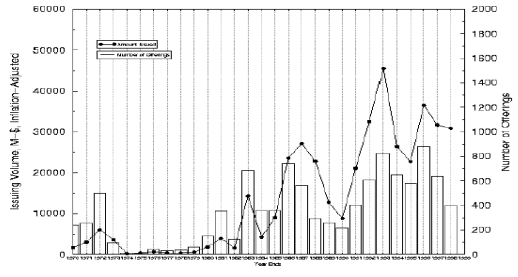
Irrational Investors and Capital Structure

Optimal Financing Policy: Market timing facts

Large fluctuations in IPO's market:



Irrational Investors and Capital Structure

Optimal Financing Policy: Market timing facts

New 'theories' arise...

Two possible explanations for the observed facts are:

- Stay within efficient market framework → jazz up Myers and Majluf model to address dynamic issues

→ Basic implication: adverse selection problems of equity issuance reduced during good times

- Behavioral explanation: market is inefficient; or managers think it is. (Stein, 1996)

→ Equity issues are timed to exploit mispricing. Consistent with survey evidence (Graham and Harvey, 2001): 67% say under or over-valuation is a factor in issuance decision.

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But, is it really true that managers succeed in timing the market?

Baker and Wurgler (2000) find that:

- Equity issues TODAY are strongly negatively correlated with FUTURE stock *market* returns (in-sample method).
  - When the equity share in new issues is in the bottom historical quartile (below 0.14), the average value-weighted market return in the next year is 14%
  - When it is in the top quartile (above 0.27), the average return in the next year is -6%.

→ The equity share has stable predictive power

→ Contrary to efficient market hypothesis

→ The fact that the equity shares sometimes predict significantly negative market returns suggests:

1. ***Market inefficiency, and***
2. ***That firms successfully time the market component of their returns when issuing securities***

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If that is the case how relevant is the market timing component in explaining capital structure?

Baker and Wurgler show the persistent effect of equity market timing on the capital structure of firms.

"Market Timing and Capital Structure" (Baker and Wurgler, JF 2002)

This paper provides support for the theory that capital structure is the cumulative outcome of past attempts to time the equity market.

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Baker and Wurgler (2002)

Recall that "Equity market timing" consists in: issuing shares at high prices and repurchasing them at low prices by exploiting temporary fluctuations in the cost of equity relative to the cost of other forms of capital.

Their results show that fluctuations in market value have **very long-run** impacts on capital structure:

'*For example, capital structure as of the year 2000 depends strongly upon variation in the market-to-book ratio from 1990 and before, even controlling for the 1999 value of market-to-book.'*

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Baker and Wurgler (2002)

- New hypothesis!
  - *Capital structure is the cumulative outcome of attempts to time the equity market*
  - Two versions:

1. Adverse selection varies across firms or across time and is inversely related to the market-to-book ratio.
2. Managers think that investors are irrational and raise equity when the cost of equity is unusually low.

   → in this case, variation in the market-to-book ratio is a proxy for managers' perceptions of misvaluation.

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Baker and Wurgler (2002)

- Both hypothesis require that adjustment costs reduce the desirability of undoing market timing in order to explain the persistent empirical effect of past valuations.
- The results of the paper are not able to discriminate between the two versions, but the earnings management evidence and the long-run return evidence point to the second version.

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Baker and Wurgler (2002)

Main questions:

- Does market-to-book affect capital structure through net equity issues, as market timing implies?
- Does market-to-book have persistent effects that help to explain the cross section of leverage?

Data:

Compustat firms for which IPO date can be determined, so as to examine the behavior of leverage around the IPO.

Period of 1968 to 1999, excluding financial firms, firms with book value of assets below $10 million, and firms without complete data on total assets. Also excludes outliers.

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Baker and Wurgler (2002)

Two steps:

- First, estimate the net effect of market-to-book on the annual change in leverage (with Rajan and Zingales (1995) controls):

$$\left(\frac{D}{A}\right)_t - \left(\frac{D}{A}\right)_{t-1} = a + b\left(\frac{M}{B}\right)_{t-1} + c\left(\frac{PPE}{A}\right)_{t-1} + d\left(\frac{EBITDA}{A}\right)_{t-1} + e\log(S)_{t-1} + f\left(\frac{D}{A}\right)_{t-1} + u_t$$

- The dependent variable is the change in leverage
- The relevant independent variable is market to book
- Controls include: tangibility, profitability and size

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Baker and Wurgler (2002)

- This first regression is run in IPO time on the IPO sample.
- For example, the IPO row in Panel A denotes the change in leverage between the pre-IPO value and the end of the IPO year;
- The IPO+1 row denotes the change in leverage from the end of the IPO year to the end of the IPO+1 year; et cetera.
- The last variable, lagged leverage, is included because leverage is bounded between zero and one. When leverage is near one of these boundaries, the change in leverage can only go in one direction, regardless of the values of the other variables.
  - Not controlling for lagged leverage may obscure the effects of the other variables.
  - Lagged leverage therefore enters with a negative sign (not reported).

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Baker and Wurgler (2002)

Results:

→ The net effect of high market-to-book is to lower leverage.

Ex: at IPO+3, a one std deviation increase in market-to-book leads to a 1.14 (=0.93*1.23 (std dev)) percentage-point decrease in leverage.

Thus firms increase equity when market valuations are high, but a channel through higher retained earnings or lower debt cannot be ruled out.

		M/B_{t-1}		PPE/A_{t-1} %		$EBITDA/A_{t-1}$ %		$\log(S)_{t-1}$		
Year	N	b	$t(b)$	c	$t(c)$	d	$t(d)$	e	$t(e)$	R^2
Panel A: Change in Book Leverage $(\Delta(D/A)_t)$ %										
IPO	2,281	−3.70	(−11.81)	0.04	(2.50)	−0.10	(−3.84)	3.83	(14.65)	0.45
IPO + 1	2,652	−1.21	(−5.65)	0.04	(3.78)	−0.16	(−6.33)	0.22	(1.24)	0.12
IPO + 3	2,412	−0.93	(−4.47)	0.03	(2.79)	−0.10	(−4.26)	0.69	(4.31)	0.08
IPO + 5	1,668	−0.03	(−0.10)	0.04	(3.89)	−0.11	(−3.22)	0.89	(5.09)	0.06
IPO + 10	715	−1.80	(−2.75)	0.04	(2.20)	−0.02	(−0.28)	0.12	(0.41)	0.09

Baker and Wurgler (2002)

Two steps (continued):

→ The second step: decompose the change in leverage to examine whether the effect comes through net equity issues, as market timing implies:

$$\left(\frac{D}{A}\right)_t - \left(\frac{D}{A}\right)_{t-1} = -\left[\left(\frac{E}{A}\right)_t - \left(\frac{E}{A}\right)_{t-1}\right] = -\left(\frac{e}{A}\right)_t - \left(\frac{\Delta RE}{A}\right)_t - \left[E_{t-1}\left(\frac{1}{A_t} - \frac{1}{A_{t-1}}\right)\right]$$

This equation divides the change in leverage into:

Equity issues + retained earnings + residual change in leverage

These three components of changes in leverage are regressed on the market-to-book ratio and the other independent variables.

→ This allows to determine whether market-to-book affects leverage through net equity issues, as market timing implies.

Baker and Wurgler (2002)

Results:

→ The effect of market-to-book on changes in leverage does indeed come through net equity issues

	N	(M/B)		(PPE/A)	$(EBITDA/A)$		$log(S)$		$R2$
Panel B: Change in Book Leverage Due to Net Equity Issues $(-(e/A_t))$ %									
IPO	2,281	−5.33	(−13.58)	0.05	(2.55)	0.10	(2.89)	4.98	(18.10)	0.27
IPO + 1	2,652	−3.44	(−11.76)	−0.02	(−1.55)	0.31	(8.82)	0.96	(4.93)	0.18
IPO + 3	2,412	−3.69	(−10.87)	−0.01	(−1.05)	0.25	(6.26)	0.96	(3.80)	0.17
IPO + 5	1,668	−3.14	(−6.49)	0.01	(0.54)	0.20	(3.69)	0.73	(3.00)	0.14
IPO + 10	715	−3.56	(−4.41)	−0.02	(−1.22)	0.25	(2.46)	0.39	(1.34)	0.20
Panel C: Change in Book Leverage Due to Newly Retained Earnings $(-(\Delta RE/A_t))$ %										
IPO	2,281	0.20	(0.59)	0.02	(1.71)	−0.27	(−7.14)	0.81	(4.24)	0.12
IPO + 1	2,652	−0.18	(−0.80)	0.01	(0.63)	−0.59	(−16.19)	−0.97	(−5.24)	0.37
IPO + 3	2,412	−0.20	(−0.54)	0.03	(2.23)	−0.54	(−12.24)	−0.31	(−1.33)	0.25
IPO + 5	1,668	−0.51	(−0.77)	0.01	(0.89)	−0.45	(−5.85)	−0.15	(−0.53)	0.17
IPO + 10	715	−0.37	(−0.41)	0.05	(2.44)	−0.56	(−5.20)	−0.76	(−1.76)	0.26
Panel D: Change in Book Leverage Due to Growth in Assets $(-E_{t-1}(1/A_t - 1/A_{t-1}))$ %										
IPO	2,281	1.44	(6.68)	−0.02	(−2.91)	0.07	(3.24)	−1.96	(−12.79)	0.46
IPO + 1	2,652	2.41	(9.33)	0.05	(4.70)	0.12	(3.31)	0.24	(1.15)	0.16
IPO + 3	2,412	2.84	(9.82)	0.01	(0.69)	0.18	(5.59)	0.16	(0.65)	0.13
IPO + 5	1,668	2.70	(6.50)	0.00	(0.34)	0.25	(4.78)	0.47	(2.00)	0.20
IPO + 10	715	1.77	(3.84)	0.01	(0.30)	0.29	(3.63)	0.66	(2.06)	0.17

Baker and Wurgler (2002)

Results (cont.):

- Panel B shows that higher market-to-book is associated with higher net equity issues.
- Panel C shows that market-to-book is not strongly related to retained earnings, ruling out the possibility that market-to-book affects leverage because it forecasts earnings.
- Panel D shows that market-to-book is positively related to growth in assets, an effect that tends to increase leverage.
- → This reflects the total effect of market-to-book on net equity issues, net debt issues, and newly retained earnings.
- → By the above equation, the sum of the coefficients in panels B, C, D equal the coefficients in panel A.
- → The clear result is that market to book affects leverage through net equity issues.

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Baker and Wurgler (2002)

→ A question that follows is whether market timing has persistent effects or whether market timing is just a local opportunism whose effect is quickly rebalanced away.

Thus, next is to test what is the determinant of cross section of leverage.

$$\left(\frac{D}{A}\right)_t = a + b\left(\frac{M}{B}\right)_{efwa,t-1} + c\left(\frac{M}{B}\right)_{t-1} + d\left(\frac{PPE}{A}\right)_{t-1} + e\left(\frac{EBITDA}{A}\right)_{t-1} + f\log(S)_{t-1} + u_t$$

→ Book and market leverage are regressed on the 'external finance weighted average market-to-book ratio' and the four Rajan and Zingales (1995) variables.

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Baker and Wurgler (2002)

- The external finance weighted average market-to-book ratio is:

$$\left(\frac{M}{B}\right)_{efwa,t-1} = \sum_{s=0}^{t-1} \frac{e_s + d_s}{\sum_{r=0}^{t-1} e_r + d_r}\left(\frac{M}{B}\right)_s$$

This variable takes high values for firms that raised external finance when the market-to-book ratio was high and vice-versa.

And it gives more weight to valuations that prevailed when significant external financing decisions were being made.

- The previous regression also controls for current cross-sectional variation in the level of market-to-book [(M/B)(t-1)], in this way what is left for the 'efwa' variable is the residual influence of past within-firm variation in market-to-book.

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Baker and Wurgler (2002)

Regression results:

Year	N	$M/B_{ffwt,t-1}$ b	t(b)	M/B_{t-1} c	t(c)	PPE/A_{t-1} % d	t(d)	$EBITDA/A_{t-1}$ % e	t(e)	$\log(S)_{t-1}$ f	t(f)	R^2
Panel A: Book Leverage %												
IPO + 1	2,652			−4.86	(−15.59)	0.13	(7.30)	−0.22	(−6.44)	5.00	(16.40)	0.25
IPO + 3	2,412	−4.93	(−8.40)	−0.86	(−1.50)	0.12	(6.63)	−0.31	(−7.41)	4.62	(15.53)	0.25
IPO + 5	1,668	−6.49	(−9.78)	0.05	(0.07)	0.12	(5.74)	−0.32	(−7.18)	4.30	(12.40)	0.26
IPO + 10	715	−10.81	(−10.59)	3.71	(3.28)	0.12	(3.65)	−0.38	(−5.01)	2.67	(4.82)	0.23
1980–1999 All firms	31,151	−7.21	(−21.20)	2.20	(3.38)	0.04	(3.62)	−0.48	(−7.20)	2.84	(21.79)	0.20
Panel B: Market Leverage %												
IPO + 1	2,694			−8.09	(−26.57)	0.14	(8.00)	−0.19	(−6.26)	2.91	(9.96)	0.36
IPO + 3	2,482	−6.05	(−10.03)	−5.84	(−9.53)	0.12	(6.53)	−0.32	(−9.17)	3.31	(10.43)	0.40
IPO + 5	1,731	−7.41	(−9.55)	−5.30	(−6.14)	0.12	(4.99)	−0.36	(−7.09)	2.43	(6.25)	0.37
IPO + 10	738	−10.77	(−9.38)	−3.29	(−3.19)	0.11	(3.22)	−0.53	(−5.92)	1.29	(2.06)	0.37
1980–1999 All firms	32,209	−7.35	(−20.52)	−5.53	(−14.45)	0.06	(3.65)	−0.61	(−7.54)	1.63	(15.06)	0.35

Baker and Wurgler (2002)

Results:

- The effect of the external finance weighted average variable is stronger and more consistent than the effect of the current cross-sectional variation in market-to-book.
- In book values, the once-lagged market-to-book goes from having little incremental explanatory power for young firms, to none at all, the flips sign for older firms. In contrast, the coefficient of the 'efwa' variable remains negative and gets larger with firm age.

→ These results suggest that historical within-firm variation in market-to-book, not current cross-firm variation, is more important in explaining the cross section of leverage.

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Baker and Wurgler (2002)

Results and conclusions:

In their paper, Baker and Wurgler document two results:

1. High market valuations reduce leverage in the short run
2. Historically high market valuations are associated with lower leverage in the cross section

→ The connection between these two results must be that the market-to-book effect is very persistent.

→ They further document the degree and magnitude of this persistence. Their results are striking:

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Baker and Wurgler (2002)

Results and conclusions (cont.):

- They indicate that market-to-book variation from 1990 and before remains a strong determinant of capital structure as of year 2000.
- The historical path of market-to-book, even calculated with data over 10 years old, is much more influential than the current market-to-book.

They conclude that data provides support for their equity market timing theory of capital structure involving irrational investors.

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Irrational Investors and Capital Structure

Following the two papers by Baker and Wurgler (2000 and 2002), a series of papers build on the debate whether firms are actually able to forecast the systematic component of their market returns.

We will study these papers:

- Butler, Grullon and Weston: *"Can managers forecast aggregate market returns?"* (JF 2005)

- Butler, Grullon and Weston: *"Can managers successfully time the maturity structure of their debt issues?"* (JF 2006)

Obviously Baker et al. respond on the debate with a new paper:

- Baker, Taliaferro and Wurgler: *"Predicting returns with managerial decision variables: is there a sample bias?"* (JF 2006)

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Butler, Grullon and Weston (2005)

Recall that Baker and Wurgler (2000), in their paper find that:

-- the share of equity in total new issues is negatively correlated with future aggregate equity *market* returns

They interpret that as evidence of

-- managers being able to predict, not only the idiosyncratic (Loughran and Ritter, 1995) but also, the systematic component of their stock returns and to issue equity when the market is overvalued

The paper by Butler, Grullon and Weston (2005): "Can managers forecast aggregate market returns?"

-- criticizes Baker and Wurgler (2000) findings

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Butler, Grullon and Weston (2005)

Butler et al. show that when controlling for a 'look-ahead bias':

1. the share of equity in total new issues does not provide real-time predictive power for forecasting market returns.
2. Even when not controlling for that, the predictive power of the share of equity in total new issues appears to stem from aggregate *pseudo* market timing and not from any abnormal ability of managers to time the equity markets.

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Butler, Grullon and Weston (2005)

-- The main convincing explanation is based on Schultz' (2003):

Pseudo market timing hypothesis

Equity market timing: is the tendency of firms to issue equity before low equity market returns

Pseudo market timing: is the tendency of firms to issue equity following high returns.

→ 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.

→ If this is the case, ex post performance may be negative even though ex ante expected abnormal returns are zero.

→ This result goes in favor of market efficiency!!!

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Butler, Grullon and Weston (2005)

In a setting with *aggregate* market returns, aggregate market timing can be found surrounding aggregate economic events that affect the entire economy.

Example: in the Great Depression and the Oil Crisis, both periods were preceded and followed by bull markets.

- → Since managers are more likely to issue equity when stock prices are high (positive economic shocks), and less likely to issue equity when prices are low (negative economic shocks), it is not surprising that S is relatively low (high) just after (before) the market crashes.
- → This claim means that BGW are fine with the hypothesis that managers predict idiosyncratic returns, but not the systematic component as BW claim!

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Butler, Grullon and Weston (2005)

- Butler et al. test the hypothesis that pseudo aggregate market timing may affect the perceived ability of managers to time the equity market.
- They do that by:
  -- replicating the in-sample analysis **by excluding the market crashes that followed the Great Depression of 1929 (1929-1931) and the Oil Crisis of 1973 (1973-1974).**

Results:

β_0	$t(\beta_0)$	β_1	$t(\beta_1)$	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.

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Butler, Grullon and Weston (2005)

The previous regression results show that:

- The predictive power of Equity issuance depends critically on these two unique economic periods: only 5 observations are removed!!!
- The absence of the 5 observations, completely removes the in-sample statistical significance of the predictive power of equity share of new issues for both equally and value-weighted returns
- Thus, for 96% of the observations in the sample, managers are not able to time the equity market, even based on in-sample tests.

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Butler, Grullon and Weston (2005)

- Out of sample predictability
- Same data as Baker and Wurgler
- Replicates BW regression and obtains same results.
  - Crucial issue! BW estimate the regression parameters by using the full sample: *in-sample* estimation method.
  - Thus, it is possible that BW results are driven by a *look-ahead bias*:
    - In-sample estimations do not take into account the fact that managers only have access to historical data when they make their forecasts: look-ahead bias!
- Butler et al. assess the forecasting ability of the equity share in total new issues (S) in a conditional model that uses S as a predictor, and an unconditional model (naïve model):

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Butler, Grullon and Weston (2005)

Conditional model:

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

Unconditional model:

$$R_{Et} = \beta_0' + \mu_t'$$

Where the dependent variable is the annual return on the CRSP value-weighted or equally-weighted portfolio.

Comparing the two models one can assess the forecasting ability of S to predict future equity market returns (Goyal and Welch, 2003).

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Butler, Grullon and Weston (2005)

Indeed,

If the model that includes S (conditional model) does not outperform the naïve model that has only a constant term (unconditional model),

→ then one can reject the idea that managers are able to predict aggregate market returns in real time

→ and that S does not have any out-of-sample predictive power.

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Butler, Grullon and Weston (2005)

How it works:

- To measure the forecasting ability of each model one calculates the out-of-sample forecast error of each model using a recursive scheme
- Under this scheme the forecast at time t is based on the parameters estimated using observations 1 through t-1.
- The forecast error in each model is equal to the return at time t minus the estimated return using the estimated parameters for the period 1 through t-1.
- Then calculate the differences in mean square error and mean absolute deviation between the two models:

→ If S is a good predictor of future returns, the difference equations should be negative

→ P-values should show significance.

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Butler, Grullon and Weston (2005)

This is not the case!

- Results show no significant difference between the two models.

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	$MSE_C - MSE_{ff}$	0.0087	0.1353	0.0374
			$MAD_C - MAD_{ff}$	0.0193	0.1127	0.0371
1928–1947	20	−0.77	$MSE_C - MSE_{ff}$	0.0011	0.8067	0.3953
			$MAD_C - MAD_{ff}$	0.0043	0.6517	0.3288
1928–1957	30	−0.81	$MSE_C - MSE_{ff}$	−0.0015	0.7668	0.3727
			$MAD_C - MAD_{ff}$	−0.0043	0.6825	0.3270
1928–1967	40	−0.79	$MSE_C - MSE_{ff}$	0.0033	0.5256	0.2540
			$MAD_C - MAD_{ff}$	0.0076	0.5624	0.2779
1928–1977	50	−0.70	$MSE_C - MSE_{ff}$	0.0042	0.3310	0.1641
			$MAD_C - MAD_{ff}$	0.0030	0.8189	0.4115
			Panel B: Dependent Variable: *EWCRSP*			
1928–1937	10	−1.79	$MSE_C - MSE_{ff}$	0.0116	0.4028	0.1741
			$MAD_C - MAD_{ff}$	0.0117	0.5739	0.2739
1928–1947	20	−1.49	$MSE_C - MSE_{ff}$	−0.0922	0.8415	0.4089
			$MAD_C - MAD_{ff}$	−0.0086	0.6505	0.3122
1928–1957	30	−1.56	$MSE_C - MSE_{ff}$	−0.0033	0.7964	0.3816
			$MAD_C - MAD_{ff}$	−0.0077	0.7142	0.3463
1928–1967	40	−1.49	$MSE_C - MSE_{ff}$	0.0084	0.5786	0.2843
			$MAD_C - MAD_{ff}$	0.0071	0.7755	0.3979
1928–1977	50	−1.27	$MSE_C - MSE_{ff}$	0.0150	0.1675	0.0904
			$MAD_C - MAD_{ff}$	0.0147	0.5446	0.2742

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Butler, Grullon and Weston (2005)

Conclusion:

- The proportion of annual new security issues that are equity, S, does not provide real time predictive power for forecasting market returns
- Market participants are unable to capitalize on a relation between S and future returns
- Results are consistent with market efficiency
- Result crucially depends on the exclusions of some observations. Nothing holds in this paper if those observations are included again.

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Butler, Grullon and Weston (2006)

In their follow-up paper,

Butler, Grullon, Weston: "Can managers successfully time the maturity structure of their debt issues?" (JF 2006)

Show that a structural break in excess bond returns during the early 1980s generates a spurious correlation between the fraction of long-term debt in total debt issues and future excess bond returns.

The presence of these structural breaks can lead to nonsense regressions.

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Butler, Grullon and Weston (2006)

Effect of a structural break on a regression coefficient:

- Suppose Y an X are two random variables that both exhibit an exogenous structural break in their means, but innovations in the two series are otherwise independent.

⇓

- Suppose an exogenous shock hits the two variables at the same time. As a result, the means of Y and X change at the same time.

⇓

- Then, the two series can exhibit a significant (unconditional) correlation because Y tends to be above (or below) it sample mean during the period in which X is also above (or below), or vice versa, its sample mean.

⇓

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Butler, Grullon and Weston (2006)

Effect of a structural break on a regression coefficient (cont.):

- Now suppose the econometrician draws a finite sample of Y and X from both the pre- and post-shock periods but ignores the structural break.

⇓

- Then, if she regresses Y on X, she may find a large t-statistic on the regression coefficient for X.
- → One interpretation of this regression result might be that X affects Y, although there is no real causal link between them.
  - → A spurious correlation arises
  - → X is simply a proxy for the omitted structural change in Y.

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Butler, Grullon and Weston (2006)

Effect of a structural break on a regression coefficient (cont.):

- The spurious regression induced by shifting means can similarly create problems in predictive regressions in which Y is regressed on lagged values of X.
- → Thus, structural shifts in the data can generate the illusion of successful forward-looking managerial timing.
- → This paper examines this in the context of excess bond returns which experience a structural shift in the early 1980s around a significant change in US monetary and fiscal policy.

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Butler, Grullon and Weston (2006)

Effect of the 1982 change in US monetary and fiscal policy:

-- In the early 1980s, the Federal Reserve in the US began a zero inflation policy in order to control rising inflation

-- At that time, the new chairman of the Federal Reserve, Paul Volcker, pursued a restrictive monetary policy that significantly increased interest rates.

-- Concerning fiscal policy, there is evidence that the large and sustained federal budget deficits throughout the 1980s and early 1990s caused long-term rates to exceed short-term rates by a wide margin.

-- The structural shift in monetary and fiscal policy systematically increased the relative cost of long-term debt, creating an incentive for firms to issue more short-term debt relative to long-term debt after 1982.

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Butler, Grullon and Weston (2006)

Effect of the 1982 change in US monetary and fiscal policy (cont.):

- Since this phenomenon causes the ratio of long-term debt issues to total debt issues to be above (below) its sample mean during the period in which the relative cost of long-term debt is below (above) its sample mean, an in-sample negative correlation could arise between the long-term share and future excess long-term bond returns.

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Butler, Grullon and Weston (2006)

Findings:

- The paper finds that ignoring the structural shift in the predictive regressions can significantly affect inferences about the coefficient of the long-term share.
- Specifically they find that conditioning on the structural shift, the correlation between the long-term share and future excess returns disappears.
- Therefore, the previously documented negative relation between the long-term share and future excess bond returns may be spurious since the long-term share may simply be proxying for the omitted structural break.
- It is also possible that the correlation between the long-term share and the structural shift may reflect the fact that managers predicted the break. The authors find little evidence supporting it.
- Thus it seems that the correlation is driven by manager's reaction to the break, rather than them forecasting it.

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Baker, Taliaferro and Wurgler (2006)

A response to the Butler et al. previous papers is given by

Baker, Taliaferro and Wurgler in "Predicting Returns with Managerial Decision Variables: Is There a Small-Sample Bias?" (JF 2006).

Equity market timing: is the tendency of firms to issue equity before low equity market returns

Pseudo market timing: is the tendency of firms to issue equity following high returns.

→ In small samples, pseudo market timing can give the appearance of genuine market timing.

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Baker, Taliaferro and Wurgler (2006)

-- Example of pure pseudo market timing:

- Consider only two returns:
  - If the first return is high, equity issues rise; if the first return is low, equity issues fall.
  - The first return can be mechanically explained ex post:
    - Relatively low equity issues precede a high first return and relatively high equity issues precede a low first return
    - Thus, even though the returns are random, equity issues 'predict' in-sample returns more often than not.

→ Baker et al. run simulations and assess the magnitude of the small-sample bias induced by aggregate pseudo market timing

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Baker, Taliaferro and Wurgler (2006)

Conclusions :

- → Baker et al. conclude that predictability is much too strong to be attributed to small-sample bias.
- → They respond to Butler et al. (2004) by saying that these authors' conclusions on pseudo market-timing bias are misleading since these authors do not present any direct estimates of the bias, but instead build a case from several indirect exercises.
  - → Their paper boils down to a strategic process of removing data that are identified ex post as most consistent with genuine market timing.

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Baker, Taliaferro and Wurgler (2006)

Conclusions (cont.):

- This process, they say, is exactly equivalent to searching for an indicator variable that removes as much of the variation in bond returns as is mathematically possible. These manipulations that have no a priori justification are not trivial for time series regressions that involve fewer than 75 data points and an R-squared of 25 percent.
- Not surprisingly, in both cases, the predictive power of the managerial decision variable falls
- This is maybe an interesting analysis of robustness, but it has nothing to do with pseudo market timing.

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Jenter (2004)

An alternative theory of timing is addressed in the paper by Dirk Jenter:

"Market Timing and Managerial Portfolio Decisions" (Jenter, JF 2004)

This paper provides evidence of managers' perceptions of market valuation divergence from fundamental value:

- It shows that managers' perceived mispricing has an impact on insider trading patterns, i.e. their own portfolio decisions.
- Thus providing evidence that managers try to actively time the market in their private trades (as well as in firm-level decisions).
- Because the authors do not have a measure of perceived mispricing, they will be using proxies of mispricing (book to market deciles, equity issuance activity). Alternative interpretations?

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Jenter (2004)

- To test the hypothesis that managers perceive their own stock as misvalued when making corporate decisions, the author uses managers' own portfolio trades as a window into their beliefs.

Two main results:

1. Managers in low book-to-market firms dispose of company shares much more frequently and aggressively than managers in high book-to-market firms
2. Managers' contrarian views also affect their decisions whether to issue seasoned equity → the author documents a strong correlation between equity issues and insider sales.

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Jenter (2004)

Data:

- Data on managerial equity ownership comes from Standard and Poor's ExecuComp database, years 1992-2000.
- Data on book equity, earnings, cash-flow and other financial statement variables comes from Compustat.
- Data on stock prices, market capitalization and returns is taken from the monthly CRSP files.

Empirical Strategy:

There are three reasons that motivate insider trading by managers:

1. Portfolio rebalancing
2. Diversification motives
3. Perceived misvaluation and market timing

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Jenter (2004)

1. Portfolio rebalancing

   Managers are more likely to rebalance their portfolios after large changes in equity prices

   → Thus the value of inside holdings over the current and previous year are included as control variables

2. Diversification motives

   Managers are underdiversified in terms of stock of human capital, as a result they should tend to sell stock

   → The levels of managers' stock and option holdings are included in regressions to account for managers' incentives to diversify

3. Perceived misvaluation and market timing

   Managers who believe that their own firm is undervalued by the market have an incentive to postpone insider sales or even to acquire company stock

   → This is the variable of interest

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Jenter (2004)

Other control variables are included since they affect managerial decisions:

- Firm size: managers in large firms are more likely to sell company shares than managers in small firms
- Total stock return volatility: managers in more risky firms tend to sell equity more aggressively
- Changing firm risk: changes in firm risk induce managers to modify their holdings

Results:

A first set of univariate results shows the number of net buyer vs net seller managers in ten book-to-market deciles:

→ Going to decile one (growth firms) to decile ten (value firms), the number of net buyers increases from 24% to 54%, while the number of net sellers falls from 68% to 33%.

→ Thus, managers in high valuation firms are more likely to be net sellers than managers in low valuation firms.

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	Dependent Variables							
Independent Variables	Dollar Value of Individual Net Purchases of Company Stock		Dollar Value of Net Purchases of Company Stock Averaged by Firm-Years		Individual Net Purchases of Company Stock as Percentage of Prior Exposure		Net Purchases of Company Stock as Percentage of Prior Exposure Averaged by Firm-Years	
Intercept	4,906	(12.72)**	4,000	(7.99)**	23%	(9.31)**	23%	(5.65)**
B/M-Decile								
1 (Growth)	-3,753	(16.19)**	-3,413	(11.07)**	-19%	(15.07)**	-19%	(9.24)**
2	-2,046	(13.79)**	-1,969	(9.84)**	-17%	(14.59)**	-17%	(8.80)**
3	-1,643	(13.04)**	-1,545	(9.12)**	-16%	(13.59)**	-15%	(8.40)**
4	-1,214	(11.89)**	-1,102	(7.99)**	-17%	(13.94)**	-17%	(9.00)**
5	-1,133	(11.11)**	-1,079	(8.07)**	-16%	(13.00)**	-17%	(8.60)**
6	-696	(8.12)**	-623	(5.19)**	-12%	(10.40)**	-11%	(6.44)**
7	-634	(7.84)**	-602	(5.37)**	-11%	(9.15)**	-11%	(6.02)**
8	-460	(6.25)**	-392	(4.14)**	-10%	(8.34)**	-10%	(5.39)**
9	-330	(4.72)**	-340	(3.54)**	-5%	(4.38)**	-5%	(2.95)**
10 (Value)	-		-		-		-	
Dollar value of equity stake	-0.0015	(3.45)**	-0.0013	(3.79)**	0.0010%	(1.65)	0.0016%	(1.79)
Intrinsic value of exercisable options	-0.0015	(1.64)	-0.0019	(1.43)	0.0017%	(2.81)**	0.0004%	(0.41)
Intrinsic value of unexercisable options	-0.0608	(3.80)**	-0.0616	(3.60)**	0.0284%	(2.62)**	0.0660%	(2.02)*
Dollar value of stock grants	-0.0735	(3.56)**	-0.1002	(7.38)**	-0.0195%	(0.51)	-0.0568%	(0.57)
Black-Scholes value of option grants	-0.0970	(2.08)*	-0.1892	(3.19)**	-0.0162%	(0.51)	-0.4211%	(2.56)*
Dollar change in value of equity stake in current year	-0.0004	(0.65)	-0.0025	(2.44)*	-0.0001%	(0.33)	-0.0038%	(1.30)
Dollar change in value of equity stake in prior year	0.0007	(2.70)**	0.0005	(2.51)*	0.0001%	(0.59)	0.0009%	(2.10)*
Total return volatility (t-2)	-3,365	(11.66)**	-2,861	(7.42)**	-25%	(11.50)**	-27%	(7.36)**
Change in total return volatility (t-1)	-697	(2.34)*	-486	(1.21)	-6%	(2.04)*	-5%	(1.09)
Change in total return volatility (t)	-792	(3.15)**	-367	(1.03)	-2%	(0.95)	-4%	(1.02)
Log of Total Assets	481	(12.01)**	394	(7.49)**	2%	(8.80)**	2%	(5.32)**
Year dummies	Yes		Yes		Yes		Yes	

Jenter (2004)

Regression Results:

- The coefficients on the valuation dummies are economically and statistically significant, and increase strongly with book-to-market.
- Managers in the high valuation (growth) decile sell net $3.75 million worth of shares more than managers in the low valuation (value) decile, with a robust t-statistic of 16.19.
- Prior equity ownership and prior option holdings have a negative effect on open market purchases
- Return volatility and firm size also have a negative coefficient

-- Robustness checks (e.g.: averaging the dependent and explanatory variables across managers in the same firm) lead to similar results.

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Jenter (2004)

-- → Managers in high valuation firms dispose of company shares more aggressively than managers in low valuation firms.

→ Managers seem to view value firms as relatively undervalued by the stock market and thus they are reluctant to sell

→ Managers seem to view growth firms as relatively overvalued by the stock market and thus they sell stock at the first opportunity.

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Jenter (2004)

How does capital structure changes with managers' perceptions of misvaluation?

- Two measures of equity issuance activity:
  - Seasoned equity offerings (from Securities Data Corporation)
  - Change in paid-in share capital during each fiscal year (balance sheet information from Compustat) = change in book equity minus the change in balance-sheet retained earnings divided by total assets.

In the same regression as before, a dummy variable is included that accounts for issuing firms reported in the SDC database. Same for the second measure (although not reported here).

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Jenter (2004)

	Dependent Variables:							
Independent Variables:	Value of Individual Net Purchases of Stock		Value of Net Purchases of Stock Averaged by Firm-Years		Value of Individual Net Purchases of Stock		Value of Net Purchases of Stock Averaged by Firm-Years	
Intercept	4,872	(12.68)**	3,986	(8.02)**	4,838	(12.58)**	3,939	(7.92)**
B/M-Decile								
1 (Growth)	-3,661	(15.81)**	-3,316	(10.77)**	-3,590	(15.39)**	-3,228	(10.41)**
2	-1,982	(13.36)**	-1,902	(9.62)**	-1,920	(12.80)**	-1,825	(9.11)**
3	-1,578	(12.63)**	-1,475	(8.85)**	-1,516	(12.06)**	-1,399	(8.41)**
4	-1,186	(11.65)**	-1,074	(7.80)**	-1,162	(11.53)**	-1,044	(7.67)**
5	-1,091	(10.79)**	-1,030	(7.82)**	-1,067	(10.82)**	-1,001	(7.79)**
6	-658	(7.68)**	-584	(4.86)**	-634	(7.41)**	-555	(4.60)**
7	-609	(7.54)**	-579	(5.20)**	-584	(7.21)**	-549	(4.95)**
8	-435	(5.91)**	-373	(3.95)**	-448	(6.07)**	-382	(4.05)**
9	-324	(4.65)**	-341	(3.54)**	-325	(4.66)**	-337	(3.51)**
10 (Value)	-		-		-		-	
SEO dummy	-1,448	(7.63)**	-1,588	(6.14)**	-		-	
Issuer B/M 1-3 (Growth)	-		-		-1,869	(5.21)**	-2,087	(4.27)**
Issuer B/M 4-7	-		-		-1,398	(5.20)**	-1,504	(4.14)**
Issuer B/M 8-10 (Value)	-		-		-619	(3.21)**	-618	(2.45)*
Dollar value of equity stake	-0.0015	(3.46)**	-0.0013	(3.83)**	-0.0015	(3.47)**	-0.0013	(3.84)**
Intrinsic value of exercisable options	-0.0015	(1.65)	-0.0019	(1.47)	-0.0015	(1.65)	-0.0020	(1.48)
Intrinsic value of unexercisable options	-0.0612	(3.82)**	-0.0624	(2.64)**	-0.0613	(3.82)**	-0.0626	(2.65)**
Dollar value of stock grants	-0.0738	(3.56)**	-0.1009	(7.49)**	-0.0739	(3.56)**	-0.1011	(7.42)**
Black-Scholes value of option grants	-0.0961	(2.08)*	-0.1870	(3.20)**	-0.0962	(2.08)*	-0.1872	(3.21)**
Dollar change in value of equity stake in current year	-0.0004	(0.66)	-0.0025	(2.46)*	-0.0004	(0.66)	-0.0025	(2.47)*
Dollar change in value of equity stake in prior year	0.0007	(2.67)**	0.0005	(2.44)*	0.0007	(2.67)**	0.0005	(2.43)*
Total return volatility (t-2)	-3,148	(10.98)**	-2,635	(6.95)**	-3,131	(10.89)**	-2,613	(6.90)**
Change in total return volatility (t-1)	-619	(2.09)*	-410	(1.03)	-621	(2.10)*	-408	(1.03)
Change in total return volatility (t)	-722	(2.90)**	-300	(0.85)	-728	(2.93)**	-306	(0.87)
Log of total assets	-474	(11.87)**	-387	(7.40)**	-475	(11.90)**	-388	(7.41)**
Year dummies	Yes		Yes		Yes		Yes	

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Jenter (2004)

Results:

- Column 1 indicates that managers sell $1.4 million more equity in the year of an equity issue than in years with no issuance, holding everything else constant. Same for firm-year averages.
- → Thus, equity issuance and insider sales are positively correlated even when controlling for valuation levels.
- Column 3 indicates that managers in issuing firms sell an additional $619,000 worth of equity. The effect gets larger as the book-to-market ratio falls, with managers in issuing growth firms selling an additional $1.87 million. Stronger for firm-year averages.
- → The decision to issue equity is associated with large insider sales, and more strongly for growth firms than value firms.

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Jenter (2004)

Conclusion:

- Jenter's results suggest that top managers tend to have contrarian views with regard to their own company stock
- Manager's disagreements with the market are not randomly distributed across firms, and seem instead described by managers in low valuation firms regarding their stock as undervalued and managers in high valuation firms regarding their stock as overvalued.
- It therefore appears likely that a perception of mispricing is an important force behind the market timing behavior documented for initial public offerings, seasoned equity offerings, stock repurchases, and mergers and acquisitions.

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Investor sentiment and M&A

Irrational investor arguments are also invoked in other fields of corporate finance:

- Mergers and acquisitions
- Dividends
- Earnings Management

Mergers and Acquisitions as a 'large' investment:

- Shleifer and Vishny (2003) propose a market timing model of acquisitions;

"Stock market driven acquisitions"

Based on stock market misvaluations of the combining firms.

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Investor sentiment and Dividends

- Recent papers on "catering theory of dividends"
- Twist the original Stein (1996) idea:
  - Increasing or initiating dividends may affect both fundamental value (standard theory) and the degree of mispricing (investors categorize stocks according to payout policy, Baker and Wurgler, 2004)
  - Start from the failure of traditional dividend theories.

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Investor sentiment and Dividends: empirical findings

- Behavioral theory of explaining dividends not much more successful than traditional theories, but matches some evidence:
  - Baker and Wurgler (2004a,b) measure a "dividend premium" (the difference between the average MB ratio of payers and non-payers)
  - "dividend premium" changes over time
    - It switched sign from positive to negative in 1978 and has remained negative through 1999. Explanation for disappearing dividends?
    - But why? Sentiments!
  - Firms initiate dividends when the shares of existing payers are trading at a premium to those of non-payers
  - When dividend initiations increase the future stock returns of payers (as a portfolio) are lower than those of non-payers.

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Investor sentiment and Dividends: empirical findings

- But:
  - The "dividend premium" does not explain aggregate fluctuations in the level of dividends.
  - The empirical evidence matches for initiations, but not for omissions
  - Not clear how to explain persistence
  - And why, again, the dividend premium changes over time?

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Conclusions and open questions

- With huge measurement problems, the quantification of the problems has not been investigated.
- To what extent can features of financial contracts be understood as responses to behavioral biases by the investors?
- What should governance look like in inefficient markets? Even, more basically, what should be the objective function of the manager (read the key note speech of Mike Jensen at the WFA, 2004)

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Conclusions and open questions

- Behavioral economics aims at building its foundation on well founded theories of behavior.
- In economics, the use of experimental settings and large micro databases are providing the empirical basis of the analysis.
- In finance, and more so in corporate finance, the concept of irrationality is still too much synonymous of *any* deviation from efficient markets.

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