Engelberg, Le, and Williams

Introduction

Data

Gradual Information Diffusion

Disagreement

Conclusion

Stock Market Anomalies and Baseball Cards

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Anomalies

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Basic finance theory suggests that stock returns should be unpredictable after adjusting for risk

• Strategies that consistently earn abnormally high returns must be risky

Empiricists have documented several anomalies that are difficult to explain:

- **Momentum**: Stocks that have performed well (poorly) in the past tend to continue performing well (poorly) in the future (Jegadeesh and Titman, 1993)
- **Post-Earnings Announcement Drift**: Stock prices drift in the direction of past earnings surprises (Ball and Brown, 1968)
- **IPO Underperformance**: Stocks of firms that have recently gone public perform poorly (Ritter 1991)

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Financial economists have developed many theories to explain these price patterns

• There is still much debate and disagreement about the cause of these anomalies

Explanations

 Although these theories were motivated by the stock market, some of them naturally generate predictions in non-financial environments, too

Point of this paper: to test some of these theories in a non-financial environment

• If a theory is valid, it should be able to explain price patterns in any environment that satisfies the model's key features

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Hong and Stein (1999):

Information gradually diffuses across the investor population

Explanations (cont.)

- · Investors do not learn from price
- Prediction: price movements are positively autocorrelated
- One of the most prominent theories of stock price
 momentum

Miller (1977)

- · Assets are priced by the most optimistic investors
- Prediction: high disagreement causes overpricing and subsequent underperformance
- A common explanation for IPO underperformance (Ritter and Welch, 2002)

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Our laboratory: the baseball card market

- Generally, each card is a piece of cardboard featuring a specific player
 - Contains an image of the player and often past statistics
- · Generally sold in "packs"
 - Buyers do not know whose cards will be in a pack

Although baseball cards generate no cash flows:

- The value of a player's baseball cards is highly correlated with his on-field performance
- · Baseball cards can have substantial value
 - T206 Honus Wagner (produced in 1909-1911) has been sold for \$2.8 million
- Theories of gradual information diffusion and disagreement should apply in this market

Baseball Cards

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Beckett Baseball Monthly

Our data come from Beckett Baseball Monthly

- James Beckett was a statistics professor who began collecting data on card prices in 1976
- First monthly price guide was published in November 1984
- Our sample: 72 issues published between January 1991 and December 1996
 - Scanned the pages (roughly 40-50 pages of price data per issue)
 - Converted the images to machine-readable data using optical character recognition ("OCR") software

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Sample page from January 1991

PRICE GUIDE

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Summary Statistics

For a card to be in our sample, it must be listed in at least one of the 72 Beckett issues

- 37,116 distinct cards in our sample
- Card years range from 1948 and 1996
- 1,662,273 (card, date, price) combinations

Price distribution:

- Mean = \$8.87
- 5th percentile = \$0.035
- 25th percentile = \$0.086
- Median = \$0.37
- 75th percentile = \$2.40
- 95th percentile = \$35.40

Max: \$19,733 (1952 Mickey Mantle Topps)

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Card Price Determinants

		Dependent Variable: Price							
Batting Average	1461.55***								
	(521.64)								
On Base Percentage		1465.22**							
		(565.99)							
Slugging Percentage			758.11***						
			(257.06)						
OPS				606.98***					
				(203.35)					
Home Runs					0.272***				
					(0.093)				
Runs						0.104***			
						(0.033)			
RBIs							0.098***		
							(0.0296)		
Observations	187186	187186	187186	187186	187186	187186	187186		
Card Set*Month Fixed									
Effects	YES	YES	YES	YES	YES	YES	YES		
R-Squared	0.0821	0.1017	0.1088	0.1156	0.1112	0.1108	0.1057		

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Hong and Stein (1999) Predictions

Baseball card prices should exhibit momentum because:

- Baseball players play 162 games per year
- Player performance is a primary determinant of card values in the long run
- Hong and Stein (1999) predict that the information about a player's ability should slowly diffuse among card collectors

Additional predictions:

- · Card price momentum should be stronger among
 - active (rather than retired) players
 - among newer sets than older sets
- Player performance in year *t* should be positively correlated with card returns in year *t* + 1

Momentum

Cards Engelberg, Le, and Williams

Stock Market Anomalies

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Momentum: stocks that have done well over the past 3-12 months continue to outperform (over the next 3-12 months) stocks that have done poorly over the past 3-12 months

Momentum strategies:

- Each month, sort stocks into deciles based on their return over the prior 3-12 months
- Go long (short) the top (bottom) decile
- Unwind your positions 3-12 months later

Momentum profits:

- Profitability is 6-12% per year
- This is puzzling because stocks that have performed well in the past don't appear riskier than stocks that performed poorly in the past

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Momentum Profits

Test 1: Does momentum exist among baseball cards, as predicted by Hong and Stein (1999)?

Replicate a standard momentum strategy:

- Sort cards into deciles based on return over past 3 months
- Buy (sell) cards in the top (bottom) decile
- Unwind the position 3 months later

Monthly profits, by decile:

	Ret	<u>t-stat</u>
Loser	-2.91%	-13.52
Middle	0.17%	1.21
Winner	2.69%	10.48
W - L	5.60%	19.46

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Gradual Information Diffusion

Monthly Momentum Profits, Active versus Retired Players

Active Players:

١		Ret	<u>t-stat</u>
	Loser	-4.61%	-11.44
	Middle	-0.61%	-2.70
ent	Winner	4.82%	10.01
	W - L	9.42%	15.48

Retired Players:

	Ret	<u>t-stat</u>
Loser	-1.03%	-9.85
Middle	0.40%	3.28
Winner	1.63%	7.43
W - L	2.66%	10.53

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Monthly Momentum Profits, Complete Sets

It is also common for collectors to trade *complete sets* of cards (e.g., 1952 Topps)

Does momentum exist at the set level?

Profitability of the momentum strategy that trades complete sets of cards:

	Ret	<u>t-stat</u>
Loser	-2.60%	-9.69
Middle	-0.62%	-5.59
Winner	1.75%	6.19
W - L	4.34%	13.18

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Monthly Momentum Profits, New versus Old Sets

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Sets Less than 10 Years Old:

	<u>Ret</u>	<u>t-stat</u>
Loser	-2.67%	-9.07
Middle	-1.02%	-7.79
Winner	1.93%	5.14
W - L	4.60%	10.90

Sets Greater than 10 Years Old:

	Ret	<u>t-stat</u>
Loser	-0.48%	-1.98
Middle	-0.03%	-0.22
Winner	0.49%	2.38
W - L	0.90%	3.36

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Another advantage of baseball cards is that there are objective measures of players' on-field performance

If gradual information diffusion causes momentum, then price drifts should be related to past information

To test this, we examine the monthly returns of players' cards as a function of their on-field performance in the *prior* season

- This strategy trades on extremely stale information
 - E.g., this strategy compares the returns of cards in December of 1995 with the player's on-field performance in April of 1994

These tests are analogous to tests of post-earnings announcement drift

Price Drift

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Price Drifts Following On-Field Performance

Introduction	Performance Metric	Bottom	Тор	Top - Bottom	t- stat
Data Gradual	Batting Average	-0.012	0.007	0.018***	4.35
Information Diffusion Disagreement	On Base Percentage	-0.003	0.002	0.005	0.85
Conclusion	Slugging Percentage	-0.010	0.005	0.015***	3.22
	OPS (On Base + Slugging)	-0.014	0.004	0.018***	4.38
	Home Runs	0.001	0.002	0.001	0.26
	Runs	-0.007	0.000	0.007*	1.59
	RBIs	-0.013	-0.001	0.011**	2.21
	Stolen Bases	-0.005	-0.001	0.004	1.01

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Empirically, stocks underperform following IPOs

- The average cumulative abnormal return of an IPO is -23.4% over the first 3 years (Ritter and Welch, 2002)
- Most common explanation: Miller (1977)

Miller (1977):

- Stock prices are determined by the most optimistic investors
- Stocks with high disagreement will be overpriced compared to stocks with low disagreement
- As disagreement declines, stock prices move towards the average valuation
- In the context of IPOs:
 - There is generally a lot of disagreement about the value of IPO firms
 - Hence, they underperform as more information is gradually released

IPOs

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Miller (1977) predictions

Miller (1977) predicts that overpricing (and subsequent underperformance) is most severe when disagreement is high

In the baseball card market, disagreement should be highest for:

- Rookie players (during their rookie year)
- Newer sets

Hence, rookie cards should underperform the other cards in the set, and newer sets should underperform older sets

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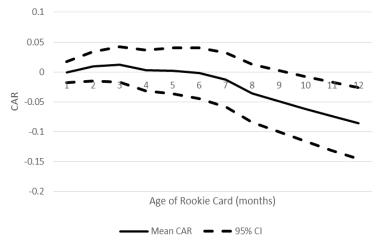
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Returns of Rookie Cards



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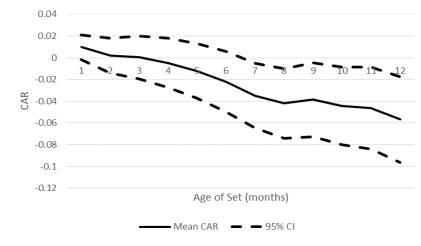
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Returns of New Sets

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The market for baseball cards exhibits momentum as well as analogs for post-earnings announcement drift and IPO underpricing

The evidence is supportive of the theories developed by Hong and Stein (1999) and Miller (1977)