

Clairvoyant Value

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Research Affiliates, LLC

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Are We Blinded by Theory?

Theory does a *Marvelous* Job explaining how the world ought to work

Theories are sometimes *provable*, based on certain assumptions

Gaps between theory and reality are *normal*

Still, some observers cling to theory as *fact*

- Assume a theory is correct description of reality
- Assume, therefore, that the assumptions are correct
- Assume that empirical evidence to contrary is wrong
- *This is exactly backwards!*

The Clairvoyance Paradox

Suppose we have something better than strong-form EMH

- Perfect foresight; assets priced at “ex post realized value,” which Bill Sharpe refers to as “Clairvoyant value” (CV). $MV = CV$
- MVW index is perfectly mean variance efficient. But there's no risk.

Suppose our crystal ball gets just **a little** cloudy.

- MV no longer matches CV.
- MVW index fund overweights every single stock that's trading above CV and underweights every single stock that's trading below CV.
- Every stock above CV is priced to give lower IRR than it should; every stock below CV has higher IRR than it should.
- MVW index suffers a return drag relative to CV-weighted index.

In the real world, our crystal ball is **a lot** cloudy.

- So, the MVW indexes suffer a material return drag.

Clairvoyant Value and the Value Effect

**What is “Clairvoyant Value” and
What Can It Teach Us?**

Questions Asked in This Paper

Does the market capitalization represent an unbiased estimate of Clairvoyant Value?

Do the companies that are accorded a premium valuation multiple enjoy superior future growth in actual fundamental economic scale, as evidenced by a Clairvoyant Value weight that is also larger than the companies' current economic scale?

Does the market overpay for expectations of future growth and over-discount expected disappointments?

The Many Meanings of “Growth” and “Value”

To the Financial Analyst

- Value is whatever an asset is worth
- Growth is growth in sales, profits, dividends or other metrics of company size, either past or expected

To the Finance Professor or “Quant”

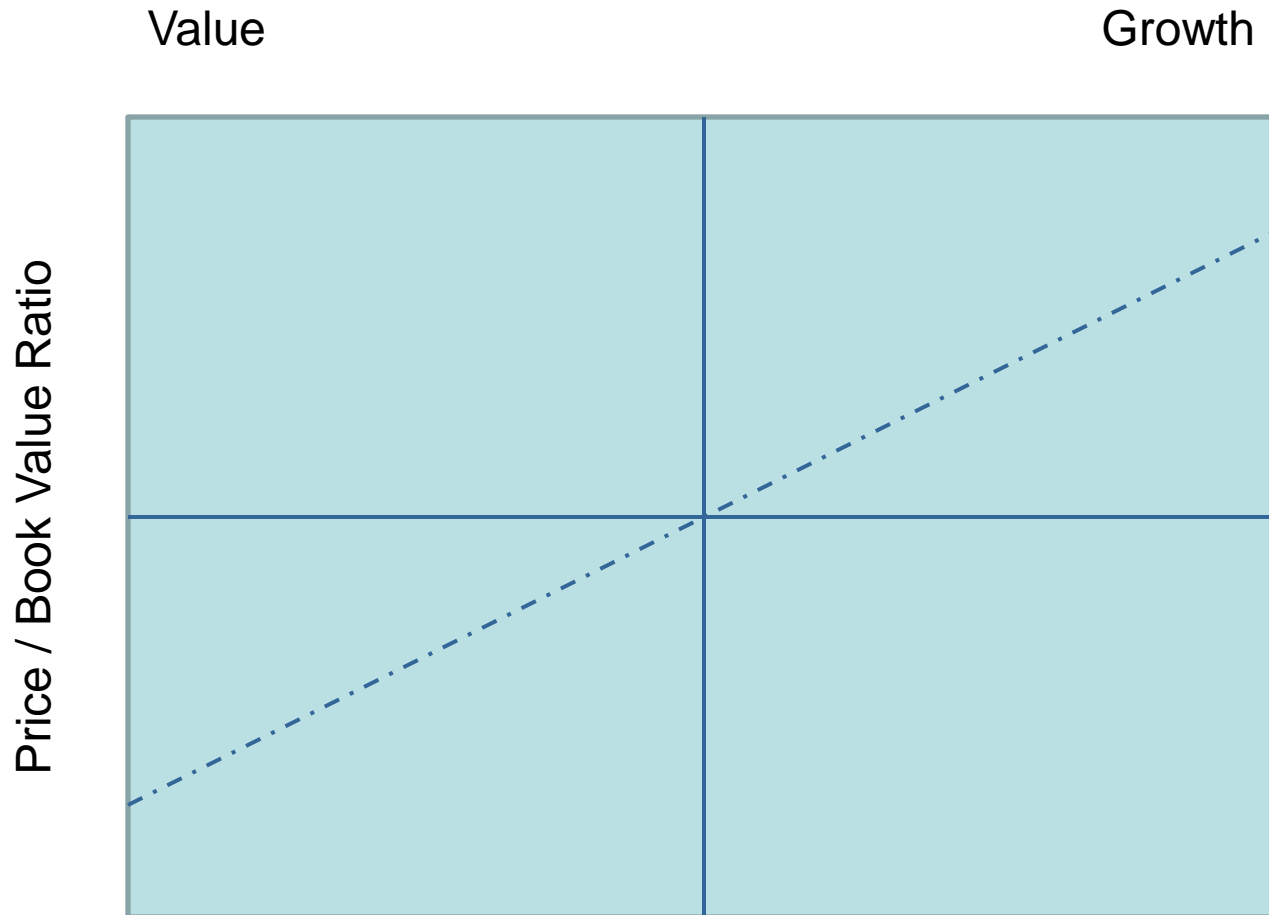
- Value refers to companies trading below market valuation multiples
- Growth is companies above market valuation multiples

To the Portfolio Manager or Consultant

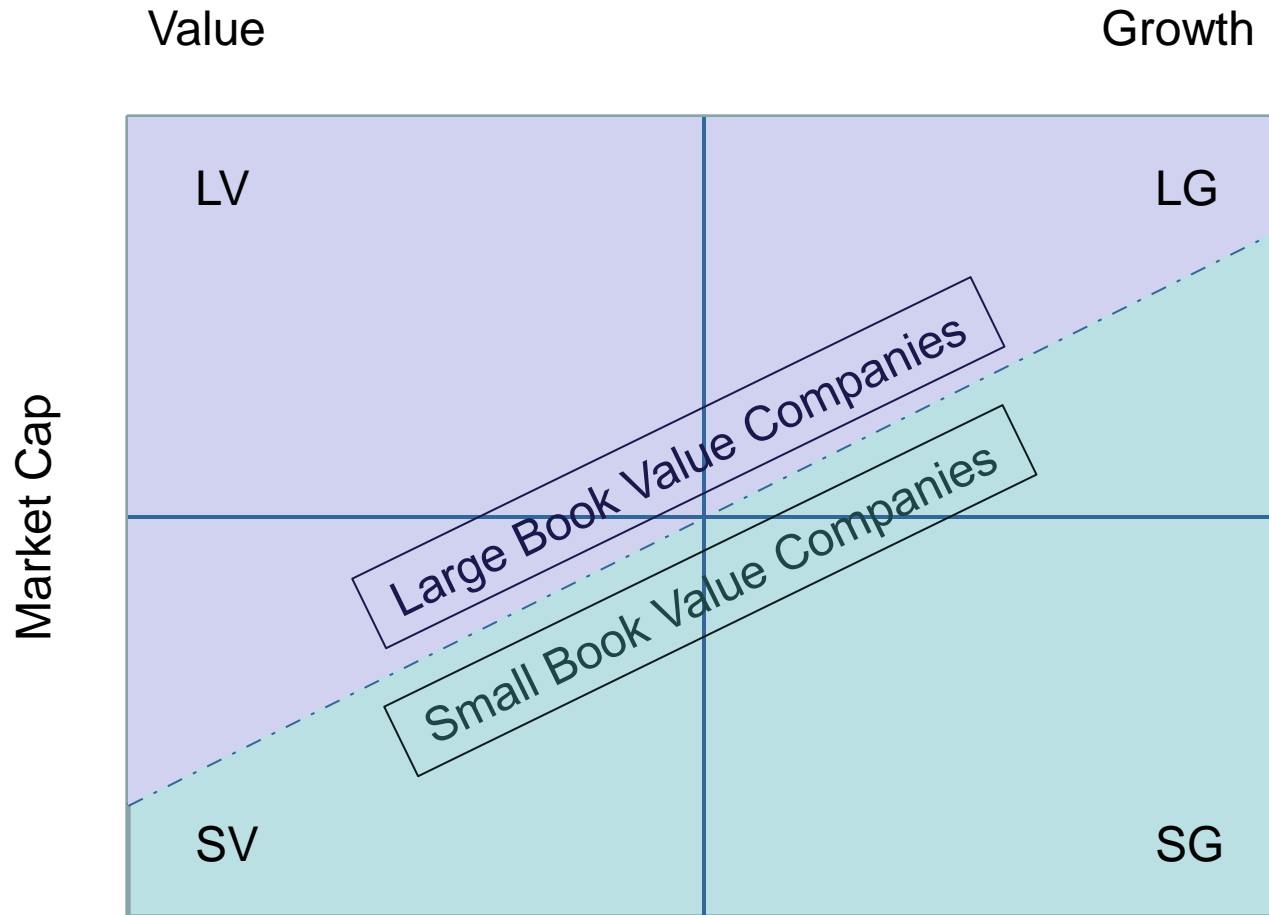
- Value investing reflects a preference for low multiples
- Growth investors prefer high growth expectations
- Valuation multiples tacitly reflect growth expectations

The same terms are used for multiple meanings!

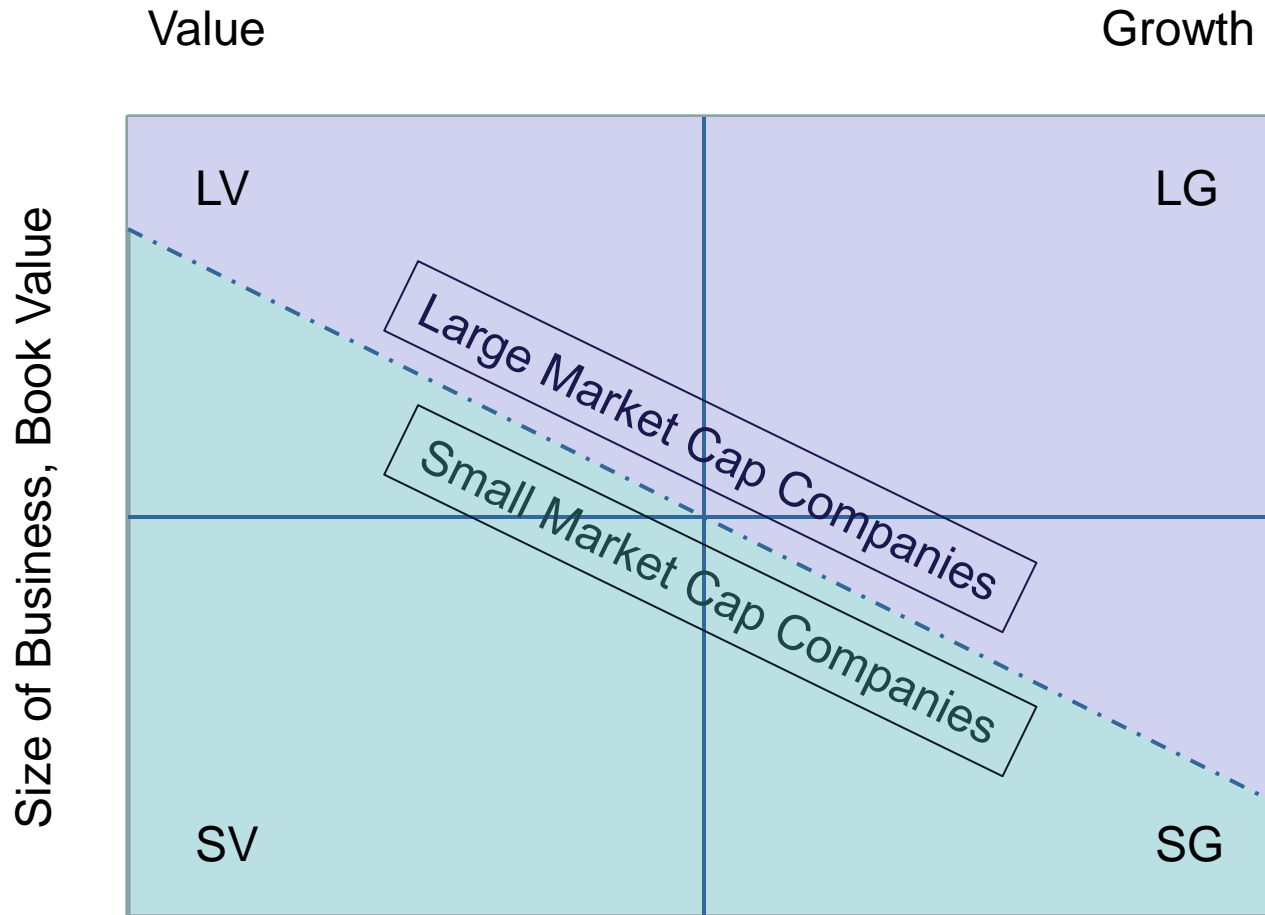
Shifting Our Frame of Reference From Market-Centric to Company Centric



Shifting Our Frame of Reference From **Market-Centric** to Company Centric



Shifting Our Frame of Reference From Market-Centric to **Company Centric**



Many Ways to Measure Company Size ...

Going *W-a-y* Back: the Original Top 10 in S&P 500

Panel A. Company Size	Various Measures of Company Size					
Name	Market Cap (\$mil)	Total Assets (\$mil)	Sales (\$mil)	Cash Flow (\$Mil)	Dividends Paid (\$Mil)	Book Value (\$Mil)
GENERAL MOTORS CORP	\$12,206	\$6,569	\$10,796	\$1,985	\$553	\$4,235
STANDARD OIL CO N J	\$11,534	\$7,871	\$7,127	\$1,582	\$412	\$5,143
AMERICAN TELEPHONE & TELEG CO	\$10,778	\$16,207	\$5,825	\$2,039	\$517	\$9,554
DU PONT E I DE NEMOURS & CO	\$8,769	\$2,591	\$1,917	\$616	\$296	\$1,885
GENERAL ELECTRIC CO	\$5,225	\$2,221	\$4,090	\$522	\$172	\$1,143
UNITED STATES STEEL CORP	\$3,947	\$4,109	\$4,199	\$948	\$145	\$2,454
GULF OIL CORP	\$3,657	\$2,865	\$2,340	\$601	\$69	\$1,901
UNION CARBIDE & CARBON CORP	\$3,483	\$1,460	\$1,325	\$396	\$94	\$812
TEXAS CO	\$3,285	\$2,574	\$2,046	\$497	\$129	\$1,836
STANDARD OIL CO CALIFORNIA	\$3,114	\$2,041	\$1,453	\$415	\$104	\$1,711
<i>AVERAGE, TOP TEN</i>	<i>\$6,600</i>	<i>\$4,851</i>	<i>\$4,112</i>	<i>\$960</i>	<i>\$249</i>	<i>\$3,067</i>
<i>AVERAGE, CAP/METRIC RATIO</i>		<i>1.36</i>	<i>1.61</i>	<i>6.87</i>	<i>26.49</i>	<i>2.15</i>

Source: Research Affiliates, LLC.

What if our Crystal Ball Allowed Perfect Foresight? The “Clairvoyant Value” of the “Ancient” Top Ten

Panel B. Clairvoyant Values		Clairvoyant Value, based on Various Time Spans and Methods			
Name	Market Cap (\$mil)	S&P DR, 10- Year	S&P DR, 20- Year	S&P DR, thru 2007	CAPM DR, thru 2007
GENERAL MOTORS CORP	\$12,206	\$12,947	\$14,219	\$9,346	\$9,446
STANDARD OIL CO N J	\$11,534	\$8,479	\$9,270	\$12,241	\$19,515
AMERICAN TELEPHONE & TELEG CO	\$10,778	\$13,507	\$15,381	\$9,519	\$11,912
DU PONT E I DE NEMOURS & CO	\$8,769	\$6,479	\$6,305	\$4,313	\$4,420
GENERAL ELECTRIC CO	\$5,225	\$4,396	\$4,124	\$5,149	\$4,341
UNITED STATES STEEL CORP	\$3,947	\$1,784	\$1,559	\$1,416	\$1,479
GULF OIL CORP	\$3,657	\$3,321	\$3,438	\$2,840	\$3,122
UNION CARBIDE & CARBON CORP	\$3,483	\$1,919	\$1,870	\$1,757	\$1,780
TEXAS CO	\$3,285	\$4,925	\$4,856	\$3,401	\$4,316
STANDARD OIL CO CALIFORNIA	\$3,114	\$2,827	\$3,066	\$3,192	\$3,976
<i>AVERAGE, TOP TEN</i>	<i>\$6,600</i>	<i>\$6,058</i>	<i>\$6,409</i>	<i>\$5,317</i>	<i>\$6,431</i>
<i>AVERAGE, CAP/CLAIRVOYANT VALUE</i>		<i>1.09</i>	<i>1.03</i>	<i>1.24</i>	<i>1.03</i>

Source: Research Affiliates, LLC.

How Much Does Terminal Price Contribute to Clairvoyant Value?

Terminal Price, 1957-2007 (Percent of Clairvoyant Values Based on Various Time Spans and Method)

Company	S&P DR, 10 Years	S&P DR, 20 Years	S&P DR, thru 2007	CAPM DR, thru 2007
<i>B. Terminal Price (percent of Clairvoyant Value)</i>				
General Motors Corp.	58.9%	33.6%	1.2%	1.2%
Standard Oil Company of New Jersey	61.3	43.3	29.6	40.2
American Telephone & Telegraph Co.	67.1	40.5	3.2	5.0
Du Pont E.I. de Nemours & Co.	65.0	36.7	7.9	8.3
General Electric Co.	72.8	50.8	36.6	32.9
United States Steel Corp.	46.3	38.5	4.9	5.8
Gulf Oil Corp.	75.5	40.9	36.6	38.5
Union Carbide & Carbon Corp.	61.8	40.9	25.3	25.6
Texas Co (Texaco)	74.1	35.7	12.0	16.2
Standard Oil Company of California	68.2	45.4	23.1	27.9
Average for Top 10	65.1	40.6	18.0	20.2

Source: Research Affiliates, LLC.

Average Clairvoyant Value/Price Ratio by Book/Market & Size, 12/31/1956

CV/Price Ratio by Size and Value Quintiles, 1957 - 2007

		S&P Discount Rate Value Quintiles					CAPM Discount Rate Value Quintiles							
Size Quintiles	10 Year	low	2	3	4	high	Size Only	10 Year	low	2	3	4	high	Size Only
	small		1.13	1.14	1.15	1.50	1.74	1.33	small	0.98	0.99	1.01	1.31	1.50
2		0.96	1.25	1.23	1.29	1.91	1.33	2	0.84	1.10	1.08	1.13	1.66	1.16
3		0.99	1.22	1.23	1.46	1.28	1.24	3	0.86	1.07	1.07	1.27	1.13	1.08
4		1.02	1.19	1.48	1.39	1.23	1.26	4	0.89	1.04	1.30	1.22	1.08	1.11
large		0.97	0.84	1.39	0.84	1.06	1.02	large	0.84	0.74	1.22	0.74	0.94	0.90
Book/Mkt Only		1.01	1.13	1.30	1.30	1.44	---	Book/Mkt Only	0.88	0.99	1.14	1.13	1.26	---
		S&P Discount Rate Value Quintiles					CAPM Discount Rate Value Quintiles							
Size Quintiles	20 Year	low	2	3	4	high	Size Only	20 Year	low	2	3	4	high	Size Only
	small	0.87	1.24	1.28	2.28	3.03	1.74	small	0.68	0.98	1.03	1.79	2.34	1.36
2	0.78	1.29	1.73	1.89	3.50	1.84	2	0.63	1.04	1.38	1.50	2.71	1.45	
3	0.75	1.38	1.37	2.32	1.87	1.54	3	0.62	1.11	1.11	1.83	1.49	1.23	
4	0.84	0.97	1.92	2.26	1.77	1.55	4	0.68	0.80	1.53	1.78	1.41	1.24	
large	0.92	0.85	1.38	0.98	1.29	1.09	large	0.74	0.70	1.13	0.80	1.06	0.88	
Book/Mkt Only	0.83	1.15	1.54	1.94	2.29	---	Book/Mkt Only	0.67	0.93	1.23	1.54	1.80	---	
		S&P Discount Rate Value Quintiles					CAPM Discount Rate Value Quintiles							
Size Quintiles	2007	low	2	3	4	high	Size Only	2007	low	2	3	4	high	Size Only
	small	0.34	1.95	2.47	7.09	13.36	5.04	small	0.27	1.07	1.36	3.54	6.34	2.51
2	0.51	1.55	3.23	4.02	7.28	3.32	2	0.38	0.96	1.79	2.20	3.86	1.84	
3	0.60	1.91	1.71	3.10	4.23	2.31	3	0.43	1.13	1.07	1.86	2.31	1.36	
4	0.82	0.94	2.11	2.53	2.42	1.76	4	0.53	0.65	1.32	1.55	1.46	1.10	
large	0.70	0.77	1.13	0.86	1.16	0.92	large	0.48	0.54	0.82	0.62	0.83	0.66	
Book/Mkt Only	0.59	1.42	2.13	3.52	5.69	---	Book/Mkt Only	0.42	0.87	1.27	1.95	2.96	---	

Source: Research Affiliates, LLC.

Definition of Terms

- **Cap Weight** is the weight that a company has in the stock market, measured by its stock market capitalization.
- **Company Size Weight** is the “Fundamental Size” weight that a company has in the economy, measured by a blend of four measures of company size: sales, cash flow, book value and dividends.
- **Clairvoyant Weight** is the weight that a company would have in the stock market if it were trading at its “clairvoyant” value.
- **Clairvoyant Error** is defined as Clairvoyant Weight - Cap Weight, a measure of whether a company is under- or over-valued relative to its “Clairvoyant Value.”
- **Relative Valuation** is defined as Cap Weight - Company Size Weight, a measure of the confidence the investment community has in the future growth prospects of the company.
- **Clairvoyant Growth** is defined as Clairvoyant Weight - Company Size Weight, the speed that a company grows relative to the broad market, measured in terms of discounted future cash flows versus the starting economic scale of the company.

Attributes and Correlations for Various Measures of Company Size and Valuation Measures

<u>Variable</u>	<u>Mean</u>	<u>Std Dev</u>	<u>Skewness</u>	<u>Correl with CW</u>	<u>Correl with CSW</u>	<u>Correl with CVW</u>	<u>Correl with RV</u>
<i>Cap Weight</i>	0.0024	0.0076	7.3231	1.0000	0.9496		0.4968
<i>Company Size Wgt</i>	0.0024	0.0067	7.9822	0.9496	1.0000		0.1998
<i>Relative Valuation</i>	0.0000	0.0024	4.4613	0.4968	0.1998		1.0000
<i>CV Weights Based on S&P 500 Discount Rate</i>							
<i>CVW(10)</i>	0.0024	0.0076	7.5300	0.9319	0.9060		0.4046
<i>CVW(20)</i>	0.0024	0.0076	7.5488	0.9278	0.9036		0.3986
<i>CVW(2007)</i>	0.0024	0.0073	7.4951	0.9438	0.9102		0.4303
<i>Clairvoyant Error = Clairvoyant Weight – Cap Weight</i>							
<i>CVW(10)-CW</i>	0.0000	0.0028	2.7441	-0.1729	-0.1069	0.1962	-0.2444
<i>CVW(20)-CW</i>	0.0000	0.0029	3.7784	-0.1795	-0.1111	0.2006	-0.2535
<i>CVW(2007)-CW</i>	0.0000	0.0025	-2.4248	-0.2819	-0.2273	0.0510	-0.2520
<i>Clairvoyant Growth = Clairvoyant Weight – Company Size Weight</i>							
<i>CVW(10)-CSW</i>	0.0000	0.0032	6.5680	0.2230	0.0572	0.4743	0.5388
<i>CVW(20)-CSW</i>	0.0000	0.0033	8.6067	0.2101	0.0501	0.4732	0.5182
<i>CVW(2007)-CSW</i>	0.0000	0.0030	3.2737	0.1648	-0.0284	0.3881	0.5940

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Cap Weight and Fundamental Size Weight had a 95% correlation, at this snapshot in time. But, Cap Weight also had a 50% correlation with valuation multiples ... large cap bias means growth bias.

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Our Crystal Ball, whether with 10-year, 20-year or 50-year look-ahead, shows that future value is highly correlated with Market Cap. The market does a darned good job at gauging future realized value.

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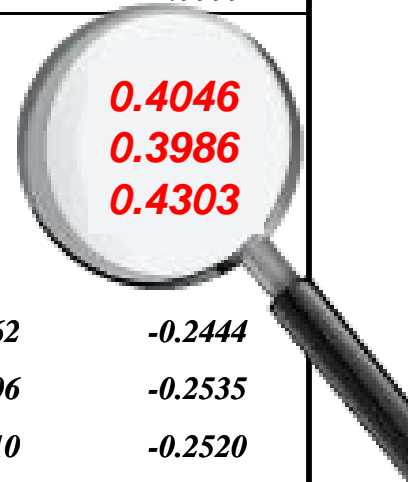
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Key Insight: Fundamental Company Size is also highly correlated with future realized value ... but less so. And so ...

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Future realized value for a stock has a 40% correlation with the original valuation multiples! The market's assessment, of which companies merit high valuation multiples, is awfully good! More on this shortly ...

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<i>CVW(10)</i>	0.0024	0.0076	7.5300	0.9319	0.9060		0.4046
<i>CVW(20)</i>	0.0024	0.0076	7.5488	0.9278	0.9036		0.3986
<i>CVW(2007)</i>	0.0024	0.0073	7.4951	0.9438	0.9102		0.4303
<i>Clairvoyant Error = Clairvoyant Weight – Cap Weight</i>							
<i>CVW(10)-CW</i>	0.0000	0.0028	2.7441	-0.1729	-0.1069	0.1962	-0.2444
<i>CVW(20)-CW</i>	0.0000	0.0029	3.7784	-0.1795	-0.1111	0.2006	-0.2535
<i>CVW(2007)-CW</i>	0.0000	0.0025	-2.4248	-0.2819	-0.2273	0.0510	-0.2520
<i>Clairvoyant Growth = Clairvoyant Weight – Company Size Weight</i>							
<i>CVW(10)-CSW</i>	0.0000	0.0032	6.5680	0.2230	0.0572	0.4743	0.5388
<i>CVW(20)-CSW</i>	0.0000	0.0033	8.6067	0.2101	0.0501	0.4732	0.5182
<i>CVW(2007)-CSW</i>	0.0000	0.0030	3.2737	0.1648	-0.0284	0.3881	0.5940

As for future investment merit, valuation multiples turn out to be a great predictor – in the wrong direction. (No surprise here ... classic value effect!)

Attributes and Correlations for Various Measures of Company Size and Valuation Measures

<u>Variable</u>	<u>Mean</u>	<u>Std Dev</u>	<u>Skewness</u>	<u>Correl with CW</u>	<u>Correl with CSW</u>	<u>Correl with CVW</u>	<u>Correl with RV</u>
<i>Cap Weight</i>	0.0024	0.0076	7.3231	1.0000	0.9496		0.4968
<i>Company Size Wgt</i>	0.0024	0.0067	7.9822	0.9496	1.0000		0.1998
<i>Relative Valuation</i>	0.0000	0.0024	4.4613	0.4968	0.1998		1.0000
<i>CV Weights Based on S&P 500 Discount Rate</i>							
<i>CVW(10)</i>	0.0024	0.0076	7.5300	0.9319	0.9060		0.4046
<i>CVW(20)</i>	0.0024	0.0076	7.5488	0.9278	0.9036		0.3986
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The market does a remarkable job of forecasting future growth. There's a 50-60% correlation between clairvoyant and actual valuation multiples. But, the market seems to overpay for that growth. Hubris.



Questions Asked in This Paper

- Does the market capitalization represent an unbiased estimate of Clairvoyant Value?

No.

- Do the companies that are accorded a premium valuation multiple enjoy superior future growth in actual fundamental economic scale, as evidenced by a Clairvoyant Value weight that is also larger than the companies' current economic scale?

Emphatically yes. With high statistical significance.

- Does the market overpay for expectations of future growth and over-discount expected disappointments?

Emphatically yes. With high statistical significance.

Enough Ancient History!

***Clairvoyant Value and
The Growth/Value Cycle***

**How Have Things Changed
Over the Last Fifty Years?**

Questions Asked in The Intertemporal Setting

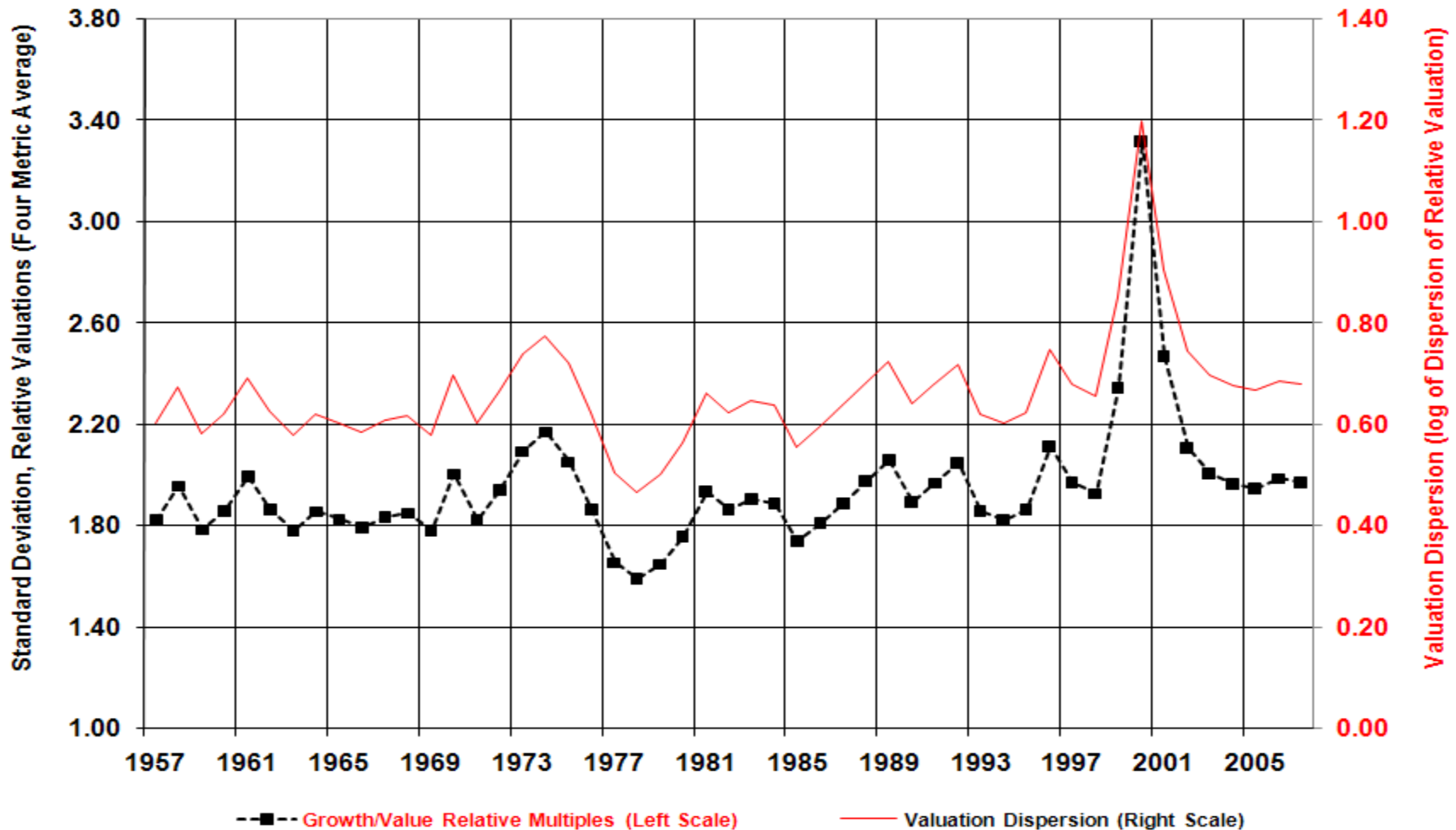
Does the dispersion of valuation multiples expand and contract because of changing fundamentals or because of changing *market confidence* in its ability to discern worth?

Does the change in the dispersion of valuation multiples mean revert towards some norm?

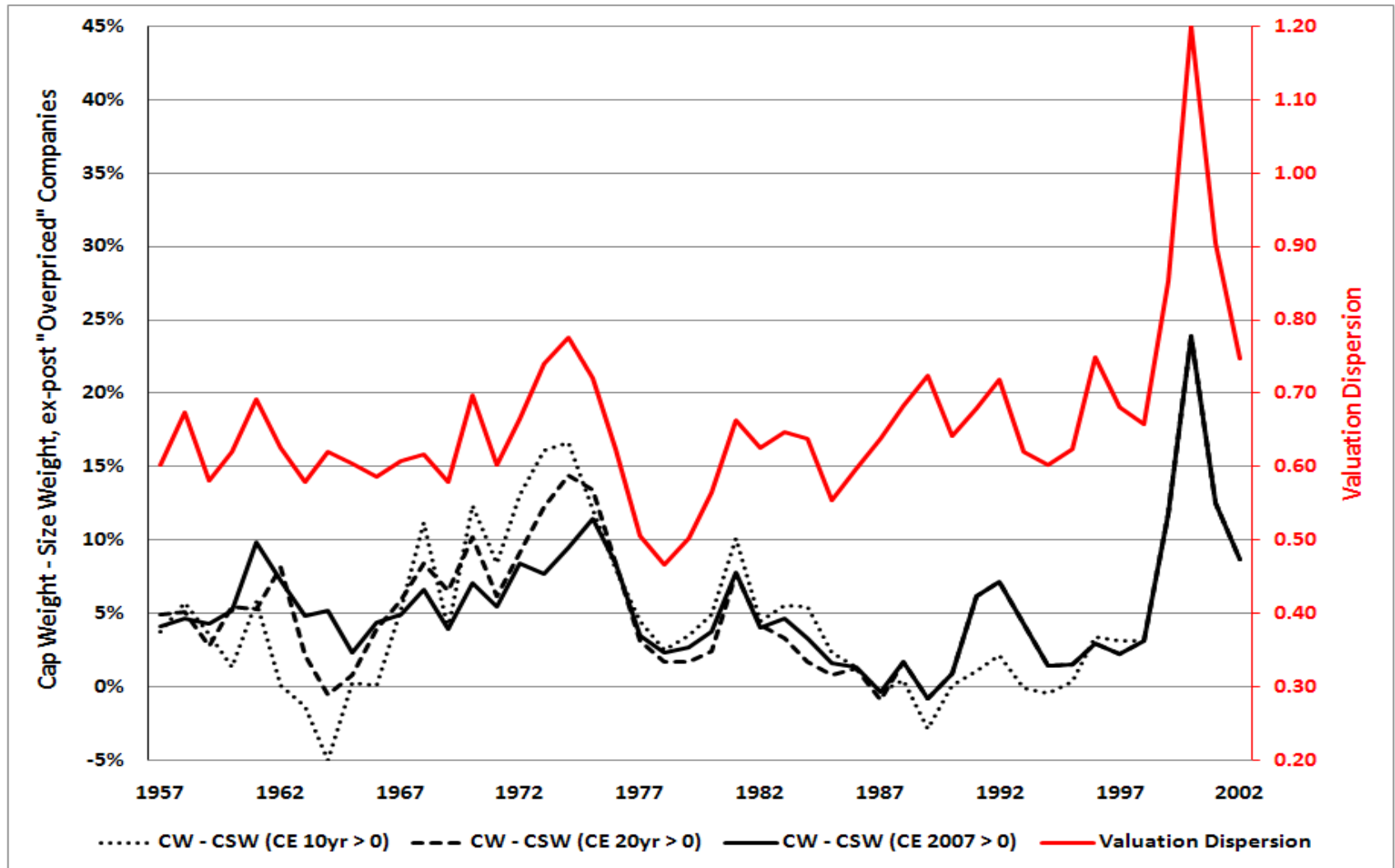
Does a wider dispersion of valuation multiples tell us that growth stocks are more overvalued than usual?

Does the dispersion of valuation multiples tell us whether growth or value stocks are likely to win?

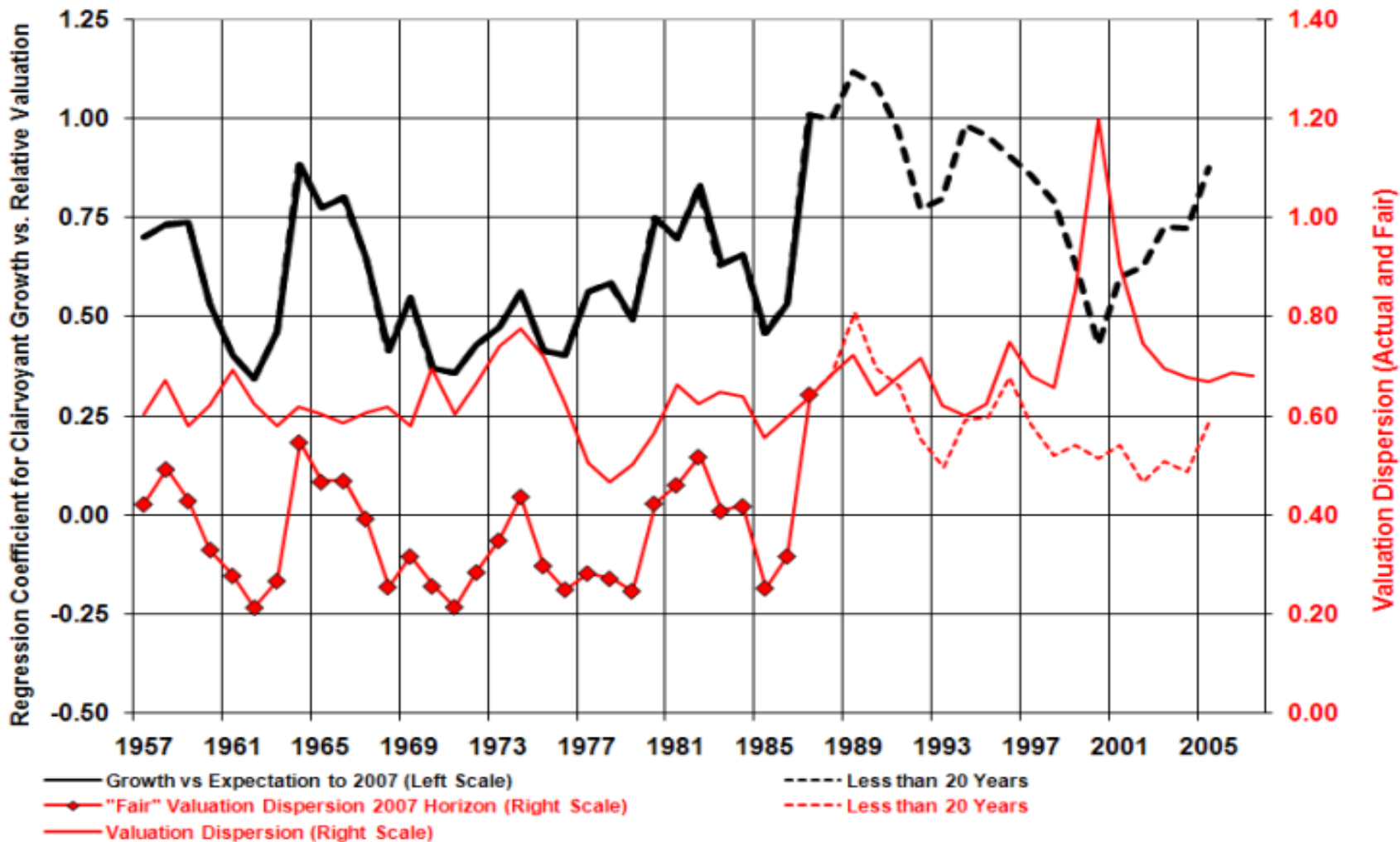
The Premium That the Market Pays for Growth, versus Value, is not Static



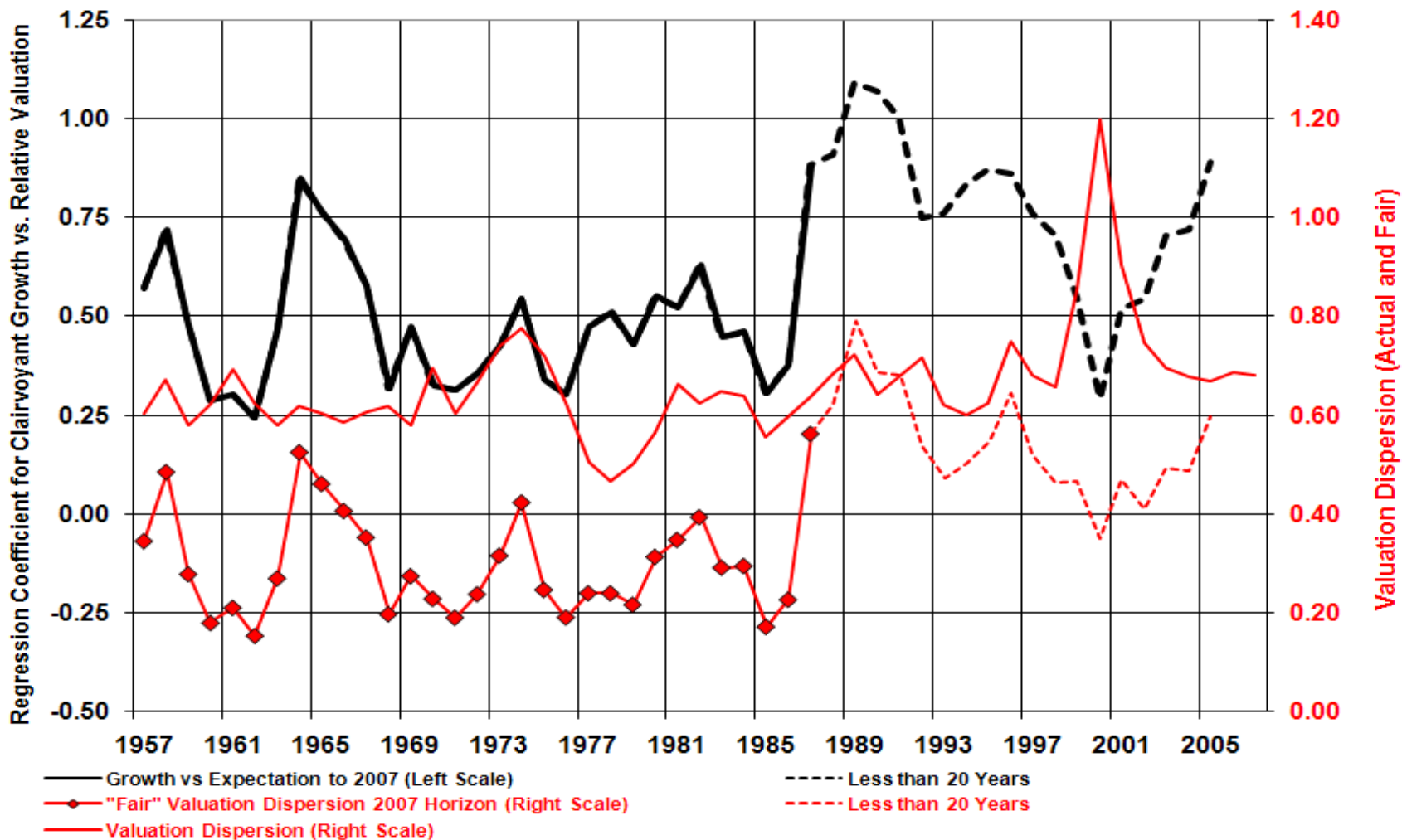
When the Market Pays a Large Premium for Growth, it Reliably Overpays



The Premium That the Market Pays for Growth, versus Value, is Reliably Too High

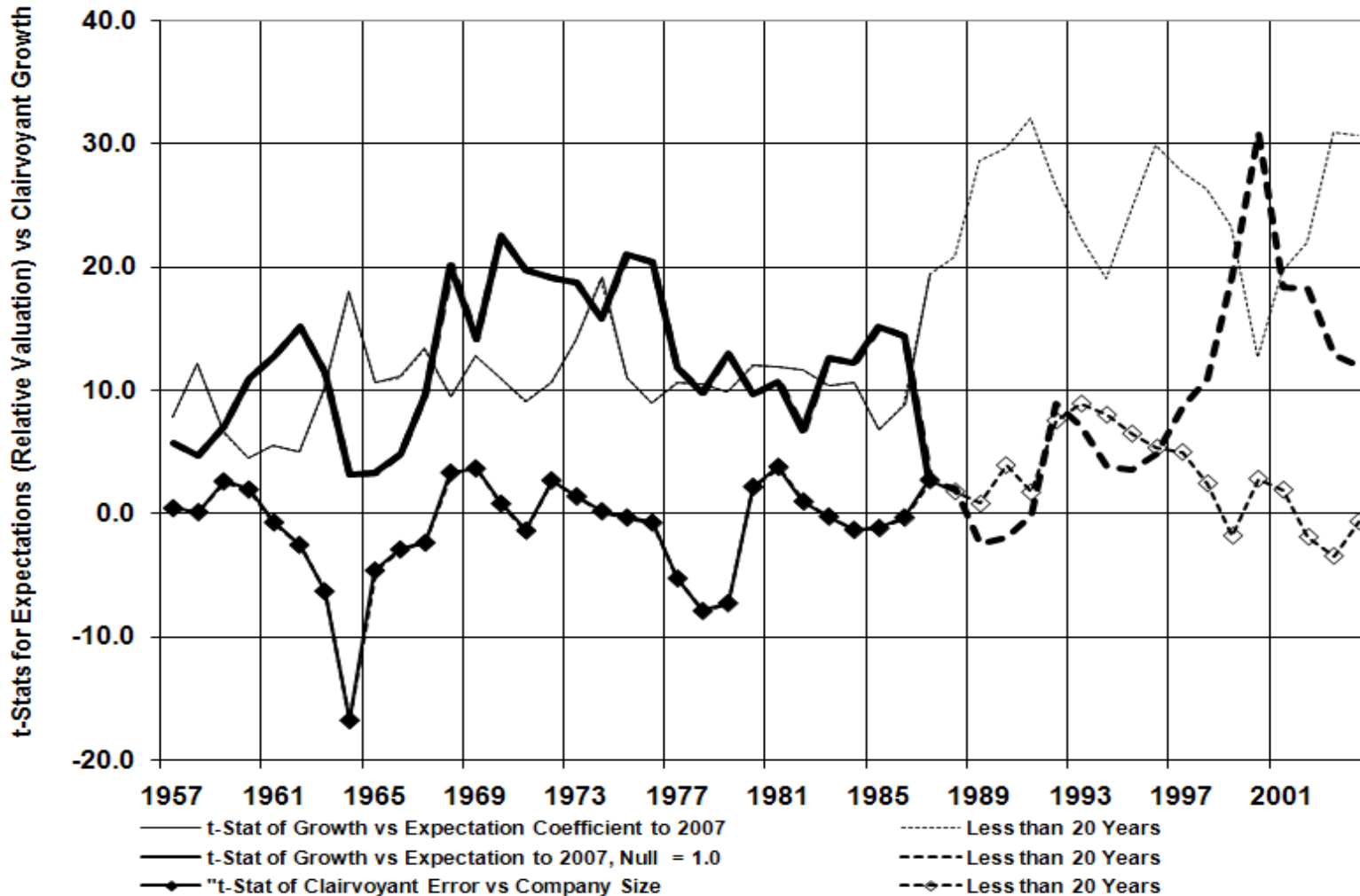


The Premium That the Market Pays for Growth, versus Value, is Even Higher, Risk-Adjusted

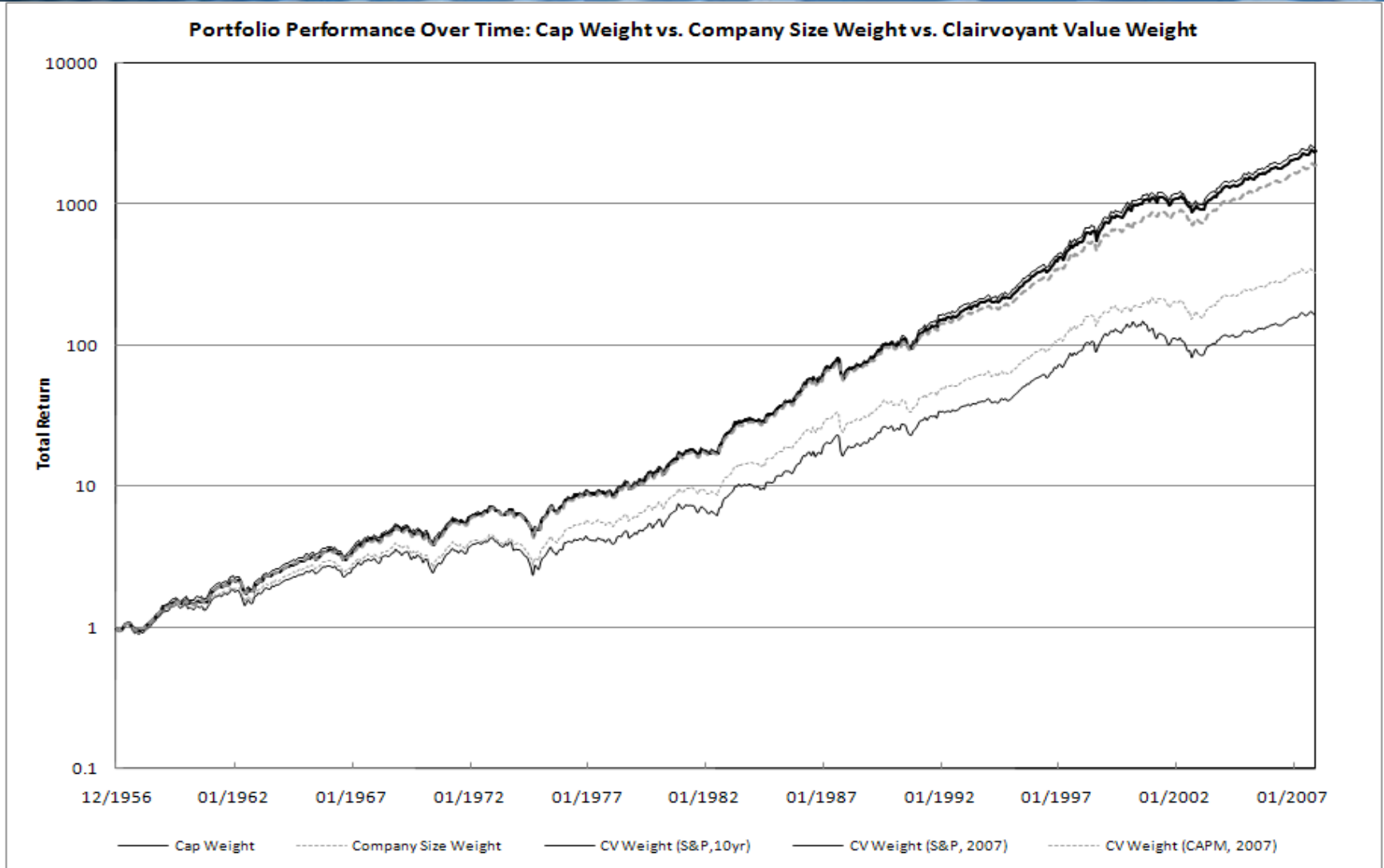


Highly significant: relative valuation predicts relative growth; relative valuation overpays for that growth

How Statistically Significant Are These Findings?

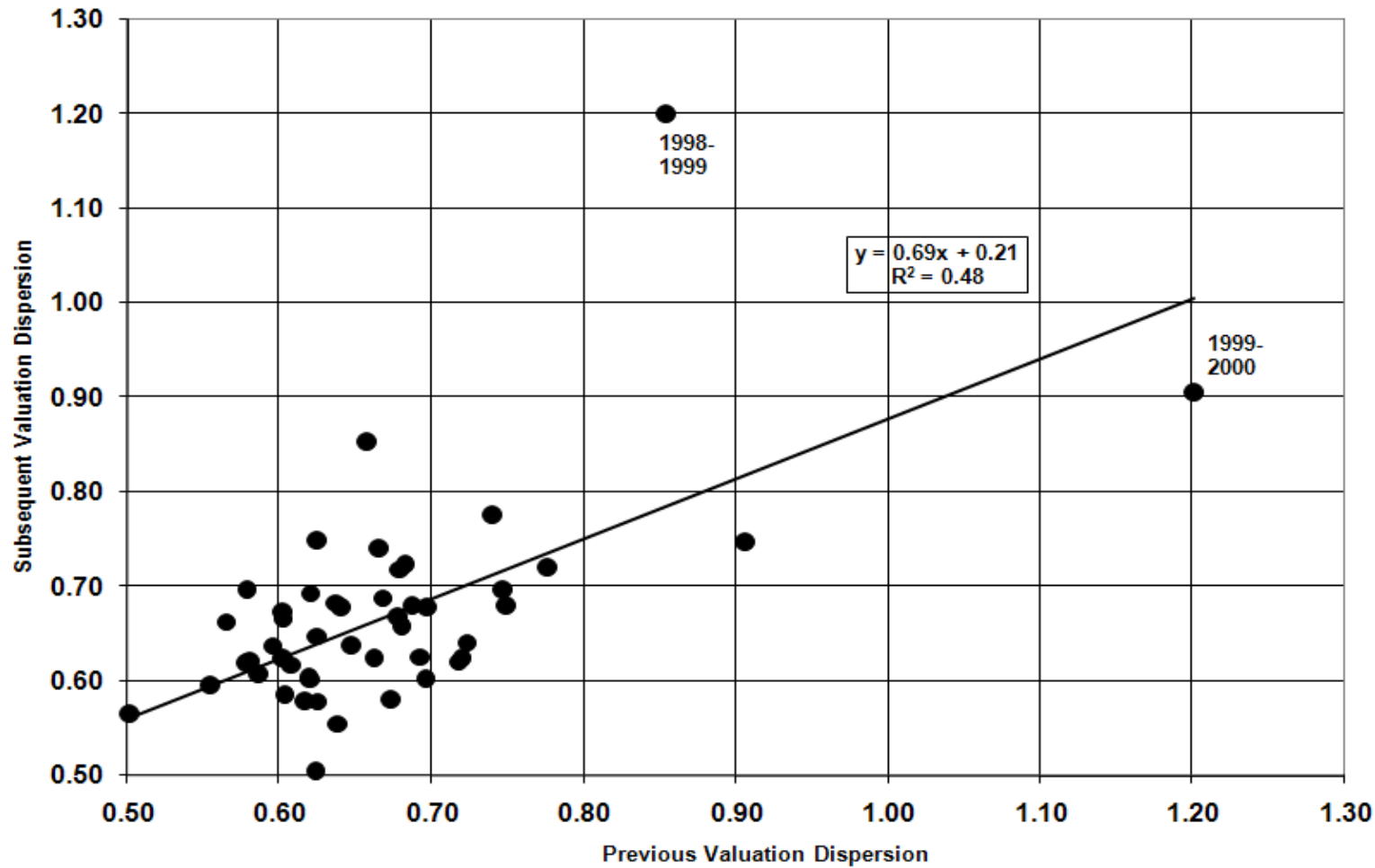


Clairvoyance is immensely valuable over time. Yet, in any given year, it's worth only about 5%.



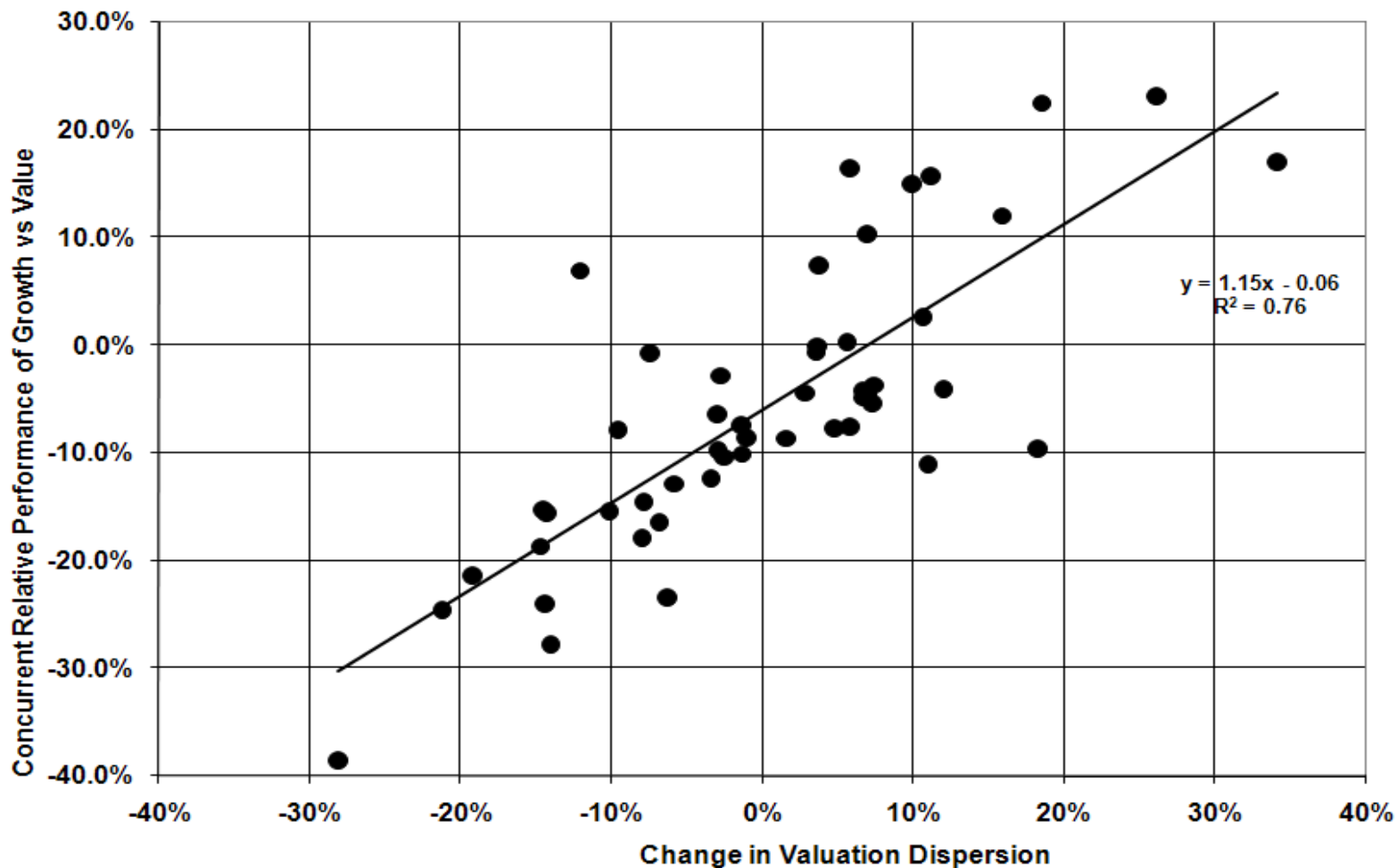
The Premium That the Market Pays for Growth Exhibits Serial Correlation and Mean Reversion

Mean Reversion in G-V Dispersion



The Premium That the Market Pays for Growth Changes due to Changing Confidence, not Changing Fundamentals

Is the Growth/Value Spread Correlated with Growth-Value Return Difference?



Valuation Dispersion Mean Reverts (Long Term), Trends (Short Term) and Predicts Growth-Value Relative Returns

Panel A. Persistence and Mean Reversion in Growth-Value Dispersion

	<i>Dependent Variable: GVD_t</i>	Coefficient	Std Err	<i>p-Value</i>
Constant	c	0.24	0.08	0.004
Prior Valuation Dispersion	$b_1 \times GVD_{t-1}$	0.64	0.12	0.000
Prior Change in GVD	$b_2 \times (GVD_{t-1} - GVD_{t-2})$	0.21	0.11	0.070

Panel B. Persistence and Mean Reversion in Growth-Value Dispersion

	<i>Dependent Variable: GVD_t</i>	Coefficient	Std Err	<i>p-Value</i>
Constant	c	0.30	0.08	0.001
Prior Valuation Dispersion	$b_1 \times GVD_{t-1}$	0.55	0.12	0.000
Prior Change in GVD	$b_2 \times (GVD_{t-1} - GVD_{t-2})$	0.09	0.17	0.615
Prior G-V Return	$b_3 \times GVRR_{t-1}$	0.13	0.15	0.406

Panel C. Does Growth-Value Dispersion Predict Growth-Value Relative Returns?

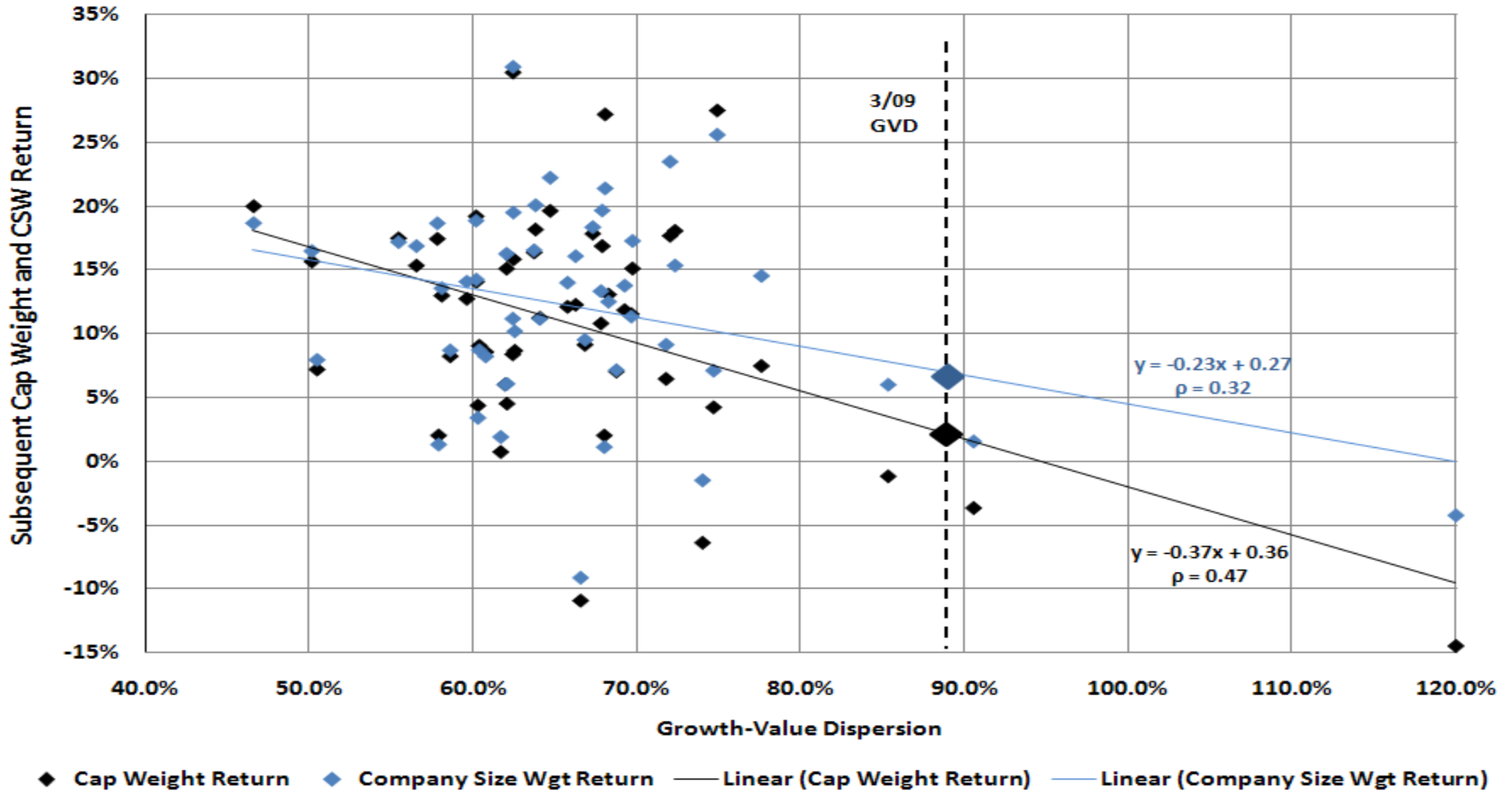
	<i>Dependent Variable: $GVRR_t$</i>	Coefficient	Std Err	<i>p-Value</i>
Constant	c	0.16	0.11	0.159
Prior G-V Relative Return	$b_1 \times GVRR_{t-1}$	-0.16	0.15	0.278
Prior Valuation Dispersion	$b_1 \times GVD_{t-1}$	-0.35	0.17	0.050

When Valuation Dispersion is wide, the Cap-Weighted Market is Overpaying for Growth



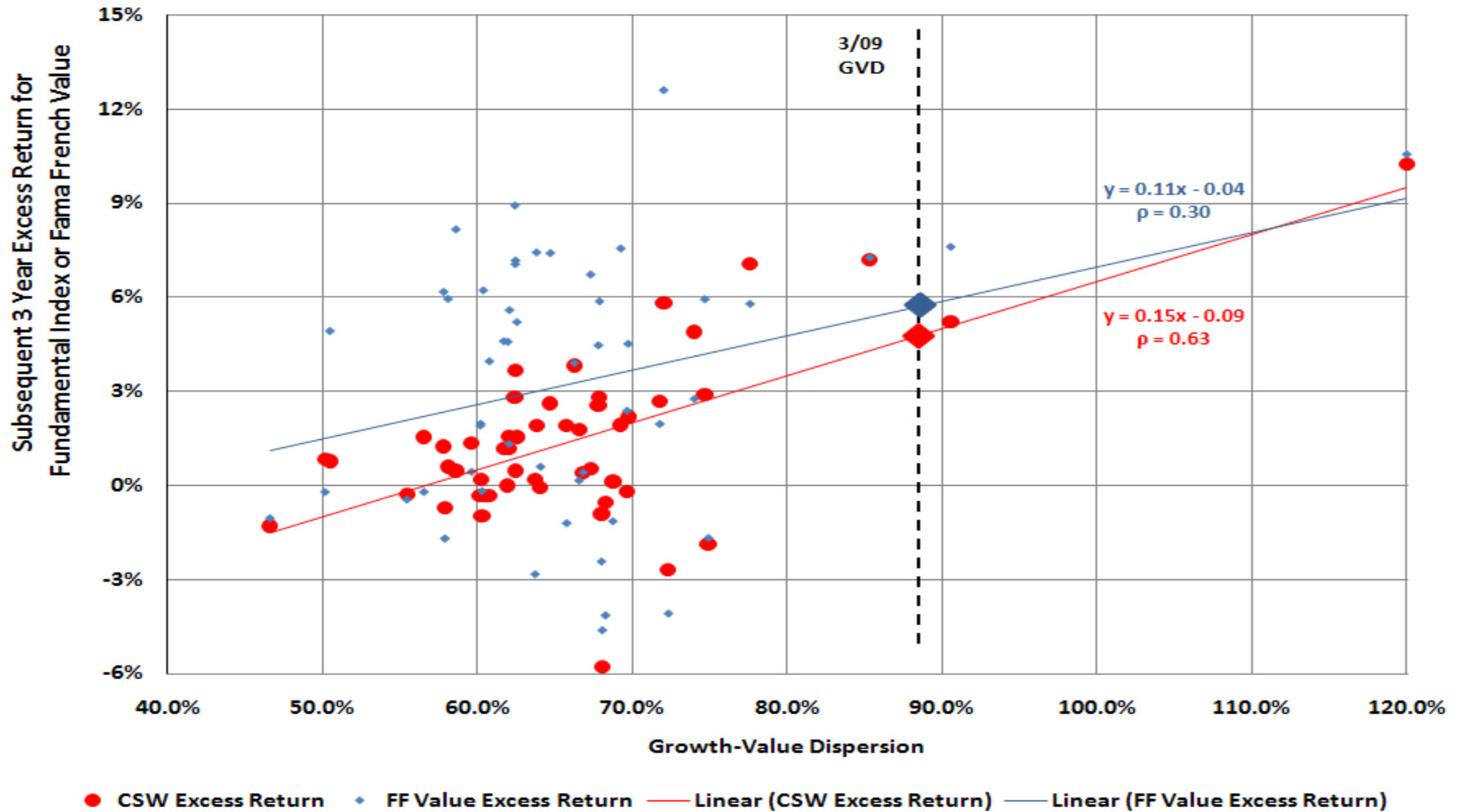
The Dispersion of Valuation Multiples is Slightly Predictive of Cap-Weighted Market Returns

Does Growth-Value Dispersion Predict Market Returns?



The Dispersion of Valuation Multiples is Highly Predictive of the Growth-Value Cycle

Does Growth-Value Dispersion Predict Growth vs Value Relative Returns?



Questions Answered

Does the dispersion of valuation multiples expand and contract because of changing fundamentals or because of changing *market confidence* in its ability to discern worth?

Confidence is the key driver, with 87% correlation.

Does the change in the dispersion of valuation multiples mean revert towards some norm?

Yes. Average dispersion is 2:1. Fair dispersion is 1.5:1.

Does a wider dispersion of valuation multiples tell us that growth stocks are more overvalued than usual?

Yes. With high significance. T-Stat is double-digit.

Does the dispersion of valuation multiples tell us whether growth or value stocks are likely to win?

Yes. With very high statistical significance.