Northfield's 22nd Annual Research Conference

The Earnings Estimate Dispersion Effect in International Stock Returns

Harald Lohre, Union Investment
Markus Leippold, University of Zurich

Venice, June 1, 2009

Union Investment

Outline

The Dispersion Effect

- Besides the mean, the distribution of earnings forecasts may contain additional valuable information
- The dispersion of earnings forecasts helps judging the credibility of a given earnings signal
- While intuition suggests a risk premium for bearing more uncertain earnings prospects, empirical evidence is at odds with dispersion being a priced risk factor
- Diether, Malloy, and Scherbina (2002) contend:
  - Dispersion is not a risk factor but rather a metric for differences of opinion
  - Prices tend to reflect the view of the optimists whenever there is disagreement since the pessimists' views are not revealed due to short-sale constraints (Miller, 1977)

Motivation of our Paper

- Does the dispersion effect extend to European markets?
- Rationalizing a given anomaly is only meaningful if the evidence is not spurious in the first place
- When internationally investigating the dispersion effect we address the following issues:
  - Traditional Risk and Return Analysis
  - Robustness with respect to data snooping?
  - The role of information uncertainty
  - The role of liquidity risk
  - Is the anomaly persistent or being exploited?

Motivation (cont'd)

- The need for robustness checks
  - In some cases, anomalies might be more apparent than real.
  - A common strategy for robustness checks is to study trading strategies in many countries or for different time periods.
  - In our paper, we choose to study the dispersion effect in different countries.
- But with the right tools!
  - Researchers have long been aware of data snooping biases (Lo and MacKinlay, 1990; Sullivan et al., 1999; White, 2000).
  - Common statistical procedures are rarely optimal in terms of power, hence most likely rejecting the anomaly.
  - To overcome these problems, we make use of latest results on multiple hypotheses testing.

Data and Sample Selection

- Comprehensive sample of 16 developed countries:
  - 15 European markets and the U.S., spanning 1987-2009.
  - Largest European markets: U.K., France, Germany, Switzerland and the Netherlands.
  - Survivorship bias avoided by including dead companies.
  - Adjust for secondary issues and cross-listings.
  - Penny stocks are excluded, i.e., stock price below $5.
  - In total, we end up with 59,394 firm-years (32,905 firm-years for the U.S.).
- Cleaning Datastream Return Data:
  - Ince and Porter (2006), “Handle Datastream Data with Care!“
  - Issues not resolved by Datastream have been screened and corrected.

Outline

The Dispersion Strategy

- Following Diether, Malloy and Scherbina (2002) we define:

$$Dispersion = \frac{Standard\ Deviation\ of\ Earnings\ Forecasts}{|Mean\ Earnings\ Forecast|}$$

- Based on the previous month‘s dispersion stocks are asssigned into
  - Quintiles for larger countries
  - Terciles for smaller countries
- The dispersion strategy is to go long low dispersion stocks and to go short high dispersion stocks.
- Holding period is one month

Return and Volatility of Dispersion Portfolios

		Portfolio Dispersion Ranking						
Country		Low	2	Mid	4	High	Lo-Hi	*t*-stat
USA	Return	1.22	0.87	0.87	0.82	0.72	**0.50**	**2.05**
	Volatility	4.98	5.08	5.64	6.33	7.49	3.93	
Europe	Return	0.88	0.76	0.74	0.62	0.45	**0.43**	**2.46**
	Volatility	4.21	4.64	4.97	5.22	5.96	2.81	
Austria	Return	1.08		0.69		0.50	**0.58**	**2.31**
	Volatility	6.30		6.27		6.41	4.06	
Belgium	Return	0.83		0.74		0.41	**0.43**	**2.20**
	Volatility	4.82		5.26		5.84	3.14	
France	Return	1.01	0.93	0.77	0.59	0.55	*0.46*	*1.83*
	Volatility	5.33	5.68	6.15	6.46	7.43	4.05	
Germany	Return	0.58	0.49	0.49	0.26	0.12	**0.46**	**1.98**
	Volatility	5.27	5.62	6.00	6.08	7.56	3.78	
Italy	Return	0.62	0.56	0.56	0.33	0.02	**0.60**	**2.22**
	Volatility	6.27	6.89	6.63	6.67	7.86	4.37	
Netherlands	Return	1.14	0.99	0.82	0.77	0.37	**0.76**	**2.81**
	Volatility	5.13	5.28	5.69	5.97	7.01	4.39	
Spain	Return	1.14	0.89	0.71	0.66	0.50	**0.64**	**2.43**
	Volatility	5.05	5.85	6.02	6.67	7.10	4.23	

Characteristics of Dispersion Portfolios

- Prior U.S. evidence is confirmed (Diether, Malloy & Scherbina, 2002 or Avramov, Chordia, Jostova & Philipov, 2008) and the European experience looks promising as well.
- The lion‘s share of the hedge returns is typically due to the high dispersion portfolio.
- As for the quantile portfolios‘ dispersion we note that the high dispersion portfolio is decidedly different from the remaining portfolios in that there is considerable disagreement among analysts.
- As a consequence the quantile portfolios‘ volatility increases with dispersion.
- Moreover, we find the highest betas for the high dispersion portfolios, which calls for controlling for common risk factors in the hedge strategies‘ returns!

⇨ Are the dispersion strategies simply compensating for risk?

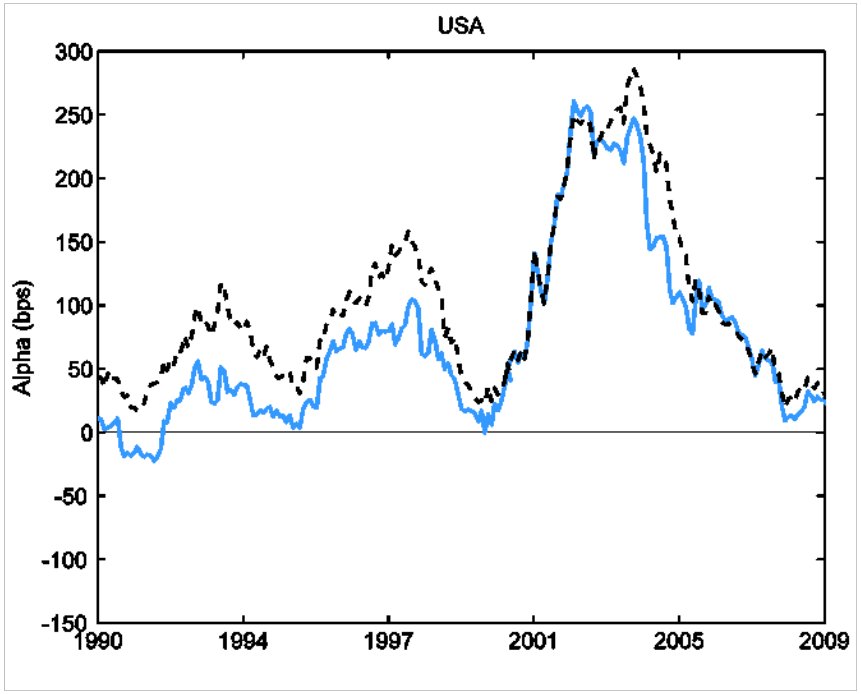
Fama-French-Momentum Regressions

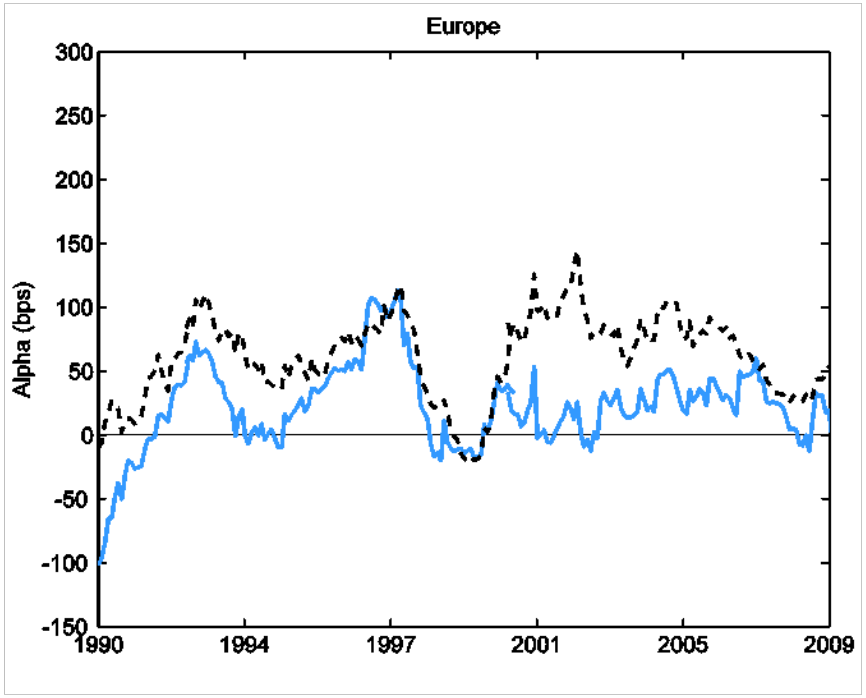
$$R_{Lt} - R_{St} = \alpha + \beta(R_{Mt} - R_{Ft}) + \gamma R_{SMBt} + \delta R_{HMLt} + \varphi R_{PMNt} + \varepsilon_t$$

		α	β	γ	δ	φ	t(α)	t(β)	t(γ)	t(δ)	t(φ)	Adj. R^2
USA	Low	0.11	0.94	-0.32	-0.02	0.18	1.03	41.66	-11.50	-0.54	3.56	88.2
	High	-0.60	1.25	-0.05	-0.20	-0.28	-4.23	42.44	-1.28	-4.19	-4.24	91.6
	Low-High	0.71	-0.31	-0.28	0.18	0.45	4.51	-9.55	-6.74	3.39	6.26	64.6
Europe	Low	0.00	0.96	-0.33	0.07	0.25	0.06	51.01	-13.11	2.00	5.27	92.5
	High	0.01	1.27	-0.25	-0.10	-0.44	0.05	47.05	-7.11	-2.04	-6.38	92.7
	Low-High	0.00	-0.32	-0.07	0.17	0.69	-0.01	-9.88	-1.66	2.89	8.46	55.1

- Risk factors explain a sizeable portion of the hedge returns
- Considerate negative market exposure indicates hedging potential
- While the U.S. alpha is robust to the common factor controls, the European one is fully explained away, however, Austria, Italy, the Netherlands, and Spain are robust as well.

Trailing Alphas for the U.S. and Europe





- Fama-French-Alpha dashed, 4-Factor-Alpha solid blue
- Both alphas exhibit similar patterns over time
- However, the U.S. alpha generally appears to be more sizable
- Also, while the U.S. alpha is more robust to common factor controls the European one is virtually subsumed by earnings momentum

Outline

Data Snooping and Anomalies

- When testing several strategies some may outperform by chance alone:
  - Extensive re-use of a given database.
  - Testing one investment idea in similar markets.
- Control for data-snooping is essential:
  - Goal: When assessing several strategies, avoid as many false rejections of capital market efficiency.
  - Statistically speaking: Seek control of the FWE or FDP.
  - Classical methods are too conservative and virtually reject everything.
- We employ the most recent framework of Romano, Shaikh and Wolf (2008) (StepM Method).
- Is our suspicion and hence this (complex) battery of tests justified?

Leippold and Lohre (2009), “Data Snooping and the Global Accrual Anomaly”

- Accrual accounting: Record economic transactions corresponding to their originating period:
  - Earnings = Cash Flows + Accruals
  - Accruals = (ΔCA − ΔCash) − (ΔCL − ΔSTD- ΔTP) − Dep
- Accrual gives room for earnings management and may trigger adverse earnings moves in the future.
- (Naive) investors fixate on current earnings.
- Profitable trading strategy: Go long in low accruals companies and short in high accruals companies (Sloan, 1996).

⇒ Accounting for multiple hypothesis testing, the accrual anomaly as a global phenomenon disappears.

Leippold and Lohre (2008), “International Price and Earnings Momentum”

- Price Momentum: Jegadeesh and Titman (1993, 2001)
  - Buy winners and sell losers.
  - Momentum measured over 6 months, 6 months holding period, monthly rebalancing implies 6 overlapping portfolios.
- Earnings Momentum: Chan, Jegadeesh, Lakonishok (1996)
  - Buy positive and sell negative revisions.
  - Earnings momentum signal is 6 months cumulated I/B/E/S revisions:
  - 6 months holding period, monthly rebalancing, overlapping portfolios.

⇒ Both, price and earnings momentum are robust with respect to data snooping controls.

Accounting for Multiple Testing

	Return					4-Factor-Alpha				
Country	θ_s	*StepM*		*FDP-StepM*		θ_s	*StepM*		*FDP-StepM*	
	(bp)	c_l	*rej*	c_l	*rej*	*(bp)*	c_l	*rej*	c_l	*rej*
USA	50	-20	0	-20	0	71	9	1	9	1
Europe	43	-19	0	-19	0	0	-41	0	-41	0
Austria	58	-7	0	-7	0	61	-14	0	-14	0
Belgium	43	-11	0	-11	0	26	-25	0	-25	0
Denmark	36	-46	0	-46	0	29	-47	0	-47	0
Finland	47	-70	0	-70	0	40	-76	0	-76	0
France	46	-30	0	-30	0	23	-35	0	-35	0
Germany	46	-24	0	-24	0	29	-30	0	-30	0
Greece	-3	-80	0	-80	0	4	-70	0	-70	0
Italy	60	-17	0	-17	0	48	-27	0	-27	0
Netherlands	76	-6	0	-6	0	40	-22	0	-22	0
Norway	16	-73	0	-73	0	15	-63	0	-63	0
Portugal	5	-85	0	-85	0	-4	-98	0	-98	0
Spain	64	-25	0	-25	0	50	-22	0	-22	0
Sweden	55	-51	0	-51	0	43	-54	0	-54	0
Switzerland	9	-63	0	-63	0	-15	-73	0	-73	0
UK	22	-58	0	-58	0	-15	-104	0	-104	0

Outline

Explaining the Dispersion Effect

- Taking these results at face value, one may be tempted to right-away reject the notion of international dispersion effects
- We hesitate to do so given the intriguing fact of almost always positive return differentials together with positive alphas
- In reconciling these results with intuition, we delve into the economic nature of the dispersion effect.
  - Analyze the interaction of the dispersion effect with measures of information uncertainty
  - Examine the profitability of dispersion strategies among varying levels of liquidity
  - Consider the evolution of the related strategies over time

The Dispersion Effect and Information Uncertainty

- If the dispersion effect is due to investors'underreaction, it should be stronger in more opaque information environments for which information diffusion is slowest

⇨ Analyze extreme dispersion portfolios limited to different degrees of information uncertainty as measured by:

  - Analyst coverage
  - Size
  - Volatility
  - Idiosyncratic Volatility

The Dispersion Effect and Information Uncertainty

	Analyst Coverage			*Size*			*Volatility*			*Idiosyncratic Volatility*		
Country	Low	Mid	High	Low	Mid	High	Low	Mid	High	Low	Mid	High
	0.74	0.58	0.26	0.76	0.60	0.32	0.32	0.78	1.49	0.92	1.05	1.42
USA	3.41	2.43	0.79	3.17	2.33	1.09	1.62	4.05	6.36	3.04	4.52	6.17
	0.44	0.49	0.32	0.76	0.41	0.24	0.41	0.33	0.69	0.83	0.66	0.68
Europe	2.59	2.51	1.31	3.69	2.47	1.01	3.21	2.28	3.64	4.08	3.38	3.49
	0.48	0.06	-0.13	1.19	0.03	-0.09	0.18	0.36	0.43	0.07	0.38	0.50
UK	1.48	0.19	-0.58	2.92	0.09	-0.35	0.92	1.60	1.26	0.25	1.48	1.66
	-0.10	0.83	0.31	1.09	0.54	0.09	0.11	0.81	0.83	0.60	0.72	0.95
Germany	-0.23	2.72	0.91	2.35	1.56	0.27	0.33	2.85	2.54	1.81	2.21	3.03
	-0.66	0.29	0.18	0.56	-0.33	0.06	-0.09	0.12	0.49	0.46	0.24	0.32
Switzerland	-1.87	0.95	0.55	1.17	-1.15	0.19	-0.35	0.43	1.44	1.71	0.80	0.94
	0.79	0.55	-0.32	0.43	0.25	0.18	0.30	-0.03	1.30	0.94	0.92	1.02
France	2.22	1.71	-0.87	0.89	0.73	0.58	1.07	-0.09	3.99	3.48	2.89	2.99
	-0.81	1.23	0.60	-0.93	0.43	0.58	0.28	0.10	1.21	0.98	0.61	0.77
Italy	-1.66	2.33	1.55	-1.81	0.98	1.48	0.76	0.26	2.28	2.20	1.33	1.68
	0.03	0.54	0.41	-0.09	0.41	0.68	0.57	1.22	0.29	0.73	0.66	0.22
Spain	0.07	1.26	0.81	-0.18	1.06	1.08	1.00	2.73	0.55	1.66	1.98	0.55
	1.30	0.44	0.16	1.35	0.59	-0.33	0.35	0.48	0.96	0.93	0.92	1.18
Netherlands	3.73	1.06	0.35	3.22	1.52	-0.69	0.96	1.28	1.89	2.62	2.69	2.87
	0.04	1.05	0.26	-0.25	0.85	0.19	0.27	0.80	1.26	0.56	1.47	1.10
Sweden	0.07	2.32	0.56	-0.34	1.56	0.45	0.56	1.77	2.02	1.03	2.86	2.08
	0.61	0.45	-0.08	-0.01	0.46	-0.17	1.95	0.42	-0.28	1.31	0.89	-0.27
Denmark	1.25	1.16	-0.18	-0.02	1.08	-0.47	2.98	1.10	-0.59	2.00	2.18	-0.60
#max	5	6	0	7	2	2	1	1	9	5	1	5
ranking	2.00	1.45	2.55	1.64	1.91	2.45	2.45	2.18	1.36	1.91	2.36	1.73

The Dispersion Effect and Liquidity

- The dispersion effect is most pronounced when limited to high idiosyncratic risk stocks, hence, high arbitrage costs may additionally deter investors from its exploitation
- Also, size, volatility, or idiosyncratic volatility may simply be proxying for liquidity risk which is inhibiting the successful implementation of the dispersion strategy

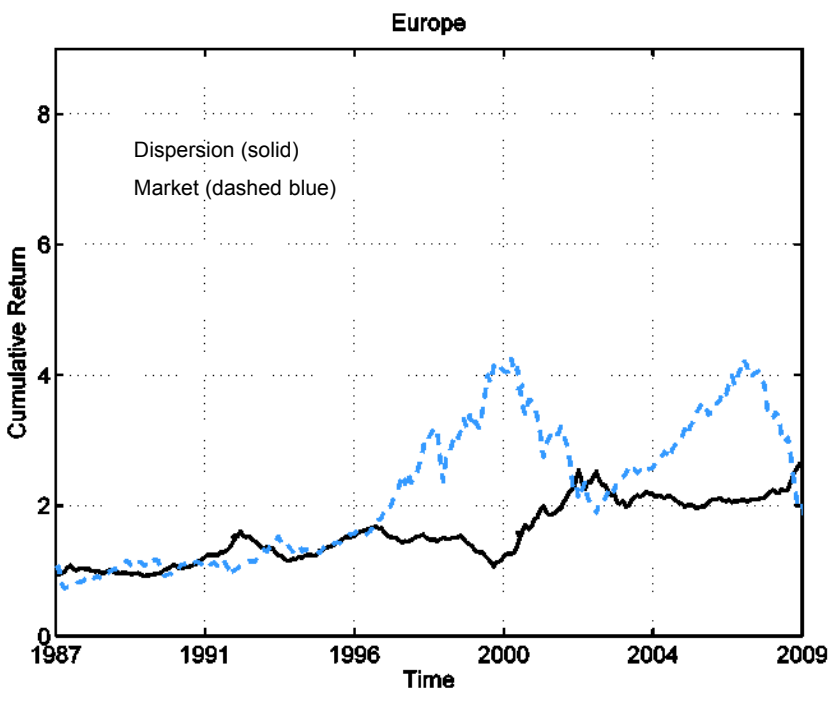
⇒ Analyze extreme dispersion portfolios limited to different degrees of liquidity as measured by:

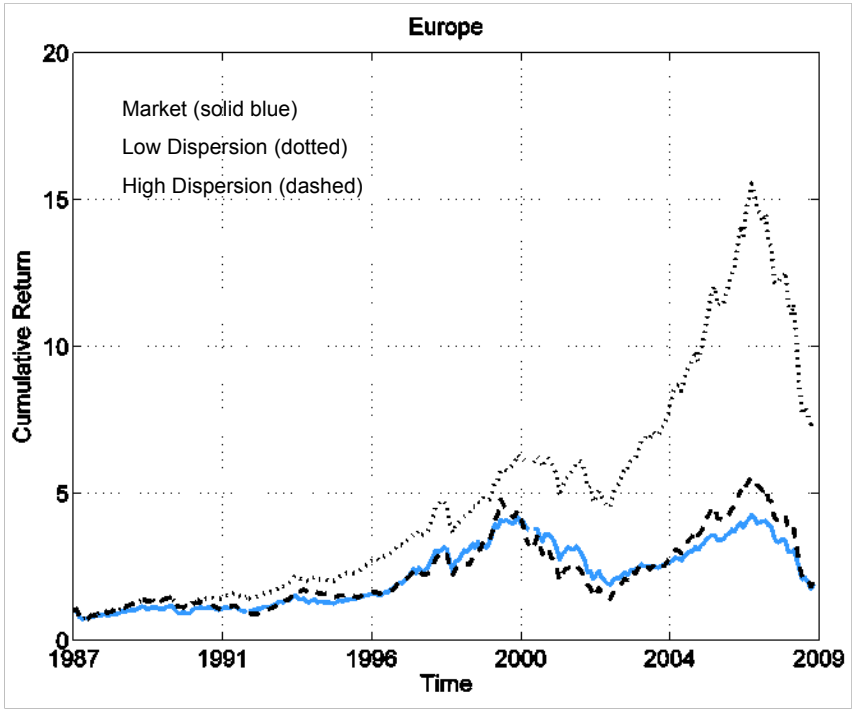
  - Dollar Volume
  - Share Turnover
  - Amihud's (2002) ILLIQ measure
  - Liu (2006) measure

The Dispersion Effect and Liquidity

	Dollar Volume			*Share Turnover*			*ILLIQ*			*Liu Measure*		
Country	High	Mid	Low	High	Mid	Low	Low	Mid	High	Low	Mid	High
	0.34	0.41	0.48	0.59	0.42	0.46	0.28	0.42	0.61	0.74	0.29	0.35
USA	1.08	1.65	2.25	2.09	1.66	2.26	0.97	1.57	2.70	2.64	1.19	1.74
	0.07	0.39	0.59	0.13	0.46	0.40	0.12	0.33	0.49	0.43	0.19	0.48
Europe	0.31	2.09	3.55	0.55	2.31	2.51	0.56	1.73	2.79	1.77	1.06	3.36
	0.04	0.35	0.57	0.27	0.17	0.55	0.05	0.12	0.66	0.27	0.19	0.41
UK	0.17	1.39	2.04	1.00	0.74	2.15	0.21	0.45	2.51	1.07	0.73	1.56
	0.33	0.64	0.56	0.69	0.27	0.65	0.31	0.36	0.90	0.43	0.60	0.67
Germany	0.98	2.28	1.54	2.08	1.02	1.80	1.06	1.29	2.33	1.43	2.17	1.82
	-0.22	-0.19	0.49	0.04	-0.19	0.14	-0.28	-0.29	0.29	0.05	0.22	0.10
Switzerland	-0.68	-0.62	1.43	0.14	-0.63	0.49	-0.96	-0.91	0.89	0.16	0.70	0.27
	-0.24	0.77	0.09	-0.01	0.59	-0.07	-0.05	0.46	0.22	0.03	0.40	0.31
France	-0.78	2.64	0.23	-0.03	1.97	-0.23	-0.16	1.41	0.64	0.09	1.43	0.85
	0.80	0.52	0.13	0.53	0.59	0.66	0.80	0.46	-0.11	0.83	0.75	0.02
Italy	2.31	1.25	0.26	1.36	1.72	1.51	2.42	1.23	-0.23	2.12	2.09	0.04
	0.05	0.69	-0.03	0.39	0.27	0.49	-0.23	0.43	0.06	0.79	-0.37	0.20
Spain	0.11	1.65	-0.08	0.95	0.66	1.28	-0.51	0.98	0.16	1.98	-0.89	0.50
	0.30	0.31	1.39	0.19	0.79	1.10	0.33	0.77	0.92	0.93	0.54	0.64
Netherlands	0.64	0.67	3.74	0.39	2.07	2.96	0.71	1.85	2.54	1.98	1.42	1.48
	0.27	1.02	1.14	0.36	0.58	1.12	0.47	0.74	1.57	0.37	0.67	0.73
Sweden	0.59	1.94	1.80	0.71	1.09	2.19	1.08	1.30	2.52	0.83	1.28	1.25
	0.46	0.15	0.14	0.66	-0.17	0.69	0.40	0.19	-0.38	0.35	0.38	-0.30
Denmark	1.38	0.31	0.29	1.74	-0.41	1.21	1.13	0.43	-0.67	1.03	0.97	-0.59
#max	2	3	6	2	2	7	2	2	7	4	3	4
ranking	2.55	1.73	1.73	2.18	2.36	1.45	2.55	1.91	1.55	2.00	2.18	1.82

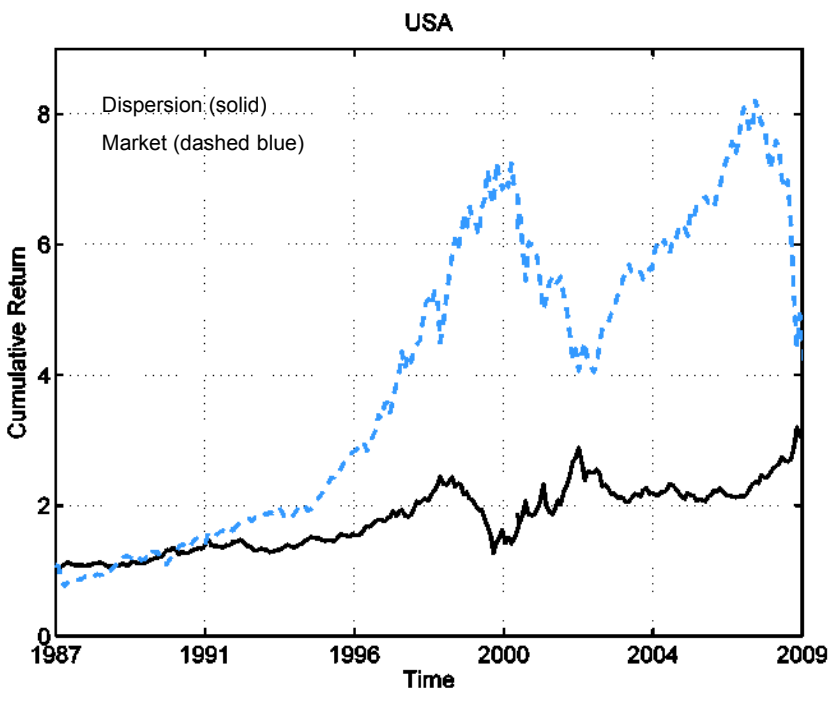
The Dispersion Effect over Time: Europe

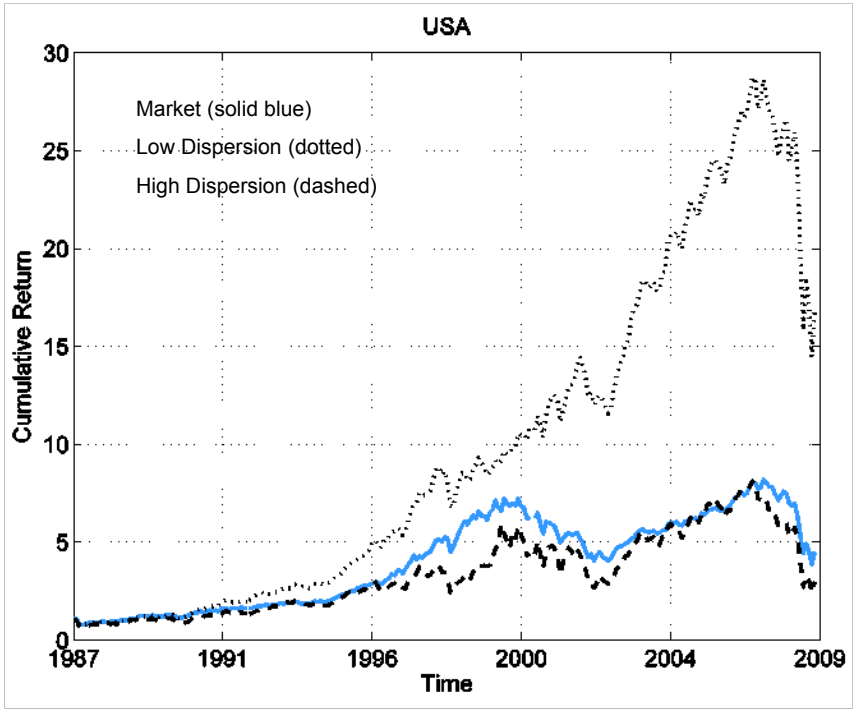




- The dispersion strategy's return path is mostly flat.
- The returns amass during a three-year period following the burst of the tech bubble and are mostly driven by the short leg.
- This behavior repeats during the most recent market turmoils in 2008.

The Dispersion Effect over Time: U.S.





- Prior 1998: Steady build-up of wealth followed by a severe breakdown.
- The strategy also works best during the tech bubble and the recent financial crisis.

Outline

Conclusion

- We provide evidence of international dispersion effects
- These effects do not prevail when subjected to multiple testing controls
- Economic Inference:
  - Dispersion strategy requires implementing rather infeasible positions
  - High arbitrage costs additionally questions the size of the expected benefits
  - Returns amass in a very narrow time frame
- The dispersion effect is more apparent than real, thus, markets are more efficient than they appear

Outlook

- We show that the dispersion effect cannot be traded upon. Chen, Wu and Zhang (WP, 2007) show that the very U.S. dispersion effect is driven by the denominator (absolute mean estimate) instead of the numerator (variance of earnings estimates).
- Thus, dispersion appears to be an inappropriate measure for capturing heterogenous beliefs.
- For instance, Doukas, Kim, and Pantzalis (2006) find a positive price of heterogenous beliefs when measuring disagreement via (1 - ρ) where ρ is a measure of the consensus (also the across-analyst correlation in forecast errors)
- While the above measure is only available ex post it would be beneficial to test different metrics of heterogenous beliefs to re-test for the according return relationship.