

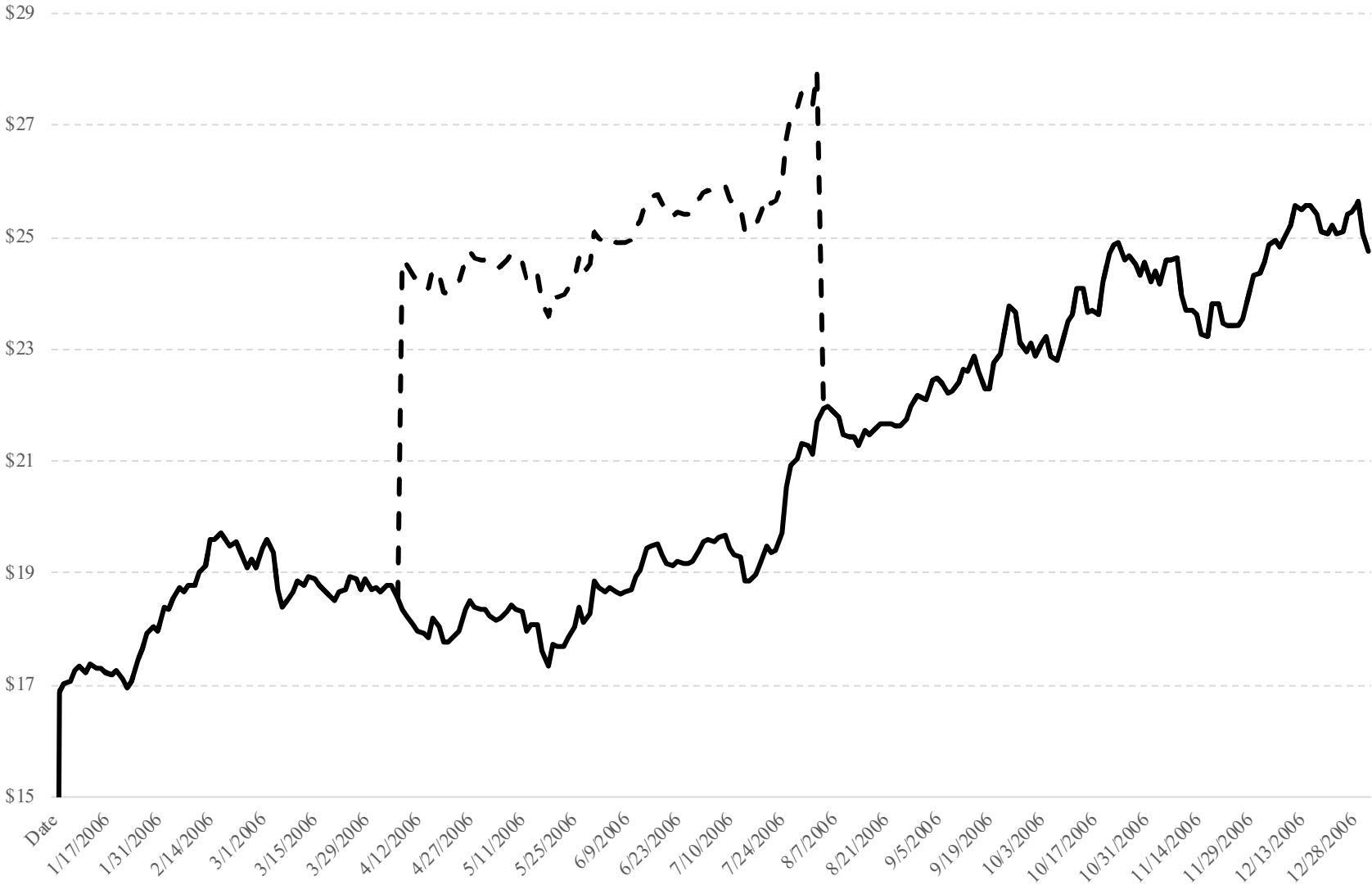
Single Firm Event Studies, Securities Fraud, and Financial Crisis: Problems of Inference

Andrew Baker

Securities Litigation

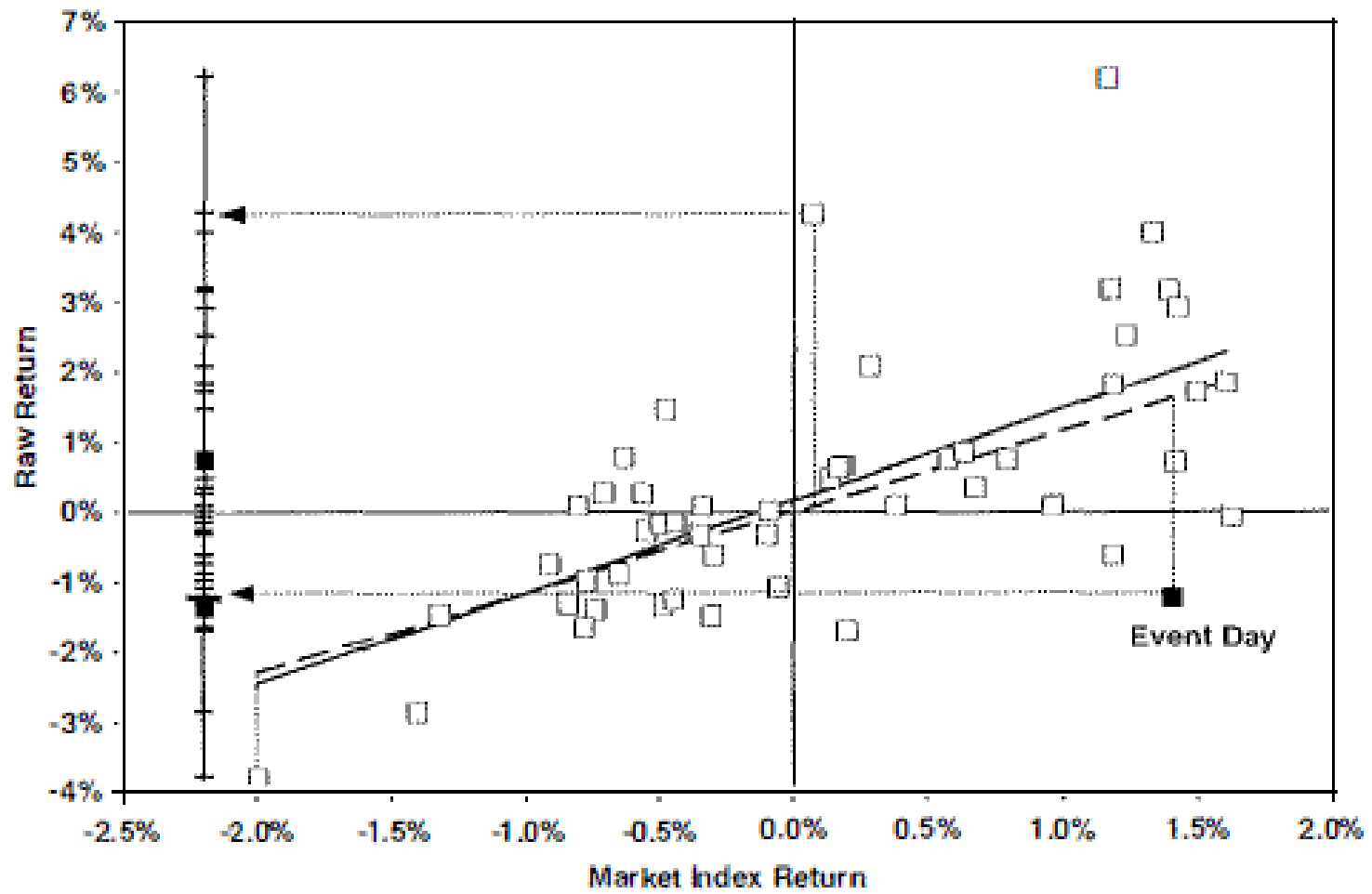
- In 2014 - total maximum dollar loss of \$215 billion according to a report from Cornerstone Research.
- 1934 Securities Exchange Act
 - unlawful activities such as fraudulent transactions, insider trading, market manipulation, omitted material information, and misstatements in filed documents.
- Most cases are brought under Rule 10b-5, which makes it unlawful to make any untrue statement of a material fact or omit to state a material fact.
- Courts have generally awarded damages based on the “out of pocket measure” – difference between the price purchased and the value of the actual security.

Theoretical Securities Fraud Case



Role of Expert Testimony

- Experts are used in three primary areas
 - To conduct an event study
 - To calculate a but-for price line
 - To calculate class-wide damages
- An event study is an empirical analysis of an intervention in a time series.

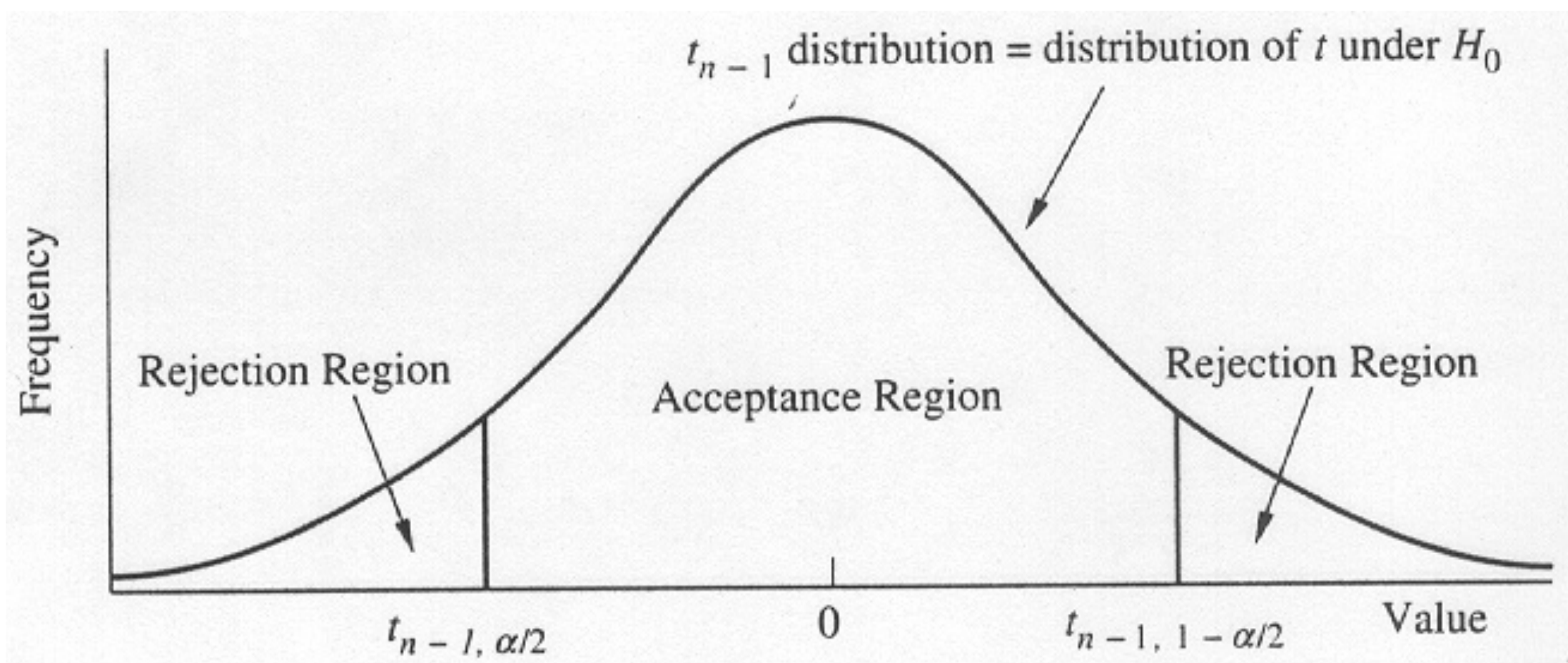




Long-Term Capital Management

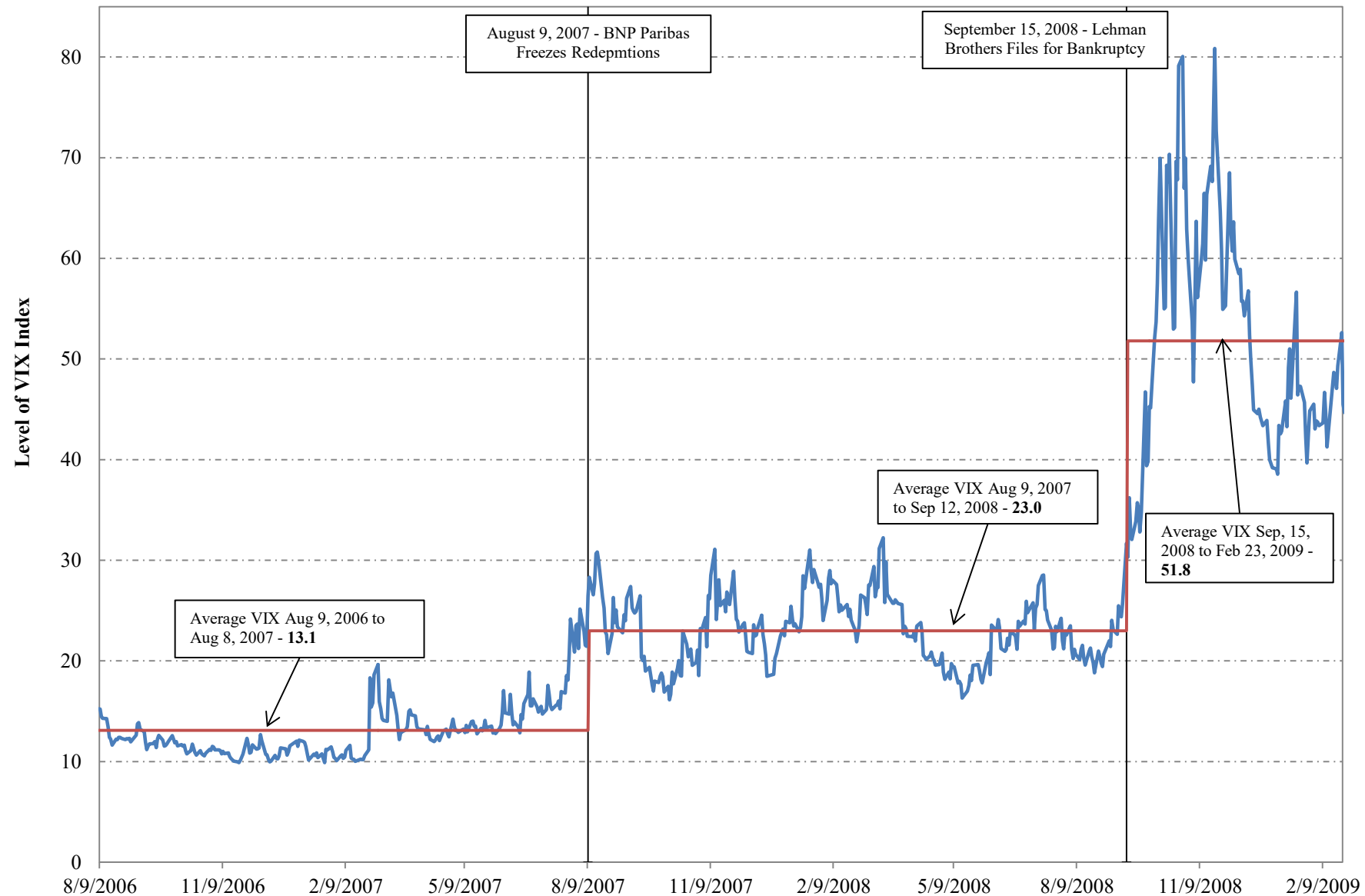






VIX Level Over the Financial Crisis Period and One Year Prior

August 9, 2006 to February 23, 2009



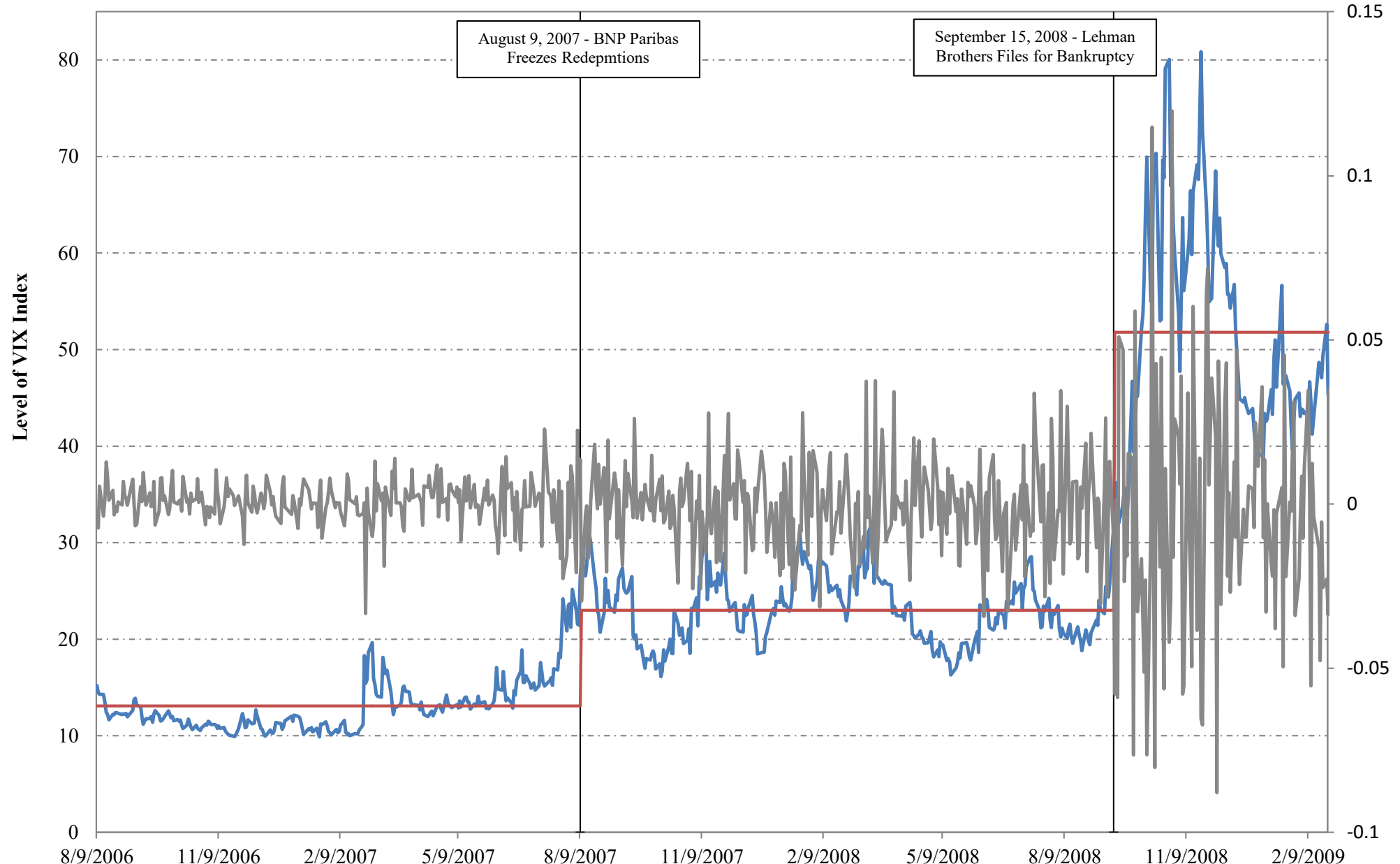
Summary Statistics of 29 Companies in Dow 30 (No GM)

	Name	Ticker	Mean	Standard Deviation	Kurtosis	Skew	Normally Distributed
1	Alcoa	aa	-0.46%	4.58%	7.08	-0.02	No
2	AIG	aig	-1.24%	9.18%	35.42	-3.49	No
3	American Express	axp	-0.42%	4.19%	5.63	-0.27	No
4	Boeing	ba	-0.27%	2.70%	6.56	0.38	No
5	Citigroup	c	-0.79%	6.93%	11.17	0.23	No
6	Caterpillar	cat	-0.29%	2.91%	6.19	0.04	No
7	DuPont	dd	-0.23%	2.75%	6.51	-0.36	No
8	Walt Disney	dis	-0.17%	2.77%	7.67	0.33	No
9	GE	ge	-0.37%	3.27%	6.69	-0.13	No
10	Home Depot	hd	-0.17%	2.99%	4.49	0.51	No
11	Honeywell International	hon	-0.18%	2.63%	5.05	-0.09	No
12	HP	hpq	-0.13%	2.68%	6.65	0.58	No
13	IBM	ibm	-0.07%	2.17%	5.53	0.26	No
14	Intel	intc	-0.17%	3.02%	4.91	-0.18	No
15	Johnson & Johnson	jnj	-0.03%	1.57%	15.08	0.93	No
16	JPMorgan	jpm	-0.21%	4.97%	7.10	0.05	No
17	Coca-Cola	ko	-0.06%	1.96%	11.10	0.87	No
18	McDonald's	mcd	0.03%	1.93%	5.70	0.11	No
19	3M Company	mmm	-0.16%	2.10%	6.36	-0.07	No
20	Altria	mo	-0.07%	2.05%	15.53	0.05	No
21	Merck	mrk	-0.15%	2.69%	8.91	-0.74	No
22	Microsoft	msft	-0.13%	2.82%	8.23	0.35	No
23	Pfizer	pfe	-0.13%	2.16%	7.32	-0.22	No
24	Procter and Gamble	pg	-0.06%	1.71%	8.88	-0.15	No
25	ATT	t	-0.13%	2.54%	8.08	0.73	No
26	United Technologies	utx	-0.13%	2.41%	7.44	0.55	No
27	Verizon	vz	-0.09%	2.41%	6.93	0.46	No
28	Wal-Mart	wmt	0.01%	1.97%	7.46	0.22	No
29	Exxon	xom	-0.05%	2.81%	10.61	0.22	No

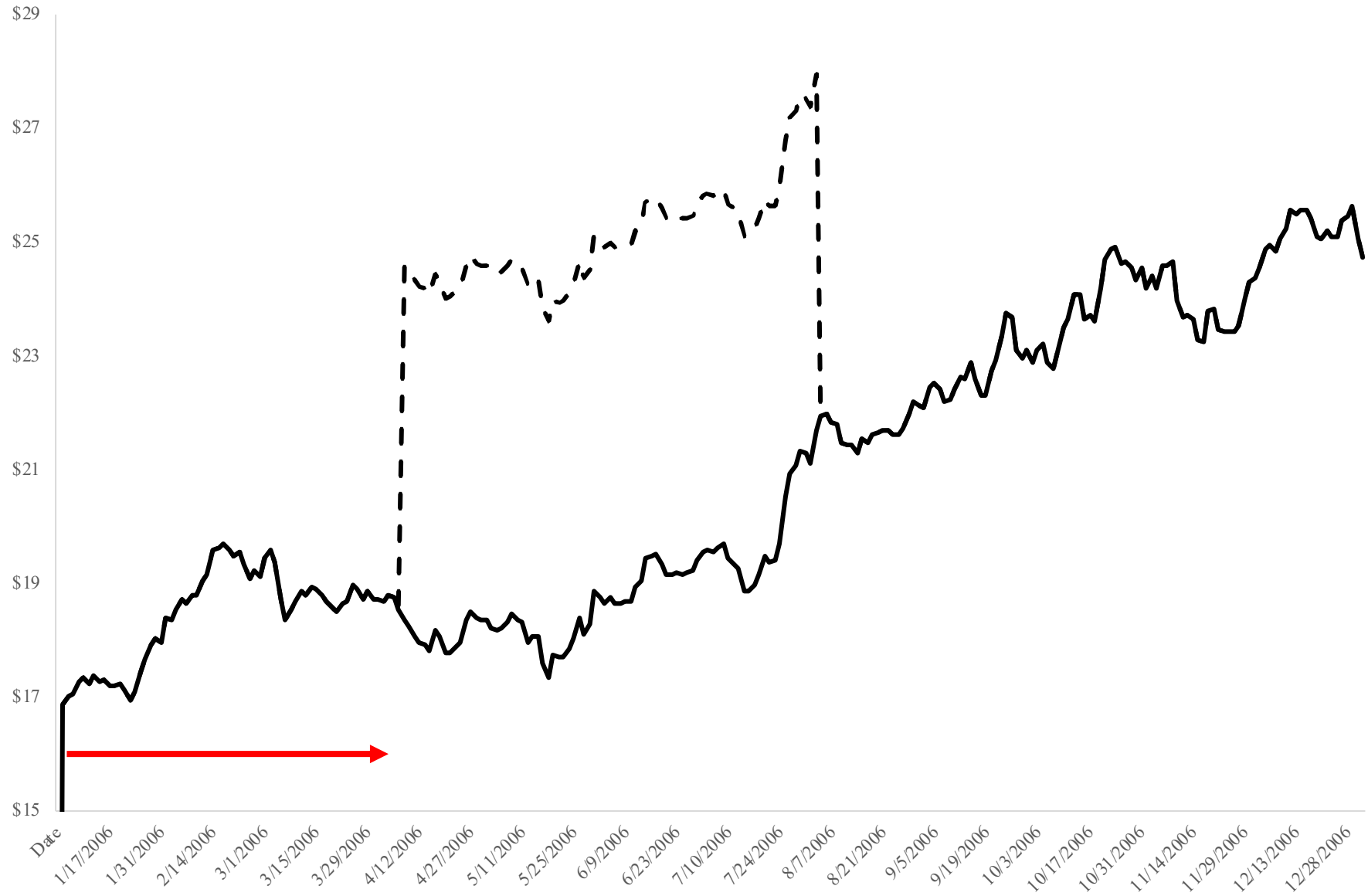
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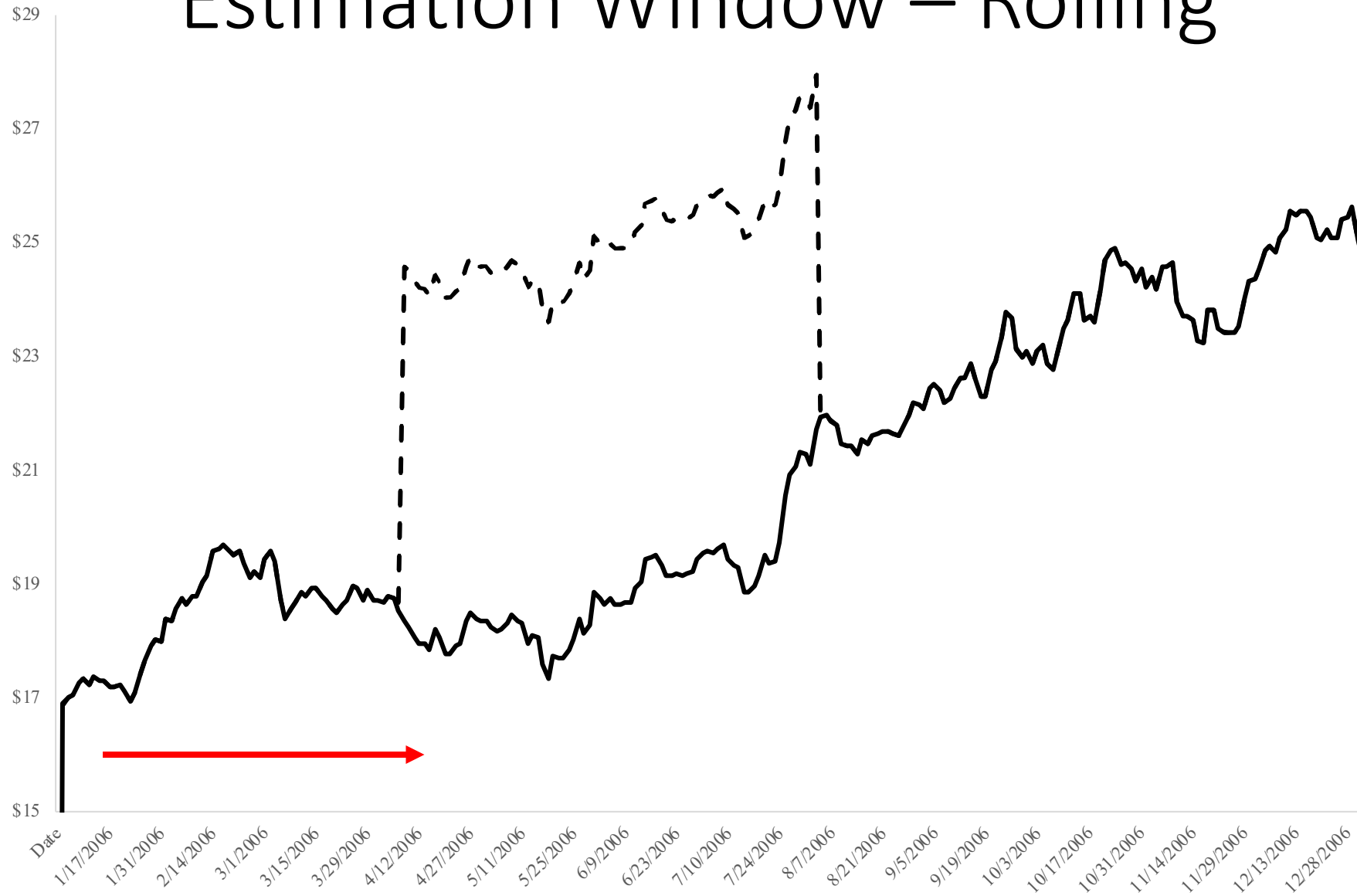
With Mean Dow Return



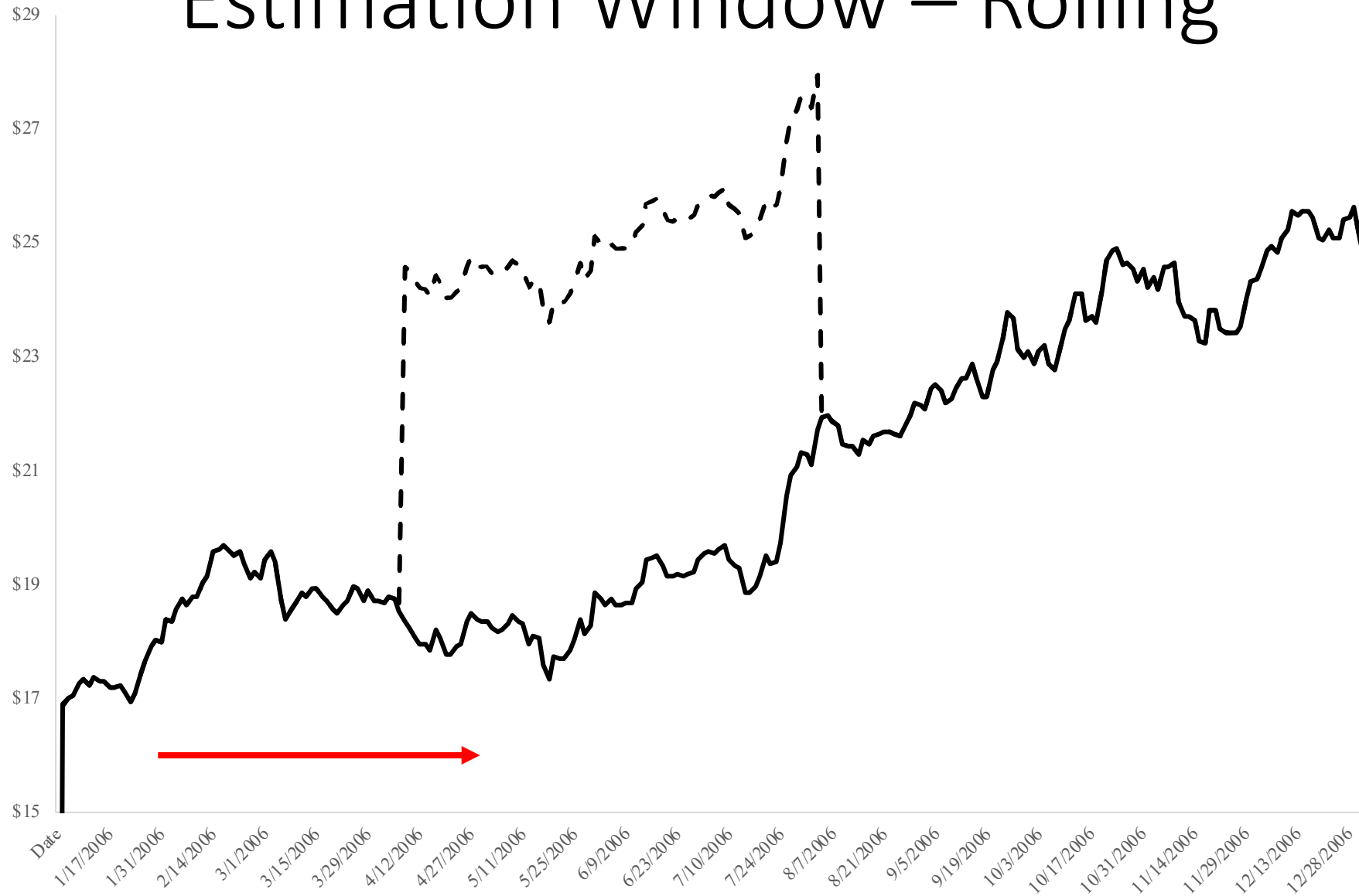
Estimation Window – Pre-Period



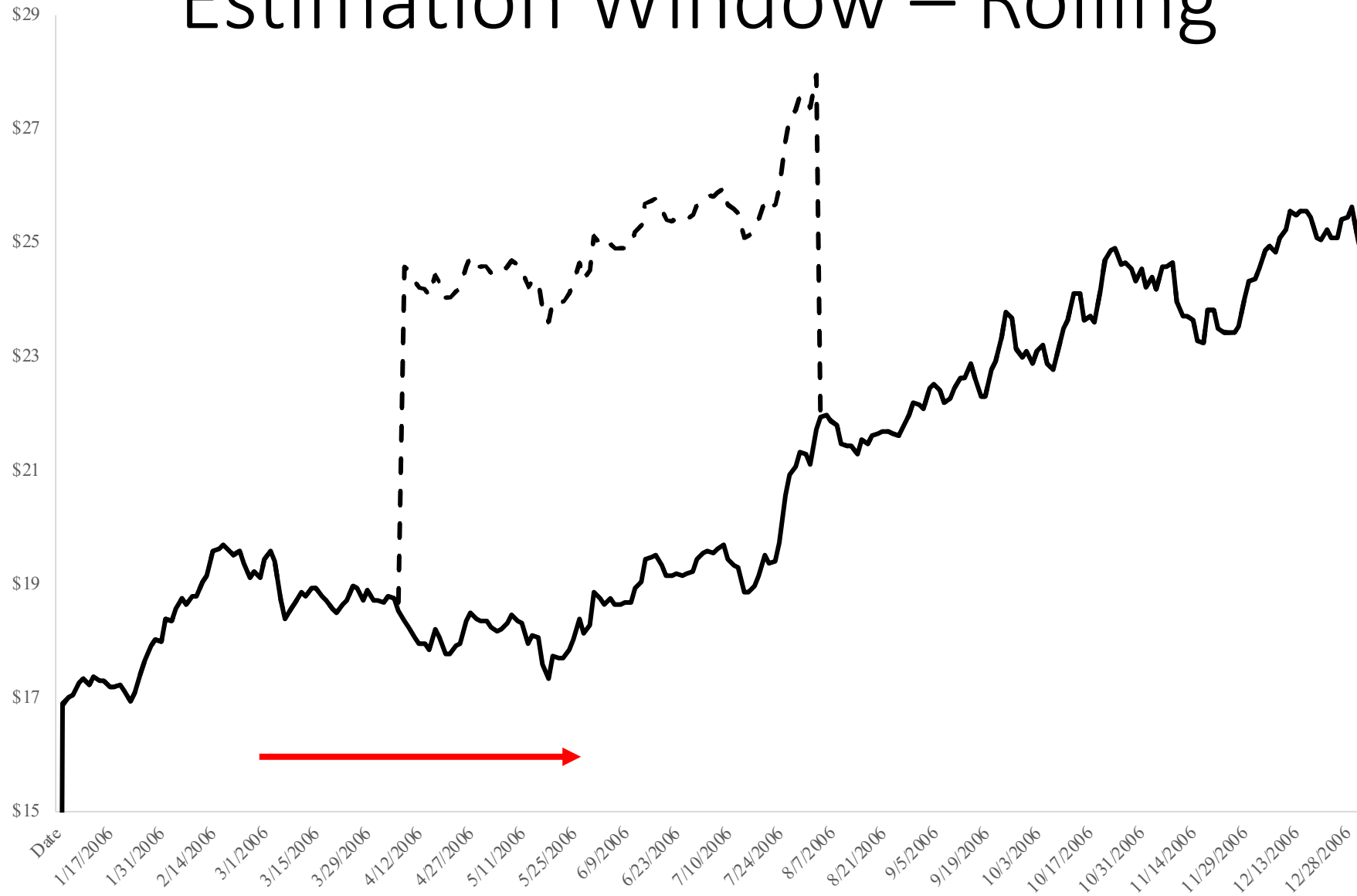
Estimation Window – Rolling



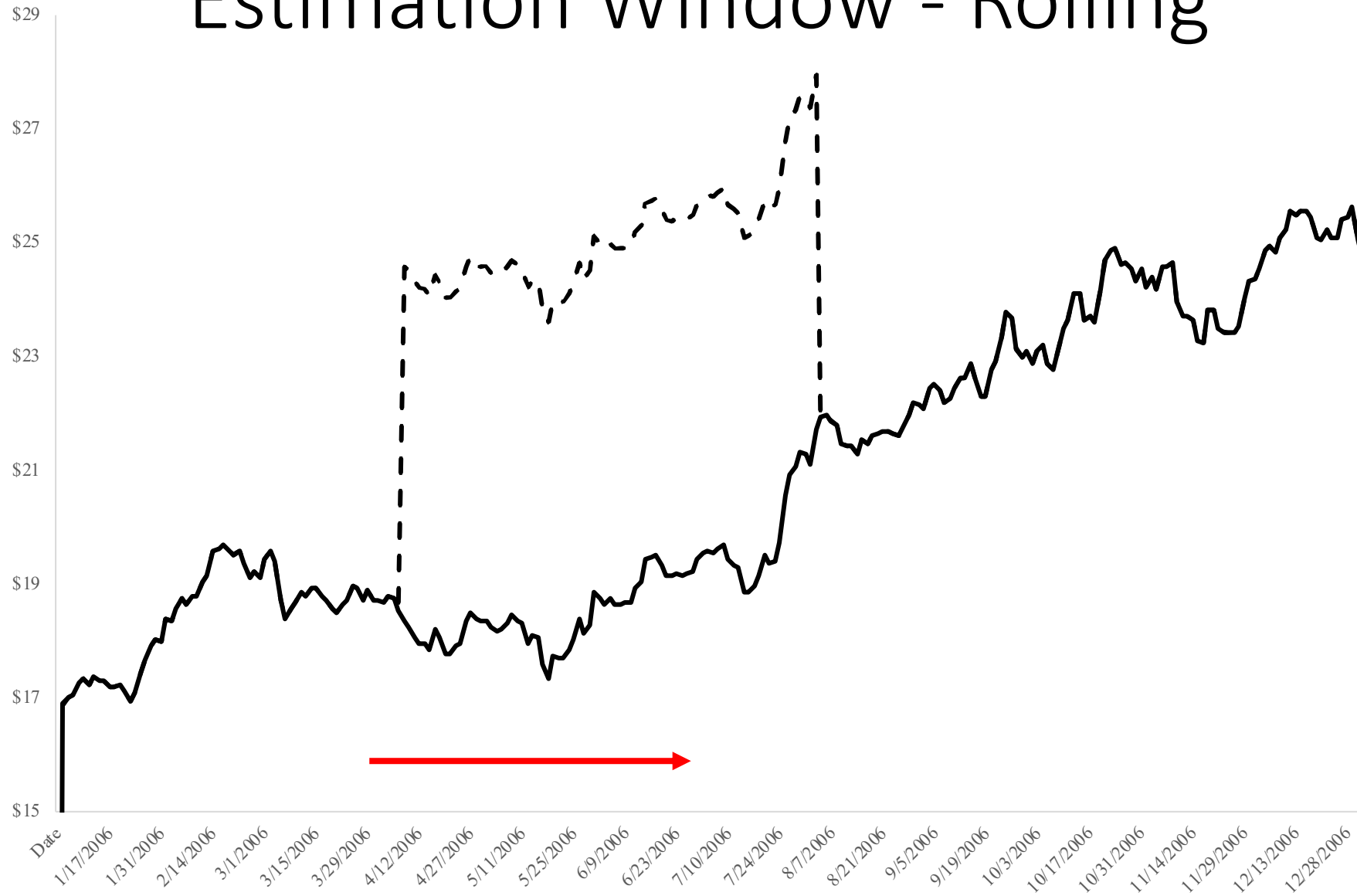
Estimation Window – Rolling



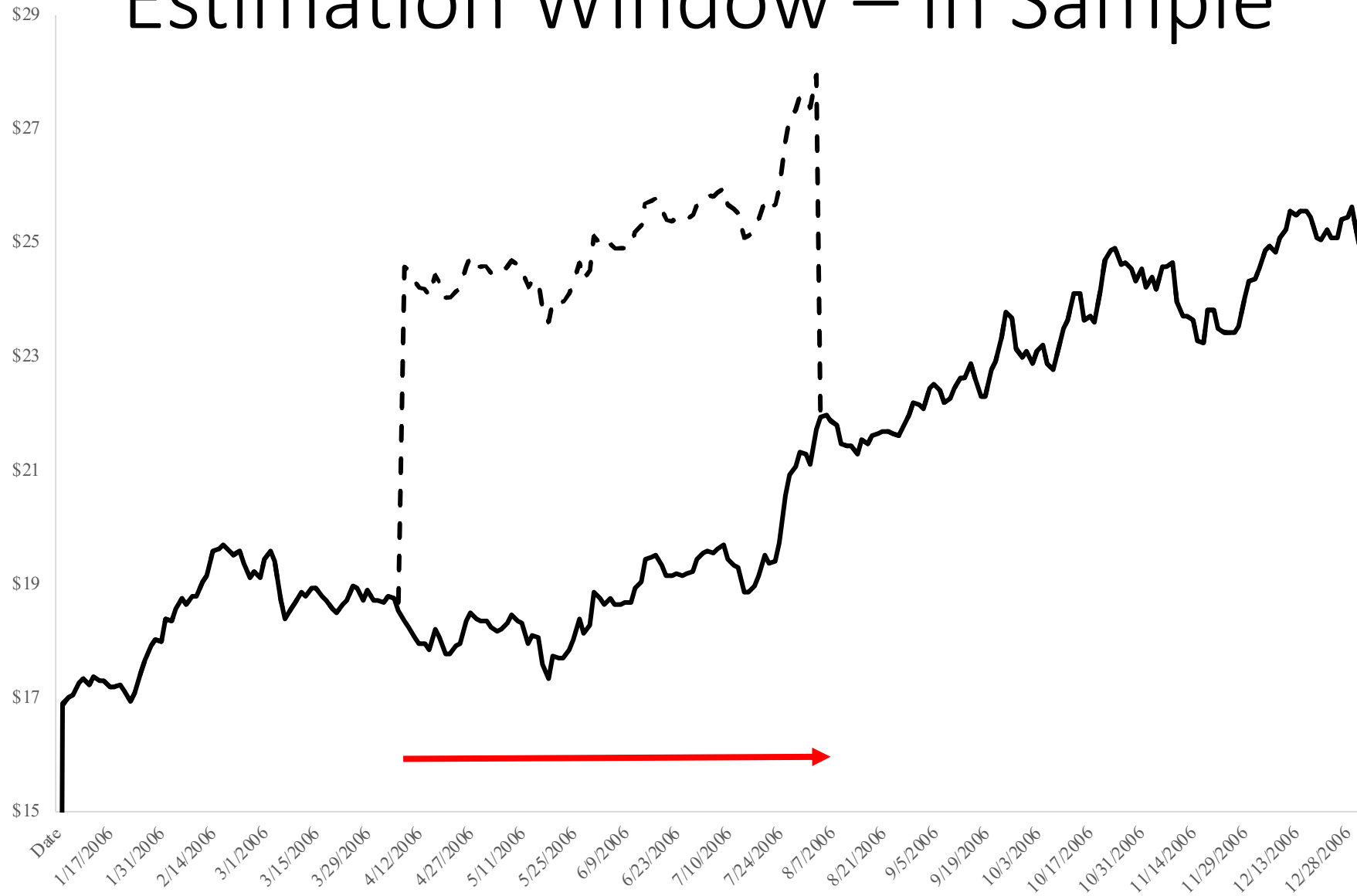
Estimation Window – Rolling



Estimation Window - Rolling



Estimation Window – In Sample



Empirical Results

“Clean Period”

Rejection Frequencies -All Companies in Dow 30

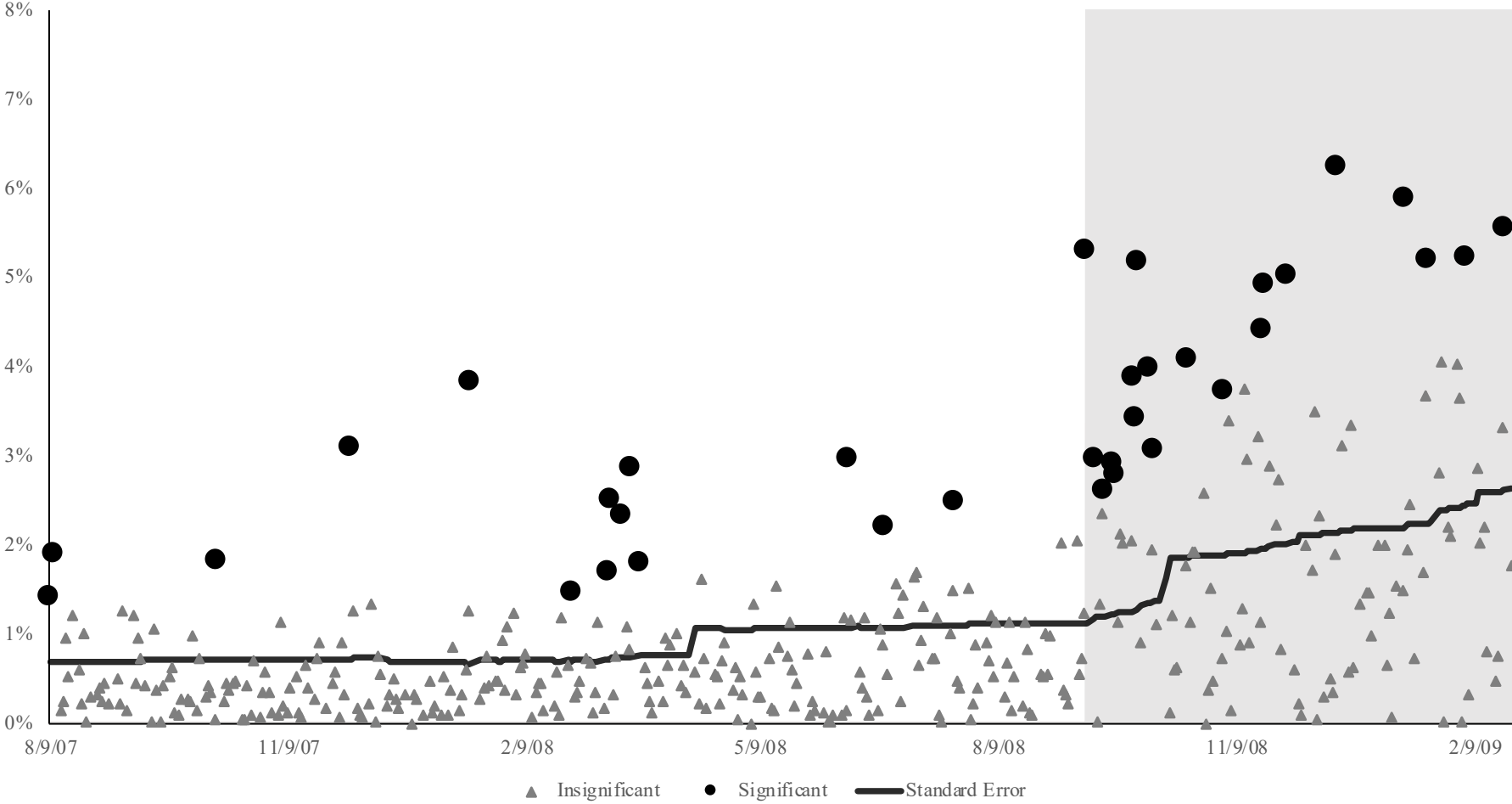
	Pre-period Estimation Window	Rolling 250 Day Estimation Window	In-Sample Estimation Window
OLS, No Adjustment	4.2%	4.7%	4.8%
SQ Test	4.4%	4.7%	4.8%
OLS, Daily VIX Adjustment	4.6%	4.6%	5.2%
Feasible Generalized Least Square	5.4%	5.7%	7.0%

Financial Crisis Period

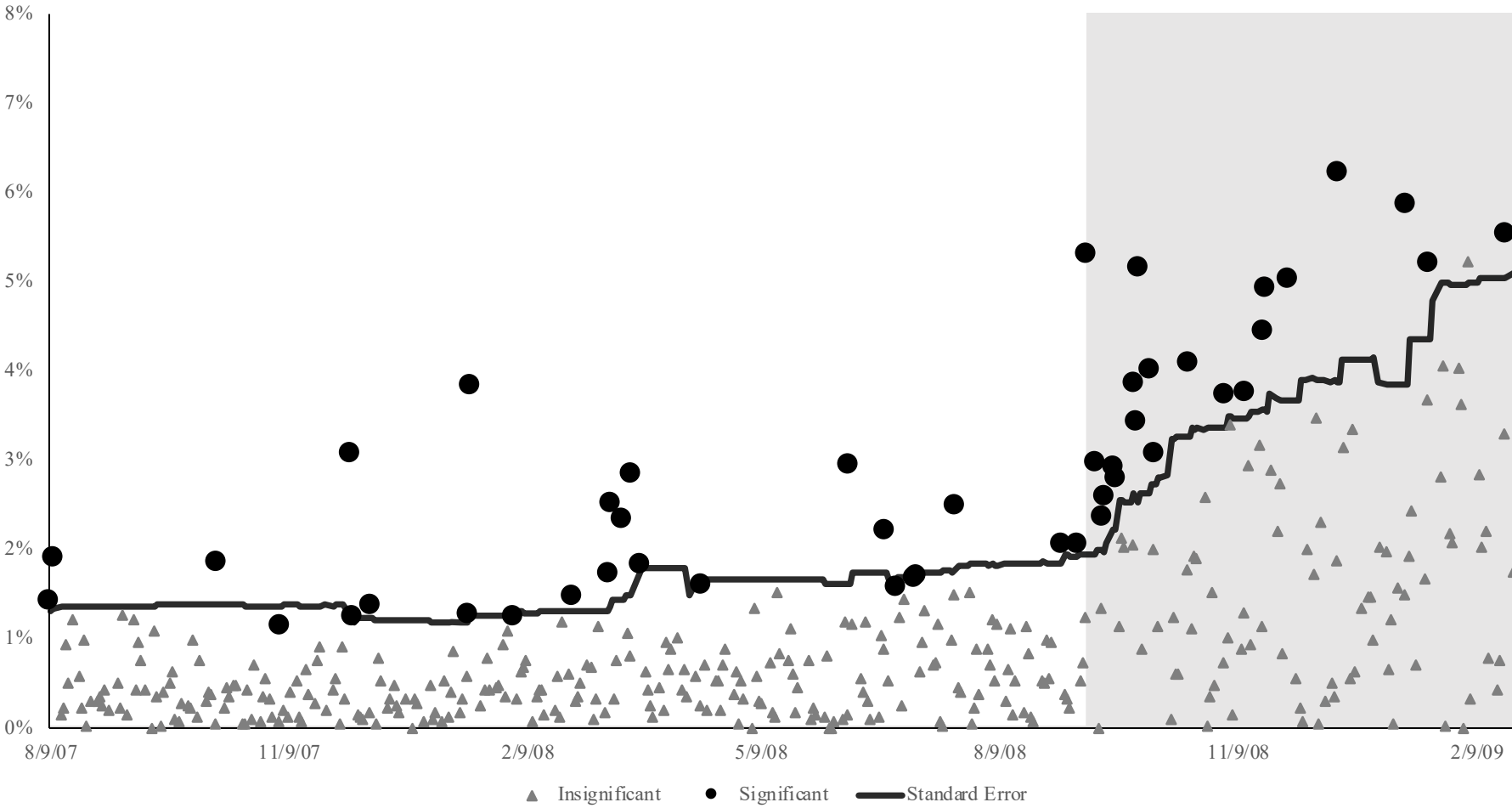
Rejection Frequencies -All Companies in Dow 30

	Pre-period Estimation Window	Rolling 250 Day Estimation Window	In-Sample Estimation Window
OLS, No Adjustment	22.8%	10.8%	5.5%
SQ Test	23.1%	10.3%	4.7%
OLS, Daily VIX Adjustment	5.3%	5.0%	5.1%
Feasible Generalized Least Square	6.4%	6.5%	8.8%

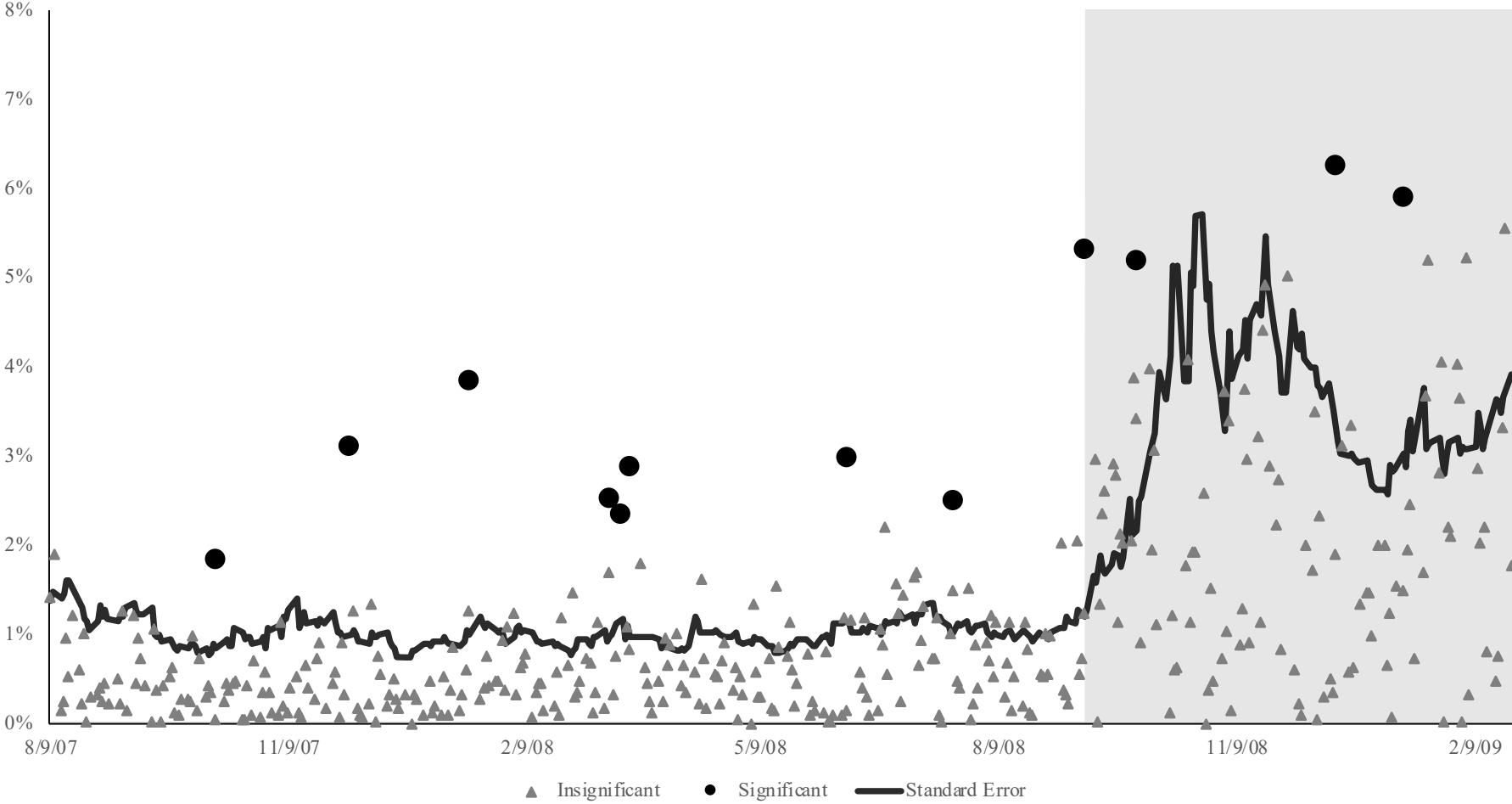
OLS Regression Rolling Window Estimation



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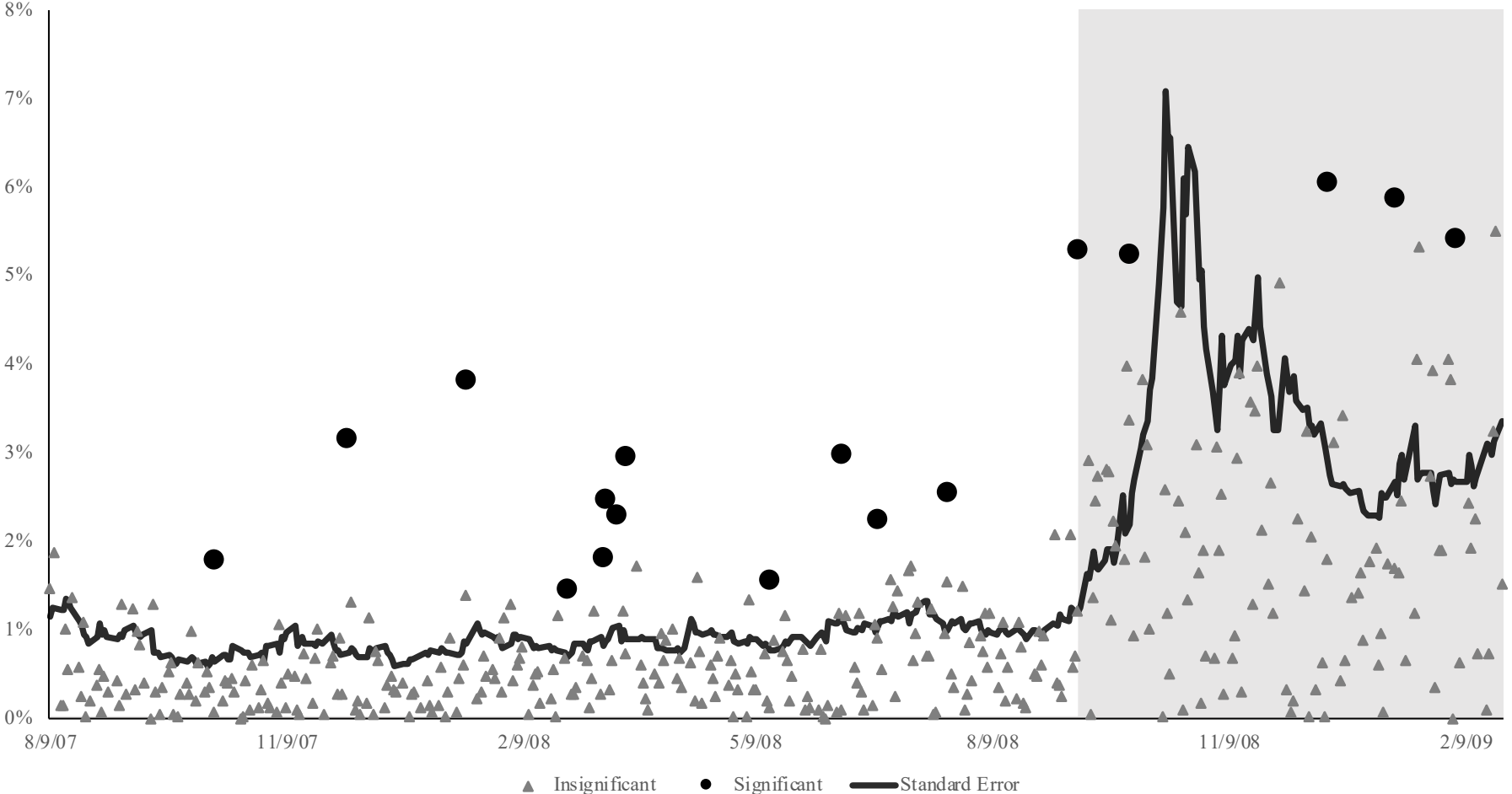


OLS With VIX Adjustment Rolling Window Estimation

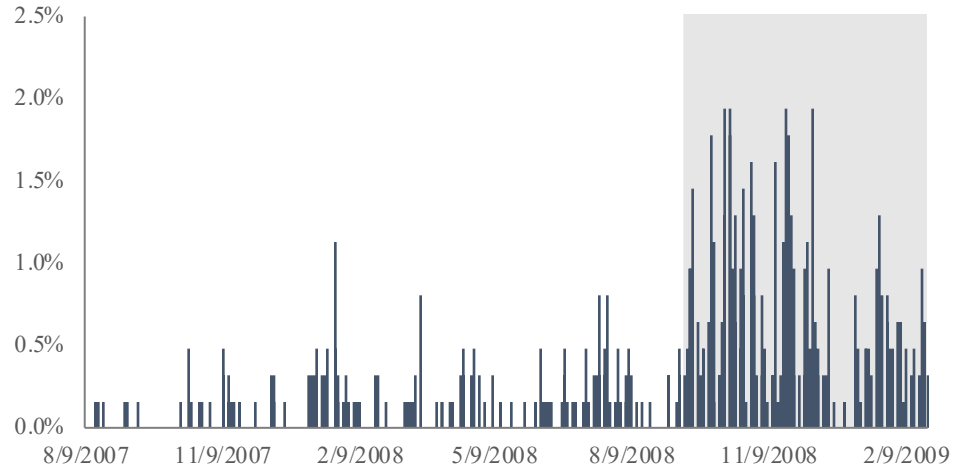


FGLS

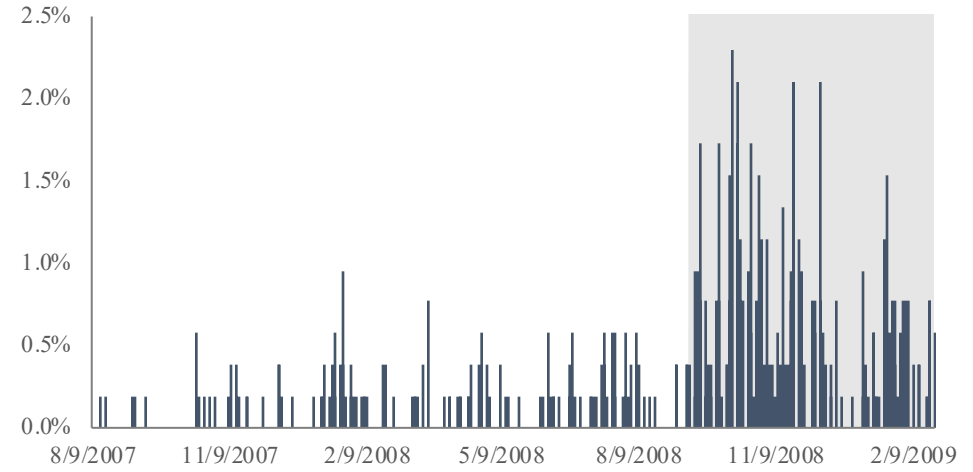
Rolling Window Estimation



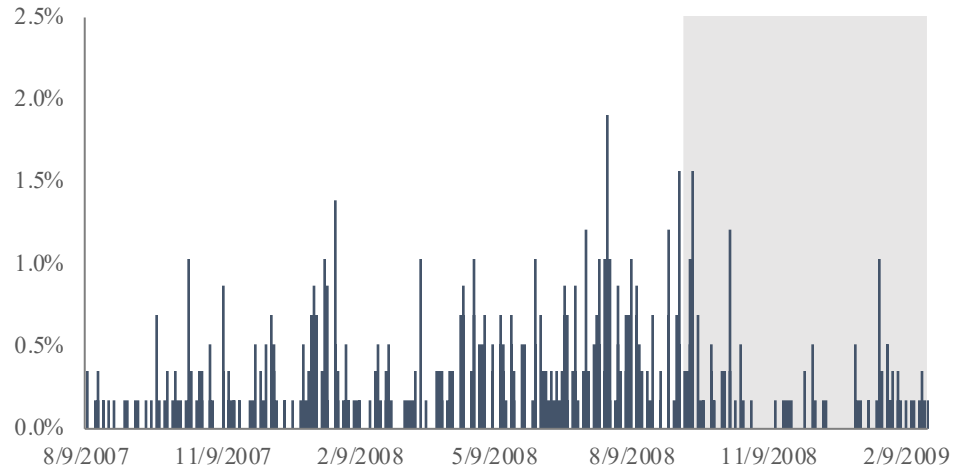
OLS Regression



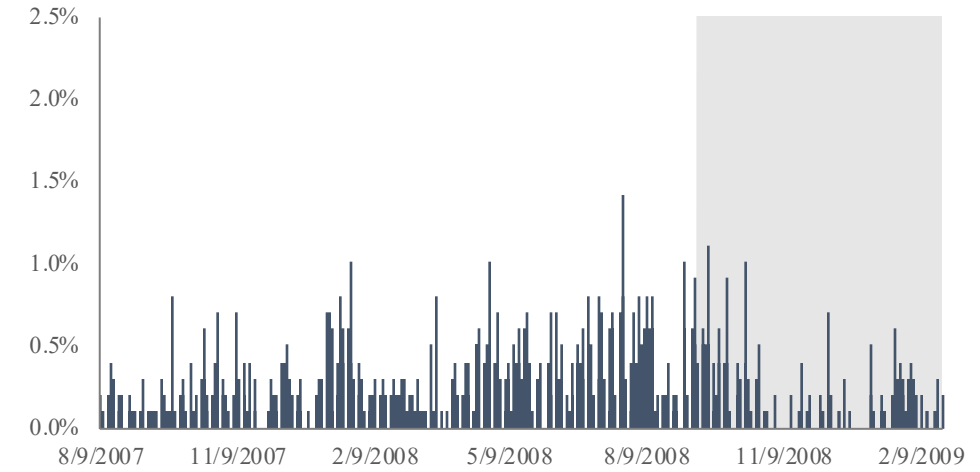
SQ Test



OLS With VIX Adjustment



FGLS



Type 2 Errors

Rejection Frequencies - (1% Abnormal Return)

	Pre-period	Rolling Window	In-Sample
Standard OLS	36.6%	24.5%	10.7%
SQ Test	42.9%	29.5%	13.2%
VIX-Adjusted OLS	9.9%	14.1%	15.5%
FGLS	12.5%	18.0%	22.9%

Rejection Frequencies - (3% Abnormal Return)

	Pre-period	Rolling Window	In-Sample
Standard OLS	85.2%	75.3%	57.3%
SQ Test	87.5%	78.5%	62.4%
VIX-Adjusted OLS	50.4%	61.1%	60.7%
FGLS	57.2%	67.3%	69.0%

Rejection Frequencies - (5% Abnormal Return)

	Pre-period	Rolling Window	In-Sample
Standard OLS	96.6%	92.6%	84.7%
SQ Test	97.1%	93.5%	86.8%
VIX-Adjusted OLS	78.3%	84.4%	82.0%
FGLS	82.1%	87.8%	86.1%

Rejection Frequencies - Financial Crisis Period

	Pre-period	Rolling Window	In-Sample
Standard OLS	22.5%	10.3%	5.3%
SQ Test	22.6%	9.9%	4.6%
VIX-Adjusted OLS	4.4%	4.7%	5.1%
FGLS	5.1%	6.0%	9.1%

Conclusion

- Standard model event studies don't adequately incorporate volatility.
- This likely violates the Daubert Standard for admissibility.
- Meta critique on sloppy social science and the law
 - Law → Empirics
 - Empirics → Law
- Judicial Acceptance of Empirical Evidence