

Business Cycle Variation in Short Selling Strategies: Picking During Expansions and Timing During Recessions

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Main idea

Short sellers stock pick during expansions and
market time during recessions

Why does this matter?

- ▶ Short sellers are key contributors to price efficiency
- ▶ Sophisticated traders are important monitors of the firm

Motivating Theory: Rational Attention

Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016)

- ▶ Collect either firm specific or macroeconomic signal
- ▶ What you pay attention to is determined by the volatility of the signal with more attention paid to more volatile signals
- ▶ During recessions, when the macro signal is more volatile, more information is paid to macro signals
- ▶ Prediction: Investors will collect more **firm specific information during expansions** and **macro-economic information during recessions**

Motivating Theory: Rational Attention

Economic activity itself produces information

- ▶ (Veldkamp (2005), Van Nieuwerburgh and Veldkamp (2006))
- ▶ More information production during expansions means more opportunity for sophisticated traders to exploit their advantages
- ▶ Prediction: Better stock picking during expansions

Motivating Theory: Overconfidence

Overconfidence leads to mispricing

- ▶ Traders are more likely to be overconfident during expansions when markets are on average going up
- ▶ Overconfidence \Rightarrow mispricing
 \Rightarrow opportunities to exploit mispricing
- ▶ Prediction: Stock picking is more profitable during expansions

Primary Data

- ▶ Compustat Bi-Monthly Short Interest Data
 - ▶ NYSE and AMEX Securities January 1973-December 2017
 - ▶ Nasdaq January 2004-December 2017
 - ▶ Nasdaq Data from June 1988-December 2003 is obtained directly from Nasdaq's website
 - ▶ Limit to mid-month observation for whole time series
 - ▶ Compute SIR for each stock each month
 - SIR = short interest/shares outstanding

Short interest ratio

$SIR = \text{short interest} / \text{shares outstanding}$

Compute SIR for each stock each month

Stock Returns Data

▶ CRSP filters

- ▶ Common stocks (share code 10 and 11)
- ▶ Traded for at least 1 year
- ▶ Delisting adjust returns
- ▶ Non-missing: shares outstanding, returns, price, trading volume

Stock picking tests

- ▶ Each month sort stocks according to SIR
 - ▶ Stocks in the lowest 1%, 5%, and 10% are lightly shorted stocks
 - ▶ Stocks in the highest 90%, 95%, and 99% are highly shorted stocks
- ▶ One-, and three-month equal weighted calendar time portfolios which long lightly shorted stocks and short highly shorted stocks are created beginning in month $t+1$
 - ▶ 10%-90%
 - ▶ 5%-95%
 - ▶ 1%-99%

Does the alpha of the long-short portfolio vary systematically with the business cycle?

Risk adjusting the alphas

- ▶ Based on the Carhart 4-factor model
 - ▶ (MKRF, SMB, HML, MOM)

$$r_t^{SIR\%} = \alpha + \beta^{MKRF} MKRF_t + \beta^{SMB} SMB_t + \beta^{HML} HML_t + \beta^{MOM} MOM_t + \varepsilon_t$$

Risk adjusting the alphas

- ▶ Important to allow factor loadings for the portfolios to be time varying

$$r_t^{SIR\%} = \alpha + \beta^{MKRF} MKRF_t + \beta^{SMB} SMB_t + \beta^{MKRF} HML_t + \beta^{MOM} MOM_t + \varepsilon_t$$

1. Stocks with different factor loadings are consistently entering and exiting the portfolio
2. Account for time series variation in factor loadings themselves

Risk adjusting the alphas

- ▶ For each stock each month, we estimate a 4-factor regression using 60 months of data
(τ goes from $t-59$ to t)

$$r_{\tau}^i = \alpha + \beta_{i,t}^{MRKF} MKRF_{\tau} + \beta_{i,t}^{SMB} SMB_{\tau} + \beta_{i,t}^{HML} HML_{\tau} + \beta_{i,t}^{MOM} MOM_{\tau} + \varepsilon_{\tau}$$

- ▶ Save the estimated factor loadings from these regressions as that stock's factor loadings for month t

Compute each stock's risk adjusted alpha each month

$$\alpha_{i,t} = r_t^i - \beta_{i,t}^{MRKF} MKRF_t - \beta_{i,t}^{SMB} SMB_t - \beta_{i,t}^{HML} HML_t - \beta_{i,t}^{MOM} MOM_t$$

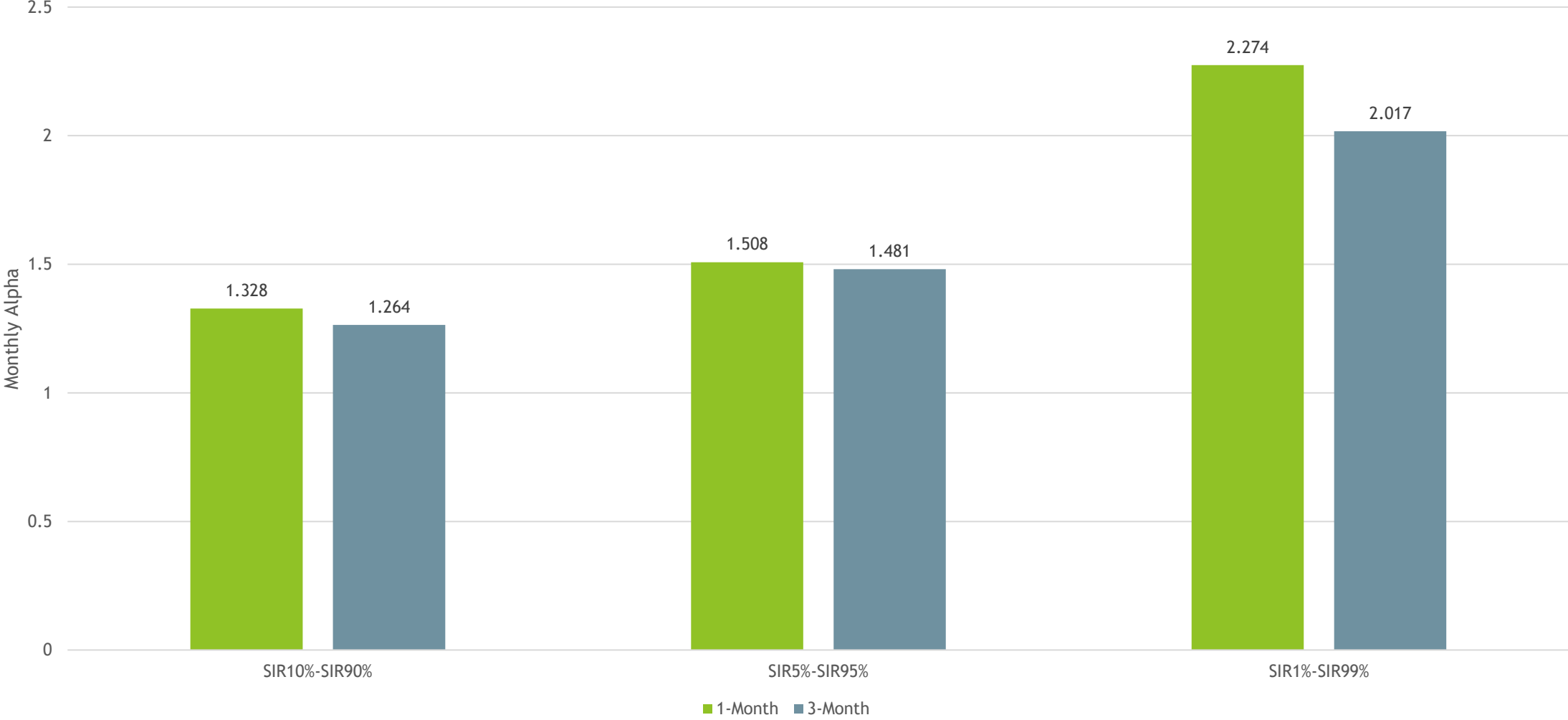
Compute the time varying 4-factor risk adjusted portfolio alpha

$$\alpha_t^{SIR\%} = \sum_{i=1}^k \omega_i \alpha_{i,t}$$

Portfolio alpha



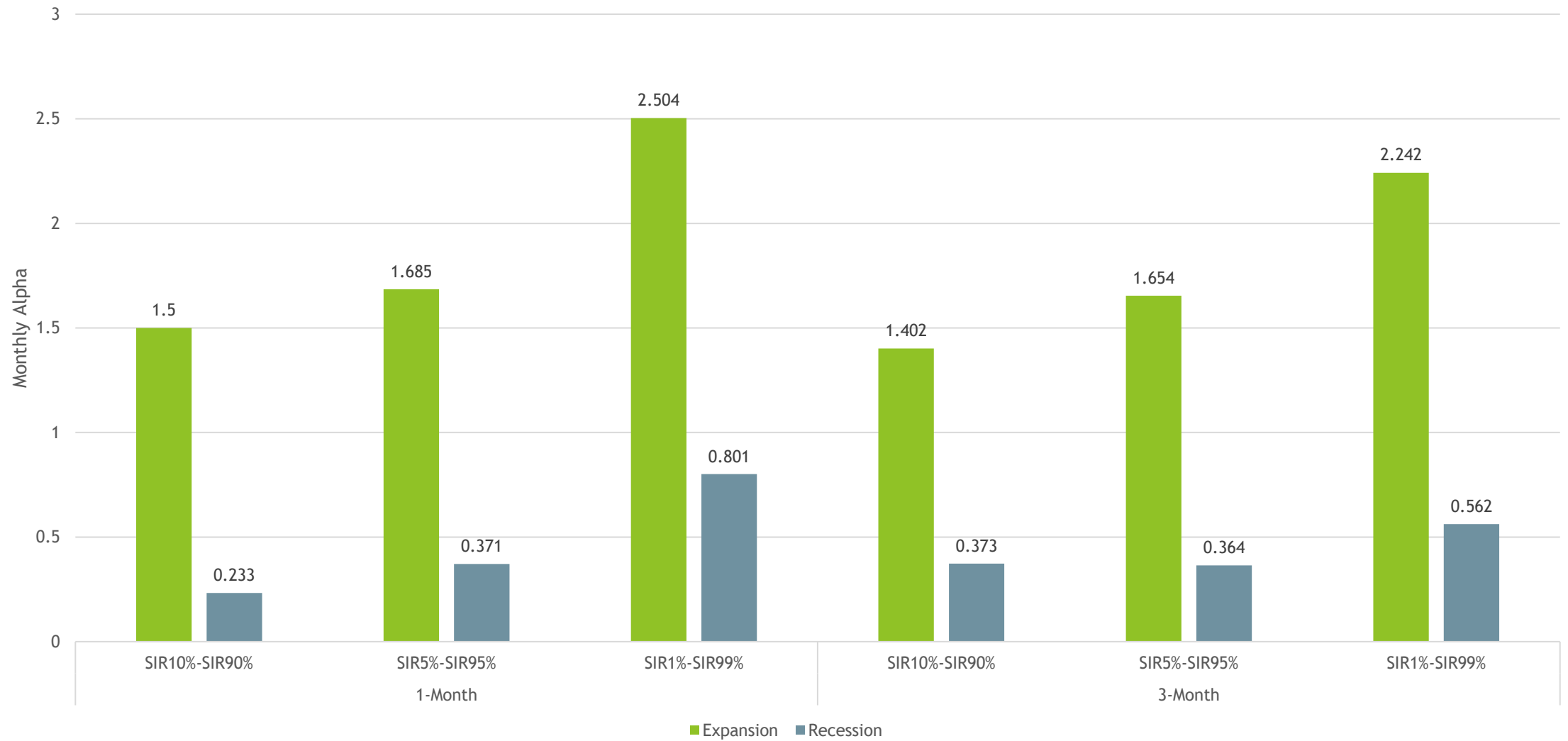
Adjusted 4-factor long-short alpha



Recession and alpha

- ▶ Measure alphas during expansions and recessions

Stock Picking During Expansions and Recessions

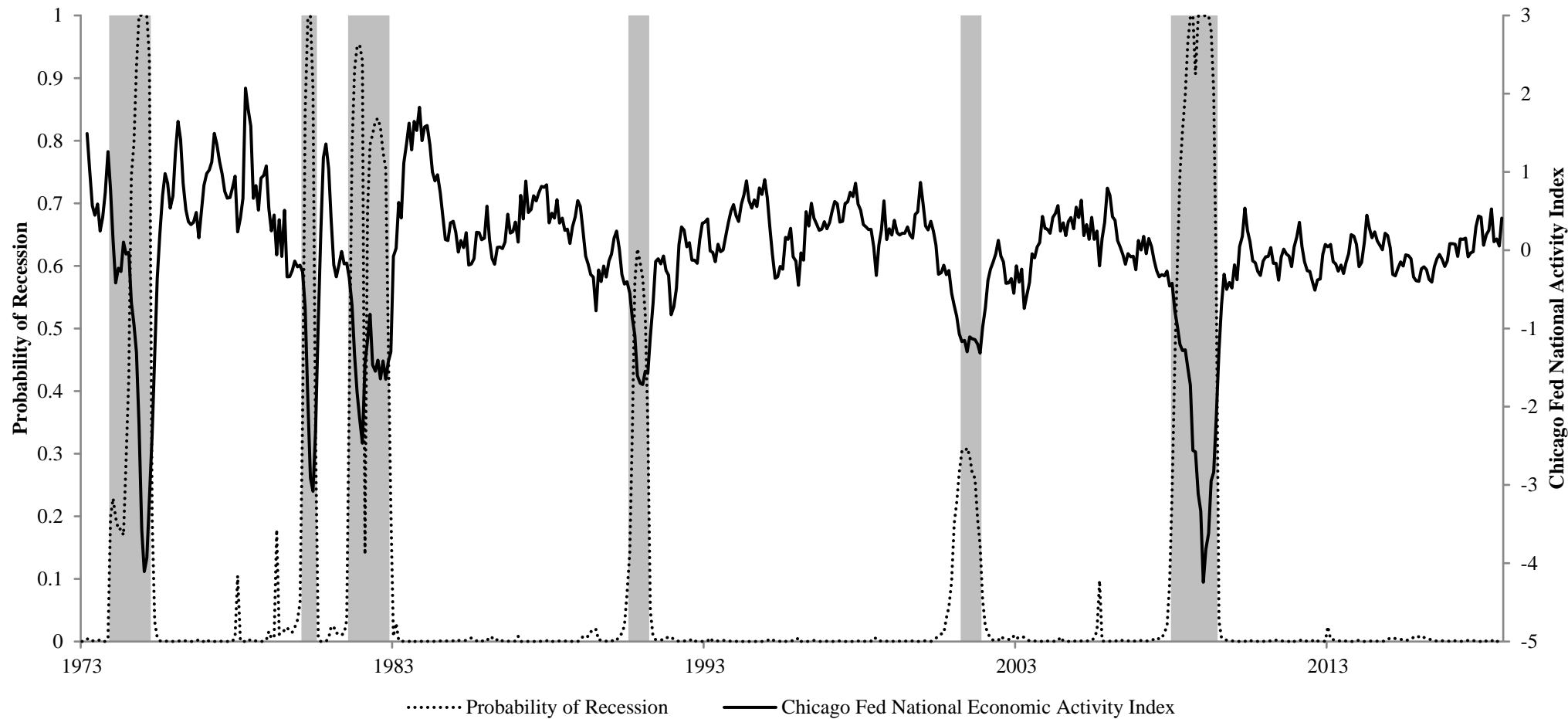


Robustness

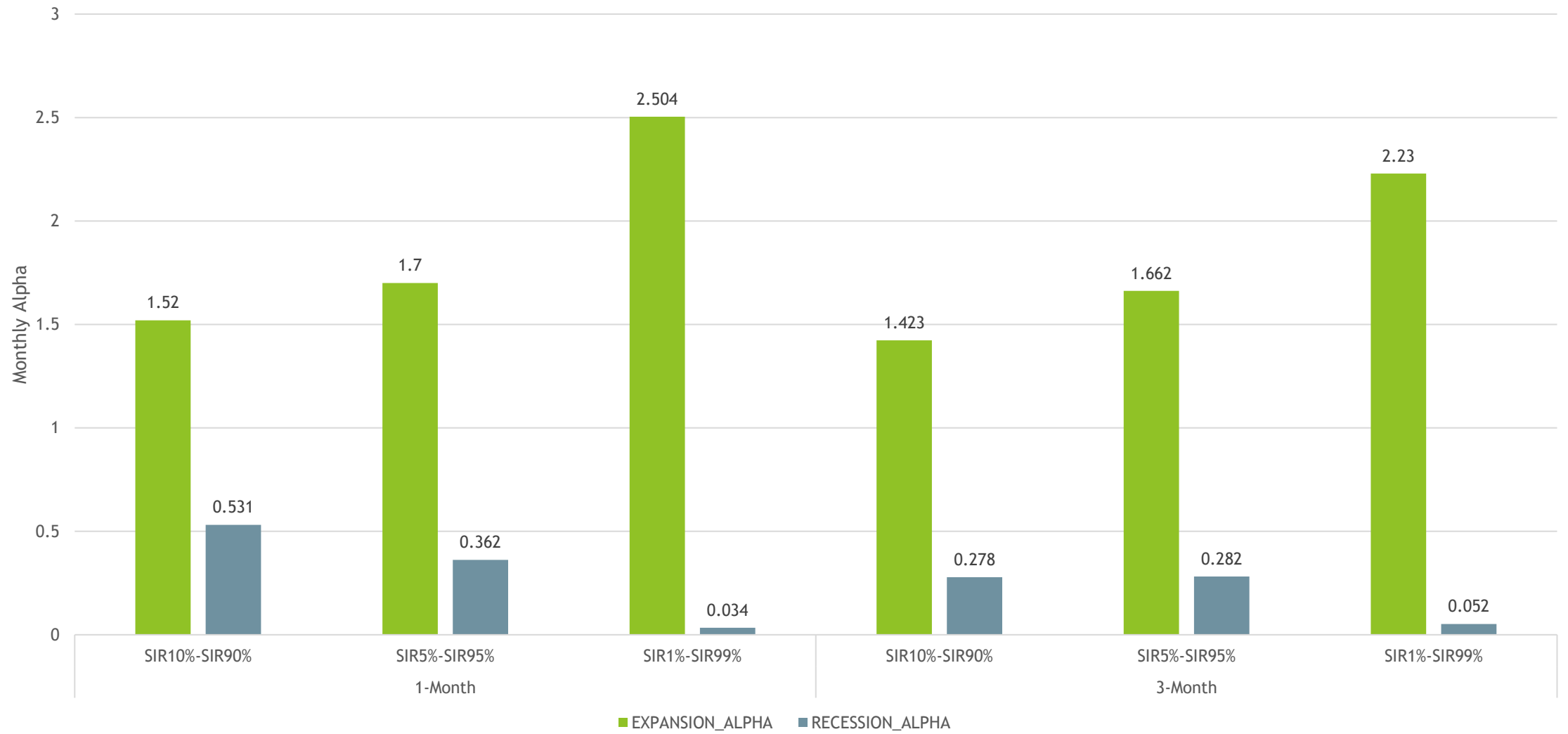
NBER recessions are determined by committee after the fact, are there recession measures that are based on more real time data?

- ▶ Chauvet and Piger (2008): $P(\text{Recession})$
- ▶ Index based on the Chicago Fed National Economic Activity Index: (CFNAI)

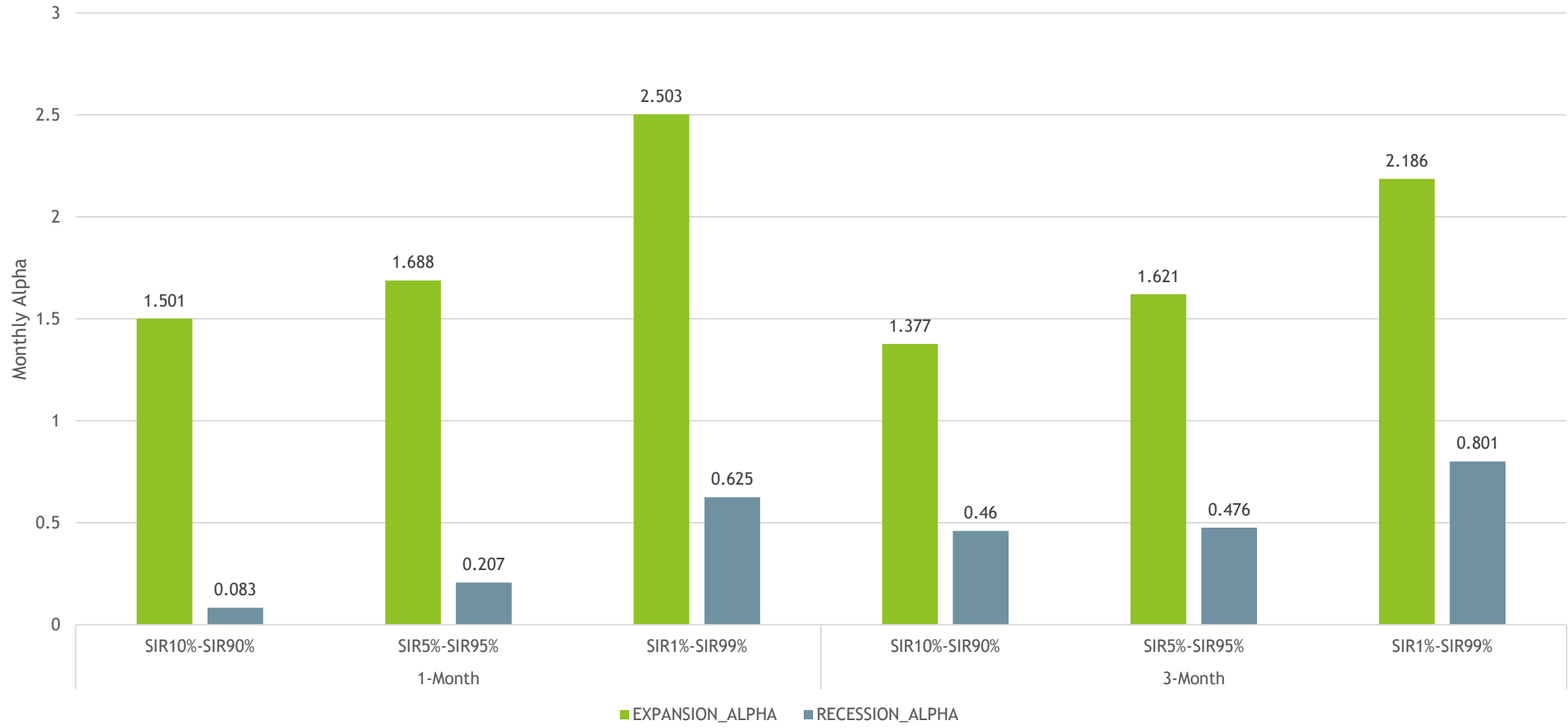
Alternative risk adjustment models



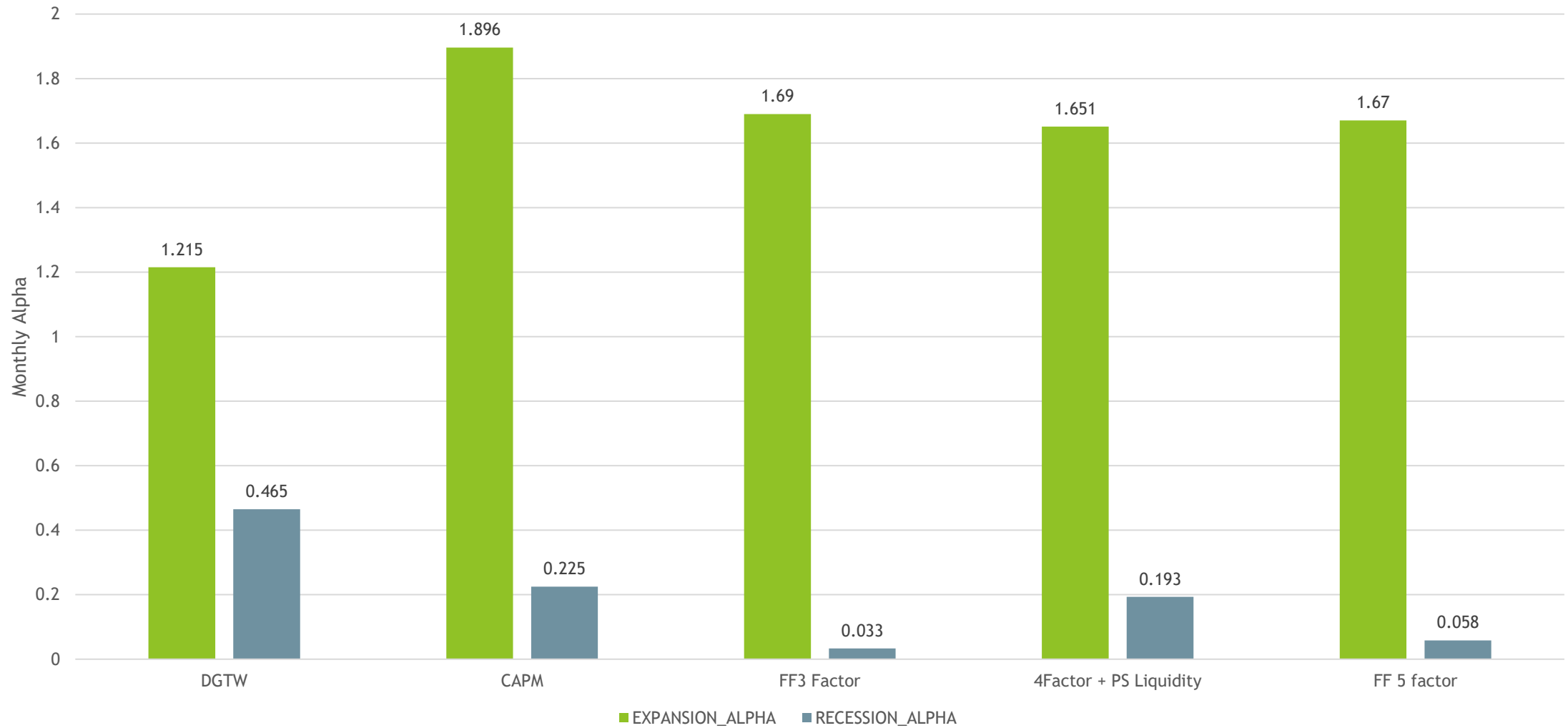
Robustness P(Recession)



Robustness CFNAI



Alternate Risk Adjustment Methodology



Short Interest and Earnings Announcements

- ▶ SIR portfolios are indirect
- ▶ Look at a specific piece of information and see if short interest does a better job predicting that

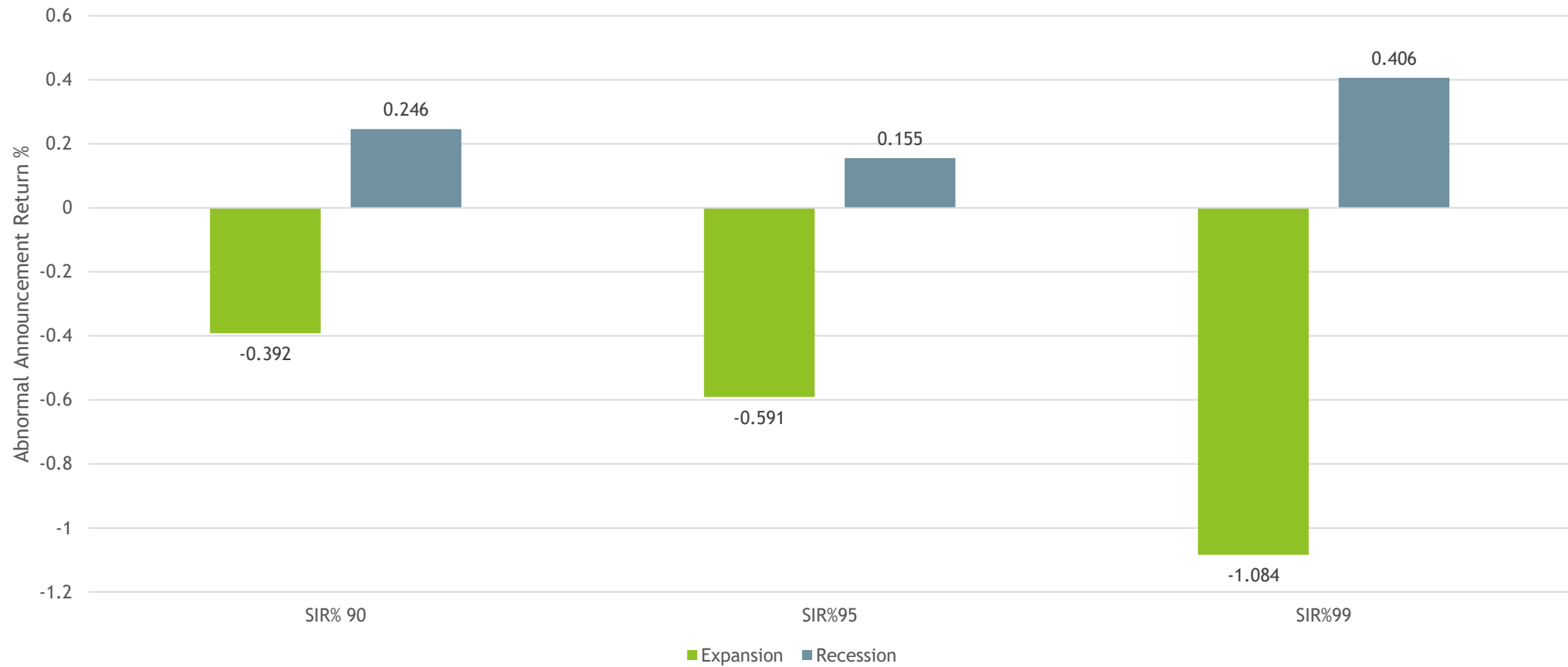
Short Interest and Earnings Announcements

- ▶ Collect quarterly earnings announcements dates for all firms in Compustat and IBES
- ▶ Compute three day CRSP value-weighted adjusted returns ($t-1$ to $t+1$)
- ▶ High short interest stocks are determined based on the most recent mid-month short interest observation

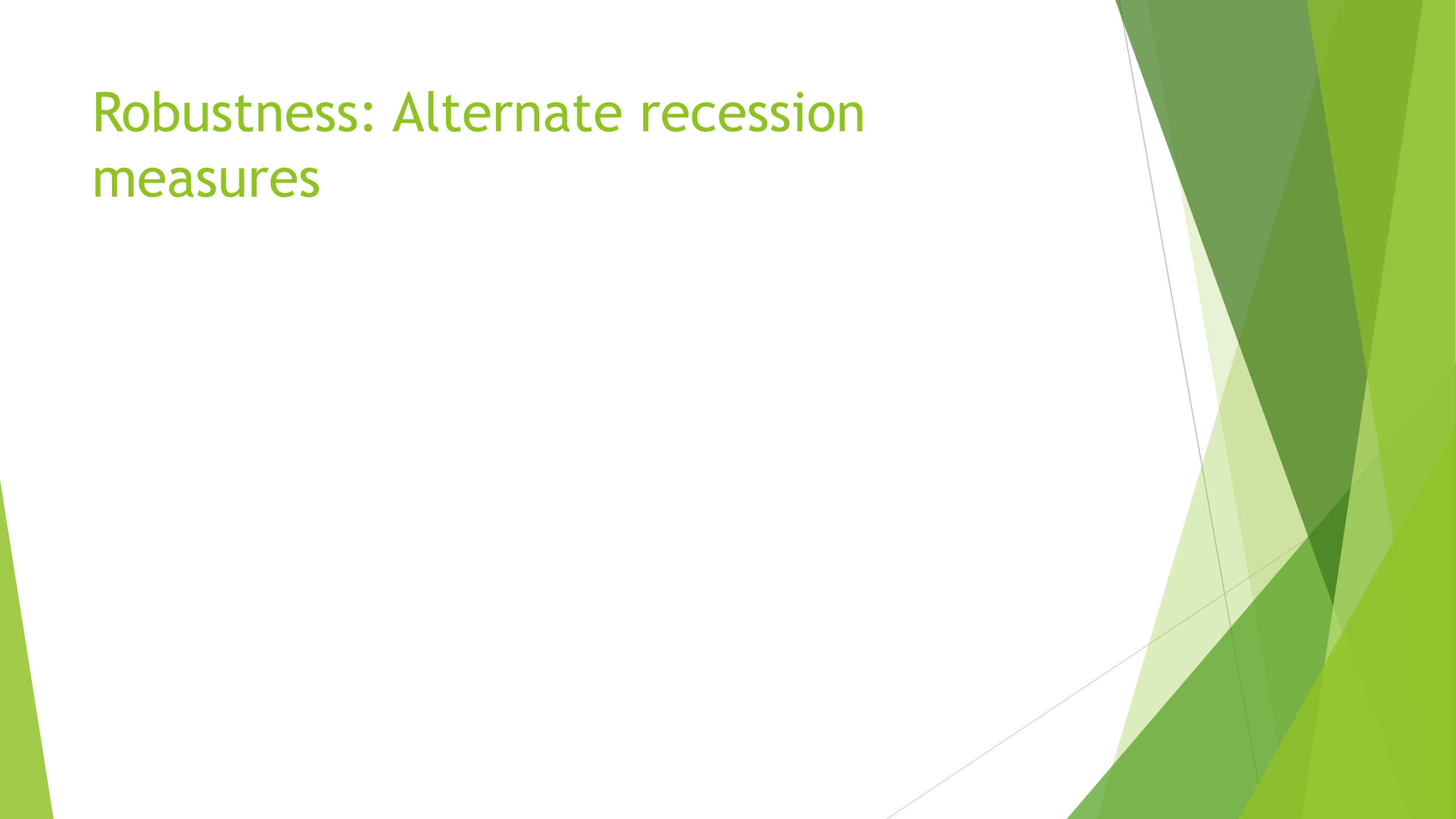
Short Interest and Earnings Announcements

- ▶ Does high short interest negatively predict announcement returns stronger during expansions?

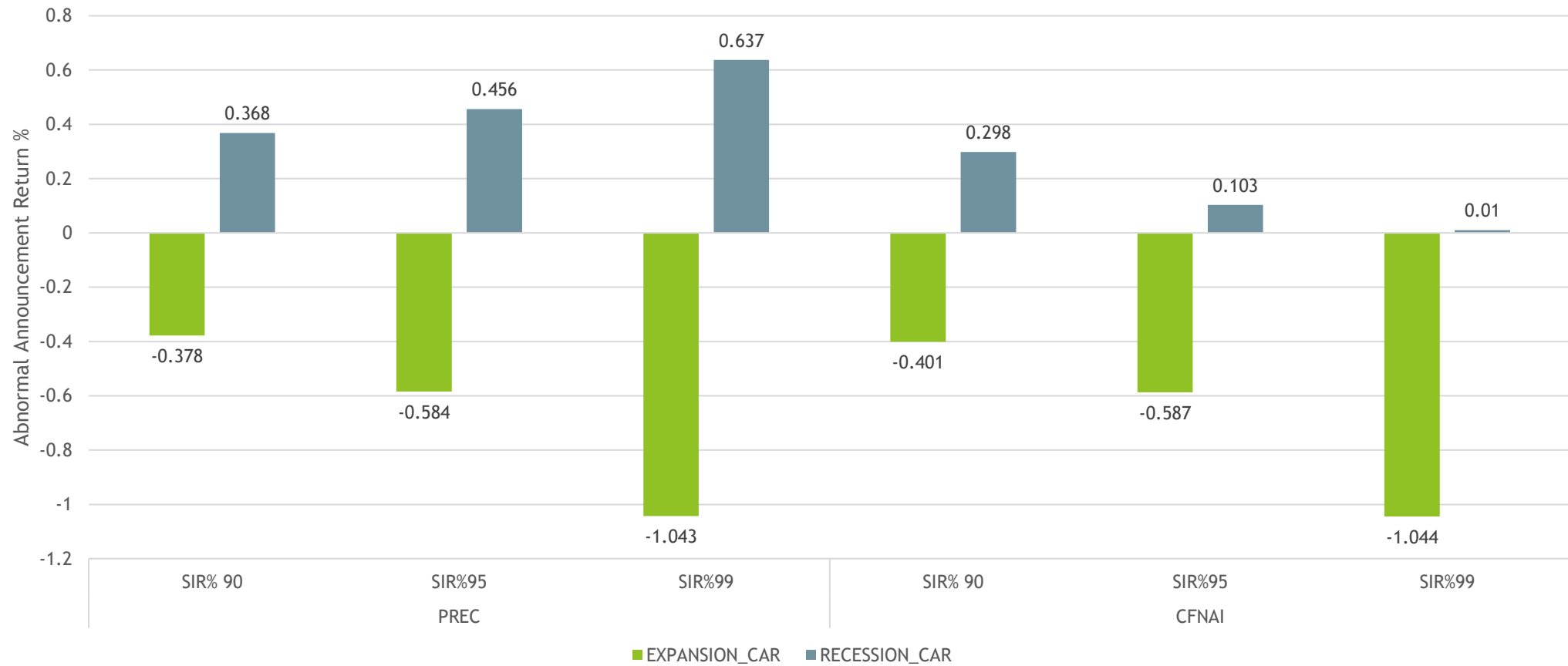
Earnings Announcements



Robustness: Alternate recession measures



Earnings Announcements Robustness



What are short sellers doing during recessions?

- ▶ Weaker cross-sectional predictability during recessions doesn't immediately imply that short sellers switch to market timing during recessions
- ▶ It could simply be that stock picking is simply harder during recessions, or that short sellers drop participation
 - ▶ Schmalz and Zhuk(2018) information releases have a bigger market impact during recessions

An alternative explanation

- ▶ Short sellers are collecting and trading on macro-economic signals
 - ▶ Public announcements would have a greater impact because less of that information would have already been incorporated into prices
 - ▶ Consistent with Loh and Stulz (2018)
 - ▶ Implies that short interest should resemble a market timing strategy during recessions

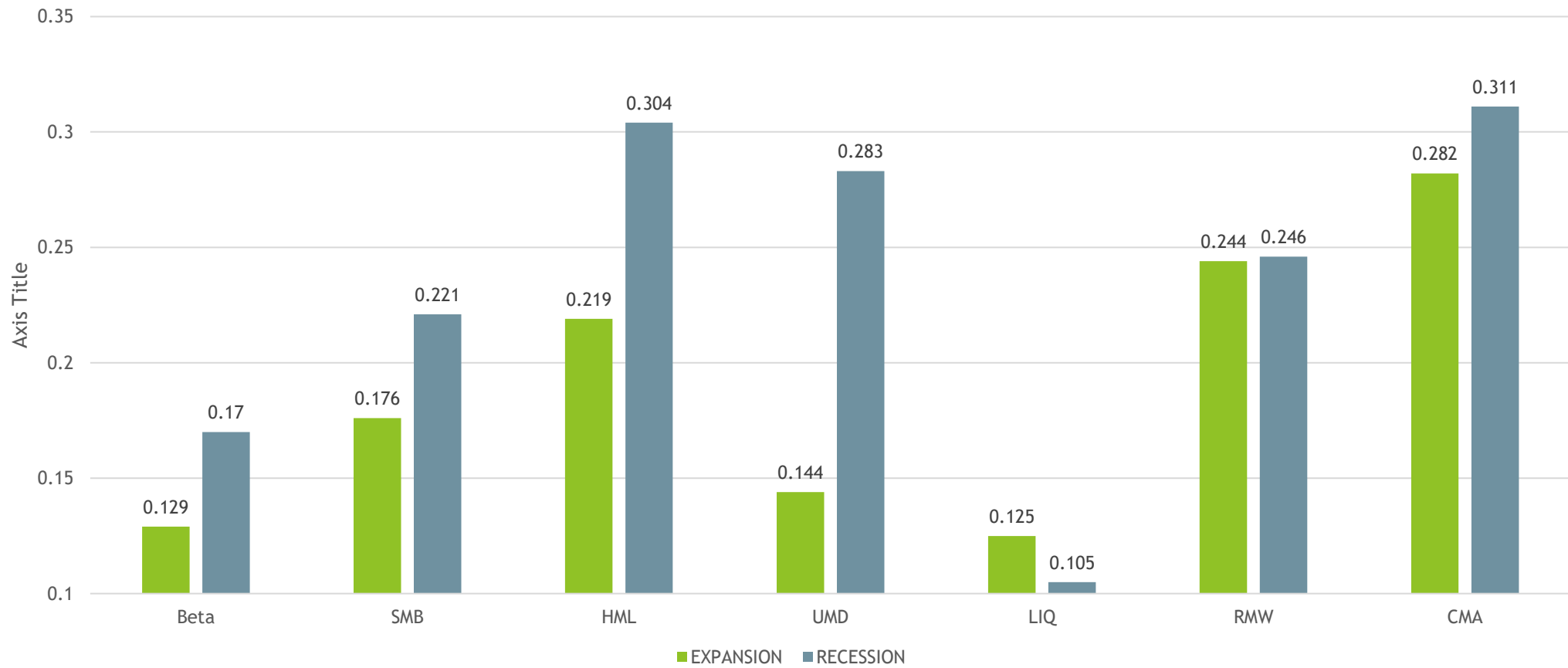
Market timing: three predictions

1. The volatility of time series of the average factor loading (e.g. beta) of the high short interest portfolio will increase during recessions
2. The dispersion of factor loadings (e.g. beta) for stocks in the high short interest portfolio will decrease
3. The high short interest portfolio will resemble a factor timing strategy (e.g. the beta of the portfolio will predict aggregate stock returns)

Market timing: three predictions

1. The volatility of time series of the average factor loading (e.g. beta) of the high short interest portfolio will increase during recessions
 - ▶ Sensier and van Dijk (2004) test for constant volatility of the timeseries of average factor loading for stocks in the SIR95% portfolio

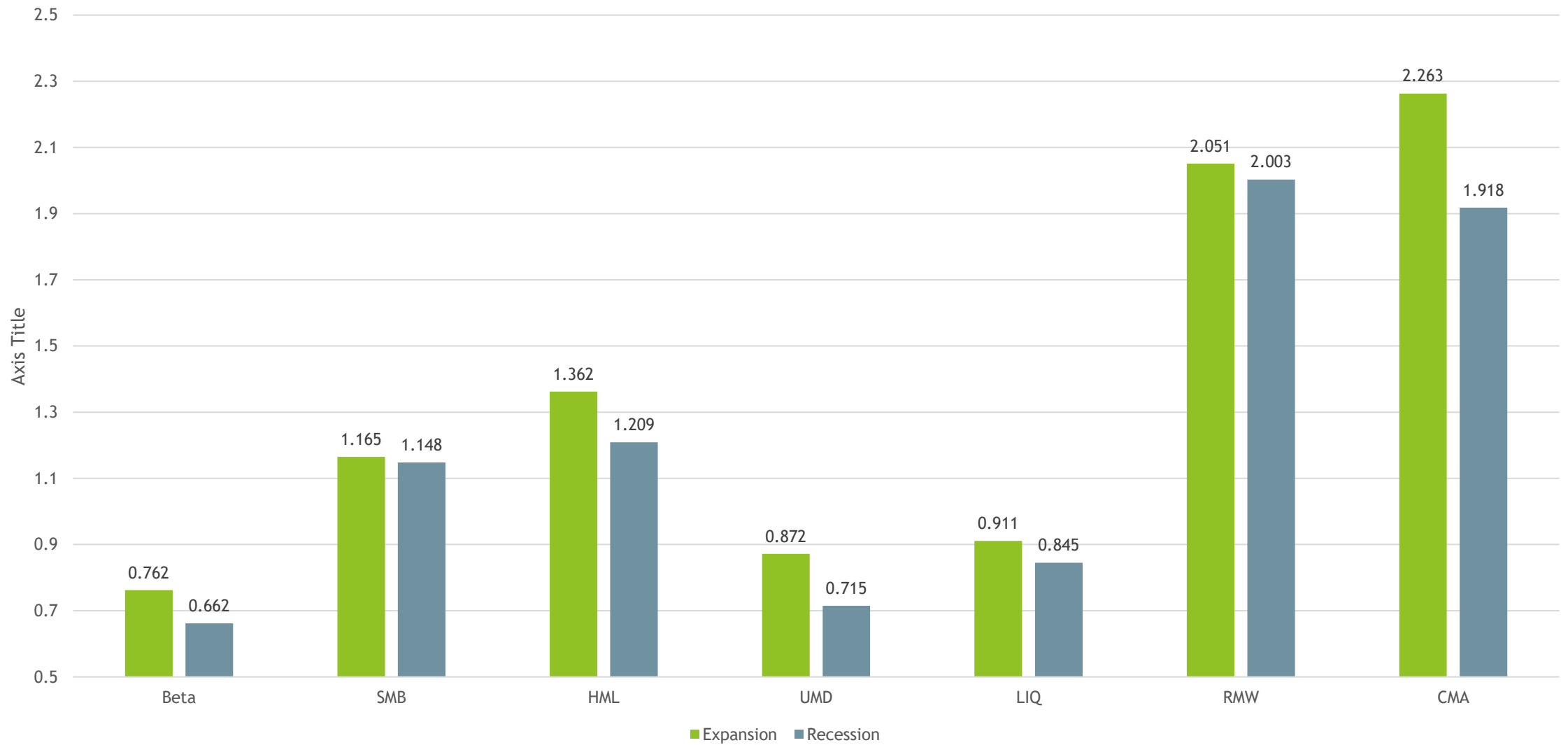
Volatility of the Time Series



Market timing: three predictions

2. The dispersion of factor loadings (e.g. beta) for stocks in the high short interest portfolio will decrease
 - ▶ Create a time series of the standard deviation of factor loadings (e.g. beta) for stocks in the high short interest portfolio
 - ▶ Test whether the standard deviation goes down during recessions

Dispersion



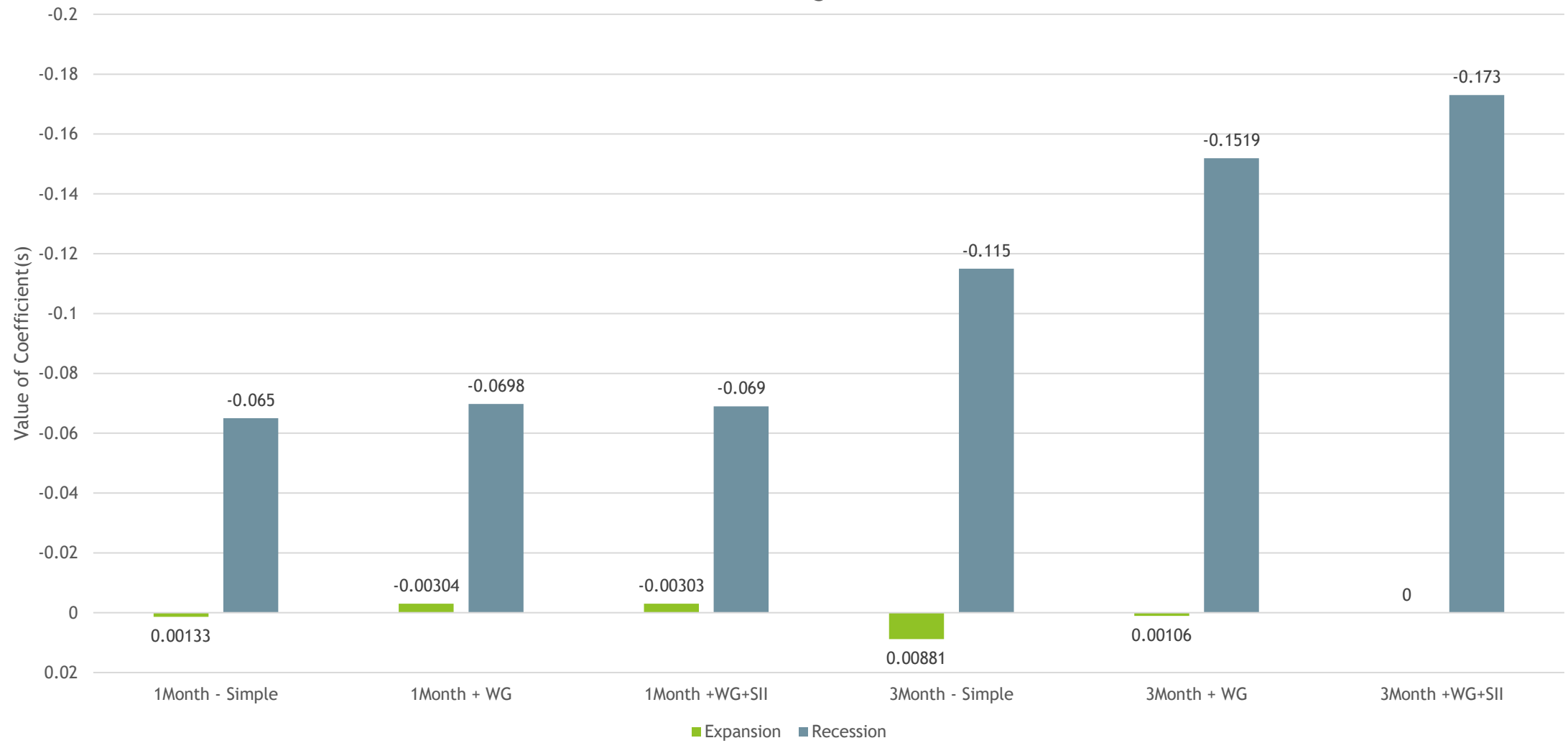
Market timing: three predictions

3. The high short interest portfolio will resemble a factor timing strategy (e.g. the beta of the high short interest portfolio will predict aggregate stock returns)

Short Selling Beta Index

- ▶ Compute 3 month moving average of the time series of the average beta for the SIR95% portfolio
- ▶ Normalize it by subtracting the mean and dividing by the standard deviation
- ▶ Run regressions of the beta index on future market returns

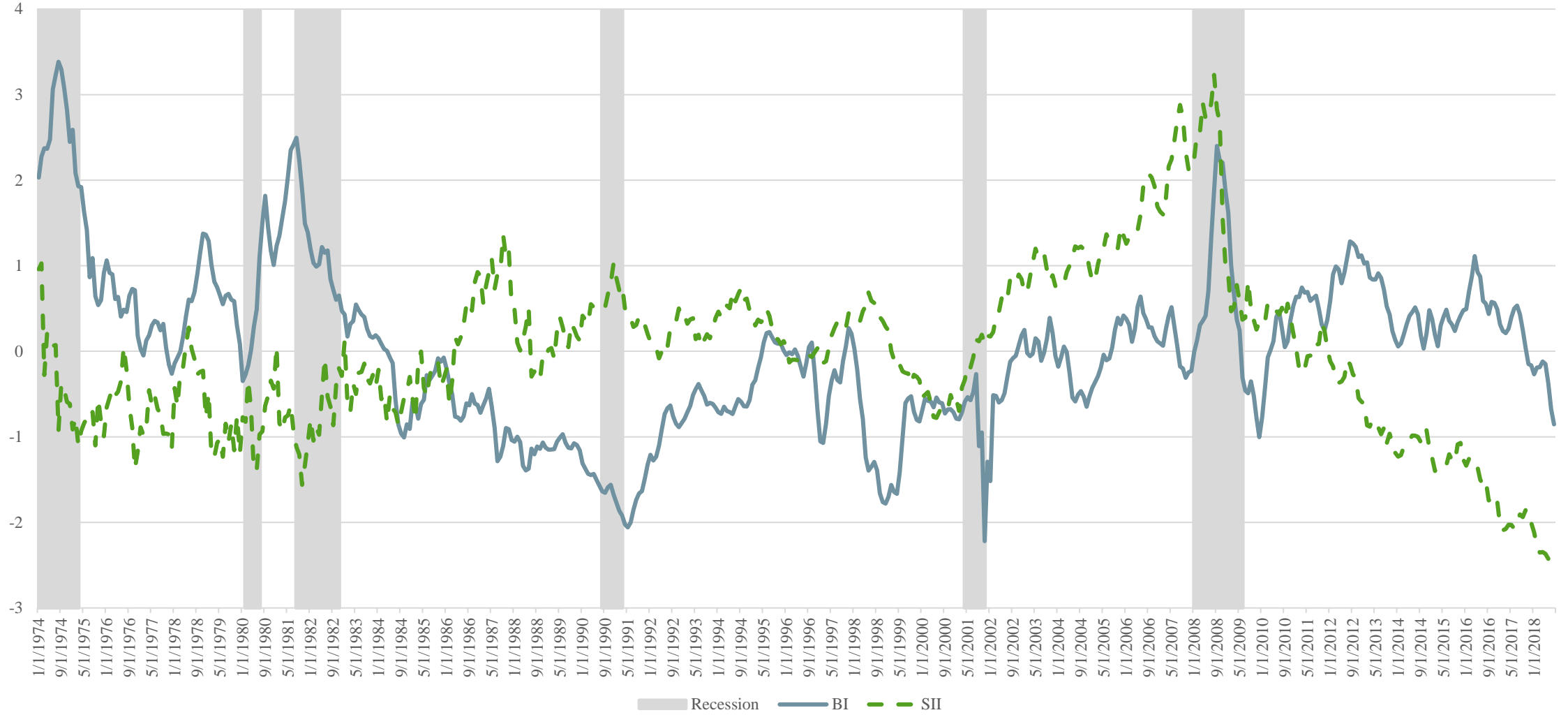
Market Timing



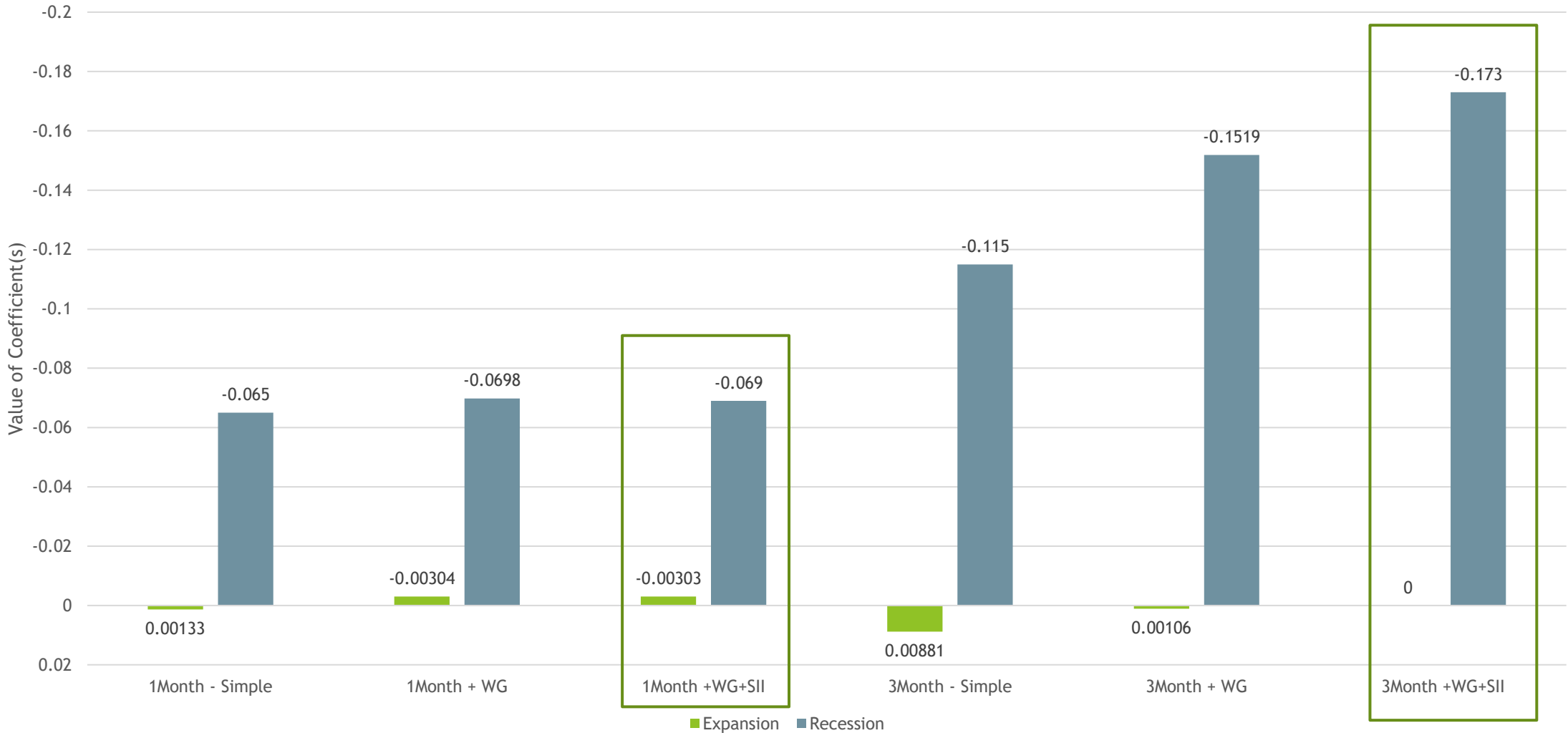
Short Selling Beta Index and SII

- ▶ Rapach, Ringgenberg, and Zhou (2016) propose a short interest index (SII) that they argue is perhaps the best predictor for aggregate stock returns out there
- ▶ Are the Short Selling Beta Index and SII picking up the same thing?
- ▶ No

Short Interest and Beta Indices 1974-2017



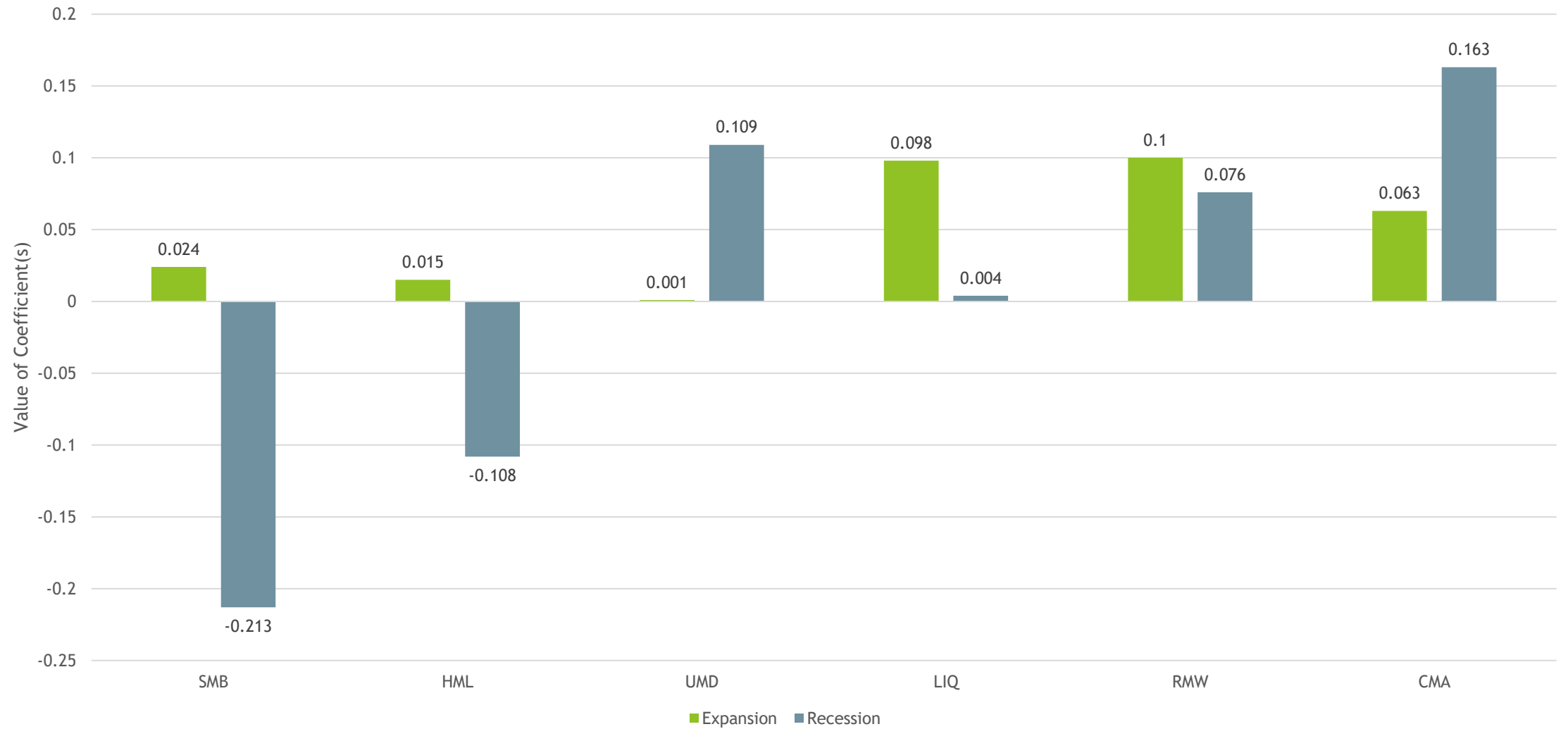
Market Timing



Are short sellers timing other factors?

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Market Timing Other Factors

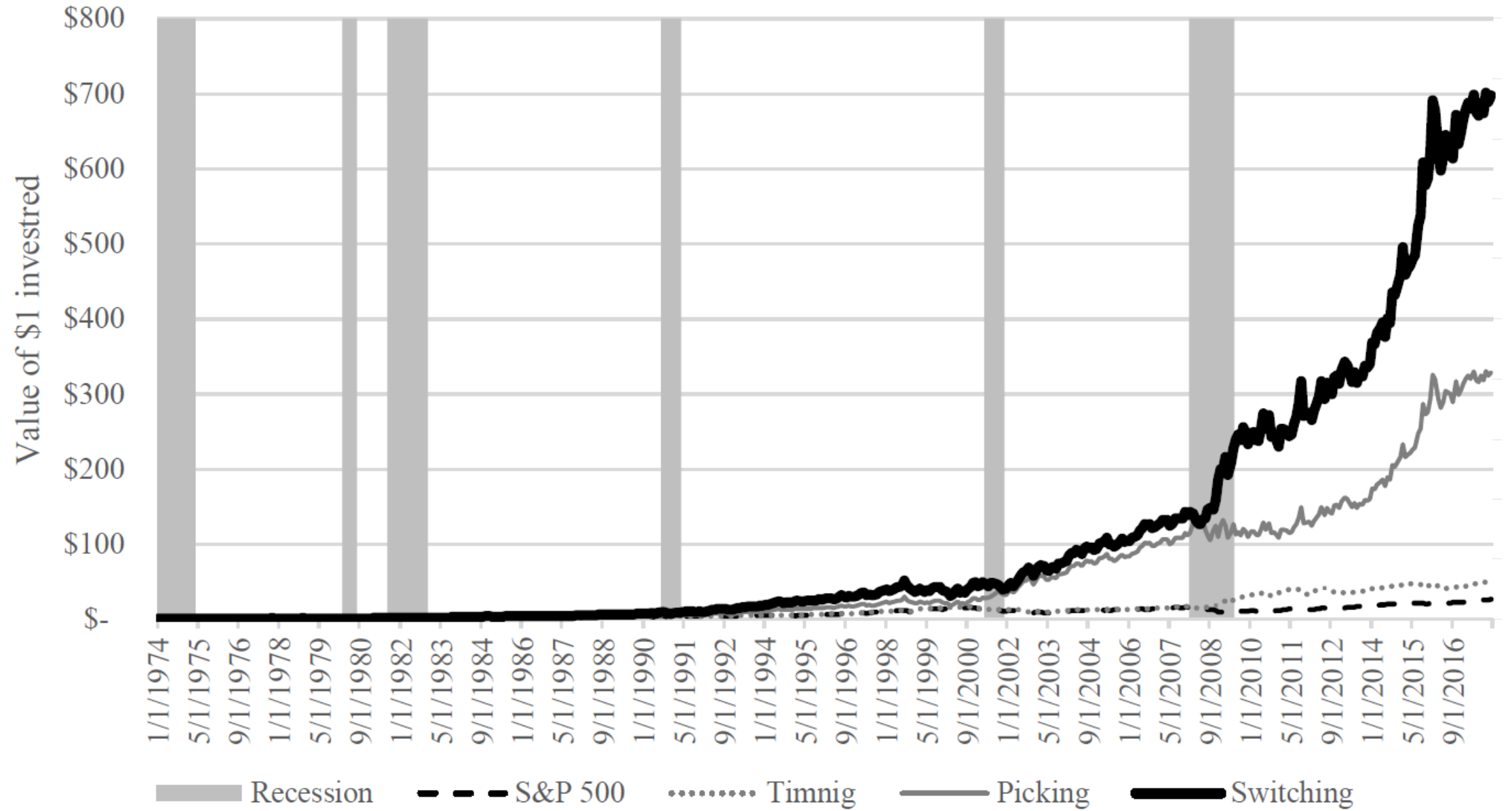


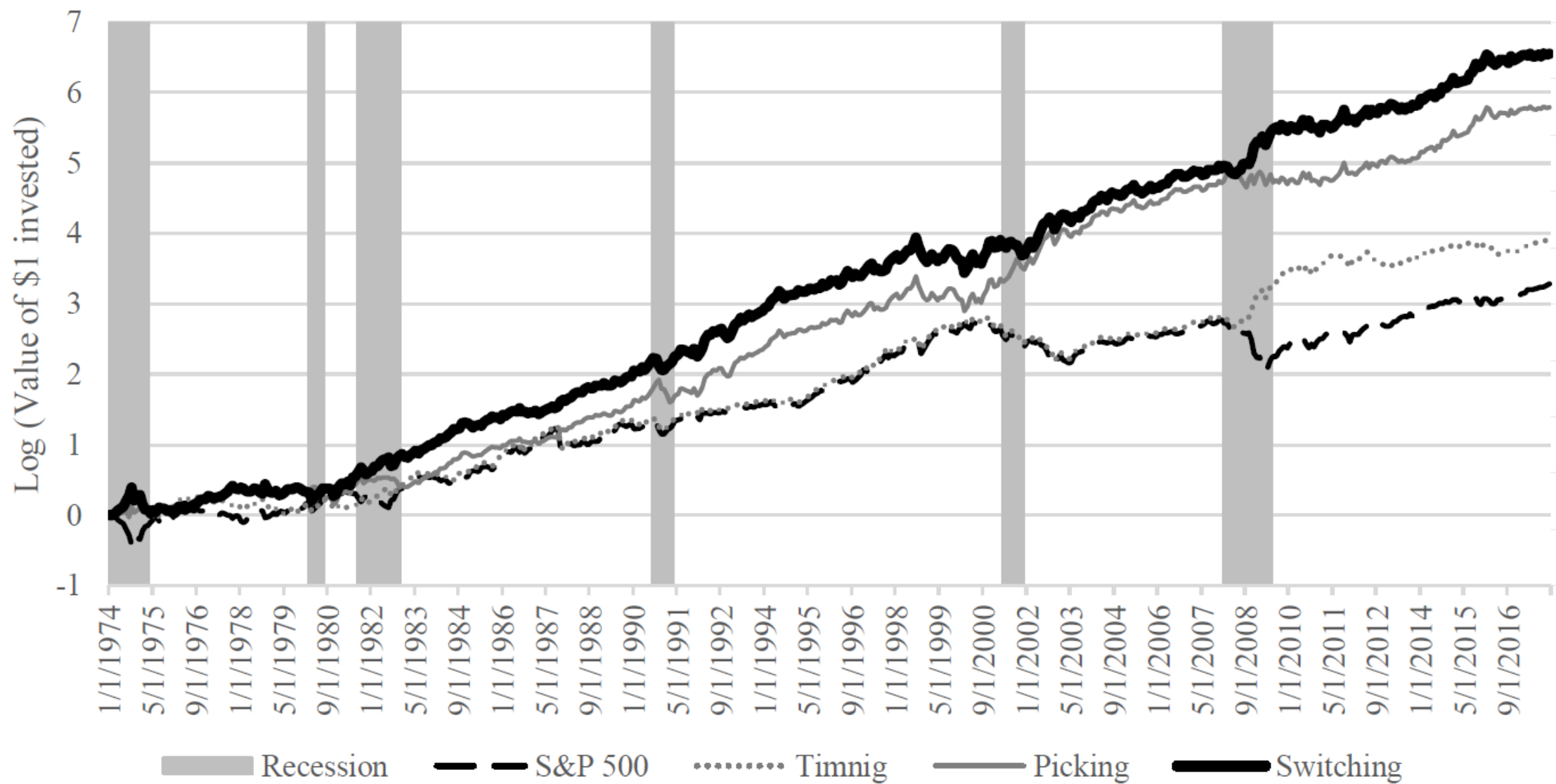
Concluding Thought Experiment

- ▶ Evidence suggests short sellers collect firm specific information during expansions and macro-economic information during recessions
- ▶ Is this optimal?

Four wealth paths: Jan 1974-Dec 2017

1. Market: Hold the SNP500
2. Stock Picking: Hold an equal weighted portfolio of the SIR95% portfolio
3. Market timing: short the SNP500 when Beta index exceeds 0.5 and long the SNP500 otherwise
4. Simple switching: switch between picking during expansions and timing during recessions





Takeaways

Evidence consistent with the hypothesis that short sellers collect firm-specific information during expansions and macro-economic information during recessions

- ▶ Are there opportunities to act countercyclically? i.e. to collect firm specific information during recessions and macro-economic information during expansions?
- ▶ Is monitoring weaker during recessions when investors are not collecting firm specific information?