Aalto University

Cross-Asset Signals and Time Series Momentum

By Aleksi Pitkäjärvi, Matti Suominen, and Lauri Vaittinen

Equity Returns by Equity Momentum Regime

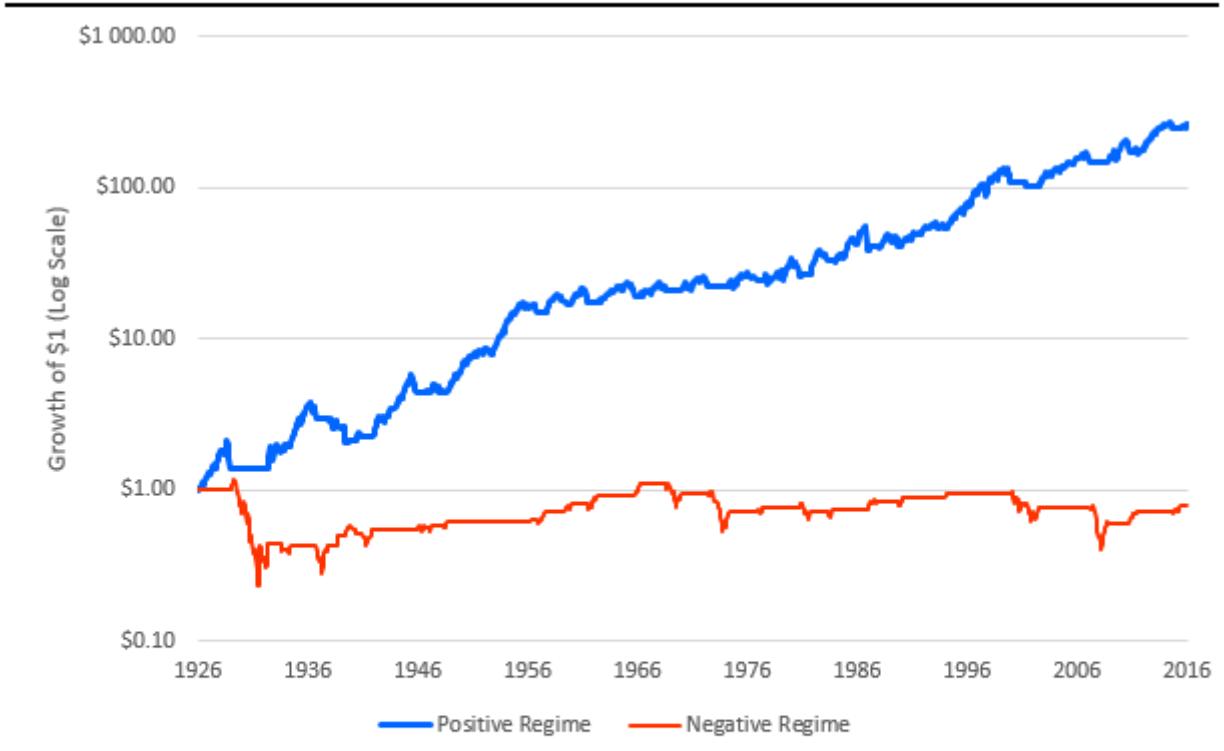


Figure 1: Cumulative Excess Equity Returns by Equity Momentum Regime

Plotted are the cumulative excess returns from holding the CRSP value-weighted index during positive or negative equity momentum regimes, and otherwise holding the risk-free asset. A month t belongs to a positive (negative) regime if the t - 12 to t - 1 cumulative CRSP value-weighted index return was positive (negative). The sample period is Dec-1926 to Dec-2016.

Equity Returns by Bond Momentum Regime

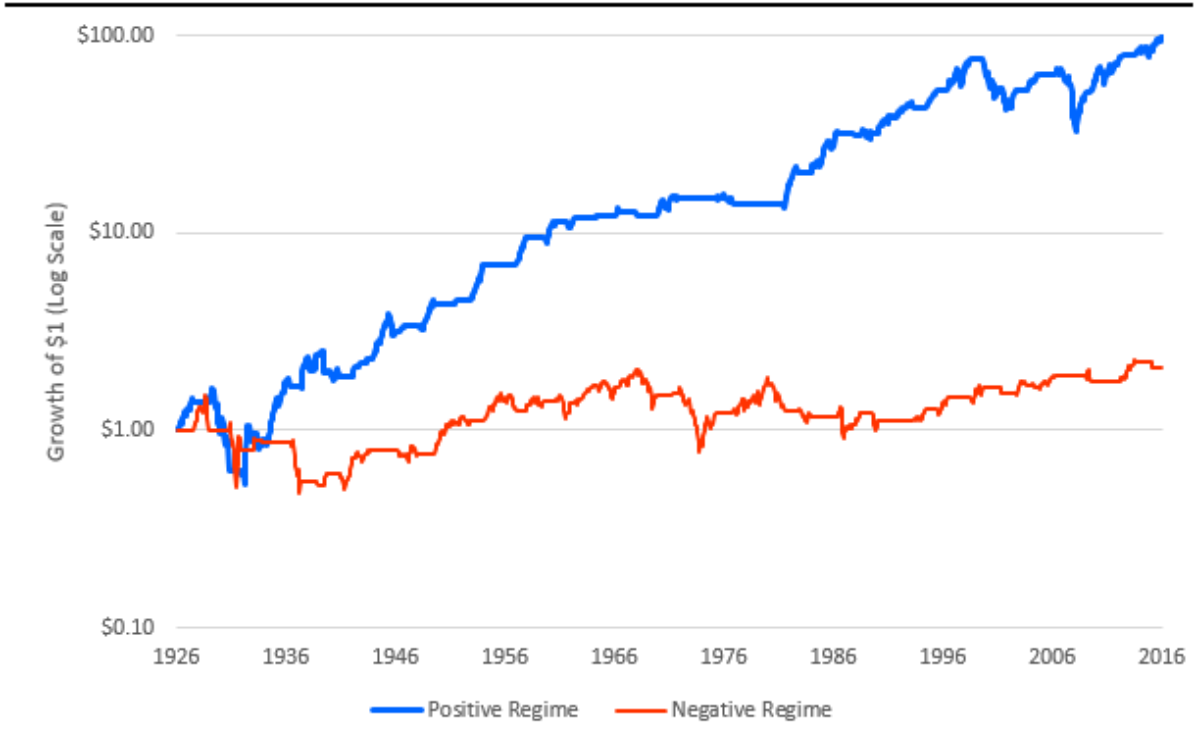


Figure 2: Cumulative Excess Equity Returns by Bond Momentum Regime

Plotted are the cumulative excess returns from holding the CRSP value-weighted index during positive or negative bond momentum regimes, and otherwise holding the risk-free asset. A month t belongs to a positive (negative) regime if the t - 12 to t - 1 change in the long-term Treasury yield was negative (positive). The sample period is Dec-1926 to Dec-2016. Before Apr-1953 we manually collect the long-term Treasury yield from Federal Reserve Board (1976a, 1976b). From Apr-1953 the long-term Treasury yield is the ten-year constant maturity Treasury yield.

Equity Returns by Bond Momentum Regime

This exemplifies our main findings:

Momentum in bond market returns predicts future equity market returns

Similarly, momentum in equity market returns predicts future bond market returns

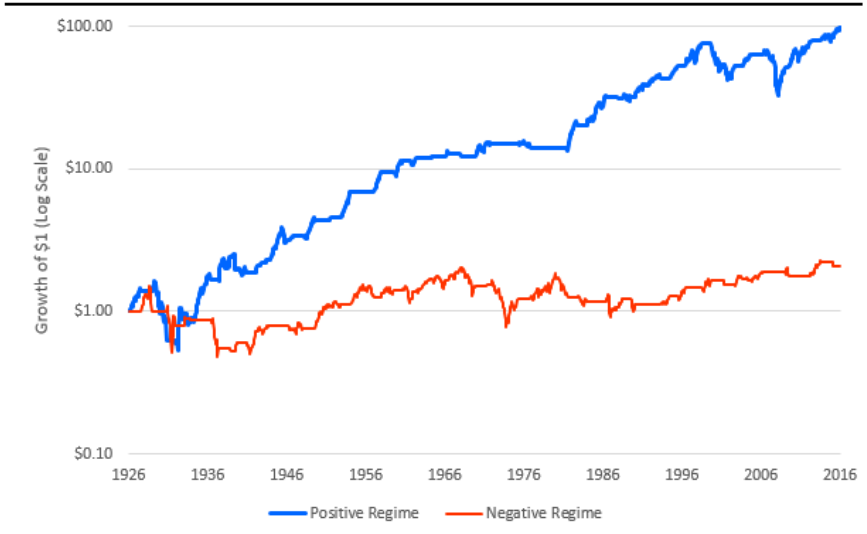


Figure 2: Cumulative Excess Equity Returns by Bond Momentum Regime

Plotted are the cumulative excess returns from holding the CRSP value-weighted index during positive or negative bond momentum regimes, and otherwise holding the risk-free asset. A month t belongs to a positive (negative) regime if the t - 12 to t - 1 change in the long-term Treasury yield was negative (positive). The sample period is Dec-1926 to Dec-2016. Before Apr-1953 we manually collect the long-term Treasury yield from Federal Reserve Board (1976a, 1976b). From Apr-1953 the long-term Treasury yield is the ten-year constant maturity Treasury yield.

Our Paper in a Nutshell

Past bond returns positively predict future equity returns, while past equity returns negatively predict future bond returns

Cross-asset time series momentum portfolios outperform traditional time series momentum portfolios

Past twelve-month bond and equity returns predict future changes in bond and equity demand, thus helping explain the returns to time series momentum strategies

Past twelve-month bond and equity returns contain information about future changes in economic conditions, thus linking time series momentum to real economic activity

Related Literature

Time series momentum

- Moskowitz, T. J., Ooi, Y. H., Pedersen, L. H., 2012. Time series momentum. Journal of Financial Economics 104, 228-250.

Frictions, slow-moving capital, and fund flows

- Constantinides, G. M., Donaldson, J. B., Mehra, R., 2002. Junior can't borrow: A new perspective on the equity premium puzzle. Quarterly Journal of Economics 117, 269-296.
- Duffie, D., 2010. Presidential address: Asset price dynamics with slow-moving capital. Journal of Finance 65, 1237-1267.
- Ben-Rephael, A., Kandel, S., Wohl, A., 2011. The price pressure of aggregate mutual fund flows. Journal of Financial and Quantitative Analysis 46, 585-603.
- Greenwood, R., Hanson, S. G., Liao, G. Y., 2016. Asset price dynamics in partially segmented markets. Working Paper.

Related Literature

Cross-asset spillovers in cross-sectional momentum

- Gebhardt, W. R., Hvidkjaer, S., Swaminathan, B., 2005. Stock and bond interaction: Does momentum spill over? Journal of Financial Economics 75, 651-690.
- Jostova, G., Nikolova, S., Philipov, A., Stahel, C. W., 2013. Momentum in corporate bond returns. Review of Financial Studies 26, 1649-1693.
- Lee, J., Naranjo, A., Sirmans, S., 2016. Related securities and the cross-section of stock return momentum. Working Paper.
- Geczy, C., Samonov, M., 2017. Two centuries of multi-asset momentum (Equities, bonds, currencies, commodities, sectors and stocks). Working Paper.

Forecasting macroeconomic variables

- Stock, J. H., Watson, M. W., 2003. Forecasting output and inflation: The role of asset prices. Journal of Economic Literature 41, 788-829.

Data

International data

- MSCI country-level equity total return indices
- Datastream Benchmark Government Bond total return indices
- JPMorgan 1-Month Cash total return indices

➢ Monthly data on 20 developed countries from 1980 to 2016

US data

- CRSP: value-weighted index returns, bond and equity mutual fund flows
- Datastream: US five-year government bond total return index returns
- SDC: stock repurchases and SEOs
- CFTC: speculator net length and open interest
- FRASER and NYSE: margin debt
- FRED: five-year Treasury yields, Fed Funds rates, unemployment rates, industrial production, inflation

Time Series Momentum (TSMOM) and Cross-Asset Time Series Momentum (XTSMOM)

Economic Drivers of TSMOM

Economic Drivers of XTSMOM

Relation to Economic Conditions

Conclusion

Single-Asset Time Series Predictability

$$r_t^s = \alpha + \beta_h \text{sign}(r_{t-h}^s) + \varepsilon_t^s$$

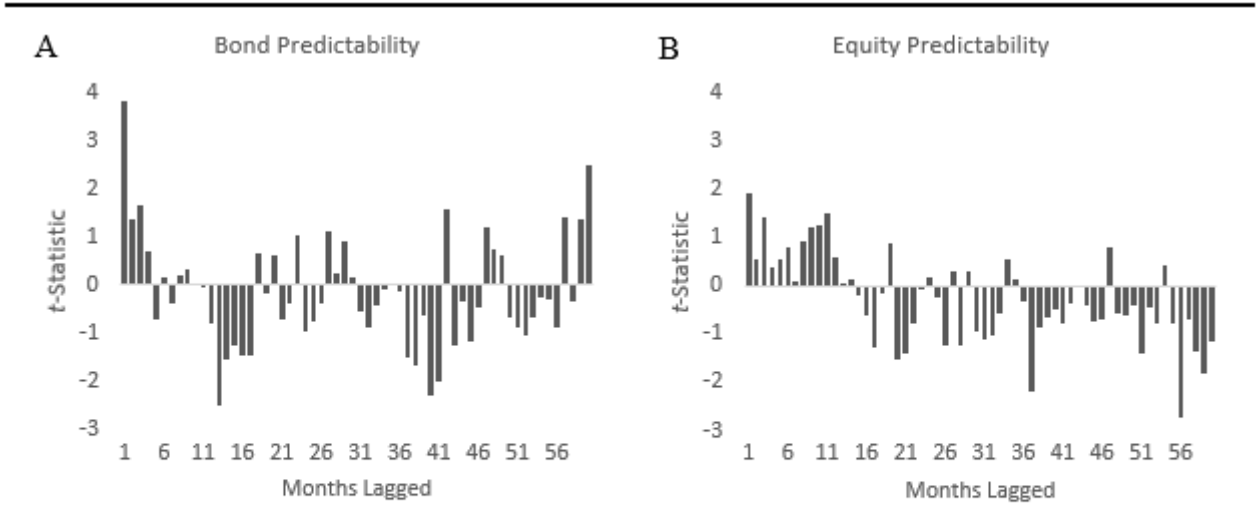


Figure 3: Single-Asset Time Series Predictability

Plotted are the t-statistics clustered by month from pooled panel regressions where we regress the monthly excess return of each bond (equity) index in our data set on the sign of its own excess return lagged one to sixty months. The sample period is Jan-1980 to Dec-2016. (A) Panel A: Bond t-statistics; (B) Panel B: Equity t-statistics.

Cross-Asset Time Series Predictability

$$r_t^s = \alpha + \beta_h^s \text{sign}(r_{t-h}^s) + \beta_h^x \text{sign}(r_{t-h}^x) + \varepsilon_t^s$$

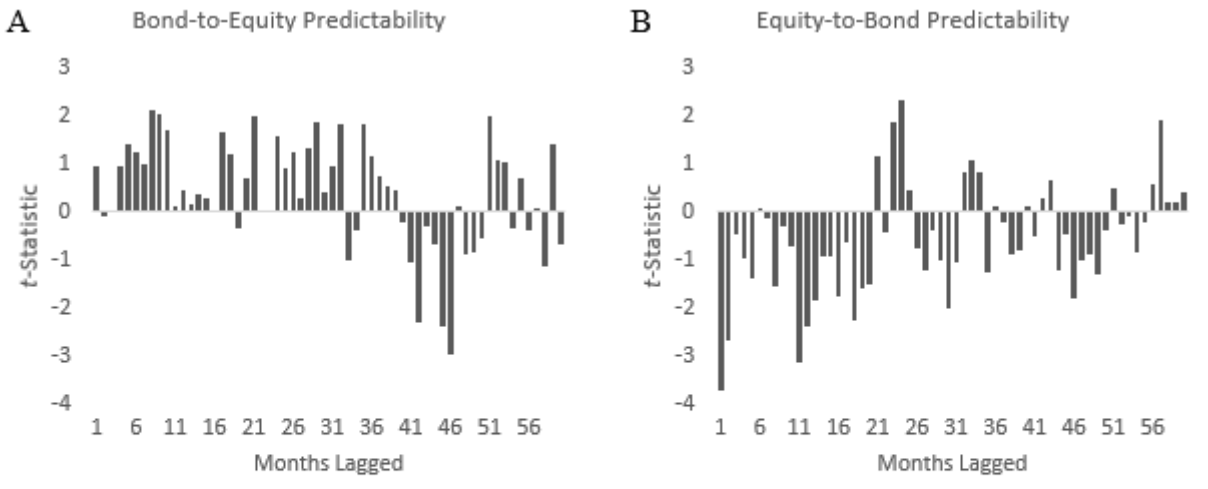


Figure 4: Cross-Asset Time Series Predictability

Plotted are the t-statistics clustered by month of the cross-asset predictors from pooled panel regressions where we regress the monthly excess return of each bond (equity) index in our data set on the sign of its own excess return lagged one to sixty months, as well as the sign of the similarly-lagged excess return of the corresponding equity (bond) index. The sample period is Jan-1980 to Dec-2016. (A) Panel A: Bond t-statistics from the equity regression; (B) Panel B: Equity t-statistics from the bond regression.

Returns by Momentum Regime

Table 1: Returns by Momentum Regime

Reported are the number of index-month combinations, the annualised gross Sharpe ratios, and the average monthly excess returns of the bond and equity indices in our international data set during different bond and equity momentum regimes. An asset belongs to a positive (negative) regime in month t if the t - 12 to t - 1 cumulative excess return of the asset was positive (negative). The sample period is Jan-1980 to Dec-2016. (A) Panel A: TSMOM regimes; (B) Panel B: XTSMOM regimes.

Panel A: TSMOM regimes

	Positive Bond	Negative Bond	Positive Equity	Negative Equity
N	4858	2082	4420	2700
Equity Return			0.81 %	-0.20 %
Equity Sharpe Ratio			0.52	-0.09
Bond Return	0.24 %	0.07 %		
Bond Sharpe Ratio	0.26	0.08		

Panel B: XTSMOM regimes

	Positive Bond & Negative Equity	Negative Bond & Positive Equity	Positive Equity & Positive Bond	Negative Equity & Negative Bond
N	1856	1357	2980	711
Equity Return			1.04 %	-1.18 %
Equity Sharpe Ratio			0.66	-0.53
Bond Return	0.31 %	-0.07 %		
Bond Sharpe Ratio	0.29	-0.09		

Diversified Portfolio Performance

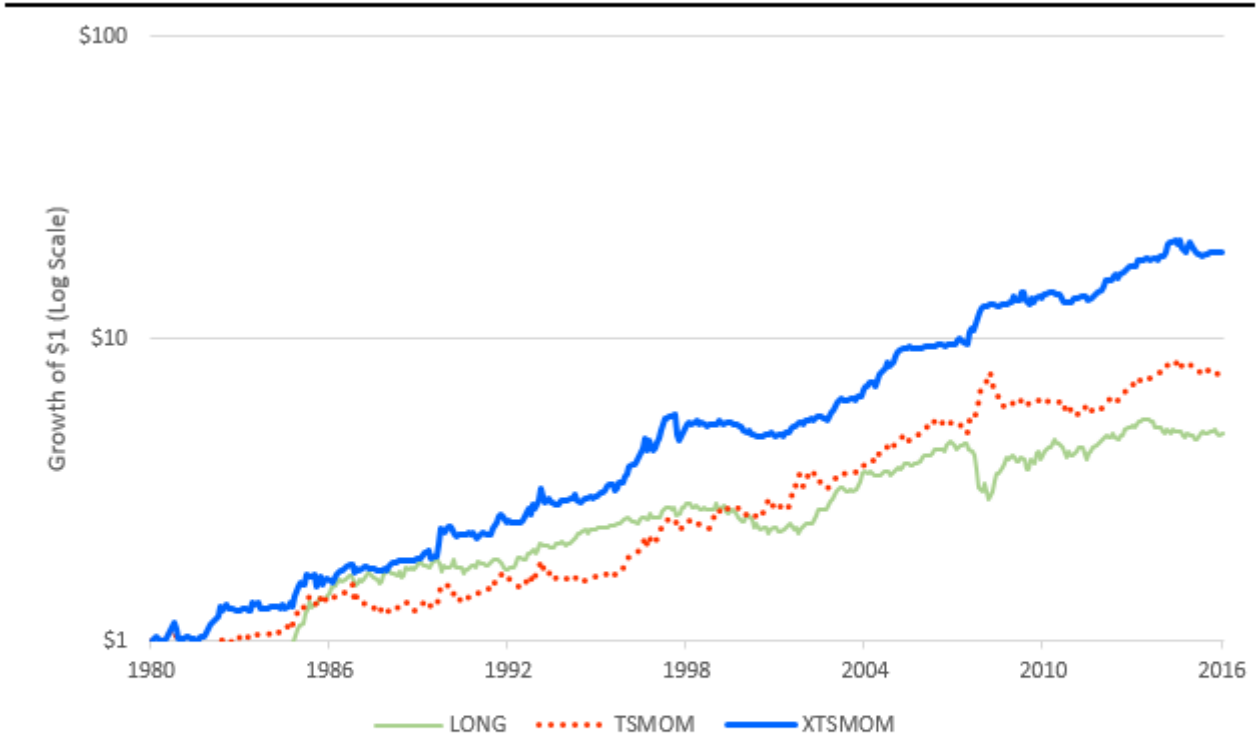


Figure 5: Cumulative Excess Returns of Diversified Portfolios

Plotted are the cumulative excess returns of buy-and-hold (LONG), time series momentum (TSMOM), and cross-asset time series momentum (XTSMOM) portfolios diversified across each bond and equity index in our data set. Each strategy uses a lookback period of twelve months and a holding period of one month. The returns of each portfolio are scaled so that their ex post annualised volatilities are 10%. The sample period is Jan-1980 to Dec-2016.

Sharpe Ratios by Country

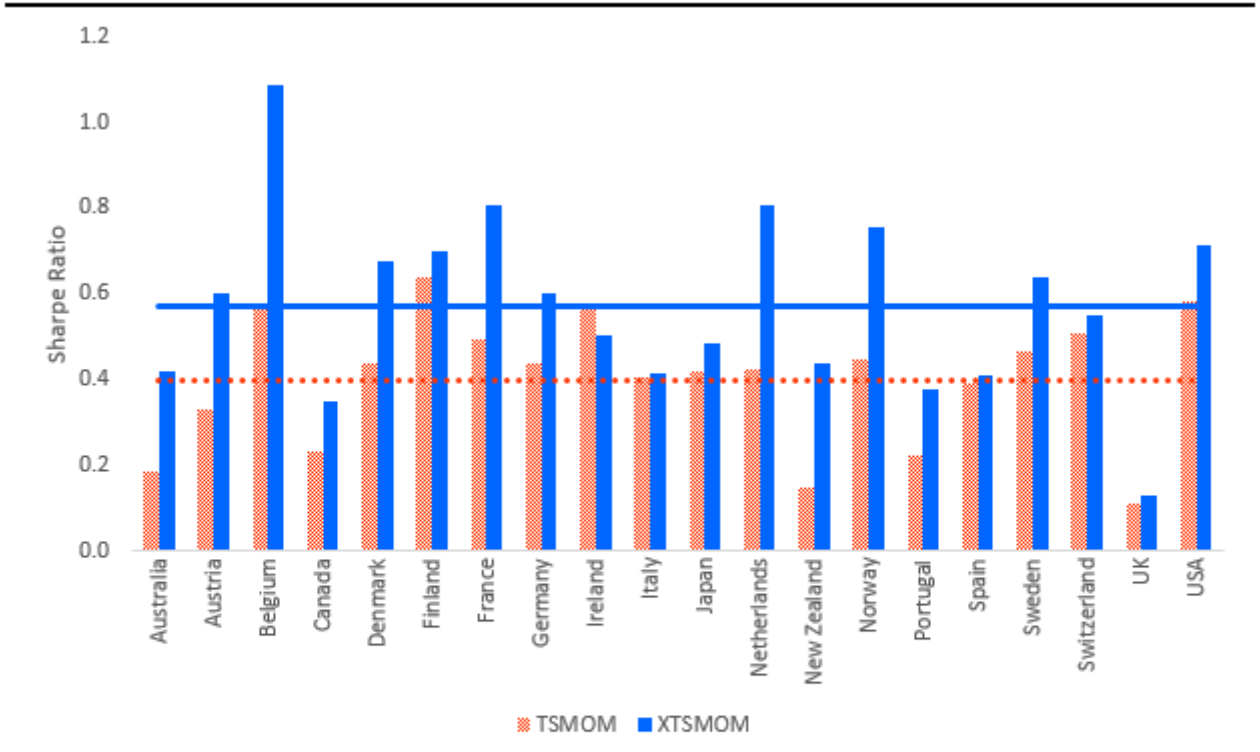


Figure 6: Sharpe Ratios of Time Series Momentum Portfolios

Plotted are the annualised gross Sharpe ratios of time series momentum (TSMOM) and cross-asset time series momentum (XTSMOM) portfolios diversified across a country's bond and equity indices for each country in our data set. Each strategy uses a lookback period of twelve months and a holding period of one month. Horizontal lines indicate the average Sharpe ratios of the portfolios. The sample period is Jan-1980 to Dec-2016.

Lookback and Holding Period Analysis

$$XTSMOM_t^{(k,h)} = \alpha + \beta_1 TSMOM_t^{(k,h)} + \beta_2 MKT_t + \beta_3 BOND_t + \beta_4 SMB_t + \beta_5 HML_t + \beta_6 UMD_t + \varepsilon_t.$$

Table 2: Cross-Asset Time Series Momentum Alpha *t*-Statistics

Reported are the *t*-statistics of the alphas from regressing the monthly excess returns of diversified cross-asset time series momentum (XTSMOM) portfolios with different lookback and holding periods on passive exposures to bond and equity markets, the excess returns of a corresponding diversified single-asset time series momentum (TSMOM) portfolio, as well as the Fama-French-Carhart size, value, and momentum factors. The sample period is Jan-1980 to Dec-2016.

		Holding Period (Months)							
		1	3	6	9	12	24	36	48
Lookback Period (Months)	1	2.07	3.04	4.09	4.66	4.57	4.32	4.63	4.24
	3	2.84	3.58	4.09	4.55	4.19	4.10	4.41	3.82
	6	3.58	3.94	4.55	4.29	4.26	4.18	5.04	4.64
	9	3.10	3.76	3.86	3.98	3.82	4.18	4.76	4.62
	12	3.27	4.01	4.24	3.86	3.86	4.34	4.84	4.97
	24	3.41	3.57	3.42	3.25	3.26	3.70	3.59	3.69
	36	3.85	4.36	4.70	4.68	4.57	3.86	3.65	3.53
	48	4.24	3.88	3.89	3.55	3.22	3.19	2.96	2.66

Benchmark Regressions

Table 3: Cross-Asset Time Series Momentum Risk-Adjusted Performance

Reported are the results from regressing the monthly excess returns of the diversified cross-asset time series momentum portfolio (XTSMOM) on the excess returns of the diversified single-asset time series momentum portfolio (TSMOM), the excess returns of the MSCI World total return index, and standard asset pricing factors. The sample period is Jan-1980 to Dec-2016. (A) Panel A: Fama-French-Carhart size, value, and momentum factors; (B) Panel B: Asness, Moskowitz, and Pedersen (2013) value and momentum "everywhere" factors.

Panel A: Fama-French-Carhart factors

	Alpha	TSMOM	MSCI World	SMB	HML	UMD	Adj. R^2
Coefficient	0.27 %		0.07	0.00	0.01	0.04	5 %
(*t*-Stat)	(4.32)		(4.65)	(0.21)	(0.23)	(2.98)	
Coefficient	0.12 %	0.56	0.06	0.02	0.03	-0.06	64 %
(*t*-Stat)	(3.16)	(26.23)	(6.88)	(1.29)	(2.09)	(-5.88)	

Panel B: Asness, Moskowitz, and Pedersen (2013) factors

	Alpha	TSMOM	MSCI World	VAL Everywhere	MOM Everywhere	Adj. R^2
Coefficient	0.17 %		0.08	0.13	0.22	10 %
(*t*-Stat)	(2.69)		(5.39)	(2.88)	(5.74)	
Coefficient	0.14 %	0.58	0.06	0.02	-0.13	63 %
(*t*-Stat)	(3.43)	(24.84)	(7.23)	(0.55)	(-4.53)	

Time Series Momentum (TSMOM) and Cross-Asset Time Series Momentum (XTSMOM)

Economic Drivers of TSMOM

Economic Drivers of XTSMOM

Relation to Economic Conditions

Conclusion

Equity Returns and Equity Fund Flows

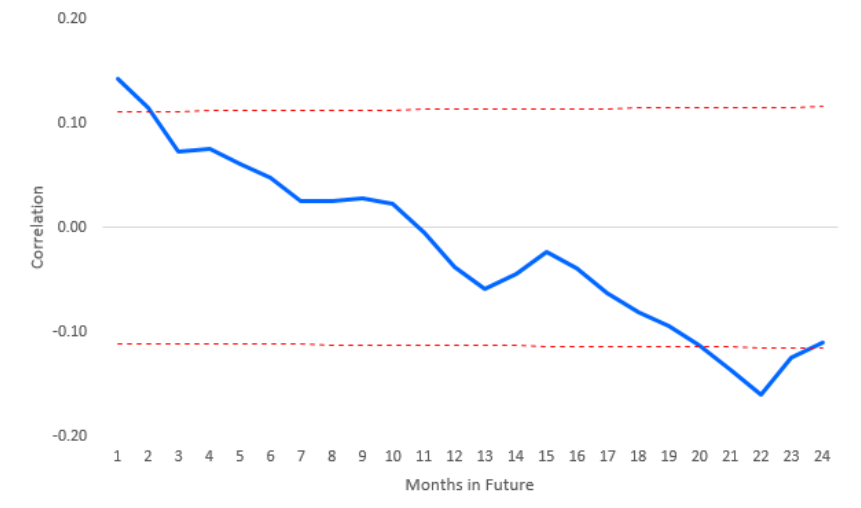


Figure 8: Correlations Between Equity Returns and Future Equity Fund Flows

Plotted are the correlations between CRSP value-weighted index twelve-month cumulative returns and equity mutual fund flows one to 24 months in the future. The fund flows are normalised by equity mutual fund assets under management. Horizontal lines indicate approximate 5% critical values. The sample period is Dec-1990 to Dec-2016.

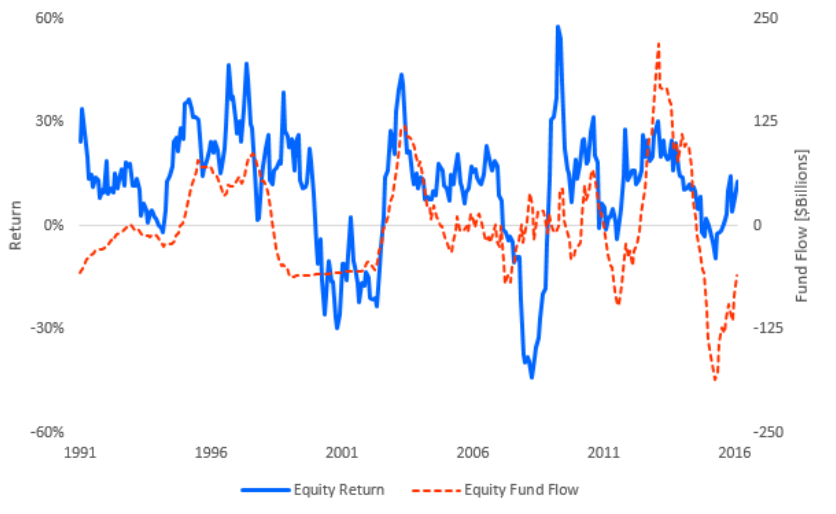


Figure 10: Comovement of Equity Returns and Equity Fund Flows

Plotted are the twelve-month cumulative returns of the CRSP value-weighted index (left axis) and detrended twelve-month cumulative equity mutual fund flows (right axis). The correlation between the series is 0.44. The sample period is Nov-1991 to Dec-2016.

Bond Returns and Bond Fund Flows

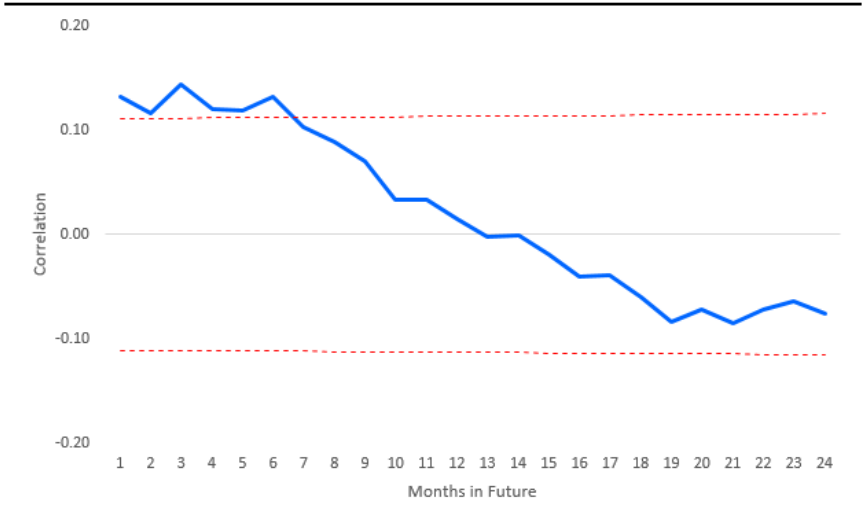


Figure 9: Correlations Between Bond Returns and Future Bond Fund Flows

Plotted are the correlations between Datastream US Five-Year Benchmark Government Bond total return index twelve-month cumulative returns and bond mutual fund flows one to 24 months in the future. The fund flows are normalised by bond mutual fund assets under management. Horizontal lines indicate approximate 5% critical values. The sample period is Dec-1990 to Dec-2016.

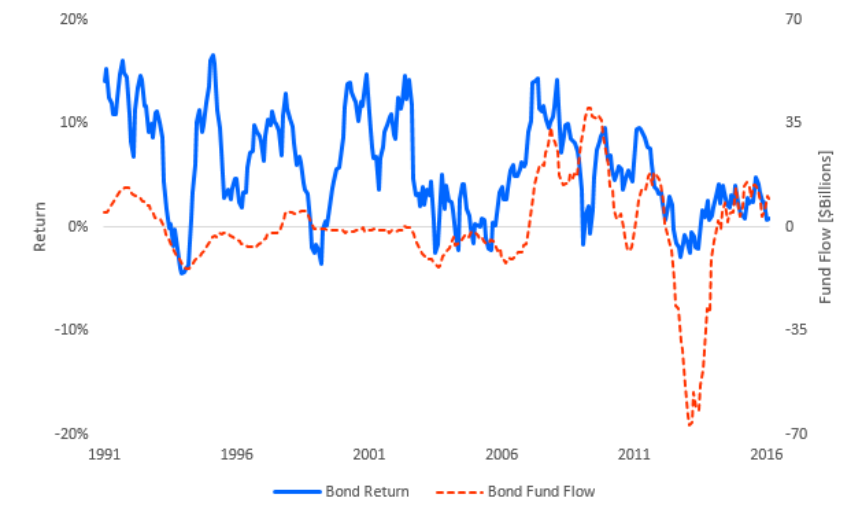


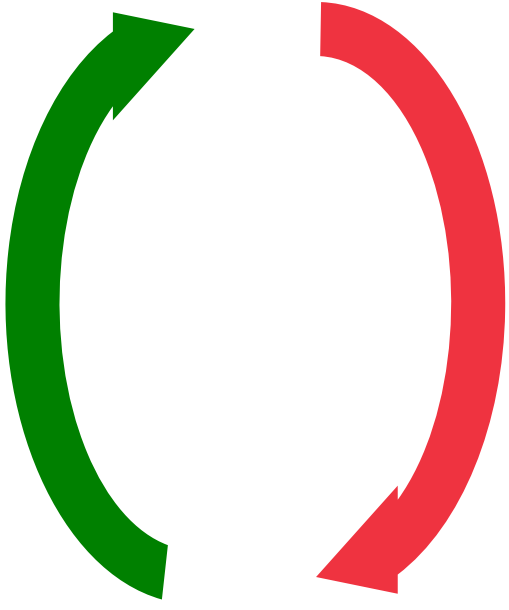
Figure 11: Comovement of Bond Returns and Bond Fund Flows

Plotted are the twelve-month cumulative returns of the Datastream US Five-Year Benchmark Government Bond total return index (left axis) and detrended twelve-month cumulative bond mutual fund flows (right axis). The correlation between the series is 0.39. The sample period is Nov-1991 to Dec-2016.

Flows Chase Returns and Prolong Trends

Positive Momentum:

Positive returns lead to inflows to risky assets, which supports further positive returns



Negative Momentum:

Negative returns lead to outflows from risky assets, which supports further negative returns

Other Proxies for Equity Demand

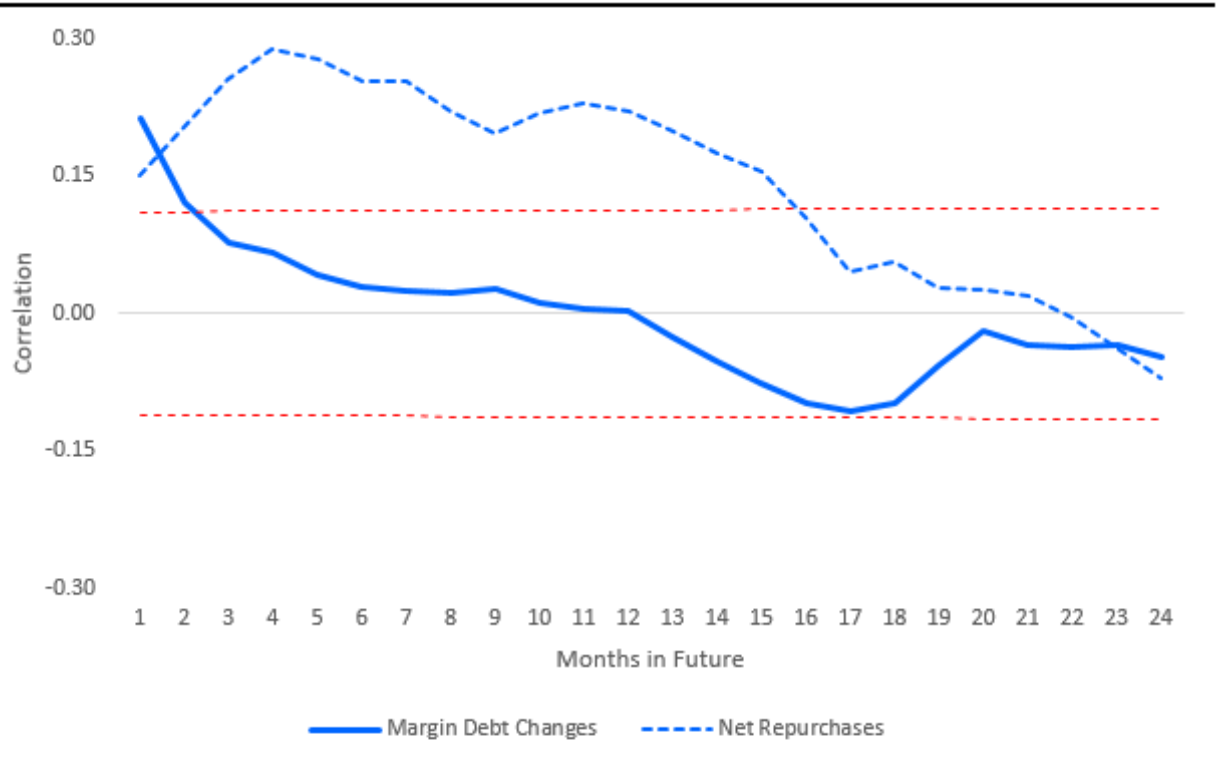
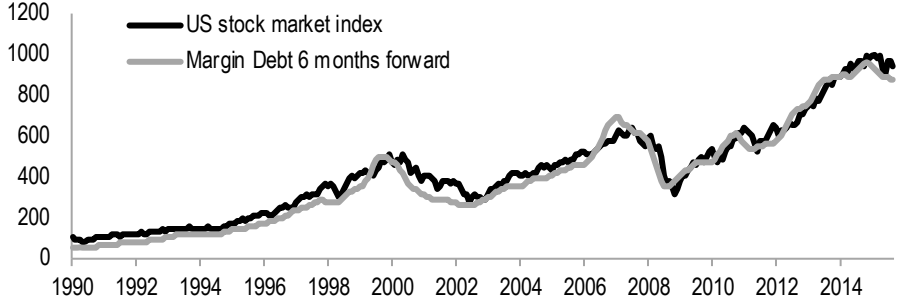


Figure 12: Correlations Between Equity Returns and Future Changes in Equity Demand

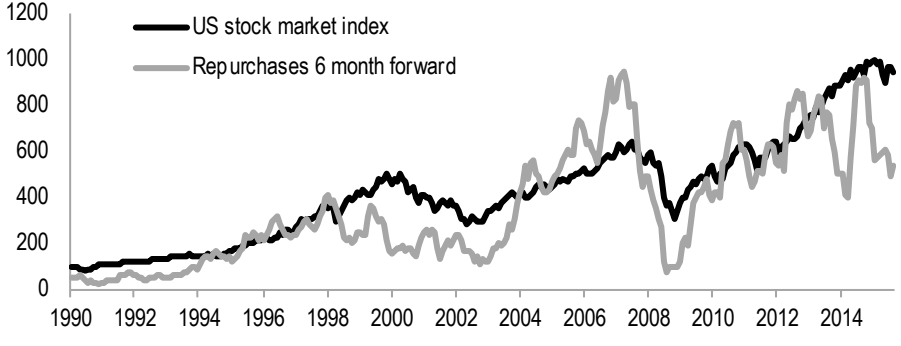
Plotted are the correlations between CRSP value-weighted index twelve-month cumulative returns and monthly percentage changes in NYSE margin debt, and the correlations between the same returns and total stock repurchases net of SEOs, one to 24 months in the future. The margin debt changes and repurchases are normalised by US equity market capitalisation. Horizontal lines indicate approximate 5% critical values. The sample period is Dec-1990 to Dec-2016.

Why Equity Momentum Works

Margin debt level vs. stock market



Share repurchases vs. stock market



Time Series Momentum (TSMOM) and Cross-Asset Time Series Momentum (XTSMOM)

Economic Drivers of TSMOM

Economic Drivers of XTSMOM

Relation to Economic Conditions

Conclusion

Three XTSMOM Channels

The Credit Channel

- Bond returns positively affect equity returns through the increased use of margin debt
- Motivated by Constantinides, Donaldson, and Mehra (2002)

The Credit Channel

Table 5: Margin Debt Vector Autoregression

Reported are the results from a multivariate vector autoregression on monthly CRSP value-weighted index returns, percentage changes in the US five-year constant maturity Treasury yield, and percentage changes in NYSE margin debt. Six lags of each variable are used. The coefficient sums are the sums of the coefficients of the lags of the respective variable. The *p*-values are from tests of the hypothesis that the coefficients of each lag of a given variable are zero. The sample period is May-1953 to Dec-2016. ***: Significant at 1%. **: Significant at 5%. *: Significant at 10%.

Dependent Variable	Equity Return		Yield Change		Margin Debt Change		Adj. R^2
	Coef. Sum	(*p*-Value)	Coef. Sum	(*p*-Value)	Coef. Sum	(*p*-Value)	
Equity Return	0.19**	(0.038)	-0.14*	(0.084)	-0.02	(0.416)	0.013
Yield Change	0.26**	(0.036)	0.08***	(0.000)	0.18	(0.139)	0.125
Margin Debt Change	0.57***	(0.000)	-0.15***	(0.002)	0.29***	(0.000)	0.254

The Credit Channel

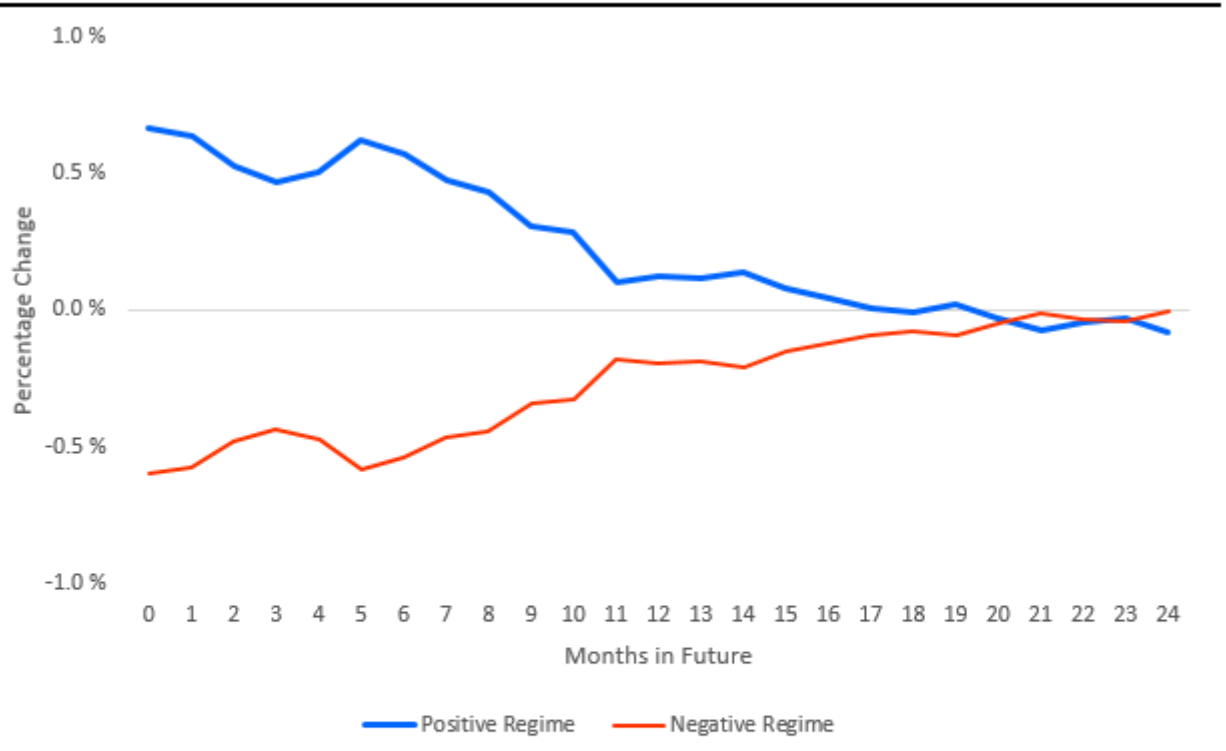


Figure 13: Abnormal Changes in Margin Debt by Bond Momentum Regime

Plotted are the average abnormal monthly percentage changes in NYSE margin debt during, and one to 24 months after, positive and negative bond momentum regimes. The abnormal change is defined as the monthly percentage change minus the average monthly percentage change over the whole sample. A month t belongs to a positive (negative) regime if the t - 12 to t - 1 change in the five-year constant maturity Treasury yield was negative (positive). The sample period is Apr-1954 to Dec-2016.

Three XTSMOM Channels

The Credit Channel

- Bond returns positively affect equity returns through the increased use of margin debt
- Motivated by Constantinides, Donaldson, and Mehra (2002)

The Fund Flow Channel

- Bond returns positively affect equity returns through increased equity fund flows
- Equity returns negatively affect bond returns through decreased bond fund flows

The Fund Flow Channel

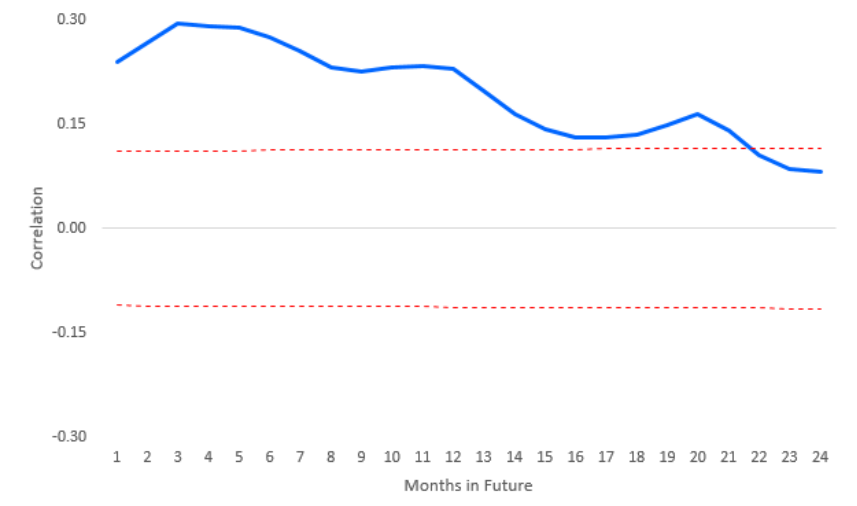


Figure 14: Correlations Between Bond Returns and Future Equity Fund Flows

Plotted are the correlations between Datastream US Five-Year Benchmark Government Bond total return index twelve-month cumulative returns and equity mutual fund flows one to 24 months in the future. The fund flows are normalised by equity mutual fund assets under management. Horizontal lines indicate approximate 5% critical values. The sample period is Dec-1990 to Dec-2016.

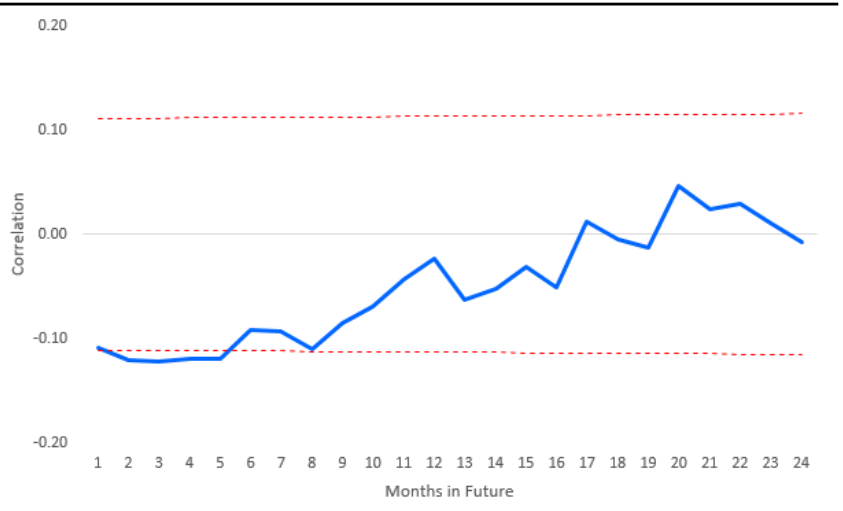


Figure 15: Correlations Between Equity Returns and Future Bond Fund Flows

Plotted are the correlations between CRSP value-weighted index twelve-month cumulative returns and bond mutual fund flows one to 24 months in the future. The fund flows are normalised by bond mutual fund assets under management. Horizontal lines indicate approximate 5% critical values. The sample period is Dec-1990 to Dec-2016.

The Fund Flow Channel

Table 6: Mutual Fund Flow Vector Autoregression

Reported are the results from a multivariate vector autoregression on monthly CRSP value-weighted index returns, Datastream US Five-Year Benchmark Government Bond total return index returns, AUM-adjusted equity mutual fund flows, and AUM-adjusted bond mutual fund flows. Six lags of each variable are used. The coefficient sums are the sums of the coefficients of the lags of the respective variable. The *p*-values are from tests of the hypothesis that the coefficients of each lag of a given variable are zero. The sample period is Dec-1990 to Dec-2016. ***: Significant at 1%. **: Significant at 5%. *: Significant at 10%.

Dependent	Equity Return		Bond Return		Equity Flow		Bond Flow		Adj. R^2
Variable	Coef. Sum	(*p*-Value)	Coef. Sum	(*p*-Value)	Coef. Sum	(*p*-Value)	Coef. Sum	(*p*-Value)	
Equity Return	0.00	(0.467)	0.57	(0.749)	0.59**	(0.012)	-0.30*	(0.051)	0.045
Bond Return	-0.04***	(0.001)	0.02	(0.280)	-0.01	(0.355)	0.04	(0.581)	0.085
Equity Flow	0.00	(0.506)	0.21	(0.134)	0.85***	(0.000)	0.03***	(0.000)	0.561
Bond Flow	-0.14	(0.277)	0.26	(0.180)	-0.06***	(0.004)	0.08***	(0.000)	0.408

Three XTSMOM Channels

The Credit Channel

- Bond returns positively affect equity returns through the increased use of margin debt
- Motivated by Constantinides, Donaldson, and Mehra (2002)

The Fund Flow Channel

- Bond returns positively affect equity returns through increased equity fund flows
- Equity returns negatively affect bond returns through decreased bond fund flows

The Monetary Policy Channel

- Equity returns negatively affect bond returns through increases in the Fed Funds Rate

The Monetary Policy Channel

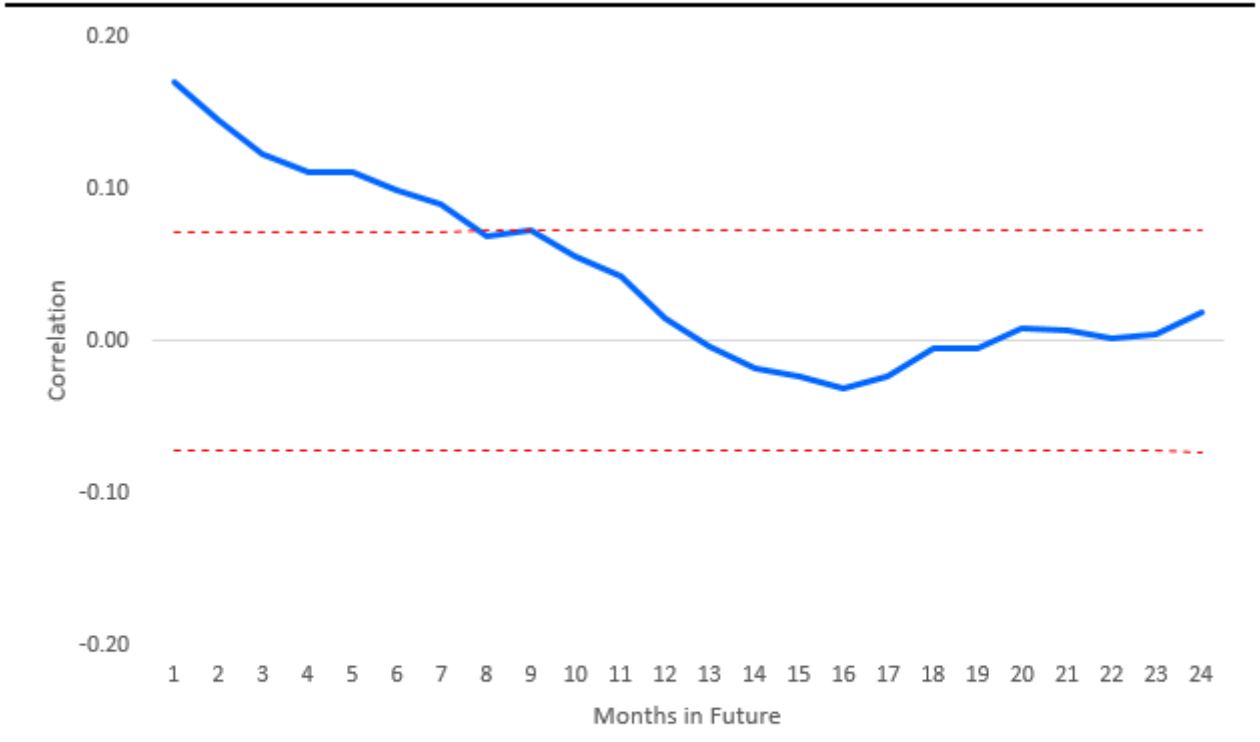


Figure 16: Correlations Between Equity Returns and Future Federal Funds Rate Changes

Plotted are the correlations between CRSP value-weighted index twelve-month cumulative returns and monthly percentage changes in the federal funds rate one to 24 months in the future. Horizontal lines indicate approximate 5% critical values. The sample period is Jul-1954 to Dec-2016.

Time Series Momentum (TSMOM) and Cross-Asset Time Series Momentum (XTSMOM)

Economic Drivers of TSMOM

Economic Drivers of XTSMOM

Relation to Economic Conditions

Conclusion

Relation to Economic Conditions

Table 7: Economic Indicators by Momentum Regime

Reported are the average next twelve-month percentage change in industrial production, change in the inflation rate, and change in the unemployment rate during positive and negative bond and equity momentum regimes. A month t belongs to a positive (negative) bond regime if the t - 12 to t - 1 change in the five-year constant maturity Treasury yield was negative (positive), and to a positive (negative) equity regime if the t - 12 to t - 1 cumulative CRSP value-weighted index return was positive (negative). The sample period is Apr-1954 to Dec-2016. (A) Panel A: TSMOM regimes; (B) Panel B: XTSMOM regimes.

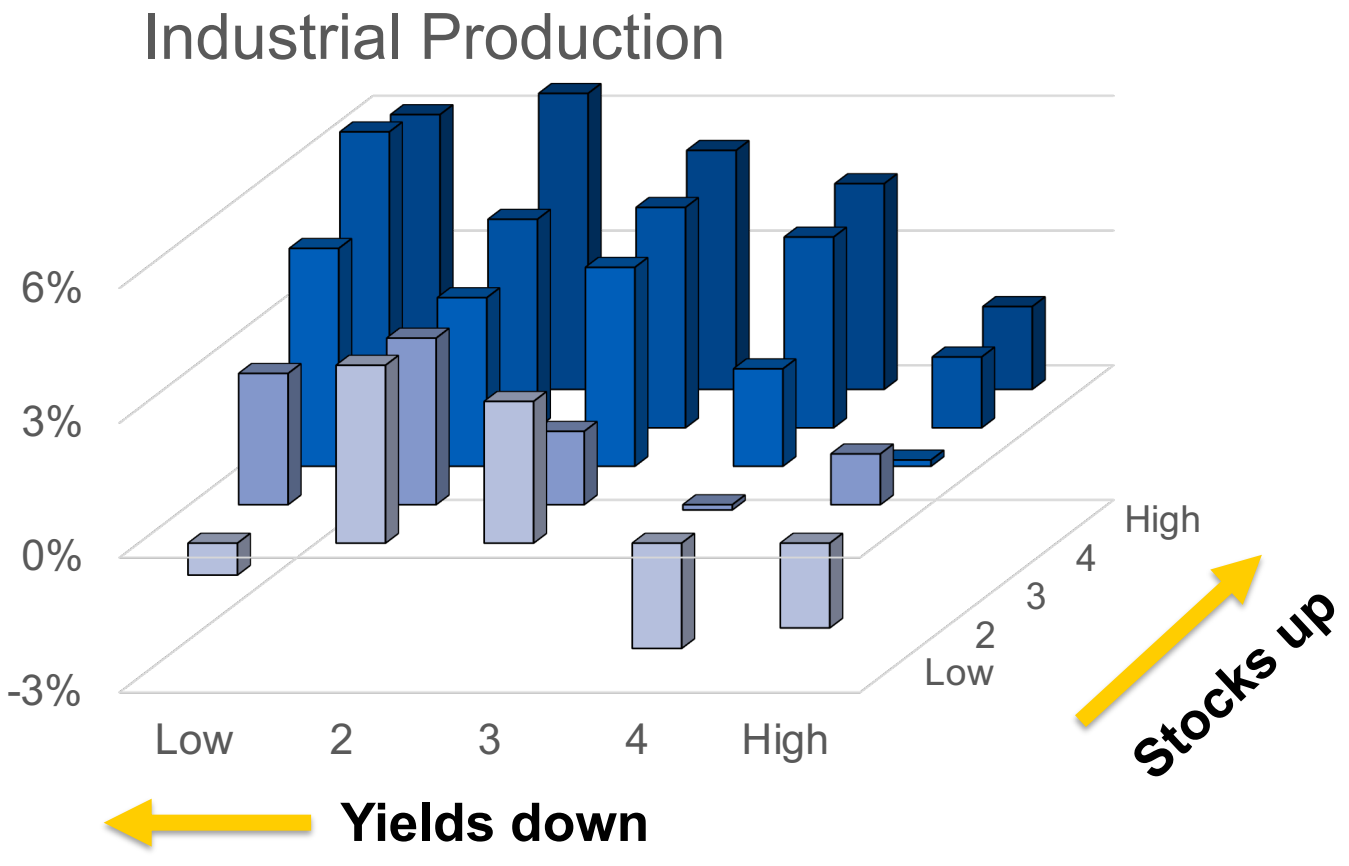
Panel A: TSMOM regimes

	Positive Bond	Negative Bond	Positive Equity	Negative Equity
Industrial Production	3.96 %	1.96 %	3.68 %	0.29 %
Inflation	-0.14 %	0.17 %	0.24 %	-0.69 %
Unemployment Rate	-0.21 %	0.17 %	-0.27 %	0.86 %

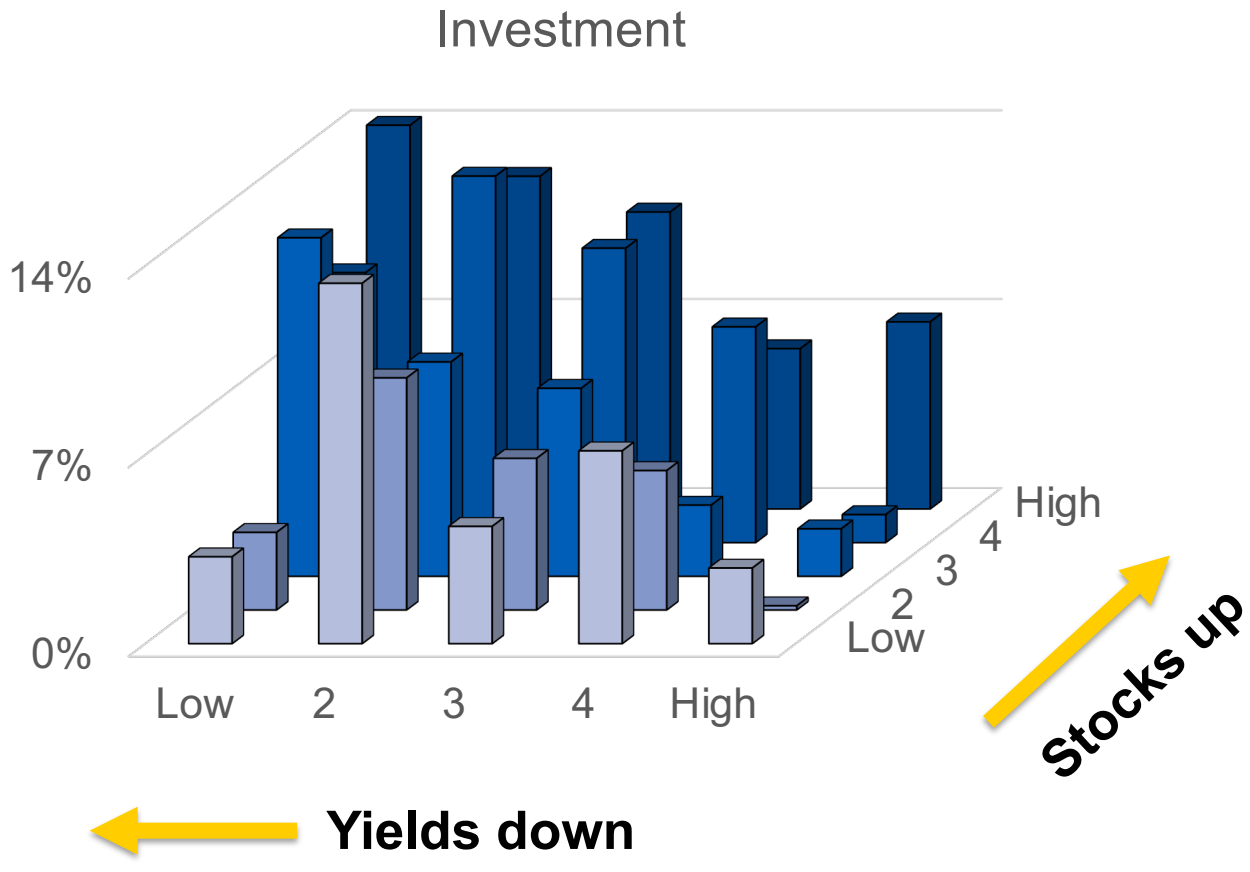
Panel B: XTSMOM regimes

	Positive Bond & Negative Equity	Negative Bond & Positive Equity	Positive Bond & Positive Equity	Negative Bond & Negative Equity
Industrial Production	1.86 %	2.86 %	4.69 %	-1.37 %
Inflation	-0.88 %	0.34 %	0.11 %	-0.48 %
Unemployment Rate	0.65 %	-0.08 %	-0.51 %	1.08 %

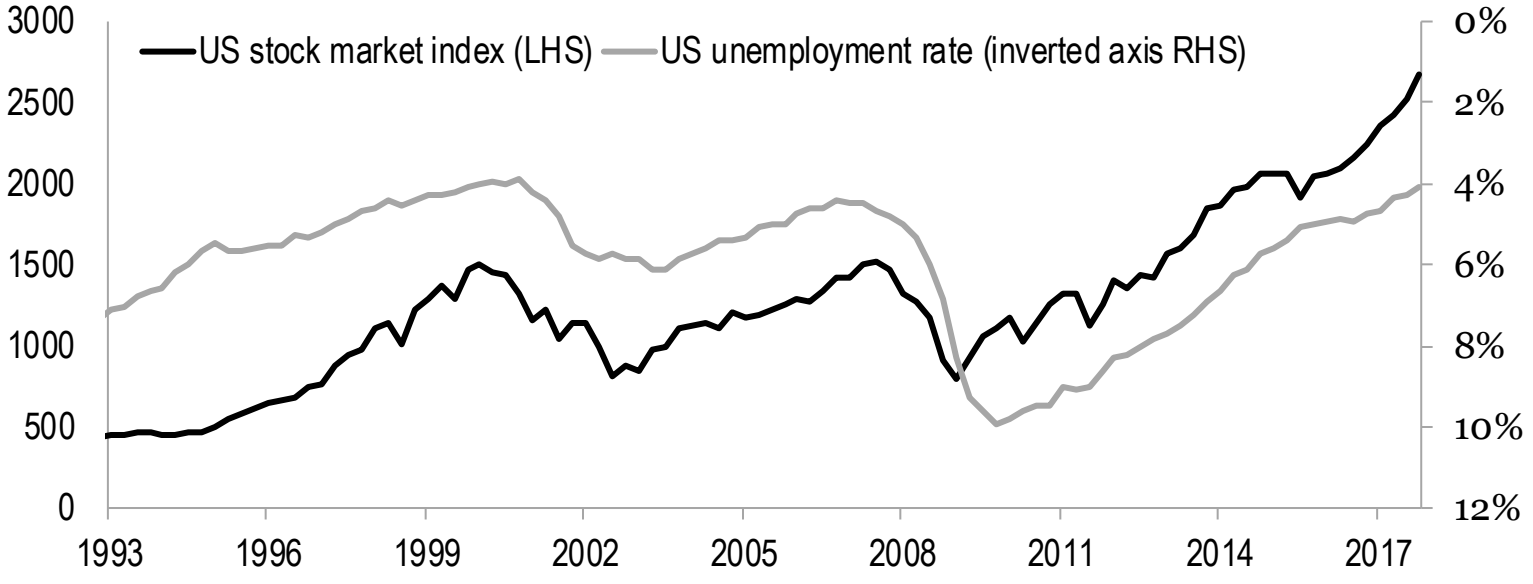
Relation to Economic Conditions



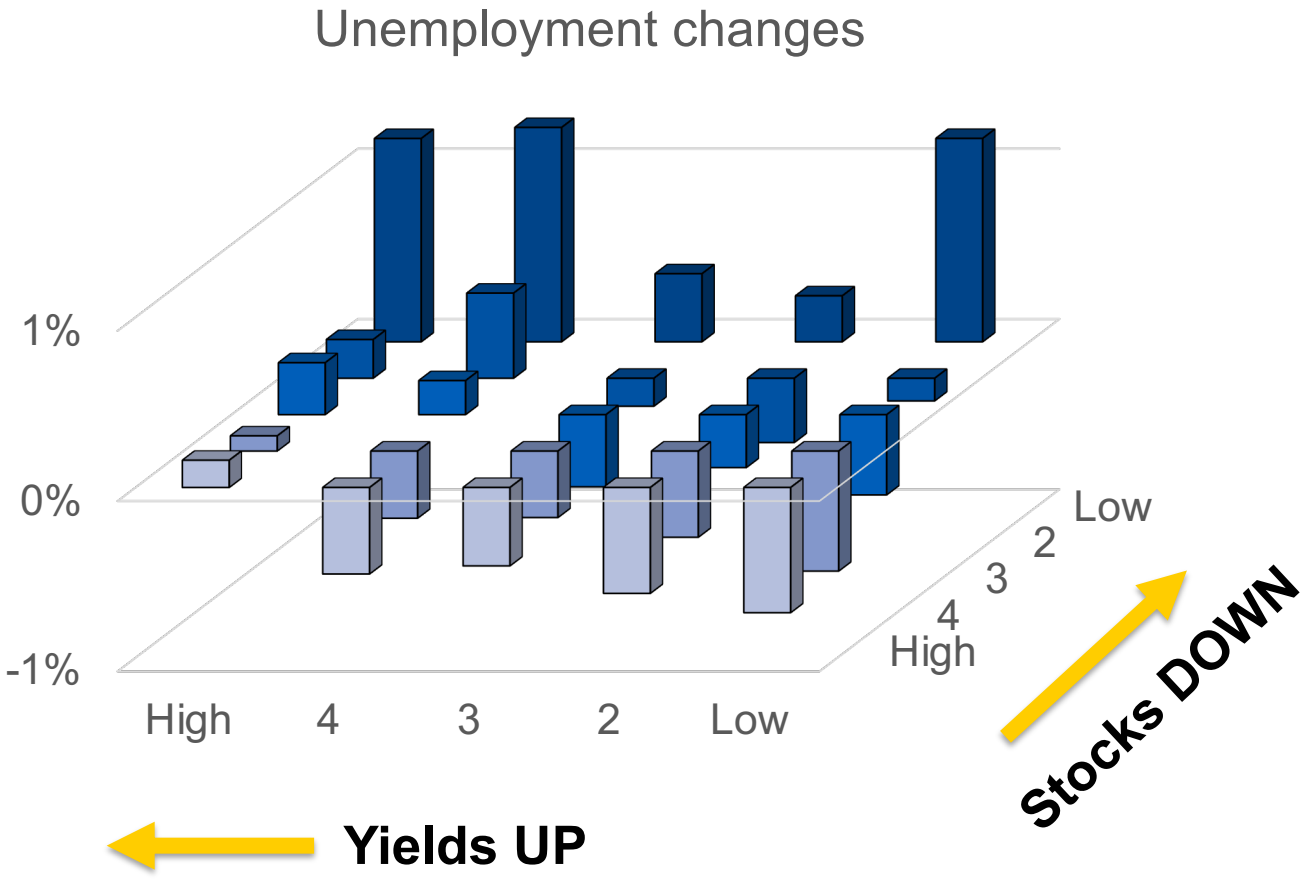
Relation to Economic Conditions



Unemployment and XTS-momentum



Relation to Economic Conditions



Time Series Momentum (TSMOM) and Cross-Asset Time Series Momentum (XTSMOM)

Economic Drivers of TSMOM

Economic Drivers of XTSMOM

Relation to Economic Conditions

Conclusion

Conclusion

- **Past bond returns positively predict future equity returns, while past equity returns negatively predict future bond returns**
- **Cross-asset time series momentum portfolios outperform traditional time series momentum portfolios**
- **Past twelve-month bond and equity returns predict future changes in bond and equity demand, thus helping explain the returns to time series momentum strategies**
- **Past twelve-month bond and equity returns contain information about future changes in economic conditions, thus linking time series momentum to real economic activity**

Appendix

Equity Portfolio Performance

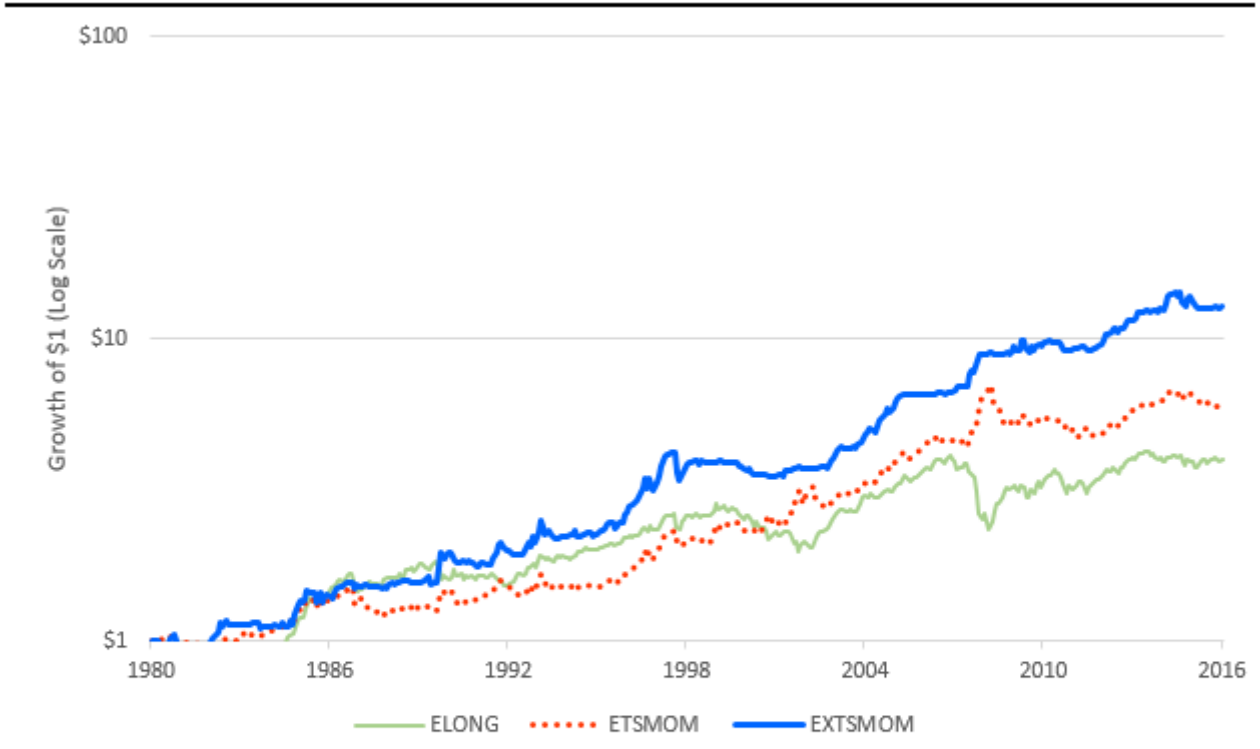


Figure A1: Cumulative Excess Returns of Equity Portfolios

Plotted are the cumulative excess returns of buy-and-hold (ELONG), time series momentum (ETSMOM), and cross-asset time series momentum (EXTSMOM) portfolios diversified across each equity index in our data set. Each strategy uses a lookback period of twelve months and a holding period of one month. The returns of each portfolio are scaled so that their ex post annualised volatilities are 10%. The sample period is Jan-1980 to Dec-2016.

Bond Portfolio Performance

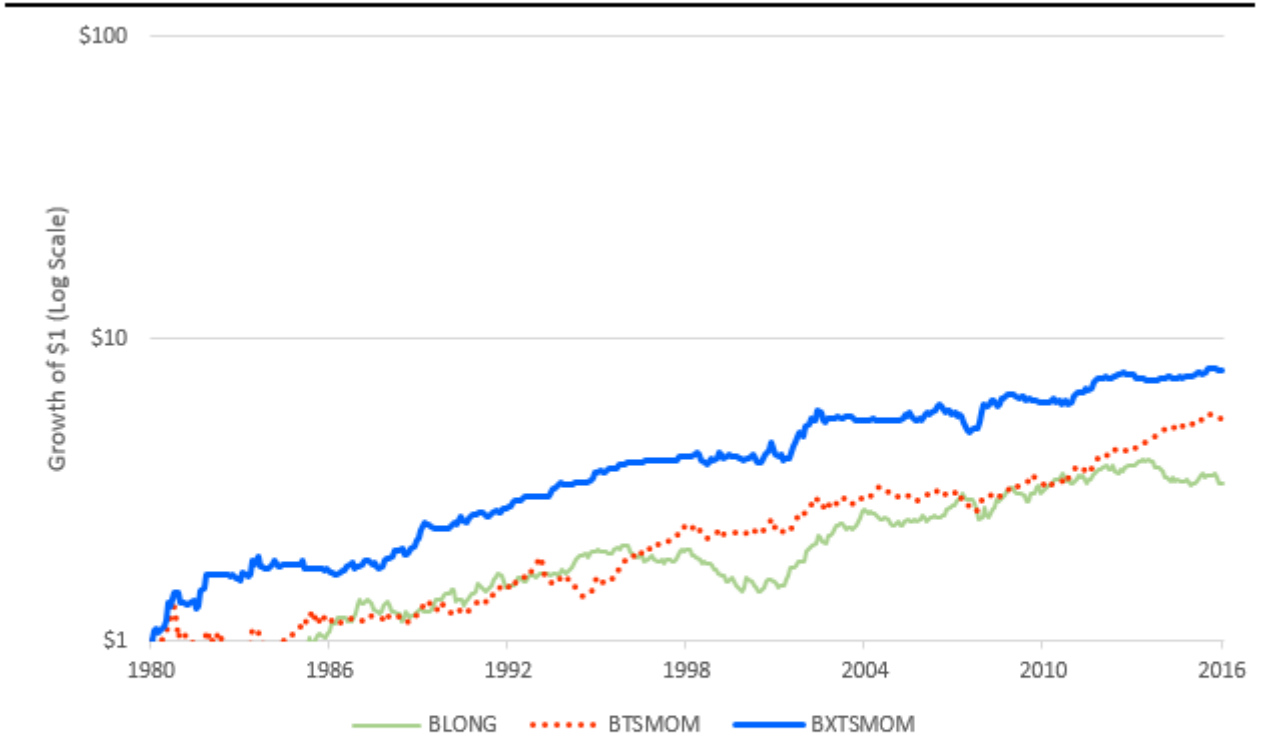


Figure A2: Cumulative Excess Returns of Bond Portfolios

Plotted are the cumulative excess returns of buy-and-hold (BLONG), time series momentum (BTSMOM), and cross-asset time series momentum (BXTSMOM) portfolios diversified across each bond index in our data set. Each strategy uses a lookback period of twelve months and a holding period of one month. The returns of each portfolio are scaled so that their ex post annualised volatilities are 10%. The sample period is Jan-1980 to Dec-2016.

The XTSMOM Smile

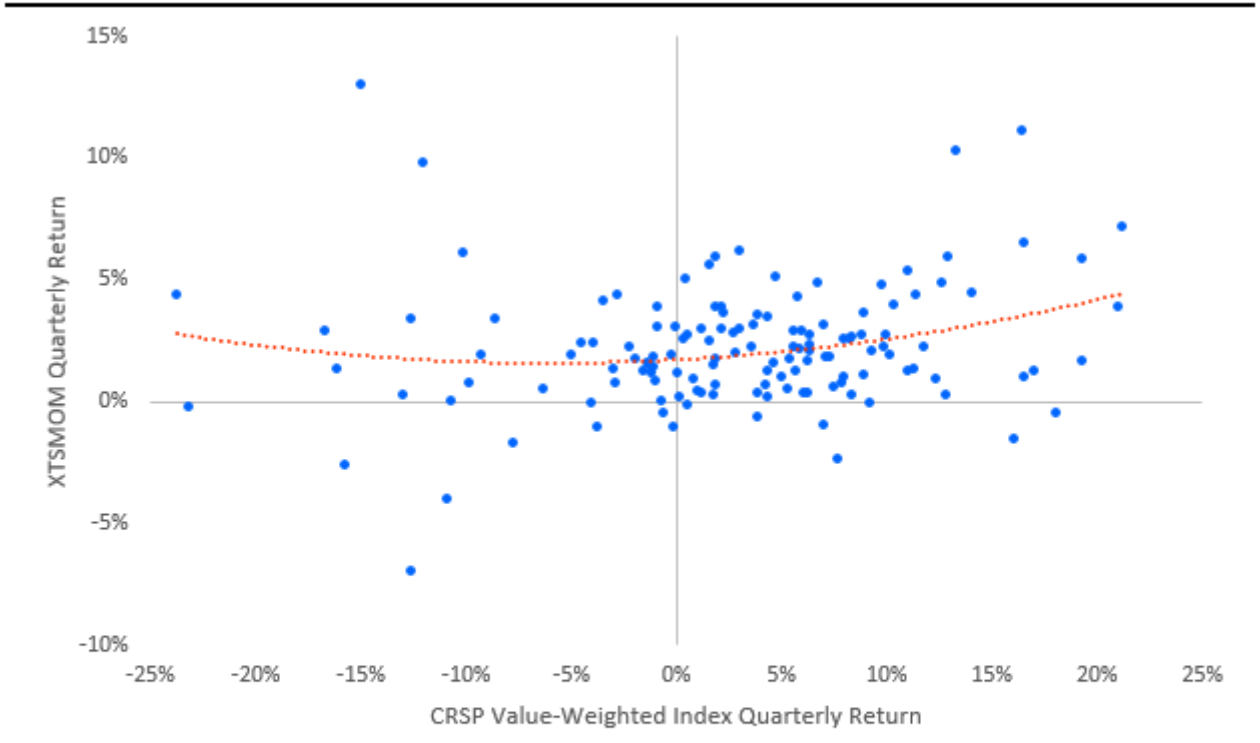


Figure 7: The XTSMOM Smile

Plotted are the non-overlapping quarterly returns of a cross-asset time series momentum (XTSMOM) portfolio diversified across each bond and equity index in our data set, against the corresponding non-overlapping quarterly returns of the CRSP value-weighted index. The sample period is Jan-1980 to Dec-2016.

Net Speculator Positions

Table 4: Net Speculator Position Differences by Regime

Reported are the differences in average net speculator position between positive and negative TSMOM and XTSMOM regimes, for the five-year Treasury and S&P 500 futures. A Treasury (S&P 500) TSMOM regime is positive if the bond (equity) regime is positive, and negative otherwise. A Treasury XTSMOM regime is positive (negative) if the bond regime is positive (negative) and the equity regime is negative (positive). An S&P 500 XTSMOM regime is positive (negative) if both the bond and equity regimes are positive (negative). A month t belongs to a positive (negative) bond or equity regime if the t - 12 to t - 1 cumulative Datastream US Five-Year Benchmark Government Bond total return index return or CRSP value-weighted index return, respectively, was positive (negative). The sample period is Apr-1987 to Dec-2016.

	Five-Year Treasury	S&P 500
TSMOM	3.10 %	-1.92 %
XTSMOM	6.50 %	3.11 %

Equity Returns by Combined Momentum Regimes

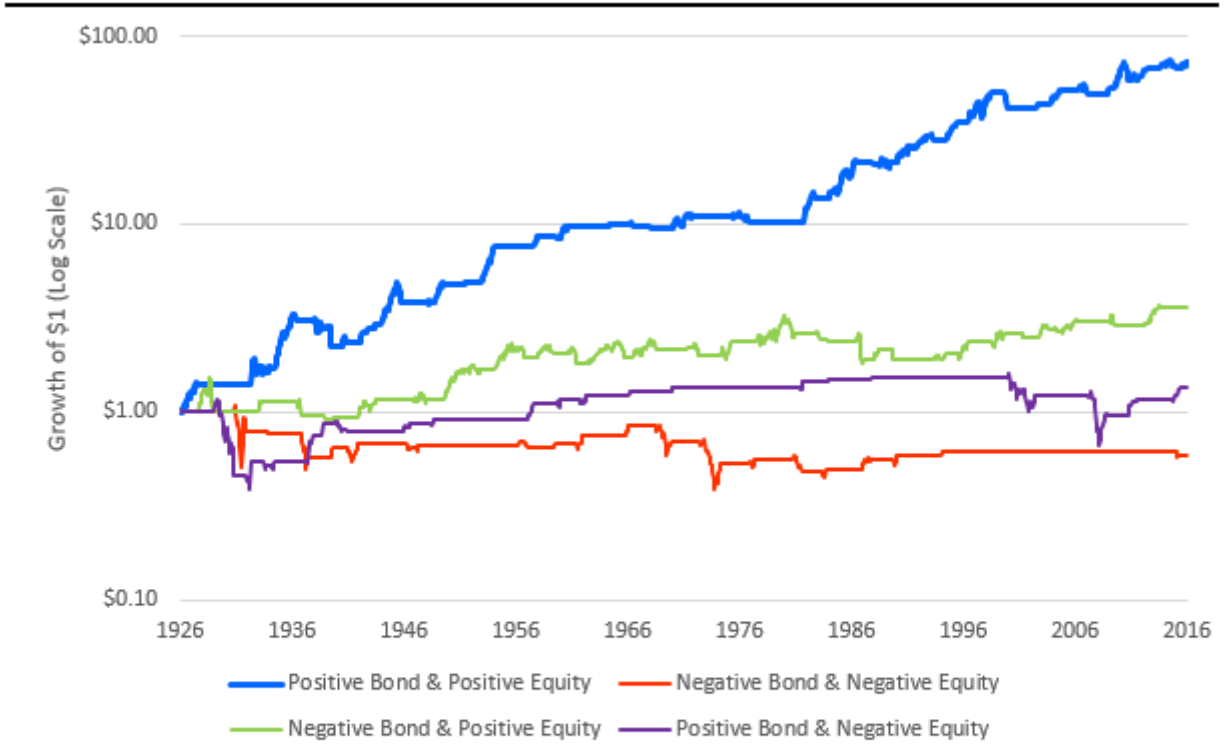


Figure X: Cumulative Excess Equity Returns by Combined Momentum Regimes

Plotted are the cumulative excess returns from holding the CRSP value-weighted index during given combinations of bond and equity momentum regimes, and otherwise holding the risk-free asset. The regimes are defined as in Figures 1 and 2. The sample period is Dec-1926 to Dec-2016.