Speculator Spreading Pressure and the Commodity Futures Risk Premium

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Abstract

This paper investigates the impact of speculative trading on the commodity futures risk premium. We focus on speculators' spread positions, and study the asset pricing implications of spreading pressure on the cross-section of commodity futures returns. Spreading pressure negatively predicts futures excess returns even after controlling for well-known determinants of futures returns such as basis-momentum. The spreading pressure factor-mimicking portfolio carries a significant risk premium of 21.55% per annum after commodity market financialization. Our single-factor model provides a better cross-sectional fit than the existing factor models. We show that spreading pressure reflects speculators' expectation on the change in the slope and curvature of futures term structure, and our spreading pressure is explained by innovations in real economic uncertainty.

Research Questions

1. Does spreading pressure predict commodity future excess returns?
2. Is spreading pressure a priced factor in commodity future market?
3. What are the economic determinants and information content of spreading pressure?

Motivation

1. Spreading Pressure (ratios of speculators intra-commodity spreading positions relative to total open interests) increased dramatically from around 5% before commodity market financialization to more than 20% after financialization. (i.e. Energy category)

2. Boons and Prado (2019) find that the basis-momentum factor has higher predictive power on the commodity premiums when speculators' intra-commodity spread positions are high.
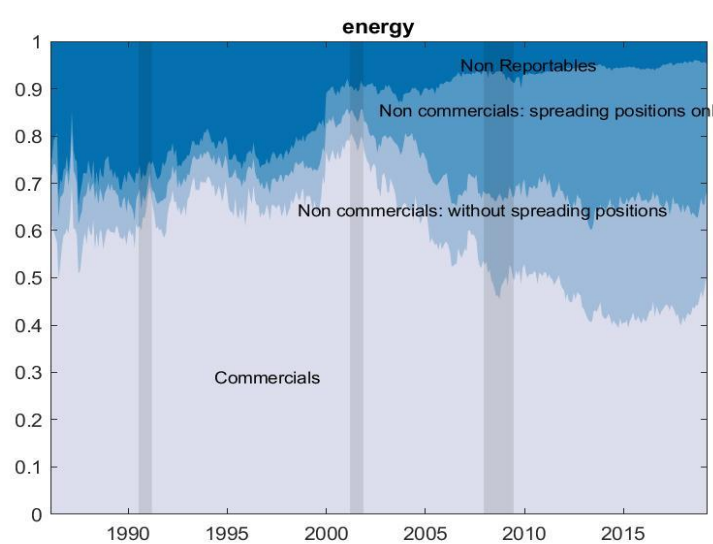
Main Finding

1. Spreading pressure predicts commodity futures excess returns negatively and significantly. Annualized commodity futures excess returns will decrease 11.76% (t-statistics =-5.43) when spreading pressure increase 1%.
2. Spreading pressure factor-mimicking portfolio can generate highest excess return after commodity market finacialization: 21.19% return per annum
3. Spreading pressure is a priced factor after commodity market finacialization. The estimated price of risk on spreading pressure is 21.55% (t-statistics = 7.58) per annual under single-factor model and $R^2 = 70\%$, which is better than the existent 2-factor or 3-factor models.
4. Spreading pressure reflects expected slope and curvature of commodity future curve and spreading pressure factor is linked to innovations in real economic uncertainty

Data and Sample

1. **Commodities covering five major categories**: Energy (heating oil, natural gas, RBOB/unleaded gasoline and WTI crude oil), Grains (corn, oats, rough rice, soybean oil, soybean meal, soybeans and wheats), Meats (Feeder cattle, lean hogs, live cattle and frozen pork belly), Metal (high grade copper, palladium, platinum, silver and gold) and Soft (cocoa, coffee, cotton, lumber, orange juice and sugar)
2. **Sample Period**: January 2, 1986 and June 30, 2018
3. **Data Source**: Daily Price (Bloomberg), Weekly aggregate traders long, short and spread positions from Commitment of Trader Reports (Commodity Futures Trading Commission, CFTC)
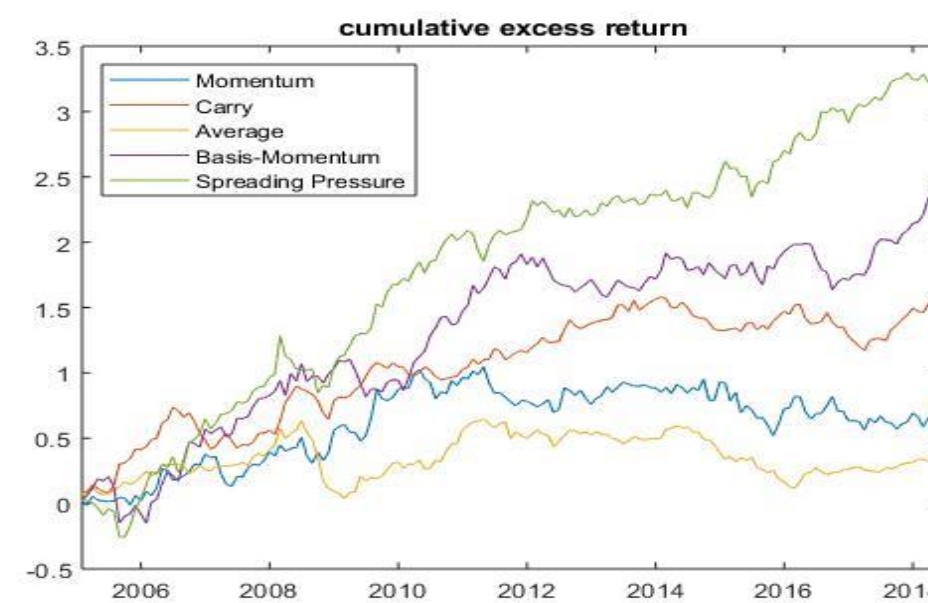
Empirical Results

1. **Does Spreading Pressure Predict Excess Returns?**

   ➢ **Univariate Sort**

	Low3	Mid	High3	Low3-High3
Mean (%)	9.64	2.89	-11.55	21.19
Std. Dev. (%)	23.95	14.1	22.69	24.42
Sharp Ratio	0.40	0.20	-0.51	0.87
Adjusted Sharp Ratio	0.40	0.20	-0.51	0.86

   ➢ **Cumulative Excess Return by Different Trading Strategy**

   ➢ **Pooled Predictive Regressions**

   $$R_{i,t+1} = \lambda_F F_{i,t} + \alpha_{t+1} + \mu_i + \epsilon_{i,t+1}$$

   α_{t+1} and μ_i are used to control time and commodity fixed effect. $F_{i,t}$ is a set of features of commodity i at time t including spreading pressure, basis-momentum, carry and momentum

Model	Spreading Pressure	Basis Momentum	Carry	Momentum	Fixed Effect	R^2
(1)	**-11.76** **(-5.43)**				Yes	**0.171**
(2)		5.08 (-4.86)			Yes	0.171
(3)			-2.78 (-0.70)		Yes	0.169
(4)				-0.11 (-0.27)	Yes	0.169
(5)	**-11.12** **(-5.10)**	4.57 (-4.36)			Yes	**0.174**

Empirical Results

2. **Is Spreading Pressure a Priced Commodity Factor?**

   ➢ **Fama-MacBeth Regressions with Different Model Specifications**

   $$R_i = \gamma_0 + \lambda_{SP}\beta_{SP,i} + \lambda_{BM}\beta_{BM,i} + \lambda_C\beta_{C,i} + \lambda_M\beta_{M,i} + \lambda_{Avg}\beta_{Avg,i} + \epsilon_{i,t}$$

Model	γ_0	λ_{SP}	λ_{BM}	λ_C	λ_M	λ_{Avg}	R^2
(1)	**0.32** **(0.40)**	**21.55** **(7.58)**					**0.70**
(2)	-1.77 (-0.85)		19.85 (3.88)			4.04 (1.56)	0.47
(3)	0.28 (0.10)			16.52 (3.97)	13.99 (1.96)	1.67 (0.51)	0.49
(4)	-0.15 (-0.12)	19.28 (5.96)	13.87 (11.01)			2.61 (2.19)	0.79
(5)	0.63 (0.41)	20.67 (6.34)		14.69 (3.05)	7.73 (2.40)	1.60 (1.21)	0.81

3. **Spreading Pressure is Related to Slope and Curvature of Future Term Structure**

   ➢ $SP_{i,t+k}^{avg} = \alpha_k + \beta_{slope,k}slope_{i,t+k}^{avg} + \beta_{curv,k}curv_{i,t+k}^{avg} + \varepsilon_{i,t+k}$

	β_{slope}	t-stat	β_{curv}	t-stat	R^2
k=0	0.17	(3.46)	-0.29	(-2.92)	0.865
k=12	0.16	(2.14)	-0.62	(-4.85)	0.866

   ➢ $\{slope_{i,t+12}^{avg}, curv_{i,t+12}^{avg}\} = \alpha + \beta_{SP}SP_{i,t}^{avg} + \varepsilon_{i,t+12}$

	β_{SP}	t-stat	R^2
$slope_{i,t+12}^{avg}$	0.03	(5.79)	0.51
$curv_{i,t+12}^{avg}$	-0.01	(-2.48)	0.33

   - Commodity and Time fixed effects are controlled
   - spreading pressure, slope and curvature are 12-month average

4. **Spreading Pressure Factor is Related to Real Economic Uncertainty**

   $$R_{SP,t} = \beta_{RealUncertainty}\Delta RealUncertainty_t + \varepsilon_t$$

	β	t-stat	R^2(%)
Spreading Pressure Factor	-18.92	(-2.66)	9.46
Long (low SP commodities)	-16.75	(-2.45)	4.80
Short (high SP commodities)	2.17	(0.33)	2.14

Conclusion

In this paper, we identify speculators held spread positions and speculators held long or short positions have different trading behaviors and market impact. After finacialization, the trading behavior of speculators held spread positions carry more information about commodity risk premia. The spreading pressure related to the speculators held spread positions has excellent predictive power of dynamic components of commodity future excess returns. Spreading pressure reflects expected slope and curvature of commodity future curve and spreading pressure factor is linked to innovations in real economic uncertainty.

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