

The valuation effects of index investment in commodity futures

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Introduction

We first date a significant surge in the amount of investment tracking commodity futures indices (financialization), a phenomenon dated heretofore with anecdotal or visual evidences. Second, we compute cumulative abnormal price changes (CAPCs) around the contract rollover (the roll) of the main commodity index (SP-GSCI), as well as their s.e. adjusted for event-induced variance and cross-correlation, due to the event overlaps, a necessary adjustment not previously accounted for. Third, we test the financialization effects on CAPCs, using non-indexed contracts as counterfactuals. Fourth, we explain the CAPCs by measures of risk (liquidity) premia required at long (short) term horizon by speculative (hedging) activity. Finally, we relate the cumulative abnormal term-structure changes (CATCs) to the transaction costs incurred by an arbitrageur (price taker).

Hypotheses

- The share of index investment in total open interest of commodity futures contracts, constituents of the SP-GSCI, show a common break over the 1999–2010 period.
- CAPCs of the nearby (first deferred) SP-GSCI contracts are significantly negative (positive) during the roll and larger in the post-financialization period.
- Liquidity (insurance) premia are positive (negative) determinants of the CAPCs during the roll.
- Transaction costs, are positive determinants of the CATCs.

Methodology

- Bai et al. (1998) algorithm for **multivariate break dating** with confidence interval.
- Event study with **event-induced variance** and **cross-correlation** s.e. adjustments (Kolari and Pynnonen, 2010).
- **Difference in differences** of CAPCs: treated (SP-GSCI) / non-treated (non-indexed) contracts, before / after the break.
- Panel regressions to explain the CAPCs with **insurance** and **liquidity premia** Kang et al. (forthcoming).
- Panel regressions to explain the CATCs with low frequency **bid-ask spread** estimations (e.g. Abdi and Ranaldo, 2017).

Results

- Break test on the intercept with Bai et al. (1998) algorithm, confidence intervals (CI) in days.

Date	CI (10%)	CI (5%)	CI (1%)	Size%	F-stat.	Signif.
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17-Dec-03	+ / - 9	+ / - 11	+ / - 15	1.80	259.14	***
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- CAPCs and CATCs with adjustments for event-induced variance and cross-correlation during the roll. (Kolari and Pynnonen, 2010).

period	$CAPC_{c,t}^{near.}$		$CAPC_{c,t}^{def.}$		$CATC_{c,t}$	
	1999–2003	2004–2010	1999–2003	2004–2010	1999–2003	2004–2010
Magnitude (bps)	41.97	17.91	50.69	27.15	8.71	9.24
unadj. t-stat.	3.30	1.56	4.50	2.58	1.42	2.05
BMP t-stat.	2.78	1.55	3.36	2.40	0.97	1.72
KP t-stat	1.02	0.67	1.26	0.88	0.34	0.87

Results

- Difference in differences of CAPCs (roll) with SP-GSCI (treated) / non-indexed contracts (non-treated) before / after the break.

$$DGSCI_{c,t} \times DFIN_t \begin{matrix} CAPC_{c,t}^{near.} & CAPC_{c,t}^{def.} \\ -48.05^* & -54.02^{**} \\ (-1.80) & (-2.03) \end{matrix}$$

- CAPCs (roll) explained with liquidity and insurance premia.

	$CAPC_{c,t}^{near.}$		$CAPC_{c,t}^{def.}$	
$VCIT_{c,t}(\%)$	2.34*	4.54	2.30*	1.56
	(1.80)	(1.03)	(1.71)	(0.71)
$\Delta HN_{c,t}(\%)$	-5.42	1.36	-0.65	-3.03
	(-1.58)	(0.46)	(-0.51)	(-0.61)
Controls + FE		y		y

- CATCs explained by measures of transaction costs.

	$CATC_{c,t}^{pre-roll}$	$CATC_{c,t}^{roll}$	$CATC_{c,t}^{pre-roll+roll}$
$TC_{c,t}$	0.63***	0.55***	0.88***
	(3.32)	(4.01)	(3.96)

Conclusion

We identify a structural break in the amount of relative index investment in December 17, 2003. The CAPCs are not significant and decrease post-financialization. We show that liquidity and insurance premia are significant determinants of the CAPCs, which confirms that index funds modify the structure of the market, acting as traditional speculators (insurance providers, liquidity consumers). Finally, we find that the CATCs magnitude is small (nine basis points at most during the roll) and is positively related to time and cross-sectional variations in transaction costs, with a coefficient close to unity. This supports the hypothesis of market efficiency with frictions and discards the previously advocated limits to arbitrage / investor's inattention hypotheses. Overall, we find very unlikely that index investment has modified the term structure.

References

- Abdi, F., Ranaldo, A., 2017. A simple estimation of bid-ask spreads from daily close, high, and low prices. *Review of Financial Studies* 30, 4437–4480.
- Bai, J., Lumsdaine, R. L., Stock, J. H., 1998. Testing for and dating common breaks in multivariate time series. *Review of Economic Studies* 65, 395–432.
- Kang, W., Rouwenhorst, K. G., Tang, K., forthcoming. A tale of two premiums: The role of hedgers and speculators in commodity futures markets. *Journal of Finance*.
- Kolari, J. W., Pynnonen, S., 2010. Event study testing with cross-sectional correlation of abnormal returns. *Review of Financial Studies* 23, 3996–4025.

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R package for BLS algorithm (forth.): <https://github.com/loicym>