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## What does futures market interest tell us about the macroeconomy and asset prices? ☆

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### ABSTRACT

Economists have traditionally viewed futures prices as fully informative about future economic activity and asset prices. We argue that open interest could be more informative than futures prices in the presence of hedging demand and limited risk absorption capacity in futures markets. We find that movements in open interest are highly pro-cyclical, correlated with both macroeconomic activity and movements in asset prices. Movements in commodity market interest predict commodity returns, bond returns, and movements in the short rate even after controlling for other known predictors. To a lesser degree, movements in open interest predict returns in currency, bond, and stock markets.

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## 1. Introduction

Economists have traditionally viewed futures prices as fully informative about future economic activity and asset prices and have remained silent on the role of open interest, or the amount of futures contracts outstanding (Samuelson, 1965; Grossman, 1977). The theory of backwardation implies that the risk premium depends only on the net supply–demand imbalance among hedgers in the futures market, not on the gross amount of futures contracts outstanding (Keynes, 1923; Hicks, 1939). The range of empirical work that uses futures market data reflects these traditional theories. Macroeconomists use commodity futures and spot prices to forecast inflation. International economists use the forward discount, or the ratio of futures to spot price in the currency market, to forecast movements in exchange rates. Financial economists use the yield spread to forecast bond and stock returns.

In this paper, we show that open interest contains information about future economic activity and asset prices that is not fully revealed by futures prices or net supply–demand imbalances among hedgers in futures markets. Our point of departure from these traditional theories is the observation that gross (as opposed to net) hedging demand, by either producers or consumers of commodities, tends to be pro-cyclical. For example, oil producers that anticipate higher demand could go short oil futures, while utilities that anticipate higher demand from manufacturing firms could go long oil futures. Importers that anticipate higher US demand could go short currency futures, while exporters that anticipate higher US demand could go long currency futures. Financial firms and insurance companies that anticipate expansion of their balance sheets could enter bond and stock market futures to hedge interest rate and equity risk. In all of these examples, anticipation of higher economic activity leads to higher hedging demand, which drives up open interest.

In a simple model, we show that open interest is a more reliable signal of higher economic activity and, consequently, future movements in asset prices than futures prices. The key assumption is limited risk absorption capacity in the futures market. If there is excess hedging demand from producers that want to be short futures, the futures price will fall due to limited arbitrage by speculators. Conversely, if there is excess hedging demand from consumers that want to be long futures, the futures price will rise due to limited arbitrage by speculators. Because the futures price can either fall or rise in response to anticipation of higher economic activity, the futures price is a less reliable signal of future economic activity and asset prices than open interest.

We show a number of new facts that are consistent with this view of futures markets. First, movements in open interest are highly correlated with movements in both futures and spot prices in commodity, currency, bond, and stock markets. In each of these markets, movements in open interest are positively correlated with the Chicago Fed National Activity Index, which is a weighted average of 85 monthly indicators of US economic activity. Periods of high US economic activity tend to coincide with

high commodity returns, appreciation of foreign currencies relative to the US dollar, low bond returns, and high stock returns. The fact that movements in open interest are pro-cyclical is surprising because open interest does not necessarily signal the direction of hedging demand.

Second, movements in open interest predict returns. Our main evidence is from the commodity market, which is relatively ideal for testing our hypothesis because hedging demand and limited risk absorption capacity tend to be more important in this market. Moreover, our sample for the commodity market starts in 1966, which is much earlier than 1984 for the other markets. We find that a standard deviation increase in commodity market interest increases expected commodity returns by 0.73% per month, which is both economically large and statistically significant. Commodity market interest remains a powerful predictor even after controlling for a number of other predictors including the short rate, the yield spread, the Chicago Fed National Activity Index, commodity basis (i.e., the ratio of futures to spot price in the commodity market), commodity market imbalance (i.e., excess hedging demand from hedgers), and past commodity returns. Interestingly, a high yield spread or a high Chicago Fed National Activity Index predicts low commodity returns, implying that expected commodity returns are procyclical.

We find qualitatively similar, but statistically weaker, evidence for predictability of returns in currency, bond, and stock markets. We find that rising currency market interest, which signals higher US economic activity and rising inflation expectations, predicts appreciation of a portfolio of foreign currencies relative to the US dollar. Notably, currency market interest has more forecasting power than the forward discount, which is a leading predictor of exchange rates in international finance. Similarly, rising bond market interest, which signals higher economic activity and rising inflation expectations, predicts low bond returns. Finally, rising stock market interest predicts high stock returns, although the statistical evidence is the weakest for this market.

Third, we find that rising commodity market interest predicts low bond returns and a rising short rate. A standard deviation increase in commodity market interest decreases expected bond returns by 0.32% per month, which is highly statistically significant. This finding supports our hypothesis that commodity market interest reflects hedging in response to news about higher economic activity. Anticipation of higher economic activity, which is bad news for the bond market, predicts low bond returns and rising inflation expectations.

Our preferred interpretation of the evidence is that open interest contains information about future economic activity and inflation expectations that is not immediately impounded in asset prices. An alternative interpretation, that open interest captures time-varying risk premium, is less likely because the relation between movements in open interest and asset prices implies momentum instead of mean reversion. That is, movements in open interest are positively correlated with both contemporaneous and future returns, which imply momentum generated by underreaction to news captured by open interest.

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