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Intraday seasonality in efficiency, liquidity, volatility and volume: Platinum and gold futures in Tokyo and New York☆

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ABSTRACT

We investigate intraday seasonality in, and relationships between, informational efficiency, volatility, volume and liquidity. Platinum and gold, both traded in overlapping sessions in Tokyo and New York, provide an interesting comparison because Tokyo is an internationally important trading venue for platinum but not for gold. Our analysis indicates that both platinum and gold markets in Tokyo are dominated by uninformed trading, while there is evidence supporting both uninformed and informed trading in New York. Separating global trading hours into Tokyo, London and New York day sessions, we also find that uninformed trading is more prevalent during the Tokyo day session while informed trading dominates the New York day session for both metals in both locations. This evidence suggests that futures markets for the same underlying commodity on different exchanges have different microstructure characteristics, while both informed and uninformed traders choose when to trade depending on market characteristics in different time zones.

1. Introduction

Why do multiple exchanges that trade the same commodity exist? A number of futures exchanges have extended their trading hours to include night sessions, overlapping with each other. It is now common for different exchanges to trade futures based on the same underlying commodity at the same time. Arbitrage activity, assisted by the globalisation of commodity markets and advances in trading technology, encourages commodity futures mid-prices on different exchanges to be virtually identical after adjusting for contract specifications and exchange rates. A straightforward argument would suggest that market participants prefer to trade on the exchange with superior price discovery, efficiency and liquidity. Therefore, trade in the futures of a particular commodity would be expected to agglomerate to one exchange, as higher liquidity and scale economies encourage traders to the venue. However, multiple futures exchanges persist for many commodities.

In this paper, we aim to shed light on why this may be the case. We investigate whether markets for commodities futures contracts on different exchanges have different microstructure characteristics. Such differentiated characteristics may be advantageous for certain investors, and provide a competitive advantage for the exchange. We address this question by estimating and comparing the intraday

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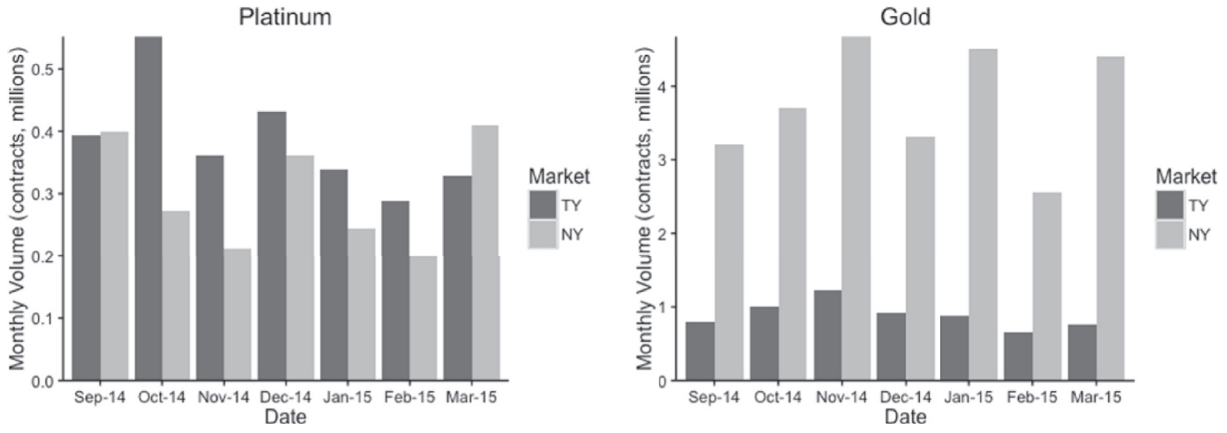

Fig. 1. Monthly contract volume.

seasonality of informational efficiency, volatility, volume and liquidity in platinum and gold futures traded in overlapping sessions on exchanges in Tokyo and New York.

Platinum and gold futures are traded on the Tokyo Commodity Exchange (TOCOM), while in New York, platinum futures are listed on the New York Mercantile Exchange (NYMEX) and gold on the Commodity Exchange, Inc. (COMEX). Historically, TOCOM has been an important global venue for trading platinum futures. In the past, activity in the global market for platinum has been heavily influenced by the hedging trades of large industrial end consumers of platinum metal in Japan who access the futures market via TOCOM. Until recently, the total weight of platinum represented by futures traded on TOCOM far outweighed that of NYMEX. In 2008 for example, 3.5 million kilograms was traded on TOCOM,[1] or 4.4 times that of NYMEX. However, annual volume on the Tokyo market has been in long-term decline, down from over 16 million contracts in 2001 to just over 3.1 million contracts in 2016 (including both the platinum standard and mini contracts). In 2015 NYMEX was about 2.9 times larger than Tokyo by weight of platinum, and 4.2 times larger in 2016. However, in terms of contract volume, monthly turnover in Tokyo usually exceeds that of New York (see Fig. 1). The TOCOM contract unit is 500 g or 16.08 troy ounces of metal for the standard future and 100 g for the mini contract, versus the NYMEX standard specification of 50 Troy ounces.[2] Despite the decline in TOCOM volume, a not insubstantial share of the global platinum futures trade still occurs on the exchange. Important end users of physical platinum continue to use TOCOM futures for hedging. Global futures trade in platinum is concentrated on the two venues TOCOM and NYMEX. This contrasts with gold, for which TOCOM's annual futures turnover by weight of metal is small compared to that on COMEX. As also shown in Fig. 1, COMEX gold turnover by number of contracts still dwarfs that on TOCOM despite the COMEX contract being 100 troy ounces compared with 1 kg or about 32.15 troy ounces for the TOCOM standard contract. Gold pricing is considered driven by global risk and monetary factors, and trading is decentralised (Hauptfleisch et al., 2016). Further, there are no features of the gold business in Tokyo that would suggest the location is particularly important in the determination of global gold futures prices. Tokyo gold futures trade represented about 6 percent and 5 percent of COMEX trade by weight in 2015 and 2016, respectively. Accordingly, platinum and gold futures traded in Tokyo and New York provide an interesting comparison for the analysis of intraday microstructure patterns.

TOCOM has become a more internationalised market over time. Trade orders originating outside Japan have been an increasing proportion of total trade on TOCOM since May 2009 after the exchange launched a new trading platform and night session (TOCOM, 2015). International buy and sell orders make up a substantial portion of both the platinum and gold trade on TOCOM during our sample period.[3] Foreign buy and sell trades in the platinum market made up approximately 36 percent and 45 percent of the total in 2014 and 2015, respectively. The proportion of foreign transactions in the gold market was higher, with 46 and 51 percent of both buy and sell trades in 2014 and 2015, respectively. Most foreign orders over this period originated from the United States, Australia, Singapore and Hong Kong.

An important difference between the Tokyo and New York futures markets for both platinum and gold is the most actively traded maturity. In New York, as with most commodity futures markets, nearby contract months are the most actively traded, while deferred contract months tend to be inactively traded. As noted in Kang et al. (2011), platinum and gold in Tokyo are actively traded in deferred contract months and inactively traded in nearby contract months. Our analysis uses data for the most liquid contract month for each metal on each exchange. Accordingly, we use the nearby contract months for platinum and gold in New York, and the deferred contract months for platinum and gold in Tokyo. Although this introduces a maturity mismatch, we do not believe this makes a material difference to our analysis. We are interested in comparing the microstructure characteristics of the most actively traded contract for each

[1] Refer to http://www.tocom.or.jp/historical/dekidaka.html for TOCOM trading volume.

[2] TOCOM contract specifications can be found at http://www.tocom.or.jp/guide/youkou/platinum.html and http://www.tocom.or.jp/guide/youkou/gold.html, NYMEX at http://www.cmegroup.com/trading/metals/files/platinum-and-palladium-futures-and-options.pdf, and COMEX at http://www.cmegroup.com/trading/metals/precious/gold_contractSpecs_futures.html.

[3] Data on foreign customer transactions is obtained from http://www.tocom.or.jp/jp/historical/download.html.