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Global price discovery in the Australian dollar market and its determinants

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ABSTRACT

With Australia's growing importance in the global economy, the Australian dollar (AUD) has started to play a significant role in the global Foreign Exchange (FX) market. Using intraday trading data over the period of January 1999 to December 2013, we examine the determinants of price discovery in the AUD markets at two different time horizons. We find that the short-run determinants of price discovery include macroeconomic news, order flows and market state variables (i.e., return, volatility, trading volume and bid/ask spread). After controlling for the cross-region information flow and dynamic self-dependence, we find that more favorable market states and more unexpected order flows on macroeconomic news announcement days make a significant contribution to price discovery in the AUD market. Furthermore, we found that a higher level of market integration and consolidation contributes to price discovery process in the long-run.

1. Introduction

In recent years, the Australian Dollar (AUD) has started to play an increasingly important role in the global foreign exchange (FX) market. According to the Bank for International Settlements (BIS, 2013), the market share of the AUD in the global foreign exchange (FX) trading has steadily increased. By 2013, the AUD has become the fifth most important currency in terms of turnover. The increase in the AUD trading could be attributed to a higher level of internationalization of the Australian economy (Edison et al. 2003; Debelle et al. 2006; Battellino and Plumb 2011), as well as the growth in Australia's international trade, especially the increasing demand for Australia's natural resources from emerging economies, such as China.

This paper focuses on the determinants of dynamic information shares in AUD trading. More specifically, using the intraday price quotes of AUD against the US Dollar (USD) over the period of 1999–2013, we firstly estimate the magnitudes of information shares of the global FX market. Then we attempt to identify the determinants of estimated information shares at two different time horizons (i.e. daily and monthly information shares).

The issue of price discovery in financial markets has been receiving more attention in recent decades due to rapid globalization of exchanges as well as the availability of high-quality trading data. For example, using data on Helsinki Stock Exchange, Booth et al. (2002) examine the roles of upstairs and downstairs markets in price discovery. Huang (2002) explores the impact of the Electronic Crossing Networks (ECNs) on price discovery of NASDAQ stocks. Hasbrouck (2003) analyze the importance of different trading venues for price discovery of the US equity indices. Wang and Yang (2011) propose a structural vector autoregressive (SVAR) model and a non-parametric approach to measure the global information distribution in the FX market and conclude that (i) the information

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shares of the four exchange rates considered in their paper (i.e. AUD/USD, GBP/USD, EUR/USD, and USD/JPY) are dominated by Europe and the U.S. and (ii) Asia is losing information shares in AUD trading. [Chai et al. \(2015\)](#) estimate the information distribution in the over-the-counter (OTC) gold market over the period of 1996–2012, which shares a number of characteristics with the foreign exchange market. They conclude that information on the gold price is concentrated in the London/New York overlapping trading hours.

Some existing studies have considered the determinants of information shares in different financial markets. Within the context of Euro bond futures market, [Fricke and Menkhoff \(2011\)](#) find that (i) order flow plays a dominant role in the price discovery process and (ii) order flow and information share of futures contracts are positively correlated. [Mizrach and Neely \(2008\)](#) show that a higher spread of the US bond futures contracts increases the price of incorporating non-common knowledge, which hinders the market's role in price discovery relative to the spot market. However, [Patel et al. \(2014\)](#) find that the US options market makes a fairly large portion (i.e. about one third) of contribution to price discovery.

While a number of studies have considered the measures as well as the determinants of price discovery in FX market, some important issues are yet to be fully settled, especially in relation to AUD. This paper aims to fill this gap in the existing literature. While focusing on the price discovery in the AUD market, this paper makes some important contributions to the existing literature. First, we use a non-parametric approach to measuring the global information distribution of the 24-hour AUD market, which provides an appropriate setting in the framework of sequential markets. The widely-used methodology of [Hasbrouck's \(1995\)](#) information share measure relies on the implicit assumption that price differentials among markets are bounded by arbitrage opportunities and hence the prices of the traded assets are cointegrated. Such price differentials can only be observed in each market when these markets are open and studies are typically conducted for short periods, during which trading hours overlap (e.g., [Grammig et al. 2005](#); [Pascual et al. 2006](#)). For sequential markets, like the FX market, however, the prices in different markets are not necessarily cointegrated as the fundamental prices may change over time. In order to mitigate this drawback in [Hasbrouck's \(1995\)](#) information share approach, we utilize a non-parametric Two-scale Realized Variance (TSRV) approach. This approach not only yields a relatively more accurate measure that can be easily applied to sequential markets but also mitigates the effect of contemporaneous correlations as documented in [Hasbrouck \(1995\)](#). Furthermore, the tick-by-tick data used in this study allows us to fully exploit the information and detect information-induced volatility jumps ([Erdemlioglu et al., 2013](#)). Using data from January 1996 to December 2003, [Wang and Yang \(2011\)](#) utilize the same non-parametric approach to measuring the price discovery of four currencies including AUD. However, the market share of the AUD in the global FX trading has increased significantly after 2000, which could be attributed to Australia's closer economic ties with the emerging Asian economies, and hence a re-examination of the case of AUD, using a longer time series that includes the post-2000 period, is highly desirable.¹

Second, this paper attempts to identify the determinants of information shares for the AUD trading both in the short- and long-run. The conventional macroeconomic models assume that information can be reflected by exchange rates directly. However recent empirical studies on FX microstructure (e.g., [Love and Payne 2008](#); [Evans and Lyons 2002a, 2002b, 2008](#)) emphasize the role of order flows. In this paper, we argue that order flow is a crucial channel through which heterogeneous information is transmitted into the price. While taking order flows into account, we link the information shares with macroeconomic news announcements. Furthermore, we decompose the order flows into expected and unexpected components and examine their impacts on price discovery process separately. We also contribute to the existing literature by proposing a model of long-run determinants of information shares, which evaluates the lasting impacts of market development and integration of financial centers on their roles in price discovery and providing some policy implications accordingly.

Third, in this paper, we rely on a much broader set of macroeconomic news related to both the U.S. and Australia. In the previous studies, the most commonly used proxies of macroeconomic news are scheduled announcements on Gross Domestic Product (GDP), unemployment, interest rates, durable goods orders, and trade balance ([Evans and Lyons 2008](#)). In this paper, we make use of Bloomberg News, which includes both scheduled and unscheduled announcements. Our dataset shows that scheduled announcements account for less than 5% of the total macroeconomic news. The existing studies on the AUD have mostly ignored unscheduled announcements that account for a very large proportion of macroeconomic news.² Therefore, we aim to examine whether the unscheduled news affects the price discovery process differently.

The remainder of the paper is structured as follows. [Section 2](#) estimates the information shares of four sequential markets (i.e. Asia, Europe, London/New York overlapping hours, and the U.S.) in the AUD trading. [Section 3](#) proposes the hypotheses on the determinants of price discovery in the AUD market. Following the introduction to the dataset and the empirical specifications in [Section 4](#), the empirical results and various robustness checks are reported in [Section 5](#). Policy implications along with the conclusions are presented in [Section 6](#).

2. Global information shares for the AUD trading

2.1. Two-scale realized variance

In this paper, the approach to measuring the information share in the AUD market is based on the fast-expanding literature on

¹ The average daily transactions of the AUD in the main markets over the sample period are reported in [Appendix A](#).

² The unscheduled news includes all the real-time, breaking news on the economic and financial markets of Australia and the U.S., as well as key international market-moving headlines.

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