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Private information, capital flows, and exchange rates ☆

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ABSTRACT

Not all international capital flows influence exchange rates equally. Capital flows induced by foreign investors' transactions in local stock markets have an impact on exchange rates that is economically significant and permanent, whereas capital flows induced by investors' transactions in local government bond markets do not. The differences in price impacts are related to differences in the amounts of private information conveyed by these flows. Our findings are based on daily-frequency data on all transactions undertaken by foreign investors in the stock, bond, and onshore FX markets of Thailand over a period of nearly two years.

1. Introduction

The determination of foreign exchange rates has long been an important but empirically challenging topic in international economics. Models that aim to relate foreign exchange (FX) rates directly to macroeconomic fundamentals tend to have disappointing out-of-sample and forecasting properties (Meese and Rogoff, 1983; Cheung et al., 2005, 2017). Instead of contin-

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uing to try to model exchange rates primarily as variables that equilibrate exports and imports of goods and services across countries, economists turned to modeling exchange rates as the relative prices of assets denominated in various currencies, with trade flows and financial flows *both* responding to asset demands and supplies. Moreover, beginning with the work of Glosten and Milgrom (1985), Kyle (1985), and Admati and Pfleiderer (1988), it has been argued that in order to understand the price formation in a financial market more fully, one needs to distinguish between the private and public information sets of market participants. Because published data about macroeconomic fundamentals constitute public information, models that rely exclusively on macroeconomic fundamentals are bound to disappoint as the miss the influence investors' private information.

There is by now broad agreement among researchers that FX order flow, defined as the difference between buyer-initiated and seller-initiated transaction volumes in the FX market, helps explain exchange rates because it conveys investors' private information. Market-relevant private information can pertain to future changes in aggregate economic activity and inflation as well as to firm-level cash flows and discount rates. FX order flow that is driven by market participants' private information ("informed trades") should have, in principle, a permanent effect on exchange rates. In contrast, FX order flow that is not driven by private information ("noise trades") should have at most a temporary impact on exchange rates. Models of exchange rate determination which include order flow as an explanatory variable—such as those in Evans and Lyons (2002, 2012) and, more recently, Krohn and Moore (2017)—tend to dramatically outperform models which rely exclusively on macroeconomic variables and other forms of public information, in terms of both in-sample goodness of fit and out-of-sample forecasting accuracy.[1]

These empirical studies show convincingly that FX order flow matters because it conveys private information. However, they do not examine *where* in the economy the private information originates. Rime et al. (2010, p. 73) note that "economists are still [waiting] for conclusive evidence explaining where the information in order flow stems from." Specifically, does the private information originate in the FX market itself, or is it generated in other financial markets, and is it transmitted to the FX market via linkages between financial markets?

Several empirical studies have found significant statistical linkages between foreign investors' order flow in local stock markets and returns in the FX market (see, e.g., Goodhart, 1988; Brooks et al., 2004; Gehrig and Menkhoff, 2004; Siourounis, 2008; Albuquerque et al., 2008; Dunne et al., 2010). Francis et al. (2006, p. 219) note that "there are important, yet not well understood, dynamic relationships between international equity and currency markets and these are driven by information spillover via the mechanism of currency order flow."[2]

The empirical findings we present in this paper are fully consistent with these earlier studies. One main contribution of our paper is to expand the scope of the earlier work, by estimating the effects of FX order flow associated with investors' transactions in *both* stock and government bond markets. Using an order flow regression setup, we find that the portion of foreign investors' FX order flow that is associated with their transactions in the local stock market has a statistically significant contemporaneous influence on the exchange rate, whereas the portion of FX order flow that is related to their government market transactions does not. In addition, we find that the effect of stock-market-related FX order flow on the exchange rate is permanent, whereas all other portions of FX order flow have at most a transitory influence.

To establish these empirical results, we employ datasets from three different financial markets—FX, stock, and bond markets—for an entire country. The data consist of nearly two years' worth of all *daily-frequency* transactions undertaken by foreign investors in the onshore foreign exchange, stock, and bond markets of Thailand. Importantly, the data comprise all buy and sell transactions of foreign investors in all three markets. We also exploit knowledge of certain institutional features of financial markets in Thailand, such as regulations which strictly limit the size of Thai baht-denominated bank balances that may be held by foreign investors in Thailand, to demonstrate that the statistical linkages across these financial markets are not mere coincidences but are, at least in part, induced by these institutional features.

To the best of our knowledge, our study is the first of its kind that analyzes the exchange rate determination puzzle empirically by combining comprehensive datasets on order flow and returns from *three* separate financial markets—FX, stock, and bond markets—for an entire country. Having datasets for three financial markets is what makes it possible to estimate the portions of FX order that are associated with, or triggered by, order flow in the stock and bond markets. This, in turn, makes it possible to answer the question as to whether the private information that appears to influence exchange rates is diffuse, i.e., whether it is generated roughly equally by transactions in both domestic capital markets, or if it is concentrated in just one of the domestic markets—the stock market. By utilizing data from Thailand, a major emerging market economy, our study also serves to broaden the geographical range of data employed in exchange rate determination studies; previous studies in this field have generally used datasets from developed economies.[3]

[1] For surveys of the market microstructure literature on the subject of exchange rate determination, see Lyons (2001), Sarno and Taylor (2002), Osler (2009), and King et al. (2013). Linkages between private information and capital flows—as opposed to those between private information and exchange rates—are examined by Forbes and Warnock (2012), Broner et al. (2013), and Tille and van Wincoop (2014). Ter Ellen et al. (2013) examine various decision rules institutional investors report using for their FX market transactions.

[2] It is also well known that FX dealers routinely scrutinize their own customers' order flow carefully in order to extract any information that may be relevant for exchange rates; importantly, this scrutiny extends to linkages in their customers' order flow across two or more financial markets.

[3] Exceptions to this claim are Richards (2005) and Chai-Anant and Ho (2008), who provide descriptions of investors' trading behavior and of financial market dynamics in several Asia–Pacific economies. Rime and Tranvåg (2012) and Duffuor et al. (2012) also examine order flow and exchange rate dynamics in selected emerging-market economies. Gyntelberg et al. (2014) examine empirically whether portfolio balance effects may explain returns in both the stock market and the FX market of Thailand.