Bond futures and order imbalance Examining international linkages

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ABSTRACT

Order imbalance methodology is utilized to examine the link between trading activity and returns in the six most liquid international bond futures markets. Order imbalances are strongly related to contemporaneous returns, in the expected direction (i.e. excess buy (sell) orders push down (up) yields), even after controlling for aggregate market volume. There is evidence of contrarian investor behaviour following an increase in yields, but continuation of order imbalances when yields are falling (the prices of bond futures are rising). International bond futures markets are strongly intertwined with the US market having a strong influence on the returns and order-flow across all countries; this is likely an indication of the spill-over effect of US macroeconomic data.

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1. Introduction

Futures markets play a key role in the global financial system, allowing owners of physical assets to hedge their price risk and providing speculators with a fast and inexpensive method of positioning their capital. Ultimately, bond futures markets affect the cost of funding of both corporate and governments. Previous literature has studied the relationship between trading activity and the return of financial assets but has mainly focused on US equity markets and the use of volume as a proxy for trading activity. Benson and Hagerman (1974), Foster and Viswanathan (1990), Hiemstra and Jones (1994) and Lo and Wang (2000) find that volume is positively related to price change, and closely linked to liquidity.

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However, it is possible that measuring trading activity by volume may actually conceal information. Trading volume can be high either due to a preponderance of buyer-initiated or seller-initiated trades, or because there is generally a large amount of trading interest that is evenly distributed between buyers and sellers; each possibility having implications for prices and liquidity.

Order imbalance, defined as the difference between buyer-initiated and seller-initiated trades, is a measure of trading activity that has been suggested as more informative than volume. The impact of order imbalance on returns and liquidity may be the result of information asymmetry, or inventory adjustment. Glosten and Milgrom (1985) and Kyle (1985) develop theoretical models which suggest that, in equilibrium, the sensitivity of prices, and prevailing liquidity, will depend on the level of information asymmetry. The inventory models of Stoll (1978) and Ho and Stoll (1983) provide an alternative explanation; a large order imbalance may exacerbate the inventory problem faced by market-makers who will respond by changing bid-ask spreads and amending price quotations.

Chan et al. (1999), Chan and Fong (2000), and Hasbrouck and Seppi (2001) study order imbalance in US equity markets over relatively short periods and find that there is a strong predictive ability for subsequent stock returns. Chordia et al. (2002) conducted the first extended study using order imbalance on NYSE stocks and found that order imbalances are strongly related to contemporaneous absolute returns, as well as past market returns, and that investors exhibit contrarian behaviour in aggregate.

More recently, variants of the order imbalance methodology have been used to analyze the foreign exchange and fixed income markets. Evans and Lyons (2002) and Evans (2002) provide evidence that order flow contains information about economic fundamentals, and so performs an important function that explains price movements. Pasquariello and Vega (2007) find that unanticipated order flow has a significant and permanent impact on daily bond yield changes, and correlation between order flow and price changes is higher when the dispersion of beliefs among market participants is high. Underwood (2009) looks at the cross-market relationship between equities and bonds and notes that aggregate order imbalances play a strong role in explaining returns. Brandt and Kavajecz (2004) examine price discovery in the US Treasury market, finding that order-flow drives price movements, accounting for up to 26% of the variation in yields on days without macroeconomic announcements; Smales (2012a) reports similar results in Australian markets in the period around macroeconomic announcements.

To date, non-US fixed income market and futures markets in particular have largely been neglected in this research. With the substantial size, scope and importance of the market for Government bond futures there is need for a greater understanding of both the drivers of returns within individual futures markets and the information flow between the markets of different countries. The market for Government bond futures differs from equity markets in several crucial ways, and thus provides strong motivation for extending the existing work on order imbalance within equity markets to the bond futures market. Firstly there is a different clientele with private or individual investors constituting a smaller part of the futures market. Second, the bond futures market is more frictionless than the equity market, with lower transaction costs, reduced liquidity concerns, and no short-sale constraints. Third, equity order imbalance on any given day may be driven by firm-specific factors, but this cannot be the case with bond futures which trade on the basis of macroeconomic factors. Additionally, there is a different inventory adjustment process within the bond futures market; while specific market makers exist within the equity market, this is not the case with bond futures. However, the interest rate swaps (IRS) and physical bond market does have market makers who use will use futures to hedge – it is therefore possible that a different transmission process operates between order-flow and returns in such a market. Finally, and perhaps most importantly, there is a lower level of fragmentation within the bond futures market; equities trade across a number of exchanges and dark-pools, for example Madhaven (2012) examines U.S. equities trading across 14 exchanges with just 40% of volume trading on the two largest exchanges, while each bond future only trades on one primary exchange.[1] As a result of the difference in the level of fragmentation it may be possible that a more explicit, and directly examinable, relationship exists between order imbalance and the returns on bond futures.

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[1] US Treasury Futures are an exception as whilst over 90% of the volume is transacted electronically through CME Globex there is still the option of open outcry trading.