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A substitution effect between price clustering and size clustering in credit default swaps

Lei Meng^a, Thanos Verousis^{b,*}, Owain ap Gwilym^b

^a School of Business, East China University of Science and Technology, Shanghai, China

^b Bangor Business School, College Road, Bangor University, Gwynedd, LL57 2DG, UK

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ABSTRACT

In a perfectly liquid market, investors' optimal allocation decisions refer to maximizing all three dimensions of liquidity, namely immediacy, width and depth. To the extent that investors fail to accommodate size (depth) along with price (width) in their optimal allocation decisions, their overall costs may increase. This paper focuses on the substitution of width and depth by investigating the simultaneous determination of price clustering and size clustering in the credit default swap (CDS) market. We report strong evidence that when traders round prices they tend to quote more refined sizes, and vice versa. The findings highlight a clear trade-off between price clustering and notional amount in the CDS market, and contribute to the emerging literature on size clustering.

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1. Introduction

If a market is perfectly liquid, market participants can trade a desired quantity immediately without moving the market price. However, if a market is not perfectly liquid, market participants must compromise on one or more of the three dimensions of liquidity, i.e. immediacy, width and depth (see Hodrick and Moulton, 2009). Immediacy refers to the speed at which trades of a given size can be executed at a given cost; width refers to the cost of completing a trade of a given size; depth refers to the size of a trade that can be arranged at a given cost (see Harris, 2003, p. 398). For example, market participants may have to choose from a discrete set of prices or frequently quoted sizes for a financial asset in order to speed up order execution. Price clustering refers to the observation of a concentration

* Corresponding author. Tel.: +44 1248 388393; fax: +44 1248 383228.
E-mail address: t.verousis@bangor.ac.uk (T. Verousis).

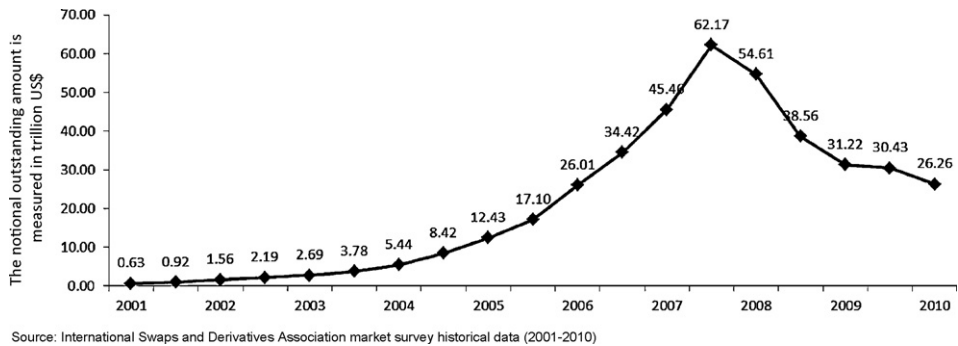


Fig. 1. Outstanding notional amount of credit default swaps.

of quotes or trades at certain integers, or significantly greater than 50% of quotes or trades occurring at even price fractions. There have been several proposed theories of the causes of price clustering, e.g. attraction of numbers (e.g. Goodhart and Curcio, 1991), price resolution (Ball et al., 1985), negotiation costs (Harris, 1991), and cultural factors (Brown et al., 2002) as well as empirical findings in support of different theories (e.g. Grossman et al., 1997). The presence of price clustering can have a significant impact not only on liquidity (as bid–ask spreads can only take discrete values given discrete bid and ask prices (see Christie and Schultz, 1994)), but on asset pricing in general since it implies non-randomness of the price process.

Analysis of size clustering is a recently emerging theme in the literature, which focuses on the quantity dimension of liquidity. There is currently no consensus definition; here, size clustering is defined as the concentration of the size of quotes or trades at certain amounts. There have also been theories of the causes of size clustering (e.g. Hodrick and Moulton, 2009), though not as well-developed as those relating to price clustering. There has been investigation of the presence and determinants of trade size clustering in the equity, foreign exchange and index futures markets (see Alexander and Peterson, 2007; Moulton, 2005; ap Gwilym and Meng, 2010; respectively), but not in other markets so far. There are some prior indications that size clustering (in notional amounts) exists in credit default swaps (CDS) (e.g. Houweling and Vorst (2005)), which suggests that the CDS market could be a fruitful location to investigate the possibility of substitution between price clustering and size clustering.

Credit derivatives are one of the most important financial innovations of the last 25 years, offering users the ability to manage credit risk. The credit derivatives market has attracted particular attention during the US sub-prime crisis and the European sovereign debt crisis, but relatively little empirical evidence exists relating to the market's microstructure. Heightened attention to CDS contracts is highlighted by the designation of a “credit event” by the International Swaps and Derivatives Association (ISDA) for the Greek debt restructuring in March 2012. The notional outstanding amount of CDS, the most important credit derivative product, grew from US\$ 0.92 trillion in 2001 to US\$ 62.17 trillion in 2007, a 6766% increase. However, due to the effects of the recent financial crisis, this fell back to 2006 levels and was estimated at US\$ 26.26 trillion in 2010 (see Fig. 1). Whereas the above prior literature has considered clustering in trade sizes, this paper focuses on size clustering in terms of notional amounts in CDS contracts. We adopt this approach because the notional amount forms the basis for calculating the payoff of a CDS contract, and this feature also adds to the uniqueness of this study.

This paper investigates the presence of price clustering and size clustering in the CDS market, and whether the two forms of clustering in this market are substitutes. To the best of our knowledge, this is the first empirical study that draws links between price clustering and size clustering in a formal model based on simultaneous determination. Additionally, although price clustering has been widely studied in financial markets, there are no such studies of the CDS market. This is important, given the growth of this market, and the attention it has received in recent years. Size clustering is an emerging theme in the literature, and has only been previously documented in the equity, foreign exchange and index futures markets.

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