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Hoarding and short-squeezing in times of crisis: Evidence from the Euro overnight money market[☆]

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ABSTRACT

We study at an individual level the prices that banks pay for liquidity, measured here by overnight rates charged for unsecured loans on the e-MID trading platform, which is an important and transparent money market for European banks. Using data from both before and within crisis sub-periods, we provide evidence that borrower's and lender's own liquidity status has a significant impact on overnight rates, both before and during the turmoil periods. We first review the literature focused on the role of liquidity risk in the recent interbank turmoil. We then implement an integrative LSDV estimation to assess the determinants of e-MID overnight rates. In these regressions, we put together measures of the three types of factors that have received theoretical and empirical support, namely, counterparty risk, liquidity factors and market imperfections. We find that even when counterparty risk and market imperfections are controlled for, banks with higher funding liquidity risk pay an interest rate premium. We show that this is probably explained by hoarding and short-squeezing behavior of liquidity-long banks. These phenomena disappeared when the ECB launched its full allotment policy in October 2008.

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1. Introduction

The recent financial turmoil has revealed overlooked fragilities in the wholesale money market, when the spreads of short-term interbank loans started to become exceptionally large and volatile during summer 2007. According to the expectations theory of the yield curve, current and expected short-term interest rates influence all other rates. They consequently form the first stage of the monetary policy transmission mechanism. That is why a large theoretical and empirical body of literature has developed around the determinants of these tensions in interbank markets. Several significant advances have been made that show that both solvency and liquidity problems have played a role in the evolution of money market rates during this troubled period. However, the contribution of liquidity risk among these factors remains controversial. Some rigorous empirical studies that tried to disentangle the components of money market spreads over the crisis period obtained disappointing results regarding the impact of liquidity risk and liquidity hoarding behaviors (Angelini et al., 2011; Afonso and Shin, 2011; Afonso et al., 2011). In the same perspective, some event studies of central bank interventions during the

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turmoil found that the provision of supplementary liquidity did not relieve interbank tensions. Their authors consequently concluded that public liquidity crowds out private liquidity in a context of elevated counterparty risk and high asymmetric information (Taylor and Williams, 2009; Brunetti et al., 2011). These empirical results are supported by various modeling endeavors that conclude in favor of the explanation of the interbank market freeze by solvency or adverse selection problems (see, e.g., Flannery and Sorescu, 1996; Flannery, 1996; Furfine, 2001; Freixas and Jorge, 2008; Heider et al., 2008).

This set of results challenges the view that lender of last resort interventions would be an efficient resolution mechanism for interbank market crises. They also question the emphasis put by central bankers and prudential regulators on banks' liquidity position and the ongoing implementation of the two liquidity ratios proposed in the Basel 3 framework. If insolvency and asymmetric information are the roots of all evil, lender of last resort interventions are at best relevant to curing market liquidity problems, but they are useless in treating liquidity hoarding in the interbank market. The only relevant treatment for the latter disease would be to restructure insolvent banks and reduce asymmetric information by publishing stress tests or any other type of relevant information on banks' solvency (Brunetti et al., 2011).

Nevertheless, a number of theoretical and empirical papers now suggest that liquidity problems indeed played a role during the interbank market turmoil. On the theoretical side, contagious liquidity shocks are convincingly modelled, for example, in Allen and Gale (2000), and Allen et al. (2009). Other theoretical models more specifically focused on money markets show that hoarding and overpricing of liquidity can be a rational behavior for lenders (e.g., Eisenschmidt and Tapking, 2009; Acharya and Skeie, 2011) and for borrowers (e.g., Nyborg and Strebulaev, 2004; Valimaki, 2008). On the empirical side, several papers confirm that interbank markets do not always allocate liquidity efficiently. Some recent studies have shown that banks fearing to be liquidity-short pay interest rate premiums during the Main Refinancing Operations (MRO) of the European Central Bank (ECB), in normal times as well as during turmoils (Bindseil et al., 2009; Eisenschmidt et al., 2009; Drehmann and Nikolaou, 2013; Fecht et al., 2011). There is also a series of empirical results showing that both aggregate and individual liquidity positions significantly contribute to interbank rates dynamic during the crisis (e.g., Michaud and Upper, 2008; De Socio, 2011; Beirne, 2012; Acharya and Merrouche, 2013; Soares and Rodrigues, 2013). Lastly, several studies show that liquidity provision by central banks actually relieved interbank markets during the crisis (McAndrews et al., 2008; Christensen et al., 2009; Frank and Hesse, 2009).

In this paper, we add new results to the empirical literature that studies the liquidity premium paid by banks on money markets. Most previous cross-sectional studies focused on the primary money market and therefore examined banks behavior during auctions organized by central banks for their main refinancing operations. They all argue that the significant liquidity premium observed in this primary money market is explained by the two following rationales: banks expecting to be liquidity-short would overbid at the repo auctions because they fear either being squeezed by liquidity-long banks on the secondary money market or because they do not want to experience the stigma effect of borrowing at the marginal lending facility. However, there is still a lack of evidence that banks borrowing in the secondary money market actually have to pay a liquidity premium because they are squeezed by their liquidity-long pairs. We only know of one cross-sectional study on the secondary Sterling money market made by Acharya and Merrouche (2013), which found that individual unsecured overnight spreads vary significantly with the liquidity held by other banks but not with the bank's own liquidity endowment.

We obtain different results for the Eurozone because both the own liquidity position of borrowers and the liquidity situation of lenders appear to influence significantly the individual overnight rates in our estimations. We also differ from the two other studies that exist on the interbank Euro Money market because we work at an individual bank level whereas they use aggregate EONIA spreads (Beirne, 2012; Soares and Rodrigues, 2013).

We implement an integrative approach to estimate the determinants of e-MID overnight interbank rates, in which we try to integrate relevant measures of the three types of factors that have received theoretical and empirical support in recent years, namely counterparty risk, liquidity balances and market imperfections. e-MID SIM S.p.A. is a multilateral electronic platform where nearly 200 Italian and European banks exchange unsecured interbank deposits and Overnight Indexed Swaps. It is one of the two multilateral trading devices in the European interbank unsecured deposit market and, according to the ECB Financial Integration Report, e-MID accounted for 17% of the total turnover of the unsecured segment of the Euro market before the crisis. e-MID is the only publicly available source of micro data on interbank uncollateralized transactions in the Euro area because the majority of short-term interbank transactions are negotiated over the counter. Publicly disseminated EONIA, LIBOR and EURIBOR rates are averaged over a limited panel of large banks in a way that does not allow cross-sectional analysis. Moreover, e-MID rates are those of actual transactions and therefore do not suffer from the potential distortions affecting LIBOR and EURIBOR rates.

A couple of recent papers use e-MID data to analyze overnight interbank rates, but we differ significantly. First, we cover a larger period before and after the onset of the "subprime crisis": our dataset starts on January 2, 2006, and ends on December 31, 2009, whereas most studies on e-MID cover 2006 to mid-2008¹. More importantly, to the best of our knowledge, this is the first study to obtain evidence of a funding liquidity effect in a cross-sectional decomposition of the e-Mid overnight rate. Cassola et al. (2008), Iori et al. (2012) and Liberati et al. (2015) use similar data but focus on the determinants of market fragmentation and market power. Gabrieli (2012) mainly concentrate on connectedness issues. Brunetti et al. (2011)

¹ In many papers authors provide studies until the passage to the Fixed Rate Full Allotment (FRFA) MRO auctions by the ECB (October 2008). In this paper we extend our study up to the announcement date of new 1-year FRFA LTROs by the ECB. We consider that at least until that period the interbank market still provides relevant information about banks' funding needs.

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