



The impact of unconventional monetary policy on the market for collateral: The case of the French bond market

Sanvi Avouyi-Dovi ^{a,*}, Julien Idier ^b

^a Paris-Dauphine University, Banque de France, 31, rue Croix des Petits Champs, 75049 Paris, CEDEX 01, France

^b Paris 1 Pantheon-Sorbonne University, Banque de France, 31, rue Croix des Petits Champs, 75049 Paris, CEDEX 01, France

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ABSTRACT

We consider the channel consisting in transferring the credit risk associated with refinancing operations between financial institutions to market participants. In particular, we analyze liquidity and volatility premia on the French government debt securities market, since these assets are used as collateral both in the open market operations of the ECB and on the interbank market. In our time-varying transition probability Markov-switching (TVTP-MS) model, we highlight the existence of two regimes. In one of them, which we refer to as the conventional regime, monetary policy neutrality is verified; in the other, which we dub the unconventional regime, monetary policy operations lead to volatility and liquidity premia on the collateral market. The existence of these conventional and unconventional regimes highlights some asymmetries in the conduct of monetary policy.

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1. Introduction

This paper provides an empirical analysis of the impact of unconventional monetary policy on the market for collateral, taking the case of the French government debt securities market. This asset class is used both in the open market operations (OMOs) conducted by the central bank and on the secured interbank market. Open market operations and repo operations are subject to credit risk (Stiglitz and Weiss, 1981), so that collateral is provided to insure the lender against any default. The value of collateral is marked to market such that it is not constant throughout the duration of the loan. Market liquidity therefore becomes a key factor in determining the value of collateral. The aim of the paper is to examine whether tensions in the refinancing process of the banking system and the unconventional monetary policy implemented during the crisis have turned credit risk into market liquidity risk via the extensive use of some types of collateral.

Green (2005), for example, shows that the assets eligible as collateral provide lower rates of return than those not eligible by incurring an opportunity cost to owners. In the context of the re-

cent financial crisis, we have observed several adverse phenomena. First, the increased risk associated with interbank refinancing created a concentration on the highest quality eligible collateral, such as government bonds. Second, higher counterparty risk increased the required haircuts on the value of collateral so that larger amounts of collateral became necessary. Third, increased refinancing via the central bank raised the amount of deposited collateral. Fourth, the stepping-up of numerous refinancing operations resulted in more frequent aggressive trading of collateral. Finally, the preference for longer-term operations also required larger amounts of collateral: for example, in 2006, collateral deposited amounted to EUR 959 billion, versus EUR 1585 billion in September 2008. Given these specific circumstances, market neutrality may not always be achieved in the monetary policy stance, especially vis-à-vis the market for collateral. A large body of the literature has focused on the market for public debt securities. Diaz et al. (2006), among others, examine the impact of European Monetary Union (EMU) on the liquidity of Treasury bonds and market volatility. They conclude that EMU led to sharp falls in volatility and improved efficiency in the Spanish Treasury bond market. In the same vein, Dunne et al. (2007) compare the different European bond segments and show that, contrary to the prevailing market belief, the 10-year segment of the French bond market is a benchmark asset for the European bond market as a whole. Goldreich

* Corresponding author. Tel.: +33 142929084; fax: +33 142925484.

E-mail addresses: sanvi.avouyi-dovi@banque-france.fr (S. Avouyi-Dovi), julien.idier@banque-france.fr (J. Idier).

et al. (2005) and Fleming (2003) also focus, precisely, on the liquidity of US Treasuries and its impact on interest rates, as do Chakravarty and Sarkar (1999), who also compare the different bond segments in terms of bid-ask spreads.

Our approach is different from previous papers since we explicitly relate French bond market dynamics to the ECB's unconventional monetary policy. This is also quite different from that of some recent work that develops interesting, promising and coherent macroeconomic models of the unconventional monetary policy of central banks. This research, some of which is an extension of New Keynesian general equilibrium models, is clear and computationally tractable (see among others, Gertler and Karadi, 2011; Curdia and Woodford, 2010). We do not construct a micro founded model for analysing the effects of unconventional monetary policy on the market for collateral, but rather adopt a reduced empirical assessment of unconventional monetary policy. More specifically, in our paper, we analyze the impact of unconventional monetary policy on the liquidity (bid-ask spreads) and volatility (realized bipower variation from Barndorff-Nielson and Shephard, 2004) of the market for collateral during these unconventional periods. This analysis is based on high-frequency data identifying all quotes for on-the-run 3-month and 10-year French debt securities between 2003 and 2009. We selected on-the-run 3-month and 10-year securities for their representativeness of the short and the long segments of the French market respectively. We consider a time-varying transition probability Markov-switching vector autoregressive (TVTP-MS-VAR) model (Filardo and Gordon, 1998). In our case, the transition probabilities are governed both by the cycle of monetary policy operations and the cycle of French Treasury auctions of 10-year notes and 3-month bills.

Our main findings are as follows. First, the stepping-up of special refinancing operations with high bid-to-cover ratios makes more probable the emergence of an unconventional regime in which liquidity and volatility premia appear with, in parallel, the segmentation of the bond market. Second, regime identification shows the potential asymmetry in the monetary policy stance between conventional and unconventional regimes, where the same decision (for example more frequent open market operations (OMOs) and loose liquidity provision) may have positive or negative effects depending on the regime markets are in.

The paper is organized as follows. In the next section, we propose a brief review of the implementation of unconventional monetary policy and of developments in the French sovereign bond market. In the third section, we define indicators of liquidity and volatility and present the models. The fourth section discusses the empirical results and sheds light on their monetary policy implications. Section 5 concludes.

2. Unconventional monetary policy and the French bond market

In this paper we distinguish between three types of liquidity: central bank liquidity provided through open market operations; funding liquidity, defined by the BIS (2008) as the ability of banks to meet their liabilities, and unwind or settle their positions as they become due; and market liquidity, defined by the IMF (2004) as the ability of investors to trade quickly, at a fair price and low cost, a large amount of shares with a small impact on prices. In 2007–2008, we observed in the financial system: (i) a shortage of funding liquidity; (ii) a shortage of market liquidity in the funding market; (iii) a shortage of market liquidity in some other markets. Given this unprecedented context, the ECB, like the other major central banks, experimented with unconventional monetary policy.

2.1. A brief review of the ECB's unconventional monetary policy

The recent crisis seriously undermined the interbank market so that the ECB decided to provide huge amounts of liquidity to the banking system through regular and special OMOs.¹ With respect to regular open market operations, the ECB first increased the levels of allotments to meet liquidity needs through main refinancing operations (MROs) and long-term refinancing operations (LTROs). Due to the strong demand for liquidity, the ECB also decided (i) to use fixed-rate tenders with full allotment in order to completely satisfy banks' liquidity needs; (ii) to introduce very long-term refinancing operations with 1-year maturity; (iii) and to conduct several one-off fine-tuning and FX swap operations (Fig. 1).

The proportion of operations outside the regular monetary policy framework has dramatically increased during the recent period from 3% to 40%.² Moreover, from January 2000 to July 2007 the mean amount of allotted liquidity per operation in special operations was around EUR 17 billion, compared with around EUR 40 billion between August 2007 and October 2008. Finally, no exit strategies were put in place afterwards. Looking at the bid-to-cover ratio³ before the implementation of unconventional monetary policy, it jumped from 1.51 in 2006 to 1.82 in 2007 (i.e. from 51% to 82% excess liquidity demand in open market operations) and plummeted to 1.03 in 2009 following the implementation of the full allotment procedure (Fig. 2).

All of these operations conducted by the central bank lead to some collateral immobilization: to protect the ECB from losses due to open market operations, collateral is deposited by banks. In the event of default, this collateral may be liquidated by the central bank to get its money back. The assets used as collateral must meet certain criteria to be eligible by the ECB (ECB "The implementation of monetary policy in the euro area", November 2008) mainly because their value is marked to market. As a consequence, the ECB, which is exposed to downward variations in the value of the collateral, uses some additional measures. First, a haircut, as a percentage discount, is applied to the value of the collateral.⁴ Second, margin calls consist in counterparties (banks) providing additional cash to maintain the value of the collateral. This creates interactions between the collateral market and the central bank's refinancing operations when unconventional monetary policy undermines the principle of market neutrality. Here, we focus on the French government debt market.

2.2. The market for collateral: the case of French debt market securities

The amount of the French government's negotiable debt almost doubled between 1998 and 2008, reaching EUR 988 billion at the end of September 2008.⁵ This upward trend was made possible by the introduction of marketable products with a continuum of maturities. After regular pre-scheduled auctions, securities are actively traded on the secondary market, where transactions are not centralized. This secondary market is an over-the-counter market and bilateral transaction details are partially known. It should be noted that we directly analyze rates, not prices. This is chosen rationally for the purposes of comparison because we consider several maturities which can be differently compounded according to their issuance:

¹ A detailed description of the regular monetary policy framework is discussed in Idier and Nardelli (2011). Curdia and Woodford (2010) provide a summary of the effects of the unconventional monetary policy implemented by the Federal Reserve for the United States. We can use this for the purposes of comparison.

² Here, we only include liquidity-providing operations.

³ This is defined as the supply-demand ratio for liquidity. It sums up some of the tensions relating to refinancing operations.

⁴ The level of the haircut is based on an asset liquidity classification: the lower the liquidity, the higher the haircut (see Avouyi-Dovi and Idier, 2010).

⁵ Curdia and Woodford (2010), Gertler and Karadi (2011), among others, provide figures regarding the United States.

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