The effect of the term auction facility on the London interbank offered rate

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A R T I C L E   I N F O

Article history:
Received 22 October 2015
Accepted 22 December 2016
Available online xxx

A B S T R A C T

The Term Auction Facility (TAF), the first auction-based liquidity initiative by the Federal Reserve during the global financial crisis, was aimed at improving conditions in the dollar money market and bringing down the significantly elevated London interbank offered rate (Libor). The effectiveness of this innovative policy tool is crucial for understanding the role of the central bank in financial stability, but academic studies disagree on the empirical evidence of the TAF effect on Libor. We show that the disagreement arises from mis-specifications of econometric models. Regressions using the daily level of the Libor-OIS spread as the dependent variable miss either the permanent or temporary TAF effect, depending on whether the dummy variable indicates the events of the TAF or the regimes before and after a TAF event. Those regressions also suffer from the unit-root problem and produce unreliable test statistics. By contrast, regressions using the daily change in the Libor-OIS spread are robust to the persistence of the TAF effect and the unit-root problem, consistently producing reliable evidence that the downward shifts of the Libor-OIS spread were associated with the TAF. The evidence indicates the efficacy of the TAF in helping the interbank market to relieve liquidity strains.

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1. Introduction

The U.S. dollar money markets ran into serious trouble in August 2007. The interest rates on interbank short-term and medium-term loans rose to levels that are unusually high. The spread between the three-month London interbank offered rate (Libor) and the federal funds rate rose from its typical level of a few basis points to about 50 basis points and ascended further to 90 basis points in September 2007. The widened spread was largely believed to be the result of a sharp increase in the liquidity risk as well as the credit risk perceived by the market players. Transactions in the interbank market declined, and borrowers often could not obtain funds at the posted rates. Since Libor affects interest rates on a wide variety of loans and securities (e.g. home mortgages and commercial loans), unusually high term rates had disruptive effects on the economy.

Responding to the disruption in the money markets, the Federal Reserve (the Fed) used open market operations to maintain the effective federal funds rate (i.e., the interest rate on overnight loans of reserves between U.S. domiciled depository institutions) close to its target rate. Although the Fed succeeded in stabilizing the overnight rate, the rates on term loans among banks continued to move up, reflecting a sustained reluctance of banks to lend to each other at longer terms.

When the conventional Federal Reserve open market operations brought down only the expectation of the federal funds rate but not Libor, the Libor-OIS spread widened in late 2007. The Libor-OIS spread, a widely watched index in the financial markets, is the difference between Libor and the overnight index swaps (OIS) rate of the same maturity term. The elevated Libor-OIS rate kept the interest rates high on many term loans in the markets because of the close ties of Libor to the fixed-income securities. To bring down the term rates in the economy, the Fed faced at least the following three challenges: (1) How to lower the term rates in the interbank market, (2) How to make banks in sound condition more willing...

References

The paper has benefited from comments by Tobias Adrian, Adam Ashcraft, Chris Burke, Darrell Duffie, Michael Fleming, Warren Hrung, Trish Moser, Krista Schwarz, Simon Potter, Suresh Sundaresan, Joe Tracy, and the seminar and conference participants at the Federal Reserve Bank of New York, the Federal Reserve Bank of Dallas, the Annual Conference of the American Economic Association, and the Yale Financial Crisis Conference. The paper has also benefited from suggestions by the anonymous referee. Michal Lempertowski and Kevin Pan provided excellent research assistance. The views stated here are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.

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http://dx.doi.org/10.1016/j.jbankfin.2016.12.011
0378-7216/© 2017 Published by Elsevier B.V.

to lend, and (3) How to overcome discount window stigma, which refers to banks’ reluctance to borrow from the discount window.

On December 12, 2007, the Fed responded to the continuing difficulty that banks faced in obtaining term funds by introducing the Term Auction Facility (TAF). This was the first auction-based facility initiated by the Fed during the 2007–2009 financial crisis. The TAF provided term funding to eligible depository institutions in sound financial condition through periodic auctions, in which those depositories with the highest bid rates received the funds at the stop-out rate. The total amount of the funds available at each TAF auction was announced in advance by the Fed. The interest rate for the funds was set in a competitive auction process among the participating depository institutions.

Through TAF auctions, the Fed provided term funding to depositories that needed it most, with the purpose to relieve the strains arising from the unwillingness of sound institutions to lend to each other. Besides providing the needed term funding, an additional objective was to reduce the uncertainty of banks’ access to future term funding. Since the TAF offered a new source for banks to obtain term funding, it makes banks more willing to supply loans if they had surplus funds. The increased availability of lending by some banks could also reduce the uncertainty of other banks’ sources for short-term funds. It could also prevent inordinate reliance by some banks on overnight funding that might have caused excess volatility in the overnight market. The two intended effects of the TAF—meeting banks’ immediate funding demands and reassuring potential lenders of their future access to funds—should both work to reduce bank liability risks, increase transaction volumes, and reduce market interest rates.

Theoretical and empirical studies prior to the initiation of the TAF suggest that direct funding provided by central banks may reduce liquidity risk premiums in private markets, especially when the markets face widespread uncertainty in liquidity. Holmstrom and Tirole (1998) theorize that government provision of funding lessens the premium of market-wide liquidity risk. Sundaresan and Wang (2009) show that the funds auctioned by the Fed right before the Millennium date change (Y2K) were associated with the drops in the liquidity risk premium in the Treasury bond markets when primary dealers feared that the Y2K might cause a market-wide liquidity shortage. The auctions that the Fed conducted for the Y2K have provided a valuable lesson for the Fed in mitigating market-wide uncertainty of liquidity shocks.

Studies since the initiation of the TAF also suggest that direct government funding should reduce the liquidity premium in the interbank market. Armati et al. (2008) show that the $360 billion term funding offered through the first ten TAF auctions was highly demanded by the banks. Acharya and Skeie (2011) theoretically reason that the increase of loan supply by the TAF should lessen the liquidity risk in the interbank market. Armati et al. (2015) empirically demonstrate that the TAF overcame the discount window stigma during the global financial crisis.

Since the TAF was the first auction-based facility during the 2007–2009 financial crisis, it is critical to know whether the facility helped in reducing the liquidity risk premium in the strained money markets. In addition, the study of the effectiveness of the TAF is part of a broader research geared to a better understanding of liquidity risk premia and the role of central banks. In theory (Tirole, 2006), when all banks face uncertainty of funding risk simultaneously, the liquidity risk premium is high. In this situation, the interbank term-loan markets come under stress, and the term interest rates may be disconnected from the overnight interest rate. The disconnection between the term and overnight rates was a key challenge faced by financial markets and the economy during the recent financial turmoil. The TAF was a new approach taken by central banks to address the problem of a high liquidity risk premium and the resulting misallocation of funds. Measuring the effects of the new liquidity facility is a crucial first step to understanding whether the central bank can reduce the liquidity risk premium effectively as well as gaining insight into the liquidity risk premium and its cause.

Academic studies so far disagree on the empirical evidence of the TAF effect on the London interbank offered rate. McAndrews et al. (2008) present empirical results to show that the TAF helped in lowering the Libor-OIS spread. By contrast, Taylor and Williams (2009) do not find evidence that the TAF had a significant effect on the spread after controlling for the credit risk premium. Based on several alternative regressions, they argue that the evidence of the TAF effect is not robust. Wu (2011) joins the debate by comparing the averages of the Libor-OIS spread before and after the TAF was introduced and concludes that the spread was lower in the later period, after controlling for other factors such as the credit risk premium. However, the magnitude of the TAF effect estimated in Wu (2011) is unstable in his regressions, as pointed out by Taylor and Williams (2009).

In this paper, we investigate the controversy of the TAF effect. We show that these disagreements arise from mis-specifications of the econometric models. We show that the regressions using the daily level of the Libor-OIS spread as the dependent variable, as in Taylor and Williams (2009) and Wu (2011), miss either the permanent or the temporary TAF effect, depending on whether the dummy variable in the regression indicates the events of the TAF or the regimes before and after the TAF. Furthermore, we demonstrate that those regressions suffer from the unit-root problem, producing unreliable and confusing test statistics. By contrast, we prove that the regressions using the daily change in the Libor-OIS spread, as in McAndrews et al. (2008), are robust to the persistence of the TAF effect and the unit-root problem, consistently producing evidence that the TAF was associated with downward shifts of the Libor-OIS spread.

We develop a general econometric specification for the TAF effect. The general specification detects both persistent and temporary effects and is robust in the presence of the unit-root component in the Libor-OIS spread. This econometric specification is an extension to those used by McAndrews et al. (2008). The specification empirically tests the association of the TAF with the negative shifts (or jumps) of Libor after controlling for the term premium and the credit risk premium. Such association provides a supporting evidence of the efficacy of the TAF in helping to relieve the strains in the interbank term loan markets. Our empirical results clearly indicate that the TAF helped in easing the strained conditions in money markets.

The rest of the paper is organized as follows. Section 2 provides the necessary information of the Term Auction Facility and Libor and discusses the data of the Libor-OIS spread. Section 3 develops and analyzes various alternative econometric specifications. Section 4 presents the empirical evidence of the TAF effect, examines its robustness, and looks at the symptoms of the unit-root problem. Section 5 offers some concluding remarks.

2. TAF and Libor-OIS spread

2.1. Term auction facility

The term auction facility (TAF) was designed to promote the distribution of liquidity when unsecured term funding markets were under stress. The Fed announced the creation of the liquidity program on December 12, 2007, in response to the continuing difficulty that banks faced in obtaining term funds. Under this facility, the Fed initially auctioned 28-day loans to eligible depository institutions and, since August 2008, also auctioned 84-day loans. All loans extended under the facility were fully collateralized. These term loans were secured by the same collateral that is accepted at
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