Journal of Financial Economics 000 (2016) 1–21

Contents lists available at ScienceDirect

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/finec

The impact of unconventional monetary policy on firm financing constraints: Evidence from the maturity extension program☆

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ARTICLE INFO

Article history:
Received 12 December 2014
Revised 9 December 2015
Accepted 21 December 2015
Available online xxx

JEL:
E52
G23
G32

Keywords:
Unconventional monetary policy
Firm-financial constraints
Bond markets

ABSTRACT

This paper investigates the impact of unconventional monetary policy on firm financial constraints using the maturity extension program (MEP). Consistent with bond market segmentation and limits to arbitrage, around the MEP's announcement, stock prices rose for those firms more dependent on longer-term debt. These firms also issued more long-term debt during the MEP and expanded employment and investment. There is also evidence of "reach for yield" behavior, as the demand for riskier corporate debt also increased. Our results suggest that unconventional monetary policy might have relaxed financial constraints for some firms by inducing gap-filling behavior and affecting bond market risk premia.

1. Introduction

To help overcome the zero lower bound constraint after the 2008–2009 financial crisis, the Federal Reserve and other central banks have implemented a number of unconventional policies, including a series of large-scale asset purchases or quantitative easing (QE). These policies are in part intended to work around the zero lower bound constraint by directly buying assets, such as U.S. Treasury bonds and mortgage-backed securities, to offset disruptions in private sector intermediation and relax firms' external finance constraints in the aftermath of the crisis (Cahill, D'Amico, Li, Sears, 2013; Gertler and Karadi, 2011, 2013; Krishnamurthy and Vissing-Jorgensen, 2011, 2013; and Shleifer and Vishny, 2011).[1]

This paper develops a number of empirical tests to understand how unconventional monetary policy might

☆ We would like to thank Roc Armenter, Mitchell Berlin, Jef Boeckx, Pablo D'Erasmo, Harry DeAngeleo, Thorsten Drautzburg, Argia Sbordone, Steven Sharpe, Ashley Wang, and participants in seminars hosted by the American Economic Association, the Bundesbank, Federal Reserve Bank of Atlanta, Federal Reserve Bank of Philadelphia, Federal Reserve Bank of San Francisco, Federal Reserve Board of Governors, Reserve Bank of Australia, and Wharton School of Business. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Philadelphia, the Federal Reserve Board of Governors, or the Federal Reserve System.

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[1] See Chodorow-Reich (2014) for evidence on how the crisis might have affected financial constraints at bank-dependent firms. Di Maggio and Kacperczyk (2016) study the impact of low interest rates on reach for yield behavior in the mutual fund industry. Benmelech, Meisenzahl, and Ramcharan (2016) and Ramcharan, Van den Heuvel, and Verani (2016) study the impact of financial sector distress during the crisis on households. DiMaggio, Kermani, and Ramcharan (2014) study how monetary policy after the crisis might have affected household-level financial constraints.

http://dx.doi.org/10.1016/j.jfineco.2016.07.002
0304-405X/

shape firms' financial constraints. We focus mainly on the Federal Reserve's attempt to flatten the yield curve through the maturity extension program (MEP), announced on September 21, 2011. The explicit intention behind the MEP was to reduce the supply of long-term Treasury securities and put downward pressure on longer-term interest rates, especially on those assets considered close substitutes for long-term Treasury securities. Under the plan, lower borrowing costs and increased credit availability would relieve possibly binding financial constraints on firms and households. To that end, the MEP committed the Federal Reserve to sell about $400 billion in shorter-term Treasury securities and use the proceeds to buy longer-term Treasury securities. The Federal Reserve extended the program in June 2012 through December 2012 for an additional $267 billion. In this paper, we examine how stock prices, debt issuance, and firms' investment and hiring activities reacted to the MEP.

Our empirical tests of the MEP's impact are motivated by those theories that emphasize partial segmentation in bond markets, limits to arbitrage, and the role of nonfinancial corporations in responding to shocks in the supply of government debt (Greenwood, Hanson, and Stein, 2010; Vayanos and Vila, 2009). Partial segmentation in bond markets can arise when some natural buyers of bonds, such as insurance firms and pension funds, prefer investing at specific maturities; life insurers, for example, mainly invest in longer-term bonds to match the duration of their liabilities.[2] These models also observe that in response to an unexpected decline in the supply of longer-term government debt, arbitrageurs with limited capital relative to the size of the shock or high levels of risk aversion may only imperfectly enforce the expectations hypothesis, resulting in bond yields that differ from the expectations hypothesis.

With inelastic demand and limits to arbitrage, the argument in Greenwood, Hanson, and Stein (2010) predicts that nonfinancial corporations would fill in the supply gaps for longer-term debt created by government supply shocks like the MEP.[3] This channel would be especially strong for those firms with a preference for using longer-term debt to meet their financing needs or those with the financial flexibility to adjust the maturity of their debt issuances easily. Moreover, if these firms faced financial constraints after the crisis, then filling the supply gaps created by the MEP might also allow them to take better advantage of growth opportunities, leading to increased investment and employment. In contrast, if arbitrageurs operate freely at different maturities along the yield curve, then any policy-induced reduction in longer-term yields might be evanescent, leaving little impact on corporate debt issuances and real outcomes.

Table 1 shows that the decline in the supply of longer-term government debt envisaged by the MEP was large relative to the size of the Treasury market, and we find evidence consistent with the gap-filling hypothesis in Greenwood, Hanson, and Stein (2010). Our first set of tests exploits cross-sectional differences in the stock price response to the MEP's announcement. These tests suggest that market participants likely expected the MEP to lower financing costs and relax financial constraints primarily for those firms that traditionally rely on longer-maturity debt. That is, for those nonfinancial firms that traditionally relied on longer-term debt finance, their abnormal stock returns on the day after the MEP's announcement rose sharply. An increase of one standard deviation in the long-term debt ratio of a firm is associated with a 0.26 percentage point higher abnormal return, which is about 93% in annualized terms. These results are robust to a variety of controls and persist even when using higher-frequency intraday data around the announcement.

The next set of tests examines the response of firms to the MEP using a difference-in-difference methodology. There is evidence that firms with a greater preference for relying on longer-term debt issued more longer-term debt during the MEP to fill the "gap" created by the Fed's purchases of longer-term assets. An increase of one standard deviation in the long-term debt ratio is associated with about an 8% faster growth in the stock of long-term debt during the MEP's implementation. As a falsification test, the coefficient estimate for the growth in short-term debt is not statistically significant, giving us some confidence that the effect of the MEP program operates through longer-term borrowing. And consistent with the gap-filling motive, as well as the evidence in Badoer and James (2016), we find suggestive evidence that firms with more financial flexibility might have more easily adjusted their financing plans to take advantage of the MEP.

Beyond inducing gap-filling bond issuances by nonfinancial firms, low nominal interest rates or the expectation that low rates might persist can also create incentives for certain types of creditors to take added risk in an effort to reach for yield, affecting risk premiums and the demand for longer-dated high-yielding debt (Morris and Shin, 2012; Borio and Zhu, 2012; Hanson and Stein, 2015). That is, a monetary policy shock such as the MEP might be associated with changes in the risk premium over and above any change in the actuarially fair long-term interest rate implied by the expectations theory of the yield curve.

We test this "reach for yield" channel using a discontinuity in the capital regulations that govern the insurance industry (Becker and Ivashina, 2015). Insurers are the main buyers of corporate debt in the United States, accounting for about 60% of all institutional investors' corporate bond holdings. Their bond holdings are also subject to risk-adjusted capital requirements. These requirements are based on bond ratings, and they increase exponentially as the credit quality worsens. For bonds rated AAA through A-, the capital requirement is identical, but this requirement rises sharply for bonds below the A- threshold. Among AAA through A- bonds, we show that during the period of the MEP's implementation, risk premiums fell disproportionately for the higher-yielding A- bonds, reflecting in part an increased demand for higher-yielding debt that also economizes on regulatory capital requirements.

[2] The average maturity of corporate bond holdings in the life insurance industry is about 11 years, roughly unchanged since 2004 (National Association of Insurance Commissioners (NAIC), 2014).

[3] Apart from the MEP, Badoer and James (2016) provide evidence that gap-filling behavior in response to Treasury supply shocks might be an important determinant of long-term corporate issuances.

Please cite this article as: N. Foley-Fisher et al., The impact of unconventional monetary policy on firm financing constraints: Evidence from the maturity extension program, Journal of Financial Economics (2016), http://dx.doi.org/10.1016/j.jfineco.2016.07.002