



# Bank liquidity creation and recessions

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## ABSTRACT

We investigate the relationship between bank liquidity creation and recessions in the U.S. For the 1984–2010 sample, we find that (i) lower bank on-balance sheet liquidity creation signals recessions four quarters into the future; (ii) off-balance sheet liquidity creation is not a robust predictor of recessions at longer forecast horizons; (iii) off-balance sheet liquidity creation falls in tandem with on-balance sheet liquidity creation one quarter prior to recessions, and aggregate, on- and off-balance sheet bank liquidity creation continue to decline during and up to five quarters after recessions; and (iv) liquidity creation of larger banks contains more information about future recessions than that of smaller ones.

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## 1. Introduction

Forecasting recessions is important for many stakeholders including households, investors, businesses, and policymakers. The existing literature (e.g., [Harvey, 1988, 1989](#)) has shown that the Treasury yield curve contains information about future economic growth. Specifically, the slope of Treasury yield curve, the spread between long- and short-term interest rates forecasts National Bureau of Economic Research (NBER) recessions (e.g., [Estrella and Hardouvelis, 1991; Estrella and Mishkin, 1998](#)). In this study, we focus on bank liquidity creation as a forecasting variable for NBER recessions. Monetary policy is generally altered to change bank liquidity creation and it further changes the slope of the yield curve. If monetary policy aims to change how banks create liquidity, then bank liquidity creation is likely to contain information about the real economy and may help predict recessions.<sup>1</sup> How-

ever, while banks play a central role in virtually all financial crises (e.g., [Diamond and Rajan, 2005](#)), the existing banking literature does not investigate the relationship between bank liquidity creation and recessions. Using [Berger and Bouwman \(2009\)](#) bank liquidity creation measure, we find that bank liquidity creation contains information about the onset of NBER recessions. Bank liquidity creation contracts up to four quarters prior to recessions and continues to fall for approximately five quarters past recessions. We further show that bank liquidity creation significantly improves the ability of the term spread to forecast recessions.

The existing literature linking bank lending and economic activity provides inconclusive evidence of a “credit crunch” (e.g., [Bernanke and Lown, 1991; Kashyap and Stein, 1994](#)). One potential reason for the inconclusive results is that for reputational reasons, commercial banks act as a buffer for long-standing customers with pre-arranged credit lines, which is an off-balance sheet bank activity (e.g., [Thakor, 2005](#)). In this study, we investigate both on- and

posits (e.g., [Diamond and Dybvig, 1983; Berger and Bouwman, 2009](#)), but also create liquidity off the balance sheet by activities, such as extending standby letters of credit and loan commitments to their customers (e.g., [Holmstrom and Tirole, 1998; Kashyap et al., 2002; Thakor, 2005; Diamond and Rajan, 2005; Berger and Bouwman, 2009](#)).

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<sup>1</sup> Financial intermediation theories posit that banks exist to create liquidity and transform credit risk (e.g., [Diamond, 1984; Diamond and Rajan, 2001; Kashyap et al., 2002; Berger and Bouwman, 2009](#)), and thereby promote economic growth (e.g., [Berger and Sedunov, 2015](#)). Banks not only create liquidity on the balance sheet by activities, such as providing loans to businesses and individuals funded from de-

off-balance sheet bank liquidity creation prior to recessions since banks' inability to manage their balance sheet is believed to be the root cause of the most recent financial crisis.

Berger and Sedunov (2015) study the relationship between bank liquidity creation and economic development at the U.S. state level. They find that higher bank liquidity creation in the present quarter leads to higher per capita GDP for the next quarter. Contrary to expectations, the authors show that liquidity creation of small banks rather than that of large banks has higher impact on economic growth. They further do not find significant relationship between bank liquidity creation and per capita GDP during the 2007–2009 subprime crisis. However, Acharya and Mora (2015) show that during the last crisis, banks were unable to provide liquidity. Importantly, Berger and Sedunov (2015) do not investigate whether bank liquidity creation contains leading information about recessions.

Investigating the link between bank liquidity creation and crises, Berger and Bouwman (2014) use NBER recession quarters and events, such as the Long-Term Capital Management (LTCM) bailout and the Russian debt crisis. The authors show that higher aggregate U.S. bank liquidity creation relative to a linear trend leads to crises, but their results contradict those of Berger and Sedunov (2015). We try to reconcile these findings in the literature by investigating whether bank liquidity creation forecasts NBER recessions. While predicting recessions with precision is one of the objectives of this study, we are particularly interested in investigating the dynamics of bank on- and off-balance sheet liquidity creation prior to and after recessions since this knowledge may help influence monetary policy.

Our study differs from that of Berger and Bouwman (2014) in several important ways. First, we investigate recessions, including the recent subprime crisis rather than exogenous shock-driven crises, such as the Russian debt crisis. We argue that liquidity creation of U.S. banks is unlikely to cause such one-time extreme events. Second, while their model predicts crises one quarter ahead of the events, we forecast recessions one to four quarters into the future. Finally, we investigate the dynamics of bank liquidity creation *during* and *after* recessions.

Our results show that bank liquidity creation is an important predictor of recessions. In particular, we show that bank on-balance sheet liquidity creation decreases at about four quarters prior to recessions and continues to fall leading up to recessions. We further show that on-balance sheet liquidity creation of large banks rather than that of small and medium ones decreases before recessions. This set of results is robust to the exclusion of the recent 2007–2009 recession. In contrast, we do not find that bank off-balance sheet liquidity creation is a robust predictor of recessions. The results are further robust to the inclusion of the term spread.

Our results further suggest that the fall in aggregate, on- and off-balance sheet liquidity creation continues after recessions. However, the term spread turns positive after recessions. The results thus imply that, while monetary policy is loosened around recession quarters and market participants expect such accommodating policies (resulting in an upward sloping yield curve), banks continue to shrink their balance sheet. This relationship between the term spread and bank liquidity creation (before and after recessions) is not investigated in the existing literature.

Our findings contribute to the strand of the literature that investigates the relationship between financial intermediation and economic growth. Since Bagehot (1873), the importance of banking to spur economic development and future growth has been debated. The connection between the components of bank liquidity creation and economic growth is theoretically and empirically grounded in the literature (e.g., Bencivenga and Smith, 1991; Boot et al., 1993; Jayaratne and Strahan, 1996; Bernanke and Blinder, 1988; Kashyap et al., 2002). Our study contributes to this strand of

the literature by showing that lower bank liquidity creation leads to recessions.

The rest of the paper proceeds as follows. Section 2 describes bank liquidity creation and other data, reports data sources, and investigates data characteristics. Section 3 presents the main empirical results, while Section 4 conducts several robustness checks. Section 5 discusses monetary policy implications and Section 6 concludes.

## 2. Data and sample construction

The sample under investigation dates from the first quarter of 1984 to the fourth quarter of 2010 since the Federal Deposit Insurance Corporation (FDIC) call report data is available only from 1984.<sup>2</sup> Since we augment the Estrella and Hardouvelis (1991) Treasury term spread model (with bank liquidity creation measures that are described in Section 2.1), one of our primary predictor variables is the term spread (*TS* hereafter). *TS* is computed as the difference between the yields on the 3-month Treasury-bill and the 10-year Treasury bond index.

As is standard in the literature (e.g., Estrella and Mishkin, 1998), we further use other predictors such as real GDP, stock market returns (*RET* hereafter), stock market volatility (*VOL* hereafter) and the Federal funds rate (*FED* hereafter). Stock market variables are computed using all New York Stock Exchange (NYSE) stocks as in Næs et al. (2011). Since the literature finds that asset market liquidity and corporate bond credit spread (*CS* hereafter) are important determinant for bank liquidity creation (e.g., Chatterjee, 2015), we use those variables as controls. We obtain the Moody's corporate AAA and BAA rated bond indices yield data to compute credit spreads, the difference between the yields on 10-year AAA and BAA rated corporate bonds. Asset market liquidity measures are described in Section 2.2. We include quarterly unemployment and inflation rates as additional predictors.<sup>3</sup>

To compare the estimates of recession probabilities of our models with that of the Survey of Professional Forecasters (SPF hereafter), we also use the SPF estimates in the analysis. Every quarter, SPF asks its participants to provide estimates of the probability of negative real GDP for the current and next four quarters, and hence following Rudebusch and Williams (2009) and Lahiri et al. (2013), we analyze the recession forecasting ability of bank liquidity creation for up to four quarters forecast horizons.

Unless noted otherwise, all data are collected from the U.S. Federal Reserve Bank. The Treasury bonds and stocks trading data are obtained from the Center for Research in Security Prices. The GDP, unemployment, and inflation data are obtained from the U.S. Bureau of Economic Analysis.

### 2.1. Bank liquidity creation

Berger and Bouwman (2009) propose an all-inclusive measure of bank output factoring in both banks' on- and off-balance sheet activities such as loans, deposits, equity, derivatives, and loan commitments. Bank liquidity creation is computed for almost all commercial banks in the U.S. using the call reports data from the FDIC. We obtain the bank liquidity creation (BLC hereafter) data of individual banks from Christa Bouwman's website.<sup>4</sup> The BLC variables in our paper are presented as *LC*, *LC<sup>ON</sup>*, and *LC<sup>OFF</sup>*. *LC* is the weighted sum of bank on-balance sheet (loans, deposits, equity, etc.) and off-balance sheet (standby letter of credits, etc.) variables,

<sup>2</sup> The related literature (see, e.g., Rudebusch and Williams, 2009) argues for recent data for reasons such as lowered inflation expectations in recent years, to investigate the relationship between recessions and term spread.

<sup>3</sup> We thank an anonymous referee for the suggestion.

<sup>4</sup> We sincerely thank Christa Bouwman for providing the data.

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