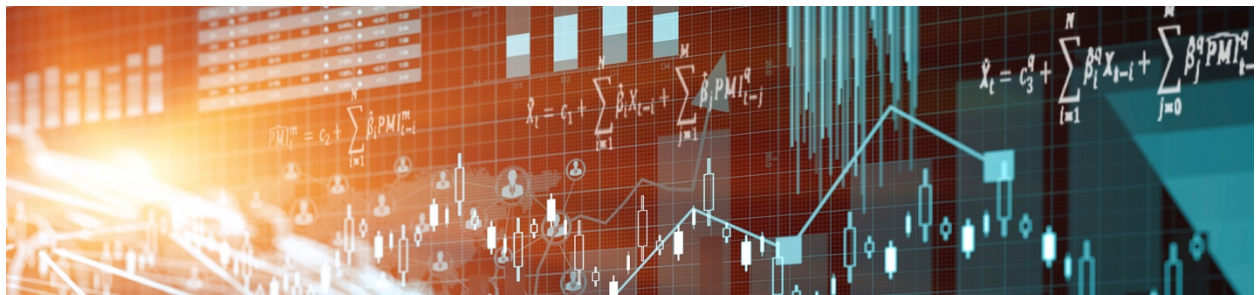


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Assessment of Liquidity Creation in the Canadian Banking System



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Abstract

Liquidity creation is a fundamental function of banks. It provides the public with easy access to funds. These funds are important because they allow households and businesses to consume and invest. In this note, we measure liquidity creation by Canadian financial institutions from the first quarter of 2012 to the second quarter of 2019, using a methodology suggested by Berger and Bouwman (2009) and known as the BB measure. Our assessment shows that the Canadian banking sector created liquidity steadily from 2012 to 2015, stabilizing in 2016 through the second quarter of 2019. Over this period, liquidity creation was mainly driven by two sets of movements on banks' balance sheets: decreases in illiquid liabilities and increases in liquid liabilities such as bank deposits. Liquidity creation is important for supporting economic growth, but it may have financial stability implications if banks engage in high levels of liquidity creation. Therefore, it is important to monitor this balancing act between the benefits and costs of liquidity creation to predict and perhaps lessen risk to the financial system. To facilitate this, we suggest using the BB measure as a tool. By monitoring the movements on banks' balance sheets, we can observe the changes in banks' liquidity creation over time.

Bank topics: Financial institutions; Financial stability; Monetary and financial indicators

JEL codes: G21, G28, G32

Résumé

La création de liquidités est une fonction fondamentale des banques. Elle permet aux ménages et aux entreprises d'accéder facilement à des fonds, grâce auxquels ils peuvent consommer et investir. Dans la présente note, nous mesurons la création de liquidités des institutions financières canadiennes du premier trimestre de 2012 au deuxième trimestre de 2019, au moyen de la méthode suggérée par Berger et Bouwman (2009). Notre évaluation montre que la création de liquidités du secteur bancaire canadien a été soutenue de 2012 à 2015 et s'est stabilisée de 2016 au deuxième trimestre de 2019. Au cours de cette période, la création de liquidités était surtout attribuable à deux types de mouvements dans le bilan des banques : des baisses du passif illiquide et des hausses du passif liquide (comme les dépôts bancaires). La création de liquidités par les banques est un important moteur de la croissance économique, mais elle peut avoir des implications pour la stabilité financière si son niveau est élevé. Il est donc essentiel de surveiller cet équilibre entre les avantages et les coûts de la création de liquidités afin de pouvoir prédire, et peut-être même atténuer, les risques pour le système financier. Pour ce faire, nous proposons d'utiliser la méthode de Berger et Bouwman. En suivant les mouvements qui surviennent dans le bilan des banques, nous pouvons observer les variations de la création de liquidités au fil du temps.

Sujets : Institutions financières; Stabilité financière; Indicateurs monétaires et financiers

Codes JEL : G21, G28, G32

Introduction

Liquidity creation is a fundamental role of banks. It provides households and businesses (i.e., the public) with access to liquid funds. Banks create liquidity by financing relatively illiquid assets, for example, business loans with relatively liquid liabilities such as bank deposits (Berger and Bouwman 2009). An increase in bank liquidity creation promotes economic growth (Berger and Sedunov 2017), as conditions for the public to access liquid funds get easier (i.e., the cost of borrowing is lower). However, an increase in bank liquidity creation may subsequently render banks more prone to liquidity risk. This is because the more liquidity a bank creates, the greater the risk that it may take losses when disposing of illiquid assets to meet its customers' liquidity needs (Berger and Bouwman 2009). Therefore, it is important to monitor liquidity creation in order to predict and perhaps lessen risks to the financial system. Yet despite the importance of this concept, there are limited measures of liquidity creation. This note measures liquidity creation by Canadian banks based on the methodology proposed by Berger and Bouwman (2009) and known as the BB measure (see the Appendix for an explanation of the measure).¹

Motivation

Banks create liquidity on both sides of their balance sheets. On the asset side, banks make loans to households and businesses, thus enhancing the flow of credit in the economy. On the liability side, banks provide liquidity on demand to depositors. While liquidity creation is an essential part of the role of banks as financial intermediaries, the trade-offs of high levels of liquidity creation can include financial fragility (Diamond and Rajan 2001). High levels of liquidity creation can result in more illiquid bank balance sheets. For example, banks create the highest levels of liquidity when they provide long-term loans using short-term funding from depositors. This, however, exposes banks to liquidity risk. Loan repayments may not come in time to meet depositors' liquidity needs, causing banks to liquidate assets at a loss. So, in the process of creating more liquidity for the public, banks gradually make themselves less liquid (Berger and Bouwman 2009). Furthermore, recent literature suggests that financial crises tend to follow high levels of liquidity creation—such levels may generate asset price bubbles that can increase the probability of bank failures and financial stress (Berger and Bouwman 2017).

The BB measure can be used to indirectly monitor banks' liquidity risk by observing the fluctuations in liquidity creation over time. Following the financial crisis of 2008, the Basel Committee on Banking Supervision (BCBS) developed liquidity standards to promote the resilience of banks to liquidity risk as part of [Basel III post-crisis regulatory reforms](#).² While the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) rely on a selected range of bank activities, the BB measure offers a more comprehensive approach by weighing all bank

¹The BB measure has some similarities with the net stable funding ratio (NSFR) in that both measures weigh elements of a bank's balance sheet. However, the NSFR also accounts for off-balance-sheet exposures, and its purpose is not to measure liquidity creation but to impose a regulatory requirement that encourages banks to develop a more stable funding profile. Hence, the weights used in the NSFR are based not only on the asset's or liability's liquidity but also on other factors such as tenor (Basel Committee on Banking Supervision 2014).

² For regulations specific to Canada, refer to the Office of the Superintendent of Financial Institutions' (OSFI's) Liquidity Adequacy Requirements guideline.

activities across the entire balance sheet, thus complementing the existing regulatory tools used to monitor bank liquidity risk. The BB measure is also a useful early-warning indicator for monitoring signs of financial stress. Furthermore, this measure can help analyze policy issues such as assessing the effects of banking regulation on liquidity creation.

Methodology behind measuring liquidity creation

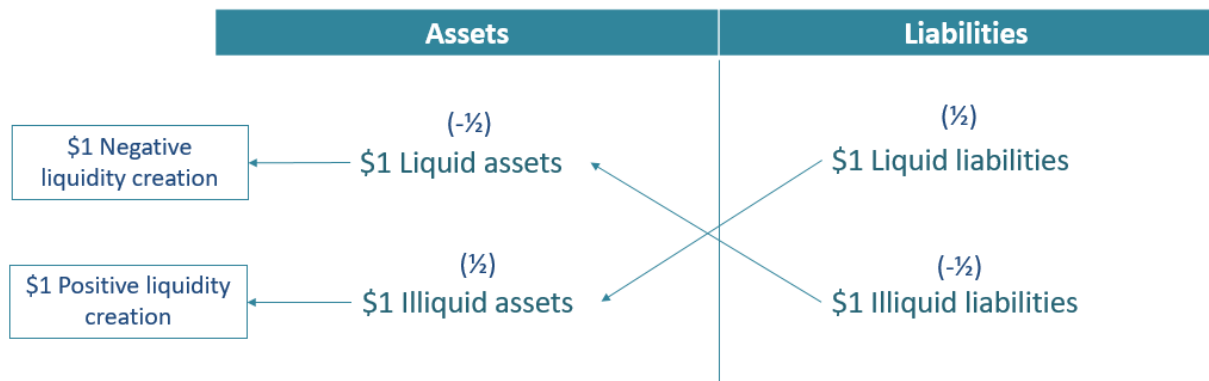
According to Berger and Bouwman (2009), the liquidity creation measure is constructed using a three-step process:

1. **Classify** all bank activities as liquid, semi-liquid or illiquid (**Table 1**).
2. **Assign** weights to each classification.
3. **Calculate** the liquidity creation measure by combining weights with balance sheet activities.

Since the concept of liquidity creation is observed from a bank customer’s perspective, it is based on the ease, cost and time it takes for households and businesses to access their liquid funds, and the ease, cost and time it takes for banks to dispose of their assets to meet these liquidity demands. We therefore classify bank liabilities such as demand and notice deposits (e.g., funds in a chequing account) as “liquid liabilities,” whereas we classify liabilities with maturity terms, such as term deposits, as either “semi-liquid” or “illiquid,” depending on the length of their term to maturity. In contrast, bank assets such as cash and tradable securities, which can provide banks with instant access to liquidity, are classified as “liquid assets.”

Upon classification, each bank activity receives a weighting that is negative one-half ($-\frac{1}{2}$), zero (0) or positive one-half ($\frac{1}{2}$). We assign $\frac{1}{2}$ to both illiquid assets and liquid liabilities, and $-\frac{1}{2}$ to both liquid assets and illiquid liabilities. In practice, banks create one dollar of liquidity when they finance one dollar of illiquid assets with one dollar of liquid liabilities. They also eliminate one dollar of liquidity (i.e., they create negative liquidity) when they finance one dollar of liquid assets with one dollar of illiquid liabilities (**Figure 1**). The goal of the BB measure is to monitor this balancing act between positive and negative liquidity creation within the financial system.

Figure 1: The mechanics of liquidity creation on banks’ balance sheets



Canadian-specific adjustments to BB classifications

The liquidity classifications outlined by Berger and Bouwman (2009) reflect the unique properties of the US financial system. To better represent the properties of the Canadian financial system, such as the limited market for securitizations, we adjust the BB classifications to the Canadian environment (**Table 1**).

Under the BB classifications, all loans that are generally easy to securitize are considered semi-liquid. We follow this classification for credit card loans since they make up the largest portion (about 40 percent) of individual non-business loans that can be securitized (DBRS 2019, 11). However, we classify all other individual non-business loans as illiquid since the market for securitization is much smaller in Canada than in the United States. In addition, unlike the United States, Canada has no liquid private-label mortgage-backed security (MBS) market, but it does have a government-backed *National Housing Act* (NHA) MBS market.³ As such, we consider all residential mortgages to be illiquid, with the exception of insured mortgages securitized through the NHA MBS, which makes them liquid.⁴

Table 1: Liquidity classification of bank activities adjusted to Canadian financial properties

Assets		
Illiquid assets (weight = ½)	Semi-liquid assets (weight = 0)	Liquid assets (weight = -½)
<ul style="list-style-type: none"> • Business loans • Non-business loans • Residential mortgages • Non-residential mortgages • Land, buildings and equipment • Other assets 	<ul style="list-style-type: none"> • Credit card loans • Loans to investment dealers and brokers • Loans to financial institutions and governments • Reverse repos 	<ul style="list-style-type: none"> • Cash and securities • <i>National Housing Act</i> Mortgage-Backed Securities
Liabilities		
Liquid liabilities (weight = ½)	Semi-liquid liabilities (weight = 0)	Illiquid liabilities (weight = -½)
<ul style="list-style-type: none"> • Demand and notice deposits • Cheques and other items in transit • Advances from the Bank of Canada 	<ul style="list-style-type: none"> • Fixed-term deposits • Other liabilities* 	<ul style="list-style-type: none"> • Other liabilities† • Subordinated debt • Shareholders' equity • Acceptances

* Other liabilities under the semi-liquid classification include obligations related to borrowed securities and assets sold under repurchase agreements.

† Other liabilities under the illiquid classification include liabilities of subsidiaries (excluding deposits), insurance-related liabilities, accrued interest, mortgages and loans payable, income taxes, deferred income and derivative-related amounts.

³ Under the NHA MBS program, banks can securitize a portion of their insured mortgage portfolios, backed by the Canada Mortgage and Housing Corporation.

⁴ This is in line with the fact that NHA MBS are classified as Level 1 high-quality liquid assets under the OSFI's liquidity guidelines.

Scope and data description

The BB measure in our analysis captures all domestic systemically important banks (D-SIBs) and 77 non-D-SIBs, which consist of the smaller domestic banks, foreign banks,⁵ and loan and trust companies. Our analysis uses data that capture on-balance-sheet activities obtained from the Office of the Superintendent of Financial Institutions' (OSFI's) consolidated balance sheet (M4) return from the first quarter of 2012 to the second quarter of 2019. The balance sheet values we use are reported in the Canadian-dollar-equivalent value of all relevant currencies.

The M4 return has undergone significant reporting changes over time, limiting our ability to extend the analysis to earlier periods. This prevents us from comparing the current trend in liquidity creation with pre-2012 levels or analyzing how liquidity creation may change during a crisis.

An overall flattening in the liquidity creation trend

Our analysis indicates that the Canadian banking system showed a steady increase in liquidity creation between 2012 and 2015 (**Chart 1**). Following a sharp increase at the end of 2015, bank liquidity creation stabilized and remained roughly constant through the second quarter of 2019.⁶

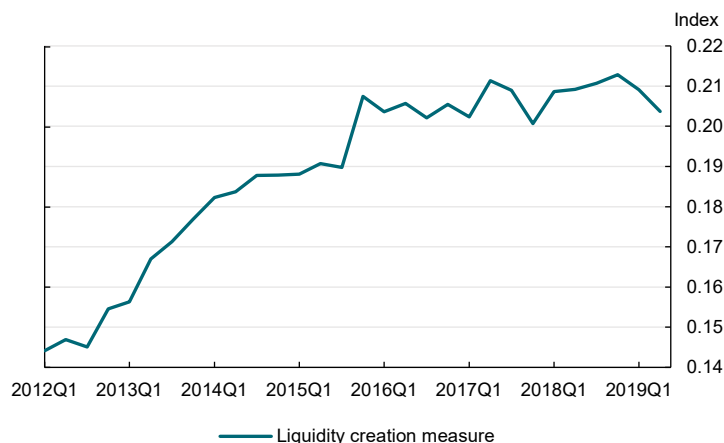
The Canadian data limitations prevent us from comparing the relative magnitude of the recent increase in liquidity creation between 2012 and 2015 with previous years, and from assessing whether it was significant enough to pose liquidity risk for the banking system. Despite these shortcomings, as data accumulate over time, we can benefit from monitoring the BB measure, as it will help us better understand how the liquidity creation trend behaves through economic cycles and periods of bank stress.

The following section analyzes the underlying causes of bank liquidity creation between the first quarter of 2012 and the second quarter of 2019 by breaking down the banks' balance sheets into components.

⁵ The assessment excludes foreign bank branches.

⁶ The sharp increase in the fourth quarter of 2015 was caused by the positive and simultaneous effects of changes in liquid assets and illiquid liabilities on liquidity creation. The two classifications normally move in opposite directions and neutralize each other's effect on the measure.

Chart 1: Liquidity creation in the Canadian financial system



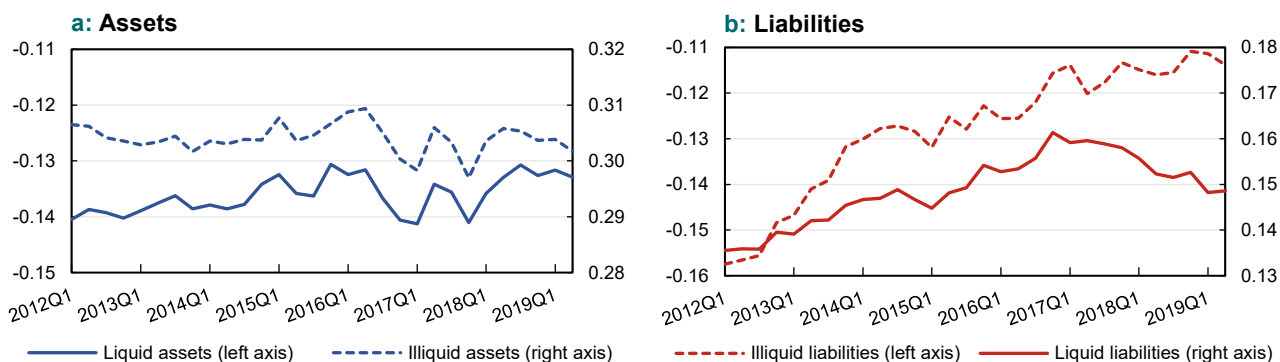
Source: Office of the Superintendent of Financial Institutions—M4 return

Last observation: 2019Q2

Liquidity creation driven by liabilities

In panels a and b of **Chart 2**, we break down our overall liquidity creation into liquid and illiquid components of banks’ assets and liabilities. By doing so, we are better able to identify, through the movements in the banks’ balance sheets, the main drivers of liquidity creation. Our breakdown shows that illiquid liabilities have been by far the strongest contributors to the observed increase in liquidity creation since 2012, with liquid liabilities following closely behind (**Chart 2b**). This indicates that decreases in illiquid liabilities reported on banks’ balance sheets since 2012 continue to be greater than increases in liquid liabilities. There is no indication of a major trend in liquidity creation resulting from the movements on the asset side of the banks’ balance sheets.

Chart 2: Liquid and illiquid assets and liabilities



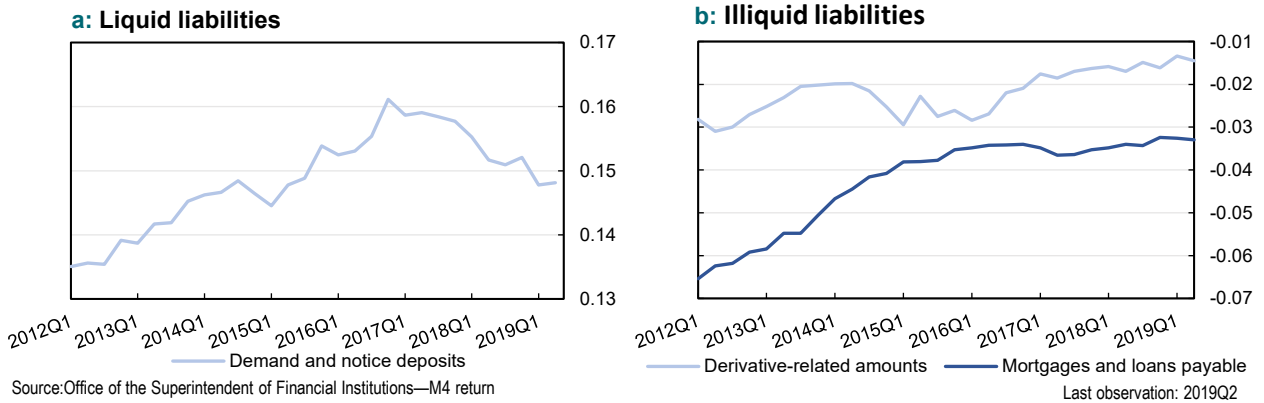
Source: Office of the Superintendent of Financial Institutions—M4 return

Last observation: 2019Q2

To further analyze this trend on the liability side, we break down bank liabilities into their individual line items. On the liquid liability side, the increase in liquidity creation is mainly driven

by an increase in banks' demand and notice deposits until 2017 (**Chart 3a**). Illiquid liabilities, which receive a negative weight in the BB measure, contribute to an increase in liquidity creation if they decline in value on banks' balance sheets. Indeed, we find that the increase in liquidity creation driven by illiquid liabilities is a result of a decline in mortgages and loans payable (i.e., securitization liabilities) and derivative-related amounts (i.e., value derived from price movements of the underlying assets) on banks' balance sheets (**Chart 3b**).

Chart 3: Components of liabilities contributing to liquidity creation



Overall, we propose using the BB measure as a monitoring tool to track bank liquidity creation by observing the changes in banks' balance sheet activities over time. Future work could examine the variation in liquidity creation across Canadian banks with different characteristics (cross-sectional analysis). It could also study the effects of banking regulation on banks' liquidity creation.

Appendix

We follow the notation by Roberts, Sarkar and Shachar (2018), such that the BB measure for bank i and quarter t is defined as:

$$\begin{aligned}
 BB_{i,t} &= \sum_{j=1}^m \lambda_{a,j} A_{ijt} + \sum_{k=1}^n \lambda_{l,k} L_{ikt} \\
 &= BBA_{i,t} + BBL_{i,t} \quad ,
 \end{aligned}$$

where $\lambda_{a,j}$ and $\lambda_{l,k}$ are the weights for asset item A_j and liability item L_k , respectively. The weights $\lambda_{a,j}$ and $\lambda_{l,k}$ are fixed over time at pre-assigned values $\{-\frac{1}{2}, 0, +\frac{1}{2}\}$ with illiquid assets and liquid liabilities receiving positive weights and, conversely, liquid assets and illiquid liabilities receiving negative weights. Semi-liquid items receive 0 weight. Weights for the BB measures are taken from Table 1.

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