

1 **Q. Please provide data and workpapers used to prepare Figures 1, 2, 4-9, 13, 15-17, 19-**  
2 **25, 27-30.**

3  
4 A. The requested information is provided in Attachments B, D through I, and K of this  
5 response. Attachments A, C and J can be found on Newfoundland Power's stranded  
6 website at the following link: <https://ftp.nfpower.nf.ca/>.

7  
8 Notes:

9  
10 Figure 1 and Figure 30 present a summary of results derived from Mr. Coyne's various  
11 ROE analyses for the Canadian, U.S. Electric and North American proxy groups.

12  
13 Figure 15 summarizes Mr. Coyne's DCF results for the three proxy groups.

14  
15 Figure 16 was prepared using Consensus Economics April 2018 survey, which is  
16 provided in the response to Request for Information CA-NP-105.

17  
18 Figure 17 is based on historical bond spreads using data from Bloomberg, which is  
19 provided as Attachment G to the response Request for Information CA-NP-103.

20  
21 Figure 19 is based on Exhibits JMC-5 and JMC-6 for the forward-looking market risk  
22 premium and historical market return data which is provided in Attachments H and I to  
23 the response to Request for Information CA-NP-103.

24  
25 Figure 20 summarizes Mr. Coyne's CAPM results for the three proxy groups.

26  
27 Figure 29 is based on the DBRS report that is provided in the response to Request for  
28 Information CA-NP-124.

**Fig 2 FOMC Primer**

**Finance and Economics Discussion Series  
Divisions of Research & Statistics and Monetary Affairs  
Federal Reserve Board, Washington, D.C.**

**The Federal Reserve's Balance Sheet and Earnings: A primer and  
projections**

**Seth B. Carpenter, Jane E. Ihrig, Elizabeth C. Klee, Daniel W.  
Quinn, and Alexander H. Boote**

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## The Federal Reserve's Balance Sheet and Earnings: A primer and projections<sup>1</sup>

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September 2013

### Abstract

Over the past few years, the Federal Reserve's use of unconventional monetary policy tools has received a vast amount of public attention, from discussing how these asset purchases have put downward pressure on longer-term interest rates and thus supported economic activity to evaluating the implications for Federal Reserve remittances to the Treasury and the effect on monetary and fiscal policy. As the economic recovery has gained some momentum of late, the focus has turned to issues associated with the normalization of monetary policy. In this paper, we consider a variety of scenarios consistent with statements by Federal Reserve officials about how the FOMC will normalize policy, including whether to sell mortgage-backed securities and the timing of lifting the federal funds rate off from the zero lower bound. In addition, we analyze the potential costs associated with using reserve-draining tools, which could become an important expense during the years of normalization. In each of these scenarios, we discuss the implications of these normalization policies on the size and composition of Federal Reserve asset holdings, which provides some indicate the length of time unconventional monetary policy will be in place, and on remittances of earnings to the Treasury, which capture the interest rate risk of these normalization policies.

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<sup>1</sup> This paper relies on the details described in in "The Federal Reserve's Balance Sheet and Earnings: A Primer and Projections," FEDS Working Paper #2013-1.

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## 1 Introduction

In response to the financial crisis that began in 2007 and the subsequent recession, the Federal Reserve has been employing a variety of nontraditional monetary policy tools that have garnered a vast amount of public discussion. Some discussion has focused on the expanding size and changing composition of the Federal Reserve's balance sheet, and specifically, the Federal Reserve's holdings of securities in the System Open Market Account (SOMA) (Federal Reserve Bank of New York (2013)). This expansion of holdings of securities has led to deeper discussions about the effects of unconventional monetary policy on interest rates (Li and Wei (2013), Krishnamurthy and Vissing-Jorgensen (2011)) as well as the implications for Federal Reserve remittances to the Treasury and the effect on monetary and fiscal policy (Rudebusch (2011), Greenlaw et al. (2013), and Carpenter et al. (2013)).

More recently, as the economic recovery has gained some momentum, the discussion has turned to questions about the normalization of monetary policy. In various venues, Federal Open Market Committee (FOMC) participants have expressed their views about normalizing the stance of monetary policy. In particular, Chairman Bernanke provided commentary on policy normalization and the long-run composition of the balance sheet during the press conference that followed the June 2013 FOMC meeting. In addition, recent FOMC statements clearly tie the rise in the federal funds rate to the outlook for unemployment and inflation. For example in its June 2013 statement the Committee stated that it anticipated that a 0 to 25 basis point "range for the federal funds rate will be appropriate at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored." In this paper, we consider how the Federal Reserve's balance sheet, and the income that derives from the balance sheet, might evolve under a variety of assumptions about the path of monetary policy and approaches to the normalization of policy. For example, we consider both the June 2011 exit principles that included sales of mortgage-backed securities (MBS) as part of the normalization process, as well

as the approach laid out by the Chairman at his June 2013 press conference that suggests that such sales would not be a prominent part of policy normalization. In addition, given the evolving views in markets about the likely timing of the first increase in the federal funds rate, we also consider a scenario where the date of lift off is pushed out, consistent with a lower unemployment rate threshold, and analyze the effect of that timing for the path of the balance sheet. Finally, we discuss some of the possible implications for Federal Reserve expenses from using reserve-draining tools during the normalization process.

In analyzing each of these normalization scenarios, we report the length of time until the Federal Reserve's balance sheet returns to a normal size; the evolution of the size composition of the balance sheet determines the effect of the asset purchases on interest rates (see, for example Ihrig, et al. (2012)). We also project how MBS holdings will evolve, given that holdings of MBS are a particularly novel development for the Federal Reserve and minutes from FOMC meetings suggest that their acquisition has been a source of some debate. In addition, we look at the interest-rate risk of different exit strategies that appear to be under consideration. Such considerations may be important if, as Greenlaw et al. (2013) suggest, a period of zero remittances might result in negative political pressures (see Greenlaw et al. (2013)).

The projections in this paper are constructed to be consistent with Federal Reserve accounting principles; Carpenter et al. (2013) discusses Federal Reserve accounting and the methodology employed.<sup>3</sup> Our projections rely on the FOMC's guidance regarding monetary policy normalization principles, the forecasts in the June 2013 Primary Dealer Survey conducted by the Federal Reserve Bank of New York, as well as the June 2013 Blue Chip forecast. In the near-term, we assume large-scale asset purchases that are in line with the median projection from the Dealer survey, with purchases in 2013 and 2014 totaling about \$1.1 trillion. Following the public statements by Federal Reserve officials, we assume that the Federal Reserve will continue to reinvest the proceeds from maturing or prepaying securities in order to keep the

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<sup>3</sup> The Federal Reserve's accounting principles are published on the website of the Board of Governors of the Federal Reserve: <http://www.federalreserve.gov/monetarypolicy/files/BSTfinaccountingmanual.pdf>

size of its balance sheet roughly constant in the time between the end of asset purchases until just before the first increase in the target for the federal funds rate. Consistent with the June 2011 FOMC exit principles, we assume that the first step to normalize the stance of monetary policy involves the FOMC allowing SOMA holdings to mature or prepay without reinvestment. Beyond that first move, we analyze a variety of alternative normalization policies mentioned above. A summary of the key results is shown in Table 1.

In the baseline projection, we assume no MBS sales, consistent with the Chairman's comments in his June 2013 press conference. The size of the SOMA portfolio will normalize by August 2020. Despite the normalization of the size of the portfolio, the composition of the portfolio will still reflect the nontraditional policy choices; at the end of our projection period in 2025, over \$400 billion of MBS will remain on the Federal Reserve's books. Annual remittances to the Treasury are projected to remain sizable over the near term and cumulate from 2009-2025 to about \$910 billion. Overall, this scenario suggests that large-scale asset purchases will have a net positive effect on income relative to a scenario with no purchases, but the Federal Reserve will continue to hold MBS for some time.

Under the June 2011 exit strategy principles, sales of MBS were included because of a desire to return to a Treasury only portfolio.<sup>4</sup> Sales of MBS accelerate the date of normalizing the size of the portfolio by about a year relative to the scenario with no MBS sales. However, sales of MBS would also likely result in realized capital losses on the MBS, an outcome that would most likely reduce annual remittance to zero for a few years and result in the Federal Reserve recording a small deferred asset. In pursuing this normalization strategy, the FOMC presumably would need to evaluate, among other considerations, the tradeoffs of reducing MBS holdings to zero with the possibility of zero remittances. In addition, selling seasoned MBS that may have a coupon that is very different from prevailing market interest rates might also be seen as risking unnecessary volatility or illiquidity in fixed income markets at the critical point when the FOMC is trying to firm the stance of policy.

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<sup>4</sup> In the minutes of the April 2011 FOMC meeting, the reason for selling MBS was to "minimize the extent to which the SOMA portfolio might affect the allocation of credit across sectors of the economy."

Another recent policy option noted by Chairman Bernanke in his June 2013 post-FOMC press conference is to lower the unemployment threshold, which, if all else were unchanged, would imply a later date for the funds rate to lift off from the zero lower bound. This change would delay the date of normalization of the size of the balance sheet somewhat. Moreover, this alternative path for the balance sheet combined with a different path for interest rates would have implications for Federal Reserve income and, as a result, remittances to the Treasury. In our analysis, this delay in lift off would boost remittances but result in more MBS holdings at the end of the projection period.

Finally, we examine the use of reserve-draining tools. The baseline analysis does not explicitly model reserve-draining tools, one interpretation of which is that no such tools are needed, or that the use of reverse repurchase agreements (RRPs) or term deposits by the Federal Reserve would be at same cost as interest on excess reserves (IOER). FOMC communications have noted the likely use of these reserve-draining tools, and it is possible that some of the operations will involve transactions with terms longer than overnight, and as a result, a rate that is above the IOER rate. A priori, we have little information to gauge the likely cost of these tools. To provide a rough gauge as to how costly could possibly be, we assess the effects on Federal Reserve net income if the interest expense is 50 basis points higher than the projected level of the federal funds rate. 50 basis points is roughly one standard deviation of the historical spread between the federal funds rate and the yield on the three-month Treasury bill. Although interest expenses rise, there is only a modest effect on the Federal Reserve's cumulative remittances.

The above analysis assumes interest rates follow the path forecasted by the Primary Dealers and Blue Chip respondents. To explore the interest rate sensitivity of our results, we also consider a case where interest rates are 200 basis points higher after liftoff, for both the baseline and MBS sales scenarios. This scenario provides a rough notion of the interest rate risk embedded in the SOMA portfolio. Compared to the baseline, the higher interest rate path implies greater interest expense on reserve balances, lower net income, and consequently lower remittances to the Treasury. In the case of MBS sales, the higher interest rate path also



leads to greater realized capital losses, which further reduce net income and remittances. In these high interest rate scenarios, we project at least three years of zero remittances to the Treasury. Zero remittances do not preclude the FOMC from conducting monetary policy; in fact, foreign central banks, such as the Czech National Bank, have operated with negative equity.<sup>5</sup>

**Table 1 – Summary Statistics of Alternative Normalization Policies**

	<b>SOMA size normalizes</b>	<b>SOMA composition normalizes</b>	<b>2025 MBS holdings</b>	<b>2009-2025 Cumulative remittances</b>	<b>Trough remittances (date)</b>
	Date		\$ billions		
Baseline	Aug 2020	--	\$407	\$908	\$17 (2018)
MBS sales	May 2019	Mar 2020	\$0	\$841	\$0 (2018-2019)
Threshold UR 6.0%	Jun 2021	--	\$512	\$1,052	\$31 (2019)
Reserve Draining tools +50bp	Aug 2020	--	\$407	\$870	\$12 (2018)
Higher Interest Rates +200bp					
Baseline	Aug 2020	--	\$407	\$869	\$0 (2017-19)
MBS sales	Jun 2019	Jun 2020	\$0	\$804	\$0 (2017-21)

<sup>5</sup> The assertion that zero remittances would not affect the conduct of monetary policy is based on a number of points. First, as noted in the text, foreign central banks have operated with negative capital. Second, monetary policy in the United States has historically been conducted by adjusting short-term interest rates—there is no link between the remittances to the Treasury and short-term interest rates. One possible, though in our view, unlikely, channel through which losses could impair monetary policy is if, for some reason, economic agents believed that inflation was affected by the central bank's earnings. If beliefs were formed in that way, perhaps because of a misunderstanding of the mechanics of the economy, inflation expectations could rise and thereby become embedded in actual inflation. Such a process, however, seems irrational.

The remainder of the paper is organized as follows. Section 2 outlines the assumptions used as inputs to the projections of the balance sheet. The baseline balance sheet and income projections are discussed in Section 3. Section 4 considers the alternative normalization policies. Section 5 provides the sensitivity analysis. Section 6 concludes.

## 2 Projections assumptions

In order to construct projections of the Federal Reserve's balance sheet, assumptions about many of the details of the macroeconomy as well as the Federal Reserve's balance sheet and its evolution must be made. The following subsections review key assumptions made to project the balance sheet and income; a detailed description of these and all other balance sheet line items is in Carpenter et al. (2013).

### 2.1 Interest rate assumptions

To evaluate the current and future value of the SOMA portfolio, to project the future interest expense of reserve balances, and to project the future interest income from the portfolio, assumptions must be made about the path of interest rates over the projection period. For this analysis, we rely on the median interest rate projection from the June 2013 Primary Dealer Survey (PDS) for the federal funds rate and the Blue Chip forecast for the ten-year Treasury rate.<sup>6</sup> The assumed path for the federal funds rate and the yield on the ten-year Treasury note are shown in Figure 1. The federal funds rate remains in the 0 to ¼ percent range until the third quarter of 2015. This liftoff date coincides with an unemployment rate of roughly 6.5 percent in the PDS, consistent with the threshold communications by Federal Reserve officials. After that point, the rate is projected to rise and stand at 4 percent in 2025. The yield on the ten-year Treasury note also rises, from the average 2013:Q2 rate of 1.9 percent to 4.9 percent at the end of the projection period. With these two rates, we project the entire yield curve at each point in time.<sup>7</sup>

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<sup>6</sup> The PDS reports only the near term ten-year yield, so we use the Blue Chip forecast for later dates. The two forecasts are nearly identical in the near term. The June 2013 Blue Chip only reports a medium-term forecast, so we append the longer-term projections from the March 2013 Blue Chip forecast.

<sup>7</sup> Refer to Carpenter et al (2013).

## 2.2 Near-term balance sheet assumptions

This subsection reviews our projection methodology for selected asset and liability items that are of particular interest.

### 2.2.1 SOMA portfolio

The evolution of the SOMA portfolio is intended to be consistent with the FOMC statement on June 19, 2013. In particular, we assume:

- (1) Holdings of securities are increased at a pace of \$45 billion per month in longer-term Treasury securities and \$40 billion per month in agency MBS until December 2013. At that time, the pace of purchases is reduced over the first half of 2014 and the expansion of the portfolio ends in June 2014. As a result, total expansion in holdings of Treasury securities and MBS over 2013 and 2014 is about \$1.1 trillion. This path is consistent with the median response to the June 2013 PDS.
- (2) Reinvestment of principal payments from agency securities into agency MBS continues until the FOMC begins to unwind the current accommodative monetary policy stance. Specifically, maturing or prepaying securities are assumed to be reinvested until six months prior to the first projected increase in the federal funds rate.

Given the initial composition of the SOMA portfolio on May 31, 2013, the portfolio evolves reflecting these two primary assumptions and the fact that, over time, securities held in the portfolio age, mature, or prepay. The interest earned on securities already in the portfolio is known. The interest rate on securities purchased in the future is calculated as a function of projected interest rates at the time of purchase. Moreover, the composition of future purchases imposes the assumed constraint announced by the Federal Reserve Bank of New York that SOMA holdings that any one CUSIP will remain below 70 percent of the total amount outstanding in that CUSIP.<sup>8</sup>

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<sup>8</sup> Refer to [http://www.newyorkfed.org/markets/lttreas\\_faq.html](http://www.newyorkfed.org/markets/lttreas_faq.html).

It is important to note that Federal Reserve accounting records the securities holdings at face value and records any unamortized premium as a separate asset or unamortized discount as a separate negative asset. Consequently, we must project both the face value of the portfolio and the associated premiums. To project premiums on future securities purchases we need to calculate the market value of securities in the future, which we assume is the present discounted cash flow of these securities.

### 2.2.2 Liabilities and capital

In our modeling, projections of Reserve Bank liabilities and capital are also critical. In the near term, the size of the balance sheet is driven primarily by securities purchases boosting the asset side of the balance sheet and reserve balances increasing on the liabilities side as the primary offsetting accounting entry. Prior to the financial crisis, however, the liabilities side of the balance sheet typically determined the size of the balance sheet. Reserve balances were fairly small, so increases in currency were the main driver of the balance sheet, with Reserve Bank capital also contributing, but to a lesser extent. Normalization of the size of the balance sheet, therefore, can be thought of as the point when the size of the balance sheet is once again driven by the liabilities side of the balance sheet. For simplicity, we assume that Federal Reserve notes grow in line with the Blue Chip forecast for nominal GDP.<sup>9</sup> Capital paid in is assumed to grow at its decade average of 15 percent per year, and surplus is equated to capital paid in.<sup>10</sup> This growth rate plays a role in the long-run trend growth rate of the SOMA portfolio.

As noted above, until the size of the balance sheet is normalized, we allow reserve balances to be endogenous, calculated as the residual of assets less other liabilities less capital. When reserve balances fall to \$25 billion as the portfolio shrinks, however, we assume that the

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<sup>9</sup> In a classic money demand model with no change in velocity, one can proxy money growth with nominal GDP growth. That said, there are a number of factors that influence demand for currency beyond nominal GDP, including demand for currency from abroad, demand for currency during financial crises, and technological change in payment systems.

<sup>10</sup> In the years prior to the financial crisis, capital-paid in grew rapidly. Each member bank of the Federal Reserve System is required, by law, to subscribe to shares of its local Reserve Bank in an amount equal to 6 percent of its own capital and surplus. Of this 6 percent, half is held at the Federal Reserve and the other half is on call at the bank. Consolidation in the banking industry, which resulted in rapid growth of member bank assets, and regulatory pressures led to higher KPI from member banks. Member bank asset growth declined during the financial crisis; however, capital paid in growth may increase going forward because of, for instance, systemically important financial institution surcharges or Basel III requirements.

Federal Reserve does not allow them to fall further. As currency and Reserve Bank capital are still expanding at that point, purchases of Treasury securities are assumed to restart. Holdings of Treasury securities expand at the same rate as currency and Reserve Bank capital, keeping reserve balances at the assumed \$25 billion level. To maintain reserve balances at \$25 billion, we assume that the Desk begins to purchase Treasury bills. Purchases of bills continue until these securities comprise one-third of the Federal Reserve's total Treasury security holdings – about the average proportion of Treasury holdings prior to the crisis. Once this proportion of bills is reached, we assume that the Desk buys coupon securities in addition to bills to maintain an approximate composition of the portfolio of one-third bills and two-thirds coupon securities.

### 2.3 Exit strategy assumptions for the balance sheet

We tie our modeling of the normalization of policy to the forecasted initial increase in the federal funds rate. We rely on the general principles for the exit strategy that the FOMC outlined in the minutes of the June 2011 FOMC meeting, but update our assumptions based on the Chairman's comments from his June 2013 press conference, which noted that the majority of FOMC participants do not want to sell MBS. Specifically, we assume that the reinvestment of securities ends six months before the federal funds lifts off from the zero lower bound. Although the FOMC guidelines note that reserve-draining tools will be used prior to raising the funds rate, to support the implementation of increase in the federal funds rate when appropriate, we abstract from this detail in the baseline projection.<sup>11</sup> The key assumptions used in the baseline and alternative normalization projections are summarized in appendix table A1.

## 3 Baseline

With the assumptions in place, this section presents the baseline balance sheet and income projections. This scenario illustrates one path for monetary policy normalization that is

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<sup>11</sup> If reserve-draining tools incur the same expense as the rate paid on excess reserve balances, then there is no effect on Federal Reserve income and the effect is only a classification of balance sheet items. If the draining tools are more costly than interest on excess reserve balances, see the discussion later in the paper.

generally consistent with current FOMC communications. Critical assumptions for this scenario, as well as all other scenarios, are found in appendix table A1.

### 3.1 Balance sheet

Figure 2 presents the projections of key balance sheet line items (the solid lines). As shown in the top left panel, SOMA holdings move up slightly through the middle of 2014 reflecting the continuation of the asset purchase program. In mid-2014, with no further purchases, the portfolio remains fairly steady at its mid-2014 level of \$3.9 trillion. This portfolio is much larger than the size of SOMA immediately prior to the financial crisis, which was roughly \$800 billion, and about \$1.2 trillion above Federal Reserve notes in mid-2014. Securities holdings in excess of Federal Reserve notes can be considered one indicator for the presence of unconventional monetary policy in the economy.

After purchases end, under the assumption that the FOMC begins to allow all asset holdings to roll off the portfolio as the first step in the exit strategy, SOMA holdings should begin to decline. However, because the Federal Reserve sold or redeemed almost all of the Treasury securities with less than three years remaining maturity in the portfolio as part of the maturity extension program in 2011-2012, the portfolio holds very few shorter-dated Treasury securities at the time redemptions begin. Therefore, as shown in the bottom left panel, when roll off begins in February 2015, only a minimal amount of securities are maturing, and Treasury securities do not immediately decline. As shown in Table 2, Treasury securities that are maturing become sizeable in 2016 and then Treasury holdings decline quickly.

**Table 2 – Projected maturing Treasury securities (\$ billions)**

2015:H1*	\$1.9
2015:H2	\$1.6
2016	\$215.5
2017	\$185
2018	\$342.2

\*Rolloffs begins in February 2015.

While Treasury securities do not decline until sometime after liftoff, MBS holdings, the bottom right panel, begin to contract immediately. Still, these holdings decline modestly, as prepayments are projected to be only about \$20 billion per quarter around the time of lift off, and then slow further as rates rise. By the end of 2025, MBS holdings are roughly \$400 billion. Recall that in Chairman Bernanke's press conference he noted "in the longer run, limited sales could be used to reduce or eliminate residual MBS holdings." This projection suggests residual holdings are still a sizable amount.

The decline in Treasury and MBS securities implies the size of the balance sheet is normalized in August 2020 with \$1 trillion in Treasury securities holdings and \$755 billion in MBS holdings. This is suggestive that unconventional monetary policy is putting downward pressure on interest rates through this date. Afterwards, SOMA begins to expand in line with the growth of currency and capital. Purchases of Treasury securities can be strategic to move the portfolio toward the FOMC's desired composition in the longer run.

The level of reserve balances throughout the projection roughly reflects the asset program minus currency in circulation. As shown in the top right panel, reserve balances top out at \$2.7 trillion in May 2014, as the SOMA portfolio peaks with the end of asset purchases. Further out in the projection, the reduction in the size of the SOMA portfolio, along with the projected growth of Reserve Bank capital and Federal Reserve notes, results in declines in the level of reserve balances. Since we assume that reserve balances do not fall below \$25 billion, by early 2019 the Desk again starts to reinvest maturing Treasury securities and begins purchases of Treasury securities.<sup>12</sup> If one were to consider a higher level of steady-state reserve balances, then normalization would occur slightly earlier.

### 3.2 Income

Figure 3 shows the path of Reserve Bank net income. Because of the large size of the SOMA portfolio, combined with the (relatively high) coupons on the securities, interest income

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<sup>12</sup> Prior to the financial crisis, reserve balances averaged \$25 billion. We assume this nominal level in the projection. A higher minimum would imply an earlier date of normalizing the size of the SOMA portfolio.

is elevated through 2015.<sup>13</sup> As the SOMA portfolio begins to contract with the assumed steps in the exit strategy, interest income declines through mid-2018. After reserve balances reach \$25 billion, Treasury purchases resume, expanding the portfolio, causing interest income to rise.

Interest expense reflects both the level of the federal funds rate and the level of reserve balances. The federal funds rate in the Dealer survey begins to rise in 2015, and interest expense rises with it. However, in 2016, interest expense begins to moderate, as the decline in reserve balances more than offsets the rise in the federal funds rate.

On net, annual remittances to the Treasury remain elevated by historical standards through 2015, but then decline. The trough in remittances is \$17 billion in 2018, a level that is not much lower than the \$25 billion average remittances in the decade prior to the financial crisis. Cumulative remittances from 2009 through 2025 are nearly \$910 billion, above the level predicted by a trend growth in remittances. Of course, the overall effect on the federal government's finances is more complicated than just the impact from Federal Reserve remittances. For example, if asset purchases provide meaningful economic stimulus, the increase in government revenues from faster economic growth could more than offset any lull in remittances. Further, if the asset purchases lower interest rates, the interest expense of the federal government is lower.

Although only realized gains or losses affect the Federal Reserve's income, we project the unrealized gain or loss on the portfolio. Given the large SOMA portfolio and the projected rise in interest rates, under the baseline projections, the portfolio is in an unrealized loss position beginning at the end of 2014. This unrealized loss position continues to grow through the beginning of 2017, but subsequently diminishes as the portfolio shrinks through redemptions and sales.

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<sup>13</sup> The current weighted average coupon on the SOMA portfolio is 3.4 percent. This weighted average coupon evolves over the projection period as securities are purchased or are removed from the portfolio.



### 3.3 Deferred asset

One aspect of Federal Reserve Bank accounting that will be important in some scenarios is the deferred asset. When Reserve Bank income is not sufficient to cover interest expense, realized losses, operating and other expenses, a deferred asset is created. For example, as shown on the H.4.1 Statistical Release from November 3, 2011, the Federal Reserve Bank of New York recorded a deferred asset that week and the subsequent week.<sup>14</sup> The deferred asset reflects the amount by which earnings failed to cover expenses and, as a result, the amount of future earnings that must be withheld as a result. Put differently, if a Reserve Bank were to incur an overall loss, its capital would not fall, rather it would suspend remitting to the Treasury until such time as it had returned to positive earnings and had earned back any losses to date. This accounting concept is similar to deferred tax accounting for the private sector. A Reserve Bank deferred asset does not bear interest. Because there has never been a deferred asset of any meaningful size, there is little guidance as to the whether or not there is a limit to the potential size of the asset. It may be plausible to assume that it would not be allowed to exceed the value of all future earnings, possibly in present discounted terms, given the fact that it is paid down through future earnings. As will be clear in these projections, a scenario that would result in a deferred asset in excess of the present value of future earnings is difficult to contemplate.

Most other central banks do not record deferred assets and instead use different accounting policies. For example, many central banks smooth remittances each year, by transferring an average amount of net income back to the government and saving the “excess” net income for times with negative shocks. Other central banks allow for negative remittances – that is, transfers from rather than to the government—if the loss is too large. The infusion of funds from their governments in cases of large negative shocks avoids deferred assets for these

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<sup>14</sup> In November 2011, the Maiden Lane accounts, which are marked to market and consolidated onto the balance sheet of the Federal Reserve Bank of New York, were revalued and resulted in an unrealized loss that required the Federal Reserve Bank of New York to record a deferred asset. Over time, the FRBNY's loans to the Maiden Lane limited liability companies were repaid in full, with interest.

institutions. One example of a central bank with a form of a deferred asset is the Czech National Bank. This institution has operated for a number of years with a negative equity position and zero remittances.

## 4 Alternative normalization strategies

The baseline assumption of how the FOMC may choose to unwind unconventional monetary policy is one of many alternatives available to the Committee. Here we consider a few alternative normalization strategies and compare the effects on the balance sheet and income to the baseline projection, as well as note the implications for interest rates.

### 4.1 MBS sales

The June 2011 FOMC minutes laid out exit strategy principles, which included selling MBS over a period of three to five years at some date after the funds rate moved above the zero lower bound. In addition, FOMC members have expressed a desire to remove MBS from the portfolio, in part reflecting their view that the Federal Reserve should minimize the extent to which the Federal Reserve portfolio might affect the allocation of credit across sectors of the economy (FOMC, 2011).<sup>15</sup> In this projection, we consider selling MBS holdings over four years, commencing six months after liftoff. Selling MBS after the funds rate starts to rise is not only a way to remove MBS from the portfolio, but also to reduce the amount of unconventional monetary policy in place at a time when the FOMC wants to firm monetary policy. A consequence of selling MBS is that the Federal Reserve will realize capital losses, reflecting selling relatively low coupon MBS in an environment with rising interest rates. While this strategy may result in no remittances to the Treasury and the booking of a deferred asset, it will not impede monetary policy implementation.

The implications of assuming MBS sales on the balance sheet are shown in figure 2. With MBS sales (the dashed lines), MBS holdings drop much faster than in the baseline.

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<sup>15</sup> Refer to the minutes of the April 2011 FOMC meeting, available at <http://www.federalreserve.gov/monetarypolicy/fomcminutes20110427.htm>.

Consequently, the balance sheet with MBS sales normalizes in size around May 2019, implying that unconventional monetary policy is unwound one year earlier than in the baseline.

The income projection is a bit different from the baseline. Because of MBS sales, as shown in Figure 3, there are less securities in SOMA and so interest income is lower in the medium term than in the baseline. Interest expense is also lower, because of the reduction in reserve balances. Under this path of interest rates, with sales come capital losses.<sup>16</sup> Over the four-year sales period, February 2016 to January 2020, these losses average roughly \$18 billion per year. Putting the pieces together, remittances fall to zero from 2018 through 2019, and a deferred asset is booked. That is, when earnings are insufficient to cover costs resulting in an – an operating loss in some period, no funds are remitted until earnings, through time, have been sufficient to cover that loss. As explained above, the deferred asset is the value of the earnings that will be retained to cover this loss and is booked as a negative liability on the Federal Reserve’s balance sheet under the line item “Interest on Federal Reserve notes due to the U.S. Treasury.” Cumulative remittances from 2009 to 2025 are \$840 billion, about \$65 billion less than in the baseline.

Of course, zero remittances does not mean the Federal Reserve cannot conduct monetary policy. In fact, other central banks have operated with losses. For example, the Swiss National Bank experienced an operating loss in 2008 and 2010, as a result of their currency interventions in support of the Swiss Franc.<sup>17</sup> Despite these losses, the ability of the Swiss National Bank to influence monetary conditions was relatively unaffected.

Overall, there are tradeoffs of implementing this normalization policy. MBS sales will remove credit allocation to the housing sector and return monetary policy to normal operations more quickly than the baseline. There will be, however, a noticeable impact on Federal Reserve income from this policy. Some commentators, (such as Greenlaw et al. (2013)) have suggested that very low or zero remittances may involve negative political pressure. It may also be the

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<sup>16</sup> Treasury securities sales conducted under the maturity extension program resulted in small gains because of the low level of market interest rates in 2012 and the relatively higher coupon on the securities sold.

<sup>17</sup> Refer to “Annual Result of the Swiss National Bank “for 2008 and 2010, available for download at [www.snb.ch/en/mmr/reference/pre\\_20090304/source/pre\\_20090304.en.pdf](http://www.snb.ch/en/mmr/reference/pre_20090304/source/pre_20090304.en.pdf) and [http://www.snb.ch/en/mmr/reference/pre\\_20110303/source/pre\\_20110303.en.pdf](http://www.snb.ch/en/mmr/reference/pre_20110303/source/pre_20110303.en.pdf).

case that selling seasoned MBS with coupons that are noticeably different than prevailing market rates might risk introducing illiquidity or volatility into fixed-income markets.

## 4.2 Unemployment rate threshold of 6 percent

Since December 2012, the FOMC has provided forward guidance about the federal funds rate in terms of a threshold for the unemployment rate. The FOMC statement explicitly notes that the funds rate will remain in “this exceptionally low range ... at least as long as the unemployment rate remains above 6-1/2 percent....” In his June 2013 press conference, Chairman Bernanke opened up the possibility that the FOMC might lower the threshold. Here, we consider the impact of lowering the threshold to 6 percent.

Lowering the threshold affects our projections in two ways. First, all else equal, the lower threshold will delay the timing of the liftoff of the federal funds rate. Under our assumptions regarding the timing of stopping of reinvestment, the contour of the balance sheet will change, delaying the decline in the portfolio and therefore the normalization of the size of the balance sheet. Second, the delay in lift off alters the interest rate path, which affects income. Of course, a critical question is how fast will rates rise after liftoff, during the critical period when reserve balances are still elevated and interest expense is sizable. In our analysis, we hold the federal funds rate at the lower bound until the Blue Chip forecast for the unemployment rate falls below 6 percent.<sup>18</sup> This implies lift off in mid-2017, compared to August 2015 in the baseline. We assume the funds rate moves up at the same pace as the baseline scenario, as illustrated in Figure 1. We also assume that rolloff begins 6 months before liftoff, delaying the start to roll off by six quarters from the baseline. The 10-year yield is adjusted by a simple approximation of the expected change in the rate as implied by the expectations hypothesis. That is, we lower the 10 year yield by the average decrease in the path of the federal funds rate over the next 40 quarters.

Figure 2 illustrates the evolution of the balance sheet (dashed-dotted lines). The delayed start to stopping reinvestment implies larger MBS holdings throughout the projection

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<sup>18</sup> The longer-run forecast is from the March Blue Chip. The near term unemployment rate forecast has moved down 20-30 basis points between March and June. One could argue that this implies lift off might be a bit sooner than we project; however, the forward guidance is only a threshold, so it also could be later than we project.

period, with about \$500 billion in holdings at end-2025.<sup>19</sup> For Treasury securities, however, the delayed start to allowing the securities to roll off the portfolio when they mature is not as dramatic, reflecting the fact that the MEP resulted in few securities maturing in 2015 (see Table 2). Hence, projected Treasury holdings in the medium term are not that different from the baseline. Of course, later in the period, Treasury holdings are less than the baseline since there are more MBS holdings in this scenario. Taken together, the evolution of the securities holdings implies normalization of the size of the balance sheet is delayed by 10 months relative to the baseline, implying a longer period for unconventional monetary policy to be in place.

Figure 3 shows that this policy would boost remittances to the Treasury by a sizable amount. Interest income is boosted through the medium run by the higher securities holdings. Interest expense is generally lower than the baseline, reflecting the fact that delayed start to the rise in the federal funds rate allows more Treasury securities to roll off the books and reduce reserve balances faster once the federal funds rate rises. These two factors imply that remittances are much higher through the medium term, with a trough of roughly \$30 billion. Cumulative remittances are \$1,052 billion, \$144 billion more than the baseline. This scenario shows that if the FOMC chose to lower the threshold, for whatever reason, unconventional monetary policy would be unwound a bit more slowly, while remittances would be boosted relative to the baseline scenario. Again, MBS holdings would be sizable at the end of 2025.

### 4.3 Reserve-draining tools

So far, our analysis has assumed that the Federal Reserve has not engaged in any active liability management, and as a result, reserve balances passively decline as securities mature and roll off the portfolio. As noted in the June 2011 exit principles, the Committee may elect to incorporate liability management tools to reduce or “drain” reserve balances into its exit strategy in order to support conditions in which the federal funds rate trades near the intended target policy rate. Tools that could be used to drain reserve balances include reverse repurchase agreements and term deposits. While these operations would not alter the overall

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<sup>19</sup> The Chairman mentioned in his press conference statement that residual agency MBS holdings could be sold at some point in the future.

size of the portfolio, they would affect the composition of the Federal Reserve’s liabilities, leaving less reserve balances and more of these other items.

If the Federal Reserve were to use draining operations, there would be the possibility that the interest expense on liabilities would increase, as counterparties would demand a higher rate of return on a financial instrument with potentially a longer maturity or less liquidity than reserve balances. To illustrate the point, we assume that all liabilities pay 50 basis points above IOER, the extreme. This scenario is calibrated to a one standard deviation of the historical spread between the federal funds rate and selected one- and three-month money market rates.

The size of the balance sheet is unchanged in this scenario, though reserve balances would fall 1:1 with the use of term deposits and reverse repurchase agreements. Interest expense would rise, with an increase of 50 basis points per each dollar drained. Assuming all reserve balances are drained, an extreme example, as shown in table 3 and figure 3, even in this case, overall remittances are only marginally affected. This result is because the balance sheet is shrinking at the time interest expense is rising. The impact of higher costs is modest and reduces cumulative remittances by about a \$40 billion. Given the magnitude of the other costs and revenues, the expense associated with draining tools appear to be relatively modest.

**Table 3 – Projected Remittances, \$ billions**

	2015	2016	2017	2018	2019	2020	Cumulative 2009-2025
Baseline	84.1	47.5	19.7	17.1	23.3	30.2	908.9
Costly Draining*	71.6	37.2	11.8	11.8	20.8	29.9	869.8

\*Draining tools implemented on all reserve balances from liftoff to when reserve balances are normalized.

## 5 Interest rate sensitivity

To illustrate the sensitivity of our projections to the interest rate path, we consider two alternative scenarios – with and without MBS sales—where interest rates are 200 basis points higher after liftoff than in the baseline projection. This shock to interest rates will not have a meaningful impact on the size of the balance sheet; hence, the implications for the unwinding

of unconventional monetary policy are basically unaffected. However, higher interest rates affect Federal Reserve income. The results will highlight the point discussed in the December 2012 minutes: “Depending on the path for the balance sheet and interest rates, the Federal Reserve’s net income and its remittances to the Treasury could be significantly affected during the period of policy normalization.”

Figure 1 shows the projection for the higher interest rate scenarios (the dashed line). The federal funds rate and ten-year Treasury yield rise at a faster pace at lift off, and after one year are 200 basis points higher than the baseline rates over the remainder of the projection. In the baseline interest rate projection, the ten-year Treasury yield rises by 1 percentage point between end-2014 and end-2016. By contrast, the 200 basis point shock implies the ten-year Treasury yield is increasing by 3 percentage points over those two years.

There are a couple of ways to put the size of this shock in perspective. To start, this size shock is 1.2 percentage points above the average forecast of the top 10 highest respondents in the June 2013 Blue Chip survey (roughly 20 percent of the sample), and thus is probably comfortably above most market participants’ interest rate projections. In addition, for a historical comparison, from 1978 to present, the standard deviation of the two-year change in the ten-year Treasury yield is 1.6 percentage points. As a result, this higher-interest rate scenario should be seen as a somewhat unlikely scenario, but not an implausible one. Of course, to the extent that inflation expectations have become better anchored through time, this increase in interest rates may be even less probable than the historical record may suggest.

Focusing on the baseline, no MBS sales scenario, Figure 4, the interest rate shock does not materially change the Federal Reserve’s balance sheet projections.<sup>20</sup> The income projection, as shown in Figure 5, does change, however. The higher federal funds rate implies greater interest expense. Once combined with noninterest income and expenses, remittances to the Treasury fall to zero for a few years and a deferred asset is booked for 2017 through 2019. Cumulative remittances from 2009 to 2025 are \$869 billion, about \$40 billion less than in the baseline.

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<sup>20</sup> A deferred asset will have a small impact on the size of the SOMA portfolio, but not enough to see in the figures.

Turning to a scenario where MBS are sold, the higher interest-rate path does not change the balance sheet by much, but with higher interest expense and larger capital losses, a deferred asset peaks at nearly \$150 billion. Moreover, remittances to the Treasury are halted for 6½ years. Cumulative remittances from 2009 to 2025 are \$805 billion, about \$100 billion less than in the baseline. Of course, at the June 2013 post-FOMC press conference, Chairman Bernanke noted “a strong majority now expects that the Committee will not sell agency mortgage-backed securities during the process of normalizing monetary policy.” Therefore, this scenario is unlikely to play out under current expectations.

These sensitivity scenarios illustrate that in some circumstances the Federal Reserve could have years with no remittances to the Treasury and a deferred asset on its books. It is important, however, that these scenarios be viewed within a macroeconomic framework. As noted above, to the extent that asset purchases are effective in stimulating the economy, overall government revenues would be boosted on net, despite the capital losses at the Federal Reserve. In addition, one should consider the Federal Reserve’s remittances over the entire period of unconventional monetary policy. Overall, average annual remittances to the Treasury even in these shock scenarios remain well above the average annual remittances of \$25 billion recorded prior to the crisis.

## 6 Conclusion

In this paper, we have outlined a variety of ways the FOMC may unwind the unconventional monetary policy that it has instituted over the past several years. The different policies have implications for the length of time unconventional policy is in place, the composition of the Federal Reserve’s balance sheet for many years to come, and remittances to the Treasury. The Federal Reserve’s balance sheet is substantially larger than it had been historically and will remain elevated for some time. How fast unconventional monetary policy unwinds depends on FOMC actions, some possibilities of which we outlined here.



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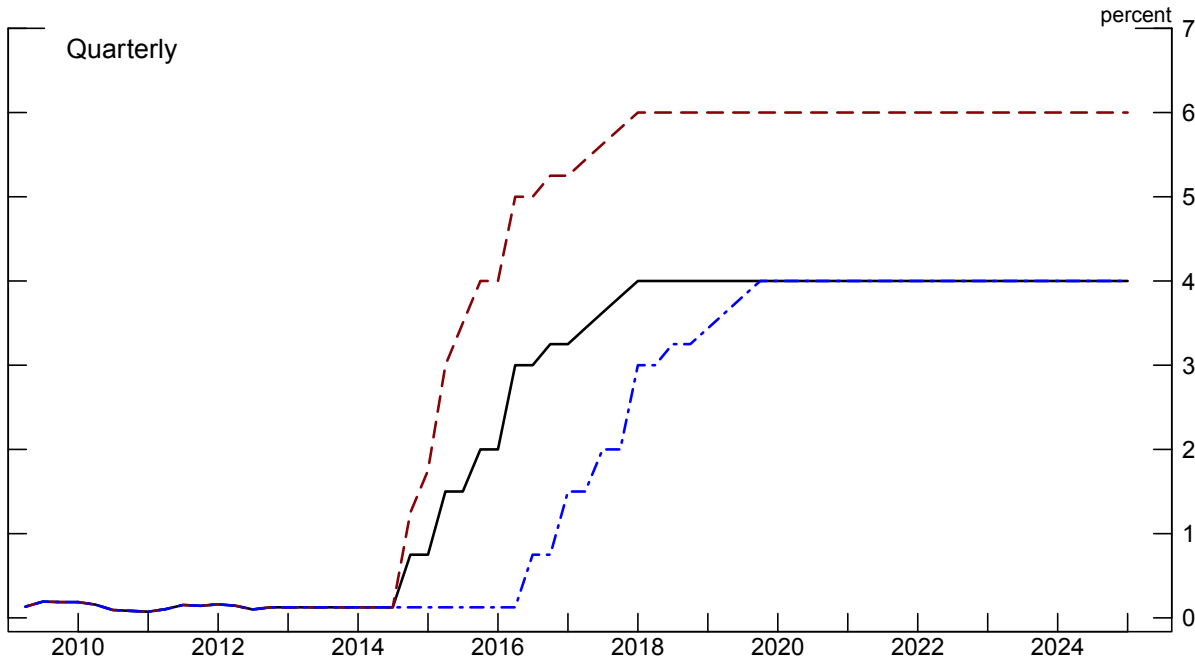
Table A1 – Key assumptions of the projections

Assumption	Baseline	Baseline w/ Sales	6.0% UR Threshold
<b>Current Portfolio Strategy</b>			
Agency reinvestments	Agency MBS	Agency MBS	Agency MBS
<b>Treasury Purchases</b>			
Total Amount (2013-2014)	\$610 billion	\$610 billion	\$610 billion
Jan-13 to Nov-13	45	45	45
Dec-13	30	30	30
Jan-14 to Feb-14	25	25	25
Mar-14	15	15	15
Apr-14 to May-14	10	10	10
Jun-14	0	0	0
<b>MBS Purchases</b>			
Total Amount (2013-2014)	\$535 billion	\$535 billion	\$535 billion
Jan-13 to Nov-13	40	40	40
Dec-13	30	30	30
Jan-14 to Feb-14	25	25	25
Mar-14	15	15	15
Apr-14	0	0	0
<b>Exit Strategy</b>			
Fed Funds liftoff	Aug-15	Aug-16	Jun-17
Redemptions start	Feb-15	Feb-15	Dec-16
Sales start	N/A	Feb-16	N/A
Sales end	N/A	Jan-20	N/A

Figure 1: Interest Rates

— Baseline      - - - UR Thresh 6%  
- - - High IRs

**Federal Funds Rate**



**10 Year Treasury Rate**

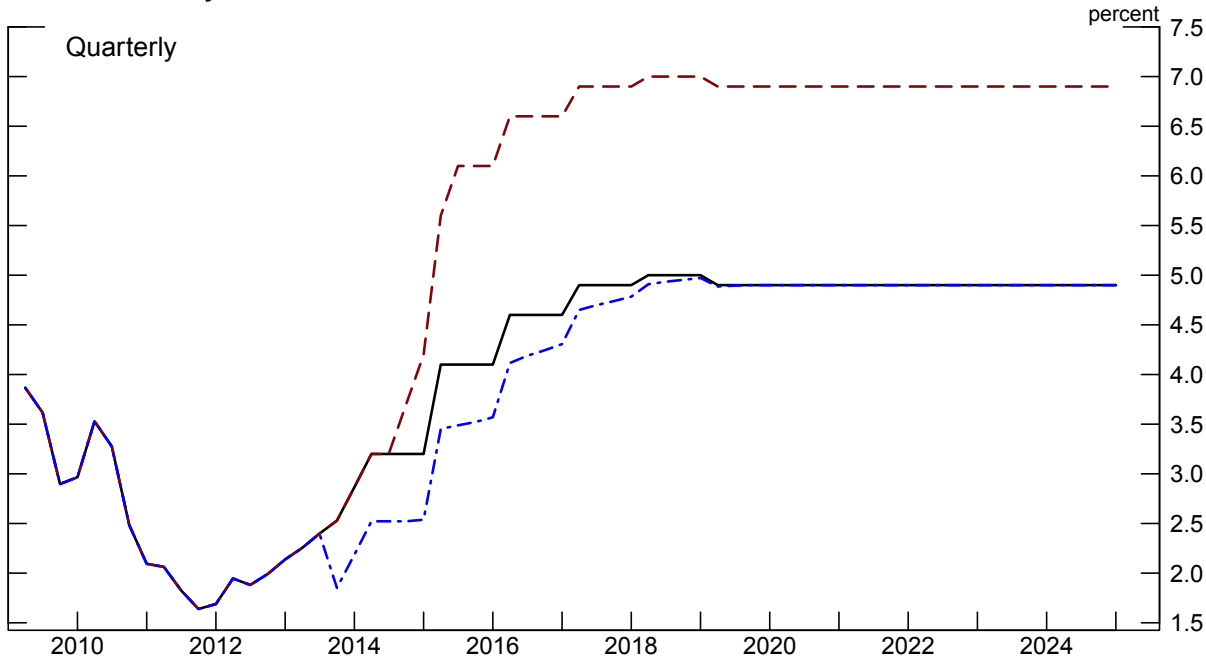
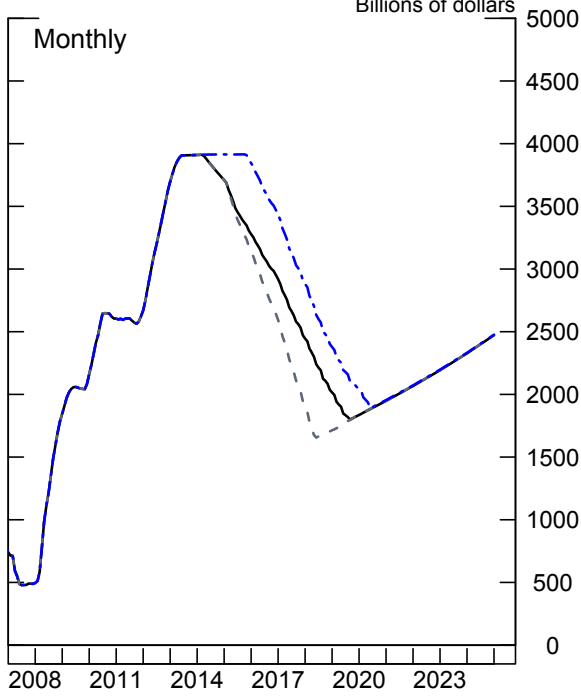


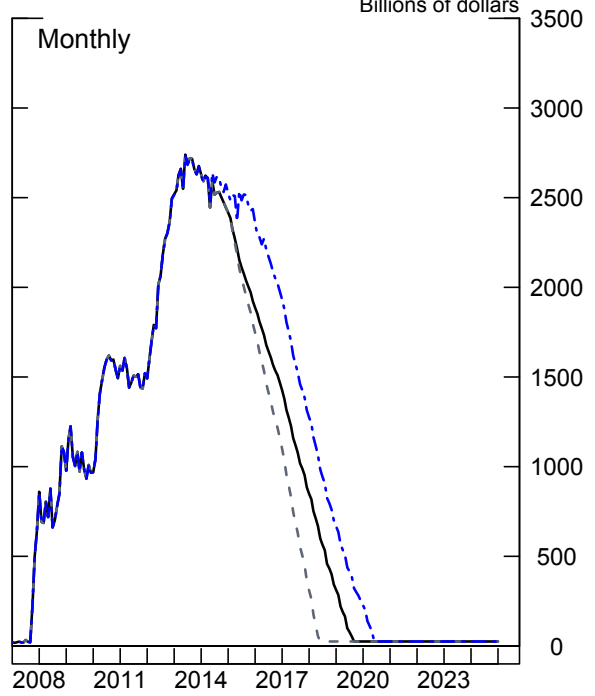
Figure 2: Selected Assets and Liabilities of the Balance Sheet

— Baseline      - - - Baseline w/ Sales      - - - UR Thresh 6%

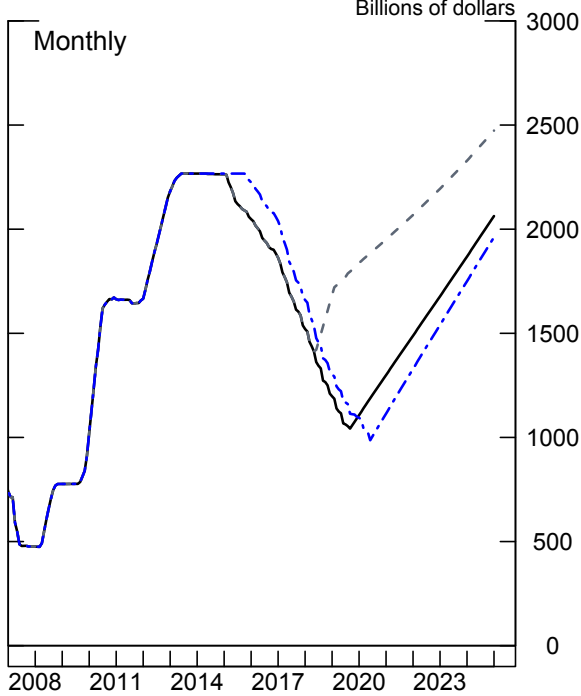
**SOMA Holdings**



**Reserve Balances**



**SOMA Treasury Holdings**



**SOMA Agency MBS Holdings**

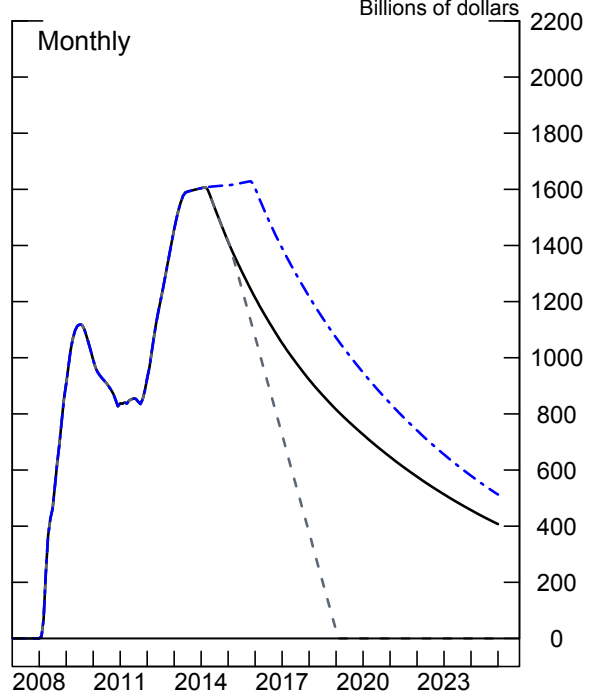
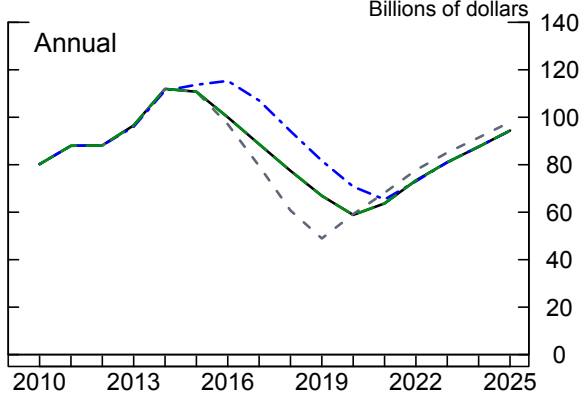


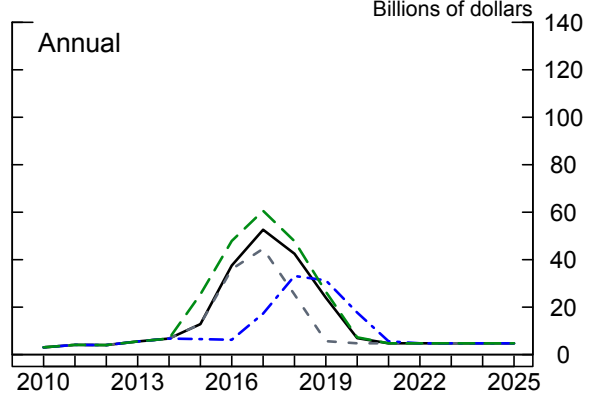
Figure 3: Income Projections

— Baseline      - - - UR Thresh 6%  
 - - - Baseline w/ Sales      - - - IOER +50bp

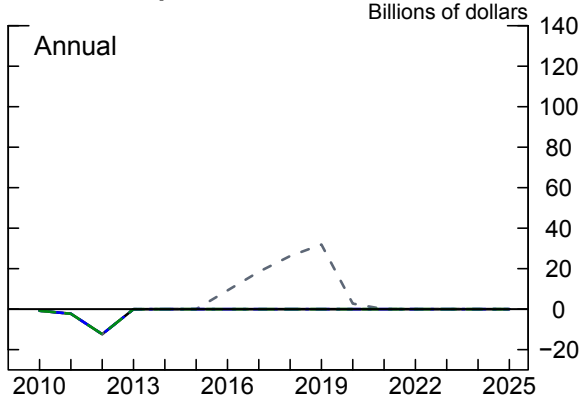
**Interest Income**



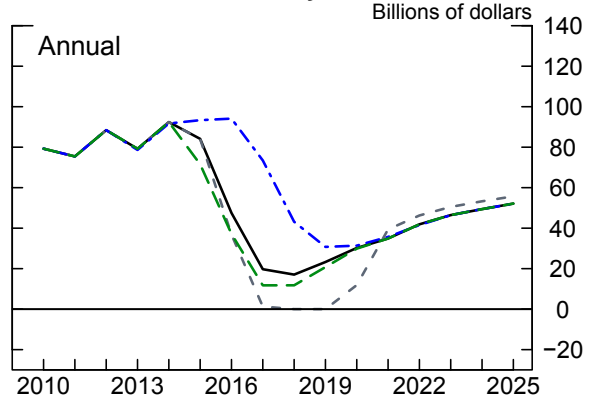
**Interest Expense**



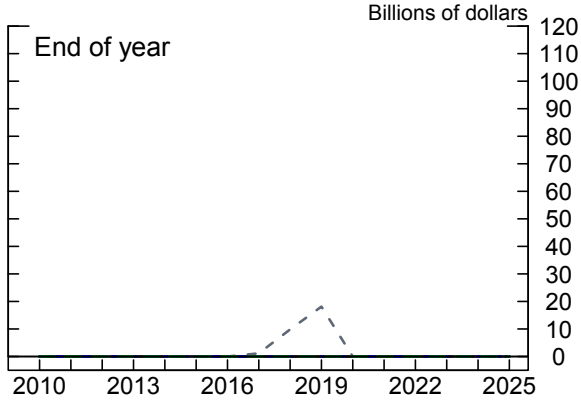
**Realized Capital Losses**



**Remittances to Treasury**



**Deferred Asset**



**Memo: Unrealized Gains/Losses**

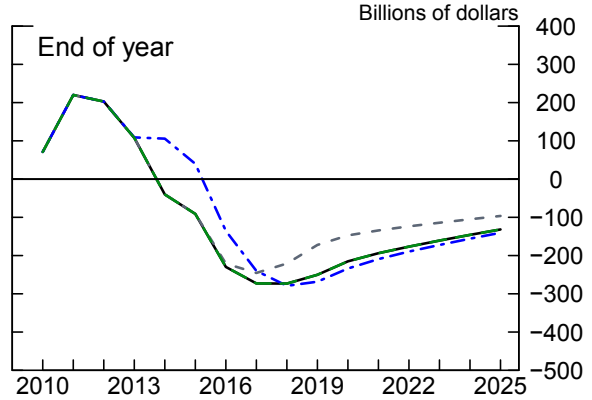
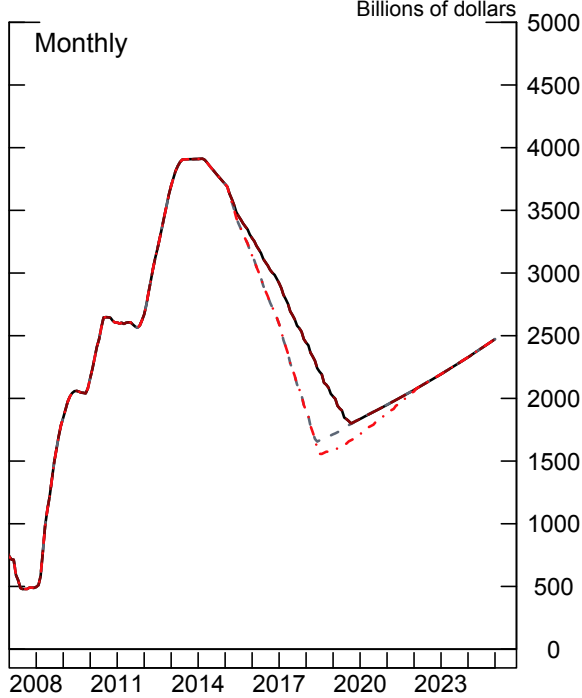


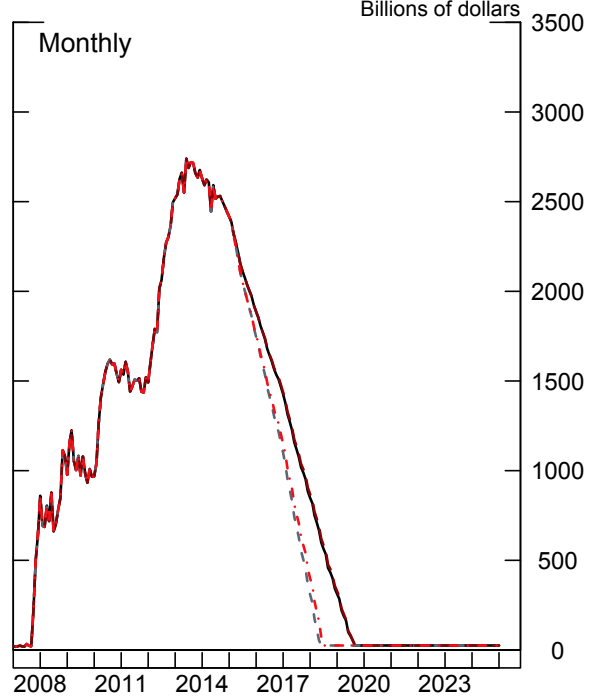
Figure 4: Selected Assets and Liabilities of the Balance Sheet

— Baseline      - - - High IRs  
- - - Baseline w/ Sales      · · · High IRs w/ Sales

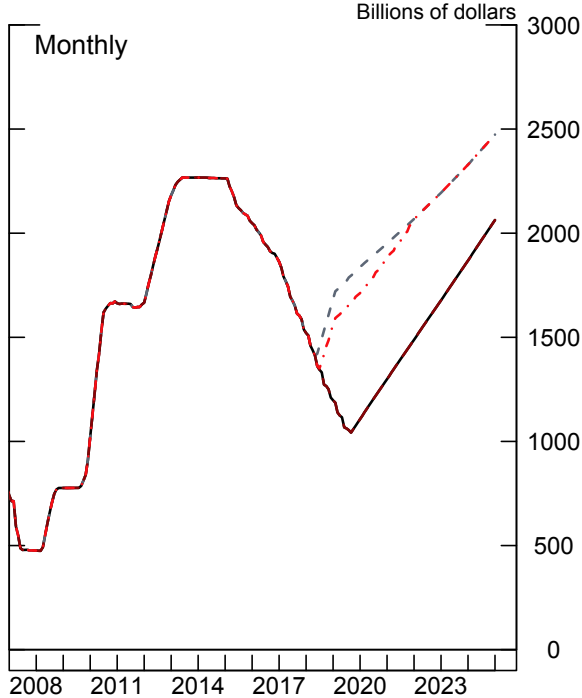
**SOMA Holdings**



**Reserve Balances**



**SOMA Treasury Holdings**



**SOMA Agency MBS Holdings**

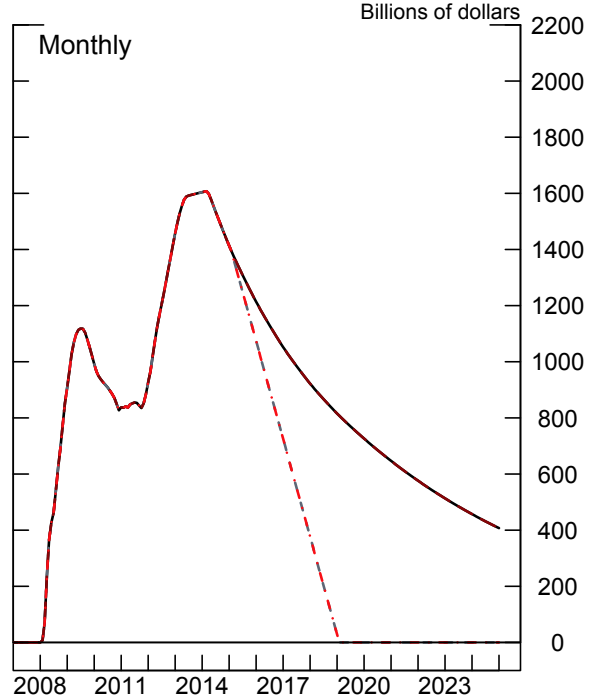
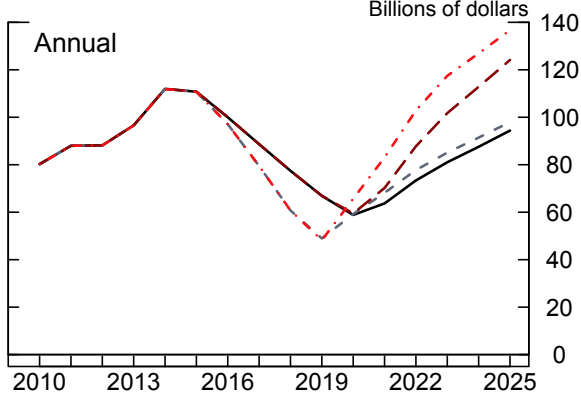


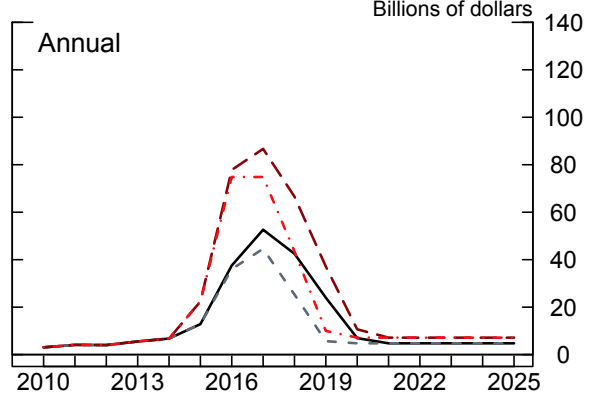
Figure 5: Income Projections

— Baseline      - - - High IRs  
- - - Baseline w/ Sales      ··· High IRs w/ Sales

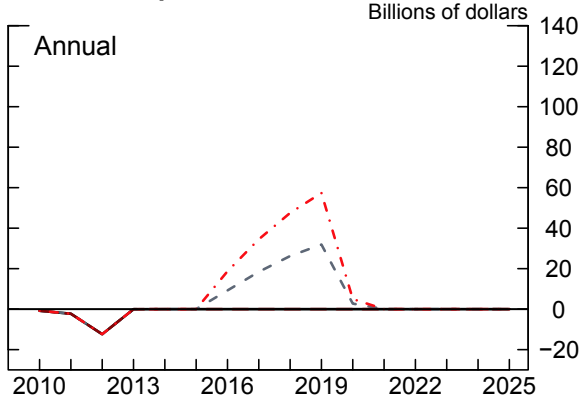
**Interest Income**



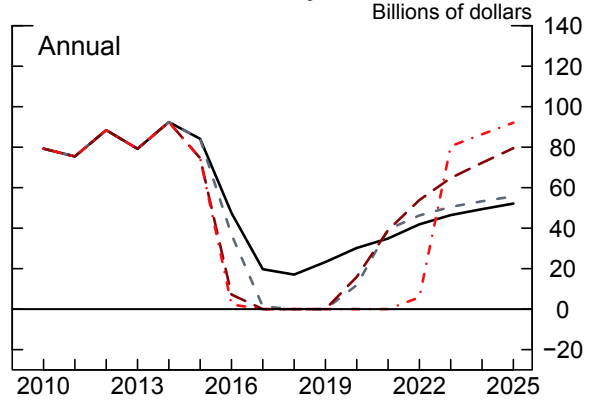
**Interest Expense**



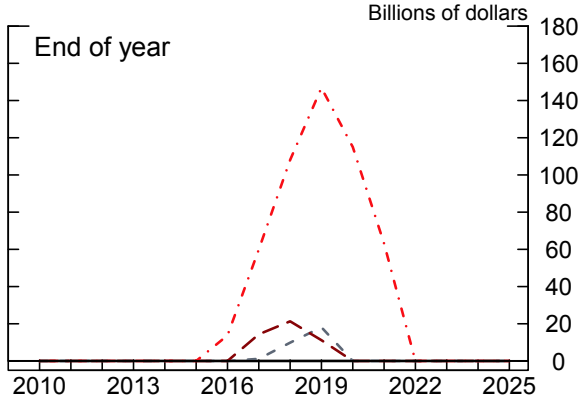
**Realized Capital Losses**



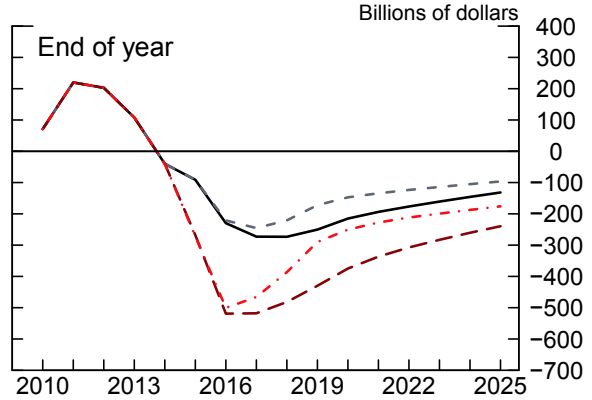
**Remittances to Treasury**



**Deferred Asset**



**Memo: Unrealized Gains/Losses**





**Fig 13 Historical Value Line Data**

	[1] Avg. EPS Growth Historical 2008-2017	[2] Avg. DPS Growth Historical 2008-2017	[3] 10-year Avg. GDP Growth 2008-2017	[4] Avg. EPS Growth Forecast 2018-2022	[5] GDP Growth Forecast 2024-2028
U.S. Proxy Group	7.37%	5.17%	3.11%	5.01%	4.35%
Canadian Proxy Group	8.04%	12.31%	3.23%	4.81%	3.73%
Combined Proxy Group	7.52%	5.53%	3.13%	5.08%	4.24%
Average	7.64%	7.67%	3.15%	4.97%	4.11%

[1] Value Line, average compound annual growth rate in EPS of each company the proxy group

[2] Value Line, average compound annual growth rate in DPS of each company the proxy group

[3] See Exhibit JMC-1, at [5] through [8]

[4] See Exhibit JMC-3, at [9]

[5] See Exhibit JMC-4, at [9]

Company	Ticker	2008 Results		2017 Results	
		Earnings per sh	Div'ds Decl'd per sh	Earnings per sh	Div'ds Decl'd per sh
ALLETE, Inc.	ALE	2.82	1.72	3.13	2.14
Alliant Energy Corporation	LNT	1.27	0.70	1.99	1.26
American Electric Power Company, Inc.	AEP	2.99	1.64	3.62	2.39
Duke Energy Corporation	DUK	3.03	2.70	4.30	3.49
Edison International	EIX	3.68	1.23	4.35	2.23
Eversource Energy	ES	1.86	0.83	3.10	1.90
OGE Energy Corporation	OGE	1.25	0.70	1.92	1.27
Pinnacle West Capital Corporation	PNW	2.12	2.10	4.30	2.70
PNM Resources, Inc.	PNM	0.11	0.61	1.90	0.99
Southern Company	SO	2.25	1.66	3.00	2.30
Average				7.37%	5.17%

Company	Ticker	2008 Results		2017 Results		EPS Growth	DPS Growth
		Earnings per sh	Div'ds Decl'd per sh	Earnings per sh	Div'ds Decl'd per sh		
Canadian Utilities Limited	CU	n/a	n/a	n/a	n/a	9.02%	9.13%
Emera Inc.	EMA	1.26	0.97	2.74	2.13	7.07%	15.48%
Enbridge Inc.	ENB	1.06	0.66	1.96	2.41		
Valener Inc.	VNR	n/a	n/a	n/a	n/a		
Average						8.04%	12.31%
Company	Ticker	2008 Results		2017 Results		EPS Growth	DPS Growth
		Earnings per sh	Div'ds Decl'd per sh	Earnings per sh	Div'ds Decl'd per sh		
ALLETE, Inc.	ALE	2.82	1.72	3.13	2.14	1.17%	2.46%
Alliant Energy Corporation	LNT	1.27	0.70	1.99	1.26	5.12%	6.75%
American Electric Power Company, Inc.	AEP	2.99	1.64	3.62	2.39	2.15%	4.27%
Duke Energy Corporation	DUK	3.03	2.70	4.30	3.49	3.97%	2.89%
Edison International	EIX	3.68	1.23	4.35	2.23	1.88%	6.83%
Eversource Energy	ES	1.86	0.83	3.10	1.90	5.84%	9.64%
OGE Energy Corporation	OGE	1.25	0.70	1.92	1.27	4.88%	6.84%
Pinnacle West Capital Corporation	PNW	2.12	2.10	4.30	2.70	8.17%	2.83%
PNM Resources, Inc.	PNM	0.11	0.61	1.90	0.99	37.24%	5.53%
Southern Company	SO	2.25	1.66	3.00	2.30	3.25%	3.69%
Canadian Utilities Limited	CU	n/a	n/a	n/a	n/a	9.02%	9.13%
Emera Inc.	EMA	1.26	0.97	2.74	2.13		
Average						7.52%	5.53%

**Fig 21-22 Canadian Cost of Capital Newsletter**

## **Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities**

Volume V, May 25, 2017

### **INTRODUCTION**

Concentric Energy Advisors, Inc. (Concentric) is pleased to publish the fifth edition of this newsletter. Each edition summarizes the latest information available on authorized ROEs and common equity ratios for over 40 Canadian gas and electric utilities. For comparison purposes, the newsletter also presents the average and median authorized ROEs and common equity ratios for U.S. gas and electric distributors, as reported by SNL Financial's Regulatory Research Associates.

### **ROE**

Average and median allowed ROEs for both Canadian and U.S. utilities in 2017 remain little changed from their 2016 levels. The 2017 median ROE for gas distributors in Canada is 8.93% vs. 9.25% in the U.S. The 2017 median ROE for electric distribution and electric transmission is 8.50% in Canada and 9.60% in the U.S. Factoring into these averages were modest 20 basis point increases in the Alberta allowed ROEs, offset by the reduction in Ontario allowed ROEs as the Board's formula re-set with lower bond yields. Ontario, has a formula linked to both government bond yields and utility bond yields. The OEB's formula produces an 8.78% ROE for 2017, based on a long Canada bond yield input of 2.04%.

The sustained period of very low government bond yields has created challenges for both regulators and analysts as they grapple with the appropriate level of bond yields for cost of capital models. Where the Capital Asset Pricing Model (CAPM) is employed, it is recognized that central banks have depressed government bond yields, requiring some form of adjustment to produce reasonable results. The Discounted Cash Flow (DCF) model is linked to utility dividend yields, and is therefore not directly tied to government bond yields. But low bond yields have driven utility dividend yields lower, and when combined with strong stock valuations, the results of the DCF model are also impacted. In response, regulators and analysts are incorporating adjustments to traditional cost of capital models, or the ranges they produce, to reflect these market circumstances. For example, the British Columbia Utilities Commission, in its 2016 decision for FortisBC Energy, acknowledged that the current risk-free rate has been impacted by the accommodative monetary policy of global central banks, and that an

adjustment was necessary to reflect the normalization in interest rate conditions expected in capital markets. In Alberta, the Alberta Utilities Commission recognized in the 2016 generic cost of capital decision that the CAPM results were being distorted by market conditions and therefore placed more weight than usual on the DCF model. The Régie in Québec had reached a similar conclusion in its 2013 Hydro Québec decision, recognizing that an adjustment was necessary to the risk-free rate used in the CAPM to reflect more sustainable long-term bond yields.

Additionally, our research has shown that the "equity risk premium" allowed by regulators over the government bond yield moves in an inverse relationship to interest rates. When interest rates are high, the risk premium is smaller, and vice versa. Significant changes in interest rates lead to corresponding changes in the equity risk premium. Regulators have responded in various ways to this relationship so as to moderate the impacts of volatile capital market conditions. For example, in Ontario, gradualism is implicit in the operation of the OEB's adjustment formula where changes in government and corporate bond yields result in a smaller change in the allowed ROE for regulated utilities. The OEB staff issued a report in January 2016 regarding the effectiveness of the ROE formula that was modified in 2009 to consider both changes in government and corporate bond yields. According to the OEB report, the revised formula has worked as intended since 2009, and has generally been well-received by utilities and stakeholders.

A notable trend over the past several years has been the closure of the gap that had developed between median allowed ROEs for Canadian and U.S. utilities. At its peak in 2007–08, the difference was 141 basis points for gas distributors, and 164 basis points for electric distributors. In 2017, the difference has narrowed to 32 and 110 basis points, respectively. ROEs for Canadian electric transmission companies are now equal to those awarded to Canadian electric distributors, and 110 basis points below those allowed U.S. electric distributors. All transmission companies but AltaLink and ATCO are provincially or municipally owned corporations.

## Authorized Return on Equity for Canadian and U.S. Gas and Electric Utilities

Volume V, May 24, 2017, p. 2

### EQUITY RATIOS

The median authorized common equity ratio has declined slightly over the past few years in both Canada and the U.S. The gas distribution equity ratio is now 39.25% in Canada, vs. 51% in the U.S. The median electric distribution equity ratio is now 37% in Canada and 49.4% in the U.S. Electric transmission equity ratios have risen to 37% in Canada.

The prevailing differences between allowed equity ratios in Canada and the U.S. remain attributable to a few factors. Regulators in both countries rely on peer group analysis, which reinforces existing levels of allowed equity ratios. Regulators in Canada also look for material differences in risk or financial metrics before changing the allowed equity ratio, so they tend to remain relatively stable. While credit rating agencies notice the greater leverage of Canadian companies, and rank some of these utility companies as "Aggressive" in terms of financial risk, most companies have been able to maintain A or A- level credit ratings, so the regulatory response has been muted.

### RECENT DECISIONS

Several important cases were decided in the second half of 2016 and first quarter of 2017. In British Columbia, the Commission maintained the allowed return of 8.75% and the deemed equity ratio of 38.5% for FortisBC Energy, Inc., the gas distributor which serves as the "benchmark" for other BC gas and electric utilities, and is used by the Yukon Utilities Board for similar purposes.

In Alberta, the Commission issued its decision in the generic cost of capital proceeding, establishing the approved ROE and capital structures for the Alberta utilities for 2016 and 2017. The generic ROE was set at 8.30% for 2016 and 8.50% for 2017 for regulated utilities in Alberta, and the common equity ratio was deemed at 37.0% for most Alberta transmission and distribution utilities, except AltaGas, which was granted a common equity ratio of 41.0%.

In Newfoundland, the Board maintained Newfoundland Power's deemed equity ratio of 45.0%, while reducing its authorized ROE to 8.50%. A decision was also issued in Newfoundland and Labrador Hydro's long-standing rate case, in which the government-owned utility was granted an allowed ROE of 8.50% and a deemed equity ratio of 25.2%.

The Yukon Utilities Board recently issued a decision reinstating an ROE premium of 25 basis points for ATCO Electric Yukon (AEY), which places the ROE at 9.0%. The Board determined that a risk premium was justified over the authorized ROE for the BC benchmark utility due to the small size of AEY.

The Ontario Energy Board recently conducted a hearing to consider the request of Ontario Power Generation (OPG) to increase its deemed equity ratio from 45% to 49% due to OPG's shift in generation mix from hydro to nuclear. A decision is expected from the OEB later this year.

### BOND YIELDS

As shown in the chart on page 4, long-term government bond yields (considered the risk-free rate of return) in both Canada and the U.S. have increased by approximately 50 basis points since reaching a trough in July 2016. The accommodative policy of central banks combined with modest economic growth and a low inflationary environment have driven bond yields steadily lower in recent years. Regulators and analysts have responded with a combination of adjustments, equilibrium level bond yields, and alternative models to account for these anomalous market conditions. Consensus forecasts call for increasing bond yields over the next several years, but a complex mix of international and North American factors will determine the actual path of interest rates. In the interim, government bond yields remain a source of considerable uncertainty in financial markets and regulatory proceedings.

**Authorized Return on Equity  
for Canadian and U.S. Gas and Electric Utilities <sup>1</sup>**

	Return on Common Equity (%)			Common Equity Ratio (%)		
	2015	2016	2017	2015	2016	2017
<b>Canadian Gas Distributors <sup>2</sup></b>						
AltaGas Utilities Inc. <sup>3</sup>	8.30	8.30	8.50	42.00	41.00	41.00
ATCO Gas <sup>3</sup>	8.30	8.30	8.50	38.00	37.00	37.00
Centra Gas Manitoba Inc.	N/A	N/A	N/A	30.00	30.00	30.00
Enbridge Gas Distribution Inc. <sup>4</sup>	9.30	9.19	8.78	36.00	36.00	36.00
Enbridge Gas New Brunswick	10.90	10.90	10.90	45.00	45.00	45.00
FortisBC Energy Inc.	8.75	8.75	8.75	38.50	38.50	38.50
Gaz Métro Limited Partnership	8.90	8.90	8.90	38.50	38.50	38.50
Gazifère Inc.	9.10	9.10	9.10	40.00	40.00	40.00
Heritage Gas Limited	11.00	11.00	11.00	45.00	45.00	45.00
Pacific Northern Gas Ltd.	9.50	9.50	9.50	46.50	46.50	46.50
Pacific Northern Gas (N.E.) Ltd. (Fort St. John/Dawson Creek)	9.25	9.25	9.25	41.00	41.00	41.00
Pacific Northern Gas (N.E.) Ltd. (Tumbler Ridge)	9.50	9.50	9.50	46.50	46.50	46.50
SaskEnergy Inc.	8.75	8.30	8.30	37.00	37.00	37.00
Union Gas Limited <sup>5</sup>	8.93	8.93	8.93	36.00	36.00	36.00
<b>Average</b>	9.27	9.22	9.22	40.00	39.86	39.86
<b>Median</b>	9.10	9.10	8.93	39.25	39.25	39.25
<b>U.S. Gas Distributors <sup>6</sup></b>						
Average of all Rate Cases Decided in the Year	9.60	9.49	9.60	49.93	49.69	51.57
Median of all Rate Cases Decided in the Year	9.68	9.50	9.25	50.40	50.00	51.00
<b>Canadian Electric Distributors <sup>2</sup></b>						
ATCO Electric Ltd. <sup>3</sup>	8.30	8.30	8.50	38.00	37.00	37.00
ENMAX Power Corporation <sup>3</sup>	8.30	8.30	8.50	40.00	37.00	37.00
EPCOR Distribution Inc. <sup>3</sup>	8.30	8.30	8.50	40.00	37.00	37.00
FortisAlberta Inc. <sup>3</sup>	8.30	8.30	8.50	40.00	37.00	37.00
FortisBC Inc.	9.15	9.15	9.15	40.00	40.00	40.00
Hydro-Québec Distribution	8.20	8.20	8.20	35.00	35.00	35.00
Manitoba Hydro	N/A	N/A	N/A	25.00	25.00	25.00
Maritime Electric Company Limited	9.75	9.35	9.35	41.90	40.90	40.00
Newfoundland and Labrador Hydro	8.80	8.50	8.50	25.20	25.20	25.20
Newfoundland Power Inc.	8.80	8.50	8.50	45.00	45.00	45.00
Nova Scotia Power Inc.	9.00	9.00	9.00	37.50	37.50	37.50
Ontario's Electric Distributors <sup>4</sup>	9.30	9.19	8.78	40.00	40.00	40.00
Saskatchewan Power Corporation	8.50	8.50	8.50	40.00	40.00	40.00
<b>Average</b>	8.73	8.63	8.67	37.51	36.66	36.59
<b>Median</b>	8.65	8.50	8.50	40.00	37.00	37.00
<b>U.S. Electric Distributors <sup>6</sup></b>						
Average of all Rate Cases Decided in the Year	9.60	9.60	9.68	49.26	48.60	47.42
Median of all Rate Cases Decided in the Year	9.53	9.60	9.60	50.00	49.55	49.40

**Authorized Return on Equity  
 for Canadian and U.S. Gas and Electric Utilities**

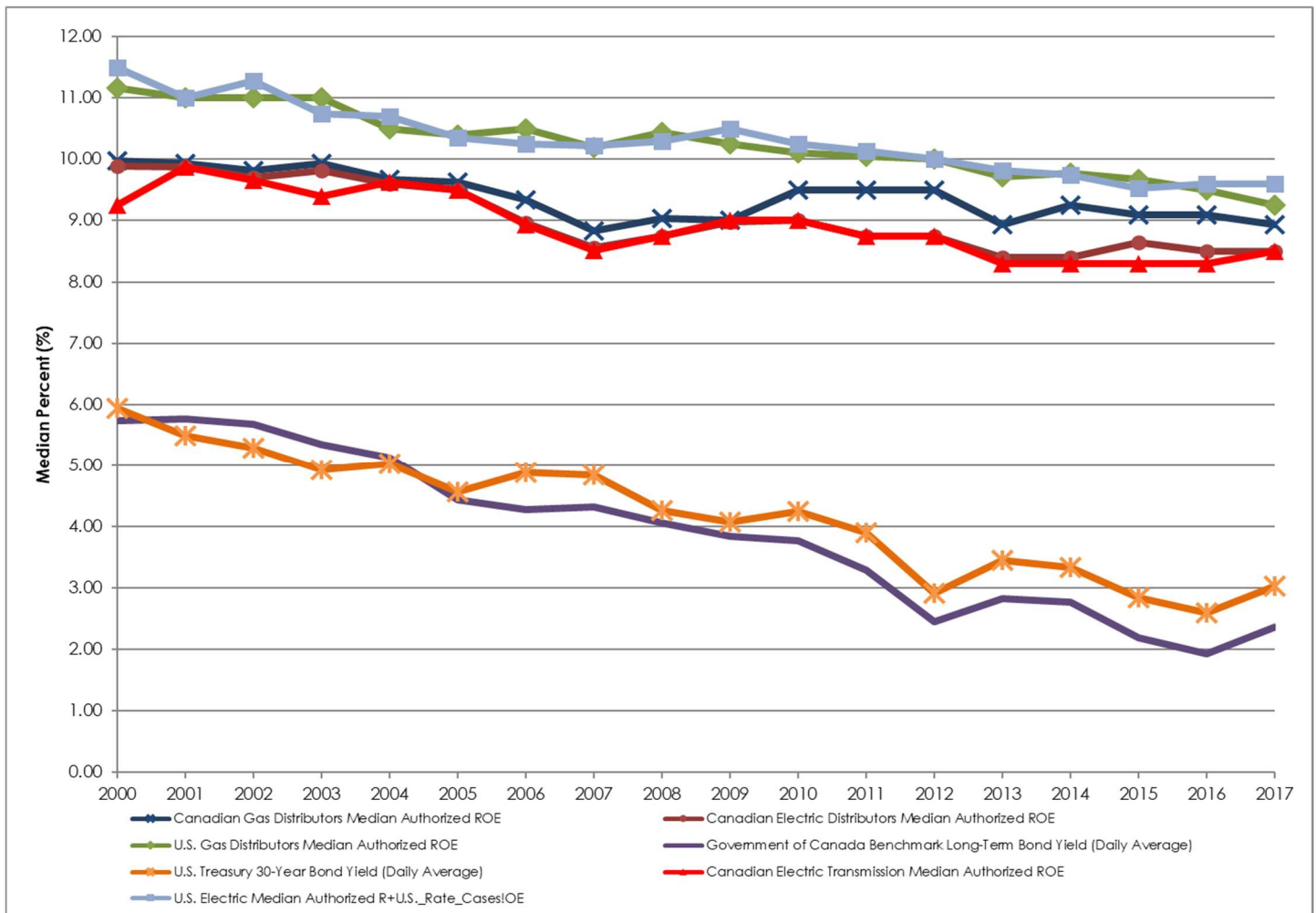
	Return on Common Equity (%)			Common Equity Ratio (%)		
	2015	2016	2017	2015	2016	2017

**Canadian Electric Transmission Companies <sup>2</sup>**

AltaLink Management Ltd. <sup>3</sup>	8.30	8.30	8.50	36.00	37.00	37.00
ATCO Electric Ltd. <sup>3</sup>	8.30	8.30	8.50	36.00	37.00	37.00
ENMAX Power Corporation <sup>3</sup>	8.30	8.30	8.50	36.00	37.00	37.00
EPCOR Transmission Inc. <sup>3</sup>	8.30	8.30	8.50	36.00	37.00	37.00
Hydro One Networks Inc. <sup>4</sup>	9.30	9.19	8.78	40.00	40.00	40.00
Hydro-Québec TransÉnergie	8.20	8.20	8.20	30.00	30.00	30.00
<b>Average</b>	8.45	8.43	8.50	35.67	36.33	36.33
<b>Median</b>	8.30	8.30	8.50	36.00	37.00	37.00

**Economic Indicators (% Yields) <sup>7</sup>**

	2015	2016	2017
Government of Canada Benchmark Long-Term Bond Yield	2.19	1.92	2.36
U.S. Treasury 30-Year Bond Yield	2.84	2.60	3.04
Bloomberg Fair Value Canada A-rated Utility Bond Yield	3.82	3.68	3.82
Moody's A-rated Utility Bond Index (U.S.)	4.12	3.93	4.18





**NOTES**

1. Data for an expanded group of Canadian gas transmission companies is contained in the Concentric Energy Advisors Return on Equity Database.
2. Allowed in rates for the corresponding year; where the year overlaps, the rate/ratio shown prevails for the majority of the year. Sources: Regulatory decisions and documents; annual information forms; annual reports.
3. The Alberta Utilities Commission's 2016 decision in the Generic Cost of Capital proceeding was effective for rate years 2016 and 2017. Returns on common equity and common equity ratios were adjusted for 2016. This also affects the category averages for 2016 as compared to those reported last year.
4. Beginning in 2014, the Ontario Energy Board updates cost of capital parameters for setting rates in cost of service applications only once per year.
5. Union's ROE per settlement agreement in its five-year incentive regulation plan for 2014–2018.
6. Source: SNL Financial LC's Regulatory Research Associates Division. Data for 2017 includes decisions through April 13, 2017.
7. Average daily yield. Source: Bloomberg Finance L.P. Data for 2017 through April 12, 2017.

\* N/A indicates the data are not available. In recent years, the Manitoba Board has not established an authorized ROE for Manitoba Hydro, but has considered whether the company has sufficient income to meet certain interest coverage ratios and capital coverage ratios at its target debt/equity ratio. Similarly, Centra Gas Manitoba previously operated under an ROE adjustment mechanism tied to government bond yields. Centra Gas contended in its 2013/14 GRA filing that the formula was not producing reasonable returns. The Board directed Centra Gas to propose an update to the ROE that is reflective of an appropriate level to be used in the feasibility test.

**CONCENTRIC ENERGY ADVISORS, INC.**

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**Fig 21-22 US Average ROE**

Docket Number	Company Name	Case Type	Service Type	Rate Case Completion Date	Authorized Return on Equity
Advice No. 3120-E	San Diego Gas & Electric Co.	Electric	Vertically Integrated	2017-10-26	10.20
Advice No. 3665-E	Southern California Edison Company	Electric	Vertically Integrated	2017-10-26	10.30
Advice No. 3887-G/5148-E	Pacific Gas and Electric Company	Electric	Vertically Integrated	2017-10-26	10.25
C-16-00276-UT	Public Service Company of New Mexico	Electric	Vertically Integrated	2017-12-20	9.58
C-16-E-0060	Consolidated Edison Company of New York, Inc.	Electric	Distribution	2017-01-24	9.00
C-17-3112-INV	Green Mountain Power Corporation	Electric	Vertically Integrated	2017-12-21	9.10
C-17-E-0238	Niagara Mohawk Power Corporation	Electric	Distribution	2018-03-15	9.00
C-2016-00370	Kentucky Utilities Company	Electric	Vertically Integrated	2017-06-22	9.70
C-2016-00371 (elec.)	Louisville Gas and Electric Company	Electric	Vertically Integrated	2017-06-22	9.70
C-2017-00179	Kentucky Power Company	Electric	Vertically Integrated	2018-01-18	9.70
C-9424	Delmarva Power & Light Company	Electric	Distribution	2017-02-15	9.60
C-9443	Potomac Electric Power Company	Electric	Distribution	2017-10-20	9.50
Ca-PUD201500273	Oklahoma Gas and Electric Company	Electric	Vertically Integrated	2017-03-20	9.50
Ca-PUD201700151	Public Service Company of Oklahoma	Electric	Vertically Integrated	2018-01-31	9.30
C-ER-2016-0285	Kansas City Power & Light Company	Electric	Vertically Integrated	2017-05-03	9.50
C-PU-16-666	MDU Resources Group, Inc.	Electric	Vertically Integrated	2017-06-16	9.65
C-U-17990	Consumers Energy Company	Electric	Vertically Integrated	2017-02-28	10.10
C-U-18014	DTE Electric Company	Electric	Vertically Integrated	2017-01-31	10.10
C-U-18322	Consumers Energy Company	Electric	Vertically Integrated	2018-03-29	10.00
D-160186-EI	Gulf Power Company	Electric	Vertically Integrated	2017-04-04	10.25
D-16-052-U	Oklahoma Gas and Electric Company	Electric	Vertically Integrated	2017-05-18	9.50
D-16-0649	Delmarva Power & Light Company	Electric	Distribution	2017-05-23	9.70

Docket Number	Company Name	Case Type	Service Type	Rate Case Completion Date	Authorized Return on Equity
D-17-0196	Commonwealth Edison Company	Electric	Distribution	2017-12-06	8.40
D-17-0197	Ameren Illinois Company	Electric	Distribution	2017-12-06	8.40
D-17-06003	Nevada Power Company	Electric	Vertically Integrated	2017-12-29	9.51
D-20004-117-ER-16	MDU Resources Group, Inc.	Electric	Vertically Integrated	2017-01-18	9.45
D-20170210-EI	Tampa Electric Company	Electric	Vertically Integrated	2017-11-06	10.25
D-4220-UR-123 (Elec)	Northern States Power Company - WI	Electric	Vertically Integrated	2017-12-07	9.80
D-46449	Southwestern Electric Power Company	Electric	Vertically Integrated	2017-12-14	9.60
D-46831	El Paso Electric Company	Electric	Vertically Integrated	2017-12-14	9.65
D-46957	Oncor Electric Delivery Company LLC	Electric	Distribution	2017-09-28	9.80
D-AVU-E-17-01	Avista Corporation	Electric	Vertically Integrated	2017-12-28	9.50
D-DE-16-383	Liberty Utilities (Granite State Electric) Corp.	Electric	Distribution	2017-04-12	9.40
D-DE-16-384	Unitil Energy Systems, Inc.	Electric	Distribution	2017-04-20	9.50
D-E-002/GR-15-826	Northern States Power Company - MN	Electric	Vertically Integrated	2017-05-11	9.20
D-E-01345A-16-0036	Arizona Public Service Company	Electric	Vertically Integrated	2017-08-15	10.00
D-E-015/GR-16-664	ALLETE (Minnesota Power)	Electric	Vertically Integrated	2018-03-12	9.25
D-E-017/GR-15-1033	Otter Tail Power Company	Electric	Vertically Integrated	2017-03-02	9.41
D-E-01933A-15-0322	Tucson Electric Power Company	Electric	Vertically Integrated	2017-02-24	9.75
D-E-2, Sub 1142	Duke Energy Progress, LLC	Electric	Vertically Integrated	2018-02-23	9.90
D-ER-16050428	Rockland Electric Company	Electric	Distribution	2017-02-22	9.60
D-ER-17030308	Atlantic City Electric Company	Electric	Distribution	2017-09-22	9.60
DPU 17-05 (NSTAR)	NSTAR Electric Company	Electric	Distribution	2017-11-30	10.00
DPU 17-05 (WMECO)	Western Massachusetts Electric Company	Electric	Distribution	2017-11-30	10.00
D-RPU-2017-0001	Interstate Power and Light Company	Electric	Vertically Integrated	2018-02-02	9.98
D-U-16-086	Alaska Electric Light and Power Company	Electric	Vertically Integrated	2017-11-15	11.95
D-UE-170033	Puget Sound Energy, Inc.	Electric	Vertically Integrated	2017-12-05	9.50
D-UE-319	Portland General Electric Company	Electric	Vertically Integrated	2017-12-18	9.50
FC-1139	Potomac Electric Power Company	Electric	Distribution	2017-07-24	9.50

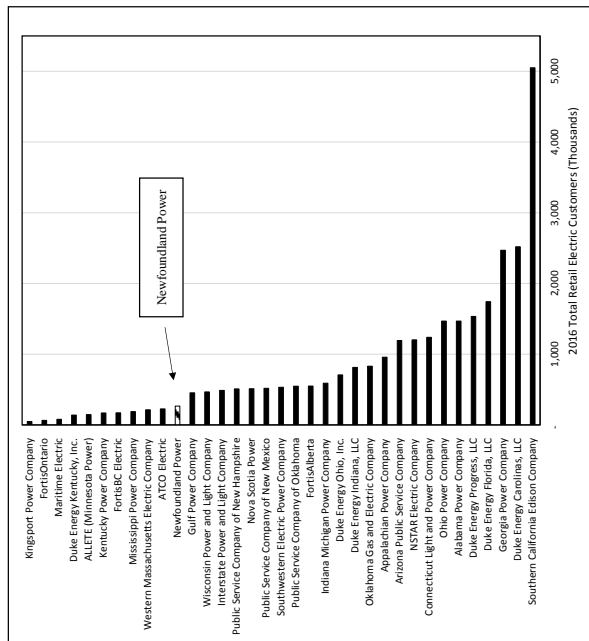
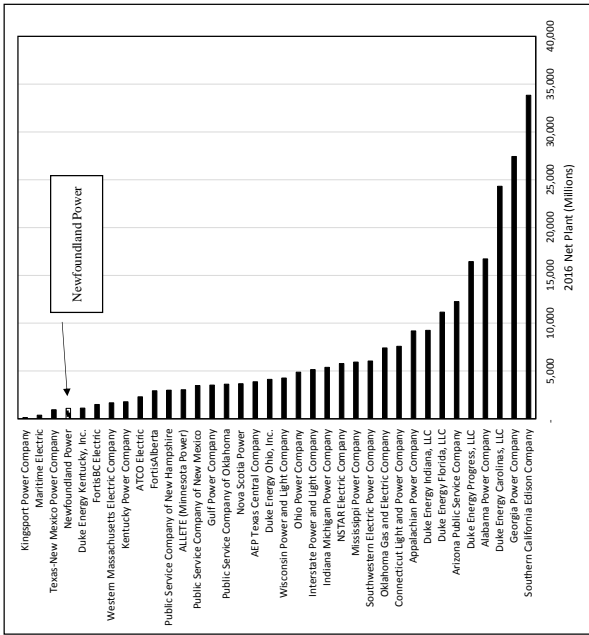
**Fig 23 US T and D Utility Sample Equity Ratios**

Docket Number	Company Name	Case Type	Service Type	Rate Case		
				Completion Date	Authorized Rate Base	Authorized Equity Ratio
C-9424	Delmarva Power & Light Company	Electric	Distribution	2017-02-15	707,246	49.1
C-9443	Potomac Electric Power Company	Electric	Distribution	2017-10-20	1,638,091	50.15
D-17-0197	Ameren Illinois Company	Electric	Distribution	2017-12-06	2,738,545	50
D-ER-17030308	Atlantic City Electric Company	Electric	Distribution	2017-09-22	1,316,151	50.47
DPU 17-05 (NSTAR)	NSTAR Electric Company	Electric	Distribution	2017-11-30	2,733,107	53.34
FC-1139	Potomac Electric Power Company	Electric	Distribution	2017-07-24	1,627,944	49.14
Average						50.37

**Fig 24-25 Net Plant and Customer Count Data**



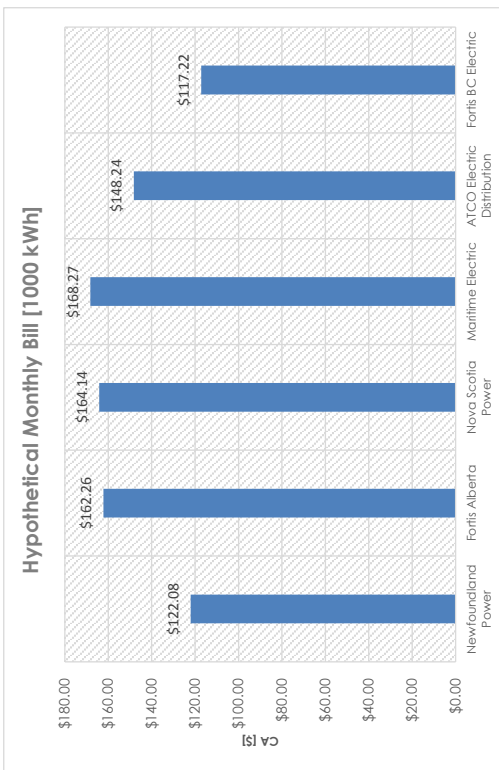




**Fig 27 Hypothetical Monthly Bill Analysis**

Residential Service Rates	Customer Charge	Energy Charge [¢ per kWh]
Newfoundland Power	\$16.04	10.604
Fortis Alberta	\$22.97	5.6578
Nova Scotia Power	\$10.83	15.331
Maritime Electric	\$24.57	14.37
ATCO Electric Distribution	\$38.54	10.97
Fortis BC Electric	\$16.05	10.117

	Energy Charge [¢ per kWh]	Hypothetical Monthly Bill [1000 kWh]	Customer Charge	Energy Charge	Distrib Charge		
Newfoundland Power	10.604	Newfoundland Power	\$16.04	\$106.04		Newfoundland Power	\$122.08
Fortis Alberta	5.8578	Fortis Alberta	\$22.97	\$58.58	\$80.72	Fortis Alberta	\$162.26
Nova Scotia Power	15.331	Nova Scotia Power	\$10.83	\$153.31		Nova Scotia Power	\$164.14
Maritime Electric	14.37	Maritime Electric	\$24.57	\$143.70		Maritime Electric	\$168.27
ATCO Electric Distribution	10.97	ATCO Electric Distribution	\$38.54	\$109.70		ATCO Electric Distribution	\$148.24
Fortis BC Electric	10.117	Fortis BC Electric	\$16.05	\$101.17		Fortis BC Electric	\$117.22



**NEWFOUNDLAND POWER INC. RATE #1.1 DOMESTIC SERVICE Effective July 1, 2017**

Availability: For Service to a Domestic Unit or to buildings or facilities which are on the same Serviced Premises as a Domestic Unit and used by the same Customer exclusively for domestic or household purposes, whether such buildings or facilities are included on the same meter as the Domestic Unit or metered separately.

Rate: (Includes Municipal Tax and Rate Stabilization Adjustments)

**Basic Customer Charge:**

Not Exceeding 200 Amp Service	\$16.04 per month
Exceeding 200 Amp Service	\$21.04 per month

**Energy Charge:**

All kilowatt-hours 10.604 ¢ per kWh

**Minimum Monthly Charge:**

Not Exceeding 200 Amp Service	\$16.04 per month
Exceeding 200 Amp Service	\$21.04 per month

**Discount:**

A discount of 1.5% of the amount of the current month's bill will be allowed if the bill is paid within 10 days after it is issued.

Source:

NEWFOUNDLAND POWER INC. SCHEDULE OF RATES, RULES AND REGULATIONS Effective July 1, 2017

**FOR Graph:**

Customer Charge	\$16.04 per month
Energy Charge	10.604 ¢ per kWh

Fortis Alberta

**RATE 11 RESIDENTIAL SERVICE** Effective: April 1, 2018

**Availability:** Rate 11 is available for individually metered single family dwelling units that are used for domestic purposes only.

	Transmission Component	Distribution Component	Total Distribution Tariff
Service Charge per unit per day		0.7655	0.7655
All kWh delivered cents per kWh	3.7009	2.1569	5.8578

The Rate Minimum is the Service Charge per unit.

Source:  
FortisAlberta Inc.  
2015 Annual Rates Filing  
Rate Schedules

For Graph:  
Customer Charge \$ 22.97 Per month  
Energy Charge 5.8578 ¢/kWh

Nova Scotia Power

**DOMESTIC SERVICE TARIFF**

**AVAILABILITY**

This tariff is applicable to electric energy used by any customer in a private residence for the customer's own domestic or household use, including lighting, cooking, heating, or refrigeration purposes.

**CUSTOMER CHARGE**

\$10.83 per month

**ENERGY CHARGE**

15.331 ¢ per kilowatt hour. See below for more information.

**FUEL ADJUSTMENT MECHANISM (FAM)**

The FAM Actual Adjustment (AA) and Balance Adjustment (BA) charges or credits (in cents per kilowatt-hour) applicable to the Tariff for the current rate year, shown in the FAM Tariff, shall apply. These charges are accounted for within the energy charge on your bill. To view the cents per kilowatt-hour charge, click here.

**MINIMUM MONTHLY CHARGE**

The minimum monthly charge shall be \$10.83.

Source:

Domestic Service Tariff

For graph

Customer Charge

Energy Charge

\$10.83 Per month

15.331 ¢ kWh



Maritime Electric

**Residential Service Rate Schedule**

**Residential Urban**

That category of residential customers located in all incorporated cities, towns and villages with population over 2000 served by Maritime Electric.

Rate (Code 110)

*Service Charge:*

\$24.57

*Energy Charge:*

14.37 ¢ per kWh for first 2000 kWh per Billing Period  
11.42 ¢ per kWh for balance kWh per Billing Period

*For Graph:*

Customer Charge

\$24.57

Energy Charge

14.37

ATCO Electric Distribution

The charge for service in any one billing period is the sum of the Customer Charge and Energy Charge, determined for each individual Point of Service.

	Customer Charge ¢/day	Energy Charge ¢/kW.h
Transmission		3.9
Distribution	99.72	7.07
Service	28.75	0
<b>TOTAL PRICE</b>	<b>\$1.28</b>	<b>10.97</b>

Application 1. Price Option - the following price option may apply: Idle Service (Option F) 2. Price Adjustments - the following price adjustments (riders) may apply: Municipal Assessment (Rider A) Balancing Pool Adjustment (Rider B) Temporary Adjustment (Rider G) Interim Adjustment (Rider J) SAS Adjustment (Rider S)

Source:

ATCO Electric 2015 PBR Rates Effective September 1, 2015

for Graph		
Customer Charge	\$	38.54
Energy Charge		10.97 ¢/kW.h

Fortis BC Electric  
Residential

Bi-monthly Residential Service:

Customer Charge

First 1,600 kWh are billed

32.09 based on 60 day billing period.

10.117 (cents per kWh.)

For Graph

Customer Charge

16.045

Energy Charge

10.117

**Fig 28 Key Economic Indicators Analysis**

	Newfoundland and Labrador		Alberta	
	2017	2040 % Change	2017	2040 % Change
GDP at market prices (2007\$)	26870	27155 0.0%	318436	486079 1.9%
Labour Force	262	209 -1.0%	2484	3138 1.0%
Population	529	466 -0.5%	4278	5703 1.3%
Employment	223	190 -0.7%	2279	2971 1.2%
Household Disposable Income	17505	26006 1.7%	174445	446865 4.2%
Retail Sales	9161	11925 1.2%	81043	147654 2.6%
Housing Starts	1211	242 -6.8%	29195	28835 -0.1%

	Canada		British Columbia	
	2017	2040 % Change	2017	2040 % Change
GDP at market prices (2007\$)	1852706	2747890 1.7%	245648	362639 1.7%
Labour Force	19657	21644 0.4%	2598	2961 0.6%
Population	36639	43632 0.8%	4807	5583 0.7%
Employment	18361	22879 1.0%	2460	2834 0.6%
Household Disposable Income	1214215	2682799 3.5%	172166	383192 3.5%
Retail Sales	587656	853514 1.6%	84095	139296 2.2%
Housing Starts	216382	123199 -2.4%	41000	12838 -4.9%

Source: Conference Board of Canada, Provincial Outlook 2018, Long-Term Economic Forecast, forecast completed January 19, 2018  
Newfoundland, pages 20 and 23  
Canada, pages 229 and 230

	Nova Scotia		Prince Edward Island	
	2017	2040 % Change	2017	2040 % Change
GDP at market prices (2007\$)	36686	44470 0.8%	5426	6782 1.0%
Labour Force	490	461 -0.3%	81	79 -0.1%
Population	953	952 0.0%	152	153 0.0%
Employment	448	430 -0.2%	73	73 0.0%
Household Disposable Income	28198	49933 2.5%	4367	7911 2.6%
Retail Sales	15748	22970 1.7%	2391	3317 1.4%
Housing Starts	4133	500 -8.8%	887	450 -2.9%

	Ontario		Quebec	
	2017	2040 % Change	2017	2040 % Change
GDP at market prices (2007\$)	703272	1094958 1.9%	352322	496424 1.5%
Labour Force	7578	9254 0.9%	4491	4981 0.5%
Population	14161	17318 0.9%	8380	9398 0.5%
Employment	7104	8724 0.9%	4136	4717 0.6%
Household Disposable Income	470157	1082735 3.7%	239971	467115 2.9%
Household Disposable Income	214988	363579 2.3%	124934	190498 1.9%
Household Disposable Income	81668	52651 -1.9%	43574	13526 -5.0%

Source: Conference Board of Canada, Provincial Outlook 2018, Long-Term Economic Forecast, forecast completed January 19, 2018  
Newfoundland, pages 20 and 23  
Canada, pages 229 and 230