

Unconventional Monetary Policy: The Perspective of a Small Open Economy

*Jean-Sébastien Fontaine, Financial Markets Department; Lena Suchanek and Jing Yang,
Canadian Economic Analysis Department*

- Quantitative easing (QE) and negative interest rates have been implemented by several central banks in small open economies (SOEs). These unconventional policy tools can be effective in easing financial conditions and also appear to stimulate aggregate demand and inflation.
- Negative rates operate as a continuation of conventional monetary policy, although the pass-through to consumer and business borrowing rates may be only partial when rates are low or negative.
- QE in an SOE may operate mainly by lowering the exchange rate and the expected path of policy rates, but it may have less influence on the term premium in long-term yields.
- Fiscal policy is a more important complement to monetary policy to support growth when policy rates are close to zero. Fiscal policy may also be more effective in an SOE if global demand for safe assets compresses long-term interest rates in the SOE and thus creates more fiscal space.

Since the Great Recession, several central banks have reduced their policy rates close to zero, which many consider is the boundary of conventional monetary policy.¹ Several central banks also implemented unconventional monetary policies (UMPs), including those in some small open economies (SOEs). The Bank of England and the Swedish Riksbank, for example, purchased large quantities of government debt and other assets, a policy known as quantitative easing (QE), expanding their balance sheets to meet their inflation target. Central banks in Sweden, Switzerland and Denmark also have lowered policy rates below zero.

This article reviews the experience of central banks with UMPs in SOEs, focusing on QE and negative rates. A growing literature provides policymakers with evidence that UMPs ease financial conditions. However, the

¹ The term “conventional monetary policy” refers to adjusting the policy rate, whereas negative rates and QE are considered “unconventional monetary policies.” This article does not cover two other policies (forward guidance and credit easing) that can also be used to provide additional monetary stimulus at very low interest rates, discussed in the Bank of Canada *Framework for Conducting Monetary Policy at Low Interest Rates* (Bank of Canada 2015).

transmission of UMPs to financial conditions may depend on the size of the economy and how open it is to trade and capital flows.² The evidence related to UMPs in the United States and the euro area may not apply to an SOE such as Canada. The experience of SOEs with UMPs and recent progress shown in the literature can help inform policy deliberations in Canada.³ At the time of writing, the Bank of Canada does not use UMPs but judges that such tools can allow more room to manoeuvre, should more easing be required.

The mobility of capital across borders plays a distinct role when we evaluate the effect of UMPs. This is particularly relevant for SOEs if global demand for safe assets compresses interest rates, limiting the manoeuvring room of monetary policy. In this context, recent research suggests that fiscal expansion may complement monetary policies more effectively to support economic activity. In fact, demand for safe assets may attenuate the classical trade-off between the expansionary effects of fiscal spending and the potential rise in interest rates resulting from excessive issuance of debt (Eggertsson et al. 2016; Farhi and Maggiori 2016).

Ultimately, central banks implement UMPs to help achieve their mandates, often spelled out in terms of price stability. While the macroeconomic impacts of UMPs are more difficult to quantify, Bank of Canada simulations suggest that UMPs would help close the output gap and lead inflation closer to its target when conventional monetary policy is at its limits (Bank of Canada 2016). With lower potential growth and lower neutral interest rates (Mendes 2014),⁴ UMP tools may be used more frequently than before.

Negative Interest Rates in a Small Open Economy

Central banks in both large economies—such as Japan and the euro area—and small economies—such as Sweden, Denmark and Switzerland—lowered their policy rates below zero to help achieve their price stability mandates. Negative rates operate through the same channels as conventional monetary policy easing when interest rates are positive.

The interest rate channel

Like conventional policy, reducing the policy rate below zero is expected to reduce other interest rates, thereby encouraging bank lending and easing debt-service costs. Modestly negative policy rates have been transmitted to money markets and longer-term yields in much the same way as positive rates. The impact on trading volumes appears to have been limited, while problems with instruments designed to work only with positive nominal interest have so far not materialized (Witmer and Yang 2016).

The transmission of a reduction of a low or negative policy rate to other interest rates may, however, have become weaker. Private banks have been hesitant to charge negative retail deposit rates, and some have even increased mortgage rates (Bech and Malkhozov 2016). The benefits of this policy for domestic financial conditions could moreover decline over time (BIS 2016). In particular, negative rates can weigh on bank profitability and

◀ *The experience of small open economies with unconventional monetary policies and recent progress shown in the literature can help inform policy deliberations in Canada*

◀ *Negative policy rates have been passed through to other interest rates in much the same way as positive rates, but transmission may have become weaker*

² The trade openness of a country is frequently measured by the sum of its exports and imports as a share of its GDP. The United States is relatively closed (28 per cent in 2015) compared with Canada (66 per cent).

³ The Bank of Canada hosted a conference in November 2016 that brought together academic scholars and monetary authorities from around the world to discuss UMPs in the context of SOEs. The conference material can be found on the Bank's [website](#).

⁴ Based on Mendes (2014), the lower estimates of the neutral rate are largely due to a lower global neutral rate and weaker potential output growth in Canada.

undermine banks' ability to provide the credit needed to support growth. Negative rates could also jeopardize financial stability if financial institutions take more risks to boost returns (Cœuré 2016).

That said, for banks, the beneficial effects of a stronger economy may support profit margins, outweighing the negative effects. Evidence to date suggests limited adverse effects of negative rates on bank profitability (Turk 2016). Trends in credit growth also seem stable, while bank stocks continue to perform relatively well. Although modestly negative interest rates appear to be a helpful addition to a central bank's tool kit, this policy is limited: lowering interest rates below some point could cause people to withdraw their deposits from banks to hold currency (Witmer and Yang 2016).

Implementing negative policy rates has been more complex than conventional monetary policy easing. Specifically, central banks in Denmark, Switzerland and Japan have exempted part of the excess reserves at their respective central banks from being subject to negative rates. The exemptions limit the impact of negative interest rates on banks' profit margins while still allowing transmission to bond yields and other market-based rates. Hence, a negative rate can still reduce interest rate differentials between countries, thereby discouraging foreign investment in domestic capital markets. This would leave the effectiveness of this policy through the exchange rate channel unaffected.

The exchange rate channel

SOEs such as Denmark, Sweden and Switzerland faced upward pressure on the exchange rates with the euro as a result of persistent monetary easing by the European Central Bank. Negative policy rates allowed these SOEs to restore or maintain interest rate differentials.⁵ The policy was designed to discourage capital inflows, to limit or stop the appreciation pressures on the exchange rate and, in turn, to help support external demand for domestic goods and services (Jackson 2015; Witmer and Yang 2016).

The exchange (i.e., external) rate channel indeed appears to function well with negative policy rates. Currencies tended to depreciate when negative interest rates were announced (Chart 1), and appreciation pressures appeared to recede (Jordan 2016; Viñals, Gray and Eckhold 2016). When Denmark lowered its policy rate in an attempt to maintain its fixed exchange rate (against the euro), for example, it effectively saw the appreciation pressure on its currency diminish. For the Swiss National Bank, the cut to negative policy rates temporarily helped relieve appreciation pressure on the Swiss franc and sustain its floor with the euro, though policy rate cuts have ultimately been insufficient to prevent the Swiss franc's appreciation. Without such policies, however, currencies may have appreciated by even more (Jordan 2016). Interestingly, other European SOEs have reportedly considered cutting policy interest rates to negative levels to restrain capital inflows and appreciating currencies.⁶ A recent Bloomberg survey found that economists believe that a negative rate works better in SOEs dealing with foreign exchange pressures than in larger economies hoping to boost growth or stem falling prices (Tartar 2016).⁷

◀ *Currencies tended to depreciate when negative interest rates were announced, and appreciation pressures appeared to recede*

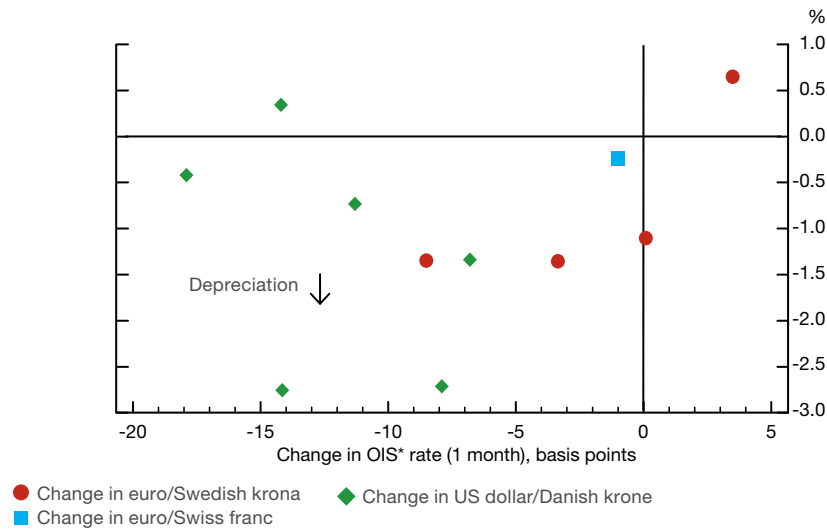
⁵ Denmark and Switzerland also directly intervened in currency markets to stem appreciation pressures, while the Swedish Riksbank stood ready to intervene.

⁶ Former Czech National Bank Board member Lubomír Lízal had mentioned that the central bank may impose negative interest rates to fend off unwanted capital inflows once the koruna cap was discontinued (Gokoluk and Chamonikolas 2016).

⁷ This belief partly reflects the limited evidence of accelerating inflation in the euro area throughout 2015, i.e., following its negative rate policy.

Chart 1: Exchange rate reactions to unexpected negative interest rate announcements

Changes from day before announcement to day after announcement



*OIS stands for Overnight-Index Swaps. OIS rates are widely used as a barometer for financial markets expectations of future movements in the policy rate. As such, the change in the OIS rate captures the surprise element in the policy rate change, i.e., negative values indicate that the rate cut was larger than what markets had anticipated.

Note: The policy rate announcements considered are 12 February 2015, 18 March 2015, 2 July 2015 and 11 February 2016 for Sweden; 18 December 2014 for Switzerland; and 5 July 2012, 4 September 2014, 19 January 2015, 22 January 2015, 29 January 2015 and 5 February 2015 for Denmark.

Sources: Bloomberg, Haver Analytics and central bank press releases

Quantitative Easing in a Small Open Economy

QE typically refers to the purchase of longer-term financial assets by central banks from financial institutions in exchange for central bank reserves. We consider three channels connecting QE to a lower path of expected future policy rates, a lower term premium and a lower exchange rate, respectively, and discuss how the importance of these channels differs in SOEs compared with larger economies.

Note that it is challenging to pin down the effect of QE, partly because QE has often been implemented together with other policy measures and partly because it is difficult to measure the unanticipated component of QE announcements. Moreover, the implementation of UMPs in other countries over the same period likely affects exchange rates, complicating the measurement of exchange rate effects.⁸

The signalling channel

Long-term yields are low if bondholders expect low short-term rates in the future or require lower additional returns to hold a long-term bond instead of rolling over shorter-term bonds (i.e., the term premium is low). The signalling channel connects QE to the expected path of short-term interest rates. Market participants may perceive the use of QE as a signal that short-term policy rates will remain lower for longer, particularly if they have incomplete information about the central bank's reaction function or the future course of the economy (Eggertsson and Woodford 2003). This signal is credible when market

◀ *Market participants may perceive the use of quantitative easing as a signal that short-term policy rates will remain lower for longer*

⁸ Kozicki, Santor and Suchanek (2011) discuss the challenges in measuring the impact of QE on financial markets.

participants believe that the central bank weighs potential capital losses on its holdings of long-term assets, which would follow from raising interest rates. The signal from QE announcements is similar to forward guidance statements by the central bank about the path of short-term interest rates.⁹ Indeed, using QE and forward guidance together may reinforce credibility (Santor and Suchanek 2016 and references therein). The lower perceived path of future policy rates also affects the exchange rate, discussed below.

The signalling channel operates in large and small economies alike. The signalling effect of QE can be measured directly from changes in short-term interest rates around QE announcements. For longer maturities, the signalling component must be derived from interest rate models to separate concurrent changes in the term premium.¹⁰ Estimates differ and may be imprecise, but the evidence suggests that QE announcements affect the expected path of policy rates in large economies (Swanson 2015). In fact, the magnitude of the estimates suggests that the effect is similar to that of conventional policy announcements.

The limited evidence for SOEs appears consistent with this conclusion (De Rezende 2016). For example, Diez de los Rios and Shamloo (forthcoming) estimate that bond purchases in Sweden lowered the expected path of future policy rates, mainly in the intermediate segments of the yield curve (two to five years).

The exchange rate channel

Just like conventional monetary policy, the signalling channel of QE lowers domestic interest rates relative to foreign rates, which tends to depreciate the exchange rate. In response to QE, investors may also rebalance their domestic portfolio toward foreign assets, which puts additional downward pressure on the exchange rate.

◀ *Lower domestic interest rates and portfolio rebalancing toward foreign assets in response to quantitative easing put downward pressure on the exchange rate.*

Conceptually, it is ambiguous whether QE would depreciate the exchange rate by more in an SOE than in a larger economy. The evidence from event studies suggests that exchange rates depreciate in SOEs around QE announcements.¹¹ For example, the British pound sterling fell around most QE policy announcements (Chart 2). The evidence from the United Kingdom suggests that the effect on the exchange rate is similar for conventional policies and UMPs (Ferrari, Kearns and Schrimpf 2016). For the United States, however, estimated effects appear to be larger in times of UMPs compared with times of conventional monetary policy (Glick and Leduc 2015). In addition, the evidence suggests that the signalling and portfolio balance channels had similar effects on the exchange rate (Swanson 2015).

The portfolio balance channel

The portfolio balance channel describes how QE can lower the term premium in bond yields. In QE, a central bank purchases financial assets such as longer-term bonds from banks in exchange for central bank reserves. The sellers of the bonds tend to adjust their portfolios by buying other assets that have similar characteristics. Benchmark models with no financial frictions predict that such reallocation of assets between private and public sector balance sheets would leave asset prices and the exchange rate unchanged (Woodford 2012); QE would thus have no effect.

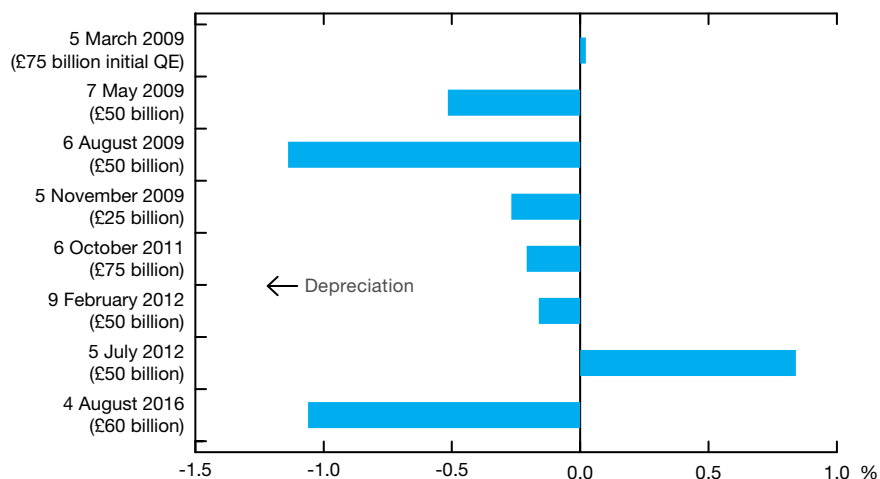
⁹ See Charbonneau and Rennison (2015) for an international review of the different types of forward guidance.

¹⁰ See, for example, Krishnamurthy and Vissing-Jorgensen (2011) and Bauer and Rudebusch (2014).

¹¹ See Haldane et al. 2016; Ferrari, Kearns and Schrimpf 2016; Diez de los Rios and Shamloo (forthcoming); and De Rezende 2016.

Chart 2: UK currency reactions to Bank of England quantitative easing announcements

Change in euro/British pound sterling from day before announcement to day after announcement



Note: Amount of additional quantitative easing in parentheses
Sources: Haver Analytics and Bank of England press releases

But QE should work in a world where investors do not consider different asset classes to be perfect substitutes; investors may prefer to hold bonds of a particular duration, currency or credit risk (Kabaca 2016; Bulusu and Gungor 2017; Vayanos and Vila 2009). Intermediation frictions may constrain the ability of arbitrageurs to bridge between segmented markets. These frictions give rise to the portfolio balance channel of QE. Portfolio reallocation pushes up the prices of bonds purchased under QE and of their close substitutes, lowering their yields through the term premiums.

QE may lower the term premium by reducing the quantity of risk in the aggregate portfolio of private investors (King 2016). As a new large buyer of longer-term bonds, and because it commits to buying bonds steadily during a set period of time, the central bank may also reduce the exposures of investors to changes in interest rates.

The portfolio balance channel may be less effective in lowering the term premiums in an SOE than in a large economy because of high capital mobility across countries. If investors consider foreign bonds to be close substitutes for domestic bonds, some of the QE purchases can “leak” abroad and have a smaller effect on yields. The mobility of capital then implies that savings tend to flow from countries with lower rates to countries with higher rates, pushing real rates toward convergence across economies (Mundell 1963; Fleming 1962).

This leakage may be significant for an SOE because the pool of foreign substitute bonds is large compared with the domestic bond market, and QE programs in SOEs are likely too small to affect global markets.¹² The term premium is largely determined by global factors, and the impact of QE may be limited (Diez de los Rios and Shamloo forthcoming). This leakage is likely to be more significant for QE than for conventional policy since QE focuses

¹² In practice, QE programs in some SOEs have become constrained by the size of their debt market. Debt markets of some SOEs are not only smaller in absolute size but also as a share of GDP, particularly in Sweden. In this context, the Swedish debt office has voiced concerns that the Riksbank may soon be reaching the limits of its QE program, amid signs that liquidity in government debt markets has deteriorated (Swedish National Debt Office 2017). The Bank of England has also struggled at times to purchase planned amounts under its expanded QE program because institutional investors refused to sell gilts (Moore and Cumbo 2016).

on long-term bonds, while conventional policy focuses on money market instruments. Long-term bonds are likely to be closer substitutes across countries than money market instruments.

The degree of asset substitutability and the size of an economy therefore determine to what extent QE can lower the term premium. Based on an SOE model calibrated for the case of Canada, Kabaca (2016) finds that the effect of QE on the term premium is only about one-third the effect of QE in a large economy, where the size of QE is kept to a fixed share of the government bond market in each country. The empirical evidence is consistent with these results. Estimates of the effect of QE on term premiums in the United Kingdom and Sweden are smaller than in larger economies, such as the United States (Diez de los Rios and Shamloo forthcoming).¹³

◀ *The degree of asset substitutability and the size of an economy determine to what extent quantitative easing can lower the term premium*

The Macroeconomic Effects of Unconventional Monetary Policies

Ultimately, central banks implement UMPs to help achieve their mandate, which, in most cases, is related to price stability. By easing financial conditions and lowering the exchange rate as described above, UMPs may boost demand, which tends to push up inflation. In particular, lower interest rates can encourage bank lending and ease debt-service costs, while a lower exchange rate can provide impetus to net exports. The exchange rate channel could play a greater role in supporting growth in SOEs such as Canada because foreign trade is a bigger share of the economy than it is for a larger economy.¹⁴

◀ *By easing financial conditions and lowering the exchange rate, unconventional monetary policies may boost demand, which tends to push up inflation*

Bank of Canada simulations suggest that UMPs would indeed help close the output gap and move inflation closer to its target in periods when conventional monetary policy is at its limits (Bank of Canada 2016). The results imply that QE and negative rates would reduce both the risk and the duration of a downturn when conventional monetary policy is constrained and would therefore reduce average output and inflation gaps.

Empirically, the effects of UMPs on inflation and economic activity are difficult to measure because of the identification challenges and lagged effect of monetary policy. For QE, the evidence for SOEs is largely limited to the experience of the United Kingdom: the initial £200 billion of QE may have increased GDP growth by 0.8 to 3.3 per cent and contributed to higher inflation (Reza, Santor and Suchanek 2015 and references therein). The large intervals for these estimates speak to the degree of uncertainty about the actual effectiveness.

More recently, researchers have overcome some of the empirical challenges by identifying QE shocks and estimating their effect in structural vector auto regressions (Haldane et al. 2016; Weale and Wieladek 2016). Encouragingly, the results suggest that the peak effects of QE on GDP in the United Kingdom were higher than in earlier studies. Theoretical research has also made some progress in assessing the effect of QE. Based on an SOE dynamic stochastic general-equilibrium (DSGE) model with imperfect substitution across assets, Kabaca (2016) estimates that QE has a smaller effect

¹³ The estimated effects are not directly comparable because the relative size of different programs differs. However, QE programs were larger in most SOEs than in the United States, as a share of outstanding debt or GDP (Santor and Suchanek 2016).

¹⁴ In addition, depreciation has an immediate impact on inflation: the higher cost of imported goods will, at least temporarily, push up prices (Jordan 2016). Sustained depreciation driven by expansionary monetary policy may even affect inflation expectations and therefore real interest rates, potentially boosting the transmission to the real economy.

on overall macroeconomic conditions in an SOE than it does in a larger economy (for a given size of QE normalized to the size of the government bond market). Of course, the results crucially depend on the parameters.

Evidence of the macro effects of negative rates remains sparse, however. More theoretical and empirical work is required to quantify the macroeconomic effect of UMPs in an SOE and compare it with their effects in a large economy.

The Mix of Monetary and Fiscal Policy in a Small Open Economy

Lower potential growth and lower neutral interest rates imply that conventional monetary policy will be closer to its limits more frequently than before.¹⁵ While the use of UMP tools may allow for more manoeuvring room for monetary policy-makers when additional stimulus is needed, the transmission of monetary policies—conventional and unconventional—appears to be partial when interest rates are approaching zero. This suggests that fiscal policy, or the combination of both fiscal and monetary stimulus, becomes more important. Indeed, fiscal policies may complement monetary policies more effectively to support economic activity when interest rates are low for an extended period.¹⁶ This is because the expansionary effects of fiscal policy are not offset by a rise in interest rates that would otherwise crowd out private investment and consumption.

Fiscal policy may also be more effective as a complement to monetary policy if global demand for safe assets compresses long-term interest rates and creates more fiscal space by reducing debt-service costs. This is particularly relevant in SOEs because interest rates in SOEs are more heavily influenced by global factors than those in a large economy (Bauer and Diez de los Rios 2012). Indeed, some SOEs, especially those with perceived safe assets, have seen large financial inflows, which may have contributed to compressing domestic interest rates. In particular, Canada's government debt market has received large flows from international investors since the Great Recession (Chart 3). For example, Pomorski, Rivadeneyra and Wolfe (2014) document that foreign official reserve managers—who must invest in safe assets—allocate a growing share of their portfolios to Canadian bonds.¹⁷ An analysis suggests that such sizable foreign flows lowered the 10-year government bond yield by around 100 basis points between 2009 and 2012 (Feunou et al. 2015). The implication for an SOE is that such global demand for its assets could attenuate the classical trade-off between the expansionary effects of fiscal spending and potentially higher interest rates resulting from excessive debt issuance (Farhi and Maggiori 2016). In other words, the global demand for safe assets may limit the extent of rising costs of borrowing for fiscal authorities in SOEs. As such, fiscal policies may complement monetary policies more effectively to support economic activity.

◀ *In a small open economy, fiscal policy may be more effective as a complement to monetary policy if global demand for safe assets compresses long-term interest rates*

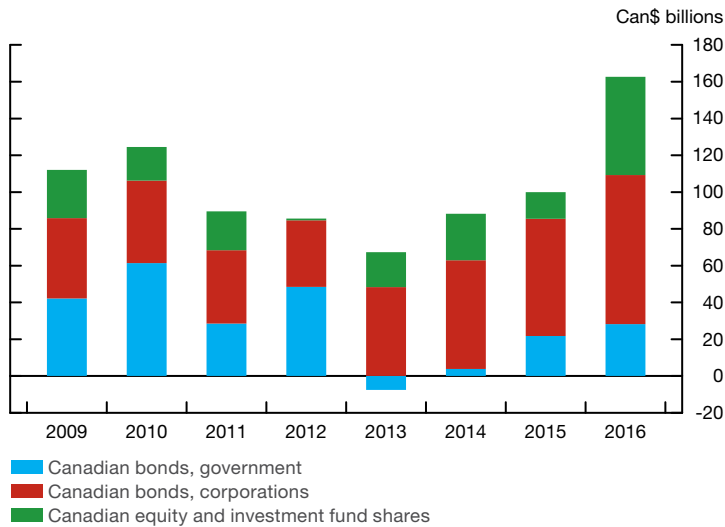
¹⁵ Several structural factors may explain the decline of the global neutral rate. In particular, global demand for safe assets appears to exceed the supply of safe assets. The “global savings glut hypothesis,” for example, states that global excess savings result from a chronic excess desire to save over the desire to invest, particularly in China and other emerging-market economies (Bernanke 2005). More recently, the “secular stagnation hypothesis” argues that some advanced economies suffer from a persistent imbalance between an increasing propensity to save and a decreasing propensity to invest (Bernanke 2015; Summers 2014, 2016; Teulings and Baldwin 2014; Eggertsson and Mehrotra 2014; Eggertsson et al. 2016; Corsetti et al. 2016).

¹⁶ See the policy discussion in Eggertsson 2011; Krugman 2009; Christiano, Eichenbaum and Rebelo 2011; and Summers 2016.

¹⁷ The estimated total value of official foreign exchange reserves allocated to Canadian assets has continued to grow to as much as Can\$300 billion at the end of 2016, compared with their estimate of Can\$200 billion in 2014.

Chart 3: Foreign investment in Canadian securities

Net flows, annual data



Source: Statistics Canada

Conclusion

The experience and research to date suggest that QE and negative interest rates allow central banks in SOEs more room to manoeuvre if more easing is required. Negative interest rates operate as an extension to conventional monetary policy easing, putting downward pressure on interest and exchange rates. QE may also lower exchange rates and the path of expected short-term interest rates, although, with open capital markets, its effect on long-term interest rates may be smaller in SOEs than in large economies. Ultimately, both policies may help central banks come closer to their mandated targets of price stability. More theoretical and empirical work is, however, required to quantify the macroeconomic effect of UMPs, in particular that of negative rates.

At the same time, fiscal policy can become a more important complement to monetary policy in supporting growth when interest rates are close to zero. This is even more a case for SOEs because it is, to a large extent, global demand for safe assets that compresses their domestic long-term yields. Such compression can reduce the debt-service costs for the government and, at the margin, the cost of an expansionary fiscal policy.

Literature Cited

Bank of Canada. 2015. *Framework for Conducting Monetary Policy at Low Interest Rates*.

———. 2016. *Renewal of the Inflation-Control Target, Background Information*. October 2016.

Bank of International Settlements (BIS). 2016. *86th Annual Report*. Basel, 26 June.

- Bauer, G. and A. D. Diez de los Rios. 2012. "Global Risk Premiums and the Transmission of Monetary Policy." *Bank of Canada Review* (Summer): 12–20.
- Bauer, M. D. and G. D. Rudebusch. 2014. "The Signaling Channel for Federal Reserve Bond Purchases." *International Journal of Central Banking* 10 (3): 233–289.
- Bech, M. and A. Malkhozov. 2016. "How Have Central Banks Implemented Negative Policy Rates?" in *BIS Quarterly Review*, March: 31–44.
- Bernanke, B. S. 2005. "The Global Saving Glut and the U.S. Current Account Deficit." Speech to the Virginia Association of Economists, Richmond, Virginia, 10 March.
- . 2015. "Why Are Interest Rates So Low, Part 2: Secular Stagnation." *Ben Bernanke's Blog*. 31 March.
- Bulusu, N. and S. Gungor. 2017. "The Life Cycle of Government of Canada Bonds in Core Funding Markets." *Bank of Canada Review* (Spring): 31–41.
- Charbonneau, K. and L. Rennison. 2015. "Forward Guidance at the Effective Lower Bound: International Experience." Bank of Canada Staff Discussion Paper No. 2015-15.
- Christiano, L., M. Eichenbaum and S. Rebelo. 2011. "When Is the Government Spending Multiplier Large?" *Journal of Political Economy* 119 (1): 78–121.
- Cœuré, B. 2016. "Assessing the Implications of Negative Interest Rates." Speech to the Yale Financial Crisis Forum, Yale School of Management, New Haven, 28 July.
- Corsetti, G., E. Mavroeidi, G. Thwaites and M. Wolf. 2016. "Step Away from the Zero Lower Bound: Small Open Economies in a World of Secular Stagnation." Cambridge Working Paper Series 2016/11.
- De Rezende, R. B. 2016. "The Interest Rate Effects of Government Bond Purchases Away From the Lower Bound." Sveriges Riksbank Working Paper No. 324, May (Revised October 2016).
- Diez de los Rios, A. and M. Shamloo. Forthcoming. "Quantitative Easing and Long-Term Yields in Small Open Economies."
- Eggertsson, G. B. 2011. "What Fiscal Policy Is Effective at Zero Interest Rates?" *National Bureau of Economic Research Macroeconomics Annual* 25 (1): 59–112.
- Eggertsson, G. and N. Mehrotra. 2014. "A Model of Secular Stagnation." National Bureau of Economic Research Working Paper No. 20574.
- Eggertsson, G., N. Mehrotra, S. Singh and L. Summers. 2016. "A Contagious Malady? Open Economy Dimensions of Secular Stagnation." *IMF Economic Review* 64 (4): 581–634.
- Eggertsson, G. B. and M. Woodford. 2003. "The Zero Bound on Interest Rates and Optimal Monetary Policy." *Brookings Papers on Economic Activity* 2003 (1): 139–233.

- Farhi E. and M. Maggiori. 2016. "A Model of the International Monetary System." National Bureau of Economic Research Working Paper No. 22295.
- Ferrari, M., J. Kearns and A. Schrimpf. 2016. "Monetary Shocks at High-Frequency and Their Changing FX Transmission Around the Globe." 31 August.
- Feunou, B., J.-S. Fontaine, J. Kyeong and J. Sierra. 2015. "Foreign Flows and Their Effects on Government of Canada Yields." Bank of Canada Staff Analytical Note No. 2015-1.
- Fleming, J. M. 1962. "Domestic Financial Policies Under Fixed and Floating Exchange Rates." IMF Staff Papers 9 (3): 369–380.
- Glick, R. and S. Leduc. 2015. "Unconventional Monetary Policy and the Dollar: Conventional Signs, Unconventional Magnitudes." Federal Reserve Bank of San Francisco Working Paper No. 2015-18.
- Gokoluk, S. and K. Chamonikolas. 2016. "Czech Central Banker Says Negative Rates May Help End Koruna Cap." Bloomberg, 8 December.
- Haldane, A., M. Roberts-Sklar, T. Wieladek and C. Young. 2016. "QE: The Story so Far." Bank of England Staff Working Paper No. 624.
- Jackson, H. 2015. "The International Experience with Negative Policy Rates." Bank of Canada Staff Discussion Paper No. 2015-13.
- Jordan, T. 2016. "Monetary Policy Using Negative Interest Rates: A Status Report." Speech to the Vereinigung Basler Ökonomen, Basel, 24 October.
- Kabaca, S. 2016. "Quantitative Easing in a SOE: An International Portfolio Balancing Approach." Bank of Canada Staff Working Paper No. 2016-55.
- King, T. 2016. "Expectation and Duration at the Effective Lower Bound." Federal Reserve Bank of Chicago Working Paper No. 2016-21.
- Kozicki, S., E. Santor and L. Suchanek. 2011. "Unconventional Monetary Policy: The International Experience with Central Bank Asset Purchases." *Bank of Canada Review* (Spring): 13–25.
- Krishnamurthy, A. and A. Vissing-Jorgensen. 2011. "The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy." National Bureau of Economic Research Working Paper No. 17555.
- Krugman, P. 2009. "Fighting off Depression." *New York Times*, 4 January, Opinion page.
- Mendes, R. R. 2014. "The Neutral Rate of Interest in Canada." Bank of Canada Staff Discussion Paper No. 2014-5.
- Moore E. and J. Cumbo. 2016. "Bank of England Bond-Buying Programme Hits Trouble." *Financial Times*, 9 August.

- Mundell, R. A. 1963. "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates." *Canadian Journal of Economic and Political Science* 29 (4): 475–485.
- Pomorski, L., F. Rivadeneyra and E. Wolfe. 2014. "The Canadian Dollar as a Reserve Currency." *Bank of Canada Review* (Spring): 1–11.
- Reza, A., E. Santor and L. Suchanek. 2015. "Quantitative Easing as a Policy Tool Under the Effective Lower Bound." Bank of Canada Staff Discussion Paper No. 2015-14.
- Santor, E. and L. Suchanek. 2016. "A New Era of Central Banking: Unconventional Monetary Policies." *Bank of Canada Review* (Spring): 29–42.
- Summers, L. 2014. "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound." *Business Economics* 49 (2): 65–73.
- . 2016. "Secular Stagnation and Monetary Policy." *Federal Reserve Bank of St. Louis Review*. Second Quarter. 98 (2): 93–110.
- Swanson, E. T. 2015. "Measuring the Effects of Unconventional Monetary Policy on Asset Prices." National Bureau of Economic Research Working Paper No. 21816.
- Swedish National Debt Office. 2017. *Central Government Borrowing: Forecast and Analysis 2017:1*. 22 February.
- Tartar, A. 2016. "Here's What Economists Think About Negative Policy Rates: They Don't Do Much for Inflation and Will Last Until at Least 2018." Bloomberg, 18 February.
- Teulings, C. and R. Baldwin, editors. 2014. *Secular Stagnation: Facts, Causes and Cures*. e-book.
- Turk, R. A. 2016. "Negative Interest Rates: How Big a Challenge for Large Danish and Swedish Banks?" International Monetary Fund Working Paper No. 16/198.
- Vayanos, D. and J. L. Vila. 2009. "A Preferred-Habitat Model of the Term Structure of Interest Rates." National Bureau of Economic Research Working Paper No. 15487.
- Viñals, J., S. Gray and K. Eckhold. 2016. "The Broader View: The Positive Effects of Negative Nominal Interest Rates." Posted on 10 April by iMFDirect.
- Weale, M. and Wieladek, T. 2016. "What Are the Macroeconomic Effects of Asset Purchases?" *Journal of Monetary Economics* 79: 81–93.
- Witmer, J. and J. Yang. 2016. "Estimating Canada's Effective Lower Bound." *Bank of Canada Review* (Spring): 3–14.
- Woodford, M., 2012. "Methods of Policy Accommodation at the Interest-Rate Lower Bound." *The Changing Policy Landscape*: 185–288.