

**DOCUMENT DE TRAVAIL / WORKING PAPER**

**No. 2020-11**



**What Monetary Policy Framework in 2021?**

**Pierre Fortin**

**Octobre 2020**

# What Monetary Policy Framework in 2021?

**Pierre Fortin**, Université du Québec à Montréal

**Document de travail No. 2020-11**

**Octobre 2020**

Département des Sciences Économiques  
Université du Québec à Montréal  
Case postale 8888,  
Succ. Centre-Ville  
Montréal, (Québec), H3C 3P8, Canada  
Courriel : [brisson.lorraine@uqam.ca](mailto:brisson.lorraine@uqam.ca)  
Site web : <http://economie.esg.uqam.ca>

Les documents de travail contiennent des travaux souvent préliminaires et/ou partiels. Ils sont publiés pour encourager et stimuler les discussions. Toute référence à ces documents devrait tenir compte de leur caractère provisoire. Les opinions exprimées dans les documents de travail sont celles de leurs auteurs et elles ne reflètent pas nécessairement celles du Département des sciences économiques ou de l'ESG.

De courts extraits de texte peuvent être cités et reproduits sans permission explicite des auteurs à condition de faire référence au document de travail de manière appropriée.

# **What Monetary Policy Framework in 2021?**

Pierre Fortin  
Emeritus Professor of Economics  
École des sciences de la gestion  
Université du Québec à Montréal  
(fortin.pierre@uqam.ca)

Revised version of paper prepared for the Bank of Canada Conference “The 2021 Renewal of the Monetary Policy Framework” held online on August 26, 2020. I am very grateful to Bank of Canada management for providing this opportunity to reflect on monetary policy. I have benefited from fruitful exchanges with Mick Devereux, François Dupuis, Joe Gagnon, former Deputy Governor John Murray, Rudy Narvas and Stephanie Schmitt-Grohé. The views expressed in this paper are solely my own.

## Summary

This background paper was prepared for the Bank of Canada conference on the 2021 renewal of the inflation-control agreement between the Bank and the Government of Canada held online in August 2020.

The first part of the paper focuses on the fact that the room for conventional monetary stimulus is being limited by the narrow space remaining between the neutral level of the policy interest rate, estimated to be 2.5 percent and expected to remain low for some time, and the effective lower bound on this policy rate, set by the Bank of Canada at 0.25 percent. Two means of getting greater monetary stimulus would be for the Bank to keep on purchasing long-term assets on a large scale, or to increase its inflation target by a couple of percentage points, say from 2 percent to 3 or 4 percent. But the macroeconomic effectiveness of the first option is uncertain, and there would most likely be strong political opposition to increasing the inflation rate to 4 percent, or even only to 3 percent. In the short term, therefore, federal and provincial budgets are the only policy instrument that can make up for the shortcomings of monetary policy – however difficult policy coordination may be – and bring the Canadian economy to fully recover from the current recession without delay.

The second part of the paper reviews results that Bank of Canada researchers have obtained in comparing the macroeconomic performance of various monetary policy frameworks with the help of their macro-econometric model of the Canadian economy called ToTEM. I am led to conclude that the 2021 agreement should keep the current flexible inflation targeting framework and continue to have it operated independently by our central bank, but that a somewhat more flexible approach than in the past could be welfare-improving. In particular, it could specify that maximizing employment is a prime concern of the Bank of Canada jointly with keeping inflation low and stable. This dual concern has been the bread and butter of the US Federal Reserve since it was legislated by the Humphrey-Hawkins Act of 1978. It would be beneficial for Canadians if the renewed agreement began to clarify how the two instruments of monetary and fiscal policy will be coordinated to achieve these two interdependent macroeconomic goals of low inflation and maximum employment.

There has been no change in Canada’s monetary policy framework since 1993 despite five periodic reviews, which suggests it has by and large been successful. I don’t know if this time will be different, but at any rate I welcome today’s exchange as an attempt on the part of the Bank to engage stakeholders. I’m a stakeholder, happy to be engaged, and thankful to Senior Deputy Governor Wilkins for her kind invitation. It is her address at the Max Bell School of Public Policy of McGill University two years ago that launched the reflection on the monetary policy framework (Wilkins 2018).

Here are my thoughts, first on the current recession and the constraints on monetary policy, and second on Bank of Canada research that has used macroeconomic models to compare alternative monetary policy frameworks. This research is summarized in a paper by José Dorich, Rhys Mendes and Yang Zhang (2020) presented at this conference by Rhys.

### **The current recession and the constraints on monetary policy**

Canada is currently struggling out of a deep recession and into recovery. Table 1 constitutes a warning that in the past recessions were short and followed by long recoveries. A short-hand estimate of the macroeconomic costs of the last recession cumulated from 2008 to 2014 would easily exceed 300 billion of 2019 dollars.<sup>1</sup>

This time, the first few steps of the recovery have been rapid due to the extraordinary set of collaborative actions taken by Ottawa, the provinces and the Bank, and also because a much larger number of the layoffs induced by the recession than usual were recall-ready. But full recuperation will now probably take a number of years. Fortunately, all available signals are that the Bank is intent on making a solid contribution to the recovery. Its policy interest rate was lowered from 1.75 percent in February to 0.25 percent in March, and earlier this month the Governor assured markets that the rate will be held “very low for a long time”, thereby adopting the “lower-for-longer” forward guidance strategy recommended by the two previous chairmen of the US Federal Reserve (Bernanke 2017; Yellen 2018). The Bank has deftly played its role of lender of last resort through financial markets. And it has actively involved itself in a large-scale asset purchase program that has probably added to the decline of interest rates further across the yield

---

<sup>1</sup> This is a “no-brainer” estimate obtained by adding the annual gaps (in 2012 dollars) between actual GDP and a reference GDP obtained by drawing a straight line from the 2007 actual GDP to the 2014 actual GDP, and then converting the resulting sum into 2019 dollars. It does not take account of any hysteretical slowdown of potential GDP that could have been generated by the recession and its aftermath.

curve. For example, the yield on Government of Canada 5-to-10 year bonds is currently 0.5 percent, down from 1.2 percent back in February. By how much this quantitative easing has stimulated aggregate demand is still uncertain at this point of time.

**Table 1**  
**Recessions\* are short, recoveries are long**

<u>Dive into recession</u>	<u>Duration of recovery</u>
1953Q2-1954Q2	3 years
1981Q2-1982Q4	5 years
1990Q1-1991Q1	7 years
2008Q3-2009Q2	5 years

\*These are Canada's last four «category 4» recessions according to the 1-to-5 classification proposed by Cross and Bergevin (2012).

The problem, as we all know, is that the room for monetary stimulus has shrunk in the last decades. Table 2 reports that the last four recoveries were supported by reductions of 9 percentage points in the policy rate on average. However, this time the downward adjustment has been a mere 1.5 points, or six times less. The drop in the average yield on Government of Canada medium- to long-term bonds since February has also been smaller than in previous recoveries, despite the Bank's diligent asset purchase program. Presently, both short- and long-term rates are at very low levels.

**Table 2**  
**The decline in interest rates coming out of the last four recessions**

<u>Trough date</u>	<u>Decline in interest rates (pp)</u>	
	Overnight	5-10-year GC bonds
June 1980	-10.4	-2.9
October 1982	-12.7	-7.4
April 1992	-8.7	-4.4
May 2009	-4.3	-2.3
<b><u>Average of last four</u></b>	<b><u>-9.0</u></b>	<b><u>-4.2</u></b>
April 2020	-1.5	-0.8

Source: Statistics Canada (CANSIM 1010-0122); Cross and Bergevin (2012).

The room for conventional monetary stimulus is being limited by the narrow space remaining between the neutral policy interest rate, estimated to be 2.5 percent in the July 2020 *Monetary Policy Report (MPR)*, and the effective lower bound, set by the Bank at 0.25 percent (Bank of Canada 2020). In fact, in the past 13 years the policy

rate has been 1 percent or less for 75 percent of the time, and it has never exceeded 1.75 percent. What it will be in the future is uncertain, but I have not seen research on the saving-investment equilibrium in Canada or elsewhere predicting that it will come back up anytime soon. Markets seem to agree. Interest rates will likely stay low, and the policy rate will be at or close to the effective lower bound for an extended period. Conventional monetary policy is literally trapped in a cage, just as Bip, the legendary pantomime character created by Marcel Marceau, was 50 years ago.

### **Marcel Marceau's Bip in *The Cage***



There are three ways to escape the cage: 1) turn to alternative forms of monetary stimulus, called “unconventional monetary policy tools” or UMPTs, 2) increase the inflation target by a couple of percentage points, or 3) rely more on fiscal stimulus.

UMPTs include four tools: negative interest rate policies, lending operations, forward guidance, and asset purchase programs. First, for the time being at least,

negative interest rates are not part of the toolkit. The Bank of Canada has said it will not consider cutting its policy rate below 0.25 percent. Second, earlier this year it has expanded its lending operations by making abundant liquidity available to financial intermediaries to address disruptions in the transmission chain of monetary policy during the recession. Third, forward guidance seems to have been quite successful in influencing market expectations coming out of the 2008-2009 recession. As I have noted above, in the current recession and recovery it takes the form of the Bank's assuring markets that its policy interest rate will be kept "very low for a long time".

The fourth UMPT is asset market purchases, a.k.a. "quantitative easing". The Bank of Canada has been engaged in large-scale asset market purchases since last spring. It buys at least 5 billion dollars per week of Government of Canada bonds and also other types of securities, including mortgage, provincial and corporate bonds. The Bank's total assets had increased to 540 billion dollars by mid-August 2020 from 120 billion earlier in March. In the July *MPR* the Bank said that these purchases were providing "considerable monetary stimulus", although it did not specify exactly what "considerable" meant. The research literature, summarized by the October 2019 Report of the Working Group of the Bank of International Settlements on UMPTs, is still uncertain by how much the interest rates of various maturities are affected by quantitative easing and by how much aggregate demand is responding (for diverse views, see Reza, Santor and Sulachek 2015; Gagnon 2016; Swanson 2018; Hamilton 2018a; Summers 2018). There is in particular the possibility that the positive response of aggregate demand to interest rate cuts might be attenuated or even reversed when interest rates are already low (e.g., Chetty 2007).

The second means of getting greater monetary stimulus would be to increase the inflation target by a couple of percentage points, say from 2 percent to 3 or 4 percent. This would make room for larger reductions in the real interest rate (which nets out the inflation rate) when needed. Many economists have made this suggestion in recent past (Blanchard, Dell'Ariccia and Mauro 2010; Ball 2014; Krugman 2014; Fortin 2016). My reading of the literature is that the marginal efficiency and distributional costs of increasing inflation this much would be transitional and small. In particular, workers would be protected by wage indexation and the low-income elderly would be protected by their indexed guaranteed income supplements and old age security pensions. There would be huge benefits from enabling the central bank to better combat recessions and support recoveries. As indicated by the 300 billion dollar estimate of the cost of the 2008-2009 recession and its aftermath reported above, Okun gaps can be large. The



concern has understandably been expressed that a 4 percent inflation target would be a slippery slope to even higher targets (Wilkins 2018). But Canadian evidence from the 1980s does not support this worry. The 4.4 percent average inflation rate backed by the central bank in that decade was very stable and did not show any sign of slipping to a higher level. Rather, the main obstacle to raising the inflation target from 2 percent to 4 percent, in my view, is not economic, but political. It would be hard to have public opinion accept that the inflation target be increased to 4, or even only to 3, percent.

The third means of escaping the cage is expansionary fiscal policy. Here we should first ask the question, how much further stimulation does the Canadian economy need now? According to the central scenario of the July *MPR*, it can be inferred that output would be short of potential by about 6.5 percent, or some 150 billion dollars, in 2021.<sup>2</sup> With UMPTs only partially effective and the higher inflation target politically unacceptable, fiscal policy remains the only instrument at our disposal that can make up for the lower bound on the interest rate, fill up the 150 billion Okun gap, and bring the economy to fully recover from the recession. Assuming that the multiplier effect of government expenditures is 1.25 and the marginal tax-less-transfer rate is 40 percent nationally, an addition of 60 billion dollars to public spending in 2021 could in principle close the output gap.<sup>3</sup> The current interest rates of 1 percent or less on long-term Government of Canada bonds would facilitate the financing of federal deficits, but there could be a political restraining effect on borrowing after the very large federal and provincial deficits incurred in 2020. Coordination with provinces would be essential, but would not be easy. Remember that in Canada's general government sector 65 percent of current spending and 85 percent of capital spending are provincial or local<sup>4</sup>. One would also have to get over the classic difficulty of deciding what kind of welfare-improving spending should be increased and how much could be done

---

<sup>2</sup> Assume that actual output was equal to potential in 2019 and that, following the *MPR* scenario, actual real GDP will drop by 7.8 percent in 2020 and increase by 5.1 percent in 2021. Then if potential GDP grows by 1.8 percent in each of 2020 and 2021 as estimated by the *MPR*, the ratio of actual to potential GDP in 2021 will be  $(1 - .078) * (1 + .051) / (1 + .018)^2 = 0.935$ , whence the 6.5 percent gap.

<sup>3</sup> Call the additional government spending  $\Delta G$ , the multiplier  $\mu = 1.25$ , the marginal tax-less-transfer rate  $\tau = 0.4$ , and the targeted increase in GDP  $\Delta Y = 150$  billion dollars. Then the needed  $\Delta G$  on net is  $(1/\mu - \tau) * \Delta Y = 60$  billion dollars. For the size of the multiplier, I rely on the evidence from Blanchard and Leigh (2013) and Nakamura and Steinsson (2014) as well as from my own research (Fortin 2014).

<sup>4</sup> From Statistics Canada (CANSIM 3610-0450).

on short notice by the 14 government authorities. All said, further fiscal stimulus is not a sure thing. Full recovery could linger.

### **The model-based results obtained by Bank of Canada researchers**

Turning now to the medium and long term, what Bank of Canada staff are presenting at this conference is a summary of their model-based research comparing and contrasting various monetary policy frameworks that might allow Bip to escape from his cage (Dorich, Mendes and Zhang 2020). This “Wellington Street Derby” includes six competing “horses”: the current inflation targeting scheme (IT), average inflation targeting (AIT), price level targeting (PLT), the dual inflation-unemployment mandate (DM) and nominal GDP (NGDP) level or growth targeting. IT, AIT and PLT can be seen as members of a family of CPI price targeting frameworks with an increasing degree of history dependence, the window being 1 year for IT, 2 to 3 years for AIT and eternity for PLT. The impacts of the frameworks on inflation and output volatility are simulated mainly with the help of an updated version of the Bank of Canada’s Terms of Trade Economic Model called ToTEM II that was developed earlier by Dorich, Johnston, Mendes, Murchison and Zhang (2013).

#### **The Wellington Street Derby**



1

ToTEM is a large-scale open economy dynamic stochastic general equilibrium (DSGE) model of the Canadian economy. Its structure details firm and household demand, wage-price adjustment and the monetary policy rule. This kind of model relies on assumptions that have been severely criticized by some (e.g.; Romer 2016; Krugman 2016; Blanchard 2018a). But ToTEM does at least attenuate some extreme assumptions such as model-based expectations,<sup>5</sup> and it can impose an occasionally-effective lower bound (ELB) of 0.25 percent on the policy interest rate.<sup>6</sup> The monetary policy frameworks are compared by looking at variances over time of key variables such as CPI inflation, the output gap, unemployment, and GDP growth.

Two sets of simulations are reported. The first set compares the three consumer-price-based frameworks, namely IT, AIT and PLT. The most relevant environment is one in which a fraction of households and firms are rule-of-thumb wage- and price-setters, the 0.25 percent ELB is occasionally binding, and the UMPTs are only partially effective. A key feature of the model is that the optimality of history dependence increases with the binding importance of ELB, but decreases with departures from model-based expectations. In general, ToTEM finds that PLT is dominated by IT and AIT, and that, by and large, AIT holds some lead over IT. When the ELB does bind, then a modest amount of history dependence under AIT can be beneficial even if rule-of-thumb expectations are present.

This is all OK. Nevertheless, I remain worried that DSGE-based exercises as this one are concerned not about maximizing the level of output over time, but only about minimizing its variance around some filter-generated average trajectory that is then coined “potential output”. There are two problems here. First, filter-based estimation techniques for potential output have raised severe criticism (Krugman 1998; Phillips and Jin 2015; Coibion, Gorodnichenko and Ulate 2018; Hamilton 2018b)<sup>7</sup>. Second, it is not clear what model-based results would look like if, say,

---

<sup>5</sup> As an aside, I should say that I take as very convincing the evidence-based view of Benjamin Friedman (1979) and Daniel Kahneman (2011) that it is rational for expectations to be adaptive. Fortunately, the authors of ToTEM have been ready to explore adaptive – which they call “rule-of-thumb” – expectations.

<sup>6</sup> This is crucial. Kiley and Roberts (2017) have shown that the current lower bound of 0 percent set in the United States could be effective up to 40 percent of the time if the neutral policy interest rate was to stay at 3 percent.

<sup>7</sup> The Bank is not unaware of the shortcomings of filtering techniques. It has often admitted having a hard time disentangling cyclical and structural factors (e.g., Wilkins 2014). Corrections to the basic estimation of potential output and the output gap have frequently been made in official Bank documents. Estimation has shifted over time from basic statistical filters to

post-DSGE hypotheses such as hysteresis (Blanchard 2018b), plucking (Dupraz, Nakamura and Steinsson 2020) or Phillips curve convexity (Akerlof, Dickens and Perry 1996; Fortin 2015; Gagnon and Collins 2016) were to be taken seriously and studied explicitly.

The second set of simulations with ToTEM extends the list of frameworks compared to include DM and NGDP level and growth, which emphasize impacts on unemployment and nominal GDP. In the same constrained environment as in the first set of simulations, with rule-of-thumb price setters, occasionally-binding ELB and poorly effective UMPTs, the calculated unconditional standard deviations this time broadly suggest that IT, AIT and DM would be the most robust of the six frameworks in terms of how well they can stabilize the variances of the set of six variables of interest that are considered.

The fact that the PLT and NGDP level and growth targeting frameworks are found to be somewhat or decisively inferior comes as relief to me. The long history dependence carried by PLT simply does not make practical sense.<sup>8</sup> Also, the two NGDP frameworks pose insurmountable practical problems. CPI inflation is easily understood by the general public, its components have concrete meaning for households, and its data are timely and exempt from revisions. In contrast, there would be confusion about the split of nominal GDP between the price level and real GDP. Furthermore, given that one third of Canada's output is exported, there would be frustration arising from the frequent and often persistent divergence of export prices, which are part of the GDP price index, and import prices, which appear in the CPI. This difficulty would be compounded by the lags in getting the GDP data, and by their frequent and large ex post revisions. It would also be quite a challenge for the Bank of Canada to explain to Maritimers, Quebeckers and Ontarians that interest rates need to be raised due to an increase in the price of oil that would be boosting incomes in Alberta, Saskatchewan and Newfoundland. I would expect that Eastern and Central Canada would not be particularly enthused by the prospect of having to suffer from a new GDP targeting disease in addition to the usual Dutch disease.

---

“extended” filters to “extended multivariate” filters to “structural integrated” filters (see Pichette, St-Amant, Tomlin and Anoma 2015 for a review up to that date).

<sup>8</sup> Unless it kicks in only temporarily during periods in which rates are constrained by the ELB, as suggested by Bernanke (2017). But in the terminology adopted here, Bernanke's “temporary PLT” is akin to “AIT for a while”.

## **Stick to independent inflation targeting, make it somewhat more flexible, and coordinate monetary and fiscal policy more tightly**

From their simulations with ToTEM (and complementary models), authors of the Bank report conclude that “it is not clear if any of the alternatives would offer expected gains large enough to justify shifting away from the proven and successful inflation-targeting framework.” I basically agree. The 2021 agreement should keep the current flexible inflation targeting framework and continue to have it operated independently by our central bank, with the 2 percent CPI target and the 1 to 3 percent control range around it unchanged.

But the simulation results are also there to suggest that a somewhat more flexible approach than in the past would be welfare-improving. First, a temporary shift to AIT in bad times would seem to be advantageous when the policy rate needs to be kept at the ELB for a while. The current “lower-for-longer” guidance announced by the Governor is actually one form of this “AIT in bad times” strategy. And second, putting more emphasis on unemployment depending upon circumstances could prove helpful. After all, in the past 25 years of inflation targeting, US macroeconomic performance does not seem to have suffered from the kind of dual mandate prescribed by the Humphrey-Hawkins Act of 1978. After adjusting for differences in unemployment measurement between the two countries, it turns out that the unemployment rate has been 0.75 point lower in the US than in Canada on average. Meanwhile, CPI inflation excluding food and energy has averaged 2.1 percent in the US. It has been below target at 1.6 percent in Canada.

More generally, it would be highly desirable that the 2021 agreement begin to clarify in simple terms for Canadians what the 2 x 2 macropolicy game, in which two instruments – monetary and fiscal – have to be coordinated to achieve two interdependent macroeconomic goals – low inflation and maximum employment – is all about. I see four reasons making this clarification more necessary than ever.

First, evidence has developed in the last 25 years that the long-run relation between inflation and unemployment – the Phillips curve – is not vertical at a unique equilibrium unemployment rate at every level of inflation as believed earlier, but is negatively-sloped and convex at low positive inflation rates (e.g., Fortin 2015 for Canada; Daly and Hobijn 2019 and Gagnon and Collins 2019 for the US). This may be due to downward rigidity of nominal wages, or to some near-rational neglect of low inflation by wage- and price-setters. A straight implication is that choosing an inflation target amounts to simultaneously choosing a steady-state unemployment rate target. Minimizing inflation and maximizing employment cannot be dissociated. They are part of a joint decision.

Second, many observers have underlined the fact that unemployment is path-dependent. After a recession, it tends to persist for long periods of time, and it converges back to equilibrium only very slowly (e.g., DeLong and Summers 2012; Blanchard 2018b). One implication is that central banks and governments have to be immediately and strongly reactive to any sign of recession and to work hard to accelerate the recovery of employment after a recession has struck. This seems now to be well-understood by Ottawa, the provinces and the Bank of Canada.

Third, the fact that the room for monetary stimulus is much narrower today than in the past can be made up by using UMPTs such as asset purchases, or by increasing the inflation target, or by having fiscal policy more involved in economic stabilization. But the effectiveness of UMPTs is uncertain and may be limited, and raising the inflation target would be politically difficult. It therefore follows that achieving both maximum employment and low and stable inflation requires that fiscal policy work hand in hand with monetary policy to this end. The smaller cost of servicing the public debt now makes this solution all the more attractive. The old Tinbergen (1952) prescription of close coordination between two policy instruments to achieve two policy goals should be our main guide. To be sure, Bob Mundell (1962) did show that under comparative advantage a one-on-one assignment of instruments to targets – for example, of monetary policy to inflation presently – could eventually bring about convergence to sought-for goals. But he was also quick to point out that this kind of assignment strategy would be (at worst) less effective and (at best) slower in achieving the task than full coordination.

Fourth, very simply and before everything else, Canadians have a basic right to comprehend the brave 2 x 2 macropolicy game that has to be played from now on if they are to make informed judgments about it.

## References

Akerlof, George, William Dickens, and George Perry (1996) “The macroeconomics of low inflation” *Brookings Papers on Economic Activity* (1): 1-59.

Ball, Laurence (2014) “The case for a long-run inflation target of four percent” Working Paper No. 14–92, International Monetary Fund, Washington.

Bank of Canada (2020) *Monetary Policy Report – July 2020*. Ottawa: Bank of Canada.

Bank of International Settlements (2019), *Unconventional Monetary Policy Tools: A Cross-Country Analysis*. Report of a Working Group chaired by Simon Potter and Frank Smets. CGFS Papers No. 63. Basel, Switzerland.

Bernanke, Ben (2017) “Monetary policy in a new era” Paper presented at Conference on “Rethinking Macroeconomic Policy”, Peterson Institute for International Economics, Washington.

Blanchard, Olivier (2018a) “On the future of macroeconomic models” *Oxford Review of Economic Policy* 34(1-2): 43-54.

Blanchard, Olivier (2018b) “Should we reject the natural rate hypothesis?” *Journal of Economic Perspectives* 32(1): 97-120.

Blanchard, Olivier, and Daniel Leigh (2013) “Growth forecast errors and fiscal multipliers” *American Economic Review* 103(3): 117-120.

Blanchard, Olivier, Giovanni Dell’Ariccia, and Paolo Mauro (2010) “Rethinking macroeconomic policy.” *Journal of Money, Credit and Banking* 42(S1): 199–215.

Chetty, Raj (2007) “Interest rates, irreversibility, and backward-bending investment” *Review of Economic Studies* 74(1): 67-91.

Coibion, Olivier, Yuriy Gorodnichenko, and Mauricio Ulate (2018) “The cyclical sensitivity in estimates of potential output” *Brookings Papers on Economic Activity* (Fall): 343-411.

Cross, Philip, and Philippe Bergevin (2012) *Turning Points: Business Cycles in Canada since 1926*. Commentary No. 366, C.D. Howe Institute, Toronto.

Daly, Mary, and Bart Hobijn (2014) “Downward nominal wage rigidities bend the Phillips Curve” Working Paper 2013-08, Federal Reserve Bank of San Francisco.

DeLong, Bradford, and Lawrence Summers (2012) “Fiscal policy in a depressed economy” *Brookings Papers on Economic Activity* (Spring): 233-274.

Dorich, José, Michael Johnston, Rhys Mendes, Stephen Murchison, and Yang Zhang (2013) *ToTEM II: An Updated Version of the Bank of Canada’s Quarterly Projection Model*. Technical Report No. 100, Ottawa: Bank of Canada.

Dorich, José, Rhys Mendes and Yang Zhang (2020) “The Bank of Canada’s ‘horse race’ of alternative monetary policy frameworks: Some interim results” Preliminary draft, Bank of Canada, Ottawa.

Dupraz, Stéphane, Emi Nakamura, and Jón Steinsson (2020) “A plucking model of business cycles” Working Paper, Department of Economics, University of California, Berkeley.

Fortin, Pierre (2014) “Avant tout, la politique budgétaire doit soutenir la reprise” *Télescope* 20(1): 105-127.

Fortin, Pierre (2015) “The macroeconomics of downward nominal wage rigidity: a review of the issues and new evidence for Canada”, in K. Banting, R. Chaykowski and S. Lehrer (eds.), *Thinking Outside the Box: A Conference Volume Celebrating Thomas J. Courchene*. McGill-Queen’s University Press, Montreal. Access at <https://depot.erudit.org/bitstream/003805dd/1/CIRPEE13-09.pdf>.

Fortin, Pierre (2016) “A stable 4 percent inflation rate could get Canadians one half million more jobs” Background paper presented at Bank of Canada November 2015 Conference “Towards the 2016 Renewal of the Bank of Canada’s Inflation-Control Target”. Working Paper 16-04, Centre interuniversitaire sur le risque, les politiques économiques et l’emploi, Université du Québec, Montréal.

Friedman, Benjamin (1975) “Optimal expectations and the extreme information assumptions of ‘rational expectations’ macromodels” *Journal of Monetary Economics* 5(1): 23-41.

Gagnon, Joseph (2016) “Quantitative easing: An underappreciated success” Policy Brief Number PB16-4, Peterson Institute for International Economics, Washington.

Gagnon, Joseph, and Christopher Collins (2019) “Low inflation bends the Phillips curve” Working Paper No. 19-6, Peterson Institute for International Economics, Washington.

Hamilton, James (2018a) “The efficacy of large-scale asset purchases when the short-term interest rate is at its effective lower bound” *Brookings Papers on Economic Activity* (Fall): 543-554.

Hamilton, James (2018b) “Why you should never use the Hodrick-Prescott filter” *Review of Economics and Statistics* 100(5): 831-843.



Kahneman, Daniel (2011) *Thinking, Fast and Slow*. Toronto: Doubleday.

Kiley, Michael, and John Roberts (2017) “Monetary policy in a low interest rate world” *Brookings Papers on Economic Activity* (Spring): 317-372.

Krugman, Paul (1998) “It’s baaack: Japan’s slump and the return of the liquidity trap” *Brookings Papers on Economic Activity* (2): 137-187.

Krugman, Paul (2014) “Inflation targets reconsidered” *ECB Forum on Central Banking: Monetary Policy in a Changing Financial Landscape*. Conference Proceedings, European Central Bank, Frankfurt am Main, Germany.

Krugman, Paul (2016) “What have we learned from the crisis?” Picciotto Prize Lecture, Graduate Institute of International and Development Studies, Geneva.

Mundell, Robert (1962) “The appropriate use of monetary and fiscal policies for international and external stability.” *IMF Staff Papers* 9(1): 70-79.

Nakamura, Emi, and Jón Steinsson (2014) “Fiscal stimulus in a monetary union: Evidence from US regions” *American Economic Review* 104(3), 753-792.

Phillips, Peter, and Sainan Jin (2015) “Business cycles, trend elimination, and the HP filter” Discussion Paper No. 2005, Cowles Foundation for Research in Economics, Yale University, New Haven.

Pichette, Lise, Pierre St-Amant, Ben Tomlin, and Karine Anoma (2015) “Measuring potential output at the Bank of Canada: the extended multivariate filter and the integrated framework” Discussion Paper No. 2015-1, Bank of Canada, Ottawa.

Romer, Paul (2016) “The trouble with macroeconomics” Discussion paper, Stern School of Business, New York University, September. Access at <https://paulromer.net/the-trouble-with-macro/WP-Trouble.pdf>

Reza, Abeer, Eric Santor, and Lena Suchanek (2015) “Quantitative easing as a policy tool under the effective lower bound” Staff Discussion Paper No. 2015-14, Bank of Canada.

Summers, Lawrence (2018) “Why the Fed needs a new monetary policy framework” Paper presented at Conference “Rethinking the Fed’s 2 percent Inflation Target”, Hutchins Center on Fiscal and Monetary Policy. Washington: Brookings Institution.

Swanson, Eric (2018) “The Federal Reserve is not very constrained by the lower bound on nominal interest rates” *Brookings Papers on Economic Activity* (Fall): 555-572.

Tinbergen, Jan (1952) *On the Theory of Economic Policy*. Amsterdam: North-Holland.

Wilkins, Carolyn (2014) “Monetary policy and the underwhelming recovery” Remarks before the CFA Society, Toronto.

Wilkins, Carolyn (2018) “Choosing the best monetary policy framework for Canada” Remarks at the Conference “Toward 2021: Reviewing the monetary policy framework”, Max Bell School of Public Policy, McGill University, Montreal.

Yellen, Janet (2018) “Comments on monetary policy at the effective lower bound” *Brookings Papers on Economic Activity* (Fall): 573-579.