

Fiscal and monetary policy interaction at the effective lower bound

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In responding to the COVID-19 pandemic, policy makers in advanced economies delivered extraordinary fiscal and monetary policy support. Central banks lowered their policy rates as far as they could – hitting the effective lower bound (or ELB).¹ But the risk that shutdowns would create a deep and prolonged slump led policymakers to deliver further stimulus through the deployment of unconventional or alternative monetary policy tools, and through large increases in fiscal deficits. In New Zealand, measures to contain the virus, combined with alternative monetary policy tools and fiscal support, including a wage subsidy scheme, have contributed to an economic recovery that is among the most vigorous in the world. These developments have taken place against a backdrop of a substantial decline in global interest rates over recent decades. The forces driving this decline, which include population ageing and slower productivity growth, are likely to keep interest rates low, on average, over the years ahead. One obvious and significant implication of persistently low interest rates is an increased likelihood of future episodes where the lower bound constrains the ability of central banks to lower their policy interest rates. Alternative monetary policy tools have a role to play in meeting the challenge of providing the desired stimulus, and there is a case for short-term fiscal support.

This paper contributes to the Treasury’s Macroeconomic Framework Review through a discussion of the effects of fiscal stimulus when monetary policy is constrained by the lower bound. It supplements the recent work of Lyu (2021) that considers the effects of fiscal policy

¹ Sometimes referred to as the zero lower bound, the ELB, while typically near-zero, more accurately describes the limits to conventional monetary experienced by central banks. Some central banks have reduced their policy rates to zero, others including the Reserve Bank of New Zealand to date, have maintained a rate a little above zero. Other central banks have been able to set their policy rates a little below zero, an unconventional or alternative approach to monetary policy management.

on economic activity in normal times (that is, when monetary policy is unconstrained), and Bernstein et al (2021) that discusses ways to achieve a greater stabilisation role for fiscal policy and the challenges of doing so. Further papers, looking at different aspects of monetary and fiscal policy, are intended as the Review continues.

The paper explores the international research on the effectiveness of fiscal policy stimulus that has emerged in the wake of the GFC. This research highlights the complementary role of fiscal stimulus when monetary policy is constrained by the lower bound. Key research findings include: fiscal stimulus can be an effective means to mitigate falls in output and incomes and it can help monetary policy meet its price stability and employment objectives; fiscal stimulus is more potent when monetary policy is constrained by the ELB, compared to when it is not; the most effective forms of fiscal stimulus contribute directly to demand for labour and capital, such as spending on health and infrastructure, but are generally not well-suited to short-term manipulation; and in practice, the most effective forms of fiscal support tend to be those that are focused on supporting the incomes of households most likely to spend the stimulus payments.

The note begins with a discussion of the key concepts that underpin the recent research. It draws on this research to highlight the role of fiscal stimulus when the lower bound binds, noting the role the exchange rate plays. While the research focuses on the short-run effectiveness of fiscal stimulus, it also produces some conjectures on the longer-run implications for economic growth. The paper concludes with suggestions for the next steps to develop the Treasury's understanding of the appropriate role of fiscal policy in a low interest rate, low inflation environment.

Key points

- Largely over the past decade or so, there has been a substantial decline in estimates of global and domestic neutral interest rates, that is, the interest rate that on average, over time, would be consistent with price stability and maximum sustainable employment.
- Lower neutral rates have limited the extent of conventional policy rate cuts that central banks can deliver when faced with weaker economic conditions. To overcome the constraint of the effective lower bound on interest rates, central banks have adopted new tools and governments have drawn upon their fiscal resources. These novel responses and their interactions are at the centre of policy debates on macroeconomic stabilisation policies.
- A key lesson from the research is that fiscal stimulus can be an effective means to mitigate falls in output and incomes and it can help monetary policy meet its price stability and employment objectives.
- The effectiveness of fiscal stimulus at the ELB depends on the details of the stimulus, including the types of spending or taxes that change, the duration of the change and the duration of the ELB episode, expectations of future fiscal policy and the expected monetary policy response to rising inflation.
- The most effective forms of fiscal stimulus contribute directly to demand for labour and capital, such as spending on health and infrastructure, but there may be practical limits on how much can be achieved in the short run. In practice, the most effective forms of short-term fiscal stimulus tend to be those that are focused on supporting lower income households, which typically have a higher propensity to spend.
- Government stimulus spending is most effective when private demand is weak. When normal monetary policy resumes, continued stimulus may crowd out private demand, reducing its effectiveness.

Fiscal and monetary policy interactions

Internationally, the global financial crisis (GFC) was a catalyst for research into the effectiveness of fiscal policy. The crisis disrupted the world's financial markets, hampering the transmission of monetary policy, and drove some central banks to cut interest rates to their ELBs. Fiscal policy and alternative monetary policies were deployed to calm financial markets and support the real economy. This research has sought to identify which fiscal policies were the most effective – tax, spending or transfers – and the factors that determine their effectiveness. The research shows how monetary and fiscal policy can reinforce each other in these circumstances. For policymakers, the research highlights the increased importance of considering the way monetary and fiscal policies interact in these circumstances.

The scope of these policy interactions is guided by the institutional settings for fiscal and monetary policy. New Zealand's institutions reflect the principle of a clear separation of responsibility for monetary policy's objectives of supporting maximum sustainable employment and price stability, while fiscal policy is the primary means of achieving the government's economic policy objectives while also seeking to maintain sustainable, equitable and efficient public finances over the long term. This principle, and its emphasis on independence and transparency, guides policymakers to interact in a way that largely takes

the other's policy as given. However, the institutional framework recognises that policies interact and places requirements on the central bank and the government to consider the impacts of their decisions on the other.² The fiscal-monetary policy mix is therefore a consideration in the normal course of events, however, it becomes more important in circumstances where the scope of conventional monetary policy to stimulate the economy has been largely exhausted.

Within this framework, monetary and fiscal policy interactions can take a variety of forms. The interactions may be explicit or implicit, they may be conditional or time bound, they may be wide or narrow in scope. Bernstein et al (2021) discusses a broad range of fiscal policy tools with potential to stabilise the economy, which illustrates the wide scope of policy interactions.

Similarly, Kengmana (2021) discusses the operation of additional monetary policy tools that the Reserve Bank of New Zealand has used, or may use in the future, when its' ability to conduct conventional policy is constrained by the ELB. These tools include term lending programmes and large-scale asset purchases (LSAPs) that directly impact the consolidated government balance sheet.³ Under the LSAP programme, when the Government increased its borrowing in response to the pandemic, it put upward pressure on the interest rate it was being charged, all other things equal. However, purchases by the Reserve Bank in the secondary market lowered the cost of government borrowing, reduced other interest rates in the economy and encouraged investment in other asset types. The beneficial impact on activity in the broader economy helped to stabilise tax revenue. On the other hand, the government accounts became more exposed to the risk of future policy rate increases and changes in the term premium on bonds.⁴

Internationally and in New Zealand, the deployment of LSAPs and other additional tools, such as negative interest rates and forward guidance, have helped to overcome the ELB constraint on monetary policy stimulus, but they too have their limits and there are potential risks.⁵ How much additional headroom they create is highly uncertain, but as Bernanke (2020) argues, they may be able to largely offset the constraints of the lower bound.⁶ More generally, how much headroom each instrument, or combination of instruments can provide, how effective they are, and their risks depends on the structure of a country's financial markets, the circumstances that require the intervention and the nature of other policy support.

Indeed, a key lesson from the experience in the wake of the GFC and from the global pandemic is that the effectiveness of alternative monetary policy tools is enhanced when they are deployed as part of a broader package of policies to support the economy and

² The Public Finance Act 1989 and the remit for the Monetary Policy Committee contain the respective requirements.

³ See the Financial Statements of the Government for the year ended 30 June 2021 (<https://www.treasury.govt.nz/publications/year-end/financial-statements-2021>) for details.

⁴ The term premium captures the difference between the yield that investors require for holding longer-term New Zealand Government Bonds and the expected yield from rolling over shorter-dated ones. Callaghan (2019) discusses its drivers.

⁵ Kengmana (2021) discusses the effectiveness of the tools, their limits and risks in the New Zealand context and internationally.

⁶ For the US economy, Bernanke (2020) argues a combination of forward guidance and QE can provide stimulus equivalent to reducing the policy rate by around 3 percentage points. Whether this is enough to overcome the ELB constraint depends critically on the level of the neutral policy rate. If the neutral rate is much lower than 2 percent, monetary policy alone may not be able to prevent a deep slump in activity and employment.

mitigate their side effects.⁷ In particular, fiscal stimulus has a greater impact on output and employment when complemented by monetary policy stimulus. So long as the lower bound on interest rates remains a constraint, fiscal policy may have a greater role to play in returning the economy to full employment and ensuring inflation remains consistent with its target. To help understand the way these policies work together, this paper focuses on the impacts of discretionary fiscal stimulus when conventional monetary policy is constrained by the ELB. The next step would be to consider the interaction of fiscal policy with alternative monetary policy tools and other public policy measures, such as macroprudential policy.

Monetary policy transmission and inflation expectations

In New Zealand, monetary policy is guided by the Reserve Bank of New Zealand Act 1989 and the monetary policy remit towards the medium-term objectives of low and stable inflation and maximum sustainable employment. The main policy tool is the Official Cash Rate (OCR), a short-term (overnight) nominal interest rate that underpins the interest rates that retail banks set. Changes in the OCR, and the public's expectations about future changes (which are influenced by the Bank's guidance on future settings), are transmitted through financial markets including links to bank funding rates, mortgage rates, the housing market, equity markets, long-term bond rates and foreign exchange rates. Further down the transmission channels, aggregate spending, output and inflation are affected. The figure below is a stylised summary of this process.

Figure: Stylised representation of monetary policy transmission



The transmission chain of conventional policy works best when the policy rate is free to move up or down as required and is not constrained by its lower bound. It also requires financial markets to work efficiently and for the public's inflation expectations to be well anchored.

A critical reason for the OCR's influence on economic activity is that prices or inflation adjust slowly (or are sticky) to changes in market conditions. This means that short-run expectations of prices, or inflation, are also sticky. Consequently, when the central bank lowers the OCR it also lowers the short-term real interest rate: the difference between the nominal OCR and short-term expected inflation or

$$\text{Real interest rate} = \text{nominal interest rate} - \text{expected inflation}$$

The lower real rate encourages investment and consumption, which raises economic activity and employment. The corollary is lower saving.

The expression for the real interest rate above shows that the influence of monetary policy is critically dependent on expected inflation. The impact of a lower OCR can be offset by a fall in expected inflation, leaving the real interest rate unchanged. In this case, the real exchange rate and real activity will be unaffected. Moreover, if the fall in inflation expectations is large enough, real interest rates will rise and generate perverse consequences for real activity.

⁷ See for example Orr (2021) "Some policy lessons from a year of COVID-19" (<https://www.rbnz.govt.nz/research-and-publications/speeches/2021/speech2021-03-04>) and BIS (2019).

The considerable effort that central banks make in communicating to the public how they will respond to the economic outlook reflects the importance of keeping long-run inflation expectations in line with the inflation target to the achievement of their objectives.

In addition, New Zealand's floating exchange rate and high degree of integration into global financial markets means that a lower real interest rate will drive investors to seek better returns elsewhere, resulting in an outflow of capital and a depreciation of the real exchange rate. The real exchange rate may be interpreted as the price of non-tradable goods and services in terms of tradable goods and services. This interpretation highlights the role of the real exchange rate in determining the flow of resources to and from the traded goods sector. An exchange rate depreciation raises returns in the tradable sector, stimulating production, employment and investment in the sector.

In general, this transmission mechanism has worked well, and it has meant that monetary policy has been the preferred tool for macro stabilisation. However, this process was disrupted first by the GFC and most recently by the COVID-19 pandemic. To respond to these crises, many central banks have been forced to adopt new tools and governments have drawn upon their fiscal resources, putting these responses and their interactions at the centre of policy debates on macroeconomic stabilisation policies.

The lower bound constraint on monetary policy

The neutral real interest rate has fallen...

One of the most significant changes in our understanding of the economy over the past decade has been the substantial decline in estimates of the neutral real interest rate that, over the medium-term, is consistent with the Reserve Bank's price stability and employment mandates.⁸ The neutral real interest rate is the rate that is consistent with stable inflation and no over- or under-utilisation of resources.⁹ The neutral real rate cannot be observed directly and must be derived from other data, with all the uncertainty that entails.

As has been widely discussed, the downward trend in neutral interest rates is a long-running global phenomenon, driven by factors including population ageing and slower productivity growth, that is generally expected by forecasters and financial markets to persist for some years to come.¹⁰ In combination with low inflation and expectations of low inflation over the medium to longer-term, this has translated into low policy interest rates, leaving central banks little room to cut interest rates when required. For example, in responding to the COVID-19 pandemic, central banks found they could not provide the desired stimulus through the conventional route of interest rate cuts because their policy rates had been taken to levels regarded as their effective lower bound.

⁸ See Monetary Policy Statement, August 2021 <https://www.rbnz.govt.nz/monetary-policy/monetary-policy-statement/mps-august-2021> for recent estimates of New Zealand's nominal neutral interest rate. An assessment of longer-term inflation expectations is necessary to estimate the real neutral rate that is most relevant for setting monetary policy.

⁹ This definition implicitly assumes that there is a corresponding neutral level for the exchange rate, such that the exchange rate neither adds to, or subtracts from, aggregate demand, and that the exchange rate is at its neutral level. See Archibald and Hunter (2001) for a discussion.

¹⁰ Over longer horizons the debate is far from settled. Auclert et al (2021) provide a recent review of the literature on the macroeconomic effects of demographics. Goodhart and Pradhan (2017) argue that the downward trend in interest rates will soon reverse. The potential impacts of climate change on inflation are discussed in the Reserve Bank of New Zealand's Monetary Policy Statement, November 2021 <https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Monetary%20policy%20statements/2021/mpsnov21.pdf?revision=50077469-2ebb-444f-a893-216dc1509866>

The effective lower bound on interest rates presents a problem because the option of holding cash (with zero nominal return) provides depositors an alternative to paying others to keep their money. This sets a floor on how far deposit rates can fall and a technical minimum rate, the ELB, which overseas experience shows may be below zero. That is, a number of central banks have utilised negative interest rate policies to lower the ELB and increase monetary stimulus. In their review of this experience, the IMF observe that the effects of negative interest rates may be comparable to those of conventional interest rate cuts or of other unconventional policies, and that it remains an open question how negative rates could become before adverse effects undermine the policy.¹¹

...reducing the scope to cut interest rates...

Typically, in periods of weak demand, the central bank will seek to steer the real policy rate below the neutral rate by lowering its short-term nominal policy rate. It is useful to think of the neutral rate as comprising a trend or long-run component and a short-term or cyclical component. While both are important for the likelihood of the ELB, they are usually influenced by different factors that are best addressed through different policies. The falling trend component reflects global forces driving higher desired saving and reducing desired investment: ageing populations, slower trend productivity growth, and increased demand for safe and liquid assets.¹² The cyclical component is driven by unexpected changes in economic conditions, or shocks, such as those driven by the pandemic, sharp changes in commodity export prices or by financial disruptions. For example, the cyclical component dropped sharply following the GFC as uncertainty increased the demand for saving and reduced the demand for investment.¹³ In addition, the difficulty of tracking the neutral rate when setting policy is exacerbated by shifts in inflation expectations, highlighting the importance of stable inflation expectations.

Stable inflation expectations are critical

Interest rates need not be at the ELB to impair monetary policy. When rates are close to the ELB, the public may anticipate that monetary policy will be constrained in the future and build ELB episodes into their expectations of future inflation. The reduction in inflation expectations reduces the neutral policy rate and therefore the scope for monetary policy to respond to a downturn in demand, which risks amplifying the fall in output.¹⁴

To mitigate the risks posed by the ELB, one strategy central banks have used is to continue to communicate with the public how policy will respond to current economic conditions. Central banks use “forward guidance” to describe the evolution of interest rates in the period ahead. When used as an alternative monetary policy tool, forward guidance can increase stimulus by providing a pre-commitment to maintaining an announced policy path for a

¹¹ See IMF (2021). Estimates of the ELB under negative interest rate policies vary across jurisdictions, from around -0.5% in Canada, the US, and the euro area to about -1.5% in Sweden and Denmark.

¹² Gamber (2020) provides an overview of the drivers.

¹³ It is less clear what impact the COVID-19 pandemic has had. Woodford (2021) observes that the effects of the pandemic on output have been uneven, with public health measures affecting some sectors much more than others. The impacts of monetary stimulus are therefore also uneven and may drive an inefficient use of resources in some sectors. Jorda, Singh and Taylor (2020) find that pandemics can depress the neutral rate for decades after the pandemic has passed.

¹⁴ Clarida (2021), Vice Chair of the Board of Governors of the Federal Reserve System observes that the downward bias in inflation expectations associated with ELB encounters was a critical consideration in the Federal Reserve’s new policy framework.

certain period or until some specific economic conditions are achieved, particularly when it signals that rates will be lower than otherwise. Expectations of lower future settings of the policy interest rate flow through to longer-term rates, reduce real interest rates and put downward pressure on the exchange rate. In addition, forward guidance can reduce uncertainty about future policy rates, decreasing the term premium on longer rates. Overall, forward guidance helps prevent inflation expectations from falling and helps ensure real interest rates and the real exchange rate provide the intended stimulus to activity.

Forward guidance is typically used in conjunction with other alternative monetary policy tools such as quantitative easing. This makes it difficult to isolate its impacts, but central banks are of the view that forward guidance has worked “reasonably well” over the past decade or so.¹⁵ Forward guidance can also be used in conjunction with stimulatory fiscal policy to reinforce the commitment to higher inflation in the future.

...and increasing the risk of prolonged recessions

For a small commodity exporting economy like New Zealand, international developments are particularly important in influencing domestic demand conditions. Weaker demand for New Zealand exports directly reduces exporter incomes and their demand for goods and services, including that sector’s demand for labour and capital. Typically, the exchange rate would depreciate as overall demand for New Zealand resources and assets wanes in anticipation of lower returns¹⁶. To the extent that the exchange rate depreciates, it supports demand and incomes in the export sector, but this effect is dampened by upward pressure on the price of imported goods for all sectors. Overall, the currency depreciation helps to cushion the impacts of weaker international demand on domestic output and prices.

When inflation expectations remain stable, it is less likely that the effects of weaker international demand will spill over into wage and price setting behaviour that requires a monetary policy response. But as noted earlier, when monetary policy is constrained by the ELB, the risk of a decline in inflation expectations is greater. Should this risk eventuate, real interest rates would rise, and the exchange rate would appreciate, amplifying the downturn in activity. Moreover, when the central bank is not able to lower its policy rate, it is not able to reduce interest rate differentials with other countries, which may limit the extent of the exchange rate decline, and therefore the degree of the cushioning effect.¹⁷

Overall, an environment of low interest rates and constrained monetary policy headroom raises the risks of poor economic outcomes. Expectations of a prolonged period of weak growth and elevated unemployment may cause inflation expectations to fall well below the mid-point of the Reserve Bank’s 1% to 3% inflation target, leading to a substantial rise in shorter-term real interest rates. This rise encourages household saving, reduces investment demand and limits the decline in the exchange rate, which exacerbates the fall in output and expected inflation – the economy risks entering a deflationary spiral. When the negative shocks are particularly severe and monetary policy is constrained, the long-run growth potential of the economy could be impaired, and the neutral rate lowered further, through hysteresis effects (eg, Summers 2014). To address these risks, policymakers have turned to alternative monetary policy tools and fiscal policy.

¹⁵ BIS (2019). Bernanke (2020) discusses the effectiveness of forward guidance in the US.

¹⁶ Mabin (2010) discusses drivers of the exchange rate in more depth.

¹⁷ Cook and Devereux (2013) explore implications of the ELB in open economies with floating exchange rates.

The fiscal multiplier...

Internationally, interest in the role of fiscal policy to stimulate aggregate demand has been greatly increased by encounters with the ELB in the wake of the global financial crisis. A considerable body of research has sought to identify what factors determine how much output will increase in response to an increase in the fiscal deficit, that is, the size of the fiscal multiplier.¹⁸

The fiscal multiplier is a summary measure of the change in output caused by a \$1 change in the fiscal balance. A multiplier of one implies that the fiscal stimulus flows through in its entirety to real GDP. The multiplier may be calculated over different periods of time. For example, it can be calculated for the period (usually three months) the stimulus is introduced (the impact multiplier), for the period when it has its peak impact (it may take some time to fully implement a measure), or as the cumulative effect over a number of quarters. For stabilisation policy, the relevant multiplier is the cumulative impact of fiscal stimulus on output over one to two years.

...is smaller when the exchange rate is flexible...

In a small open economy with a floating exchange rate, such as New Zealand, the conventional wisdom is that fiscal multipliers will be closer to zero than one.¹⁹ Theory suggests that under a floating exchange rate, an increase in government spending that drives up employment and incomes puts pressure on prices and interest rates to rise, which in turn triggers capital inflows and appreciates the exchange rate. The higher interest rates reduce domestic demand, and a stronger exchange rate reduces export incomes, which reduces the effects of the initial stimulus on activity. The main impact of the fiscal expansion is a different composition of demand with increased government spending offsetting lower private investment and weaker exports.

...but other characteristics are also important

However, the exchange rate regime is only one of a number of factors that influences the effectiveness of fiscal stabilisation. The IMF (2014) identify seven factors that influence the impact of fiscal policy on activity. These features include the openness of the economy to international trade, the type of fiscal instrument that changes (transfers, taxes or spending), the degree of spare capacity in the economy, the level of public debt, how the fiscal effects are distributed across the economy, and the response of monetary policy, including whether policy is constrained by the ELB.

The international research has produced a wide range of multiplier estimates, reflecting the complex web of public policy behaviours and private sector responses, and differing views about how best to capture these interactions in an economic model.²⁰ Nonetheless, Ramey (2019) observes that, over the past decade, researchers have made progress in narrowing the range of views, particularly as it concerns government spending on goods and services,

¹⁸ Gechert and Rannenberg (2018) undertake a meta-analysis and find that across all studies average multiplier estimates at the one-year horizon are close to 1 for public consumption and investment spending, although there is a large degree of variation. Multiplier estimates for taxes and transfers are about 0.25, on average.

¹⁹ In their study of 44 countries, Iletzki et al (2013) conclude that the fiscal multiplier is zero in economies operating under flexible exchange rates. Born et al (2013) provide corroborating evidence. Corsetti et al (2011) present the theoretical case.

²⁰ See for example, Iletzki et al (2013) and Gechert and Rannenberg (2014).

and transfers. However, there is less agreement on the impacts of changes in taxes and public investment spending.

For New Zealand, Lyu (2021) reviews several earlier studies that show fiscal policy can be effective in raising output in the short-term. He finds fiscal multipliers on government consumption of 0.4, 0.3 and 0.1 at the 1-year, 2-year and 3-year horizons respectively, with negative multipliers thereafter. Multipliers for investment spending are larger, at 1.4 in the first year and over 2 in the second and subsequent years. However, similar to Ramey, the evidence on the effects of government consumption spending is more compelling than for other types of stimulus. Moreover, as noted by Bernstein et al (2021), in practice it can be difficult to significantly increase (or decrease) direct government spending in a timely manner.

Indeed, an important insight from the research is that there is no single fiscal multiplier, rather it is dependent on the characteristics of the economy at the time, the type of spending or tax that changes, who the policy affects, and conditions in the economy when it changes.²¹ In particular, the response of monetary policy is an important determinant of the effects of fiscal policy. Researchers generally agree that the effects of fiscal policy will be larger for any given policy change and circumstance when it is accommodated by monetary policy, such as at the ELB.

The fiscal multiplier at the ELB: Theory

One of the leading theories to explain why fiscal multipliers may be larger at the ELB comes from structural New Keynesian economic models as demonstrated by Eggertson (2011), Woodford (2011) and Christiano et al (2011).²² These models assume that prices are sticky so that output is primarily demand determined in the short run (the Keynesian contribution). They also feature forward-looking behaviour, so that households' and firms' actions today depend on their expectations of the future. Thus, households that expect lower income in the future will try to save today. In terms of fiscal policy, this means that when households expect higher taxes or fewer government services in the future, they will tend to work more and to save more. Consequently, over the longer term, changes in fiscal policy also affect the supply-side of the economy, or the amount of capital and labour employed, through these impacts on the incentives to work, save and invest (the new classical contribution). In this theory, real interest rates are the primary nexus through which fiscal and monetary policy interact. As discussed earlier, in normal times, monetary policy will tend to offset the inflationary pressures created by fiscal stimulus by raising the nominal interest rate, which flows through to higher real interest rates and a higher exchange rate. However, when the economy has significant spare capacity and the scope to reduce interest rates is constrained by the ELB, the fiscal stimulus feeds through into higher demand which raises inflation expectations and thereby lowers real interest rates and depreciates the real exchange rate. The stimulatory effects of the lower real rates on private spending leads to a further increase in output and expected inflation and a further decline in the real interest rate. The net result is a large rise in output and a stabilisation of expected inflation. In effect, accommodative monetary policy complements the effect of fiscal stimulus in mitigating the downward adjustment in inflation expectations that may occur at or near the ELB and helps to alleviate the risks of larger falls in output and employment.

²¹ New Zealand studies, including Lyu (2021), use time invariant models. As the economy has experienced significant structural changes, including a persistent decline in neutral interest rate, it may be useful to analyse fiscal policy using time varying models (eg, Del Negro and Primiceri, 2015), which incorporate structural changes.

²² Another leading theory is the fiscal theory of the price level, see for example Sims (2016).

An important caveat in this literature is its focus on changes in economic conditions that are driven by shifts in domestic aggregate demand (that is, preferences for consumption and investment) and in international demand (the terms of trade). Monetary policy is most effective in responding to these types of events, and a floating exchange rate provides an additional buffer. It is generally less effective when dealing with contractions caused by a loss of productive capacity, such as natural disasters, or lockdowns, as in the case of the current pandemic. When the supply of goods and services is unexpectedly disrupted, fiscal policy can be designed to support those most affected and can be tailored to different household types, businesses and regions. In contrast, monetary policy is a much blunter tool with largely indirect effects. Nevertheless, both monetary and fiscal policy have essential roles to play in addressing both the immediate impacts of a severe crises that disrupts activity and impairs financial market operations, and the subsequent objectives of achieving the inflation target and returning to full employment.²³

The size of the fiscal multiplier depends on the details of the stimulus...

As noted earlier, the effectiveness of fiscal stimulus at the ELB depends on the details of the stimulus, including the types of spending or taxes that change, the duration of the ELB episode and the monetary policy response afterwards. For example, Eggertsson (2011) observes that fiscal policies, such as government consumption spending (including health, education, and law and order), that directly stimulate aggregate demand have a greater impact on output because they have a larger impact on inflation expectations and thus real interest rates. In contrast, policies that directly stimulate supply, such as personal and corporate income tax cuts have weaker effects. Personal income tax cuts raise disposable incomes, which supports demand, and at the same time they increase the returns from work, which encourages people to work more. The increased supply of labour puts downward pressure on real wages, which partly offsets the effect of increased demand on inflation and inflation expectations. The lesser impact on inflation expectations results in a relatively higher real interest rate, which reduces the overall impact on demand. Corporate income tax cuts have similar implications for output and inflation: at the ELB, the anticipated expansion in business investment raises demand, but at the same time it expands the economy's productive capacity, which dampens inflation expectations. Consequently, real interest rates are higher than otherwise and the multiplier effect is reduced.²⁴ These effects are peculiar to the ELB environment, which highlights the value of theoretical models in circumstances where there is limited experience to draw upon.

...direct spending and targeted transfers have the largest impacts...

Coenen et al (2012) compare the short-run effects of different types of spending increases, tax cuts and higher transfers on the fiscal multiplier across a range of structural models used by central banks, the IMF and the OECD. Consistent with the theoretical literature, they find that all instruments raise output in the short-term and that the effects increase markedly when monetary policy is constrained at the ELB for a prolonged period, except reductions in labour and corporate income taxes.

²³ Dong et al (2021) and English, Forbes and Ubide (2021) discuss central bank responses to the pandemic.

²⁴ In Eggertsson's model, cuts in labour taxes reduce output at the ELB, as do cuts in capital taxes, which may not be realistic. This is driven by assumptions in the relatively simple model, including the absence of financially constrained households.

Their work shows that government spending on both consumption and investment are the most effective means to raise output, especially in circumstances when monetary policy remains at the ELB for a period of at least two years.²⁵ The longer period at the ELB allows for a more persistent reduction in real interest rates that flows through into higher output, which illustrates the sensitivity of the fiscal multiplier to monetary policy actions.

In most models, targeted transfers to financially constrained households are only slightly smaller than for government spending.²⁶ They give two reasons for this lower effectiveness, first consumption taxes and income taxes reduce the purchasing power of the transfers and second, the higher income may reduce labour supply, reducing the output gain but increasing the inflationary effects. Overall, the effectiveness of government spending and targeted transfers reflects the direct impact on demand that government spending has, and the very strong link between income and consumption of the targeted households.

In contrast to financially constrained households, non-constrained households will tend to save some proportion of a temporary increase in transfers, reducing the relative effectiveness of a more general increase in transfers. The relative shares of these households in the economy are therefore a critical determinant of the effect on output from a broad-based increase in fiscal transfers.

Temporary cuts in consumption taxes, such as GST, have similar impacts as personal income tax cuts as the effects on consumption are greatest for lower income, financially constrained households. Higher income households are more likely to save the gains, reducing the effect on consumption.

The output effects of temporary labour tax cuts tend to be small, reflecting the dampening supply-side effects on the boost to income discussed above. Temporary corporate income tax cuts tend to be the least effective because the duration of the stimulus period is generally too short to have a significant impact on expectations of future earnings over the period required to justify large increases in investment. Moreover, firms may find it challenging to implement large capital projects within the available window.²⁷

In comparing multipliers across countries, they highlight the sensitivity of the multiplier to the degree of openness to international trade and to the responsiveness of inflation to changes in output. They find that multipliers are larger in more closed economies and when inflation is more responsiveness to increases in output. If inflation is fairly sensitive to changes in demand, fiscal stimulus will result in a larger reduction of the real interest rate and bring a larger real depreciation.

²⁵ Government investment multipliers tend to be somewhat larger, reflecting their small but positive supply side effects.

²⁶ Often called liquidity constrained or “hand to mouth” households, the key characteristic of these households is that they have limited capacity to use financial markets to save or borrow to help smooth adjustments in consumption when income varies.

²⁷ In contrast, Ramey (2019) concludes that fiscal stimulus may be more effective when it relies on tax cuts rather than increases in expenditure. However, her survey draws on studies in all periods, not just those when policy is at the ELB.

...and their duration

The persistence of the fiscal expansion also affects the effectiveness of the stimulus. For example, a fiscal expansion that lasts two years has a greater impact on output in the first year than a one-year fiscal expansion because it creates additional inflationary pressure, which causes a stronger reduction in real interest rates. Critically, the value of the multiplier also depends on how much spending occurs in the period when the ELB is binding. When normal monetary policy resumes, a higher level of government spending will crowd out private spending and exports and reduce the multiplier. This point reinforces the earlier caveat of the challenges associated with the use of government consumption and infrastructure spending as a counter cyclical tool. On the other hand, experience has shown that changes in taxes and transfers can be implemented swiftly.²⁸

In addition, there is a balance to be reached between prolonged fiscal support and perceptions that the support will not be unwound. There is a risk that if fiscal support becomes too persistent, households will anticipate future fiscal contractions that causes them to raise their saving today.

Expectations of the response of the central bank when the recession ends can also affect the size of the fiscal multiplier. Hills and Nakata (2018) show that expectations of the central bank's policy can have a large effect on model-based estimates of fiscal multipliers. They argue that when fiscal policy increases output and inflation during the recession it brings forward expectations of monetary policy tightening, which dampens the expansionary effect of fiscal stimulus by holding down inflation expectations. In contrast, if the central bank looks through the effects of fiscal policy, it will adjust its policy rate more slowly, perhaps in partial compensation for the period when rates were constrained by the ELB. They argue that the latter policy characterises the US Federal Reserve's commitment to allow inflation to rise above target before adjusting interest rates.

Long-run implications

Because households and firms are forward looking, the impact of fiscal stimulus depends not only on the short-term tax and spending policies but also on expectations about future policy settings. Corsetti, Meier and Muller (CMM, 2009) argue that expectations of tighter fiscal policy in the future creates expectations of lower future short-term interest rates which affects longer-run rates today. Thus, a fiscal policy that contains a commitment to respond to rising public debt may further enhance the expansionary impact of short-run fiscal stimulus.

The argument made by CMM is similar to the difference between permanent and temporary fiscal stimulus above. Coenen et al observe that a permanent spending increase has a lower short-run multiplier and has a negative long-run impact. In their study, a permanent increase in government spending requires higher taxes over the long run, which reduces the expected value of future wealth and leads households to reduce current spending and work more, and firms to reduce investment. This wealth effect lowers the short-run boost to output and eventually leads to lower long-run output. In addition, taxes that have a distortionary effect on incentives to work and invest reduce the labour supply and lower capital accumulation in all periods, which has a cumulatively large negative impact on output over the long run.²⁹

²⁸ Bernstein et al (2021) discusses options for discretionary or semi-automatic stimulus measures in New Zealand.

²⁹ Uhlig (2010) and Drautzburg and Uhlig (2011) argue that although fiscal multipliers may be positive in the short-run, distortionary taxes can reduce long-run economic growth and outweigh the short-term benefits.

A permanent increase in public debt can have similar effects, particularly if the costs of servicing the increase in debt are met through distortionary taxes. An increase in the risk premium on public debt can also reduce the multiplier effect as it raises expectations that fiscal tightening will be required, potentially offsetting the short-term stimulus effects.

Sims (2016) observes that in the US, Europe and Japan, where monetary policy was constrained by the ELB following the GFC, concerns over excessive public debt drove expectations of future fiscal contraction and blunted the contribution of fiscal stimulus to increased inflation and output. He argues that a government's commitment to fiscal contraction needs to be conditional on reaching and maintaining inflation targets and that it is important to see inflation as the outcome of interactions between decisions about monetary policy and fiscal policy. That is, the combined support of fiscal and monetary policy for the inflation objective will provide the best outcomes.³⁰

New Zealand research...

Although there are several empirical studies of fiscal multipliers when monetary policy is unconstrained, estimates of multipliers at the ELB necessarily come from model-based simulations.³¹

For New Zealand, model simulations by Murray (2013) and the IMF (2019) consider the effects of fiscal policy when the policy rate is constrained by the ELB. Murray shows that a fiscal contraction has a much greater impact on output when monetary policy cannot offset the impact. He also shows that the size of the output effects tend to be larger the more the fiscal measures affect financially constrained households, given their higher propensity to spend.

The IMF use their large scale, multi-country economic model, calibrated to New Zealand conditions. They compare fiscal multipliers for the seven instruments described above under normal monetary policy conditions with those where the ELB binds for two years. Similar to the study of Coenen et al, the IMF simulations show how the size of the multipliers depends on the instruments used and on other features of the economy, particularly the share of financially constrained households that spend all the income gains they receive from a fiscal expansion. The results are consistent with those discussed in the New Keynesian literature above.

...is consistent with larger multipliers at the ELB

The IMF find output multipliers are roughly 15% to 20% larger at the ELB than in normal times. This is smaller than in many other advanced economies, reflecting the small, open nature of the economy, including the relatively high degree of import penetration.

The order of the multipliers, from largest to smallest, is similar to those in Coenen et al. The public investment multiplier is close to 1 at the ELB, higher than public consumption, partly reflecting the positive impact it is assumed to have on productivity. Public consumption has the second largest multiplier (0.8) because it directly increases demand for resources as well

³⁰ Bianchi, Faccini and Melosi (2020) also suggest that, in response to a significant increase in debt, there is merit in a coordinated monetary and fiscal strategy to inflate away a fraction of debt through a controlled rise of inflation.

³¹ See Lyu (2021) and the references therein for a summary of empirical NZ research on fiscal multipliers.

as indirectly supporting output. Targeted transfers to financially constrained households have a greater impact (0.5) than transfers to all households (0.1). Multipliers from changes in personal income tax and GST (both 0.3) change little at the ELB, as households that can, save the benefits and smooth their consumption over time. Corporate income taxes have a multiplier of 0.4 in this model, roughly double the estimate when the ELB does not bind.

The wage subsidy programme implemented as part of the response to the COVID-19 pandemic, alongside a range of other monetary and public policy supports, has played a vital role in New Zealand's economic resilience. Identifying the contribution of each policy measure is a challenge for future research. That task is further complicated by the interactions between policies that enhance their effectiveness when used jointly.

Next steps

International research shows that fiscal policy has an important role in supporting the economy when monetary policy is constrained by the lower bound. When conventional monetary policy support is constrained by the ELB, the economy becomes vulnerable to the risks of a downward spiral in output and inflation. Fiscal stimulus supports activity and employment and helps to stabilise inflation and inflation expectations, which promotes the recovery.

Japan's experience may be a useful guide to the effectiveness of fiscal policy under the ELB. Japan's policy rate has been near zero for more than twenty years and the country has experienced both recession and boom during ELB episodes. Miyamoto et al (2018) analyse the effects of Japan's fiscal policy under the ELB constraint and, consistent with the discussion in this note, they find that the inflation expectations channel is more pronounced under the ELB constraint.

The effectiveness of fiscal stimulus depends on the details of how it is delivered in the short-term and on expectations of future fiscal settings over the longer-term. It also depends on the expected response of monetary policy. Central banks have developed tools other than the short-term interest rate that they can use to promote activity and demonstrate their commitment to achieving their mandates, such as large-scale asset purchases and forward guidance. Better understanding how these tools interact with fiscal policy would be an important next step.

While forward guidance is typically discussed in the context of monetary policy, forward guidance can also be used in fiscal policy to reduce uncertainty and improve transparency. Some recent papers look at fiscal forward guidance (eg, Fujiwara and Waki, 2020), and it may be an interesting area to explore further.

Structural models, like those that underpin the New Keynesian framework, can provide a useful benchmark for further evaluating the way fiscal and monetary policies interact at the ELB. Structural models can draw out the relative importance of different characteristics of stimulus measures, including its duration and how it is distributed across different types of households, especially in an environment where policy is conducted differently than in the past. In addition, they can be adapted to capture the unique attributes of an economy. In New Zealand's case, this would include the role of housing assets, which is absent in the studies surveyed here.

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