

Workman, Miles

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Estimating the Cyclically- and Absorption-adjusted Fiscal Balance for New Zealand

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Estimating the Cyclically- and Absorption-adjusted Fiscal Balance for New Zealand

Miles Workman

New Zealand Treasury Working Paper 15/09

June 2015



New Zealand Government

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Estimating the Cyclically- and Absorption-adjusted Fiscal Balance for
New Zealand

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AUTHOR

Miles Workman
The Treasury
PO Box 329
Wellington
New Zealand
Email Miles.Workman@treasury.govt.nz
Telephone 64-4-890-7417

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NZ TREASURY

New Zealand Treasury
PO Box 3724
Wellington 6008
NEW ZEALAND
Email information@treasury.govt.nz
Telephone 64-4-472 2733
Website www.treasury.govt.nz

Abstract

Indicators of the structural fiscal balance help inform assessments of the sustainability of fiscal settings and identify shifts in discretionary fiscal policy. The Treasury's headline structural fiscal balance indicator – the cyclically-adjusted balance (CAB) – is estimated by removing the cyclical component of the budget balance from the government's operating balance. The cyclical component is estimated by adjusting for fluctuations of actual GDP around potential GDP via the output gap. However, this approach does not take account of the composition of GDP. A boom in domestic demand – an absorption boom – will have a more pronounced impact on fiscal revenues than a boom driven by external demand (ie, net exports). This is because some components of demand are more “tax rich” than others. In particular, indirect tax revenues are closely linked to domestic demand rather than output. This paper documents the nature of the absorption cycle in New Zealand and then quantifies its effect on fiscal revenues by estimating a new structural fiscal balance indicator – the cyclically- and absorption-adjusted balance (CAAB) – over the period 1997-2019. This indicator extends the existing CAB by adjusting for deviations in the level of domestic absorption from its long-run equilibrium level, which is in turn derived with reference to estimates of the long-run equilibrium current account balance. The estimated absorption adjustment on New Zealand's structural fiscal balance is up to 0.4 percent of GDP. This adjustment is reasonably material given conventional cyclical adjustments average 0.5 percent of GDP for New Zealand.

JEL CLASSIFICATION

E62 – Fiscal Policy

H62 – Budget deficit; surplus

KEYWORDS

fiscal policy; business cycle; absorption; structural balance

Executive Summary

Separating both the cyclical component and any one-off shocks from the budget balance provides an estimate of the structural balance. This is used to help inform assessments of the sustainability of fiscal settings and identify shifts in discretionary fiscal policy. The Treasury currently estimates a cyclically-adjusted balance (CAB) by removing the impact of the Canterbury earthquakes from the operating balance before gains and losses (OBEGAL) and adjusting for fluctuations of actual GDP around trend GDP via the output gap. Cyclical expenses are generally those associated with unemployment as a booming economy (for example) is less likely to have high unemployment and therefore high unemployment benefit expenditure. Cyclical revenues, during the same part of the cycle, are those resulting from higher direct taxes as a result of higher employment, and higher indirect taxes as domestic expenditure rises with incomes and the economic cycle.

A cyclical adjustment based solely on the output gap could overstate the structural balance when macroeconomic imbalances arise. When the domestic economy (absorption) is booming relative to a country's trading partners, net exports will decline as imported consumption and investment rise relative to exports. An absorption boom can be expected to be associated with both widening current account deficits and higher temporary indirect tax revenues – mainly goods and services tax. The current account can therefore be used to help identify periods when the absorption and output cycles deviate. Given net exports are counter-cyclical, an estimate of the structural balance based on the output gap alone could overlook non-structural indirect tax windfalls.

Following the methodology set out by the European Commission (EC) this paper identifies periods of absorption booms in, and estimates the cyclically- and absorption-adjusted balance (CAAB) for, New Zealand. This attempts to correct for macroeconomic imbalances by estimating an absorption gap and linking it to indirect tax revenue. Direct taxes are associated with income and therefore remain linked to the output gap. The absorption gap is estimated by adjusting the output gap for deviations in the current account from its estimated norm.

Based on criteria outlined by the EC, absorption booms are identified during the mid-2000s. These coincide with widening current account deficits and therefore an absorption gap that deviates from the output gap. An absorption adjustment impacts the structural balance estimate by up to 0.4 percentage points. This is significant given the average difference between the earthquake-adjusted OBEGAL and CAB, over the period 1997 – 2019, is around 0.5 percentage points. However, the literature suggests that compared to some EU economies this impact is small.

Having regard to the absorption cycle when estimating the structural balance provides policy makers with additional information when assessing the fiscal stance and the sustainability of discretionary policy. Identifying all forms of temporary revenues is likely to assist with policy formation that leans against the wind more effectively than otherwise, reducing the risk of a sharp fiscal adjustment during an economic downturn.

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Estimating the Cyclically- and Absorption-adjusted Fiscal Balance for New Zealand

1 Introduction

The actual budget balance is a useful indicator for assessing the fiscal stance. However, because it is a function of the relative position of the economic cycle and significant one-off shocks, using it can prejudice a fair assessment of the sustainability of discretionary policy settings. If the economy is experiencing an economic boom, tax revenues are generally high and expenditures low as automatic stabilisers adjust. During a boom, temporary revenue windfalls that are mistaken as permanent could lead to discretionary policy decisions that are unsustainable over the medium term. Having regard to the structural balance can assist policy makers by reducing the risk of a sharp adjustment to fiscal settings when the economy enters a downturn.

The structural balance is estimated by removing significant one-off shocks and cyclical influences from the actual budget balance, leading to an indicator better suited for assessing the sustainability of discretionary policy settings. Treasury currently estimates a cyclically-adjusted balance (CAB).¹ This strips out the impact of the Canterbury earthquakes on the operating balance before gains and losses (OBEGAL) and adjusts for fluctuations of actual GDP around potential GDP via the output gap.²

To gain a well informed view of the structural balance, Treasury's strategy is to estimate a headline CAB and supplement this with various extensions including an adjustment for the terms of trade, output gap sensitivities, and probability distribution around central forecasts to address uncertainty.³

The *External Review of the Treasury's Fiscal Policy Advice* suggested Treasury investigate the impact of absorption on the structural balance, in addition to the current suite of additional fiscal indicators.⁴ An absorption adjustment attempts to correct for the composition of output when macroeconomic imbalances develop. Adjusting for the

¹ The Treasury follows a similar methodology set out by the OECD (Girouard and Andre, 2005) and IMF (Hagemann, 1999; Bornhorst *et al.* 2011).

² The OBEGAL is an overall balance (not a primary balance) that includes net investment income. Net investment income is not cyclically adjusted when estimating the CAB.

³ See Parkyn (2010), Treasury Working Paper 10/08 for detail on extensions to the CAB. The CAB and various extensions are published as part of the Additional Information Section of the *Economic and Fiscal Update*. For the *Budget Update* see <http://www.treasury.govt.nz/budget/forecasts/befu2015/098.htm>.

⁴ The review is available online at <http://www.treasury.govt.nz/publications/informationreleases/fiscalpolicyadvice>.

composition of output is likely to matter when different components of revenue are linked to different economic bases. The cyclically- and absorption-adjusted balance (CAAB) has been developed to provide a way of dealing with some of the movements within GDP by splitting tax revenue into its two largest sub-components (direct and indirect) and linking them to their relevant output gaps: the traditional output gap for direct taxes, and the absorption gap for indirect taxes.⁵ This assumes direct taxes are related to income and indirect taxes – constituted mainly by goods and services tax (GST) – are related to domestic activity (exports being exempt and imports being taxed). When absorption considerably deviates beyond its estimated potential level, a cyclical adjustment alone will overestimate the structural balance as a portion of indirect tax revenues are misidentified as structural. This is likely to have material implications for the CAB during the mid-2000s which was characterised by a booming housing market, fast consumption growth, and widening current account deficits. It could also have implications moving forward with the residential investment boom associated with the Canterbury rebuild. Two stylised facts (both evident in New Zealand data) support this theory: indirect taxes are a significant portion of total tax revenue, and net exports are counter-cyclical. In other country studies, an absorption adjustment has been found to vary the estimate of the structural balance between 0.2 – 3.0 percentage points (Lendavi *et al.*, 2011; Dorbrescu *et al.*, 2011).

Following the methodology set out by the European Commission (Lendavi *et al.*, 2011), this paper investigates whether New Zealand has had significant absorption cycles over the period 1992 – 2014. It then investigates the impact an absorption adjustment has on the structural balance by estimating the CAAB for New Zealand.

Calculating the CAAB requires the estimation of an absorption gap in addition to the output gap. The absorption gap is generally estimated in the literature from balance of payments fundamentals and the notion of a current account norm, which itself can be estimated a number of ways. The current account norm presented here is estimated based on stability assumptions around the Net National Investment Position (NIIP) and the long-run nominal GDP growth rate. The absorption gap is estimated by adjusting the output gap for deviations in the current account from the norm.

The remainder of this paper is structured as follows: Section two presents some stylised facts about absorption in New Zealand, identifies periods of absorption booms, and discusses how an absorption adjustment can be expected to affect the structural balance estimate. Section three provides a brief review of the literature, outlines the methodology used to estimate the CAAB, provides the results and their implications for fiscal policy, and provides some sensitivity analysis. Section four concludes.

⁵ The absorption gap is estimated to capture the difference between actual and potential absorption. Potential absorption is defined here as the level of absorption that would pursue when output is at potential and the current account is at its norm.

2 Absorption Cycles

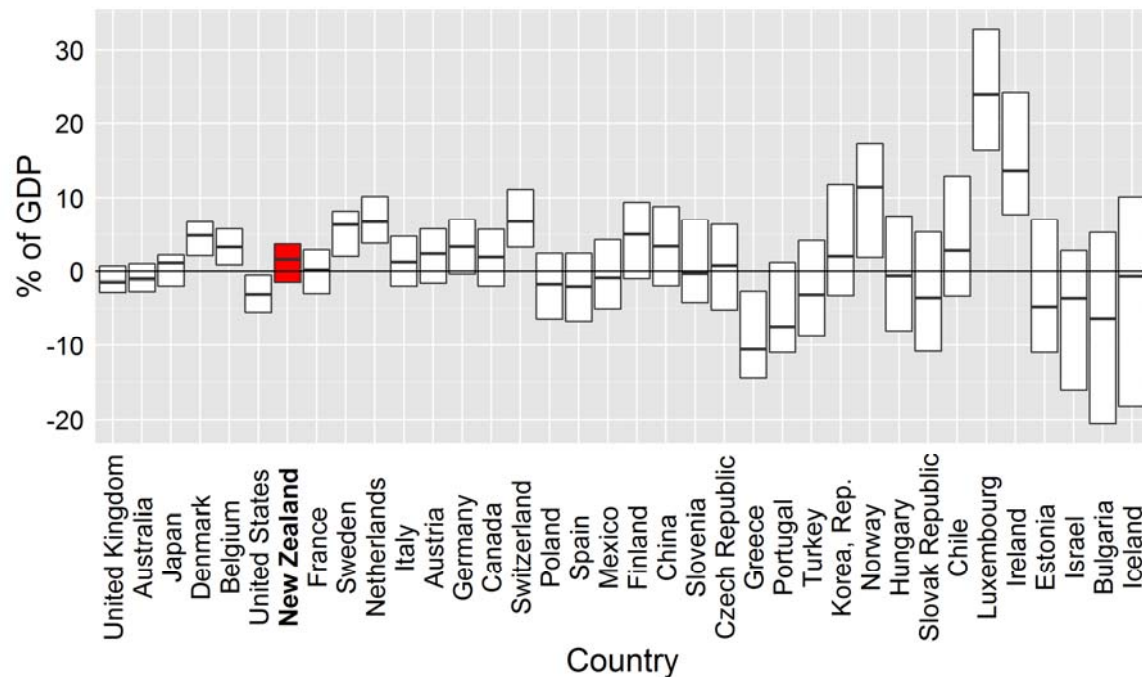
Absorption is a component of GDP

Gross Domestic Product (GDP) is equal to gross national expenditure (GNE) plus net exports. Absorption is GNE, which is defined as total expenditure on final goods and services by New Zealand residents. Absorption cycles are the domestic component of the economic cycle. When domestic demand varies relative to that of a country's trading partners, absorption as a percentage of GDP will vary accordingly. This will be evident in balance of payments data, meaning absorption cycles can be assessed without direct reference to trading partner developments.

Absorption is not a constant share of GDP over time

The components of the national income identity as a percent of GDP move around somewhat over time. Given net exports are generally countercyclical, an economy characterised by volatile net exports can be expected to have volatile absorption relative to GDP. Figure 1 provides an international comparison of net exports of goods and services as a percent of GDP (maximum and minimum) over the period 1992 – 2013. As a measure of volatility, it suggests New Zealand's profile is low by OECD standards, suggesting relatively low absorption volatility.

Figure 1 – Maximum and minimum net exports (in order of range, 1992 – 2013)



Source: World Bank data, author calculations

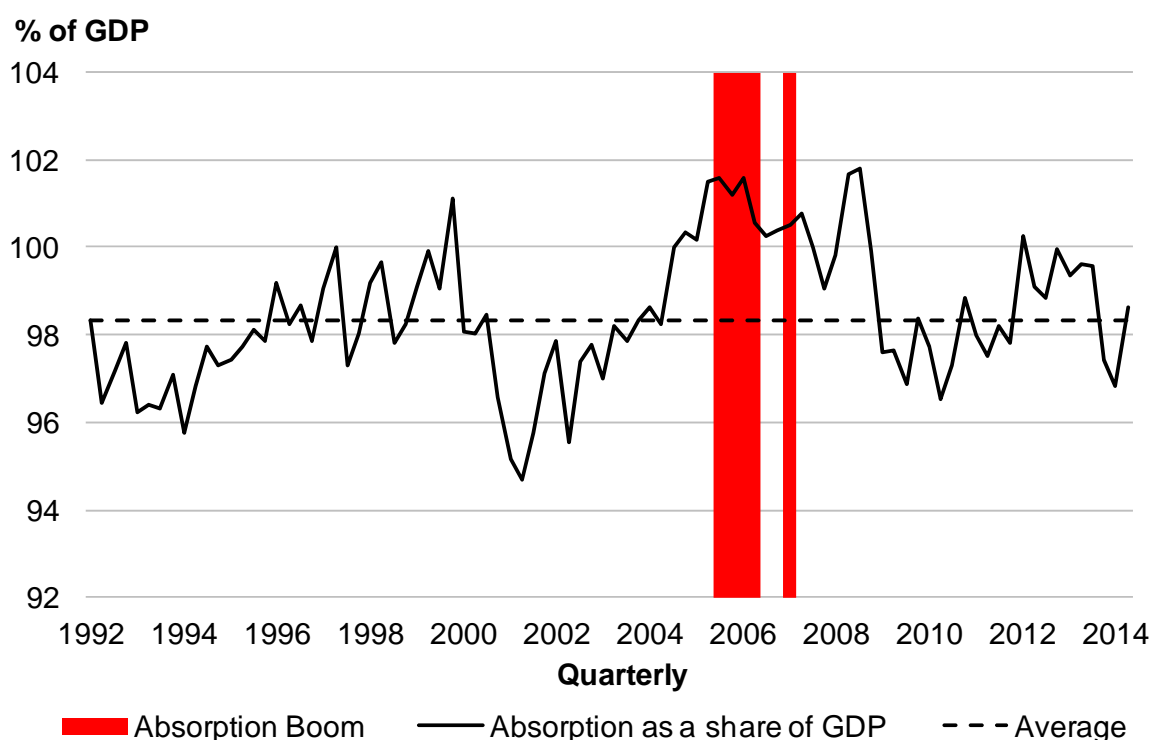
A small negative contemporaneous correlation between the trade balance of goods and services and nominal GDP growth supports the claim that New Zealand's net exports are countercyclical. One explanation for this is imperfect consumption smoothing and imperfect flows of capital leading to procyclical imports. If this dynamic holds, an

absorption boom would be associated with higher imported consumption and/or investment relative to exports, causing net exports to fall.⁶

Absorption booms in New Zealand

The European Commission outlines – in a somewhat arbitrary way – two criteria necessary to define a period of absorption boom. The first is that the share of absorption in GDP has increased by more than five percent over a five year period. The second is that absorption reaches a level above 100 percent of GDP (Lendvai *et al.*, 2011). Figure 2 shows this definition applied to nominal seasonally adjusted GNE. It suggests New Zealand was in an absorption boom for the year Q3 2005 – Q2 2006 and in Q1 2007. It also shows that GNE as a percent of GDP remains within four percentage points (\pm) of the long-run average (98.3 percent). The absorption booms identified coincide with widening current account deficits.

Figure 2 – Nominal absorption as a share of GDP



Source: Statistics New Zealand

The periods of absorption boom presented above are not significantly sensitive to either of the two criteria that define a boom. Lowering the absorption as a percent of GDP indicator to 98 percent (from 100), and the five year growth rate to four percent (from five percent) does not extend the boom periods above or add additional boom periods. However, when the criteria are applied to fiscal year data, no booms are identified as the annualised data has a smoothing affect. This result is not concerning, as when the five year absorption growth rate indicator is set to 4.8 percent, the 2006 fiscal year is identified as an absorption boom period.

⁶ For detail on New Zealand net exports (and current account) dynamics see McKelvie, S. & Hall, V., (2012); Kim, K., Buckle, A., & Hall, V. (1994); Munro, A., & Sethi, R. (2007).

Fiscal revenues are related to absorption

Periods of buoyant absorption have a positive impact on fiscal revenues as accelerated domestic activity translates into higher indirect tax revenues. When the economy is in the upswing of the absorption cycle, a portion of indirect tax revenues will be cyclical. Accounting for these will lower the structural balance estimate. Table 1 provides a correlation matrix of the absorption gap, output gap, total expenses, total revenues, direct taxes and indirect taxes.⁷ It suggests revenues are more related to absorption than to the real economy, but expenses are less related to absorption. The correlation between the absorption gap and indirect taxes is also stronger than that between the output gap and indirect taxes.

Table 1 – Correlation between fiscal aggregates and output gaps

	Absorption gap	Output gap	Total revenue	Total expenses	Direct taxes	Indirect taxes
Absorption gap	1.00	0.88	0.56	-0.16	0.38	0.18
Output gap	0.88	1.00	0.39	-0.43	0.18	0.01
Total revenue	0.56	0.39	1.00	0.49	0.44	0.22
Total expenses	-0.16	-0.43	0.49	1.00	0.42	0.41
Direct taxes	0.38	0.18	0.44	0.42	1.00	0.95
Indirect taxes	0.18	0.01	0.22	0.41	0.95	1.00

3 The Cyclically- and Absorption-Adjusted Balance

3.1 Literature review

The IMF and European Commission have published papers outlining similar methods for estimating the CAAB (Dobrescu *et al.*, 2011; Lendvai *et al.*, 2011). These outline an aggregate approach that can be adapted to incorporate a pre-existing CAB estimate.

For the period 2005 – 2009, Lendvai *et al.* (2011) estimate the CAAB for selected EU economies and find an absorption adjustment causes a deviation from the CAB that ranges between 0.2 – 3.0 percentage points.⁸ The impact on Bulgaria's CAB is the largest (3.0 percentage points) with Latvia second at 1.8 percentage points. The median impact is 0.6 percentage points. The authors show a cyclical adjustment alone can overlook a large part of temporary revenues when the economy is experiencing an absorption boom. They suggest a fiscal stance that ineffectively leans against the wind is likely to contribute to current account imbalances, and an absorption adjustment will provide a better estimate of the structural balance for countries that experience large swings in their current account. The Appendix provides the full results of this study along with the impact on the CAB for each country.

In a cross country analysis of 59 countries over the period 1990 – 2009, Dobrescu *et al.* (2011) find that the inclusion of an absorption adjustment varies the estimate of the

⁷ The output gap used is the Treasury's official 2015 *Budget Economic and Fiscal Update* estimate. For details on the methodology used to estimate the output gap see Szeto (2013). The absorption gap methodology is outlined in Section 3. Revenues and expenses are as a percent of GDP.

⁸ Measured as the average of the absolute value deviation from the CAB over the period 2005 – 2009.

structural balance by up to 1.5 percent of GDP. Further, they conclude that absorption booms can lead to the misidentification of temporary indirect tax windfalls as being permanent and that absorption booms are associated with pro-cyclical fiscal policy. This can be problematic during an economic downturn as expenditure settings may require some adjustment.

Adjusting for output composition is advocated by Bouthevillain *et al.* (2001). Parkyn (2010) estimates an output composition-adjusted structural balance for New Zealand over the period 1997 – 2009 by de-trending individual tax bases and adjusting for deviations from trend with respect to some macroeconomic base – personal income tax with respect to compensations of employees plus entrepreneurial income, for example. This addresses the impact of changing output composition on revenues, but deviates from an estimate based on the output gap, and instead relies on a mathematical filter to detect periods of compositional change. While this approach offers some valuable insights, it lacks a theoretical foundation for its estimate of an equilibrium composition of output. The CAAB attempts to bridge this gap by using the concept of external macroeconomic balance to estimate an equilibrium level of absorption.

3.2 Methodology

Equations 1 – 7 follow the methodology set out by the European Commission. Equation (1) provides an aggregate method for estimating the CAB. For New Zealand, this is the earthquake-adjusted OBEGAL (b/y) adjusted for the relative position of the economic cycle via the output gap ($ygap$), and the standard budgetary sensitivity parameter (λ). To estimate the CAAB, all parameters in Equation (1) are given. CAB is taken from the Treasury's headline estimate, (b/y) and the output gap are taken from latest Treasury actual and forecasts, and λ is backed out given the other variables in Equation (1) are known.

$$CAB_t = (b/y)_t - \lambda_t ygap_t \quad (1)$$

Equation (2) estimates the CAAB by distributing the standard budgetary sensitivity parameter over the output gap and absorption gap ($agap$) via β and γ respectively. The budgetary sensitivity parameter associated with absorption (γ) is estimated as the share of indirect taxes in GDP. Given λ and γ are known, β can be backed out as per Equation (3).

$$CAAB_t = (b/y)_t - \beta_t ygap_t - \gamma_t agap_t \quad (2)$$

Equations (1) and (2) show the CAB and the CAAB differ by the assumption that indirect taxes are linked to the absorption gap. When output and absorption are at their potential levels, the CAAB and CAB will be equal (and equal to the earthquake-adjusted OBEGAL). However, when output and absorption deviate from their potential level by a varying degree, the CAAB will differ to the CAB.

$$\beta_t = \lambda_t - \gamma_t \quad (3)$$

Equation (3) holds given the linearity of the CAB with respect to output and the assumption of unitary elasticity of indirect taxes with respect to absorption.

Equation (4) describes the absorption gap as the difference between actual absorption (a) and potential absorption (a^*) as a share of potential output (y^*).

$$agap_t = \left[\frac{(a_t - a_t^*)}{y_t^*} \right] \quad (4)$$

Equation (5) shows potential absorption is determined by potential output, the current account norm (ca^*) and the income and transfers balance (it). This is a rearranged form of the national income identity which holds given absorption is output less net exports, which can be restated as a function of the current account ($nx = ca - it$). The income and transfers balance is assumed to always be in equilibrium.⁹ The methodology for estimating the current account norm is discussed in detail later in this section.

$$a_t^* = y_t^* - ca_t^* + it_t \quad (5)$$

By substituting Equation (5) into (4), Equation (6) shows an alternative expression for the absorption gap as a function of the output gap and current account gap.

$$\begin{aligned} agap_t &= \frac{y_t - ca_t + it_t - y_t^* + ca_t^* - it_t^*}{y_t^*} \\ agap_t &= \frac{y_t - y_t^* - (ca_t - ca_t^*)}{y_t^*}, \text{ assuming } it_t = it_t^* \\ agap_t &= ygap_t - cagap_t \end{aligned} \quad (6)$$

Equation (7) provides a simplified expression for the CAAB. It shows the CAB and CAAB will differ when the absorption cycle deviates from that of the output cycle. The larger the share of indirect taxes in output, the larger this deviation.

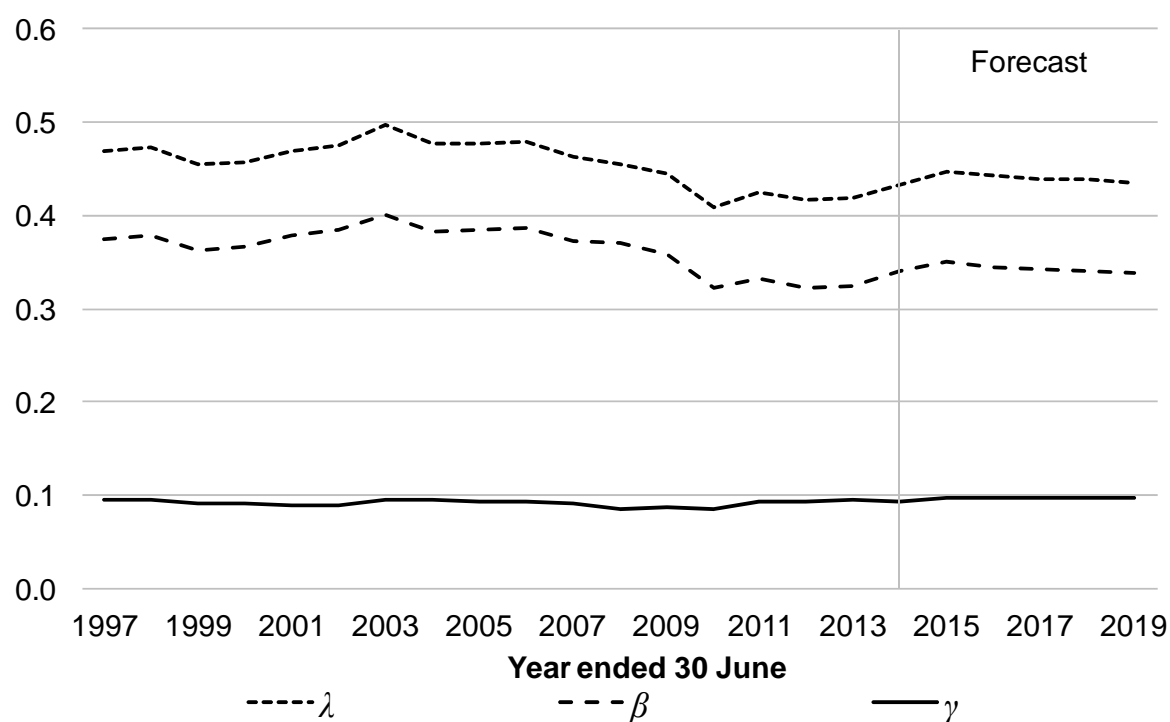
$$CAAB_t = CAB_t - \gamma_t (agap_t - ygap_t) \quad (7)$$

Parameter estimation

Following Equations (1) and (3), Figure 3 shows the budgetary sensitivity parameters β , γ and λ . Over the period 1994 – 2014, λ averages 0.45 and ranges between 0.50 and 0.41. The lower is λ , the less sensitive the CAB estimate to the output gap. Indirect tax as a share of GDP (γ) is relatively stable over time, averaging 0.1 and ranging between 0.12 and 0.09. While the CAAB is estimated using time varying parameters, averages yield almost identical results. Holding the output and absorption gap constant, this suggests the degree of variation in these parameters is not sufficient to significantly impact the CAB or CAAB estimate.

⁹ An estimate of the absorption gap as a function of an equilibrium income balance is investigated in the sensitivities section.

Figure 3 – Budgetary sensitivity parameters



Source: New Zealand Treasury

The correlation between the output gap and absorption gap mean that calibrating their coefficients in Equation (2) could result in double counting. The IMF investigates this issue, looking to the Bulgaria CAAB. They suggest any error associated with double counting is expected to be small (IMF, 2007). Given the size of average γ , double counting is unlikely to have a substantial impact on New Zealand's CAAB. Sensitivity analysis around the size of γ is provided in Section 3.4.

The current account norm

Macroeconomic balance models of the exchange rate generally require an estimate of an equilibrium current account. The IMF's Consultative Group on Exchange Rate and successive External Balance Assessment methodologies incorporate a current account norm (Phillips *et al.*, 2013; IMF, 2013; IMF, 2006), so too does the Reserve Bank of New Zealand's macroeconomic balance model (Graham & Steenkamp, 2012). The various methodologies for estimating the current account norm include cross country (trade-weighted) regression analysis, statistical filters and an estimate of the required current account to reach an equilibrium (or stabilised) NIIP as a percent of GDP. For New Zealand, current account norm estimates vary according to how they are estimated and the timeframe they are estimated for. Estimates range between -1.9 percent of GDP (Lee *et al.*, 2008) to -5.2 percent of GDP (Edison *et al.*, 2009). More recently the IMF (IMF, 2014) has estimated a norm of -3.4 percent of GDP. In general, estimates for New Zealand typically range within -3.0 to -4.0 percent of GDP.

The method used to estimate the current account norm broadly follows that of Graham and Steenkamp (2012). It is estimated as the current account (as a percent of GDP) required to stabilise NIIP (as a percent of GDP) over the long run, and is based on the following assumptions:

$$\frac{NIIP_{t+1}}{GDP_{t+1}} = \frac{NIIP_t}{GDP_t} \quad (i)$$

$$NIIP_{t+1} = NIIP_t + CA_{t+1}^* \quad (ii)$$

$$GDP_{t+1} = (1 + g) \cdot GDP_t \quad (iii)$$

Assumption (i) states the NIIP-to-GDP ratio is constant over time. This assumption seems reasonable when looking at the quarter to quarter change. However, over the period 1997 – 2014, the NIIP-to-GDP ratio ranges between -0.63 to -0.86, with an average of -0.73. Assumption (ii) assumes away revaluations of the NIIP by stating CA^* (the current account level) as the difference in NIIP between periods. Assumption (iii) states GDP grows at its long-run average (g).

Following the assumptions outlined above, Equation (8) shows the current account norm for the current period is estimated by adjusting last periods NIIP-to-GDP ratio for the long-run nominal growth rate. Figure 4 shows the actual current account and the estimated current account norm.

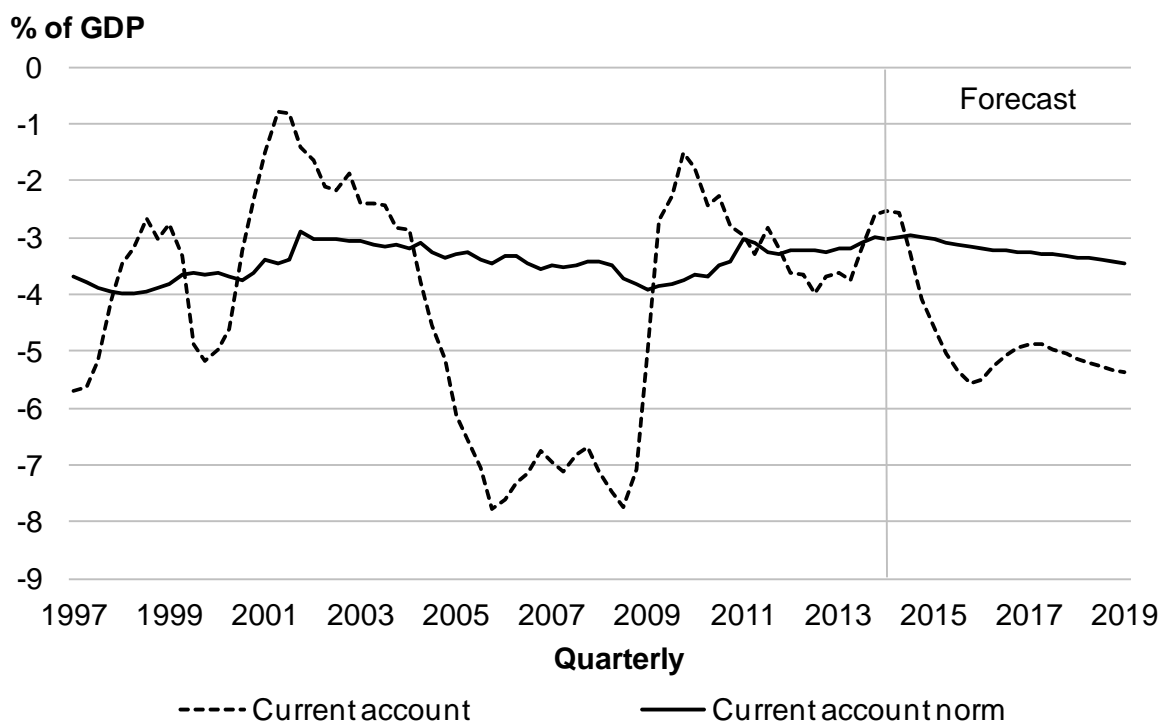
$$ca_t^* = 100 \cdot \frac{NIIP_{t-1}}{GDP_{t-1}} \cdot \left(\frac{g}{(1 + g)} \right) \quad (8)$$

This method is chosen for its simplicity and ability to provide an economic explanation of the driving factors for movements in the CAAB, while avoiding having to make additional assumptions about New Zealand's external balance equilibrium.

While the approach adopted to estimate the current account norm does not attempt to estimate the sustainable current account, the literature suggests New Zealand's current account deficits have generally not exceeded the maximum feasible limit consistent with long-run sustainability. Kim, Hall and Buckle (2001) use an inter-temporal approach over the period 1982 – 1999 and conclude that large deficits have been the result of optimal decision making and that there is no evidence that solvency conditions have been violated. Following an investment focused approach, Makin (2005) finds current account deficits over the period 1990 – 2003 have generally been consistent with long-run sustainability. Extending the time horizon of this methodology shows this result holds over the period 2003 – 2012.¹⁰ Makin *et al.* (2008) outline that a necessary condition for long-run sustainability, in terms of a country's external position, is that foreign savings are invested productively and generate a return at least equal to the cost of acquiring those funds. An in-depth analysis of New Zealand's external sustainability is beyond the scope of this paper.

¹⁰ Makin's (2005) solvency condition requires the difference between domestic production, net of capital stock depreciation, and household consumption plus government spending be at least sufficient to meet the servicing costs of foreign debt.

Figure 4 – New Zealand's current account and current account norm

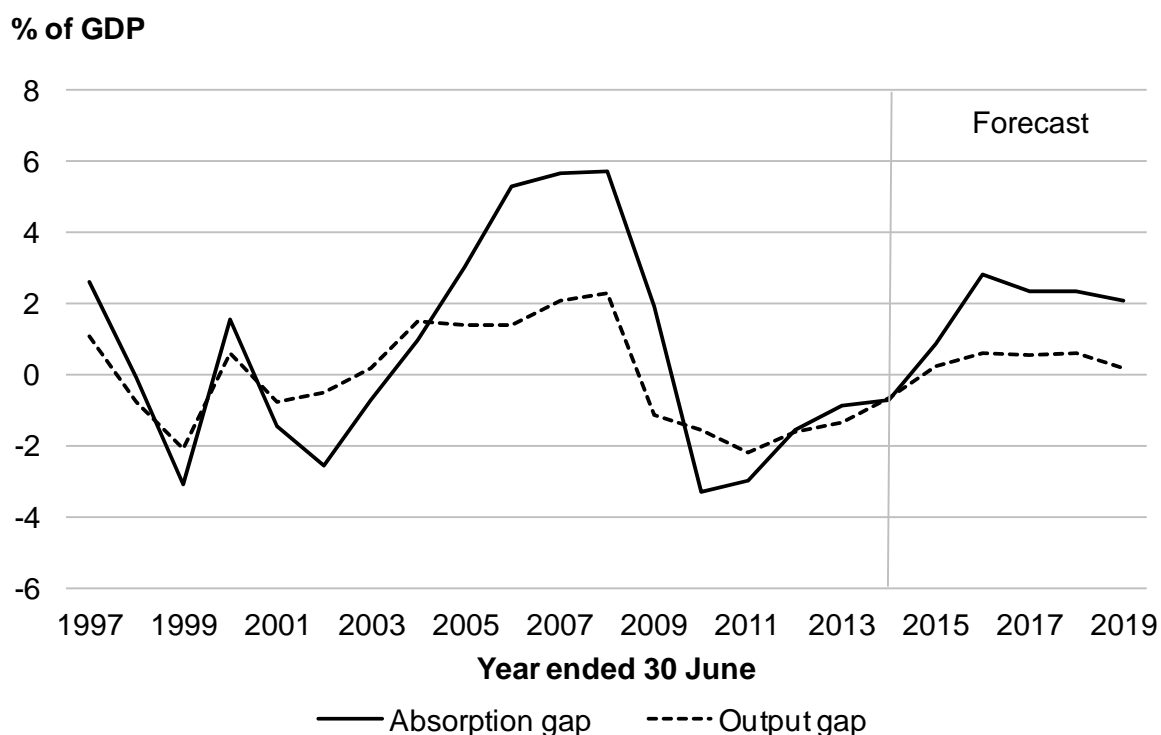


Sources: Statistics New Zealand, New Zealand Treasury

The larger the estimated deficit for the current account norm, the less the actual current account will deviate from the norm during a period of buoyant absorption. This will cause the absorption gap to be lower and deviate less from the output gap during a boom, meaning the CAAB estimate will be closer to that of the CAB than would otherwise be the case.

Figure 5 compares the absorption gap and output gap. During the absorption boom of the mid-2000s, the current account deviated significantly from the norm causing the absorption gap to deviate from the output gap. As per Equation (7), the larger absorption gap will shift the CAAB below the CAB, adjusting for a higher degree of non-structural indirect tax revenues.

Figure 5 – Absorption and output gaps



Source: New Zealand Treasury

3.3 New Zealand's cyclically- and absorption-adjusted balance

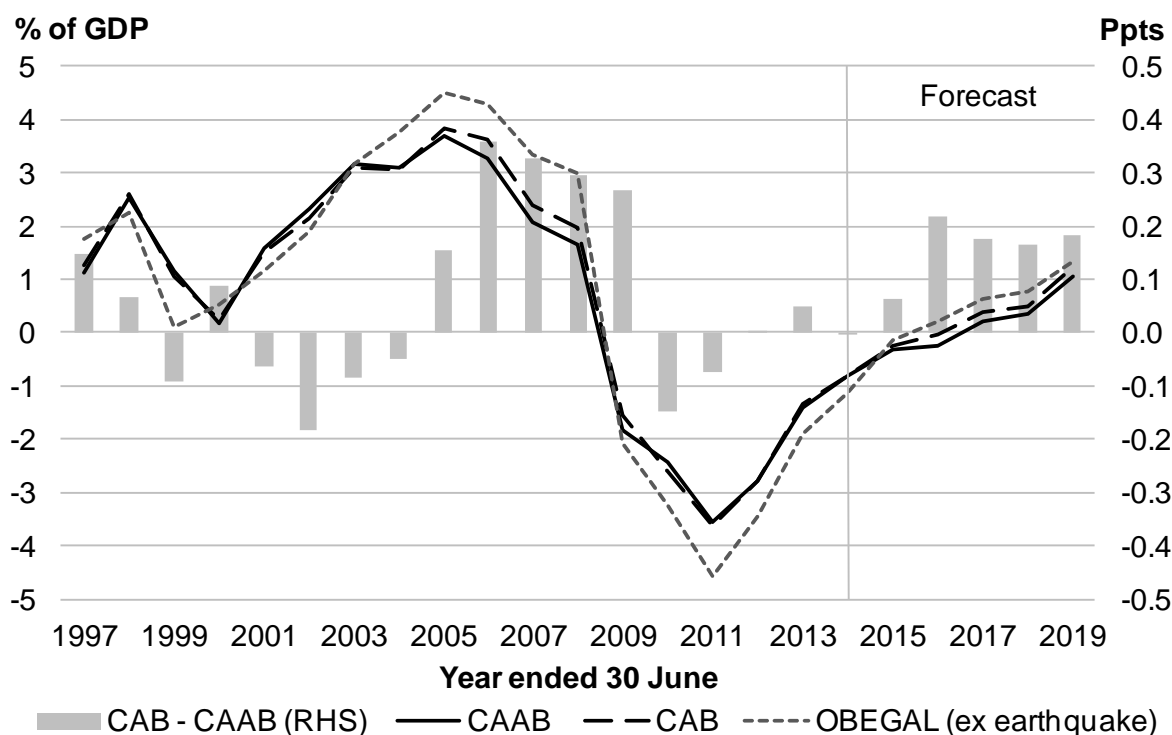
Figure 6 shows the CAAB, CAB, earthquake-adjusted OBEGAL and the difference between the CAAB and CAB. The CAAB tracks very close to the CAB when the absorption gap does not significantly deviate from the output gap. The absorption boom identified in the mid-2000s shifts the structural balance estimate downward as the CAAB adjusts for non-structural indirect taxes. The deviation expected between the absorption gap and output gap over the forecast period, suggests the economy, and therefore the structural balance estimate, will have some common characteristics to that of the mid-2000s, albeit to a lesser degree.

The CAAB estimate varies from the CAB by up to 0.4 percentage points.¹¹ This is a significant deviation given the average difference between the earthquake adjusted OBEGAL and CAB is around 0.5 percentage points, with a range between 0.0 and 1.1 percentage points. However, as Figure 7 shows, compared to the EU study by Lendavi *et al.*, New Zealand is at the lower end of the spectrum.¹²

¹¹ For the 2014 fiscal year, 0.4 percentage points of nominal GDP is around \$940 million.

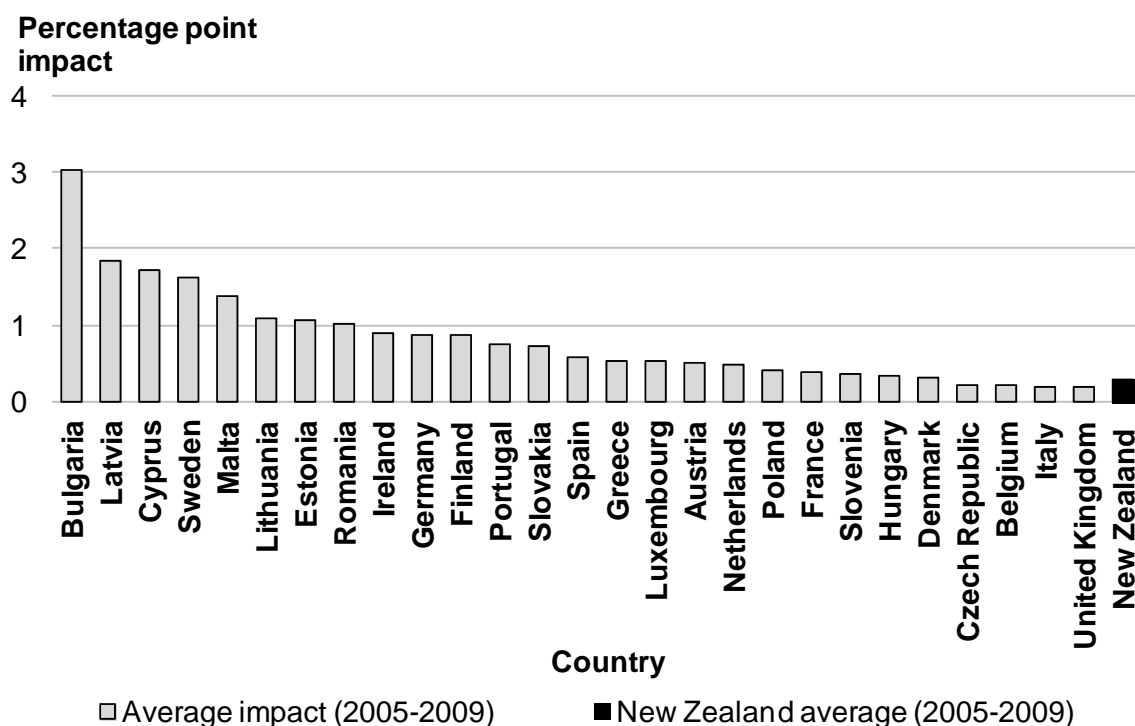
¹² This comparison is indicative only due to differences between studies around the methodology employed to estimate the output gap, and the definition of the fiscal balance.

Figure 6 – New Zealand's cyclically- and absorption-adjusted balance (CAAB)



Source: New Zealand Treasury

Figure 7 – Average impact of an absorption adjustment on the CAB (2005 – 2009)



Sources: Lendavi *et al.* (author calculations), New Zealand Treasury

While an absorption adjustment has less impact on the CAB than in many EU countries, the adjustment provides useful insight for the assessment and formulation of fiscal policy. Having regard to the absorption cycle provides a useful addition to the estimate of the structural balance as it captures more of the dynamics within the economic cycle.

Arguably, in terms of external imbalance, the experience in many European Union economies over the observed period has been more severe than in New Zealand.¹³

As mentioned in the introduction, Treasury regularly estimates and publishes various extensions to the CAB. The terms-of-trade-adjusted CAB attempts to correct for periods of temporary revenue windfalls when commodity prices exceed their estimated long-run equilibrium. This is an income adjustment. On the other hand, the absorption adjustment is an output composition adjustment. Further work is required to investigate how these two extensions may be amalgamated into a single indicator. At the current juncture, they will serve as separate extensions to the CAB.

An absorption adjusted fiscal impulse?

The fiscal impulse is defined as the change in the structural balance. It is an indicator of whether fiscal policy is adding to, or subtracting from demand pressures in the economy. Treasury's fiscal impulse indicator is estimated from a cash basis, while the CAB and CAAB are estimated from an accrual basis (in line with the OBEGAL).¹⁴ However, other than a few timing differences associated with accrual accounting, applying an absorption adjustment to Treasury's cash based fiscal impulse is likely to have a similar impact to that applied to a CAB fiscal impulse. The results are insignificant with the absorption adjustment impacting the accrual based fiscal impulse by 0.1 percentage points on average. A fiscal impulse of this magnitude is considered neutral.

3.4 Sensitivity analysis

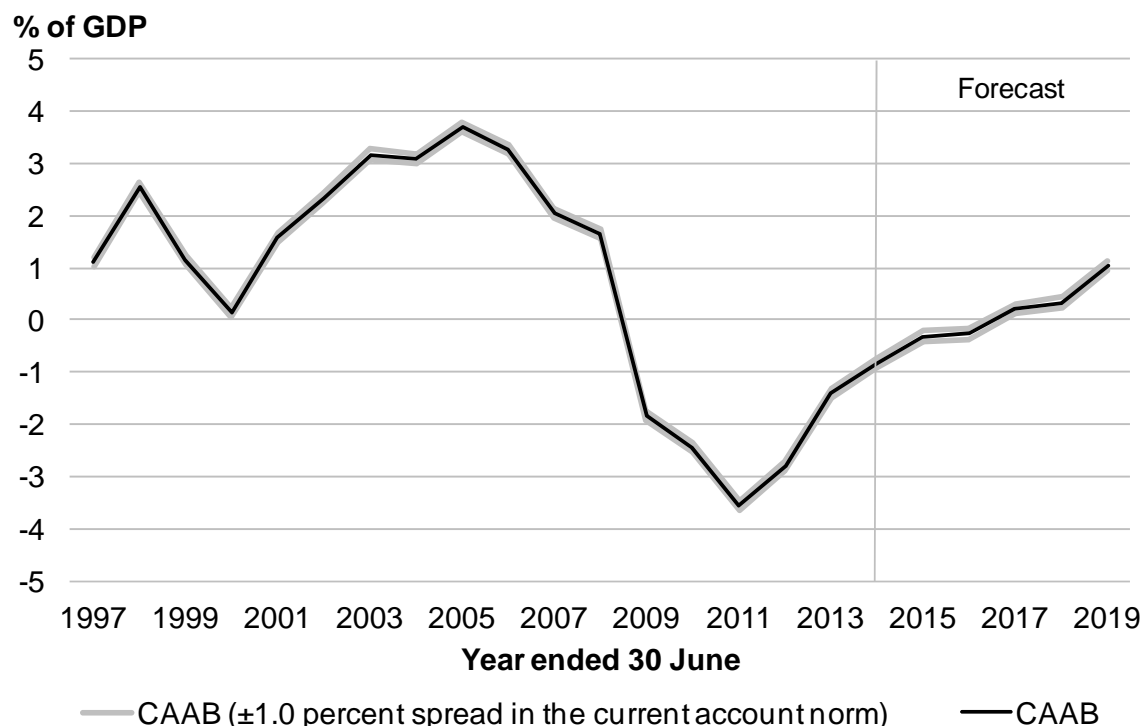
(i) Current account norm

The absorption budgetary sensitivity parameter (γ) determines how sensitive the results are to the estimate of the current account norm. A one percentage point increase in the current account norm (smaller deficit) translates into a one for one increase in the absorption gap estimate. Actual and forecast γ averages around 0.1 over the period 1997 – 2019 meaning a one percentage point increase in the current account norm will lower the CAAB by 0.1 percentage points on average. Figure 8 shows the impact on the CAAB when the current account norm is estimated with a spread of ± 1.0 percent. To the extent that the true equilibrium current account fits within this spread, the CAAB can be considered to have a low degree of sensitivity to the current account norm estimate.

¹³ See IMF_c (2007); Chen *et al.* (2012); EC (2012).

¹⁴ For details on the Treasury's fiscal impulse indicator see Phillip, R. & Janssen, J. (2002).

Figure 8 – The CAAB with a ± 1.0 percent deviation in the current account norm



Source: New Zealand Treasury

(ii) Income balance

New Zealand's persistent current account deficits are almost exclusively attributable to the income balance. To investigate the impact of the assumption that the income and transfers balance is always in equilibrium, an absorption gap has been estimated by extending Equation (6) as per Equation (9). The income gap ($igap$) has been estimated using the NIIP position and the long-run rate of return to estimate a potential income balance series. This series is used to estimate an income gap which is the difference between potential income and the actual income balance in a given period.

$$agap_t = ygap_t - cagap_t - igap_t \quad (9)$$

Over the period 1997 – 2019, the average impact on the CAAB when including an income gap is 0.1 percentage points. This falls within the impact of the current account norm sensitivity analysis above, and is not considered large enough to justify the inclusion of an income gap in the CAAB estimation.

(iii) Gamma

To get an indication of how sensitive the results are to γ , the CAAB has been estimated using half and two times its value. This will only have a significant impact when the absorption gap and output gap deviate. Over the period 2004 – 2007, when the absorption gap significantly deviates from the output gap, doubling γ causes it to increase by 0.1. This lowers the CAAB by around 0.2 percentage points as the difference between the absorption gap and output gap at this time is around 2.0 percentage points. This sensitivity analysis is particularly relevant to the forecast period where the share of indirect tax in GDP is an unknown. However, given the historical stability of indirect taxes as a percent of GDP, and the impact of this sensitivity adjustment, the CAAB results are considered to be robust with respect to γ .

4 Conclusion

Following criteria outlined by the European Commission, this paper has identified the following periods of absorption boom in New Zealand: Q3 2005 – Q2 2006 and Q1 2007. These boom periods align with widening current account deficits.

By estimating the current account norm based on stable NIIP-to-GDP and long-run nominal GDP growth rate assumptions, the current account gap and subsequent absorption gap has been estimated and applied to Treasury's existing CAB in order to estimate the CAAB for New Zealand. The absorption adjustment impacts the CAB by up to 0.4 percentage points during periods of buoyant absorption. This is most significant during the mid-2000s. The forecast absorption gap estimate is expected to significantly deviate from the output gap, albeit to a lesser extent than in the mid-2000s. This is likely to be driven by residential investment, suggesting the economy could be entering a similar period where the structural balance is somewhat lower than a cyclical-adjustment based on the output gap alone would imply.

Given the average difference between the earthquake-adjusted OBEGAL and CAB, the results are significant. However, as the literature suggests, compared to some European Union economies, the impact is small.

This paper outlines the following rule of thumb for the trade balance: holding the output gap constant, if the trade balance deteriorates such that the current account deficit exceeds that of the current account norm by 1.0 percentage point, the absorption gap will increase by 1.0 percentage point. The impact on the cyclically-adjusted balance is then determined by the budgetary sensitivity parameter associated with indirect taxes (γ). Based on average γ , this will reduce the structural balance estimate by 0.1 percentage points.

In the presence of macroeconomic imbalances, having regard to the absorption cycle can improve the estimate of the structural balance. This has implications for both the evaluation and formation of fiscal policy. When policy makers are able to identify all forms of temporary revenues, fiscal policy is likely to lean against the wind more effectively than otherwise, reducing the risk of a sharp fiscal adjustment during an economic downturn.

References

- Bornhorst, F., Dobrescu, G., Fedelino, A., Gottschalk, J., & Nakata, T. IMF (2011). When and How to Adjust Beyond the Business Cycle? A Guide to Structural Fiscal Balances. Technical Notes and Manuals. April.
- Bouthevillain, C., P. Cour-Thimann, G. van den Dool, P. Hernandez De Cos, G. Langenus, M. Mohr, S. Momigliano, and M. Tujula (2001) "Cyclically adjusted balances: an alternative approach." European Central Bank Working Paper No. 77, September.
- Chen, R., Milesi-Ferretti, G., & Tressel, T. (2012). External Imbalances in the Euro Area. IMF Working Paper WP/12/236. September.
- Dobrescu, G. and Salman, S. (2011). Fiscal Policy during Absorption Cycles. IMF Working Paper WP/11/41. February.
- Edison, H. & Vitek, F. (2009). Australia and New Zealand Exchange Rates: A Quantitative Assessment. IMF Working Paper WP/09/07. January.
- European Commission (2012). European Economy. Scoreboard for the surveillance of macroeconomic imbalances. Occasional Paper 92. February.
- Girouard, N. and Andre, C. (2005). Measuring Cyclically-adjusted Budget Balances for OECD countries. OECD Economics department. Working Paper No. 434.
- Graham, J. & Steenkamp, D. (2012). Extending the Reserve Bank's macroeconomic balance model of the exchange rate. Analytical Note: 2012/08.
- Hagemann, R. (1999) "The structural budget balance: The IMF's methodology." IMF Working Paper WP /99/95, July 1999.
- IMF. (2007). Bulgaria: Selected Issues. Country Report No. 07/390. December.
- IMF. (2013). External Balance Assessment (EBA) Methodology: Technical Background. June 25.
- IMF. (2006). Methodology for CGER Exchange Rate Assessments. November 8.
- IMF. (2014). New Zealand 2014 Article IV consultation Staff Report; Press Release. IMF, Washington, DC.
- Kim, K., Buckle, R., & Hall, V. B. (1994), Key Features of New Zealand Business Cycles. *Economic Record*, 70: 56–72. doi: 10.1111/j.1475-4932.1994.tb01825.x
- Kim, K., Hall, V., & Buckle, R. (2001). New Zealand's Current Account Deficit: Analysis based on the Intertemporal Optimisation Approach. Working Paper 01/02, New Zealand Treasury
- Lee, J., Milesi-Ferretti, G. M., Ostry, J. D., Prati, A. and Ricci, L. A., (2008). Exchange Rate Assessments: CGER Methodologies. Occasional paper no. 261, IMF, Washington, DC.

- Lendavi, J. Moulin, L. & Turrini, A. (2011). European Commission Economic Papers 442. From CAB to CAAB? Correcting Indicators of Structural Fiscal Positions for Current Account Imbalances.
- Makin, A. (2005). Feasible Limits for External Deficits and Debt. *Global Economy Journal* 5(1):1-13.
- Makin, A., Zhang, W., & Scobie, G. (2008). The Contribution of Foreign Borrowing to the New Zealand Economy. Treasury Working Paper 08/03, July.
- McKelvie, S. & Hall, V. (2012). Stylised Facts for New Zealand Business Cycles: A Post-1987 Perspective. School of Economics and Finance, Victoria University of Wellington, June.
- Munro, A., & Sethi, R. (2007). RBNZ DP2007/10. Understanding the New Zealand Current Account: A Structural Approach. Reserve Bank of New Zealand Discussion Paper 2007/10, July.
- Parkyn, O. (2010). Estimating New Zealand's Structural budget Balance. Treasury Working Paper 10/08.
- Phillip, R. & Janssen, J. (2002). Indicators of Fiscal Impulse for New Zealand. Treasury Working Paper 02/30.
- Phillips, S., Catão, L.R., Ricci, L., Bems, R., Das, M., Di Giovanni, J., Unsal, F., Casillo, M., Lee, J., Rodriguez, J., & Vargas, M. (2013). The External Balance Assessment (EBA) Methodology. IMF Working Paper WP/13/272. December.
- Szeto, K. (2013). Estimating New Zealand's Output Gap Using a Small Macro Model. Treasury Working Paper 13/18.

Appendix

Table A1 presents Lendavi *et al.* (2011) CAAB and CAB estimates for some EU economies. To provide an indication of the impact an absorption adjustment has on the structural balance, Table A2 provides the difference between the CAAB and CAB in absolute value terms.

Appendix Table 1 – The CAAB and CAB estimated for selected EU economies

Country	CAAB					CAB				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Austria	-0.7	-1.5	-1.2	-1.1	-2.9	-1.3	-1.9	-1.6	-1.7	-2.4
Belgium	-2.7	-0.2	-1.1	-2.2	-4.7	-2.9	-0.4	-1.4	-2.0	-4.5
Bulgaria	-1.1	-1.8	-5.6	-4.2	-1.3	0.8	1.7	-1.5	0.0	-2.8
Cyprus	-3.4	-2.7	0.2	-3.7	-6.2	-2.2	-1.3	2.5	-0.4	-5.8
Czech Republic	-3.8	-4.1	-3.0	-4.1	-5.5	-3.9	-4.0	-2.9	-4.5	-5.1
Denmark	5.0	3.7	3.2	3.6	1.3	4.7	3.5	3.1	3.3	0.6
Estonia	-0.2	-1.7	-2.7	-4.7	0.8	0.3	0.0	-0.7	-4.1	1.3
Finland	3.4	3.4	3.6	3.0	-0.8	2.6	2.8	2.6	2.1	0.3
France	-3.4	-3.0	-3.7	-4.1	-7.7	-3.4	-3.0	-3.7	-3.7	-6.2
Germany	-2.0	-1.3	0.0	-0.5	-1.2	-2.7	-2.2	-1.2	-1.5	-1.8
Greece	-6.4	-4.9	-6.4	-9.8	-13.2	-5.6	-4.7	-7.0	-9.6	-14.1
Hungary	-8.9	-11.1	-6.3	-5.0	-1.1	-8.7	-10.9	-6.4	-5.1	-2.2
Ireland	0.3	1.4	-2.4	-7.7	-9.7	0.9	2.1	-1.6	-7.0	-11.4
Italy	-4.5	-4.3	-2.9	-3.6	-3.7	-4.6	-4.4	-3.0	-3.3	-3.3
Latvia	-2.6	-5.9	-7.3	-7.6	-4.9	-1.5	-3.2	-4.5	-6.4	-6.3
Lithuania	-2.3	-3.2	-5.7	-7.5	-6.6	-1.8	-2.1	-3.7	-5.7	-6.7
Luxembourg	-0.1	0.2	1.1	1.1	-0.2	-0.3	0.1	1.1	2.0	1.2
Malta	-3.6	-4.0	-3.8	-6.4	-4.6	-2.5	-2.5	-2.5	-4.9	-3.1
Netherlands	0.9	1.0	-0.5	-0.7	-3.2	0.3	0.3	-1.0	-0.5	-3.6
Poland	-3.5	-3.9	-3.0	-4.8	-5.8	-3.9	-4.0	-2.8	-4.6	-6.9
Portugal	-6.2	-4.4	-3.6	-3.7	-7.1	-5.7	-3.7	-3.0	-2.9	-8.3
Romania	-3.1	-5.3	-6.4	-9.2	-7.5	-2.2	-4.1	-4.7	-8.2	-7.8
Slovakia	-3.4	-4.6	-4.2	-5.4	-7.0	-2.5	-3.9	-3.7	-4.5	-6.4
Slovenia	-1.5	-2.4	-2.8	-4.9	-5.1	-1.6	-2.6	-2.9	-4.8	-3.8
Spain	0.6	1.0	0.4	-5.1	-10.0	1.0	1.6	1.2	-4.4	-9.6
Sweden	2.3	2.2	3.8	3.9	1.7	1.0	0.3	1.6	1.4	1.9
United Kingdom	-3.9	-3.7	-3.9	-5.6	-10.2	-4.0	-3.5	-3.9	-5.7	-9.7

Source: Lendavi *et al.* (2011).

Appendix Table 2 – Absolute value difference between the CAAB and CAB

Country	2005	2006	2007	2008	2009	Average
Austria	0.6	0.4	0.4	0.6	0.5	0.5
Belgium	0.2	0.2	0.3	0.2	0.2	0.2
Bulgaria	1.9	3.5	4.1	4.2	1.5	3.0
Cyprus	1.2	1.4	2.3	3.3	0.4	1.7
Czech Republic	0.1	0.1	0.1	0.4	0.4	0.2
Denmark	0.3	0.2	0.1	0.3	0.7	0.3
Estonia	0.5	1.7	2.0	0.6	0.5	1.1
Finland	0.8	0.6	1.0	0.9	1.1	0.9
France	0.0	0.0	0.0	0.4	1.5	0.4
Germany	0.7	0.9	1.2	1.0	0.6	0.9
Greece	0.8	0.2	0.6	0.2	0.9	0.5
Hungary	0.2	0.2	0.1	0.1	1.1	0.3
Ireland	0.6	0.7	0.8	0.7	1.7	0.9
Italy	0.1	0.1	0.1	0.3	0.4	0.2
Latvia	1.1	2.7	2.8	1.2	1.4	1.8
Lithuania	0.5	1.1	2.0	1.8	0.1	1.1
Luxembourg	0.2	0.1	0.0	0.9	1.4	0.5
Malta	1.1	1.5	1.3	1.5	1.5	1.4
Netherlands	0.6	0.7	0.5	0.2	0.4	0.5
Poland	0.4	0.1	0.2	0.2	1.1	0.4
Portugal	0.5	0.7	0.6	0.8	1.2	0.8
Romania	0.9	1.2	1.7	1.0	0.3	1.0
Slovakia	0.9	0.7	0.5	0.9	0.6	0.7
Slovenia	0.1	0.2	0.1	0.1	1.3	0.4
Spain	0.4	0.6	0.8	0.7	0.4	0.6
Sweden	1.3	1.9	2.2	2.5	0.2	1.6
United Kingdom	0.1	0.2	0.0	0.1	0.5	0.2
New Zealand*	0.2	0.4	0.3	0.3	0.3	0.3

*New Zealand results taken from this study, results are not directly comparable.

Source: Lendavi *et al.*, New Zealand Treasury, author calculations

Table A2 shows the impact of an absorption adjustment for Belgium, Czech Republic, Hungary and Italy does not exceed 0.4 percentage points in any of the observed periods. In addition to these countries, Denmark, France, Poland, Slovenia and the UK average 0.4 or less. New Zealand's largest impact is 0.4 percentage points (2006) and averages 0.3 over the period 2005 – 2009.