THE TREASURY
Kaitohutohu Kaupapa Rawa

Tax and Welfare Analysis (TAWA) Commissioning Manual

August 2018

New Zealand Government

ISBN: 978-1-98-855672-7 (Online)

The Treasury URL at September 2018 for this document is
https://treasury.govt.nz/publications/guide/tax-and-welfare-analysis-tawa-commissioning-manual
The PURL for this document is http://purl.oclc.org/nzt/g-tawacm

Contents

What's New?

This document formalises commissioning practices related to Treasury's Tax and Welfare Analysis model – TAWA. It is intended to provide all parties seeking to commission and use TAWA analysis with greater clarity regarding the process for commissioning and using analyses from this model.

About this Manual

TAWA[1] is the Treasury's microsimulation model of the New Zealand personal tax and transfer system. It applies potential policy changes to individuals in its input data, and then scales up and aggregates the results so that they are representative of the New Zealand population. It is used extensively within Treasury and in external work related to policy analysis of tax and welfare settings.

This guidance document sets out the standard steps in the commissioning process, quality assurance practices, guidance on assessing and communicating the reliability of estimates, disclosure and associated modelling caveats. This information is intended as a resource to clarify expectations for all parties involved in this process.

The Manual is designed to assist the requestor by supporting them in providing the information needed to model any analysis, establish timelines, and minimise the risk of any misunderstandings regarding the model's outputs.

This guidance document should be read by anyone who wishes to commission analysis using Treasury's TAWA model. It should also be useful for Ministers and officials who intend to use analysis derived from TAWA, including communications staff, management and others who use analysis from TAWA to inform or communicate policy options and decisions related to tax and welfare settings.

The guidance outlined in this document applies until this document is updated or replaced.

This document should be reviewed immediately following any substantive change to the model or its processes.

This document has been written by the Analytics and Insights team in Treasury and is owned by the Chief Economic Advisor.

Questions and feedback

You should use this document as your first port of call prior to commissioning new analysis or using existing analysis generated from the TAWA model.

General enquiries about the information contained in this guidance, or not addressed in this guidance, can be directed to TAWA.Core@treasury.govt.nz.

Any comments as to how we could improve this guidance can be directed to TAWA.Core@treasury.govt.nz.

For more information about the TAWA model see https://treasury.govt.nz/information-and-services/financial-management-and-advice/revenue-and-expenditure/tax-welfare-analysis-tawa-model

---

1 TAWA is an acronym for 'Tax and Welfare Analysis'

Steps in the Commissioning Process

Commissioning

Definition: “to order or request the production of (something)”, in this case analysis of the impact of potential changes in New Zealand’s tax and/or transfer policy setting.

Analysis from TAWA is primarily commissioned from three sources:

- Treasury policy teams
- The Minister of Finance or his staff, and
- Public sector agencies.

Limitations

All models are subject to uncertainty. They simplify the complex, are reliant on assumptions and are subject to a range of caveats and risks. Before commissioning analysis, it is recommended that the requestor refers to Annex 2 which provides a summary of key caveats and risks related to the TAWA model. Annex 3 provides an overview of the TAWA model itself.

Any additional issues related to a specific request will be included in the response provided by the TAWA team.

Initiating a request

The first step in initiating a new analytical request is for the requestor to specify the issue they are seeking to inform and the information they require.

For anything other than a minor amendment to existing policy settings, it is standard practice for the requestor to first engage with the TAWA team to discuss the purpose of the analysis and the details of the request.

In the case of a Ministerial request this step is often facilitated via the relevant Office secondee and/or policy team with the Treasury’s Office of the Executive included in correspondence.

This step ensures that there is a clear understanding by all parties regarding the information sought and any delivery challenges, that the work is completed efficiently, and that the resulting analysis meets the requestor’s needs. This process often helps to narrow down the request, enabling it to be fulfilled more quickly.

Once the initial specification has been agreed an ‘Analysis Request’ should be completed (see Annex 1). This provides the basic information required for the TAWA team to formally assess and scope the resources required, including time.

Submitting a request

The completed Analysis Request should then be submitted to TAWA.Core@treasury.govt.nz to be actioned.

Depending on the source of the request the following parties should also be cc'd into all correspondence:

Requester	CC
Treasury policy teams	If the request originates from another agency / Minister's office, please also advise OE. OE will advise if MoF's Office are to be informed.
The Minister of Finance or his staff	Office of the Executive; relevant policy officials
Working Groups via their secretariat	Relevant Treasury and agency policy contacts

Assessment

The TAWA team will then undertake a detailed assessment of the options for responding to the request including estimating the timeframe for completion and response. The timeframes will be driven by factors such as the scale and complexity of the change to tax and/or transfer settings.

Queries that only require changes to the parameters of existing policies may be turned around quickly. As a guide, a response to a request of this nature should be able to be completed within 2 working days. At the other extreme, changes to the structure of the TAWA system that require amendments to or extensions of the model, may take from days to weeks to complete (or may not be possible with the available data).

The TAWA team will provide an assessment of the likely timeframes in their response to the initial request.

Provide requestor with details of assessment

The team will then complete the relevant sections of the Analysis Request and email these to the requestor, including the name and contact details of the lead analyst should further discussion or clarification be required.

Request confirmed

Policy parameters and other specifications for the analysis are confirmed by the requestor.

Request actioned

- Team identify and assign task to a ‘lead analyst’
- Lead analyst raises JIRA (internal tracking system) ticket that specifies query and identifies QA analyst and confidentiality checker
- Lead analyst configures TAWA and undertakes required runs
- QA analyst independently configures TAWA and undertakes independent runs
- Lead and QA analysts compare and iterate results until they confirm agreed outputs
- Confidentiality checking undertaken
- Results sense checked with relevant policy analysts (this step will be extended if the TAWA team deems this necessary)
- Submitted to Manager for sign out.

Response

The completed analysis is then written up and returned to the requestors either via:

- Aide Memoire or Treasury Report if it is going to the Minister of Finance or his Office.
- Treasury Report to Working Group secretariats.
- Email to Treasury or agency policy staff.

Note: All relevant parties identified in 1.1.2 above will also be cc’d in this correspondence.

Brief summaries of TAWA requests and responses will be included in the Treasury’s weekly Status Report to the Minister of Finance, who may request the associated advice.

Request closed

The relevant JIRA ticket is closed.

Wider disclosure

At this point all results and correspondence may be disclosed should they be requested under OIA subject to standing processes and controls.

Annex 1: TAWA Analysis Request – Template

TAWA Analysis Request

Requestor: *To be completed by requestor*

Initial request (incl context, intended use etc): *To be completed by requestor*

Desired timeframe: *To be completed by requestor*

Agreed analytical specification: *To be completed by TAWA team once agreed with requestor*

Agreed timeframe: *To be completed by TAWA team once agreed with requestor*

Risk/reliability assessment: *To be completed by TAWA team*

Special issues to note: *To be completed by TAWA team*

Modelling Caveats: *To be completed by TAWA team*

Response: *Embedded spreadsheet or link*

Lead Analyst:

QA Analyst:

Confidentiality checker:

Signed out by: *Manager A&I*

Annex 2: Risk and Reliability Framework

General Modelling Caveats

TAWA is the only Tax and Welfare model that can consider the entire New Zealand population, but to do this it requires simplifying modelling assumptions and survey data. These assumptions and data limitations may be relevant to your request. The following should be considered when using TAWA results to inform policy discussions and decisions.

The quality of the input data is variable

TAWA currently relies on Household Economic Survey (HES) input data, with results subject to reporting error, sampling variability, and other data quality issues.

Significant issues associated with the use of HES data in TAWA include the quality of the data provided by respondents, the lack of some required information, and the sample size. These issues impact directly on the accuracy of estimates. Examples of implications include significant differences when comparing the results using different HES survey years (sampling error), significant over- or underestimates of eligibility for some transfers (because HES does not contain all of the information required to determine eligibility), and differences when comparing results with models that use administrative data (due to, for example, misreporting of benefits or income in the survey).

These data issues and other modelling assumptions mean that TAWA generally provides better estimates of *changes* to income levels as a result of policy changes than the *levels* of income. A corollary is that measures of percentage change are generally better than absolute estimates of change. For example, the projected *percentage reduction* in the number of children in low income households gives an indicative assessment of the impact of a policy, but the associated estimate of *the number* of children in poverty should be considered considerably less accurate.

Revisions to estimates

Requesters should be aware that as improvements are made progressively to the model and data, it will necessarily create revisions or updates to the numerical content of advice as early analysis is re-estimated.

TAWA provides projections

TAWA projects the HES data into future years using CPI based indicators. These indicators are based on economic forecasts, so they are uncertain and subject to revisions.

Accuracy decreases with finer disaggregation

High level aggregate estimates are more accurate than finer disaggregations due to sampling error (some small subgroups of the population are generally not very accurately represented in the HES) and distortions introduced by modelling assumptions. Additionally, some decompositions of the results cannot be reported due to Stats NZ quality and confidentiality requirements.

Note that values based on an estimated population of less than 3000 or 10 samples must be suppressed.

Some population groups are not well represented

Particular sub-groups are under-represented because they are less likely to respond to the survey and HES does not include people living in non-private dwellings such as hotels, motels, boarding houses, and hostels. This under-representation and the previously mentioned sampling error implications mean that transfers that apply to small portions of the population are not well represented.

There are unmodelled behavioural impacts

Changes to the tax and transfer system are likely to have behavioural impacts that are not modelled in TAWA. For example, an increase in a tax credit that is available to workers could encourage people to work more hours. This would mean that TAWA's projected fiscal cost of the increase could be an underestimate (more people could be eligible for the tax credit), an overestimate (these people may be moving off a social welfare payment, reducing the related fiscal costs), or (most likely) a combination of the two due to different family circumstances and behavioural responses.

Risk and reliability

To communicate the implications of any uncertainties in the data and modelling assumptions, we will provide a qualitative assessment of the reliability of the requested analysis and the associated risk, given the intended usage, using the following framework. Our assessment is provided as high-level guidance, and should not be considered an exact representation of statistical variability and accuracy unless otherwise stated. We will also provide an overview of limitations that are relevant to the intended use.

Table 1: Reliability and Risk Framework

Risk: Impact given intended use	Large	High reliability, large risk	Medium reliability, large risk	Low reliability, large risk
	Moderate	High reliability, moderate risk	Medium reliability, moderate risk	Low reliability, moderate risk
	Minor	High reliability, minor risk	Medium reliability, minor risk	Low reliability, minor risk
		High	Medium	Low
		Reliability: Plausible Accuracy of the estimates and assumptions		

Annex 3: Treasury's TAWA Microsimulation Model: An Overview

TAWA[2] is the Treasury's microsimulation model of the New Zealand personal tax and transfer system. It applies policy changes to individuals in the input data, and then aggregates the results so that they are representative of the New Zealand population.

Representative micro-data on individual and family circumstances is combined with either historical, projected or hypothetical tax and transfer policies to produce indicative comparisons of the impacts of different policy settings. Projections of these results for different tax years use consumer price index (CPI) based inflators.

Unlike other models currently operating in other government departments[3], TAWA can

- model changes that expand eligibility for some benefits and tax credits to clients not in the relevant administrative data
- model interactions between tax and transfer changes, and
- analyse policy changes at either the household, family, or individual level.

TAWA currently relies on Household Economic Survey (HES) input data, so the results are subject to reporting error, sampling variability, and other data quality issues (see Annex 2).

TAWA aims to simulate as much of the tax and transfer system as possible, within the constraints imposed by data availability and sample size. The current model simulates personal income tax, four first-tier income support benefits (New Zealand Superannuation, Job Seeker Support, Sole Parent Support and Supported Living Payment), and the second-tier Accommodation Supplement, Working for Families tax credits available to families with children, the Independent Earner Tax Credit, Best Start support for families with new babies, the Winter Energy Payment.

The remainder of the support available through the transfer system (eg, Youth Payment) is assumed to be correctly reported in the HES. The standard modelling assumption is that this support doesn't change as a result of changes to the other settings simulated. These non-first and second tier components are also generally more difficult to model. Difficulties include:

- eligibility is determined by individual and family characteristics not measured in HES
- the benefit is targeted to such a small population that simulated results are unreliable
- (estimated) take-up rates tend to be noticeably higher than the number of actual recipients seen in administrative data.

---

2 TAWA is an acronym for 'Tax and Welfare Analysis'

3 Such as MSD (benefit data) or IR (tax data)

Planned improvements to TAWA using administrative data

Treasury is currently redeveloping TAWA to alleviate some of the issues highlighted in Annex 2 by incorporating administrative data from Stats NZ's Integrated Data Infrastructure (IDI)[4].

Replacing the income and benefit data in HES with linked administrative data will go some way to improving the accuracy of the TAWA output, but will not increase the size of the dataset because TAWA also requires information regarding family and household structure, housing costs, and wage rates, which are not available in any IDI datasets.

Stats NZ are planning to significantly expand the size of the HES survey in 2019/20, combine the responses with some administrative data, and get better coverage of low-socioeconomic groups.

Requesters should be aware that improvements to the model and data will necessarily create revisions to advice based on earlier versions of the model and vintages of data.

Some example outputs from TAWA

Figure 1: Table from 'Budget 2017 – budget at a glance'[5]

Who pays income tax... and how much?*

Annual individual taxable income ($)	Number of people (000)	%	Tax paid ($m)	%
Zero	319	9	0	0
1-10,000	359	10	164	0
10,001-20,000	628	17	1,172	4
20,001-30,000	491	13	1,634	5
30,001-40,000	353	10	1,819	6
40,001-50,000	328	9	2,271	7
50,001-60,000	288	8	2,728	8
60,001-70,000	217	6	2,721	8
70,001-80,000	169	5	2,647	8
80,001-90,000	108	3	2,031	6
90,001-100,000	87	2	1,920	6
100,001-125,000	128	4	3,538	11
125,001-150,000	59	2	2,121	6
150,001+	108	3	8,282	25
All	3,644	100	33,048	100

4 http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

5 https://treasury.govt.nz/sites/default/files/2017-05/b17-at-a-glance.pdf

Table 2: Example distributional impacts table for a hypothetical policy change with the required Stats NZ disclaimer

Note that values based on an estimated population of less than 3000 or 10 samples must be suppressed.

Tax Year 2019					
Taxable Income Decile	Number of Families	Families Gaining	Average gain per week for Families that gain	Families losing	Average loss per week for families that lose
1	245,000	19,000	$32	*	*
2	246,000	142,000	$31	*	*
3	245,000	235,000	$18	*	*
4	245,000	245,000	$17	*	*
5	245,000	245,000	$11	*	*
6	247,000	246,000	$21	*	*
7	244,000	242,000	$23	*	*
8	245,000	245,000	$25	*	*
9	245,000	245,000	$30	*	*
10	245,000	245,000	$35	*	*
ALL	2,454,000	2,109,000	$23	7,000	$(3)

Access to the Household Economic Survey data was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented here are the work of the Treasury, not Statistics New Zealand.

****Suppressed for confidentiality, values must have more than 3000 counts (weighted) and 10 or more sample units.***