2024 DINA UPDATE FOR NEW ZEALAND

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Purpose & introduction

The purpose of this technical note is to document the high-level construction of a distributional national accounts series for New Zealand, including estimates for the period 2000 to 2022, previewing a comprehensive presentation of our approach and results, expected in early 2025.

We benefit hugely from a recent literature led by researchers affiliated with the World Inequality Database (Bozio et al. 2018; Garbinti et al. 2018; Piketty et al. 2018; Piketty et al. 2019), which has systematised the basis for a more complete picture of the distribution of income, allocating all of the income as measured in National Accounts to individuals. By accounting for additional income components not captured in a narrower fiscal income concept - in-kind benefits from government-provided goods and services and retained earnings of companies, for example - the Distributional National Accounts (DINA) approach generates estimates of individuals' incomes aim to reflect the distribution of a more comprehensive income concept.

In this paper we briefly document the construction of a distributional income series for New Zealand, as measured by the National Accounts. Where extensive previous work in the New Zealand context has been confined to the use of tabulations, resulting in 'simplified Distributional National Accounts' estimates for New Zealand, here we have worked directly from microdata contained in the Integrated Data Infrastructure maintained by StatisticsNZ. We produce estimates of the full distribution of all national income in New Zealand for the period 2000 to 2022, by combining household survey with administrative tax microdata and adjusting to match National Accounts aggregates. Our approach is guided by Alvaredo et al. (2020), using income concepts and methods advanced by the World Inequality Database (WID). The guidelines are, however, not completely prescriptive because of the substantial variation across countries in institutional features and data availability. Our approach is therefore considerably influenced by the particular institutional features of New Zealand and the nature of the available data, including the relative strengths and weaknesses of alternative data sources.

Previous work

Considerable previous work has gone into estimating income distributions in New Zealand[1]. While complementary to the analysis we undertake, and making use of similar underlying datasets, previous approaches differ from that advocated by Alvaredo et al. (2020). Most important is the difference in income concepts. In these approaches, only income captured in the household income account is distributed to households, and thus components of national income, including retained earnings of corporations and

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[1] See, for recent examples, Creedy & Ta (2022), Alinaghi et al.l (2022), Wright & Nguyen (2024), Stephens (2023). StatsNZ (2018) begins a reconciliation of HES survey data with Household Income & Outlay Accounts of the National Accounts, but does not attempt to integrate other institutional sector accounts (and therefore does not fully distribute national income), and limits exploration to 2007. This work does, however, make more sophisticated use of expenditure data in distributing in-kind services provided by the government than we do here, as does Wright & Nguyen (2024).

government expenditure, are out of scope. Compared to prior work, we therefore present distributional information that is based on more comprehensive income concepts, concerned with the total of national income rather than income as measured in the household income account.

This work continues in the spirit of extensive earlier work to produce long-run series of top income shares in New Zealand (Atkinson & Leigh 2007 and 2008; Alvaredo & Atkinson 2013 and 2014; Alvaredo 2017; and Alvaredo & Kergozou 2019). Fisher-Post (2020, 2023) extends those estimates - which were based on fiscal income data from tax authorities - updating them and extending the estimates to cover all sources of national income, including non-fiscal (nontaxable) income that is not reported on tax returns, applying the techniques described in Alvaredo et al (2020).

Data sources

Aggregates

The National Accounts aggregates are compiled by StatisticsNZ following the System of National Accounts (SNA 2008) developed by the United Nations Statistical Commission (UNSC). See StatsNZ (2024) for the detailed methodology. The WID uses a single price index to deflate all series: the national income deflator, always anchored to the base year of the data, in this case 2022 New Zealand dollars (NZD). StatsNZ provides a more detailed decomposition of property income - we integrate these into the National Accounts aggregates available in the World Inequality Database (WID). The construction of National Income for our purposes is presented in Annex 1.

Administrative tax microdata

Access to the microdata used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

We combine tax microdata tables adapting the method employed by StatisticsNZ in the construction of the Administrative Population Census (APC, Welsh 2023, Stats NZ 2023). Adaptations provide for the more detailed disaggregation of income sources, particularly capital income types, than is found in the IDI's APC tables.

Imputation of distribution of interest expenditure from survey data

Microdata on individuals' expenditure on interest payments is not contained in the administrative tax sources. We make use of the Household Economic Survey (HES)[2] to impute values onto the tax microdata set. The HES collects information on household income, savings, and expenditure, as well as demographic information on individuals and households in three components: HES income, HES expenditure, and HES household net worth. HES income is the main vehicle for collecting household economic information, running every year. A basic survey on household expenditure is run alongside the income survey annually; wealth and more detailed expenditure data are collected only every three years. The HES data is able to be linked to the tax microdata held in the IDI from 2006/07 to 2021/22.

We use the HES expenditure survey to impute the distribution of aggregate interest payable. On the full tax microdata set, we form groups over seven labour income groupings (L), seven capital income groupings (K),

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and five age brackets (Age)[3], that is, we form 245 L x K x Age groups, and fit parameters of the distribution of interest expenditure in the linked tax-survey set for each of these groups. From these parameters for each group, we draw a value for interest expenditure for each individual in the full tax microdata set, preserving the relation between labour and capital income ranks and age groups found in the survey data.

Concepts

Within the resident population, our benchmark DINA series consider the subpopulation of people of age 20 and older. In New Zealand the tax unit is the individual, therefore we construct "individualistic adult" series from the microdata, then apply a simple transformation to attain an equal-split adult series, drawing on the relation between the individualistic and equal-split series for Australia, constructed in Fisher-Post et al (2022).

Four main national income concepts are identified in Alvaredo et al. (2020): pretax factor income; pre-tax post-replacement income; post-tax disposable income; and post-tax national income. We construct series for these four concepts, of which three are made available in the WID.

Ideally, pre-tax factor income corresponds to total income accruing to capital and labour, where all of national income is attributed to capital and labour. Pre-tax national income is the same as pre-tax factor income, but with an adjustment made to account for the public pension system by allocating pension payments to recipients and deducting the contributions used to fund them (such that it still sums to national income). In New Zealand, the pension system is non-contributory, and as such a contributions basis for distributing pension income lacks meaning. Aiming as nearly as possible to the concepts proposed by the WIL while representing the pension system soundly, our factor income and our pre-tax national income series differ in that the former allocates net government primary income (consisting of revenue from indirect taxes, operating surpluses, and property income[4]) in proportion to factor income prior to government income, meaning net government primary income scales net incomes but preserves shares, and the latter allocates pension income to its recipients, then distributes the remaining government income in proportion to factor income. In this way, factor income can be thought of as "pre-pension", and pre-tax national income as "post-pension". Post-tax series go on to capture the wider tax and transfer system.

From there, post-tax disposable income deducts all taxes attributable to individuals and adds cash transfers - atop the pension income already distributed as pre-tax national income. As an accounting identity, the total value of taxes deducted equals the total value of taxes collected by government. In the first instance, government expenditure is not allocated to individuals and thus the sum of post-tax disposable income is less than national income. The post-tax national income series then distributes all of government expenditure, proportionate to post-tax disposable income, scaling total income while maintaining the distribution.

We provide finer groupings within the top 1% of the distribution, using the generalized Pareto interpolation technique developed by Blanchet et al. (2017).

Previewing comprehensive work

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[3] This was found to be the minimum quartile size producing sufficient observations in each L x K x Age grouping in the linked subset.

[4] Only in the post-tax income series is the personal income tax system accounted for, whereupon taxes paid are attributed to individuals as negative income.

This technical note has presented in brief the high-level construction of a distributional national accounts series for New Zealand, previewing a comprehensive presentation of our approach and results, expected in early 2025.

The comprehensive paper will cover the concepts and methods touched upon here in greater detail, presenting a broad range of auxiliary analyses supporting the approach taken and discussing institutional features and particularities of the data sources in the New Zealand context. Methods and results for income concepts other than those provided for the benchmark DINA series will also be presented and discussed, including those for a Haig-Simons income concept inclusive of capital gains due to asset-price movements, comparable to the approach taken in Robbins (2018). Implications for policy evaluation and design will receive significant attention.

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Annex: Aggregates

Note: Series break from 2018 - doesn't impact the final national income distribution given aggregation of distributive bases in the DINA construction

WIL code	StatsNZ code		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
		Primary income components											
comhn		compensation of employees	138678	140965	147365	154635	160511	166971	154082	175397	175843	183085	188246
gsmhn		gross operating surplus	13051	13942	14702	15635	16741	17896	22350	25737	26873	27254	28379
prphn		net property income	50677	53164	51212	53485	59803	63296	53734	60922	67546	61275	59707
		entrepreneurial income	25564	24490	27496	25718	29132	34974	40624	45843	52160	45499	48912
		interest	8555	9063	8403	9975	10457	8866	9935	11065	10633	6176	5157
		dividend	4498	6518	3547	4486	5151	5617	6455	7398	7702	10587	5352
		pensions / insurance	1801	2070	1755	2026	2284	2116	2261	2407	2414	1899	2006
		overseas capital income	2427	2822	2567	2557	3430	3076	3697	4411	4461	3398	3561
		interest payable	-6715	-6631	-6624	-7350	-7222	-6909	-9237	-10203	-9825	-6285	-5281
prghn		gross primary income of households & NPISH	202405	208071	213279	223755	237055	248163	230166	262056	270261	271613	276332
cfchn		cfc attributable to households	-5557	-5719	-6027	-6453	-6866	-7267	-7620	-8568	-8768	-9516	-9566
prihn		net primary income of households & NPISH	196849	202352	207252	217302	230189	240896	222546	253487	261493	262098	266766
prico		net primary income of corporations	26401	30982	31989	34970	33936	37083	25036	39322	37799	45518	40507
prigo		net primary income of government	35223	39191	40269	43030	45750	46623	48255	48933	36544	40997	49512
nninc		**net national income**	**258473**	**272524**	**279510**	**295303**	**309876**	**324601**	**295837**	**341742**	**335836**	**348613**	**356786**
		Secondary income components											
taxhn		direct taxes	-51332	-54442	-57842	-59476	-63162	-66020	-64570	-74371	-77191	-81607	-84083
		income tax & contributions	-50132	-53221	-56619	-58263	-61892	-64903	-62994	-72532	-75519	-79943	-82359
		other tax	-1200	-1221	-1223	-1213	-1269	-1117	-1576	-1838	-1672	-1664	-1724

ssbhn		social benefits other than social transfers in kind	58920	59549	61125	64484	66072	67637	44816	51975	57210	56810	57972
		pensions	6427	7615	7237	7631	9783	9517	6091	7341	7397	8013	8291
		benefits	42790	42654	43590	45827	45045	46377	32214	37078	40857	40006	41210
		other incl ACC	9703	9279	10299	11026	11245	11743	6510	7556	8956	8790	8471
taxhn + ssbhn		total secondary income of households and NPISH	7588	5107	3284	5008	2910	1617	-19754	-22396	-19982	-24797	-26110
taxco + sscco + ssbco		total secondary income of corporations	-15257	-13847	-13590	-14769	-15756	-16824	-8659	-12993	-4963	-14531	-13414
taxgo + ssbgo		total secondary income of the general government	7669	8740	10307	9761	12846	15206	28413	35388	24944	39328	39524
sechn		net secondary income of households and NPISH	204437	207459	210535	222311	233100	242513	202792	231092	241512	237301	240656
secco		net secondary income of corporations	11145	17135	18399	20201	18180	20259	16377	26329	32836	30988	27093
secgo		net secondary income of government	42892	47931	50576	52791	58596	61829	76668	84322	61488	80324	89037
nninc		**net national income**	**258473**	**272524**	**279510**	**295303**	**309876**	**324601**	**295837**	**341742**	**335836**	**348613**	**356786**

StatsNZ Table reference: SNE205AA, Last Updated: 25 Jan 2024

WIL code	StatsNZ code		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
		Primary income components												
comhn		compensation of employees	94920	99200	102420	108478	114027	120119	125873	132571	135965	134295	133295	135756
gsmhn		gross operating surplus	10548	10604	10949	11492	12076	12444	12970	13492	12706	11653	12366	12883

prphn		net property income	40652	42209	39540	42605	43467	42933	45440	49168	44145	46143	46448	50114
		entrepreneurial income	25563	31253	30165	31315	32134	30360	30969	34370	19212	17501	20935	25340
		interest	6782	9462	8166	10175	9831	11272	14228	16355	9111	10990	8396	9254
		dividend	8640	2793	3076	4589	5318	6421	7426	7685	3920	4180	5309	2834
		pensions / insurance	3725	4325	3680	3733	3253	3102	3315	3257	1563	1741	1817	1836
		overseas capital income	1832	2634	1881	2018	2017	2067	2875	3191	1230	1549	2011	2335
		interest payable	-5890	-8258	-7427	-9225	-9086	-10288	-13373	-15689	-9469	-9270	-6742	-6856
prghn		gross primary income of households & NPISH	146119	152012	152909	162575	169569	175496	184284	195231	192815	192092	192109	198753
cfchn		cfc attributable to households	-3578	-3697	-3776	-4017	-4396	-4724	-4942	-5239	-5335	-5441	-5362	-5420
prihn		net primary income of households & NPISH	142541	148315	149134	158559	165173	170772	179342	189992	187480	186651	186748	193333
prico		net primary income of corporations	21721	26044	28213	28917	26028	22548	14357	16316	15310	23910	25966	24882
prigo		net primary income of government	23415	24403	25936	27320	29483	30503	36057	34935	33166	34845	32877	36007
nninc		**net national income**	187678	198762	203283	214795	220684	223824	229756	241243	235957	245405	245591	254222
	Secondary income components													
taxhn		direct taxes	-44183	-43207	-44230	-44589	-45266	-48447	-51189	-55441	-56768	-51349	-49561	-49696
		income tax & contributions	-43294	-42405	-43410	-43752	-44330	-47406	-50164	-54389	-55763	-50481	-48560	-48611
		other tax	-889	-802	-820	-837	-937	-1041	-1025	-1052	-1006	-869	-1001	-1084
ssbhn		social benefits other than social transfers in kind	46940	46653	46314	46987	45821	47773	51815	54382	57376	58059	56963	57471
		pensions	8801	9127	8303	8273	7605	6811	7830	7712	7697	8403	6673	5886
		benefits	31398	31127	31498	31623	31009	32231	34612	37054	39215	38973	40281	41478
		other incl ACC	6741	6399	6513	7091	7206	8731	9373	9615	10464	10683	10009	10106
taxhn + ssbhn		total secondary income of households and NPISH	2757	3446	2084	2398	555	-673	626	-1059	607	6710	7402	7775

taxco + sscco + ssbco		total secondary income of corporations	-10903	-12635	-13920	-17296	-17385	-19414	-18544	-17983	-15167	-12294	-13606	-12844
taxgo + ssbgo		total secondary income of the general government	8146	9189	11836	14898	16831	20088	17918	19043	14560	5584	6204	5069
sechn		net secondary income of households and NPISH	145298	151761	151218	160956	165728	170098	179968	188932	188087	193360	194150	201109
secco		net secondary income of corporations	10818	13408	14293	11622	8643	3134	-4186	-1667	144	11616	12360	12038
secgo		net secondary income of corporations	31561	33593	37772	42217	46314	50591	53974	53978	47726	40429	39081	41076
nninc		**net national income**	187678	198762	203283	214795	220684	223824	229756	241243	235957	245405	245591	254222

Annex: Concordances

Aggregate	Distributive basis
Pre-tax factor income *(IR income source)*	
Compensation of employees (including pension contributions)	Wages & salary (including pension contributions) *(EMS)*
Overseas investment	Overseas capital income *(IR3)*
Earnings attributable to pension & insurance holders	Interest *(IR3, then AC, then PTS)*
Self employment, mixed income, gross surplus of households (unincorporated businesses)	Self employment *(EMS, IR7, IR20)* and rental income *(IR3)*
Interest	Interest *(IR3, then AC, then PTS)*
Dividend	Dividends *(IR3, then AC, then PTS)*
Government net primary	Shares of national income excl GNP - scaling incomes, preserving shares
Corporate net primary	Dividend + interest *(IR3, then AC, then PTS)*
CFC	Dividend + interest *(IR3, then AC, then PTS)* + self-employment *(EMS)* + rents *(IR3)*
Interest payable	Interest expenditure *(imputed from survey data)*
Pre-tax national income (atop pre-tax factor income, after deducting pension portion of government net primary)	
Pensions	Pensions *(EMS)*
Post-tax disposable income (atop pre-tax factor income)	
Other social benefits in cash	Lump-sum
Social assistance in cash	Benefits *(EMS)*
Income tax	Total personal taxable income *(IR3)*
Other tax	Lump-sum

Corporate net secondary	Dividend + interest *(IR3, then AC, then PTS)*
Post-tax national income (atop post-tax disposable income)	
Government net secondary	Shares of national income excl GNP - scaling incomes, preserving shares