

**WHO PAYS THE TAX BURDEN
IN AUSTRALIA?
ESTIMATES FOR 1996-97**

Ann Harding and Neil Warren

**Discussion Paper no. 39
February 1999**

NATSEM

National Centre for Social and Economic Modelling
• Faculty of Management • University of Canberra •

The National Centre for Social and Economic Modelling was established on 1 January 1993, and currently receives core funding from the University of Canberra and the federal departments of Family and Community Services, Health and Aged Care, Education, Training and Youth Affairs, and Employment, Workplace Relations and Small Business.

NATSEM aims to be a key contributor to social and economic policy debate and analysis by developing models of the highest quality, undertaking independent and impartial research, and supplying valued consultancy services.

Policy changes often have to be made without sufficient information about either the current environment or the consequences of change. NATSEM specialises in analysing data and producing models so that decision makers have the best possible quantitative information on which to base their decisions.

NATSEM has an international reputation as a centre of excellence for analysing microdata and constructing microsimulation models. Such data and models commence with the records of real (but unidentifiable) Australians. Analysts typically begin by looking at either the characteristics of or the impact of a policy change on an individual household, building up to the bigger picture by looking at many individual cases through the use of large datasets.

It must be emphasised that NATSEM does not have views on policy: all opinions are the authors' own and are not necessarily shared by NATSEM or its core funders.

Director: Ann Harding

NATSEM

National Centre for Social and Economic Modelling
• Faculty of Management • University of Canberra •



**WHO PAYS THE TAX BURDEN
IN AUSTRALIA?
ESTIMATES FOR 1996-97**

Ann Harding and Neil Warren

**Discussion Paper no. 39
February 1999**



ISSN 1320-3398
ISBN 0 85889 761 X

© NATSEM, University of Canberra 1999

National Centre for Social and Economic Modelling
University of Canberra ACT 2601
Australia

170 Haydon Drive
Bruce ACT 2617

Phone + 61 2 6201 2750

Fax + 61 2 6201 2751

Email Client services hotline@natsem.canberra.edu.au
General natsem@natsem.canberra.edu.au

Website www.natsem.canberra.edu.au

Abstract

There is a paucity of information about the distribution of the direct and indirect tax burden in the 1990s in Australia. The only other study for the 1990s, by the Australian Bureau of Statistics, includes only about a third of indirect taxes within its scope. This study examines the distribution of direct, indirect and company taxes, by income and expenditure quintiles, by life cycle stage, by family type, and by whether households contain smokers or drinkers. The study concludes that the overall impact of the Australian taxation system is progressive.

Author note

Ann Harding is Professor of Applied Economics and Social Policy and inaugural Director of the National Centre for Social and Economic Modelling at the University of Canberra.

Neil Warren is Associate Professor of Economics with the Australian Taxation Studies Program (ATAX) at the University of New South Wales, Sydney.

Acknowledgments

The authors would like to thank Simon Lambert for comments on earlier drafts. A good summary of these results was published in issue 8 of NATSEM's *Income Distribution Report* in April 1998.

General caveat

NATSEM research findings are generally based on estimated characteristics of the population. Such estimates are usually derived from the application of microsimulation modelling techniques to microdata based on sample surveys.

These estimates may be different from the actual characteristics of the population because of sampling and nonsampling errors in the microdata and because of the assumptions underlying the modelling techniques.

The microdata do not contain any information that enables identification of the individuals or families to which they refer.

Contents

Abstractiii
Author note iv
Acknowledgments iv
General caveat iv
1 Introduction1
2 Data sources and methodology2
3 Tax burdens of the average household6
4 Tax burdens by income and expenditure quintile7
5 Tax burdens over the life cycle17
6 Tax burdens by family type22
7 Tax burdens by principal household income source29
8 Taxes paid by smokers and drinkers31
9 Conclusions34
References35

1 Introduction

During the past 15 years, tax reform has been a subject of intense interest in Australia. This is due partly to the two packages of sweeping reforms outlined in the Labor Government's 1985 Draft White Paper on Tax Reform and the Liberal Party's 1991 Fightback package. Such reform is again under the spotlight, as the current Government prepares a comprehensive package of tax reforms.

Equity is a key issue in the tax reform debate. There is strong community concern that the tax burden should be shared fairly across society. Many hope that tax reform will improve, or at the very least not worsen, the existing degree of fairness. The two basic principles of tax equity are horizontal and vertical equity. *Horizontal equity* means that people in similar positions should be treated equally. In tax terms, people with equal ability to pay should pay the same amount in tax. For example, single people with the same income level should pay the same amount of tax, irrespective of whether they derive that income from wages, investments or self-employment. It also means that those with additional demands on their income should pay less tax than those with the same income but without such demands. This principle is often used to justify, for example, lower tax for those with children or dependent spouses or high health costs.

Vertical equity requires that people should pay taxes according to their ability to pay. This usually means that those with greater ability to pay should pay a higher proportion of their income in tax than those who cannot afford to pay as much. For example, under the current income tax scales a single person earning \$25 000 a year pays 18 per cent of their income as income tax; a single person earning \$50 000 a year pays 28 per cent as income tax.

Although these principles may sound straightforward, there is often disagreement about their interpretation. There are no precise rules about what constitutes similar positions or about how much extra tax people with higher incomes should pay. Australians hold widely differing views, for example, about how much less tax people with children should pay or how much more tax millionaires should pay.

When assessing the fairness of the tax burden, it is also important to consider the combined impact of all taxes. Income tax is usually a *progressive* tax, which means that the proportion of income paid as tax increases as income increases. On the other hand, indirect taxes are generally *regressive*, which means that the poor pay a higher proportion of their income as such taxes than do the rich. This is principally because those on higher incomes save more of their income, and indirect taxes are incurred only when income is spent.

It is surprisingly difficult to assess how fair the distribution of the tax burden is in Australia today because of the paucity of comprehensive and up-to-date information on tax burdens. The latest fiscal incidence study (for 1993-94) of the Australian Bureau of Statistics (ABS 1996) allocates only 36 per cent of all indirect taxes to households and does not include company taxes. Earlier and more comprehensive work was undertaken by Warren (1991), but only for the 1980s. This study aims to fill the gap by providing estimates of current tax incidence for a comprehensive range of taxes and population subgroups.

It must be emphasised that assessing who bears the tax burden requires highly sophisticated modelling and numerous heroic assumptions. The methodology used in this study is generally similar to that used in most tax incidence studies, but the results can still be regarded as only indicative rather than definitive.

2 Data sources and methodology

This section provides a brief description of STINMOD-STATA, the model used to produce the results in this paper. A more comprehensive description is available in Lambert and Warren (1999), which is easily accessible on NATSEM's website.

The original base data for the study is the household expenditure survey (HES) unit record tape for 1993-94, produced by the Australian Bureau of Statistics. The deficiencies of this survey as a basis for estimating the incidence of taxes are well known and severe (Harding 1992; Wright and Dolan 1992). Problems include understatement by survey respondents of expenditure on 'sin' goods such as alcohol and tobacco, and the inclusion of 'lumpy' expenditure items such as houses and cars in the

survey but the exclusion of lumpy income items such as capital gains and inheritances. As a result of this methodology the survey finds that, for about half of all Australian households, total expenditure exceeds current usual weekly income. There is, however, no other data source available for estimating the incidence of indirect taxes.

The base data for 1993-94 have been 'aged' to 1996-97 using standard static ageing techniques. Private incomes from wages, self-employment, investments and other sources have been updated to November 1996 using movements in average earnings, the National Accounts, various components of the consumer price index and other income measures. The demographic characteristics of the population (age, sex, labour force status and family status) have been reweighted to match November 1996 ABS labour force survey data benchmarks. Household expenditures have been updated to 1996-97 by movements in relevant detailed consumer price indexes.

Government cash transfers have been imputed by NATSEM using STINMOD based on the March 1997 program rules. They total around \$42 billion and include most Commonwealth social security and veterans payments, as well as Austudy and other education income support payments. Income tax liabilities have also been modelled. The income tax scale, income tax rebates and the Medicare levy rate have been imputed by NATSEM for the 1996-97 financial year. Income taxes have been assumed to be fully incident upon those legally liable to pay them. The total amount of income tax paid in 1996-97 is estimated to have been \$64 billion. For further information about STINMOD, see Lambert et al. (1994).

Indirect and company taxes have been imputed to households using the STATAX model component of STINMOD-STATAX. The taxes allocated in STATAX, along with the assumed proportions borne by domestic consumers, are detailed in table 1.

STATAX uses four data sources in deriving its results. Input-output data for 1993-94 are used to identify the indirect tax component in final consumer prices in 1993-94. National accounts and taxation revenue data are then used to age the 1993-94 input-output data to 1996-97. The result of this process is estimates of the indirect tax component in the price of goods and services consumed by households (through household final consumption expenditure), firms (gross fixed capital expenditure and

stocks), governments (final consumption and gross fixed capital expenditure) and non-resident consumers (by consuming Australia's exports and investing in Australia).

This information is then combined with a series of assumptions about how the various taxes come to be borne by households. The most fundamental underlying assumption in STATAX is that, ultimately, all taxes are incident on households, whether they are resident or non-resident households. This is different from, for example, the modelling approach used in the ABS (1996) study. The ABS allocates to households only those taxes that can be directly attributed to households through

Table 1 Indirect and company taxes collected in Australia, 1996-97

	Total tax burden	Estimated domestic burden	Domestic burden as % of total
	\$ million	\$ million	%
Federal			
Corporation tax ^a	18 770	15 123	80.6
Wholesale sales tax	13 293	12 385	93.2
Excise			
Petrol (incl. PRRT ^b)	11 935	10 135	84.9
Tobacco	1 687	1 682	99.7
Beer	887	887	100.0
Other alcohol	542	536	98.8
Primary production	603	525	87.0
Customs duty	2 854	2 617	91.7
Fringe benefits tax	3 062	2 858	93.3
Other indirect taxes	1 819	1 667	91.7
Subtotal	55 453	48 414	86.7
State			
Land tax	1 988	1 878	94.4
Motor vehicles	3 592	3 501	97.5
Stamp duties	5 805	5 488	94.6
Payroll tax	7 632	6 558	85.9
Gambling taxes	3 497	3 497	100.0
Franchise taxes	5 221	4 988	95.5
Other indirect taxes	4 440	4 192	94.4
Subtotal	32 175	30 102	93.6
Local			
Rates	5 704	5 374	94.2
Total	93 332	83 890	89.9

^a Adjusted for imputation credits claimed through the personal income tax. ^b Petroleum resource rent tax.

Sources: ABS (1997); STATAX estimates.

their final consumption expenditure. Indirect taxes that fall on investment goods, for example, are ignored in the ABS study. (In contrast, for example, the wholesale sales tax paid on computer equipment when it is purchased by an airline is assumed in STINMOD–STATAX to be subsequently borne by consumers when they purchase airline tickets.) As a result, less than half of all indirect taxes are allocated in the ABS study. In addition, company tax is excluded from the ABS study. The ABS study is therefore not reporting the effect of all taxes on households.

The final data source used when allocating taxes to households is the household expenditure survey for 1993-94. As already noted, after aging the expenditure of households to the base year of 1996-97 using disaggregated consumer price indexes, the different indirect taxes are distributed to households on the assumption that their shares of the particular goods reported in household expenditure survey are in line with their shares of the aggregate reported in the National Accounts. What this means is that all taxes are allocated to households, even if the survey indicates a level of underreporting of specific consumption goods. This is most important in the case of alcohol consumption — the household expenditure survey appears to significantly underreport the consumption of alcohol. The STATAX modelling assumptions become an issue only if the distribution of this underreporting is not consistent with the underreporting in survey. This is again different from the assumptions made in the ABS study, where no adjustments are made to allow for the underreporting of expenditure, particularly on alcohol and tobacco (ABS 1996, p. 68).

The detailed tax incidence assumptions adopted in STATAX are described in detail in Warren (1987) and Lambert and Warren (1999). Probably the most controversial incidence assumption is that 50 per cent of the company income tax is borne by shareholders (via lower dividends) and 50 per cent by consumers of products produced by the companies (via higher prices). While various other assumptions could be adopted, the stance taken is designed to reflect a somewhat inconclusive literature on the incidence of capital taxes. While there is a growing case to assume that in an internationally competitive environment these taxes are like consumption taxes, there are other arguments that suggest that capital taxes are borne by capital owners.

It is important to note that not all households have been retained within STINMOD–STATAX when calculating the results contained in this

paper. Households with negative incomes and households whose ratios of expenditure to gross income exceeded 2.5 have been excluded (3.9 per cent of all households). The exclusion of such outliers ensures that the estimates of tax incidence are not unduly affected by the small number of households whose expenditure and income patterns are clearly temporary and cannot be maintained in the long term. This approach is also consistent with earlier practice in this field (Harding 1993, p. 435). The tax unit used in this study is the household, defined as a group of people who usually reside and eat together.

Weekly rather than annual income is used, and zero incomes are included.

Each record in STINMOD-STATAX has a weight attached to it that represents the estimated number of households with a similar set of characteristics in the Australian population. For example, a household with a weight of 300 is estimated to represent 300 comparable households in the Australian population.

All of the results are household weighted (rather than person weighted).

3 Tax burdens of the average household

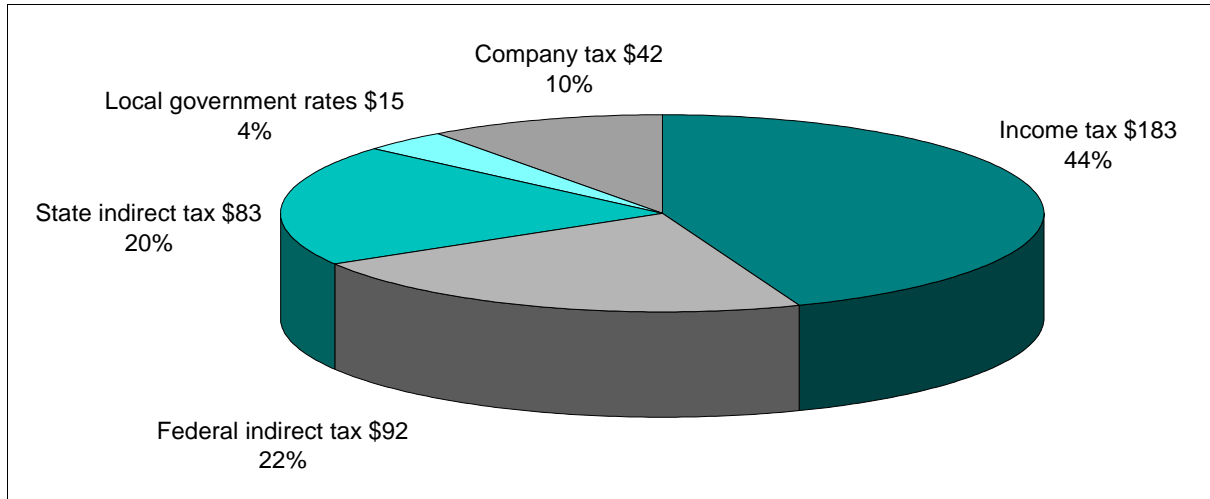
In 1996-97 the average Australian household received an estimated income of \$898 a week and paid \$414 a week in taxes. Taxes thus took up just under half of the average household's cash income.

What were these taxes? The average household paid an estimated \$183 a week in income tax — about one-fifth of gross income (figure 1 and table 2). Income tax is the most visible tax in Australia; yet it makes up under half of the total Australian tax burden.

For example, indirect taxes levied by the Federal Government — including wholesale sales tax, excises and customs duties — absorbed \$92 of the average household's income each week. Indirect taxes levied by State and Territory Governments — such as land taxes, stamp duties and payroll tax — were almost as high, taking a further \$83 a week. Local council rates made up another \$15 a week. And, finally, company tax took another \$42 a week from the average household. (Company tax

is assumed to be passed on to both consumers and shareholders — see section 2.)

Figure 1 **Estimated taxes paid by the average household, 1996-97**



Data source: STINMOD–STATAX.

4 Tax burdens by income and expenditure quintile

One of the most commonly used methods of assessing how fairly the tax burden is distributed is to look at taxes paid relative to the income of different types of households. To do this, all Australian households are ranked by their total household income, and then divided into five equally sized groups called quintiles. The least affluent 20 per cent of households — at least as measured by their cash incomes — were thus in the bottom quintile (quintile 1), while the most affluent 20 per cent were in the top quintile (quintile 5).

The simulation suggests that the least affluent 20 per cent of households had a total cash income of \$234 in 1996-97, with \$200 of this from government cash benefits and just under \$35 a week from such private income sources as wages and salaries, self-employment and investment income. Not surprisingly, because of their low taxable income, such households paid only an estimated \$2 a week in income tax.

However, such households spent an average of \$266 a week on goods and services. This was about \$30 more than their income, so such households were dissaving. Many households in the bottom quintile are retired and financing their spending by running down savings accumu-

lated during their working years. Others contain unemployed people who are drawing on their assets. Others may be self-employed, and their incomes might not be a reliable guide to their real standard of living.

Irrespective of the reason for the dissaving, the spending on goods and services results in the bottom quintile bearing significant indirect tax burdens. For example, the bottom quintile paid an estimated \$26 a week in wholesale sales tax and excise duties (on tobacco, alcohol and petrol). Other federal indirect taxes absorbed a further \$6 a week, mainly from customs duties and fringe benefits taxes. State indirect taxes, such as stamp duties, gambling taxes and franchise fees, claimed another \$33 a week, while local government rates took a further \$8 a week. After adding in company taxes, the total tax bill paid by the bottom quintile was about \$84 a week (see the first panel in table 2).

How does this compare with the taxes paid by the most affluent 20 per cent of households? The top 20 per cent had an estimated total income of about \$1990 a week, paid income tax of about \$550 and a further \$458 in indirect taxes. Their total tax burden was thus estimated at \$1007 a week, which is obviously substantially more than the \$84 paid by the bottom quintile (figure 2).

Table 2 **Estimated taxes paid and other characteristics of households, by four quintile rankings, 1996-97**

	Quintile					All households
	Bottom 20%	Second 20%	Middle 20%	Fourth 20%	Top 20%	
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
Quintile of gross household income, household-weighted						
Private income	34	242	629	1 037	1 966	782
Govt cash benefits	200	204	100	55	24	117
Total income	234	446	729	1 092	1 990	898
Current expenditure	266	466	648	838	1 151	674
Income tax	2	28	114	223	549	183
WST ^a & excise	26	49	66	84	127	70
Other federal indirect tax	6	11	18	25	47	21
State indirect tax	33	58	77	98	147	83
Local indirect tax	8	11	14	17	24	15
Company tax	10	23	29	37	113	42
Total all tax	84	181	317	483	1 007	414

(Continued on next page)

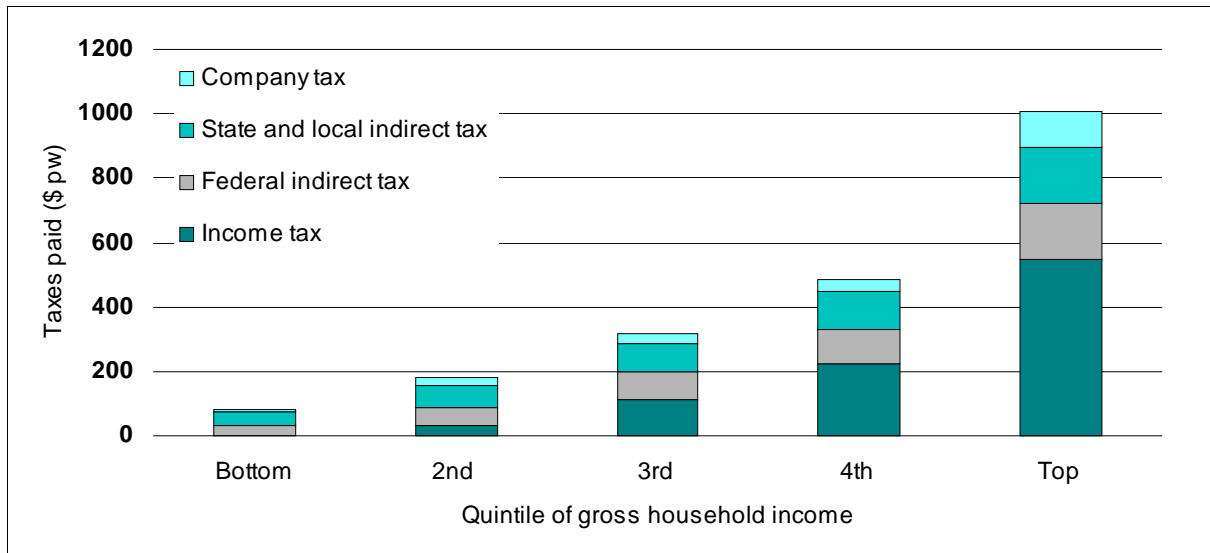
Table 2 (continued)

	Quintile					All households
	Bottom 20%	Second 20%	Middle 20%	Fourth 20%	Top 20%	
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
<i>Quintile of equivalent gross household income, person-weighted</i>						
Private income	58	342	716	1 051	1 817	782
Govt cash benefits	238	182	82	45	13	117
Total income	296	524	797	1 096	1 830	898
Current expenditure	352	523	689	807	1 045	674
Income tax	4	47	128	224	519	183
WST ^a and excise	35	52	70	82	117	70
Other federal indirect tax	8	13	19	24	44	21
State indirect tax	43	60	81	97	137	83
Local indirect tax	9	13	15	17	22	15
Company tax	12	21	30	36	113	42
Total all tax	110	205	343	479	952	414
<i>Quintile of current household expenditure, household-weighted</i>						
Private income	141	388	716	1 049	1 612	782
Govt cash benefits	182	170	112	74	46	117
Total income	323	558	829	1 123	1 658	898
Current expenditure	202	398	589	817	1 363	674
Income tax	21	73	152	242	427	183
WST ^a and excise	22	44	61	85	140	70
Other federal indirect tax	6	11	18	26	46	21
State indirect tax	29	56	73	99	156	83
Local indirect tax	9	11	13	17	24	15
Company tax	14	25	29	45	98	42
Total all tax	100	219	346	514	892	414
<i>Quintile of equivalent current household expenditure, person-weighted</i>						
Private income	273	508	769	961	1 425	782
Govt cash benefits	196	155	110	82	33	117
Total income	469	664	879	1 043	1 458	898
Current expenditure	265	463	622	804	1 233	674
Income tax	47	99	166	223	385	183
WST ^a and excise	28	48	65	82	130	70
Other federal indirect tax	8	13	19	25	43	21
State indirect tax	36	58	79	96	146	83
Local indirect tax	9	12	14	17	22	15
Company tax	13	23	31	40	104	42
Total all tax	142	253	374	482	829	414

^a WST = wholesale sales tax.

Source: STINMOD-STATAx.

Figure 2 **Estimated taxes paid, by quintile of household-weighted gross household income, 1996-97**



Data source: STINMOD-STATAx.

However, the absolute value of tax paid does not usually indicate the fairness of the tax burden. Usually tax burdens are analysed as a percentage of income. Under a progressive tax system the proportion of income paid in tax rises as income increases, while under a regressive tax the proportion falls as income increases. A tax is described as proportional if the percentage of gross income paid in tax remains steady as income increases.

Figure 3 shows different taxes expressed as percentages of gross weekly income in 1996-97. Income tax is clearly progressive, rising from less than 1 per cent of the income of the bottom quintile to about 28 per cent of the income of the top quintile. The impact of all indirect taxes (including company tax) is, however, regressive, taking 35 per cent of the income of the bottom quintile but only 23 per cent of the income of the top quintile. The indirect taxes levied by each of the three levels of government are all regressive. For example, wholesale sales tax and excise together take 11 per cent of the income of the bottom quintile, falling steadily to 6.4 per cent of the income of the most affluent quintile.

Other federal indirect taxes remain fairly steady at about 2.4 per cent of gross income across the income spectrum. When added to wholesale sales tax and excise, the net impact of all federal indirect taxes is

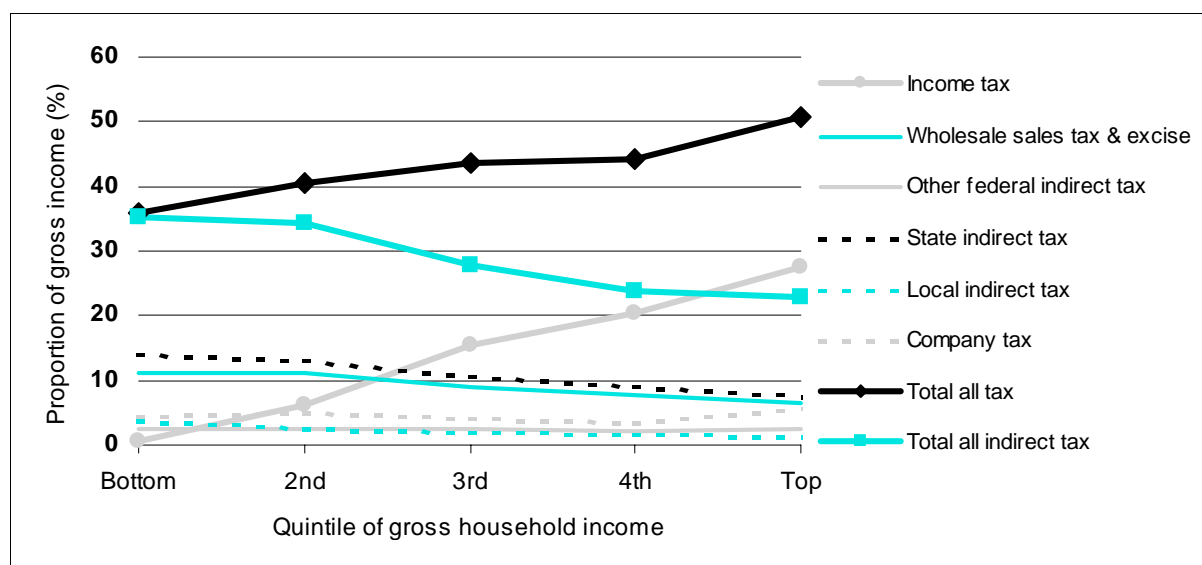
regressive, such taxes taking 13.4 per cent of the gross income of the poorest 20 per cent but only 8.7 per cent of the gross income of the richest 20 per cent in 1996-97.

What about state indirect taxes? They appear somewhat more regressive than the federal indirect taxes, falling from 13.9 per cent of the income of the bottom quintile to only 7.4 per cent of the income of the top quintile in 1996-97. Perhaps surprisingly to many people, local government rates, which are linked to the value of land owned, are also regressive, declining from 3.6 per cent of the income of the bottom quintile to 1.2 per cent of the income of the top quintile. This is largely due to the aged, who are clustered in quintiles 1 and 2 and have low incomes but relatively high land asset levels. This effect thus in part reflects the deficiencies of gross income as a measure of economic resources, as assets are excluded from this definition of economic resources.

It is more difficult to draw firm conclusions about the incidence of company tax, as this tax has a U-shaped incidence, being 4.4 per cent of the gross income of the bottom quintile of households, falling for middle income households, and then rising to reach 5.7 per cent of income for the top quintile. However, much of this trend appears related to the distribution of dividend income.

The overall effect of the entire tax system is shown in the top line in

Figure 3 **Estimated taxes as a percentage of gross income, by quintile of household-weighted weekly gross household income, 1996-97**



Data source: STINMOD-STATA.

figure 3. It indicates that the impact of the whole system is progressive, with tax burdens rising from 36 per cent of the total income of the poorest one-fifth of households to 51 per cent of the total income of the most affluent one-fifth of households. The progressive effect of income tax is thus substantially, but by no means fully, offset by indirect taxes.

Another way of assessing whether taxes are progressive or regressive is to use the tax progressivity measure developed by Kakwani (1977), which compares the Lorenz curve of pre-tax gross income with the concentration curve of taxes. (A Lorenz curve simply shows the cumulative share of total pre-tax income received by households ranked by their pre-tax income, while the concentration curve shows the cumulative proportion of a particular tax paid by households ranked by their pre-tax income.) The Kakwani progressivity measure is:

$$P = C - G$$

where C is the concentration coefficient of tax and G is the Gini coefficient of pre-tax income (these measures are derived from the Lorenz and concentration curves). A positive value of P implies a progressive tax and a negative value implies a regressive tax. The results presented in table 3 confirm that federal, state and local indirect taxes are regressive, while income tax is progressive. Interestingly, the results suggest that company tax is progressive. This underlines the significance of the incidence assumptions outlined in section 2, as in STINMOD-STATAx it is assumed that half of company tax is shifted forward to consumers via higher prices and half is shifted backward to shareholders via lower dividends. Because higher income households are more likely to own shares, the backward shifting assumption results in an apparent-

Table 3 Kakwani tax progressivity index for various taxes, 1996-97

Tax	Concentration coefficient	Gini coefficient for pre-tax gross income	Progressivity index	Result
Income tax	0.607	0.396	+0.211	Progressive
WST ^a & excise	0.290	0.396	-0.106	Regressive
Other federal tax	0.314	0.396	-0.082	Regressive
State indirect tax	0.279	0.396	-0.117	Regressive
Local indirect tax	0.210	0.396	-0.186	Regressive
Company tax	0.475	0.396	+0.079	Progressive
All taxes	0.449	0.396	+0.053	Progressive

^a WST = wholesale sales tax.

ly progressive incidence for company taxes. If, instead, it were assumed that company tax was fully shifted forward into prices, then company tax would appear to be a regressive tax. Overall, the Kakwani measure also indicates that the impact of the entire tax system is progressive. (It should be noted that the various Lorenz and Gini curves do not cross, so the results are robust for all of the above taxes (Atkinson 1970).)

This type of analysis replicates much of the approach adopted by the Australian Bureau of Statistics in their regular fiscal incidence studies (ABS 1996, p. 13). However, income distribution experts would suggest that this approach could be improved. First, in this approach gross income has been used to measure which households are affluent and which are struggling. This means that a single person living by themselves and with an income of \$750 a week is placed in the middle quintile, as is a couple with six children and an income of \$750 a week. Equivalence scales are usually applied in an attempt to place families of different size or composition on an equal footing, so that more accurate judgments about relative welfare or the fairness of tax burdens can be made. However, there is no consensus in Australia about what is the most appropriate equivalence scale to use or about whether the same equivalence scale can be applied to both high and low income families.

A second issue is that the above method makes no allowance for family size when allocating households to quintiles. Thus, a single person household and a ten-person household are both counted once when creating the quintile distribution. Because average household size has been falling, this approach may bias assessments of changes in tax burdens over time. Even when only one year is being analysed, as in this case, this approach results in an uneven distribution of the population across the quintiles, with 11 per cent of all persons being in the bottom household quintile and one-quarter of the population being in the top quintile in the first ranking (that is, in the first panel in table 2). There are thus two alternative methodologies that can be used here. *Household weighting* results in 20 per cent of all households being placed within each quintile. *Person weighting* results in 20 per cent of all persons being placed within each quintile.¹

¹ Note that person or household weighting has been used to determine only which quintile of economic resources a household belongs to. All of the other results presented in table 2 are household-weighted means. Thus, in the second ranking, \$58 a week is the average private household income received by those *households*

The second panel in table 2 shows the tax incidence results achieved when both of the above issues have been addressed. Gross incomes have been adjusted using the simplified Henderson equivalence scales, which assume, for example, that a couple without children requires 34 per cent more income than a single person to achieve the same standard of living. And the results have been weighted by the number of persons in the household, so that one-fifth of all persons is in each quintile (rather than one-fifth of all households, as in the first panel of results).

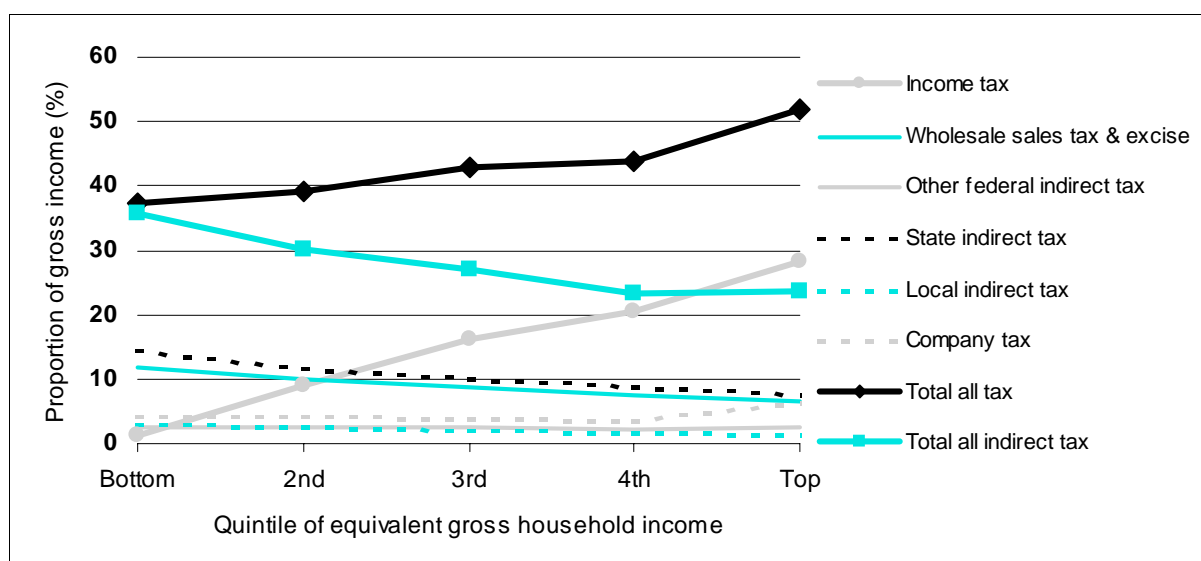
While such measures are necessary to allay fears about the equity of the tax burden being inadequately measured, the most striking outcome from the second panel of results is what little difference applying equivalence scales and person-weighting makes to the overall results. Taking account of household size and composition essentially reduces the extremes of both income and expenditure evident in the first ranking. For example, the total income of the top quintile of households falls from \$1990 in the first ranking to \$1830 in the second, as some households with heads at the peak of their lifetime earnings but with heavy family responsibilities are reclassified to lower quintiles. Conversely, some households with low incomes but with only one person in them are reclassified to higher quintiles.

While both income and expenditure of the bottom quintile are higher in the second ranking relative to the first, so too are both income tax and indirect tax. Similarly, the reduced income and expenditure at the top end of the income spectrum resulted in commensurately reduced tax burdens. As a result, the pattern of overall tax incidence looks remarkably similar (compare figures 3 and 4). Total taxes rise from 37 per cent of the gross income of the bottom quintile to 52 per cent of the income of the top quintile (compared with 36 and 51 per cent respectively under the first ranking). The Kakwani progressivity index under the second ranking for all taxes is +0.092. Under the first ranking the index was +0.053 (table 3), which suggests that the tax system is slightly more progressive once account is taken of the needs of different types of household.

Some would suggest that neither of the above two approaches provides a satisfactory guide to the fairness of tax burdens. This is because it can

placed in the bottom quintile. It is not the average household income received by *individuals* living in households placed in the bottom quintile.

Figure 4 **Estimated taxes as a percentage of gross income, by quintile of person-weighted equivalent weekly gross household income, 1996-97**

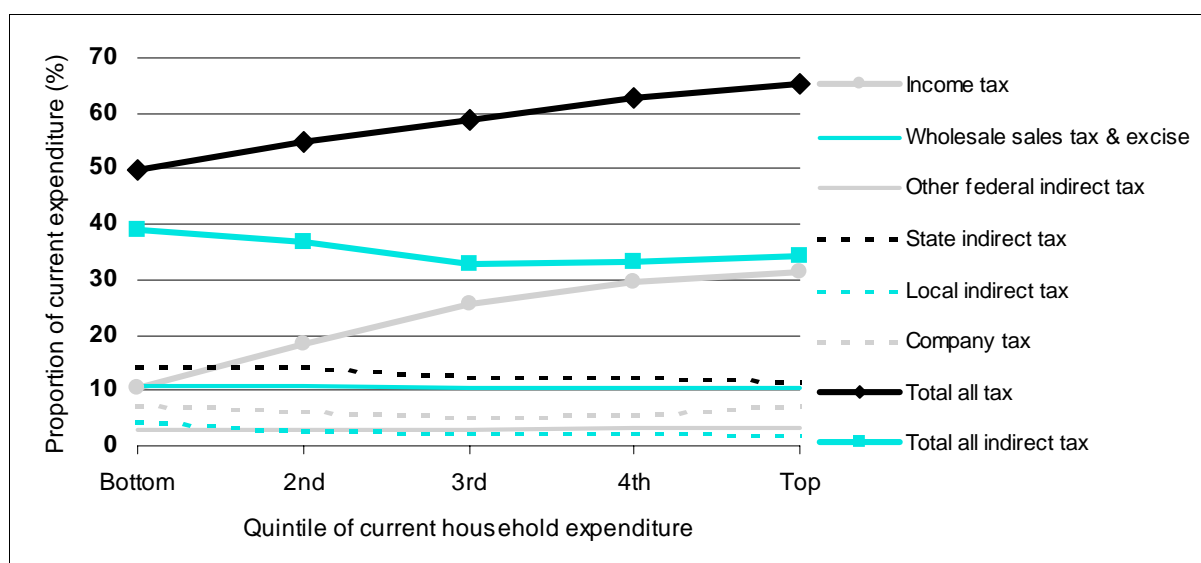


Data source: STINMOD-STATA.

be argued that *expenditure* provides a better measure of economic capacity than income (see, for example, Johnson et al. 1998). For example, in surveys such as the household expenditure survey, which take a snapshot of weekly income, many households may be only temporarily poor due to temporary changes in their circumstances. Thus, another possible way of assessing equity is to examine tax burdens as a percentage of *expenditure* rather than income.

Using expenditure as the measure of ability to pay rather than income results in dramatic changes in tax incidence (see the third panel of results in table 2). Once households are reranked by their current expenditure on goods and services, the income tax system appears much less progressive and the indirect tax system looks much less regressive (figure 5). Overall, the *slope* of the total tax incidence line appears much the same as with the first two rankings, but total tax is a higher proportion of expenditure than of income, simply because average expenditure is lower than average income (due to savings). Total tax burdens made up an estimated 50 per cent of the expenditure of the bottom quintile of households in 1996-97, rising to 66 per cent of the expenditure of the top quintile of households. Once again, the Kakwani progressivity index suggests that the incidence of the entire tax system is progressive, even when current expenditure replaces current income as the measure of economic capacity. However, the Kakwani index for all

Figure 5 **Estimated taxes as a percentage of current expenditure, by quintile of household-weighted current household expenditure, 1996-97**



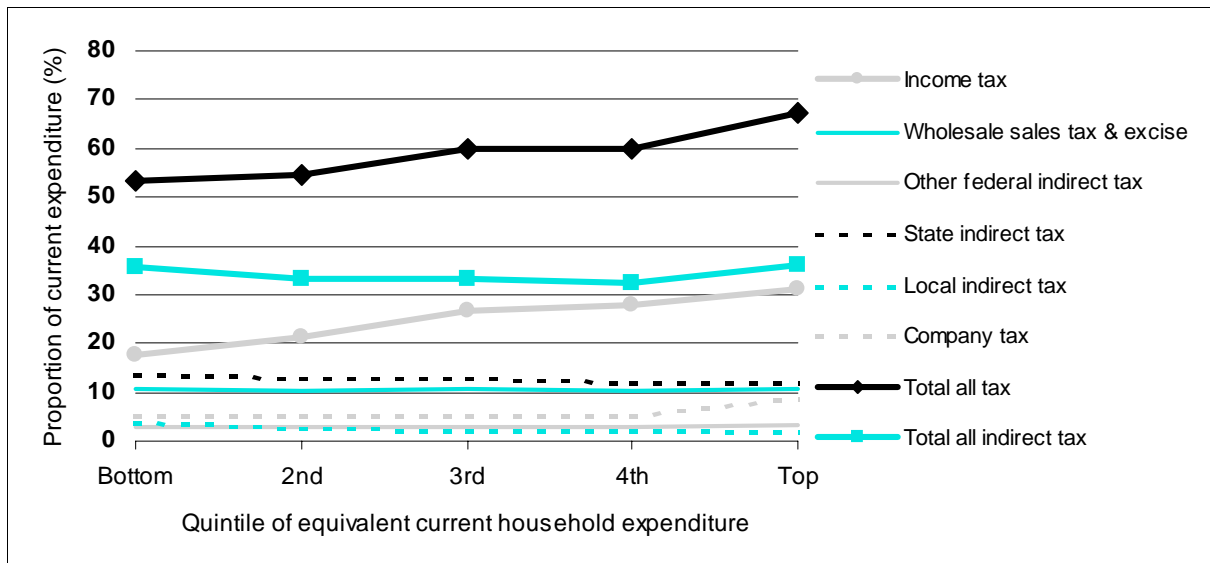
Data source: STINMOD–STATAX.

taxes is +0.042, which indicates a lower degree of progressivity than that apparent when either gross income or equivalent gross income is used as the measure of resources.

Once again, this approach could be criticised on the grounds that total household expenditure is not an adequate measure of the economic resources of households, because it does not take into account different household sizes and compositions. And, similarly, the practice of household weighting means that equal numbers of Australians have not been assigned to each expenditure quintile.

The fourth and final approach, therefore, calculates the equivalent expenditures of households (by applying the simplified Henderson equivalence scale to current expenditure) and weights all results by the number of people in each household. This approach is thus the conceptual equivalent of the second ranking, except that equivalent total current expenditure replaces equivalent total income as the measure of the welfare of the household. Interestingly, the results once again do not differ that markedly from the results of the third ranking. Thus, taking account of the different needs of households reduces the extremes apparent in the previous approach, but also evens out tax burdens. Overall, taxes ranged from 54 per cent of the current spending of the poorest quintile of households to 67 per cent of the expenditure of the most affluent quintile of households (figure 6). The relevant Kakwani

Figure 6 **Estimated taxes as a percentage of current expenditure, by quintile of person-weighted equivalent current household expenditure, 1996-97**



Data source: STINMOD–STATAX.

progressivity index is +0.057, again indicating that taking account of the needs of households results in the tax system appearing more progressive, but confirming that the tax system is less progressive when measured against equivalent expenditure than equivalent income.

5 Tax burdens over the life cycle

Tax burdens show a pronounced hump over the life cycle, being lower for the young and the old and rising in middle age with higher incomes and expenditures.

The estimated average income of single people under 35 years of age and living by themselves was \$583 a week in 1996-97 (table 4). Of this, \$135 a week was lost to income tax and a further \$130 a week to indirect and corporation taxes (figure 7). Thus, about 45 per cent of income was paid in tax.

For young couples without children, income, expenditure and tax are all relatively high. The average gross income of couples without children with a reference person aged less than 35 years was \$1138 a week in 1996-97, with both partners being in the labour force in the majority of

cases. Taxes continued to take about 45 per cent of total income, with this again being relatively equally split between income tax and other taxes.

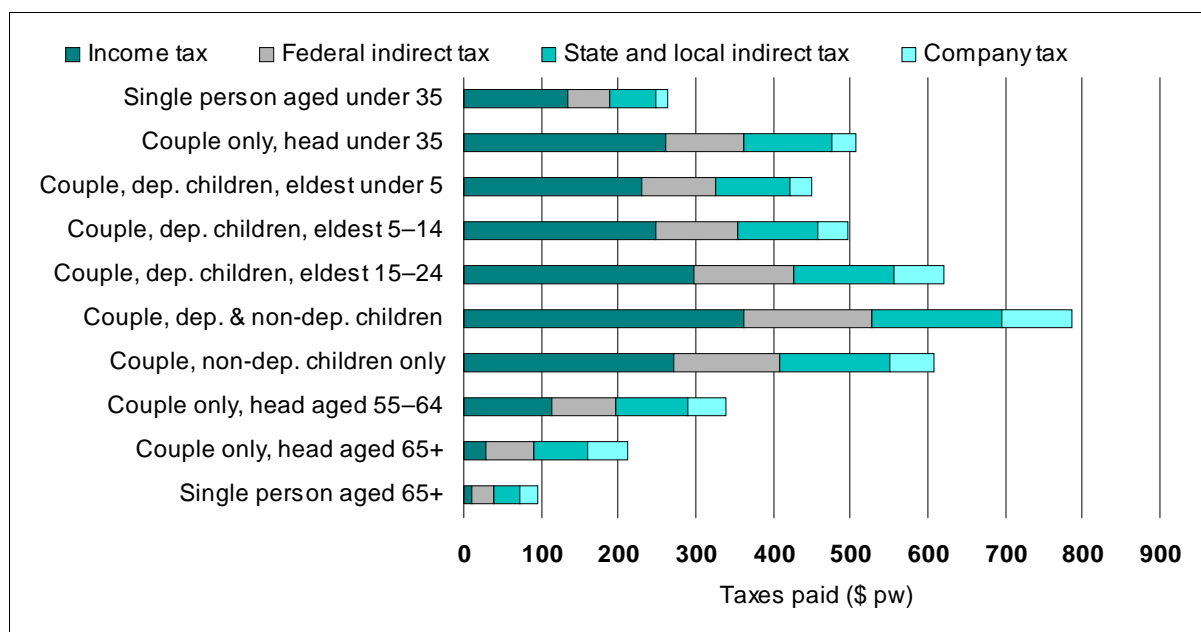
Table 4 Estimated taxes paid and other characteristics of households, by life cycle group, 1996-97

	Single person aged under 35	Couple only, head aged under 35	Couple, dep. children, eldest under 5	Couple, dep. children, eldest 5–14	Couple, dep. children, eldest 15–24	Couple, dep. & non-dep. children ^a	Couple, non-dep. children only ^a	Couple only, head aged 55–64	Couple only, head aged 65+	Single person aged 65+
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
Private income	550	1 127	915	990	1 208	1 530	1 239	557	221	85
Government cash benefits	34	11	76	91	62	106	117	107	233	167
Gross income	583	1 138	991	1 081	1 270	1 636	1 356	664	454	251
Current expenditure	445	852	785	824	982	1 131	940	549	412	214
Income tax	135	261	231	250	298	363	272	114	27	11
Federal indirect tax	55	101	94	104	128	165	137	83	62	27
State indirect tax	52	102	82	85	107	146	119	77	55	25
Local indirect tax	6	14	14	18	21	23	21	17	14	10
Company tax	17	30	28	40	67	90	58	48	53	24
All taxes	265	506	449	497	622	787	607	338	214	97
	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000
Number of households	263	327	299	950	398	282	458	359	512	554

^a Living at home.

Source: STINMOD–STATAX.

Who Pays the Tax Burden in Australia?

Figure 7 **Estimated taxes paid, by life cycle group, 1996-97**

Data source: STINMOD-STATA.

After the arrival of children for couples, average household income is less than that of young couples without children, reflecting in many cases the move by one partner to unpaid home duties or part-time work. In 1996-97, because household income was less (\$991 a week for couples with dependent children, eldest less than five years old), expenditure was also less, so that the overall tax burden remained at about 45 per cent of total income.

As the age of the oldest child increases, household income rises, reflecting both the move back to two incomes and the higher wages that come with increasing age and experience. In 1996-97 the income, expenditure and tax profiles of couples with dependent children with the eldest child aged between 5 and 14 years were remarkably similar to those of young couples without children. Household income continues to rise as the eldest child becomes a 15-24 year old, with the average tax burden of couples with such families in 1996-97 being \$622 a week, some 49 per cent of the average gross household income of \$1270.

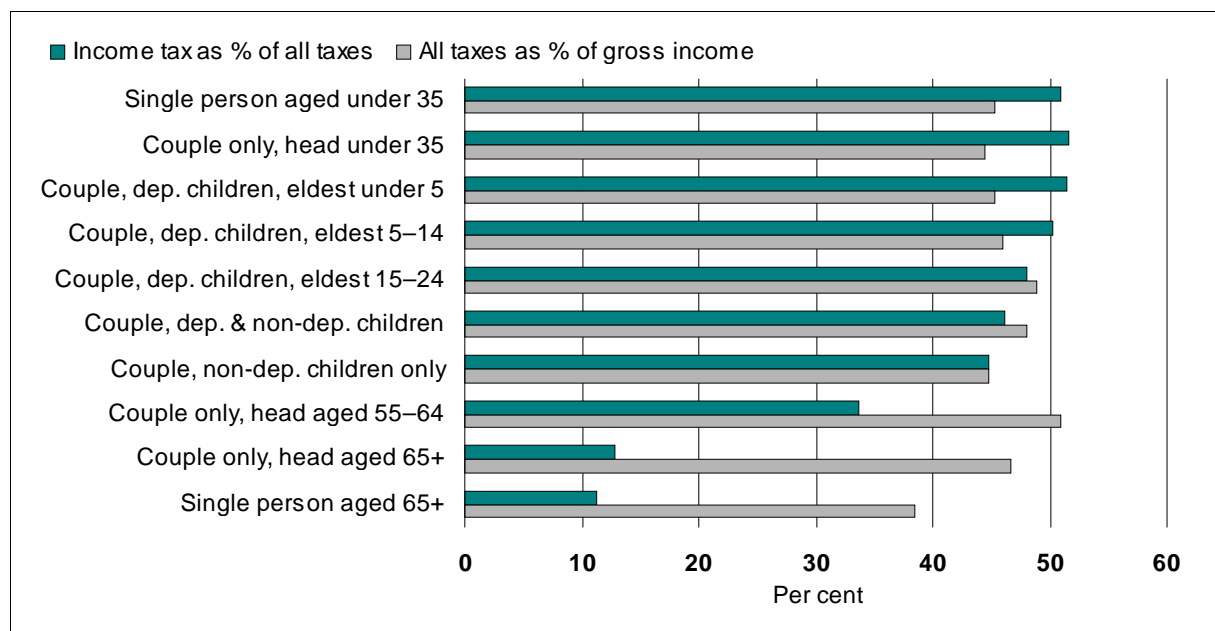
As the life cycle continues and some children cease being dependent full-time students and become non-dependent children at home, household income peaks (in 1996-97 at \$1636 a week) and household expenditure peaks (\$1131 a week). Not surprisingly, the amount of tax paid by couples with both dependent and non-dependent children still living in the family home also hits a life cycle high (\$787 a week in 1996-97).

As children leave full-time study but remain in the parental home as non-dependent children, household income declines (being about \$1356 a week in 1996-97). This is a result of partly offsetting factors — early retirement or unemployment for some partners forcing down the average household income, but the re-entry of others into the labour market raising the average income. For the first time during the life cycle, total indirect tax (\$278 a week in 1996-97) exceeds income tax liabilities (\$272 a week), and company tax takes some more (\$58 a week). For such households (couples with only non-dependent children at home), total tax paid still hovers at about 45 per cent of gross income.

After all children have left home and as the prevalence of voluntary or involuntary early retirement increases, average income declines. In 1996-97 it was about \$664 a week for couples with no children at home and with a reference person aged between 55 and 64 years. Average expenditure falls sharply (being \$549 a week in 1996-97), and both direct tax and indirect and company tax decline commensurately (being \$114 and \$224 a week respectively in 1996-97).

The amount of tax paid declines again in retirement, with income tax falling to very low levels and lower than average expenditure resulting in a smaller indirect tax burden.

Figure 8 **Income tax as a percentage of all taxes, and all taxes as a percentage of gross income, by life cycle group, 1996-97**



Data source: STINMOD-STATA.

One of the most striking features of the tax system over most of the life cycle is its extraordinary stability. As figure 8 shows, income tax hovers at about half of total tax for much of the life cycle, before plummeting dramatically once retirement nears and after the children have left home. Similarly, the total tax burden as a percentage of gross income is relatively stable, at about 47 per cent of gross income, for most of the life cycle. It is less than 40 per cent for only single persons aged 65 years or more.

6 Tax burdens by family type

Both the amount of tax paid and taxes paid as a percentage of incomes differ greatly by family type. Perhaps one of the most notable features of table 5 and figure 9 is the significance of indirect tax when income and thus income tax are relatively low. Family types with particularly low incomes include couples with and without children and neither partner working, sole parents, and aged couples and singles (defined as households where the head is aged 65 years or more and there are no children or other unrelated persons). In many cases, such families receive social security payments, such as the age or sole parent pension or unemployment allowances. But a diverse range of circumstances is also embraced by these categories. For example, the group 'couple without dependent children and neither partner working' would include self-funded early retirees with low incomes but possibly with substantial asset holdings.

Single people living by themselves who were aged less than 65 years in 1996-97 received an average income of \$559 a week and paid \$129 income tax (23 per cent of their gross income). Their indirect taxes (including company tax) took a further \$148 a week, giving a total of \$277 a week paid in tax.

The group 'couple without dependent children and neither partner working' clearly includes both unemployed couples and early retirees, as this group receives both significant amounts of private income and government cash benefits. In 1996-97 their total income was low (\$382 a week), but current household expenditure was higher (\$458 a week). While the average income tax paid by this group was low (only \$21 a

Table 5 **Estimated taxes paid and other characteristics of households, by family type, 1996-97**

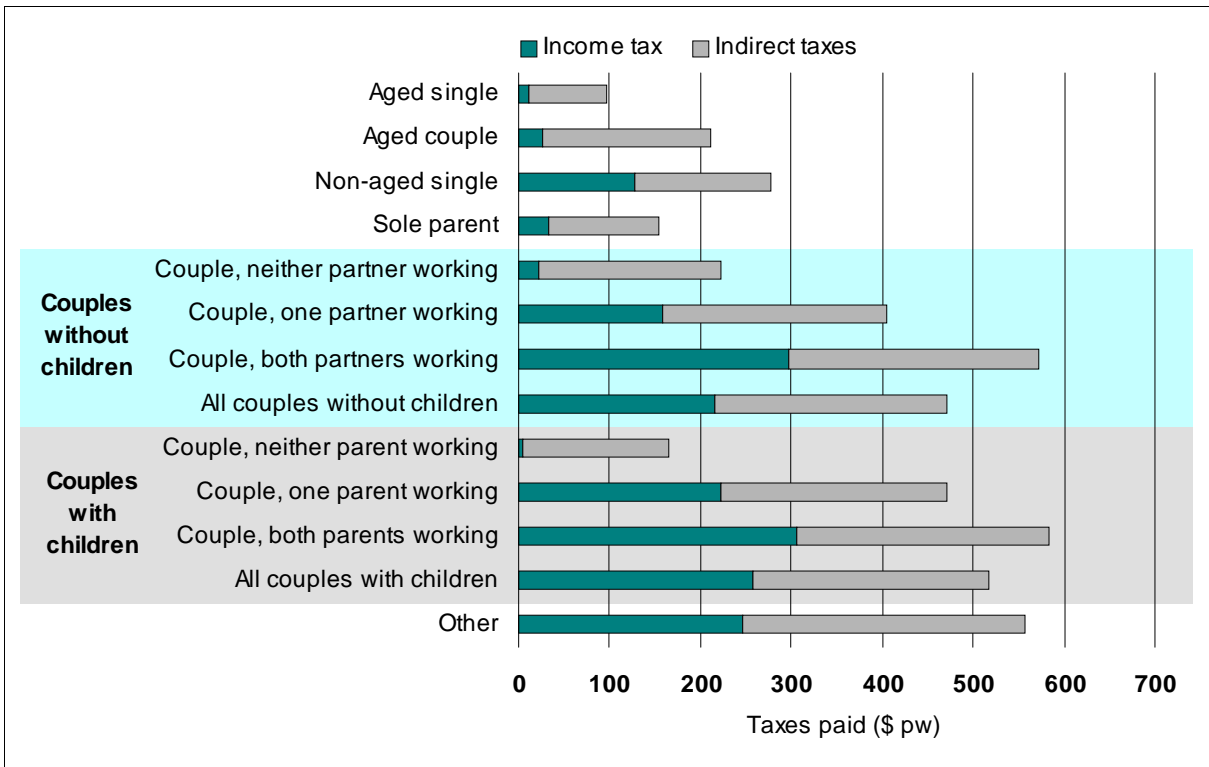
					Couple without dependent children				Couple with dependent children				Other ^a
	Aged single	Aged couple	Non-aged single	Sole parent	Neither partner working	One partner working	Both partners working	All couples without children	Neither parent working	One parent working	Both parents working	All couples with children	
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
Private income	85	221	500	212	164	724	1 234	925	32	847	1 245	1 029	1 090
Government cash benefits	167	233	59	247	218	41	4	50	404	95	38	82	141
Total income	251	454	559	459	382	765	1 238	975	436	942	1 284	1 111	1 231
Current expenditure	214	412	418	441	458	625	816	708	486	791	933	855	869
Income tax	11	27	129	33	21	158	298	216	5	222	307	258	248
WST ^b & excise	22	50	43	40	59	68	80	74	55	79	87	82	98
Other federal indirect tax	6	12	14	11	14	22	29	24	11	23	30	26	28
State indirect tax	25	55	57	47	70	91	105	95	57	87	95	90	113
Local indirect tax	10	14	9	8	14	17	17	16	9	17	20	18	17
Company tax	24	53	26	15	45	49	45	46	27	44	46	44	54
All taxes	97	212	277	154	223	405	573	471	165	472	584	518	557
	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000	'000
Number of households	553	510	794	353	189	258	633	1 081	105	574	967	1 646	1 732

^a Includes aged couples or singles with dependent or non-dependent children, couples and sole parents with both dependent and non-dependent children, couples or singles with non-dependent children only, multiple family households and unrelated group households. ^b WST = wholesale sales tax.

Source: STINMOD-STATA.

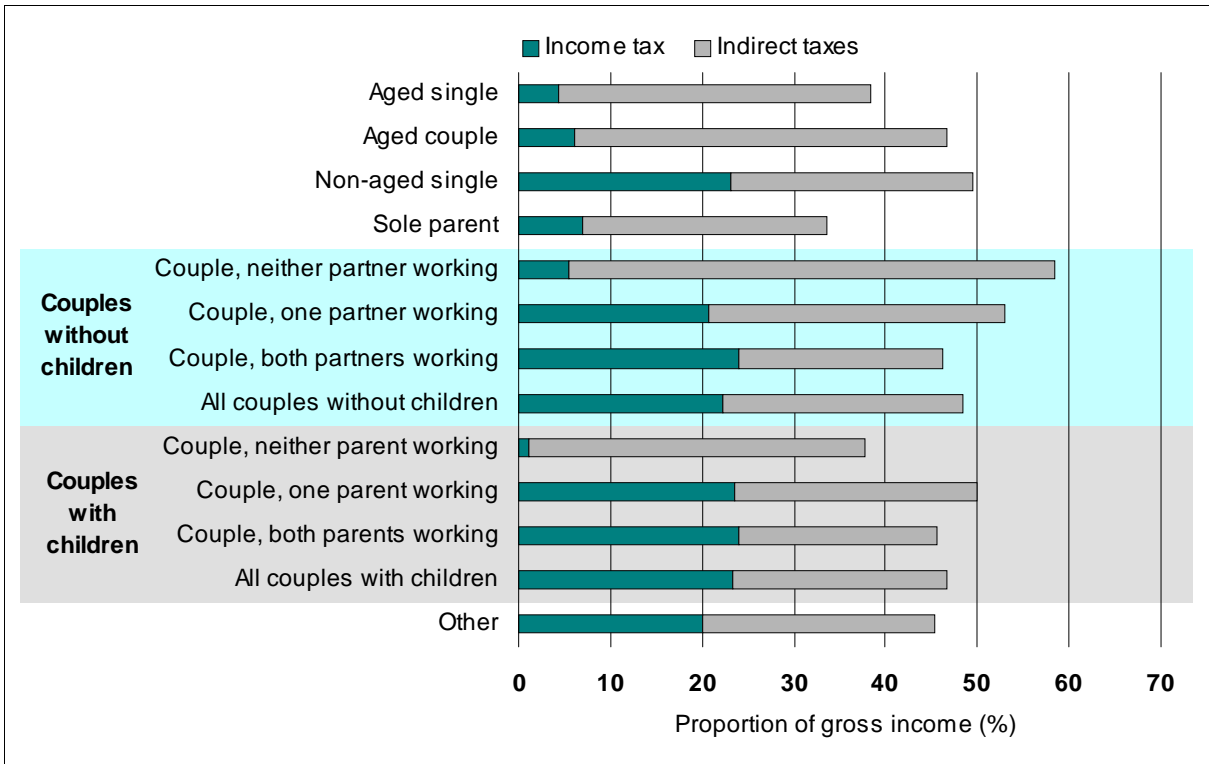
Who Pays the Tax Burden in Australia?

Figure 9 Estimated direct and indirect taxes paid, by family type, 1996-97



Data source: STINMOD-STATA.

Figure 10 Estimated direct and indirect taxes as a percentage of gross income, by family type, 1996-97



Data source: STINMOD-STATA.

week), their total indirect tax burden was relatively high. Their company tax payments were very high compared with their expenditure, indicating the presence of higher than average share holdings (again reflecting the assumption that half of all company taxes are shifted to shareholders via lower dividends). Their other indirect tax burdens were also higher than those of, for example, sole parents, despite similar levels of total current household expenditure. This reflects the different expenditure patterns of this group. For example, relative to sole parents, they spend far less each week on housing, clothing and footwear (all lightly taxed), and more on alcohol and household furnishings (both more heavily taxed). As a result, this group bears the highest tax burden relative to gross income of any of the family groupings examined, with just under 60 per cent of gross income in 1996-97 paid in taxes (figure 10).

The average tax burden of couples without children grows as the number of earners increases, reflecting the higher incomes and expenditures that accompany the increased level of labour force participation. For example, in 1996-97 the average income of couples without dependent children and both partners working was \$1238 a week, resulting in substantial income tax payments of \$298 a week — about 24 per cent of gross income (table 5). The families in this group, however, are above-average savers. Thus, while they had about three times the income that comparable couples with neither partner working had, their current spending was less than double — \$816 for the two income couples compared with only \$458 for couples with neither partner working. Because indirect tax is not paid on income that is not spent, two income couples without children on average pay relatively little indirect tax compared with their incomes. Thus, even though the average gross income of such two income couples was a third higher than that of the average Australian household, both such households paid 46 per cent of their gross income in tax in 1996-97.

Moving to couples with children — in 1996-97 the total average income of couples with dependent children and neither parent working was \$436 a week, \$404 of which were government cash benefits. A significant proportion of such benefits are not taxable (such as more-than-minimum family payment and rent assistance); therefore the income tax burden of this group was very low (only \$5 a week). This group, however, was dissaving, as total current expenditure was \$486 a week. The households

paid on average about \$160 a week in indirect and company taxes, such taxes amounting to about 37 per cent of their gross income. Overall, this group is one of only three family types examined for which total tax paid as a percentage of gross income was below 40 per cent in 1996-97 (see figure 10). For all other family types, total tax as a percentage of income exceeded 45 per cent.

How does the traditional nuclear family fare? In 1996-97 single income couples with dependent children had an average income of \$942 a week and paid \$222 a week in income tax. Their current expenditure was \$791 a week, even though their after-tax income was only \$720 a week. This illustrates one of the problems that arises from using the household expenditure survey to assess tax incidence, as the survey tends to understate income by not including 'lumpy' income sources or inheritances or capital gains. By apparently financing consumption out of savings (or income sources not recorded in the survey), the traditional nuclear family paid \$250 a week in indirect and company taxes. In total, taxes took half of their gross income (figure 10).

Two income couples with children paid more tax than any of the other types of families examined. In 1996-97 their average gross income was \$1284, higher than the average income of any of the other family types, resulting in the highest income tax burden of \$307 a week. Their current household expenditure of \$933 a week resulted in a high indirect and company tax burden of \$277 a week. Overall, this group contributed \$584 a week in total taxes. However, when the tax burden is assessed against their income this group was relatively lightly taxed on average, with total taxes amounting to 45 per cent of their gross income in 1996-97 — just under the Australian average of 46 per cent.

Sole parents emerge as a relatively lightly taxed group. Their average income of \$459 a week in 1996-97 was relatively low, but just over half of this income was in the form of non-taxable government cash benefits, making their income tax burden also relatively low (\$33 a week or 7 per cent of gross income). Their total indirect and company tax burden in 1996-97 amounted to 27 per cent of their total expenditure of \$441 a week, which was well under the Australian average of 35 per cent. This reflects their different expenditure pattern — less on alcohol, transport and recreation — as well as their lack of share ownership. Overall, their total tax burden was one-third of their gross income, the lowest proportion for any of the family types examined (figure 10).

It is also possible to look at the tax burdens of families with different numbers of dependent children.

As noted above, the amount of tax paid in 1996-97 was higher for couples with dependent children than for most of the other family types examined in table 5. This is largely because such couples have both higher incomes and higher expenditures than do the other family types. There is relatively little difference between the private incomes (from wages and salaries, investments and self-employment) of couples with different numbers of children. However, government cash benefits differ substantially, reflecting the various programs of government assistance for families with children (tables 5 and 6). The Federal Government gives couples with three or more children more than twice what it gives couples with only one child (\$125 compared with \$59 a week in 1996-97). Overall, the average gross income of couples with three or more dependent children was about 9 per cent higher than the average for couples with one child, and income taxes were also 9 per cent higher.

The average weekly spending of couples with three or more dependent children was, however, about 14 per cent higher than that of couples with only one child, reflecting the greater demands of larger households. Not surprisingly, indirect and company tax payments were also commensurately higher, reaching \$284 a week for couples with three or more dependent children. In total, couples with one child paid an estimated \$512 a week in total tax, while those with three or more dependent children paid \$552 (figure 11). (Interestingly, couples with two dependent children paid slightly less tax each week than did couples with only one dependent child. This appears to be due partly to different expenditure patterns, as their indirect taxes amounted to 24 per cent of their current weekly expenditure, compared with about 27 per cent for couples with one child. It also appears to be due to lower share ownership, as their company tax burden was appreciably lower than that of couples with one or three or more children.)

Sole parents with one dependent child had a much higher average private income than those with two or more children, although this was almost fully offset by the higher government benefits received by the larger sole parent families. Overall, sole parents with one child had similar gross incomes to those with two or more children but they paid more income tax because a smaller proportion of their income was in the form of non-taxable social security payments. However, sole parents

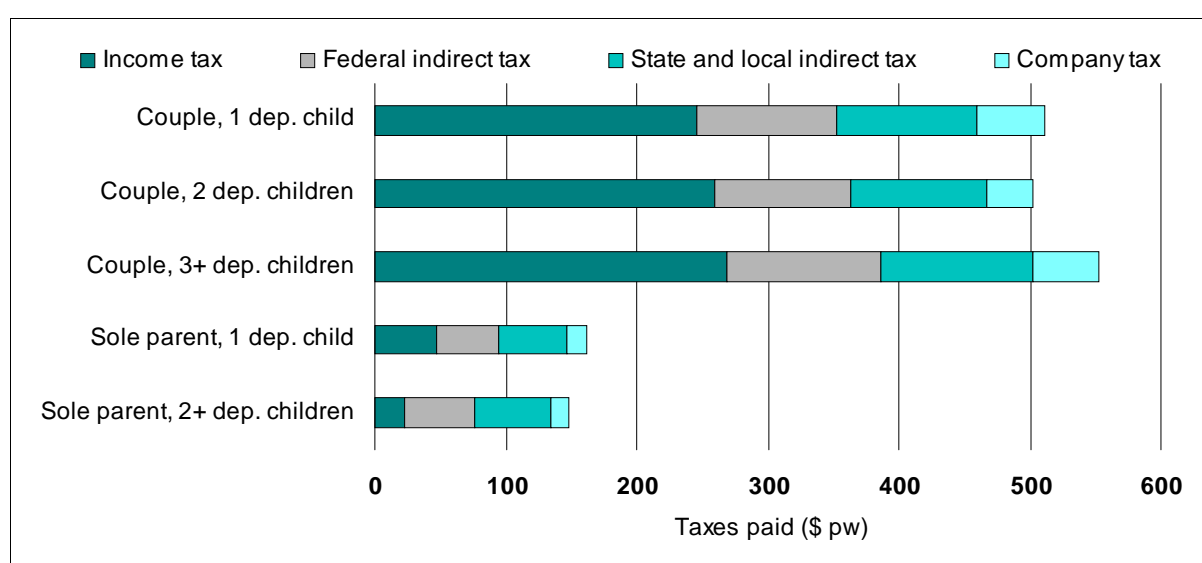
with two or more dependent children had higher weekly expenditure and, as a result, their indirect tax burden was higher than that of sole parents with one dependent child (figure 12).

Table 6 Estimated taxes paid and other characteristics of households, by number of dependent children, 1996-97

	Couple, 1 dependent child	Couple, 2 dependent children	Couple, 3+ dependent children	Sole parent, 1 dependent child	Sole parent, 2+ dependent children
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
Private income	1 008	1 036	1 041	286	160
Govt cash benefits	59	71	125	177	297
Gross income	1 067	1 106	1 166	463	456
Current expenditure	805	850	920	409	464
Income tax	246	260	268	47	22
Federal indirect tax	107	103	117	48	54
State indirect tax	90	85	98	44	50
Local indirect tax	17	19	19	7	8
Company tax	53	36	49	15	15
All taxes	512	503	552	161	149
	'000	'000	'000	'000	'000
Number of households	478	742	426	147	206

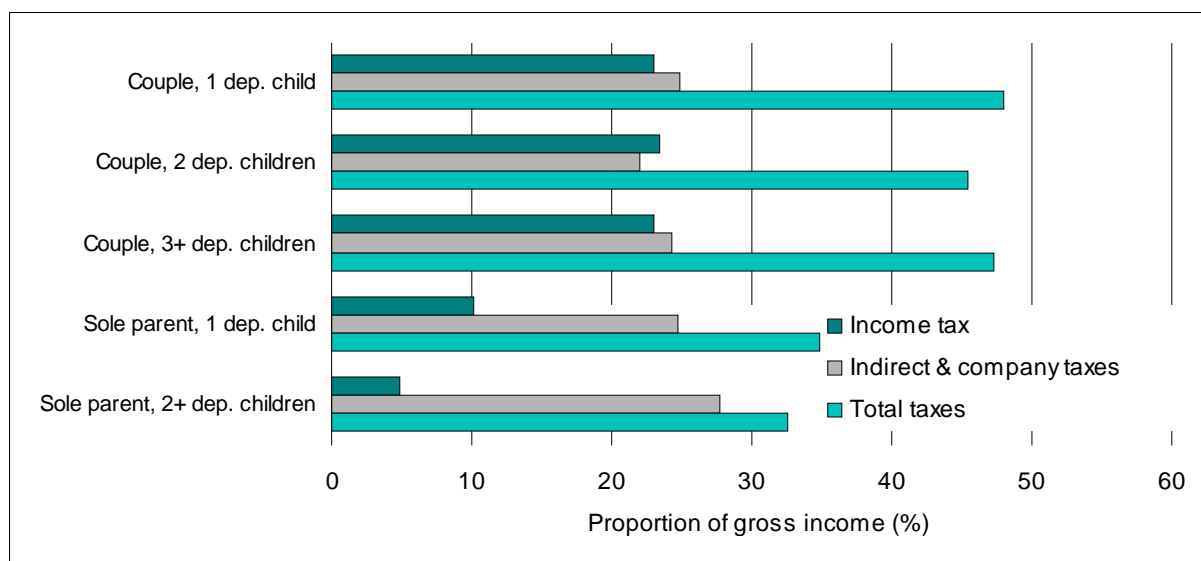
Source: STINMOD-STATA.

Figure 11 Estimated taxes paid by number of dependent children, 1996-97



Data source: STINMOD-STATA.

Figure 12 **Estimated taxes as a percentage of gross income by family type, 1996-97**



Data source: STINMOD-STATA.

7 Tax burdens by principal household income source

How do tax burdens differ by the principal source of income of the household? In the following analysis, a small number of households with no income have been deleted. The average total income of households whose principal income source in 1996-97 was wages and salaries was \$1157 a week (table 7), with the average income tax paid of \$265 amounting to 23 per cent of gross income. After adding in indirect and company taxes, all taxes took a 45 per cent slice of the total income of wage and salary households (figure 13).

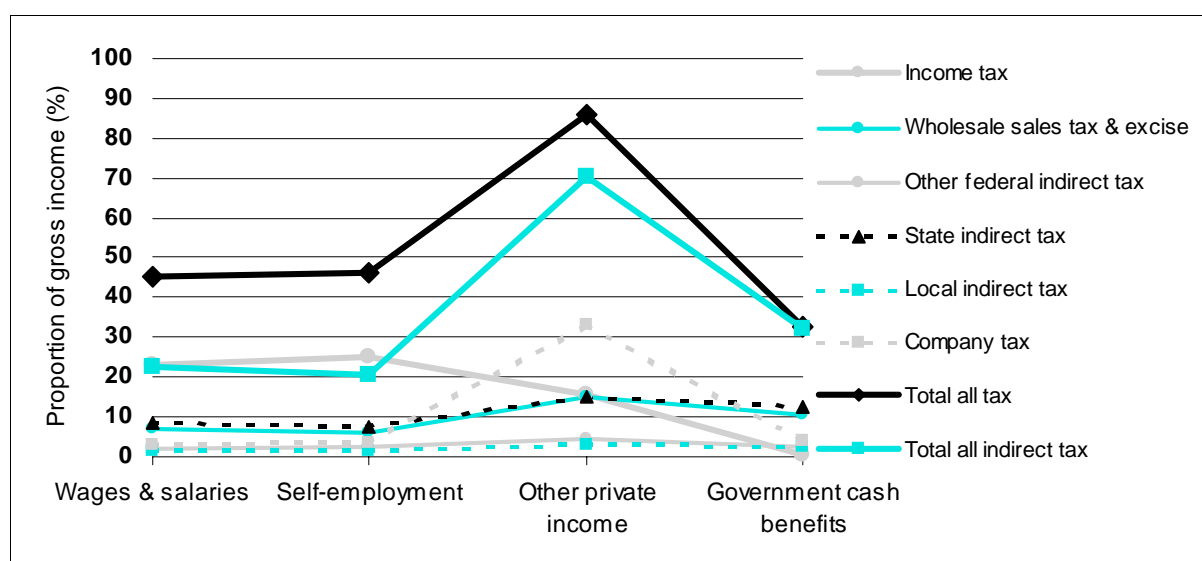
Self-employed households earned a higher average income of \$1292 a week and paid commensurately higher income tax of \$326 a week — some 25 per cent of gross income. However, households whose principal source of income was self-employment had lower weekly expenditure than did wage and salary households, despite their higher incomes. On average they had a similar indirect tax burden to that of wage and salary households but a higher company tax burden, due presumably to higher share ownership. Overall, self-employed households paid 46 per cent of their gross income in tax, just slightly higher than wage and salary households.

Table 7 **Estimated taxes paid and other characteristics of households, by principal source of household income, 1996-97**

	Wages & salaries	Self- employment	Other private income	Government cash benefits
	\$ pw	\$ pw	\$ pw	\$ pw
Private income	1 111	1 253	751	41
Govt cash benefits	46	39	58	285
Total income	1 157	1 292	809	326
Current household expenditure	845	767	560	345
Income tax	265	326	125	2
WST ^a & excise	83	77	122	35
Other federal indirect tax	26	35	35	7
State indirect tax	99	94	122	41
Local indirect tax	17	18	23	9
Company tax	36	45	267	13
All taxes	525	595	693	107
	'000	'000	'000	'000
Number of households	3 781	522	367	1 974

^a WST = wholesale sales tax.

Source: STINMOD-STATA.

Figure 13 **Estimated taxes as a percentage of gross household income, by principal source of household income, 1996-97**

Data source: STINMOD-STATA.

The tax burdens of households dependent on other private income sources such as investment income, occupational pensions and workers compensation show a very different profile for 1996-97. The average income of such households was about two-thirds of that of wage and salary households, but income tax paid was very much lower, at \$125 a week — only 15 per cent of gross income. Expenditure was also much lower, at \$560 a week. Despite this, wholesale sales tax and excise and state indirect taxes were appreciably higher than for self-employed and wage and salary households. This appears to be due to their consumption of goods subject to the wholesale sales tax. Company tax was also very much higher, reflecting the presence of self-funded retirees with significant share holdings. This group pays the highest proportion of their income in tax — about 86 per cent (figure 13).

Households whose principal income source in 1996-97 was government cash benefits had incomes that averaged just over a quarter of the average gross income of wage and salary households and paid almost no income tax. Their current household expenditure was \$345 a week, suggesting that on average most such households were only marginal savers. Their total indirect and company tax burden was \$105 a week. As a result, the total tax paid by households whose principal income source was government cash benefits amounted to 33 per cent of their income, well under the Australian average of 46 per cent.

8 Taxes paid by smokers and drinkers

Alcohol and tobacco products are subject to particularly high tax rates. For example, the wholesale sales tax on wine is 41 per cent, and on beer and spirits 37 per cent. It is thus interesting to compare the taxes paid by households where at least one person smokes or drinks with those where nobody reports expenditure on these products.²

² As explained in section 2, total outlays on tobacco and alcohol are substantially understated in the household expenditure survey when compared with the National Accounts. It is effectively assumed in STINMOD-STATA that those reporting such expenditures understate them, as total taxes are made to match National Accounts aggregates. An alternative assumption would be that some of those households reporting zero expenditure on these items actually did purchase some alcohol or tobacco products. However, it would then be necessary to impute which households were in this category and what they actually spent, and no data

As table 8 indicates, on average in 1996-97 households in which at least one person smoked paid \$17 more tax every week than did households in which no one smoked. Those smoking households in the bottom quintile of all households ranked by gross income paid an average of \$109 a week in total taxes, \$35 a week more than non-smoking households in the bottom quintile. Households in the bottom quintile that reported both smoking and drinking expenditure paid estimated total taxes of \$131 a week, more than double the \$64 paid by non-smoking and non-drinking households in the bottom quintile.

Table 8 **Estimated taxes paid and other characteristics of households, by smoking and drinking characteristics, 1996-97**

	Quintile of gross income					All households
	Bottom 20%	Second 20%	Middle 20%	Fourth 20%	Top 20%	
	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw	\$ pw
Gross income						
Smoking households	238	448	730	1 091	1 932	900
Non-smoking households	233	445	728	1 093	2 020	897
Smoking & drinking households	239	459	731	1 096	1 948	1 013
Non-smoking & non-drinking households	225	442	720	1 079	1 912	667
Total taxes						
Smoking households	109	197	337	503	956	425
Non-smoking households	74	171	304	472	1 033	408
Smoking & drinking households	131	218	352	518	978	497
Non-smoking & non-drinking households	64	147	271	438	908	264

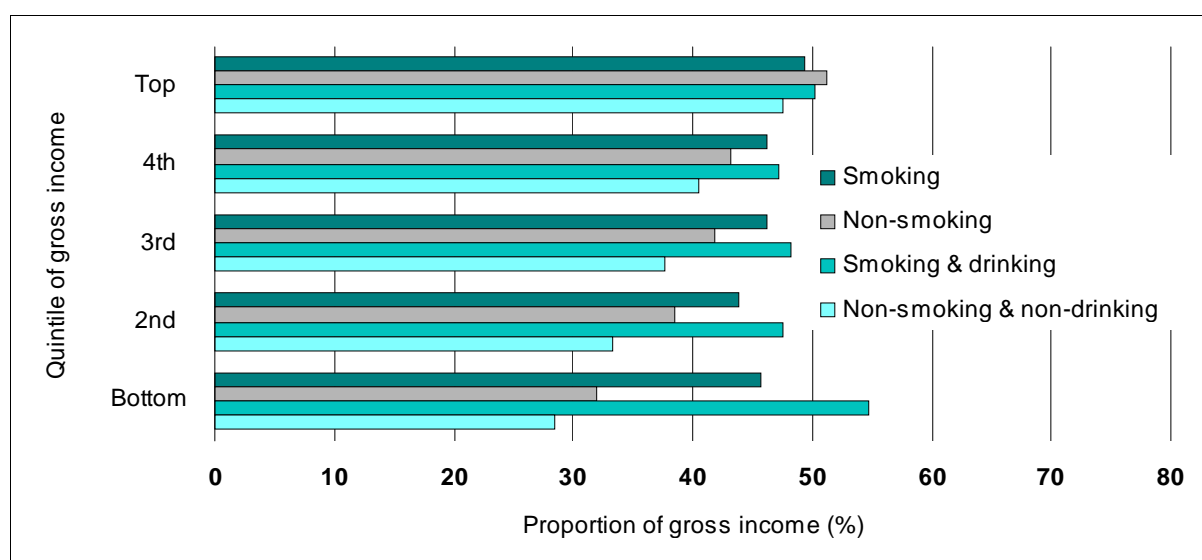
Source: STINMOD-STATAx.

are available to allow such an imputation to be made reliably. A third possible approach is to take the reported expenditures of households at face value, and just accept that allocated taxes in the model then do not match taxes actually collected by government (as the ABS (1996) does in its fiscal incidence study). In summary, there is no consensus about best practice in this area, and the results in this section reflect the STINMOD-STATAx incidence assumptions.

The amount of total tax paid shows quite different patterns at the top end of the income distribution. Smoking households in the top quintile paid an average of \$956 a week in total tax, while non-smoking households in the top quintile paid \$1033 tax a week. The difference is due to the very different incomes of smoking and non-smoking households at the top end of the income distribution, as non-smoking top quintile households enjoyed gross incomes almost \$100 a week higher than smoking households (table 8). Thus, the differences between the taxes paid by smoking and non-smoking households at the top end cannot be attributed largely to their different expenditure habits.

The variation in total taxes paid as a percentage of gross income is also, not surprisingly, most marked at the lower spectrum of the income distribution. For non-smoking and non-drinking bottom quintile households, total tax paid amounted to less than 30 per cent of their gross income (figure 14). In sharp contrast, total tax amounted to about 46 per cent of the gross income of smoking households in the bottom quintile, and 55 per cent of the gross income of smoking and drinking households in the bottom quintile. Moving up through the income quintiles, despite significant dollar differences in the amount of tax paid, the variation in tax paid as a percentage of income decreased, simply because tobacco and alcohol taxes represented a progressively smaller proportion of gross income.

Figure 14 **Total tax as a percentage of gross income, by smoking and drinking characteristics**



Data source: STINMOD–STATAX.

9 Conclusions

All estimates of the incidence of taxes have to be treated with some caution. As noted earlier, different estimates will be achieved, depending on the assumptions used in the modelling — for example, whether company taxes are assumed to be shifted forward to consumers, shifted backwards to labour or borne by shareholders, and whether adjustments are made for the substantial underreporting by ABS survey respondents of their alcohol and tobacco consumption. For example, relative to the results presented in this paper, the tax system would look more regressive if it were assumed that all company taxes were paid by consumers, and would look more progressive if tobacco taxes were not effectively grossed up to match benchmark National Account aggregates.

However, with these caveats, some interesting conclusions emerge from this study. First, it is probably not widely appreciated by the average household that their indirect and company tax payments far exceed the income tax that they pay. While the highly visible income tax took on average an estimated \$183 a week from households in 1996-97, the other 'hidden' taxes levied by federal, state and local governments took \$231 a week, about 25 per cent more.

The overall impact of the tax system appears to be progressive, as the progressive impact of income taxes is not fully offset by the regressive impact of indirect taxes. This conclusion appears to hold irrespective of whether the measure of the economic resources of households is gross income, equivalent gross income, current weekly expenditure or equivalent current weekly expenditure. While households with negative incomes or with expenditure to income ratios greater than 2.5 were deleted from the analysis, the conclusion of overall progressivity also holds if such households are retained within the analysis.

One of the most striking features of the tax system is its extraordinary stability over most of the life cycle. Income tax hovers at about half of total taxes for much of the life cycle, before plummeting dramatically once retirement nears and after children have left home. Similarly, the total tax burden as a percentage of gross income is relatively stable, at about 47 per cent of gross income, for most of the life cycle. It is less than 40 per cent for only single persons aged 65 years or more.

If the tax burden is measured as a percentage of gross income, then above-average burdens are borne by the most affluent 20 per cent of households, single persons living by themselves and aged less than 65 years, couples with no children and with one or no earners, households whose primary income source is private (not wage and salary) income, single income couples with dependent children and smoking households. Households with below-average tax burdens are the least affluent 40 per cent of households, single aged, sole parents and households whose principal income source is government cash benefits.

References

- ABS (Australian Bureau of Statistics) 1996, *The Effects of Government Benefits and Taxes on Household Income*, Cat no. 6537, ABS, Canberra.
- 1997, *Taxation Revenue: Australia, 1996-97*, Cat no. 5506.0, ABS, Canberra.
- Atkinson, A.B. 1970, 'On the measurement of inequality', *Journal of Economic Theory*, vol. 2, pp. 244-63.
- Harding, A. 1992, *Consumption Tax, Compensation and the Distribution of Income*, Discussion Paper no. 267, Centre for Economic Policy Research, Australian National University, Canberra.
- 1993, 'Lifetime vs annual incidence of indirect taxes: wholesale sales tax and excises', in Head, J.G. (ed.), *Fightback! An Economic Assessment*, Conference Series no. 12, Australian Tax Research Foundation, Sydney.
- Johnson, D., Freebairn, J., Creedy, J., Scutella, R., Cowling, S. and Harding, G. 1998, *Indirect Taxes: Evaluation of Options for Reform*, Report no. 2, Tax Reform Equity and Efficiency Project, Melbourne Institute of Applied Economic and Social Research, University of Melbourne.
- Kakwani, N. 1977, 'Measurement of tax progressivity: an international comparison', *Economic Journal*, vol. 87, pp. 71-80.
- Lambert, S., Percival, R., Schofield, D. and Paul, S. 1994, *An Introduction to STINMOD: A Static Microsimulation Model*, STINMOD Technical Paper no. 1, National Centre for Social and Economic Modelling, University of Canberra.

- and Warren, N. 1999, *STINMOD-STATAAX: A Comprehensive Model of the Incidence of Taxes and Transfers in Australia*, Technical Paper no. 16, National Centre for Social and Economic Modelling, University of Canberra.
- Warren, N. 1987, *The Distributional Impact of a Change in the Tax Mix in Australia*, Research Study no. 6, Australian Tax Research Foundation, Sydney.
- 1991, *The Changing Incidence of Federal Indirect Taxes: 1975-76 to 1988-89*, Background Paper no. 13, Economic Planning Advisory Council, AGPS, Canberra.
- Wright, J. and Dolan, A. 1992, The use of HES data in distributional analysis, Paper presented at the Conference of Economists, Melbourne, 8–10 July.

NATSEM publications

Copies of NATSEM publications and information about NATSEM may be obtained from:

Publications Officer
National Centre for Social and Economic Modelling
University of Canberra ACT 2601
Australia

Ph: + 61 2 6201 2750 Fax: + 61 2 6201 2751

Email: natsem@natsem.canberra.edu.au

See also NATSEM's website: www.natsem.canberra.edu.au

Periodic publications

NATSEM News keeps the general community up to date with the developments and activities at NATSEM, including product and publication releases, staffing and major events such as conferences. This newsletter is produced twice a year.

The ***Income Distribution Report (IDR)***, which is also produced twice a year, provides information and comment on the average incomes of Australian families, covering the incidence of taxation for different family types, the income support provided by the government and how different family groups are faring. The *IDR*, which is available on subscription, presents this information in a simple, easy-to-follow format.

NATSEM's ***Annual Report*** gives the reader an historical perspective of the Centre and its achievements for the year.

Discussion Paper series

No.	Authors	Title
1	Harding, A.	<i>Lifetime Repayment Patterns for HECS and AUSTUDY Loans</i> , July 1993 (published in <i>Journal of Education Economics</i> , vol. 3, no. 2, pp. 173–203, 1995)
2	Mitchell, D. and Harding, A.	<i>Changes in Poverty among Families during the 1980s: Poverty Gap Versus Poverty Head-Count Approaches</i> , October 1993
3	Landt, J., Harding, A., Percival, R. and Sadkowsky, K.	<i>Reweighting a Base Population for a Microsimulation Model</i> , January 1994
4	Harding, A.	<i>Income Inequality in Australia from 1982 to 1993: An Assessment of the Impact of Family, Demographic and Labour Force Change</i> , November 1994 (published in <i>Australian Journal of Social Research</i> , vol. 1, no. 1, pp. 47–70, 1995)
5	Landt, J., Percival, R., Schofield, D. and Wilson, D.	<i>Income Inequality in Australia: The Impact of Non-Cash Subsidies for Health and Housing</i> , March 1995
6	Polette, J.	<i>Distribution of Effective Marginal Tax Rates Across the Australian Labour Force</i> , August 1995 (contributed to article in <i>Australian Economic Review</i> , 3rd quarter, pp. 100–6, 1995)
7	Harding, A.	<i>The Impact of Health, Education and Housing Outlays on Income Distribution in Australia in the 1990s</i> , August 1995 (published in <i>Australian Economic Review</i> , 3rd quarter, pp. 71–86, 1995)
8	Beer, G.	<i>Impact of Changes in the Personal Income Tax and Family Payment Systems on Australian Families: 1964 to 1994</i> , September 1995
9	Paul, S. and Percival, R.	<i>Distribution of Non-Cash Education Subsidies in Australia in 1994</i> , September 1995
10	Schofield, D., Polette, J. and Hardin, A.	<i>Australia's Child Care Subsidies: A Distributional Analysis</i> , January 1996
11	Schofield, D.	<i>The Impact of Employment and Hours of Work on Health Status and Health Service Use</i> , March 1996

Discussion Paper series (continued)

No.	Authors	Title
12	Falkingham, J. and Harding, A.	<i>Poverty Alleviation Versus Social Insurance Systems: A Comparison of Lifetime Redistribution</i> , April 1996 (published in Harding, A. (ed.), <i>Microsimulation and Public Policy</i> , North-Holland, Amsterdam, 1996)
13	Schofield, D. and Polette, J.	<i>How Effective Are Child Care Subsidies in Reducing a Barrier to Work?</i> , May 1996 (published in <i>Australian Economic Review</i> , vol. 31, no. 1, pp. 47–62, 1998)
14	Schofield, D.	<i>Who Uses Sunscreen?: A Comparison of the Use of Sunscreen with the Use of Prescribed Pharmaceuticals</i> , May 1996
15	Lambert, S., Beer, G. and Smith, J.	<i>Taxing the Individual or the Couple: A Distributional Analysis</i> , October 1996
16	Landt, J. and Bray, J.	<i>Alternative Approaches to Measuring Rental Housing Affordability in Australia</i> , April 1997 (published in <i>Australian Journal of Social Research</i> , vol. 4, no. 1, pp. 49–84, December 1997)
17	Schofield, D.	<i>The Distribution and Determinants of Private Health Insurance in Australia, 1990</i> , May 1997
18	Schofield, D., Fischer, S. and Percival, R.	<i>Behind the Decline: The Changing Composition of Private Health Insurance in Australia, 1983–95</i> , May 1997
19	Walker, A.	<i>Australia's Ageing Population: How Important Are Family Structures?</i> , May 1997
20	Polette, J. and Robinson, M.	<i>Modelling the Impact on Microeconomic Policy on Australian Families</i> , May 1997
21	Harding, A.	<i>The Suffering Middle: Trends in Income Inequality in Australia, 1982 to 1993-94</i> , May 1997 (published in <i>Australian Economic Review</i> , vol. 30, no. 4, pp. 341–58, 1997)
22	Schofield, D.	<i>Ancillary and Specialist Health Services: Does Low Income Limit Access?</i> , June 1997 (published as 'Ancillary and specialist health services: equity of access and the benefit of public services', <i>Australian Journal of Social Issues</i> , vol. 34, no. 1, pp. 79–96, February 1999)

Discussion Paper series (continued)

No.	Authors	Title
23	King, A.	<i>The Changing Face of Australian Poverty: A Comparison of 1996 Estimates and the 1972-73 Findings from the Commission of Inquiry</i> , December 1997 (published in Fincher, R. and Nieuwenhuysen, J. (eds), <i>Australian Poverty Then and Now</i> , Melbourne University Press, pp. 71–102, March 1998)
24	Harding, A. and Percival, R.	<i>Who Smokes Now? Changing Patterns of Expenditure on Tobacco Products in Australia, 1975-76 to 1993-94</i> , December 1997
25	Percival, R. and Fischer, S.	<i>Simplicity Versus Targeting: A Legal Aid Example</i> , December 1997
26	Percival, R., Landt, J. and Fischer, S.	<i>The Distributional Impact of Public Rent Subsidies in South Australia</i> , April 1997, January 1998
27	Walker, A.	<i>Australia's Ageing Population: What Are the Key Issues and the Available Methods of Analysis?</i> , February 1998
28	Percival, R.	<i>Changing Housing Expenditure, Tenure Trends and Household Incomes in Australia, 1975-76 to 1997</i> , March 1998
29	Landt, J. and Beer, G.	<i>The Changing Burden of Income Taxation on Working Families in Australia</i> , April 1998
30	Harding, A.	<i>Tomorrow's Consumers: A New Approach to Forecasting Their Characteristics and Spending Patterns</i> , June 1998
31	Walker, A., Percival, R. and Harding, A.	<i>The Impact of Demographic and Other Changes on Expenditure on Pharmaceutical Benefits in 2020 in Australia</i> , August 1998
32	Harding, A. and Richardson, S.	<i>Unemployment and Income Distribution</i> , August 1998 (published in Debelle, G. and Borland, J. (eds), <i>Unemployment and the Australian Labour Market</i> , Alken Press, Sydney, pp. 139–64, 1998)
33	Richardson, S. and Harding, A.	<i>Low Wages and the Distribution of Family Income in Australia</i> , September 1998
34	Bækgaard, H.	<i>The Distribution of Household Wealth in Australia: 1986 and 1993</i> , September 1998
35	Keating, M. and Lambert, S.	<i>From Welfare to Work: Improving the Interface of Tax and Social Security</i> , October 1998

Discussion Paper series (continued)

No.	Authors	Title
36	Schofield, D.	<i>Re-examining the Distribution of Health Benefits in Australia: Who Benefits from the Pharmaceutical Benefits Scheme?</i> , October 1998
37	Schofield, D.	<i>Public Expenditure on Hospitals: Measuring the Distributional Impact</i> , October 1998
38	Miceli, D.	<i>Measuring Poverty Using Fuzzy Sets</i> , November 1998

Policy Paper series

No.	Authors	Title
1	Harding, A. and Polette, J.	<i>The Distributional Impact of a Guns Levy</i> , May 1996
2	Harding, A.	<i>Lifetime Impact of HECS Reform Options</i> , May 1996
3	Beer, G.	<i>An Examination of the Impact of the Family Tax Initiative</i> , September 1996

DYNAMOD Technical Paper series^a

No.	Authors	Title
1	Antcliff, S.	<i>An Introduction to DYNAMOD: A Dynamic Microsimulation Model</i> , September 1993

^a Discontinued series. Topic is now covered by the broader Technical Paper series.

Dynamic Modelling Working Paper series^a

No.	Authors	Title
1	Antcliff, S., Bracher, M., Gruskin, A., Hardin, A. and Kapuscinski, C.	<i>Development of DYNAMOD: 1993 and 1994</i> , June 1996

^a Discontinued series. Topic is now covered by other series, including the broader Technical Paper series.

STINMOD Technical Paper series^a

No.	Authors	Title
1	Lambert, S., Percival, R., Schofield, D. and Paul, S.	<i>An Introduction to STINMOD: A Static Microsimulation Model</i> , October 1994
2	Percival, R.	<i>Building STINMOD's Base Population</i> , November 1994
3	Schofield, D. and Paul, S.	<i>Modelling Social Security and Veterans' Payments</i> , December 1994
4	Lambert, S.	<i>Modelling Income Tax and the Medicare Levy</i> , December 1994
5	Percival, R.	<i>Modelling AUSTUDY</i> , December 1994
6	Landt, J.	<i>Modelling Housing Costs and Benefits</i> , December 1994
7	Schofield, D.	<i>Designing a User Interface for a Microsimulation Model</i> , March 1995
8	Percival, R. and Schofield, D.	<i>Modelling Australian Public Health Expenditure</i> , May 1995
9	Paul, S.	<i>Modelling Government Education Outlays</i> , September 1995
10	Schofield, D., Polette, J. and Hardin, A.	<i>Modelling Child Care Services and Subsidies</i> , January 1996
11	Schofield, D. and Polette, J.	<i>A Comparison of Data Merging Methodologies for Extending a Microsimulation Model</i> , October 1996

^a Series was renamed the Technical Paper series in 1997.

Technical Paper series

No.	Authors	Title
12	Percival, R., Schofield, D. and Fischer, S.	<i>Modelling the Coverage of Private Health Insurance in Australia in 1995</i> , May 1997
13	Galler, H.P.	<i>Discrete-Time and Continuous-Time Approaches to Dynamic Microsimulation Reconsidered</i> , August 1997
14	Bækgaard, H.	<i>Simulating the Distribution of Household Wealth in Australia: New Estimates for 1986 and 1993</i> , June 1998
15	Walker, A., Percival, R. and Fischer, S.	<i>A Microsimulation Model of Australia's Pharmaceutical Benefits Scheme</i> , August 1998
16	Lambert, S. and Warren, N.	<i>STINMOD-STATAx: A Comprehensive Model of the Incidence of Taxes and Transfers in Australia</i> , March 1999