Insurance Council of Australia

Analysis of demand for home and contents insurance

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sapere research group

About the Author

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Glossary

ABS	Australian Bureau of Statistics
CI	Contents insurance
CURF	Confidentialised Unit Record File
ESL	Emergency services levy
FSL	Fire services levy
GST	Goods and services tax
HES	Household Expenditure Survey
HI	House insurance
ICA	Insurance Council of Australia
IPT	Insurance Protection Tax
ITC	Input tax credit
Need house insurance	In this paper, refers to a household that is in the market for house insurance for their main residence because they are an owner-occupier not living in a body-corporate
PFS	Professional Financial Solutions

Executive summary

Introduction

The extent to which households are not insured is an important issue for the Insurance Council of Australia (ICA), the insurance industry and policy makers.

The paper presents the results of an empirical study on the factors that influence insurance demand and result in households being uninsured. While the study methods are technical the paper is written for a general audience. This paper builds on the previous work commissioned by the ICA on the factors that affect the demand for insurance.

A key focus of the paper is the impact of state premium-based taxes on decisions to purchase insurance. The taxes on house and contents insurance include stamp-duties that are applied in every jurisdiction (but are being removed in the ACT) and an emergency service levy (ESL) that was in place in a number of jurisdictions but that now is only applied in NSW.

Approach

The analysis in this report makes use of survey data from the Australian Bureau of Statistics (ABS) Household Expenditure Survey (HES). The HES is conducted every 5 or 6 years with the most recent survey 2009/10. The HES surveys record detailed information on household characteristics and household expenditure on a range of items including house and contents insurance.

Table S1 below provides a summary of the estimate level of non-insurance based on the most recent (2009/10) HES. At the time of this survey there were 8.4 million Australian households which may potentially purchase insurance. Of these around 2.5 million (or 29%) did not purchase contents insurance. It is estimated that almost 5.25 million households were owner-occupied homes not paying body corporate fees and therefore potentially buyers of house insurance for their main residence. Of these, 201 thousand households or 3.8% were estimated to not have purchased house insurance.

Table S1: Levels of non-insurance from 2009/10 by type of insurance cover

	Contents	House
Potential market (000s of households)	8,399	5,249
Number uninsured (000s of households)	2,456	201
Per cent uninsured 2009/10	29%	3.8%

The rate of non-insurance varies significantly across different population segments. For example, those without contents insurance are more likely to be young, renters, living in flats and living in a capital city. The rate of non-insurance is, in particular, related to tenure. Only

10 per cent of households who are owners (and not in a body corporate) do not have contents insurance.

Overview of modelling results

The data was used to analyse both the decision to purchase insurance and the level of expenditure on insurance on both house and contents insurance.

The basic modelling approach involved analysing how demand (measured in terms of households covered or household expenditure on premiums) for insurance (house or contents) related to factors that might influence demand. In addition to state premium-based taxes, these factors included measures of income and wealth, the value of insurable assets, dwelling type (e.g. house or flat), tenure (e.g. own, mortgage, rent) and some demographic (e.g. age, country of birth) and geographical variables.

The results of the modelling were generally statistically significant and consistent with expectations. Of most interest the results indicated that there is a significant and negative relationship between state premium-based taxes and the take-up of both contents insurance and house insurance and the level of expenditure on insurance.

The effect of state taxes on non-insurance

The models imply that a reduction in the tax rate of 1 percentage point would induce a 1.3 per cent increase in pre-tax expenditure in house and contents insurance (that is, the implied elasticity of demand for house and contents insurance with respect to tax is around -1.3). This large effect may be explained by how the premium-based taxes on insurance are applied. The ESL and stamp duties are based on the insurance premium, which reflects the pool of funds to cover claims in addition to the cost of providing the insurance services (which include pooling of funds and claims management etc.). When expressed relative to the estimated price of providing the insurance service, the implied elasticity is similar to the price elasticity of demand for other broad commodity groups.

Using the models of insurance demand, I estimated the impact of removing the remaining state premium-based taxes. The results are summarised in the tables overleaf. Table S2 shows estimates of the reduction in number of households that are uninsured and table S3 shows estimates of the increase in pre-tax expenditure on insurance. Both tables show the results from the 2009/10 HES, the forecast level today (uninsured households, or expenditure) and the forecast if taxes were removed.

I estimate that removing the state premium-based taxes would result in around 242 thousand more households taking out contents insurance and 38 thousand households (around one fifth of uninsured households) taking out house insurance. Furthermore, I estimate that removal of the taxes would result in an increase of around 13 per cent in the pre-tax expenditure on insurance.

Table S2: Effect of removing taxes on uninsured households

Households (000s) without insurance					
	From 2009/10 survey	Forecast today	Forecast reduction today if		
			ESL were removed	ESL and Stamp duties removed	
Jurisdiction	**Recorded**	**Estimate**	**Estimate**	**Estimate**	**% Change**
Without contents insurance (000s)					
New South Wales	979	992	98	148	15%
Other jurisdictions	1,476	1,479		94	6%
Total	**2,456**	**2,471**	**98**	**242**	**10%**
Without house insurance (000s)					
New South Wales	77.4	71.6	16.9	24.1	34%
Other jurisdictions	123	103		14	14%
Total	**200.6**	**174.6**	**16.9**	**38.4**	**22%**

1. For details by other jurisdiction and notes see Table 9 on page 29 and Table 10 on page 30.

Table S3: Effect of removing taxes on pre-tax premium purchased

Pre-tax premium $ million purchased on house or contents insurance					
	From 2009/10 survey	Forecast today	Forecast increase today if		
			ESL were removed	ESL and Stamp duties removed	
Jurisdiction	**Recorded**	**Estimate**	**Estimate**	**Estimate**	**% Change**
New South Wales	1,215	1,386	226	351	25%
Other jurisdictions	2,881	3,494		291	8%
Total	**4,097**	**4,880**	**226**	**643**	**13%**

1. For details by other jurisdiction and notes see Table 8 on page 28.

A potential challenge to the analysis of the effect of taxes is that there are other state-based factors that influence the results. This possibility seems unlikely for several reasons discussed in the report. Furthermore, where practical, I examined models using multiple survey years (over which there was more variation in rates of tax by state) and tested for unobserved

state-based effects. The results indicated that the effect of taxation was significant even with these state-based controls.

Other demand factors

The modelling was used to analyse other factors of demand. The demand for insurance was found to be most significantly influenced by the value of assets to insure. The likelihood of purchase and the expenditure on contents insurance was closely correlated with the value of contents owned by the household. Similarly the value of contents and dwelling value were found to be important factors influencing the demand for house insurance.

The effect of income — an area of considerable interest in prior empirical studies — was also examined. Income affects insurance demand in a number of ways. Those with higher incomes tend to have more assets to insure, greater wealth which may be used in an emergency and greater disposable income with which to purchase insurance. The results suggest that, having controlled for other factors, income has a small but positive influence on the demand for insurance.

Other demand factors were also analysed particularly in regard to contents insurance. After controlling for factors including the value of assets and income evidence was found that the insurance demand for contents insurance is:

- less for those born in non-Western countries
- slightly related to age (less for age<25 and more for age>55)
- less for those without need for house insurance
- lower for those without access to financial institutions for emergency money

Of note, there are a large number of households who have purchased a home insurance policy but report having no other financial asset. This suggests that for many, home insurance has an important wealth protection role for otherwise financially excluded households.

Conclusion

The results of this study are consistent with expectations and robust to different tests. The results provide evidence state premium based taxes have a significant negative affect on the take-up of insurance and are directly responsible for many households being without insurance.

1. Introduction

The Insurance Council of Australia (ICA) is the peak body for general insurance companies. Its mission is to influence, ethically and expertly, the political, social, business and economic environment in order to promote members' roles in providing insurance protection and security to the community.

A key issue for the ICA is the incidence of non-insurance for general insurance products in particular in regards to household insurances (i.e. building and contents insurance). In 2007 the ICA published two reports[1] that looked closely into the issue of non-insurance in regard to house and contents insurance. The two reports found that there are a large number of households without insurance and found evidence that non-insurance was correlated with a number of factors including state taxes on insurance. The second of these reports employed multi-variate regression analysis on data from the Australian Bureau of Statistics (ABS) Household Expenditure Survey (HES) to estimate the relationship between measures of non-insurance, insurance taxes and other measures of demand.

This study builds on the second report using more recent HES data. The focus of the paper is on the demand for insurance and specifically the impact of state taxes on decisions to purchase insurance.

The paper is based on a technical study; however, I have attempted to limit any technical discussion to the appendices, boxes, tables and footnotes.

The document is divided into 5 additional sections. Section 2 provides a background on what is known about the demand for house and contents insurance. Section 3 covers the approach. Section 4 discusses the data and the modelling challenges. Section 5 covers the results of the analysis. Section 6 concludes.

[1] The first report is Tooth and Barker (2007), "The non-insured: Who, why and trends", available at http://www.insurancecouncil.com.au.

2. Background

2.1 The demand for insurance

This report analyses the demand for house insurance and contents insurance. Contents insurance, as the name suggests, covers the contents of a building typically including unfixed household goods and valuables and personal effects. House insurance (also known as building or home insurance) covers the residential building including fixtures and structural improvements.[2] These insurance policies will provide cover for specified events including fire, theft and storm damage.

Although often purchased combined there are important differences between the two insurances. While contents insurance may be potentially purchased by all households, building insurance is not paid for directly by those who rent or by those that pay body corporate fees (as the body corporate will purchase the building insurance on behalf of the members). The two insurance types also differ in terms of the typical level of cover. Building insurance tends to have a higher level of cover (i.e. sum insured) but less frequent claims than contents insurance. For this reason we would expect risk-averse consumers to be more concerned with being covered by house insurance.

The demand for insurance takes two forms. Consumers have a choice of whether to purchase insurance and what level of cover to take-out. Consumers can reduce their premium by choosing to accept a higher deductible or a lower sum insured. Whereas we would expect a risk-averse consumer to prefer to reduce their premium via a deductible, an ongoing concern is that many households (particularly in regards to building insurance) are uninsured in terms of the sum insured. It is common to measure the responsiveness of consumers demand to changes in prices and other factors in terms of the elasticity (see Box 1 below).

Box 1: Elasticity

An elasticity measure is simply a measure of the percentage change in one variable in response to a percentage changes in another. A price elasticity of demand measures the percentage change in consumer demand in response to a percentage change in price. A price elasticity of demand of -0.5 reflects that a 1 per cent increase in price would induce a 0.5 per cent decrease in demand. Similarly the income elasticity of demand represents the percentage change in demand in response to a percentage change in income and the price elasticity of supply measures the percentage change of supply to a percentage change in the price received.

Estimates of elasticity may be comparable across regions and time. However, care is

[2] House and contents policies may also include additional features and a range of optional covers. Common additional features are legal liability for incidents causing harm to other people and their property. Optional covers include domestic workers compensation and injuries to pets. Contents policies for a strata unit will commonly include fixtures not included in the body corporate insurance.

required. The responsiveness of consumers (and suppliers) to changes in price (and any other change) will typically increase over time. Furthermore, care is required when comparing the demand and price variable. In this report, a number of different measures of demand are used and the proxy used for price is the 'rate of tax'.

2.2 Prior research

The theory of insurance demand has attracted significant attention among economists. A typical starting point is to assume that individuals are risk averse; that is, they would prefer certainty over a gamble that gives the same outcome on average. From this and other basic assumptions about consumer behaviour[3] researchers have modelled how demand for insurance varies across a range of dimensions including income and wealth, types of insurance loading and levels of risk aversion.

The theoretical models predict that when full insurance can be bought at actuarially fair prices (i.e. that premium = expected loss), risk averse individuals will fully insure themselves against all risks. Mossin (1968) famously predicted that partial coverage (such as via a deductible) would be optimal if there was a positive proportional loading (as would occur with taxes based on a level of premium). This prediction has gained significant attention given that it is generally thought that most people purchase full coverage. Other researchers have argued that full coverage (having made the decision to insure) may be optimal when there is a fixed premium loading (which might be the case if there were fixed administration costs) or when a portfolio approach to risk is taken. The extent of cover as measured by the level of premium purchased is analysed in this study.

Another area of great interest has been the extent to which insurance demand changes with wealth and income. The basic models lead to the prediction that insurance would be an inferior good i.e. that the rich, backed by greater funds, would be more likely to self-insure and demand less insurance cover. Wealth and income are however correlated with many other factors related to insurance demand. For example, wealthier people tend to have greater assets at risk and due to their lifestyle face different levels of risk. Wealthier people may also have different attitudes towards risk and a different level of education about risk and insurance. Nevertheless, the relationship between insurance demand and wealth remains an area of great empirical interest and one which is explored in this study.

There have been a growing number of empirical studies into insurance demand. Although most studies have focused on life and health insurance there are a few of note that have incorporated an analysis of property insurance including that of house and contents.

A large study of non-insurance was conducted in the UK (Whlyey et. al 1998). The authors found that around 20 per cent of UK households did not have contents insurance. The study did not attempt to study the effects of price on insurance demand but did examine the extent

[3] Another basic assumption is that consumers attempt to maximise their expected utility. This means they consider the likelihood of different scenarios and their utility (loosely, their wellbeing) in those scenarios and make decisions that maximise their expected (weighted average) utility.

to which non-insurance was related to demographic factors and in particular income and financial hardship. Of note, they found that about half of the non-insured households had at one stage held insurance but had let the policy lapse due to financial constraints.

Two other studies of note have analysed the relationship of insurance demand and income. Beenstock et al (1988) conducted a panel study across 12 countries and 12 years. They estimated long-run income elasticities of greater than 1; implying property-liability insurance is a superior good. Showers and Shotick (1994) analysed data from the 1987 US Consumer Expenditure Survey to assess the effects of age, income and household characteristics on total insurance expenditure. Of note they found insurance expenditure to be positively related to income, age and size of household and that the marginal importance of income to be greater for small households.

There has been relatively less analysis of the effect of price on insurance demand. This is perhaps because of difficulties in finding a proxy for price. Browne et al. (2000) took the approach of using the market share of foreign insurers in a country as a proxy for price assuming that the presence of foreign firms would indicate a greater level of competition and thus lower prices. They found some support for this as foreign insurer presence was positively and significantly related to general liability insurance demand. The reverse however was also found in the case of motor vehicle insurance demand. A possible explanation is that foreign insurers would stay away from a market due to an existing highly competitive market.

An alternative proxy for price can be found by comparing premiums to claims (or expected claims). Grace, Klein and Kleindorfer (2004) took this approach to estimate a price elasticity (in absolute terms) for catastrophe[4] and non-catastrophe home insurance expenditure in New York and Florida.[5] They estimated a price elasticity for home owners insurance of around -1 but perhaps surprisingly that the demand for catastrophe insurance to be much more price elastic than non-catastrophe insurance.

Esho et al. (2004) undertook a cross-country analysis of property-casualty insurance (as measured by per capita premiums). Although their focus was on the importance of legal rights they also analysed the effect of factors including price (as proxied by the inverse of the loss ratio). They found evidence for a small negative price elasticity of demand.

There are many correlates with non-insurance. These are described in Tooth and Barker (2007), "The non-insured: Who, Why and Trends". This report categorised the key correlates of the take-up of insurance as being related to house type and tenure, financial position, life stage and other demographic factors. It presented findings that were consistent with state taxes having a negative impact on the take-up of insurance but did not attempt to measure the statistical significance of these results.

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4 Catastrophe insurance refers to major perils such as floods, hurricanes and earthquakes.

5 The "expenditure" is estimated by the loss costs. The "price" is estimated as the mark-up of premiums over the present value of expected losses.

3. Approach

This study uses data on expenditure by households on house insurance (also known as building insurance) and contents insurance to analyse both the decision to insure and the amount of premium purchased. These measures of demand are analysed against a range of drivers of demand including price (proxied by state insurance taxes), income and wealth, value of assets and demographic variables.

Four different measures of household insurance demand are used as the dependent variable: two binary choice measures reflecting whether contents and house insurance were purchased; and two expenditure measures reflecting the net (of state based taxes) premium purchased for both house and contents insurance. Some analysis is also conducted on the decision to purchase, and the expenditure on, house and/or contents insurance. The analysis on house insurance is limited to the population of households who 'need house insurance'; that is those households who are in the market for house insurance.

The modelling strategy is described in Box 2 below.

Using these models, this study focuses on answering a number of questions relating to the purchase of house and contents insurance. These include:

- What is the effect of state taxes (and more generally price) on demand for insurance?
  - What is the price elasticity of demand for house and contents insurance in terms of insurance covers sold and in terms of total premium sold?
  - What would occur if state taxes were reduced or removed?
- How does the demand for insurance relate to other factors, including:
  - Income / wealth;
  - Assets to insure;
  - Other cultural and demographic factors; and
  - Levels of financial inclusion?

The approach used may lead to a slight underestimate of the price elasticity of demand. As tax rates (the proxy for price) may also influence supply, the analysis will reflect not just the responsiveness of demand but the combined effect of demand and supply changes to a variation in price. This is unlikely to be a significant cause for concern. In terms of the supply of house and contents insurance it is likely that supply in the medium term is reasonably elastic. It may be that there are some marginally increasing costs e.g. in obtaining reinsurance, but it seems unlikely that these would be significant.[6] Furthermore the focus of this study is to understand the impact of state taxes. As such we are interested in both the *supply* and *demand* effects.

6 The CIE (2005) also argues that supply is likely to be very elastic.

Box 2: Modelling strategy

The basic modelling strategy is influenced by a number of factors. Firstly, although the purchase of house and contents insurance is often considered to be a joint decision, as discussed below, many households do not require house insurance (e.g. renters) and so the demand for contents insurance is considered both separately and jointly with that of house insurance. Secondly in many cases the expenditure on house and contents insurance cannot be separated but the insurance products purchased can be inferred. As a result, the analysis of the decision to purchase insurance is examined both separately and jointly with the size of the premium purchased.

The models estimated in this study are based on the following equation:

$$\textit{Insurance demand}_i = \alpha + \beta_1(\textit{Measure of tax}) + \beta_2(\textit{Measures of income and wealth}) + \beta_3(\textit{Measures of assets to insure}) + \beta_3(\textit{Dummy household characteristics}) + \beta_4(\textit{Year dummy}) + \textit{error term}$$

To model binary choice decisions Probit and bi-variate Probit models were used. To analyse expenditure Tobit models which allow for truncation of the dependent variable were used.[7] As reflected in the notes, other models were also considered and tested.

The 'Measure of tax' in all models used in this report was the log of the tax uplift factor (i.e. 1 + the cumulative tax rate). For most models tested, logs of key financial information (value of contents, value of dwelling, net wealth and household income) were used. The use of logs enables easier pooling across survey years and generally are more effective as independent variables. In some cases 'level amounts' (e.g. $ amounts) were used. For the analysis of expenditure on insurance, level financial amounts were used to be consistent with the dependent variable. These were adjusted for inflation to enable pooling across survey years. Tests confirmed there were no significant differences depending on which approach was used.

Unless otherwise indicated, all analysis in this report makes use of the household weights. The weights enable forecasts for the total population to be made. A few tests were conducted using non-weighted data which confirmed that the use of weighting had little effect on important coefficient estimates.

As the impact of state-based tax policies is of interest, clustered standard errors (clustered by state) were computed.

7 To model expenditure, Tobit and Heckman selection models were considered. A Tobit model was considered most appropriate as there are no factors identified that would be expected to affect the decision to insure that would not also affect the level of cover obtained. I also examined the practicality of a Cragg's Tobit (also known as two-tier Tobit of double hurdle model Tobit model). A Cragg's Tobit model eases the restriction that the purchase of insurance and the amount of expenditure are determined by the same underlying parameters. However, the Tobit model was retained after testing indicated there was not a significant difference in the results obtained and because in some cases the Cragg's Tobit model did not lead to a solution.

4. Data

4.1 Household Expenditure Survey

The data used is the Household Expenditure Survey (HES) from the Australian Bureau of Statistics (ABS). This survey has been conducted every 5 or 6 years. The surveys were conducted over the course of a year from July to June, with a roughly equal number of interviews from each quarter.[8] For this study four surveys years (1993/94, 1998/99, 2003/04 and 2009/10) have been used. The analysis has focussed on the later survey years as more detailed information has been collected in these surveys.

The HES includes data on expenditure (including importantly on house and contents insurance premiums) and many other useful household, family and individual characteristics. Of note, the two most recent surveys (2003/04 and 2009/10) include:

- household expenditure on house and contents premiums[9] (in some cases separately identified)
- other expenditure data used to categorise households including body corporate payments
- dwelling characteristics (e.g. number of bedrooms, value of house)
- geographic information (e.g. state and whether household located in capital city)
- demographic information (e.g. family structure, age, country of birth), and
- financial information (e.g. income and wealth data).

The HES includes household weights which enable the survey data to be scaled so as to make estimate for entire Australian household population.

4.2 Tax data

In Australia, there are three effective "taxes" that are or have been commonly applied to general insurance product sales.[10] These are:

- Emergency Service Levy (ESL)[11] – applied to home insurances. The ESL is used to raise funds for emergency services (these have typically been applied at rates ranging from 15 to 20 per cent);
- The 10 per cent Goods and Services Tax (GST); and

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8 A slight exception is in the 2009/10 survey in which substantially more interviews were conducted in the final quarter.

9 The HES also includes expenditure on other insurance covers including compulsory and (separately) optional cover for motor vehicles, compulsory and (separately) optional cover for other vehicles, special personal items, travel insurance, life and health.

10 Insurance providers, like other companies pay other forms of company related taxes.

11 The ESL was formerly referred to as a 'fire services levy' (FSL) in some jurisdictions.

- Stamp duty – which applies to all general insurance products.

These taxes are applied on each other resulting in a compounding effect such that for some households the total premium is 41 per cent higher than would be the case in a non-taxed environment.

In NSW there was an additional "tax" related to premium volumes called the Insurance Protection Tax (IPT). This IPT may have added about an additional 1 per cent on home insurance premiums.[12] This tax was abolished on 1 July 2011.

A summary of the taxes for home insurance and their cumulative effect is reported as at April 2015 in Table 1 below.

Table 1: State taxes, excluding GST, on house and contents insurance premiums

Jurisdiction	NSW	Vic	QLD	WA	SA	NT	ACT	TAS
ESL	17.8%							
GST	10%	10%	10%	10%	10%	10%	10%	10%
Stamp Duty	9%	10%	9%	10%	11%	10%	4%	10%
Cumulative Total	**41%**	**21%**	**20%**	**21%**	**22%**	**21%**	**14%**	**21%**

Source: ICA

NSW is now the only state that retains an ESL on household insurance premiums.[13] Other jurisdictions had imposed such levies, but over time these have been removed. The removal of the ESL and IPT as well as changes in the stamp duty, relevant to this study, are summarised in Table 2 below.

Table 2: Changes in state taxes on home and contents insurance premiums

Jurisdiction	Changes
NSW	• From 1 August 2002 state stamp duty was reduced from 10% to 5% but increased again from 1 September 2005 5% to 9% • Insurance protection tax introduced in 2001 and abolished 1 July 2011

[12] The IPT became effective in late 2001 with levies applied on premiums from previous financial year. Non-registered insurers were required to pay a 1% tax on premium as of 29 November 2001. The relevant legislation stipulated that insurers "must not charge ... any amount that is directly attributable to that tax"; however it would be inconsistent with economic theory if the cost was not passed on to consumers.

[13] The Tasmanian government imposes an ESL on selected commercial products. Because the Tasmanian levy is not applied to household insurance they were not included in this study.

Jurisdiction	Changes
Victoria	• From 1 July 2013 removed ESL (replaced with a land tax) • Stamp duty has been steady at 10%
Queensland	• In 1985 an insurance based levy for funding fire and emergency services was replaced with an urban fire levy scheme. • Stamp duty was reduced on 1 August 2004 from 8.5% to 7.5% and increased on 1 August 2013 from 7.5% to 9.0%
Western Australia	• ESL which was 19% was phased-out over 2003 so that the ESL on an annual policy would only apply to the proportion of the period up to 2004. • Stamp duty was increased from 5% to 8% on 1 July 1998 and from 8% to 10% from 1 July 2003.[14]
South Australia	• From 1 July 1999, the insurance based levy for fire brigade funding was abolished and replaced with a broad based system. • Stamp duty was increased from 8% to 11% in 1999.
Tasmania	• From 1 October 2012 stamp duty rate increased from 8% to 10%
Northern Territory	• Stamp duty increase from 8% to 10% in 2000
ACT	• From 1 July 2000 an emergency services levy (paid by insurance companies based on market share) was abolished. • Stamp duty was increased from 7% to 10% in 1992. From 1 October 2012 it has been reduced by 2% per year so as to be eliminated by 2016.

ESL rates are not prescribed in regulation. The ESL is imposed by insurers on premiums to recover their mandatory contribution to emergency services budgets.[15] These contributions are set in proportion to the premium written by each firm, and as a result, in practice, the ESL acts like a tax similar to stamp duty. The ICA had (up to February 2012) published on a quarterly basis an advisory rate that reflected the average rate for the industry. These advisory rates have been used for this study. The rates post-February 2012 used are a market average rate provided by the firm Professional Financial Solutions (PFS) who now advise companies in determining their individual ESL rates. PFS estimates that an average lag period of 8

[14] The changes and the response of insurance company pricing to the changes are detailed in Sigma Plus Consulting (2004).

[15] The insurance industry funds 77 per cent of the emergency services annual budgets in NSW.

weeks applies across the industry from the time when new information on rates is available and when insurers adjust prices.

The effect of the GST on insurance premiums is not straight forward. Insurance companies receive input tax credits (ITCs) for the GST they pay on their inputs. In net terms they only pay for the GST for the value add component of the insurance company.

4.3 Data issues

4.3.1 Estimating taxes

The tax rate is a key variable of interest for two reasons. Most importantly, the tax rate is considered to be a factor that will affect the cost of insurance and therefore purchase decisions.

It is also required to calculate the pre-tax premium in the models that examine the expenditure on insurance. As the insurance premium recorded in the HES is post-tax, for analysing a comparable pre-tax insurance premium across states it is necessary to calculate a premium net of tax by adjusting expenditure for the estimated state premium based taxes.[16] [17]

Unfortunately the choice of the appropriate tax rate to use is not straightforward. The data for the HES is collected over a course of a year and the date when the household purchased insurance (or decided not to renew) may be up to a year prior to when the survey was conducted. In some cases, most notably in Western Australia, changes occurred such that the timing of the interview is important to the estimated tax rate. In Western Australia the ESL was removed (falling from 19% to 0%) and the stamp duty increased over a period that overlapped with HES interviews. In these cases the tax was estimated considering the quarter during which the HES survey was conducted and the likelihood of when the policy was purchased.[18]

In Victoria and for South Australia (up until the ESL was removed) the ESL rates differed between country and city. A field identifying the distinction between country and city is available but only for the 2003/04 and 2009/10 surveys. In models using prior survey years a weighted average tax rate for country and city was applied.

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16 This adjustment introduces a risk that the estimates of the impact of tax on pre-tax expenditure will be distorted by incorrect adjustments to the pre-tax expenditure. I expect this risk to be small given the accuracy with which the tax rate is determined and the lack of any reason for bias in estimating the rate of tax applied.

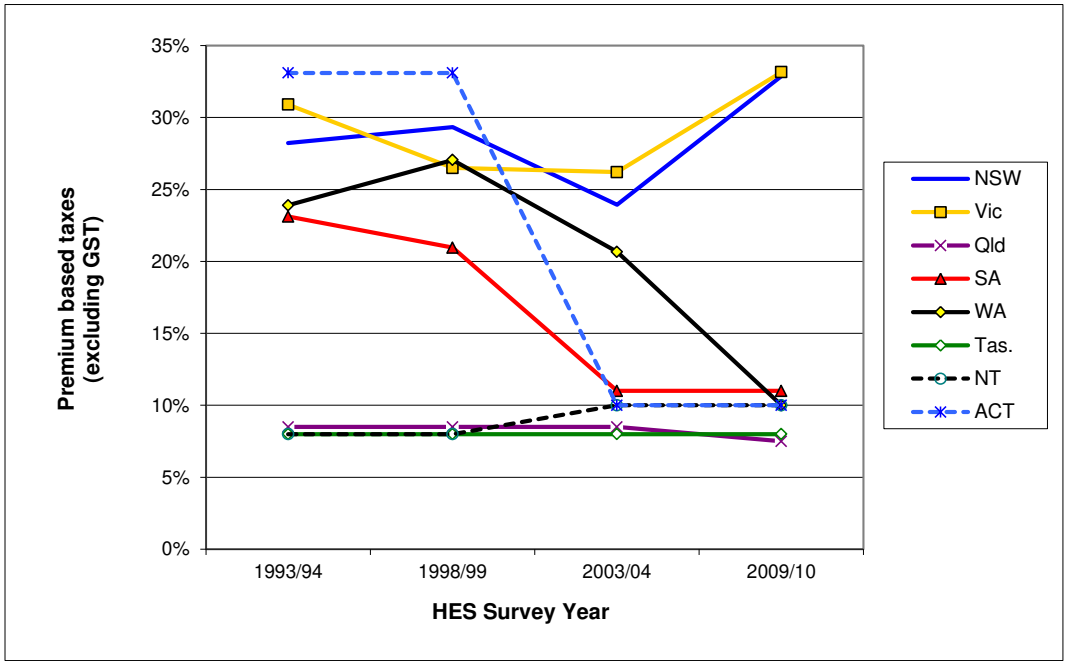
17 As discussed above, the GST is constant across jurisdictions and so is not considered in any adjustments.

18 In Western Australia the FSL was progressively removed over 2003 so that people only paid the FSL for the proportion of the period in 2003 that they were covered. Thus a premium cover from 1 July 2003 would have included 50% of the 2003 FSL (which was 19%). Insurance cover beginning in 2004 or later attracted no FSL. In addition from 1 July 2003 stamp duty was increased from 8% to 10%. The HES interviews were conducted progressively from July 2003 to June 2004. The data records the quarter in which survey interview was conducted. Using this information the % tax paid is estimated using the assumptions that a) any day in the survey period was equally likely; and b) the insurance was purchased at any period with equal likelihood in the 12 month period prior to the interview date. Thus if the interview quarter is July to September 2003 then insurance may have been purchased between July 2002 and September 2003.

A summary of taxes (excluding GST) for the survey period is graphed in Figure 1 below. As shown there has been variation in taxes over the survey periods in most jurisdictions.

A consideration in estimating the impact of taxes on purchase decisions is that there may be some lag in the time taken for households to react to price changes. This is likely to some degree. The non-insured are unlikely to be aware of most changes in taxes and so may take some time to respond. Insurance has high retention rates and so even insured households who will see the impact of tax changes in their renewal payments may be slow to respond. Since it is not known how long the lag (if at all) may be, the analysis has in effect assumed a lag of zero. There is not a serious issue as in most cases the state taxes were reasonably stable in years prior to the HES interviews and the main variation is between jurisdictions. Thus this study is in effect estimating the responsiveness of consumers over a number of years.

Figure 1: Average state premium-based taxes (ESL, Stamp Duty and IPT) estimated by jurisdiction by HES year



4.3.2 Issues with the HES data

HES data limitations

There are limitations with the HES data that affect the samples that can be used. First, the HES has changed over time, progressively becoming more useful for this study. Table 11 in Appendix 1 summarises some key differences between the survey years. The 2003/04 and 2009/10 years included questions on the value of contents in the dwelling and direct questions on the wealth of the household.

Second, house and contents insurance is listed as inseparable in many cases.[19] In 1993/94 all house and contents insurance was listed as inseparable but in the remaining surveys between 53 and 64 per cent are recorded as inseparable (see Table 12 in Appendix 1). In cases where expenditure is not listed as separable, it is still typically possible to infer what products were purchased. For the 1998/99, 2003/04 and 2009/10 surveys, I assumed that an inseparable expenditure reflects that people have purchased both house and contents insurance (otherwise it could be separated).[20] For the 1993/94 survey I assumed that for those who do not need house insurance, the insurance expenditure refers to just contents insurance. A summary of the samples that can be used is provided in Table 13 in Appendix 1.

Other issues

These are some cases where it appears data has been miscoded. For example, in a small number of cases, respondents recorded having purchased house insurance when they have no need for it. A summary of apparent anomalies in the data is provided in Appendix 1.

[19] There were a few instance of recorded expenditure on both 'contents insurance' and 'house and contents inseparable'. Presumably this may relate to covers being taken out by more than one person.

[20] In some cases households had no need for house insurance (because they did not own a place or they paid money to a body corporate).

5. Results

5.1 Levels of insurance and non-insurance

A summary of the level of insurance cover held by households on their main dwelling is shown in Table 3 below based on the latest HES.

In 2009/10 there were around 8.4 million households in Australia. All of these households are potentially in the market for contents insurance. Based on the HES, a little under 2.5 million (29%) of these did not purchase contents insurance. There were around 5.25 million households that were owner-occupiers not in a body corporate and therefore in the market for house insurance. Of these 201 thousand (3.8%) were estimated not to have purchased house insurance and 547 thousand (10.4%) estimated to be uninsured for either house or contents insurance. As shown in the table, the rates of non-insurance were comparable with the rates estimated from the 2003/04 survey.

Table 3: 2009/10 Insurance cover (number of households)

	Contents	House	House and contents
Potential market (000s of households)	8,399	5,249	5,249
Number insured (000s of households)	5,943	5,048	4,702
Number uninsured (000s of households)	2,456	201	547
Per cent without cover 2009/10	29%	3.8%	10.4%
Per cent without cover 2003/04	28%	4.1%	10.9%

1. Numbers are calculated using the HES household weights.
2. There may be some coding errors. A small number of respondents (<1%) who appear to not need house insurance reported purchasing house insurance.

The number and proportion of households purchasing house and contents insurance for other sub-populations is provided in Table 15 in Appendix 1. Around 25 per cent of all households have neither house nor contents insurance (this is slightly up from the 2003/04 survey). Unsurprisingly rates of non-insurance for contents insurance are greatest among those who do not need house insurance (e.g. renters). Around 60 per cent of these households had not purchased contents insurance compared with a rate of 10 per cent for those who needed house insurance.

As reflected in Table 15 in Appendix 1, the take-up of insurance is highly correlated with a great many factors including:

- Tenure
- Dwelling structure
- Age of respondent, and
- Country of birth.

Many of these factors are correlated with each other and also vary by jurisdiction. The presence of these correlations underlies the importance of undertaking multi-variate regression analysis (analysis that attempts to control for multiple variables) in attempting to analyse the importance of any single factor.

5.2 Overall findings from regression analysis

To examine the influence of individual factors a number of multi-variation regression models were used of the form outlined in Box 2 on page 7. In all cases a range of variables were used. The results of the key models are presented in a series of tables in Appendix 3 (Model outputs). Notes accompanying the tables provide further details about the models.

The types of models used (summarised in Table 4 below) vary with the decision that is being modelled. A variety of models and alternative specifications were tested. Variations included the number of survey years used, the form of the control variables and the type of model. The key results of interest were largely consistent across the different models. Where there are exceptions there are notes in the text or accompanying the tables showing the model results.

The results of the modelling are consistent with expectations. As we would expect, the results of all the models provide evidence that households were more likely to purchase insurance and spend more on insurance if:

- state premium-based taxes were reduced
- they had a greater value of assets to insure, and
- they had a mortgage and lived in a house (rather than a flat).

Table 4: Summary of models used

Decision being modelled	Type of model used	Notes
Purchase of house insurance	Bivariate Probit	Used to jointly estimate demand for house and contents insurance cover among those who need house insurance
Purchase of contents insurance	Probit	Used to estimate demand for contents insurance cover among all households
Pre-tax expenditure on house and contents insurance	Tobit model[21]	Applied to full sample and separately to those who did and did not need house insurance
Pre-tax expenditure on contents insurance only and house insurance only	Tobit model	Expenditure on contents insurance and house insurance often cannot be separated, so high risk of non-random sample.

5.3 Decision to purchase insurance

5.3.1 Decision to purchase insurance among those who need house insurance

For the analysis of house insurance the applicable sample is only those households that are owner occupied and not part of a body corporate. Since contents insurance is also applicable in these cases, the decision to purchase house and contents insurances is considered jointly.

The results of two models of the decision to purchase house and contents insurance among those in the market for house insurance are provided in Table 17 in Appendix 3. The models estimate the likelihood that a household will purchase house and (separately) contents insurance. The notes accompanying the table provide guidance on how to interpret the results. Care is required in interpretation as many factors are correlated with each other.[22]

The results are consistent with expectations. The results provide evidence that the likelihood of purchasing house and contents insurance decreases with higher taxes and increases with

[21] The key results were not significantly impacted by the choice of survey years or specification.

[22] For example, younger people are more likely to live in a flat and have less valuable homes and contents, all factors which may individually contribute to them being less likely to be insured.

income and the value of contents.[23] The results are largely insensitive as to whether the last two surveys (2003/04 and 2009/10) or just the last survey (2009/10) are used.

As expected the results provide evidence that the decision to purchase house and contents insurance is very closely related.[24] This indicates there are unobserved factors (such as attitudes to risk) that influence both the decision to purchase contents and house insurance. This finding may also reflect that there is a search cost to purchasing insurance and so households are more likely to purchase contents insurance in conjunction with house insurance.

The implied elasticities of the take-up of house and contents insurance with respect to the tax paid and income (taken at mean values) are shown in Table 5 below. Among those who need house insurance, the demand for house insurance appears to be much less elastic than that for contents insurance. From Table 5 the implied elasticity for house insurance coverage (i.e. whether insurance is purchased) is around -0.06, implying that a 1 percentage point reduction in the rate of tax will increase the likelihood of taking out house insurance by 0.6 per cent. The comparable elasticity for contents insurance is around 3 times greater. This is expected as there is a higher potential loss associated with household insurance and thus household insurance may be considered more of a necessity. These results are consistent with the descriptive statistics shown in Table 3 that show that for those who need house insurance, the rate of non-insurance is much higher for contents insurance (10.4%) than for house insurance (3.8%).

The implied income elasticity for the take-up of house insurance is very small and might be considered negligible. For the take-up of house insurance, the implied income elasticity from the models is around 0.02, suggesting that (after controlling for other factors[25]) a 1 per cent increase in income would only result in a 0.01 to 0.02 per cent increase in the likelihood a household has house insurance cover. The small influence of income is not surprising given that the model also includes controls for other variables such as the value of contents and age that are closely correlated with income.

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23 In theory there should be no reason why the likelihood of purchasing house insurance should increase with the value of contents.

24 This is evidenced by the finding that (from Table 17) the estimated correlation coefficient (*rho*) is large and significantly greater than 0.

25 These other factors include the value of contents, age, dwelling type and tenure.

Table 5: Implied elasticities of take-up of house and contents insurance by those who need house insurance

	2003/04 and 2009/10 pooled		Just 2009/10	
	House insurance	Contents insurance	House insurance	Contents insurance
Tax (1+ tax rate)	-0.064*	-0.191*	-0.061**	-0.192**
	(0.033)	(0.102)	(0.024)	(0.090)
Household income	0.014*	0.029***	0.022**	0.030**
	(0.008)	(0.009)	(0.009)	(0.012)

1. The table shows estimated elasticities and their standard errors.
2. The elasticity with regards to tax approximates the percentage change in the likelihood of taking out insurance relative to a percentage point change in the tax rate. The elasticities are calculated at sample means; which loosely means the household with the average characteristics.
3. Robust standard errors adjusted for clustering by state are in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels.

In regard to other explanatory variables there are some interesting findings. Owners with a mortgage are more likely to have a house insurance policy, perhaps reflecting the higher level of exposure they have or the requirement by lenders to be insured. Conversely owners living in a "semi" (i.e. a building with shared walls) are less likely to have insurance. These effects were not found with contents insurance. For both home and contents insurance two person families were less likely to be insured.

Another interesting finding is that (after controlling for other factors) households with greater wealth are less likely to insure. This may reflect wealthier households choosing to self-insure. Of note, the value of contents is a strong predictor of whether a household has house and/or contents insurance and there is some evidence that the likelihood of purchasing house insurance increases with dwelling value.

One notable difference between the results for contents and house insurance is in regards to "country of birth". Those households where the reference person is born in a non-English language country are much less likely (by a factor of 7 to 9 percentage points) to take-out a contents insurance cover than a household where the person is born in Australia. However "country of birth" appears to play no influence on the take-up of house insurance. This would suggest that the reason for "country of birth" being important may not just be a problem of language.[26]

[26] For further evidence on this issue see Tooth (2012, section 3.2.2).

5.3.2 Decision to purchase contents insurance among all households

The market for contents insurance extends to all households. To analyse the decision to purchase contents insurance, I conducted analysis on the full population of households and compared this with results from models using the sub-populations of those who 'have a need' and 'do not have a need' for house insurance. The results for these three models (using the last two survey years) are presented in Table 18 on page 41 in the appendix. The full sample results for the last one, two and three survey years are presented in Table 19 on page 43.

A summary of the implied elasticity[27] of the decision to purchase contents insurance with respect to state taxes, income and the value of contents is computed and summarised in Table 6 below. As expected the results suggest there is a significant negative relationship between state taxes and the probability of taking out insurance. The estimate for those who need house insurance is statistically significant and similar to that reported in Table 5. The results for the other samples are not statistically significant due to the large standard errors but suggest that that the elasticity with respect to tax is greater for those who do not need house insurance (e.g. renters).

The results for income are consistent with the analysis on house insurance in the previous section and imply that controlling for other factors, income by itself is not a major determinant of demand for contents insurance cover. Not surprisingly, the influence of income is much more significant when other variables correlated with income are removed from the model. This can be seen in Table 19, where in the first set of model results (which covers three surveys years) the variables for value of contents and wealth are not included and the influence of income is around 3 times greater.

Table 6 also highlights the importance of the value of household contents as a driver of the decision to purchase insurance. The results suggest that for the average household who has no need for house insurance a 10 per cent increase in the value of contents will increase the likelihood of purchasing contents insurance by over 5 per cent.

[27] Using the models presented in Table 18.

Table 6: Implied elasticities for the take-up on contents insurance premium (using 2003/04 and 2009/10 pooled)

	Need for house insurance	No need for house insurance	All
Tax	-0.176*	-0.628	-0.344
	(0.102)	(0.752)	(0.253)
Income	0.032***	0.071	0.052***
	(0.012)	(0.043)	(0.012)
Value of contents	0.126***	0.518***	0.284***
	(0.012)	(0.089)	(0.017)

1. Values show elasticities calculated at sample means. Robust standard errors adjusted for state clusters are in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels.

There are other results of interest that can be drawn from the results presented in Table 18 and Table 19. Among the group without need for house insurance, the take-up of insurance is correlated with age. The probability of purchasing insurance is only noticeably lower for the very young (age <25) and noticeably higher for the very old. This relationship is not apparent among those who are in the market for house insurance.

Again country of birth appears to be an important factor. The results suggest that even after controlling for other demographic factors, the probability of taking out contents insurance is 15 percentage points lower for those born in non-English speaking countries.

The coefficients on variables relating to house tenure are also significant. All else being equal the likelihood of having contents insurance among owners is lower for those in a body corporate and lower again for those who do not own.

The descriptive statistics had suggested that people living in a capital city were less likely to insure. There appears to be no evidence for this effect once other factors, notably country of birth are controlled for.

Measures of financial exclusion and the decision to insure

The impact of other measures of financial exclusion on the decision to insure was also tested by extending the model presented in the last column of Table 19. A summary of the results is presented in Table 20 in the appendix. Recall that this model already includes controls for household income, dwelling type and tenure.

The results provide evidence that non-insurance is related to financial exclusion. Of note the results suggest that households are more likely to be insured if they answered yes to "Would use own savings as source of emergency money". Those who can obtain emergency money from a financial institution either via a loan or temporary increase in credit card debt are also

more likely to be insured. There are also other indications of non-insurance being linked to financial hardship. Of concern is that those who stated they "could raise $2000 emergency money in a week" are also more likely to be insured (i.e. those unable to raise $2000 are less likely to be insured). Perhaps not surprisingly those unemployed and those who had money shortages were more likely to be non-insured.

A number of other non-financial indicators were also tested. No significant relationship was found between non-insurance and gambling (a number of alternative specifications were tested). Also, no significant relationship was found with measures of security (being in a multi-storey apartment and having spent money on security services).

A number of additional tests were also conducted to examine whether lower-income groups were more sensitive to the impact of taxes (and therefore price). Analysis was conducted both on the decision to insure and the level of expenditure but no conclusive findings could be identified.

5.4 Expenditure on insurance

5.4.1 Expenditure on house and contents insurance combined

For many households it is not possible to separately identify the expenditure on house and contents insurance. As a result the focus of the analysis on insurance expenditure was on the combined pre-tax expenditure on house *and* contents insurance. The main analysis is based on a model using the entire population of households (results are presented in Table 21 in the appendix[28]), however I also undertook some modelling on the groups of respondents who did and did not have a need for house insurance.

In general the results of modelling on expenditure are very consistent with the modelling of the decision to insure. The results indicate that insurance expenditure:

- increases with lower state-taxes
- increases with greater incomes
- increases with greater value of dwelling and value of contents to insure
- generally increases with age
- is lower among those with from non-English speaking countries, and
- is higher among owners and those mortgages.

There are some slight differences in the results. In contrast to the models of the decision to insure, the models on expenditure suggest a positive relationship between wealth and the demand for insurance. This possibly reflects that wealth is correlated with the value of assets that are being insured and other measures (including value of contents and value of dwellings) are imperfect proxies for the level of cover required.

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[28] Of note, the type of model used (a Tobit model) differs to the models used to examine the decision to purchase insurance and subsequently the interpretation of the model estimates differs.

The results from the modelling of expenditure tend more often to be statistically significant. This reflects that there is more information captured in the expenditure variable and also that the impact of any explanatory variable may be greater as the variable may influence expenditure by changing the level of cover in addition to the decision to insure.

A summary of the elasticity of demand for expenditure to selected variables are presented in Table 7 below. An indicative decomposition of the elasticities into the decision to insure and the typical expenditure on a policy is presented in Table 22 in the Appendix.

Table 7: Implied elasticities with respect to pre-tax expenditure on house and contents insurance

	Need house insurance	Don't need house insurance	Full sample
Tax	-1.116***	-1.441	-1.340***
	(0.198)	(0.740)	(0.143)
Household income	0.069***	0.096	0.089***
	(0.012)	(0.050)	(0.017)
Value of dwelling	0.169***	-0.007	0.138***
	(0.036)	(0.011)	(0.033)
Value of contents	0.221***	0.606***	0.315***
	(0.022)	(0.069)	(0.022)
Wealth	0.015**	0.042	0.016**
	(0.005)	(0.023)	(0.006)

1. Results show elasticities computed at mean values. The 'tax' elasticity approximates the percentage change in demand to a percentage point increase in the tax rate. Robust standard errors adjusted for state clusters are in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels.

2. The 'Full sample' elasticities are computed from the Tobit model shown in Table 21. The results for the other two columns are taken from identical models with the exception that they are filtered by whether the household has need for house insurance.

The results suggest that expenditure on house and contents insurance for both groups and the combined sample is elastic with respect to tax; that is a 1 percentage point reduction in the level of taxation will induce more than a 1 per cent increase in expenditure. This demand elasticity with respect to tax may appear large relative to the price elasticity of other goods

and services. The price elasticities for most broad commodity groups in the long-run tends towards -0.5.[29] However, the large elasticities are not that surprising for two reasons.

First, the tax on insurance is particularly burdensome as it applies to more than just the cost of the 'service' of insurance, which may be thought of the service of pooling funds from policyholders and redistributing those funds to cover the cost of claims. The insurance premium may be thought of as consisting of the policyholder's contribution to the pool of funds and a loading, which is a price to cover the cost of providing the insurance service (which includes cost of administering the pool and managing claims). The insurance taxes apply on the total premium; that is, the policyholder's contribution to the funding pool in addition to the price of the insurance service.

The loading is arguably a better measure of the price for considering the impact of taxes. The average loading on home and contents insurance (excluding taxes) in the last 10 years has been around 60 per cent;[30] that is, the pre-tax cost of insurance will be 60 per cent higher than the expected claims cost. A 10 per cent stamp duty applied to the full insurance premium increases the loading from 60 per cent to 76 per cent,[31] an increase of 27 per cent[32] or 2.7 times the size of the tax. Therefore in estimating the elasticity with respect to the price of insurance services we need to divide the elasticity with respect to the tax by a multiple of around 2.7. On this basis, the elasticity with respect to tax of -1.34 (from Table 7 above) equates to elasticity with respect to the price of the insurance service of -0.5.

Second, there are multiple effects on the level of cover obtained. A removal of taxes will increase the likelihood of people taking out insurance and also increase the amount of cover obtained. People can increase their cover in two main ways. First, they can increase the level and/or scope of the cover. Second, they can reduce the deductible. The total increase in the pre-tax premium from removing taxes will reflect the combined effect of increasing the number of house insurance covers obtained and the average pre-tax premium on covers held.[33]

The elasticities of pre-tax expenditure presented in Table 7 with respect to the other variables appear reasonable. The elasticity with respect to income is small but positive reflecting that income by itself is not a major factor on the amount of insurance cover purchased.

Not surprisingly, the results indicate the value of dwelling is an important determinant of the expenditure on insurance for those who need house insurance but not for others. The value of contents is an important factor for all groups but most significantly for those who do not need house insurance. For this group, the elasticity is around 0.6, implying that all else being equal, an increase in the average value of contents held by households by 1 per cent will

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29 Clements (2008) discusses this broad finding and provides a rationale.

30 The average loss-ratio (based on pre-tax income) estimated from Insurance Statistics Australia from March 2004 to March 2015 is 62.5%, which equates to a loading of 60 per cent (= 1/62.5% -1).

31 The loading increases from 1/.625-1 (=0.6) to 1.1/.625-1 (= 0.76).

32 Equal to 76%/60% - 1.

33 See Table 22 on page 48 for an indication of how the elasticity can be decomposed into the impact of the level of cover held and the probability of holding insurance.

increase the average expenditure on contents insurance by 0.6 per cent (recall that this effect includes both the decision to insure and the amount spent on insurance).

The result for wealth is small and positive. As discussed, this is in contrast to the results from the models on the decision to insure presented in the previous sub-section but may reflect that wealth is also an additional proxy for the value of the assets for which cover is obtained.

5.4.2 Analysis on separate expenditure on house insurance and contents insurance

Analysing the separate expenditure on home and contents insurance is problematic. A risk is that those who had separately identified expenditure on house and contents expenditure are not representative of the full population. For example, the analysis of contents insurance expenditure is limited to those who had separately identified their level of contents insurance expenditure and thus excludes those who recorded an inseparable house and contents insurance expenditure. This group is not a random sample as it includes a disproportionately large number of renters[34] and even within home owners may likely reflect differences in buying behaviour.

The results of the modelling on pre-tax expenditure on house insurance and separately contents insurance are presented in a single table (Table 23) on page 49 in the appendix. Four columns representing different samples are presented. The modelling of house insurance is just on the sample of households who have a need for house insurance. Three models for expenditure on contents insurance are separated by whether the household may need house insurance.

A summary of the key implied elasticises with respect to state-taxes is shown at the bottom of the table. The results are consistent with the earlier analysis but the standard errors are large. The results suggest that the price elasticity for contents insurance is greater than house insurance and that it is greatest among those who do not need house insurance. These results are consistent with the hypothesis that households are not likely to lessen their household insurance coverage to reduce their insurance premium. The implied income elasticity of demand for household insurance premium is also slightly positive consistent with adjusting their expenditure on insurance to meet a budget; however, it may also reflect that household income is in part a proxy for the level of coverage required (remember that the dwelling value includes land value and does not reflect rebuilding costs).

5.5 The impact of reducing or removing taxes

A motivation of this report was to develop an estimate of the impact of removing state premium-based taxes on the take-up of insurance. To do so, I used the models presented earlier in this report and make a number of adjustments to make the estimates relevant to the present day. These include adjustments to the population of households, the level of taxation

[34] The level of contents insurance expenditure is known for all renters, but only for about 25% of owners.

and the value of contents, income and wealth. Details of these adjustments are described in Box 4 below.

I estimated the impact of removing taxes in terms of:

- the pre-tax expenditure on house or contents insurance, and
- the level of non-insurance; that is the number of households without contents insurance, without house insurance and without house or contents insurance.

In summary the broad approach involved:

- first, estimating the current level of pre-tax expenditure on insurance[35] and the level of non-insurance using population forecasts and adjustments to variables used by the models
- second, using the models to estimate the impact of removing the state taxes.

The models used to do the forecast are slight variants of the pooled models (using both 2003/04 and 2009/10 surveys) presented in Table 17, Table 19 and Table 21. The results were not particularly sensitive to the choice of specification or the set of surveys used. Nevertheless there is a risk of other factors that might affect the results (see Box 3 below).

Box 3: Issues in measuring influence of tax

The analysis of the effect of taxes relies on variation between states and over time in tax rates. There are a limited number of jurisdictions and although there has been some variation over time there are at present only four surveys to use, only three of which separately identify house and contents insurance and only two of which have data on the value of contents, a key driver of demand.

A potential challenge to the study is that there are other state based factors that influence the results. If this were the case the models may over or under estimate the effect of the taxes.

There are a number of reasons to believe this risk of a missing variable to be small. First, the models tested reported standard errors that were adjusted for clustering by state. Second, the results are very consistent with expectations. The estimates of elasticity with respect to taxes are in the expected order and vary as expected between house and contents insurance and between different segments including renters and income groups. Third, the models tested included those with a broad range of variables that might control for variation by state. These include factors such as income, dwelling values, country of birth and the degree of urbanisation.

To test whether other state-based effects may be important I tested models which included state-based controls (by using dummy variables for each jurisdiction) and compared those to equivalent models without the state-based controls. To provide for some variation in tax rates, I used multiple years of surveys. This limited the models that could be employed to models of:

- pre-tax expenditure on house and contents insurance for all four survey years, and

[35] In the case of insurance expenditure, the level of expenditure on pre-tax premium.

- the decision to purchase house or contents insurance for last three survey years.

The impact of state-taxes was found to be economically and statistically significant in models (with or without state-based controls) of total expenditure on insurance and house insurance. A summary of the tax coefficients of these models is presented in Table 24 on page 51.

Some other qualifications are appropriate. The response to a change in taxation will not be instantaneous. The results should be interpreted as an estimate of the changes that would occur over a number of years. There is, of course, uncertainty in the estimates provided in this section, reflecting in the uncertainty in the model estimates discussed above as well as the adjustments used to inflate the 2009/10 data to today. Finally, as noted in Box 4 below, there are some factors that affect insurance demand for which I have not been able to make adjustments.

Box 4: Adjustments made to 2010 data to reflect 2015

As the last HES survey was conducted in 2009/10 a number of modifications were required to develop a forecast to reflect the impact of changes in 2015. These include increases in the overall household population and changes to factors that might affect the demand for insurance by household.

To adjust for the increase in the number of households, I calculated the growth rate between 2010 and 2015 in the number of households by jurisdiction implied by the ABS series 'Household and Family Projections, Australia'. I used this growth rate to inflate the household data recorded in the 2010 survey. For example, the ABS data implies that over the 5 year period the number of households in NSW has grown by 5.9 per cent.[36]

To adjust for other factors that might affect average demand I used the models developed for this report to estimate the demand with modified values for the factors. Using this approach I made adjustments to the rate of taxation as well as other variables relating to the value of contents, income and wealth.[37]

With regards to taxation, the most notable changes include the removal of the ESL in Victoria and the 'in-progress' removal of stamp duty in ACT. There are also other minor changes to rates of ESL in NSW and stamp duty in Queensland and Tasmania. I inserted the updated rates (described in Table 1) into the models to estimate the current levels of insurance demand.[38]

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36 The latest 'Household and Family Projections, Australia' extends from 2011 to 2036. As it does not include the year 2010 (and because there is a slight difference in the HES survey and the ABS data), to estimate the growth rate from 2010 I use the 2010 estimate from series '2006 to 2031' series and the 2015 estimate from the '2011 to 20236' series.

37 For simplicity, the models I excluded the value of dwelling as an explanatory variable. This simplified the adjustments required to estimate the current forecast.

38 The HES data that I had available combined the NT and the ACT. Fortunately for the survey periods these jurisdictions had identical tax rates (a stamp duty of 10%). However the ACT is in the process of removing stamp duty on house and contents insurance. To forecast the effect of the removal of stamp duty in the

I also made adjustments for other key predictors being the real value of contents, income and wealth. To adjust for these, I used the average annual growth implied by the survey data. For example, I inflated the 'real value of contents' records in the 2010 survey using the cumulative annual growth rate implied by the change in contents between the 2003/2004 and the 2009/10 surveys. This resulted in the real value of contents being increased by 5.3 per cent over the 5 years and similarly real household incomes being increased by 13.5 per cent and real wealth being increased by 24.7 per cent.[39]

There will be other changes for which I have not been able to make an adjustment. Perhaps most significantly, average insurance premiums have increased since 2010,[40] in response to increasing levels of flood cover and other market factors that I understand may include changes in the claims cost expected by insurers and reinsurers. To the extent that the premium increases are not perceived by customers as being linked to increased levels of cover or increased risk such premium increases may have a dampening effect on demand.

The estimate of the effect of removing taxes on pre-tax premium purchased on house or contents insurance is provided in Table 8 below. The first column of the table shows the total pre-tax premium as recorded in the 2009/10 survey. This amount (as with all analysis in this report) reflects insurance purchased by a household for the main residence and therefore excludes insurance purchased for holiday and investment homes and insurance purchased by a body corporate.

The second column shows the model's forecast for the premium taking into account changes in tax rates, population growth and growth in the value of contents, household wealth and household income. Of note, the 'Forecast today' figure for Victoria is substantially higher than the 'From 2009/10' survey' figure because the model has been used to estimate the impact of the removal of the ESL in Victoria. This forecast is likely to be an underestimate as it does not take into account additional growth in average premiums that has occurred between 2010 and 2015 associated with increasing levels of flood coverage and other market factors.

The remaining columns show the estimated increase in pre-tax premium that would occur if the ESL in NSW and the stamp duties in other jurisdictions were removed. As shown, using this model I estimate the amount of annual pre-tax premium would increase by 25 per cent in New South Wales and by 13 per cent across Australia if these state taxes were removed. The estimated increase in pre-tax premium is $643 million; however, this is likely to be an underestimate because (as discussed in Box 4) the 'Forecast today' does not reflect recent increases in the average household premiums.

ACT and the NT a blended stamp duty rate was used that, reflecting the relative population of households, gave a 2/3 weighting to the ACT rate and a 1/3 weighting to the NT rate.

39 The inflation in value of contents, wealth and income will, of course, with other household factors.

40 Source: Insurance Statistics Australia.

Table 8: Effect of removing taxes on pre-tax premium purchased

Pre-tax premium ($ million) purchased on house or contents insurance					
	From 2009/10 survey	Forecast today	Forecast increase today if		
			ESL were removed	ESL and Stamp duties removed	
Jurisdiction	Recorded	Estimate	Estimate	Estimate	% Change
New South Wales	1,215	1,386	226	351	25%
Victoria	880	1,212		106	9%
Queensland	950	1,069		85	8%
South Australia	353	385		37	10%
Western Australia	465	566		47	8%
Tasmania	123	130		11	8%
ACT and NT	110	131		6	5%
Total	**4,097**	**4,880**	**226**	**643**	**13%**

1. The survey data and analysis is on insurance purchased by the household for the main residence and therefore excludes insurance purchased for holiday and investment homes and insurance purchased by a body corporate.
2. The 'forecast today' is based on the results by jurisdiction from the 2009/10 survey and adjusted for population growth and the modelled impacts of trends in the value of contents, income and wealth and changes in state based tax rates (which included the removal of ESL in Victoria).
3. The forecast may be an underestimate as no adjustment has been made for premium increases since 2010 in response to increasing levels of flood cover and other market factors. The 'forecast increase' is based on predicted percentage changes by jurisdiction from the removal of state taxes.
4. The model used is the pooled (using 2003/04 & 2009/10 survey) Tobit model presented in Table 21 with the exception that dwelling value was excluded (the exclusion did not materially change the results).

Table 9 reports the estimated change in households without contents insurance if state taxes were reduced. Like the previous table, it shows separately the forecasted effect of removing ESL in the New South Wales and the removal of stamp duties in all jurisdictions.

The estimated impact of removing state taxes is significant. The removal of ESL is estimated to result in an additional 98 thousand households taking up contents insurance in NSW. The removal of all state taxes is estimated to result in around 242 thousand Australian households taking out contents insurance.

Table 9: Effect of removing taxes on non-insurance for contents cover

Households (000s) without contents insurance					
	From 2009/10 survey	Forecast today	Forecast increase today if		
			ESL were removed	ESL and Stamp duties removed	
Jurisdiction	Recorded	Estimate	Estimate	Estimate	% Change
New South Wales	979	992	98	148	15%
Victoria	533	462		28	6%
Queensland	494	534		32	6%
South Australia	130	130		10	8%
Western Australia	233	263		19	7%
Tasmania	34	35		3	7%
ACT and NT	53	55		2	4%
Total	**2,456**	**2,471**	**98**	**242**	**10%**

1. The survey data and analysis is on insurance purchased by the household for the main residence and therefor excludes insurance purchased for holiday and investment homes and insurance purchased by a body corporate.
2. The 'forecast today' is based on the results by jurisdiction from the 2009/10 survey and adjusted for population growth and the modelled impacts of trends in the value of contents, income and wealth and changes in state based tax rates (which included the removal of ESL in Victoria).
3. The model used is the pooled (using 2003/04 & 2009/10 survey) Probit model presented in Table 19 with the exception that the variable dwelling value was excluded (the exclusion did not materially change the results).

The results for the decision to purchase house insurance among households eligible to purchase house insurance (owner occupiers that are not part of a body corporate[41]) are shown in Table 10. I estimate that the removal of taxes would reduce the number of households without buildings insurance by 34 per cent in NSW and by 22 per cent across Australia. Since house insurance is less price elastic, the forecast reduction in the number of households uninsured is lower. The effect is, however, significant when compared with the total number of households uninsured.

41 For these households the purchase of house insurance is a discretionary decision unlike owners residing in a strata title arrangement where the decision to purchase insurance is made by the strata management.

Table 10: Effect of removing taxes on non-insurance for house insurance cover

Households (000s) without house insurance					
	From 2009/10 survey	Forecast today	Forecast reduction today if		
			ESL were removed	ESL and Stamp duties removed	
Jurisdiction	Recorded	Estimate	Estimate	Estimate	% Change
New South Wales	77.4	71.6	16.9	24.1	34%
Victoria	55.3	33.4		3.7	11%
Queensland	38.0	39.7		5.9	15%
South Australia	6.8	6.0		1.1	18%
Western Australia	14.3	15.2		2.7	18%
Tasmania	4.3	4.3		0.7	16%
ACT and NT	4.5	4.5		0.4	9%
Total	**200.6**	**174.6**	**16.9**	**38.4**	**22%**

1. The survey data and analysis is on insurance purchased by the household for the main residence and therefor excludes insurance purchased for holiday and investment homes and insurance purchased by a body corporate.
2. The 'forecast today' is based on the results by jurisdiction from the 2009/10 survey and adjusted for population growth and the modelled impacts of trends in the value of contents, income and wealth and changes in state based tax rates (which included the removal of ESL in Victoria).
3. The model used is the pooled (using 2003/04 & 2009/10 survey) bivariate Probit model presented in Table 17 with the exception that the variables for dwelling value and wealth were excluded (their exclusion resulted in a slightly smaller forecast reduction but was simpler to model).

6. Conclusion

This paper has examined the demand for house and contents insurance using data from a series of nation-wide surveys on household expenditure. As demonstrated in the paper, the demand for insurance is heavily influenced by a great many factors, including demographics, the dwelling type and tenure. It is therefore appropriate that multi-variate regression analysis be used to attempt to isolate the influence of individual factors.

Two state premium-based taxes on insurance, the ESL and stamp duties, are a particularly significant impost because, in effect, they apply to the funds pooled by insurers in addition to service of insurance provided (which includes risk pooling and managing claims). A number of jurisdictions have successfully removed the ESL (and the ACT is in the process of removing stamp duty) with the result that there is significant variation in the tax rates that have applied by jurisdiction and over time. Using this variation, the analysis in this paper has been used to estimate the impact of taxes on the demand for insurance. The results are consistent with expectations and provide evidence that state taxes are a significant contributor to households choosing to not insure and/or underinsure.

If state taxes on insurance premiums were removed there would be a significant increase in the take-up of house and contents insurance and increases in the spending on insurance. Using the models described in the paper, I have estimated that the ESL and stamp duties are the cause of around 240 thousand households being without contents insurance and 38 thousand households being without house insurance. The projected increase in take-up of house insurance if these taxes were removed represents over one-fifth of the estimated number of households that are uninsured. Furthermore, I estimate that removal of the taxes would result in an increase of around 13 per cent in the pre-tax expenditure on insurance.

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Appendix 1 HES Data

Overview of insurance data

Table 11: Data available by survey year

	1993/94	1998/99	2003/04	2009/10
Demographic information	Y	Y	Y	Y
Value of house	Y	Y	Y	Y
Separately distinguishes housing and contents insurance expenditure	-	Y	Y	Y
Value of contents	-	-	Y	Y
Wealth data	-	-	Y	Y
Location (capital city or other)	-	-	Y	Y

Table 12: HES insurance expenditure data by survey year (number of observations)

	1993/94	1998/99	2003/04	2009/10
Total records	8,389	6,892	6,957	9,774
No expenditure recorded	2,225	1,734	1,525	2,529
Some expenditure recorded	6,164	5,158	5,432	7,245
House insurance	-	1,559	1,283	1,187
Contents insurance	-	2,100	1,894	2,249
House and contents inseparable	6,164	2,729	3,236	4,621
Insured expenditure is inseparable (percentage of cases)	100%	53%	60%	64%

Table 13: Survey samples that can be used by insurance decision being analysed

Dependent variable analysed	Sample that can be used
1. Whether purchased contents insurance	Full sample for survey years 98/99, 03/04 and 09/10 For household with no need of house insurance in 93/94.
2. Contents insurance expenditure	Full sample of renters in all survey years Full sample of cases where insurance expenditure separately identified for survey years 98/99, 03/04 and 09/10.
3. Whether purchased house insurance	Full sample for those who need house insurance in survey years 98/99, 03/04 and 09/10 Unable to use 93/94 sample.
4. House insurance expenditure	Cases where insurance expenditure separately identified for those who need house insurance for survey years 98/99, 03/04 and 09/10.
5. Whether purchased house and/or contents insurance	Full sample for all survey years.
6. House and contents insurance expenditure	Full sample for all survey years.

Apparent anomalies in insurance data

Table 14 shows the estimated number of households with insurance cover by type of tenure. The table highlights a number of apparent anomalies. There are a small number of households who would not appear to need house insurance but have recorded some expenditure on house insurance. These include households paying body corporate fees, renters and other tenure arrangements. There may be a number of reasons for this, including miscoding of type of insurance expenditure and miscoding of body corporate expenditure.

There are also a number of households who appear to not need house insurance but have a combined house and contents insurance policy. It seems likely that in most cases the expenditure is on contents insurance and it was coded as combined insurance due to a lack of understanding of what is covered by the policy.

There are a reasonable number of owners in a body corporate who also recorded spending on house insurance. This suggests the expenditure on body corporate fees is not a precise guide as to whether a dwelling is covered with building insurance via a body corporate. Similarly there are a number of other tenure types neither owned nor rented which have

purchased house insurance. The implication is that some households are excluded in the analysis for house insurance that should be included with the result that the number of households uninsured is underestimated.

The table also shows that there are some owners not part of a body corporate who purchased contents insurance but did not purchase house insurance. This again appears strange. An owner who is risk averse would be expected to seek cover for the higher exposure which we would expect to be related to the building. These may reflect coding errors but could also be cases where the dwelling structure is of little value.

Table 14: 2009/10 Insurance cover expenditure recorded (# households surveyed) for house insurance (HI) and contents insurance (CI)

Tenure type	HI and CI		HI Only	CI Only	None	Total
	Combined	Separated				
Owners not in body corporate	4,503	767	356	28	224	5878
Owners in body corporate	69	28	14	417	144	672
Renters	<20	<10	<5	920	2,029	2972
Others	<40	<10	<10	72	132	252
Total	**<4,630**	**<820**	**<400**	**1,437**	**2,529**	**9,774**

Note: Shaded areas are cases where the household would appear to have not required house insurance but are recorded as having purchased insurance.

Appendix 2 Descriptive statistics

Table 15: Insurance take-up in 2009/10

	000s of households	Proportion Purchased Insurance		
		Contents	House	Either
Full sample	8,399	0.71	0.62	0.75
Tenure				
Owner without a mortgage	2,734	0.88	0.88	0.94
Owner with a mortgage	3,041	0.89	0.91	0.95
Renter	2,387	0.31	-	0.31
Other	237	0.39	0.2	0.42
Landlord public	324	0.21	-	0.21
Need (are in market for) house insurance	5,249	0.9	0.96	0.97
Dwelling structure				
House	6,626	0.78	0.73	0.82
Semi	841	0.58	0.36	0.63
Flat	889	0.34	0.07	0.35
Other structure	42	0.12	0.04	0.12
Age of reference person				
< 25	324	0.29	0.15	0.31
25 to 34	1,418	0.55	0.4	0.58
35 to 44	1,716	0.69	0.59	0.74
45 to 54	1,707	0.76	0.71	0.81
55 +	3,233	0.8	0.74	0.85
Country of birth				
Australia	5,830	0.75	0.63	0.78
Main English speaking countries	1,016	0.74	0.61	0.77
Other	1,552	0.53	0.58	0.65

	000s of households	Proportion Purchased Insurance		
		Contents	House	Either
State				
New South Wales	2,706	0.64	0.58	0.7
Victoria	2,095	0.75	0.67	0.79
Queensland	1,668	0.7	0.61	0.73
South Australia	661	0.8	0.67	0.83
Western Australia	867	0.73	0.64	0.77
Tasmania	204	0.83	0.71	0.84
N.T. and A.C.T	196	0.73	0.56	0.76
Location of usual residence				
Within a capital city	5,173	0.69	0.61	0.75
Outside of capital city	3,226	0.73	0.64	0.76
Source of emergency money				
Own savings	5,449	0.79	0.7	0.83
Loan from a bank etc	1,294	0.84	0.76	0.88
High interest loan from a finance company	304	0.78	0.68	0.81
Loan on credit card	1,362	0.81	0.69	0.84
Would sell something	725	0.74	0.63	0.78
Loan from family or friends	1,668	0.66	0.54	0.71
Loan from welfare or community organisation	34	0.77	0.62	0.79
Use some other source	255	0.7	0.58	0.74
Could not raise $2000 emergency money in a week	420	0.48	0.38	0.51
Could not pay registration/insurance on time due to money shortages	1,208	0.41	0.32	0.45

1. Proportions are calculated as the weighted ratio of households who purchased the insurance product to the population of households.

Table 16: Mean values by survey year

	1993/94	1998/99	2003/04	2009/10
Dwelling value ($000s)[1]	173	192	294	367
Household income ($/week) [1]	1,117	1,238	1,335	1,685
Combined house & contents insurance premium, $/week[1]	10.93	12.30	13.89	17.00
Premium as % of household income				
Contents insurance premium		0.52%	0.52%	0.48%
House insurance premium		0.58%	0.58%	0.56%
Combined house and contents insurance	0.98%	0.99%	1.04%	1.01%
Proportion insured				
Contents insurance		0.69	0.72	0.71
House insurance		0.62	0.64	0.62
House or contents	0.73	0.75	0.77	0.75
Of owners (not in a body corporate)				
Contents insurance		0.87	0.90	0.90
House insurance		0.94	0.96	0.96
House or contents	0.94	0.95	0.96	0.97

1. Adjusted for CPI (base year 2009/10). Household weights used in all calculations.

Appendix 3 Model outputs

Decision to purchase house insurance

Table 17: Bivariate-Probit model on whether house and/or contents insurance purchased

		2003/04 & 2009/10 pooled		Just 2009/10	
	Explanatory variable	**House insurance**	**Contents insurance**	**House insurance**	**Contents insurance**
	Tax rate (Log of 1 + tax rate)	-0.063*	-0.179*	-0.060**	-0.181**
		(0.032)	(0.095)	(0.023)	(0.083)
	Household income (Real $000/week)	0.008*	0.016***	0.012**	0.015**
		(0.005)	(0.005)	(0.005)	(0.006)
	Wealth (Real $ million)	-0.002***	-0.003***	-0.002***	-0.003***
		(0.001)	(0.001)	(0.001)	(0.001)
	Log of dwelling value	0.010***	0.009	0.007	0.001
		(0.002)	(0.005)	(0.004)	(0.011)
	Log of value of contents	0.024***	0.091***	0.019***	0.080***
		(0.002)	(0.012)	(0.002)	(0.011)
Dwelling type (base is house)	Flat	-0.004	-0.012	0.001	-0.018
		(0.008)	(0.010)	(0.005)	(0.017)
	Semi	-0.082***	-0.025	-0.084*	-0.003
		(0.044)	(0.026)	(0.069)	(0.061)
	Non-standard dwelling	-0.038	-0.039	-0.301**	-0.255*
		(0.050)	(0.057)	(0.215)	(0.188)
Age category (default is <25)	Age is 25 to 34	0.013	0.025	0.009	-0.004
		(0.008)	(0.025)	(0.022)	(0.062)
	Age is 35 to 44	0.012	0.027	0.013	0.008
		(0.010)	(0.024)	(0.017)	(0.054)
	Age is 45 to 54	0.011	0.020	0.006	-0.007
		(0.014)	(0.031)	(0.029)	(0.067)
	Age is 55 plus	0.026	0.051	0.025	0.022
		(0.017)	(0.035)	(0.032)	(0.062)

	Explanatory variable	2003/04 & 2009/10 pooled		Just 2009/10	
		House insurance	Contents insurance	House insurance	Contents insurance
Country of birth	Country of birth - Other English	-0.001	-0.008	-0.005	-0.009
		(0.004)	(0.013)	(0.005)	(0.008)
	Country of birth - Non-English lang.	-0.000	-0.070***	-0.004	-0.090***
		(0.002)	(0.011)	(0.003)	(0.010)
	Lives in capital city	0.004	-0.005	0.004	0.006
		(0.002)	(0.005)	(0.005)	(0.008)
	Home is mortgaged	0.015*	-0.002	0.010	-0.009
		(0.005)	(0.008)	(0.005)	(0.005)
	Two family household	-0.024**	-0.100***	-0.021***	-0.060**
		(0.013)	(0.017)	(0.004)	(0.027)
	Number of persons in household	-0.001	-0.004	-0.001	-0.005
		(0.002)	(0.004)	(0.003)	(0.004)
	Survey year is 2003/04	0.009**	0.015***		
		(0.002)	(0.004)		
	Rho (a measure of the extent to which a joint decision is made)	0.900***		0.923***	
		(0.023)		(0.017)	
	Observations	10464		5878	

1. The table shows the estimated coefficients and standard errors of a 'bi-variate Probit' model on the decision to purchase house and contents insurance. Three sets of results are shown: the first based on the pooled data from the 2003/04 and 2009/10 surveys and the second model from just the 2009/10 survey.
2. The coefficients are the marginal effects of the variable taken at mean values on the decision to purchase house insurance and separately the decision to purchase contents insurance. For dummy variables, marginal effects represent a discrete change from 0 to 1.
3. Robust standard errors adjusted for state clusters are in parentheses.
   ***, ** and * indicate significance at the 1%, 5% and 10% levels.
4. Population sample is restricted to owner occupiers not in a body corporate.
5. Base case: Dwelling type= house, Age<25, Country of Birth = Australia, Tenure = Owned outright, Number of families=1, Not in capital city.
6. A number of alternative specifications using different selection and forms of variables were tested. The key results (relating to influence of tax) were largely insensitive to the model specification.

Decision to purchase contents insurance

Main results

Table 18: Probit model on whether contents insurance was purchased (based on pool of 2003/04 and 2009/10 surveys)

		Population		
	Explanatory variable	**Need house insurance**	**Do not need house insurance**	**Full sample**
	Tax rate (log of 1 +tax rate)	-0.167*	-0.233	-0.278
		(0.097)	(0.269)	(0.196)
	Household income (Real $000/week)	0.018***	0.021	0.028***
		(0.007)	(0.014)	(0.006)
	Dwelling value (Real $million)	0.007	-0.151	0.001
		(0.009)	(0.078)	(0.035)
	Value of contents (Real $100,000)	0.162***	0.555***	0.389***
		(0.015)	(0.113)	(0.025)
	Wealth (Real $million)	-0.005***	0.038	-0.004
		(0.001)	(0.026)	(0.012)
Dwelling type (default is house)	Flat	-0.020*	-0.014	-0.018
		(0.010)	(0.016)	(0.012)
	Semi	-0.020	-0.085***	-0.068**
		(0.029)	(0.023)	(0.024)
	Non-standard dwelling	-0.201***	-0.235**	-0.295***
		(0.092)	(0.061)	(0.023)
Age category (default is <25)	Age is 25 to 34	0.026	0.151***	0.091***
		(0.019)	(0.032)	(0.017)
	Age is 35 to 44	0.029	0.184***	0.108***
		(0.020)	(0.046)	(0.020)
	Age is 45 to 54	0.026	0.185**	0.105***
		(0.023)	(0.056)	(0.022)
	Age is 55 plus	0.054	0.270***	0.165***
		(0.030)	(0.054)	(0.020)
Country of birth	Country of birth - Other English	-0.008	-0.035	-0.023
		(0.011)	(0.038)	(0.024)
	Country of birth - Non-	-0.071***	-0.186***	-0.153***

		Population		
	Explanatory variable	**Need house insurance**	**Do not need house insurance**	**Full sample**
	English lang.	(0.017)	(0.019)	(0.019)
	2 family household	-0.109***	-0.164***	-0.176***
		(0.013)	(0.034)	(0.016)
	Num. persons in household	-0.003	-0.013	-0.007*
		(0.003)	(0.009)	(0.003)
Tenure	Owner in a body corporate			-0.096***
				(0.017)
	Rented		-0.374***	-0.384***
			(0.027)	(0.031)
	Other tenure		-0.316***	-0.466***
			(0.026)	(0.036)
	Public landlord		-0.135***	-0.108***
			(0.024)	(0.029)
	House is mortgaged	0.004	0.031	0.026
		(0.009)	(0.049)	(0.019)
	Capital city	-0.002	-0.009	-0.004
		(0.007)	(0.026)	(0.013)
	Survey year is 2003/04	0.002	0.004	0.005
		(0.004)	(0.025)	(0.012)
	Observations	10,464	6,267	16,731

1. The table shows the estimated coefficients and standard errors of a Probit model on the decision to purchase contents insurance based on the pooled 2003/04 and 2009/10 surveys.
2. Three columns of results are shown: the first is based on just those who need house insurance; the second column on those who don't need house insurance and the third column on the full sample.
3. The coefficients are the marginal effects on the probability of whether contents insurance has been purchased. For dummy variables, marginal effects are a discrete change from 0 to 1.
4. Robust standard errors adjusted for state clusters are in parentheses.
   ***, ** and * indicate significance at the 1%, 5% and 10% levels.
5. Base case: Dwelling type= house, Age<25, Country of Birth = Australia, Tenure = Owned outright for full sample, owner in body corporate for the 'Do not need house insurance' sample, Number of families=1, Not in capital city..

Table 19: Probit model on whether contents insurance was purchased

		Survey years used		
	Explanatory variable	**1998/99, 2003/04 & 2009/10**	**2003/04 & 2009/10**	**Just 2009/10**
	Tax rate (log of 1 +tax rate)	-0.291	-0.278	-0.262
		(0.183)	(0.196)	(0.209)
	Household income (Real $000/week)	0.068***	0.028***	0.029***
		(0.005)	(0.006)	(0.008)
	Dwelling value (Real $million)	0.085*	0.001	-0.027
		(0.034)	(0.035)	(0.056)
	Value of contents (Real $100,000)		0.389***	0.436***
			(0.025)	(0.042)
	Wealth (Real $million)		-0.004	-0.008
			(0.012)	(0.016)
Dwelling type (default is house)	Flat	-0.047***	-0.018	-0.040***
		(0.011)	(0.012)	(0.014)
	Semi	-0.140***	-0.068**	-0.075***
		(0.025)	(0.024)	(0.027)
	Non-standard dwelling	-0.377***	-0.295***	-0.386***
		(0.020)	(0.023)	(0.070)
Age category (default is <25)	Age is 25 to 34	0.086***	0.091***	0.055***
		(0.010)	(0.017)	(0.009)
	Age is 35 to 44	0.115***	0.108***	0.082***
		(0.010)	(0.020)	(0.017)
	Age is 45 to 54	0.118***	0.105***	0.075***
		(0.011)	(0.022)	(0.013)
	Age is 55 plus	0.177***	0.165***	0.138***
		(0.010)	(0.020)	(0.022)
Country of birth (default is Aus.)	Country of birth - Other English	-0.030	-0.023	-0.012
		(0.020)	(0.024)	(0.021)
	Country of birth - Non-English lang.	-0.212***	-0.153***	-0.171***
		(0.027)	(0.019)	(0.027)
	2 family household	-0.229***	-0.176***	-0.179***
		(0.019)	(0.016)	(0.040)

	Explanatory variable	Survey years used: 1998/99, 2003/04 & 2009/10	Survey years used: 2003/04 & 2009/10	Survey years used: Just 2009/10
	Number of persons in household	0.001	-0.007*	-0.010***
		(0.002)	(0.003)	(0.003)
Tenure (default is owner occupied)	Owner in a body corporate	-0.084***	-0.096***	-0.081***
		(0.011)	(0.017)	(0.008)
	Rented	-0.443***	-0.384***	-0.382***
		(0.024)	(0.031)	(0.046)
	Other tenure	-0.467***	-0.466***	-0.464***
		(0.031)	(0.036)	(0.063)
	Public landlord	-0.139***	-0.108***	-0.089***
		(0.038)	(0.029)	(0.033)
	House is mortgaged	0.023*	0.026	0.017
		(0.011)	(0.019)	(0.022)
	Capital city		-0.004	0.006
			(0.013)	(0.010)
	Survey year is 1998/99	0.009		
		(0.014)		
	Survey year is 2003/04	0.020	0.005	
		(0.014)	(0.012)	
	Observations	23,623	16,731	9,774

1. The table shows the estimated coefficients and standard errors of a Probit model on the decision to purchase contents insurance based on the full sample of households.
2. Three columns of results are shown that differ by the sets of surveys used. The first column is based on a pool of three surveys, the second column on two surveys, and the last column on just the latest survey.
3. The coefficients are the marginal effects on the probability of whether contents insurance has been purchased. For dummy variables, marginal effects are a discrete change from 0 to 1.
4. Robust standard errors adjusted for state clusters are in parentheses.
   ***, ** and * indicate significance at the 1%, 5% and 10% levels.
5. Base case: Dwelling type= house, Age<25, Country of Birth = Australia, Tenure = Owned outright for full sample, owner in body corporate for the 'Do not need house insurance' sample, Number of families=1, Not in capital city.

Financial position

Table 20: Summary results of test of dummy variables on take-up on contents insurance

Variable tested	Coefficient	Robust standard error
Source of emergency money		
Could use own savings	0.084***	(0.013)
Loan from a bank etc	0.024***	(0.003)
High interest loan from a finance company	0.011	(0.008)
Loan on credit card	0.014***	(0.004)
Would sell something	0.001	(0.003)
Loan from family or friends	-0.002	(0.001)
Loan from welfare or community organisation	0.010***	(0.003)
Use some other source	-0.004	(0.002)
Could raise $2000 emergency money in a week	0.110***	(0.022)
Could not pay registration/insurance on time due to money shortages	-0.129***	(0.011)
Unemployed	-0.201***	(0.068)
Spent more than 5% of Household income on gambling	0.042***	(0.013)
Purchased security services	0.087	(0.055)
Potential to buy house insurance	0.388***	(0.026)

1. The variables listed are dummy variables. These were individually added into the pooled model shown in Table 19 above and the model was re-run. The coefficients show the impact of the variable on the marginal change in probability of purchasing contents insurance (assuming other variables are taken at their mean values). Thus, for example, 'being unemployed' is estimated to reduce the probability of taking out insurance by 0.2 (i.e. 20 per cent).
2. Robust standard errors adjusted for state clusters are shown in parentheses.
***, ** and * indicate significance at the 1%, 5% and 10% levels.

Expenditure

Table 21: Tobit model on house and contents insurance purchased

		Survey years used	
Explanatory variable		**2003/04 and 2009/10 pooled**	**Just 2009/10**
	Tax (log of 1+tax rate)	-12.577***	-13.462***
		(1.318)	(1.738)
	Household income (Real $000/week)	0.553***	0.488***
		(0.111)	(0.089)
	Dwelling value (Real $million)	3.900***	4.083***
		(0.911)	(1.052)
	Value of contents (Real $100,000s)	5.009***	4.940***
		(0.336)	(0.263)
	Wealth (Real $million)	0.235**	0.206***
		(0.083)	(0.060)
Dwelling type (default is house)	Flat	-0.429***	-0.890***
		(0.102)	(0.142)
	Semi	-1.726***	-2.175***
		(0.372)	(0.308)
	Non-standard dwelling	-5.700***	-9.534***
		(1.471)	(1.819)
Age category (default is <25)	Age is 25 to 34	2.327***	2.313**
		(0.510)	(0.802)
	Age is 35 to 44	2.887***	3.097***
		(0.483)	(0.533)
	Age is 45 to 54	2.989***	3.207***
		(0.525)	(0.756)
	Age is 55 plus	2.952***	3.220***
		(0.511)	(0.776)
Country of birth (default = Aus.)	Country of birth - Other English	-0.501*	-0.497*
		(0.228)	(0.218)
	Country of birth - Non-English lang.	-1.677***	-2.274***
		(0.206)	(0.256)

Explanatory variable		Survey years used: 2003/04 and 2009/10 pooled	Survey years used: Just 2009/10
Tenure (default is owner occupied)	Owner in a body corporate	-4.580***	-4.824***
		(0.557)	(0.700)
	Rented	-8.788***	-9.581***
		(1.016)	(1.628)
	Other tenure	-7.113***	-8.540***
		(0.964)	(1.761)
	Public landlord	-2.840***	-3.256***
		(0.450)	(0.725)
	Mortgaged	1.184***	1.643***
		(0.278)	(0.413)
	Two family household	-1.915***	-2.602*
		(0.567)	(1.124)
	Number of persons in household	0.167*	0.246*
		(0.082)	(0.115)
	Capital City	0.009	-0.252
		(0.200)	(0.229)
	Survey year is 2003/04	-1.016**	
		(0.340)	
	Constant	4.675***	4.767***
		(0.948)	(1.038)
Sigma (estimate of standard error of regression)		7.598***	8.531***
		(0.588)	(0.996)
Observations		16,731	9,774
- left censored		4,054	2,529
- uncensored		12,677	7,245

1. Results show coefficients and robust standard errors for a Tobit model (with a lower bound of 0) on the combined pre-tax expenditure on house and contents insurance.
2. Robust standard errors adjusted for state clusters are shown in parentheses.
   ***, ** and * indicate significance at the 1%, 5% and 10% levels.
3. Base case: Dwelling type= house, Age<25, Country of Birth = Australia, Tenure = Owned outright, Number of families=1, Not in capital city.

Table 22: Decomposition of elasticities from Tobit model

	With regard to house and/or contents insurance		
	Probability of holding insurance	**Pre-tax expenditure by those with insurance**	**Total pre-tax expenditure on insurance**
Tax (1 +tax rate)	-0.530***	-0.810***	-1.340***
	(0.056)	(0.105)	(0.143)
Household income	0.035***	0.054***	0.089***
	(0.008)	(0.010)	(0.017)
Dwelling value	0.055***	0.083***	0.138***
	(0.012)	(0.021)	(0.033)
Value of contents	0.125***	0.191***	0.315***
	(0.010)	(0.019)	(0.022)
Household wealth	0.006**	0.010**	0.016**
	(0.002)	(0.004)	(0.006)

1. Values shown are the estimated elasticities, calculated at mean values, from the pooled (2003/04 & 2009/10) model in Table 21 above.
2. Robust standard errors adjusted for state clusters are shown in parentheses.
   ***, ** and * indicate significance at the 1%, 5% and 10% levels.
3. The decomposition should be considered as indicative.

Table 23: Tobit models on pre-tax insurance purchased — separately for house and contents insurance (Based on pool of survey years 2003/04 & 2009/10)

	Population sample	Need house insurance? Yes	Yes	No	All
	Insurance type	House	Contents	Contents	Contents
Explanatory variable					
	Tax (log of 1+tax rate)	-3.740	-3.449*	-7.227	-5.907*
		(3.014)	(1.511)	(3.711)	(2.320)
	Household income (Real $000/week)	0.596***	0.790***	0.402*	0.610***
		(0.151)	(0.077)	(0.189)	(0.105)
	Dwelling value (Real $m)	3.305***	1.134***	-1.940	-0.267
		(0.418)	(0.198)	(0.992)	(0.406)
	Value of contents (Real $100k)	1.035***	4.348***	8.939***	6.495***
		(0.147)	(0.465)	(0.650)	(0.650)
	Wealth (Real $m)	-0.434*	-0.577***	0.747	-0.026
		(0.221)	(0.096)	(0.445)	(0.151)
Dwelling type (default = house)	Flat	0.062	1.089	0.002	0.194
		(0.623)	(0.788)	(0.255)	(0.247)
	Semi	-0.127	2.784	-0.884**	-0.788*
		(1.521)	(1.649)	(0.332)	(0.377)
	Non-standard dwelling	-4.760	-3.687***	-5.183**	-4.741**
		(3.155)	(0.616)	(1.974)	(1.461)
Age category (default is <25)	Age is 25 to 34	1.025**	1.808***	2.398***	2.185***
		(0.334)	(0.484)	(0.583)	(0.448)
	Age is 35 to 44	1.613**	2.449***	2.917***	2.723***
		(0.622)	(0.559)	(0.823)	(0.535)
	Age is 45 to 54	1.891***	2.660***	2.618**	2.674***
		(0.470)	(0.385)	(0.847)	(0.503)
	Age is 55 plus	2.375***	3.290***	3.506**	3.451***
		(0.605)	(0.548)	(1.249)	(0.684)
Country of birth	Country of birth - Other English	-0.312	0.057	-0.510	-0.323
		(0.385)	(0.350)	(0.527)	(0.396)
	Country of birth - Non-English lang.	0.024	-2.680***	-3.315***	-3.034***
		(0.214)	(0.379)	(0.416)	(0.335)

	Population sample	Need house insurance?			
		Yes	Yes	No	All
	Insurance type	House	Contents	Contents	Contents
Explanatory variable					
Tenure	Owner in a body corporate				2.440***
					(0.211)
	Rented			-2.840***	-0.420
				(0.499)	(0.382)
	Other tenure			-5.448***	-2.446**
				(1.522)	(0.924)
	Public landlord			-2.486***	-2.449***
				(0.525)	(0.359)
	Mortgaged	1.021***	0.276	1.822***	0.645**
		(0.291)	(0.191)	(0.468)	(0.212)
	Capital city	0.110	0.382*	0.252	0.378
		(0.154)	(0.180)	(0.346)	(0.203)
	Two family household	-1.042	-4.910***	-4.046***	-4.562***
		(0.561)	(0.758)	(0.433)	(0.215)
	Number of persons in household	0.143	-0.094	-0.043	-0.029
		(0.116)	(0.088)	(0.178)	(0.067)
	Survey year is 2003/04	-0.444*	0.617***	-0.192	0.180
		(0.202)	(0.151)	(0.315)	(0.278)
	Constant	0.980	-3.742***	-3.303*	-4.741**
		(0.644)	(0.572)	(1.498)	(1.553)
Sigma (estimate of standard error of regression)		4.964***	4.556***	6.838***	5.906***
		(0.420)	(0.397)	(0.516)	(0.481)
Observations		2791	2800	6107	8907
- left censored		432	1030	3714	4744
- uncensored		2359	1770	2392	4163
Implied elasticity with respect to tax at mean values		-0.554	-0.743*	-1.538	-1.287*
		(0.475)	(0.337)	(0.784)	(0.534)

1. Table shows coefficients and standards errors from Tobit models (with a lower bound of 0) on pre-tax expenditure on house insurance and, separately, contents insurance.
2. Robust standard errors adjusted for state clusters are shown in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels.
3. Base case: Dwelling type= house, Age<25, Country of Birth = Australia, Tenure = Owned outright for full sample, owner in body corporate for the 'Do not need house insurance' sample, Number of families=1, Not in capital city.
4. Last row shows implied elasticity with respect to tax taken at mean values.

Table 24: Sensitivity of impact of tax variable to using state based controls

		State-based dummies	
Model and sample	**Dependent variable**	**Yes**	**No**
Tobit model, all four survey years, all households	Pre-tax expenditure on house and contents insurance	-9.479**	-10.256***
		(3.321)	(1.057)
Bi-variate Probit model, three most recent survey years, those who need house insurance	Purchase of house insurance	-0.951*	-0.998**
		(0.461)	(0.370)
	Purchase of contents insurance	-0.634	-1.367*
		(0.526)	(0.558)
Probit models three most recent survey years, all households	Purchase of contents insurance	-0.629	-1.331*
		(0.494)	(0.542)

1. Results show coefficients and standard errors of only the explanatory tax variable using the model specified. In all cases the tax variable is the log of (1 + tax rate).

2. Robust standard errors adjusted for state clusters are shown in parentheses.
***, ** and * indicate significance at the 1%, 5% and 10% levels.

3. The other explanatory variables in each model are the same as those used in previous models that are available for the survey years used. The state-based dummies are simply a dummy variable for each jurisdiction (ACT and NT are combined).