Institute of Actuaries of Australia

Determinants of Claim Frequency In CTP Schemes

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Presented to the Institute of Actuaries of Australia
Accident Compensation Seminar 28 November to 1 December 2004.

Determinants of Claim Frequency in CTP Schemes

1 Introduction

For the past 30 years, the environment in which Transport Accident Schemes are operating has changed rapidly. On the one hand, technological advancements have led to improved safety on the roads. On the other hand, changes in scheme designs and common law tort reforms have altered the access to compensation for injured parties. Throughout Australia, casualty rates are declining and claim frequencies have fallen. For some states, recent claim frequency experience appears atypical, making projections of future experience problematic.

In Section 2 of our paper we examine the commonalities in claim frequency and casualty experience across different jurisdictions in Australia.

In Section 3 we develop a framework for examining the factors influencing the claim frequency.

In Section 4 we examine different elements of this framework to gain insight into the impact of the various factors on the frequency of transport accidents and casualties. An understanding of the factors influencing the recent experience can assist with formulating reasonable scenarios for the near future.
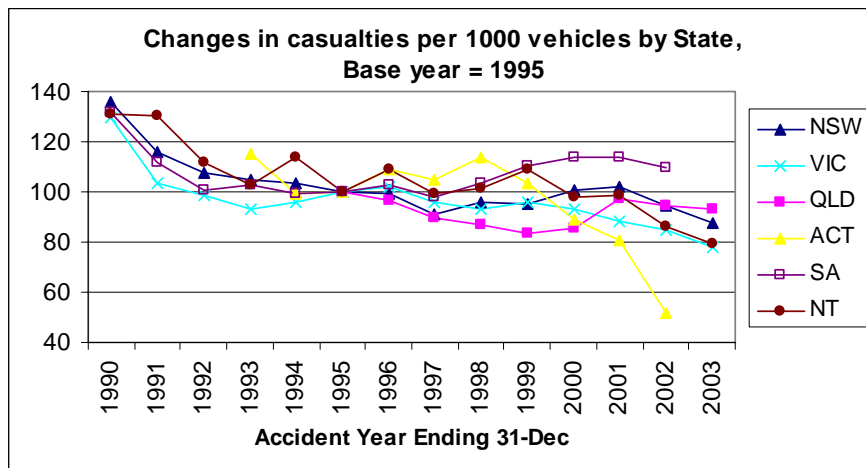
Section 5 sums up the results of our investigations.

2 Experience by state

We compare claim number experience across jurisdictions via measures of claim frequencies and casualty rates.

2.1 Casualty Rates

A casualty is any person killed or injured as a result of a car accident.

Changes in casualties per 1000 vehicles by State, Base year = 1995

Accident Year Ending 31-Dec

Legend: NSW, VIC, QLD, ACT, SA, NT

- Prior to October 2000, it was not compulsory in Queensland for an injured claimant to report the accident to the police before lodging a claim. The casualty rate increased by around 14% following the change in lodgement procedures.
- From 1990-1995, for those states and territories for which data was available, the decrease in casualty rate has been similar at around 40%.
- From 1995-2003, the ACT has a spectacular drop in the casualty rate, although with the smaller size of the territory, it is unclear whether the lower rate is sustainable.
- South Australia is the only state for which the casualties are more volatile, and casualties have increased after 1995.

2.2 Claim Frequency

Change in Claim Frequency by State
Base year = 1995
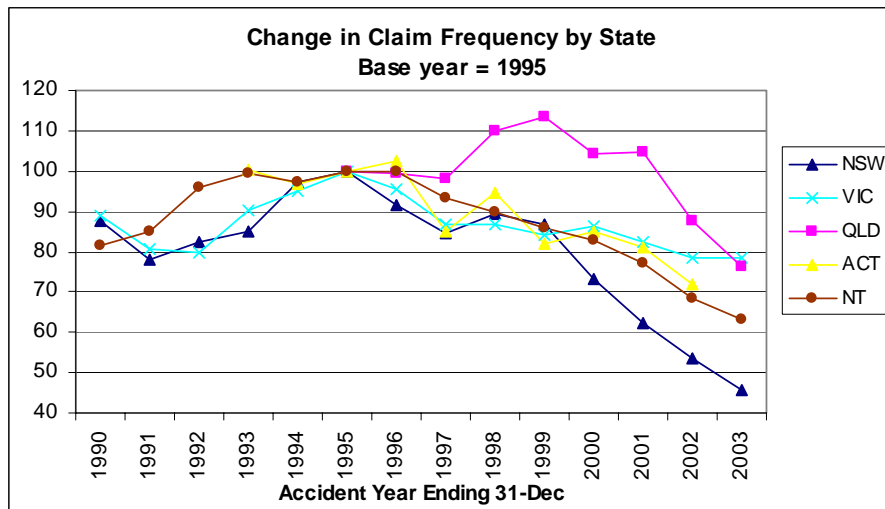
Note: Claim frequency includes an estimate for IBNR claims.

- Various legislative changes have been enacted over the last 14 years, impacting the eligibility to receive compensation.
- For those state / territories for which data is available, the claim frequency increased between 1990-1994.
- Contrary to other states, claim frequencies increased in Queensland between 1997 to 2001.
- For all states, experience from 2001 has been one of falling claim frequencies, in part driven by legislative changes.

3 Factors influencing Transport Accident Claims

For the remainder of this paper we are primarily examining third party claims. The exact definitions for what constitutes a claim vary between the different jurisdictions but can be generalised as described below.

The starting point for a claim is a vehicle accident. For each accident there may be casualties or only property damage. Where there are casualties these may be to the at-fault driver (which would make them ineligible to claim in most of the Schemes) or to a third party. The injured third party may then become a claimant or remain outside of the Scheme. This can be represented by the following diagram.

Development of third party motor claims

```
┌─────────────┐        ┌─────────────┐
│  Accidents  │───────▶│ Non-casualty│
│             │        │  accidents  │
└─────────────┘        └─────────────┘
       │
       ▼
┌─────────────┐        ┌─────────────┐
│ Casualties  │───────▶│  At Fault   │
│             │        │ Casualties  │
└─────────────┘        └─────────────┘
       │
       ▼
┌─────────────┐        ┌─────────────┐
│   Third     │───────▶│Non-claimants│
│Party Casualties│     │             │
└─────────────┘        └─────────────┘
       │
       ▼
┌─────────────┐
│  Claimants  │
│             │
└─────────────┘
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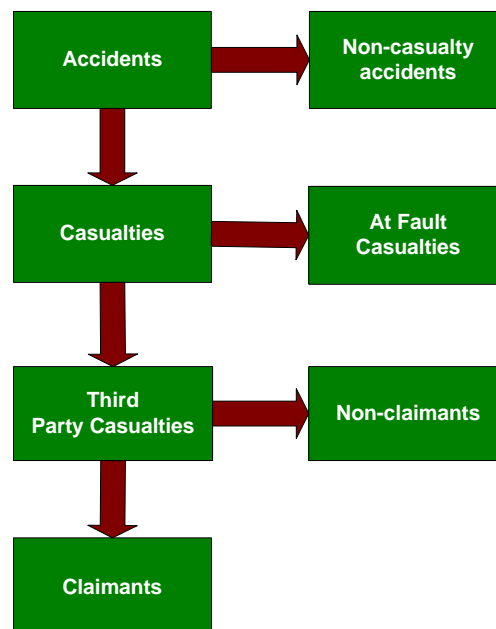
* Based on an at-fault scheme design

By examining the factors that impact each stage of this flowchart we can build a framework for examining the drivers of the experience of the Schemes.

We note at this stage that the framework could be used as a basis for examining claim frequency or claims cost. The application to claim frequency is more intuitive; however we note that the two are inextricably linked. In fact we consider the severity of the experience at each stage in the flowchart above to be one of the main contributors to the outcome at subsequent stages.

As part of our examination of the factors that impact each stage in the flowchart we reviewed the academic literature. This research located "The Haddon Matrix": a framework that had been developed by the public health community in the 1940's as a conceptual framework for organising both risk measures and countermeasure strategies.

The matrix can be applied to a number of different situations and has been applied to road traffic accidents as follows:

The Haddon Matrix[1]

	Drivers	Vehicles	Environments
Pre-Crash	• Driving Experience • Drinking and driving (legislation & penalties, education)	• State of repair (vehicle inspection programs) • Illumination (daytime running lights, flags for long loads)	• Road geometrics (highway standards • Weather (storm warnings & driving advisories) • Darkness (day-night speed limit differentials)
Crash	• "The Second Collision" (seat belt legislation)	• Auto interiors (design of car dashboards, airbags)	• Roadside obstacles (clearing trees)
Post-Crash	• Respond to emergency (carrying cell phone)	• Motor vehicle standards (Fire or rollover)	• Medical Service (Emergency Response)

This approach for organising the factors is useful in that is has two functions:
- It can be used as a tool for monitoring experience and understanding the relative importance of the different factors
- It can then be used as a basis for driving changes to the experience, in fact many of the initiatives to improve road safety have been attempts to modify one of the factors shown
  - For example many of the road safety campaigns and vehicle registration and driver licensing processes aim to address the pre-crash factors.

For the purposes of this paper we are more interested in the first function: understanding the factors influencing accidents and the relative importance of each. We are also interested in extending the application somewhat in that we are interested in both the factors influencing accidents and then how those accidents develop into third party claims.

We have brainstormed to find the factors that we believe are the main influences at each stage. These are shown in the diagram below.

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[1] http://people.hofstra.edu/geotrans/eng/ch7en/meth7en/ch7m3en.html

Factors influencing transport accident claims
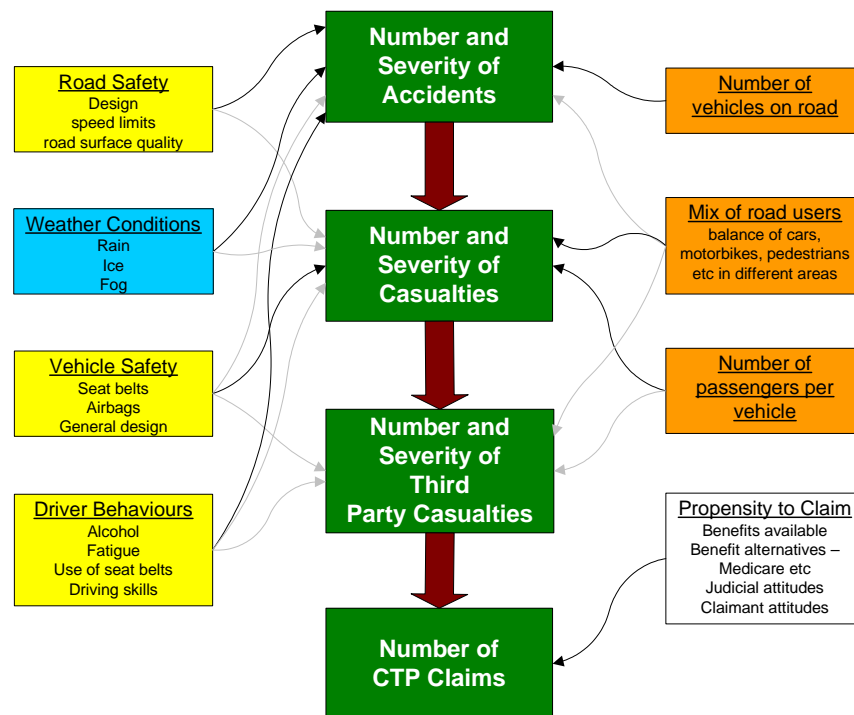
The factors shown have been categorised by colour. In doing so we have considered the extent by which the factors have been or are able to be modified and the mechanism used.

The groups are as follows:

Yellow boxes: modifiable factors which have been actively used in attempts to improve road traffic accident experience

Orange boxes: modifiable factors which are impacted by the social environment but in general have not been actively used (would expect gradual changes over time)

Blue box: unmodifiable factor

White box: modifiable factors relating to claimant experience rather than accident experience

We have shown the link we consider most significant in black and also the main secondary influences. It is difficult to separately identify the factors for many of the stages, for example vehicle safety initiatives such as rear lights may well reduce the number of accidents and may also reduce the number of casualties by reducing the severity of accidents.

4 Investigations

We have investigated a number of the factors shown in the above framework in an attempt to improve our understanding of the factors driving the experience we discussed in Section 3 and to understand the relative importance of each factor.

4.1 Accidents[2]
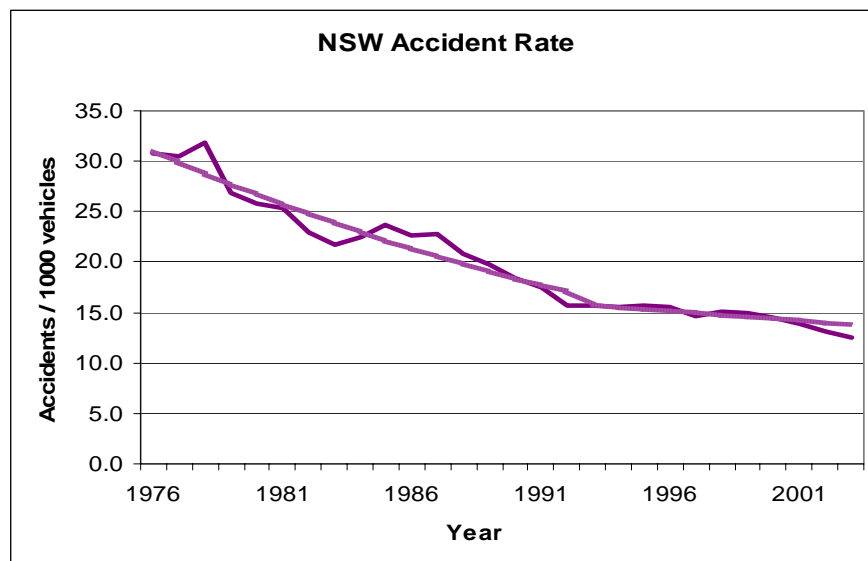
NSW Accident Rate

Note: Accident data prior to July 1975 is not available on a consistent basis, and has therefore been omitted.

From 1976 to 1992, the NSW accident rate declined at around 3.6% p.a., then at a slower rate thereafter of around 1.3% p.a. to 2001. The accident rate in 2002 and 2003 is below this trend.

The falling accident rate is generally attributed to various road safety initiatives[3], including:
- Random breath testing
- Speed cameras
- Driver education
- Improved roads
- Improved vehicle safety.

It is hypothesised that some fluctuation around the long term declining trend is, at least in part, attributable to weather patterns. This is examined later in this paper.

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[2] http://www.rta.nsw.gov.au/roadsafety/downloads/. Annual statistical statements
[3] http://www.atsb.gov.au/road/pdf/mgraph23.pdf

We have not examined the influence of improvements in road safety and driver behaviour. Vehicle safety factors are covered in section 4.2.1

4.1.1 Influence of Alcohol[4]

Random breath testing was first introduced in Victoria in 1976, with NSW coming on board in 1982. There are around 2 million RBTs p.a. in NSW.

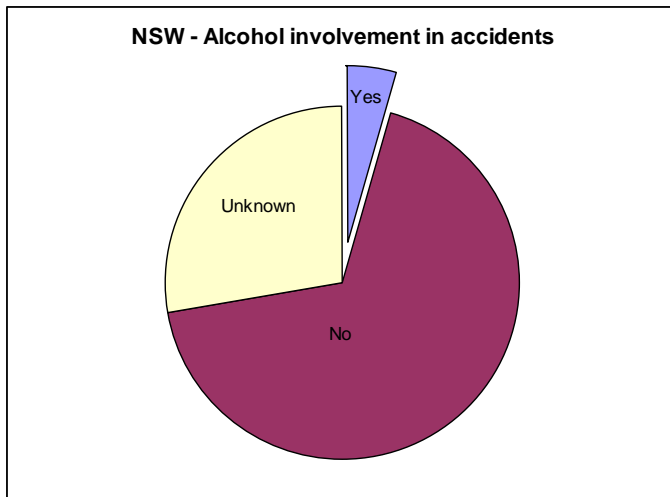The use of RBTs, and the failure rate, is show below:
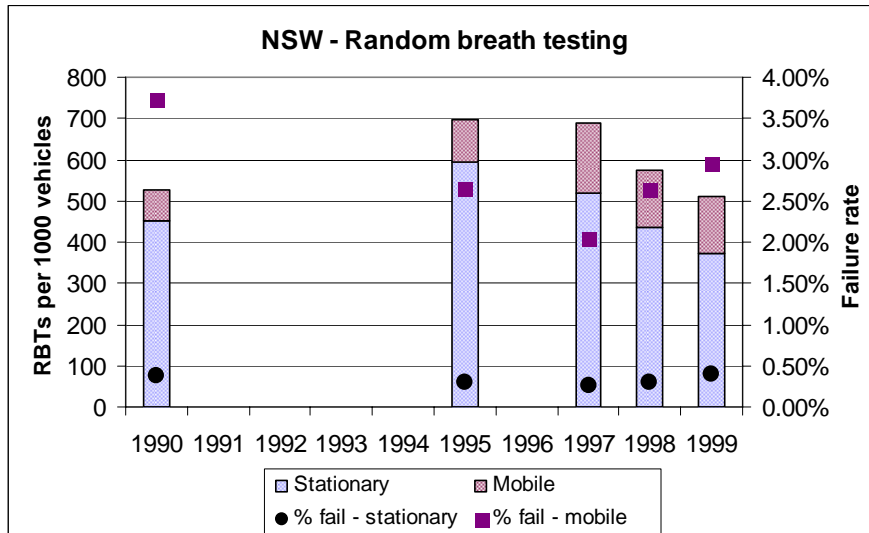
Note: RBT statistics are not readily available after 1999.

Between 1990 and 1995, compliance with drink-driving laws improved significantly, with the proportion of drivers failing RBTs falling by over 20%. However, from 1997 to 1999, the failure rate deteriorated, with the 1999 failure rate worse than prior years.

Whilst the incidence of accidents involving alcohol is low, there is a strong link between drink-driving and severity of accident.

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[4] http://www.rta.nsw.gov.au/roadsafety/downloads. Annual statistical statements. Hard copies of earlier reports provided by the RTA

NSW - Alcohol involvement in accidents

Yes

Unknown

No

Only 4% of accidents over the 1985-2003 period are known to have involved alcohol. However, 21% of fatal accidents, and 7% of injury accidents are known to have involved alcohol.

The link between fatal accidents known to involve alcohol and RBT failure rates in NSW is presented below:

NSW - Fatal crashes and RBT failues
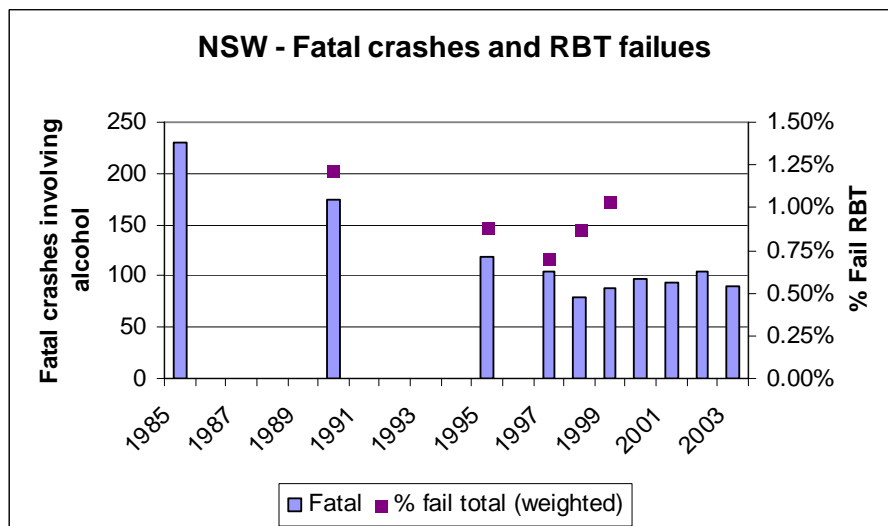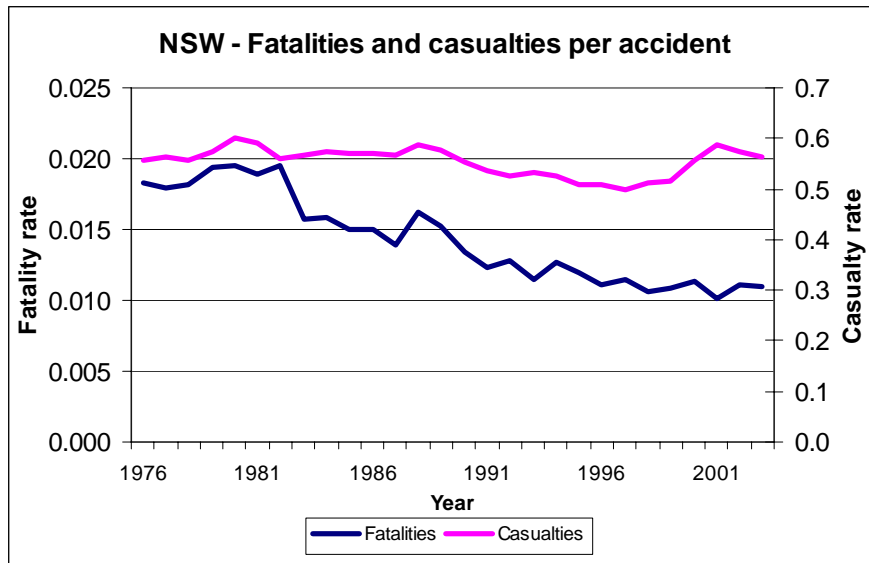
In NSW, fatal crashes involving alcohol fell from 1985 through to 1998, but have been higher thereafter. This coincides with a worsening in the RBT failure rate.

4.2 Casualties[5]

Trends in the number of casualties provide an indication of the changes in the severity of accidents over time.

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[5] http://www.rta.nsw.gov.au/roadsafety/downloads. Annual statistical statements.

NSW - Fatalities and casualties per accident

Fatalities per accident fell significantly over the 1980s, with a smaller decline thereafter. Over the whole period, fatalities per accident have declined by nearly 2% p.a. Casualties per accident (including fatalities) were broadly constant until the early 1990s, then declined to 1999, but have been higher from 2000 to 2003.

4.2.1 Car safety measures

Monash University Accident Research Centre reported in 2000 on the relative safety of passenger vehicles.[6] This was an update of earlier work, produced in 1992 and 1994. Vehicles are rated according to two safety measures, namely:

- Crashworthiness: the relative safety of a vehicle in preventing severe injury to their own driver in crashes, where severe injury is defined as a fatality or a hospitalisation as a result of a tow-away crash;
- Aggressivity: the relative risk of serious injury vehicles pose to drivers of other vehicles with which they collide.

The ratings are calculated adjusting for factors not associated with vehicle design but which are known to influence injury outcome in a crash. These include sex and age of the driver, speed zone, state, number of vehicles involved and year of crash.

A few of the findings are briefly paraphrased below:

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[6] http://www.monash.edu.au/muarc/reports/muarc171.

Vehicle Crashworthiness over time
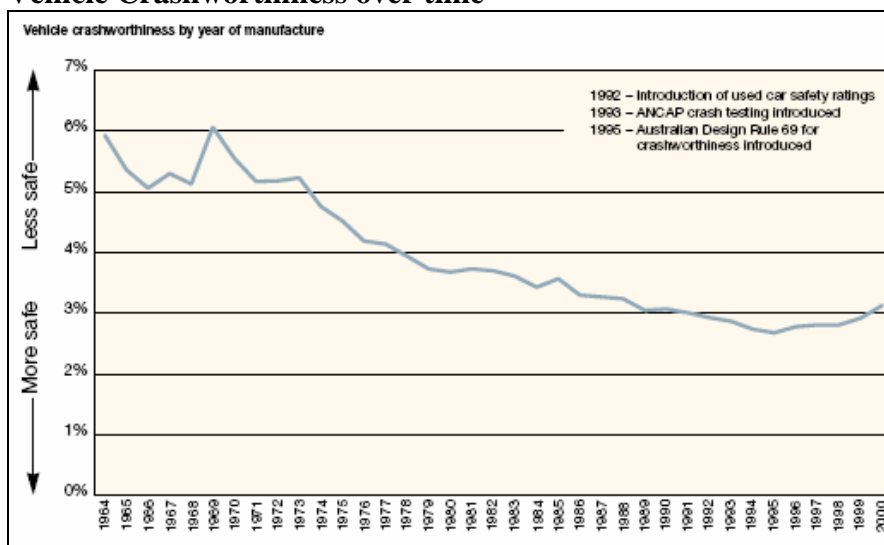
Note: For copyright reasons, the table is from a brochure[7] available from the report's sponsoring organisations, VicRoads, Transport Accident Commission, NSW Roads and Traffic Authority, NRMA Ltd, Queensland Transport.

Vehicle safety improved rapidly over the 1970s with at around a 5% improvement in crashworthiness per year of manufacture, then improved at a slower rate over the 1980s to the mid 1990s, with limited change thereafter. With nearly 60% of the NSW passenger fleet manufactured in the 1990s or later, and nearly 90% after 1985,[8] most of the safety improvements are now incorporated throughout the NSW car fleet.

The National Road Safety Strategy for 2001-2010 assumes a 10% reduction in road fatalities by 2010 as the benefits from improvements to new vehicle occupant protection achieved during the 1990s continue to accrue as newer, safer vehicles progressively replace existing vehicles. Gains assumed by the Road Safety Strategy from new technology are small.[9] Thus, without significant safety gains in vehicle design, further gains in serious injury risk from vehicle design are expected to be lower than in previous years.

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[7] http://www.rta.nsw.gov.au/roadsafety/downloads/buyers_guide_used_car_safety_ratings_2003.pdf
[8] Australian Bureau of Statistics 9309.0
[9] http://www.atcouncil.gov.au/actionplan.pdf

Crashworthiness by vehicle type
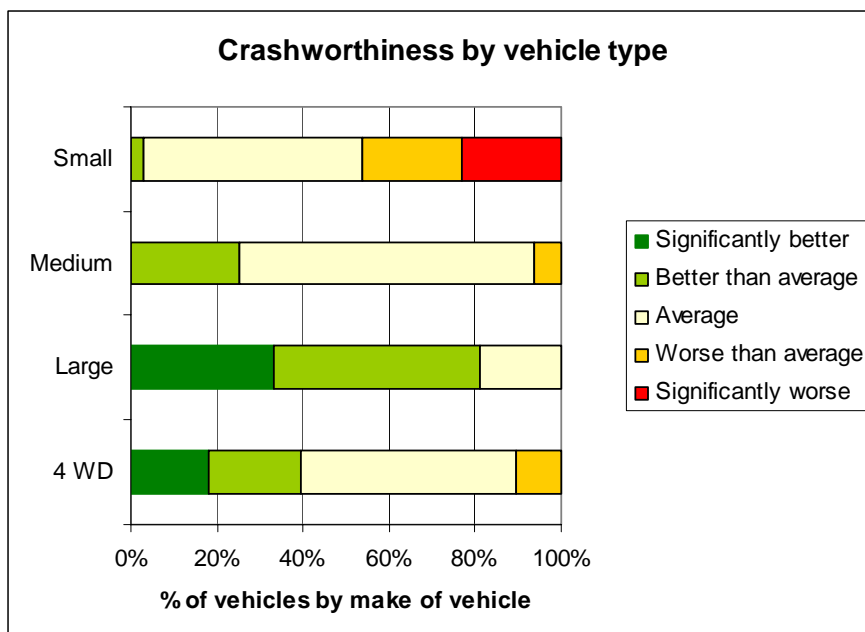
Note: The table is from a brochure available from the report's sponsoring organisations.

The relative safety improves with increasing vehicle mass, from small to large vehicles. Four-wheel drive vehicles include both lighter and the traditional large four-wheel drive.

Aggressivity by vehicle type
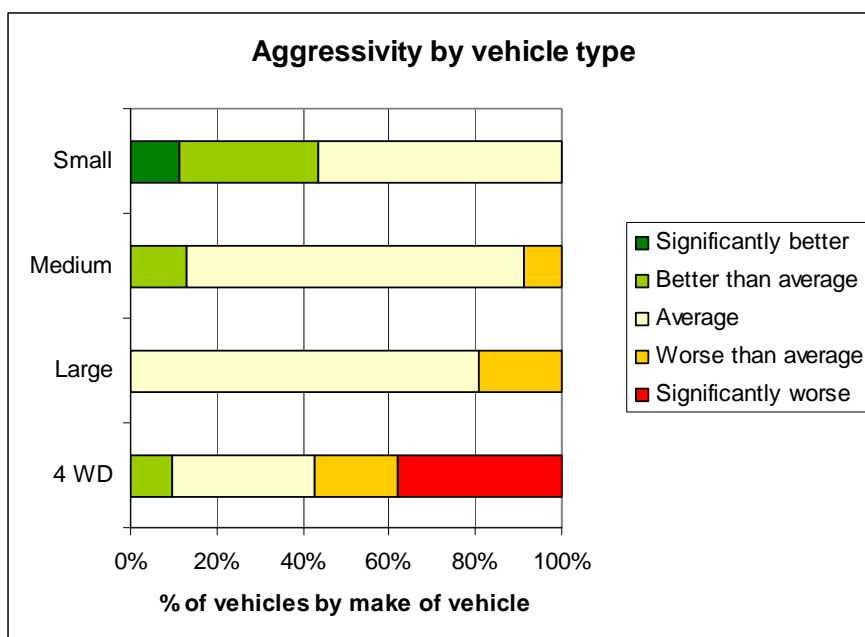
Note: A number of vehicle makes of unknown aggressivity are excluded from the above graph.

Of note is the higher proportion of four-wheel drive vehicle models with a worse than average risk of serious injury to drivers of other vehicles with which they collide. Four-wheel drives have increased in popularity. In 1990 4WDs made up 12 per cent of all new car sales and by 1998 this had increased to 17 per cent. The number of kilometres travelled by 4WDs, as a proportion of all vehicle kilometres travelled, increased from 5 per cent in 1995 to 9 per

cent in 1998.[10] The increase in the casualties per accident observed from the late 1990s appears attributable, at least in part, to the increased use of 4WDs.

4.2.2 Casualties per accident by road user[11]

NSW - Casualties per accident by road user
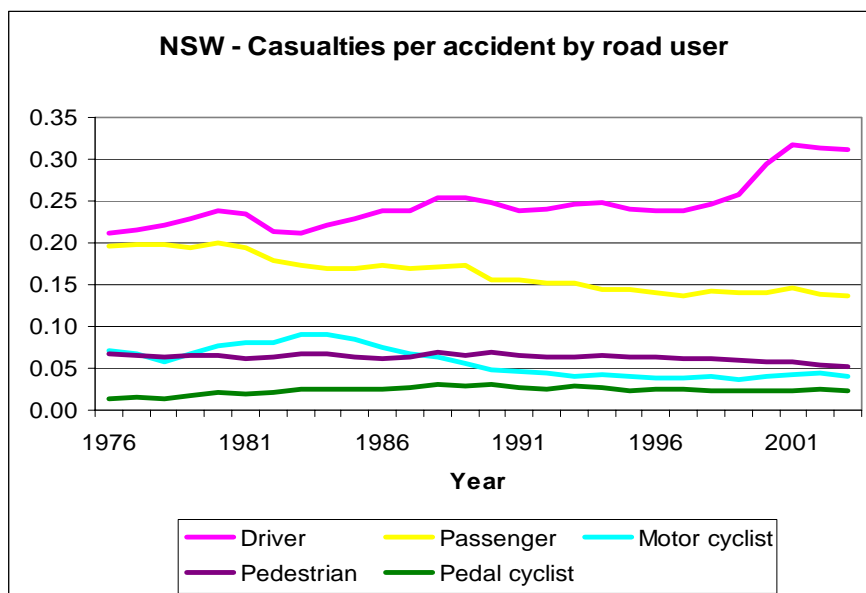
Note : Motor cyclists includes pillion passengers.

For most road users, casualties per accident have been decreasing, drivers being the clear exception.

This is examined further below:

NSW - % change in casualties per accident
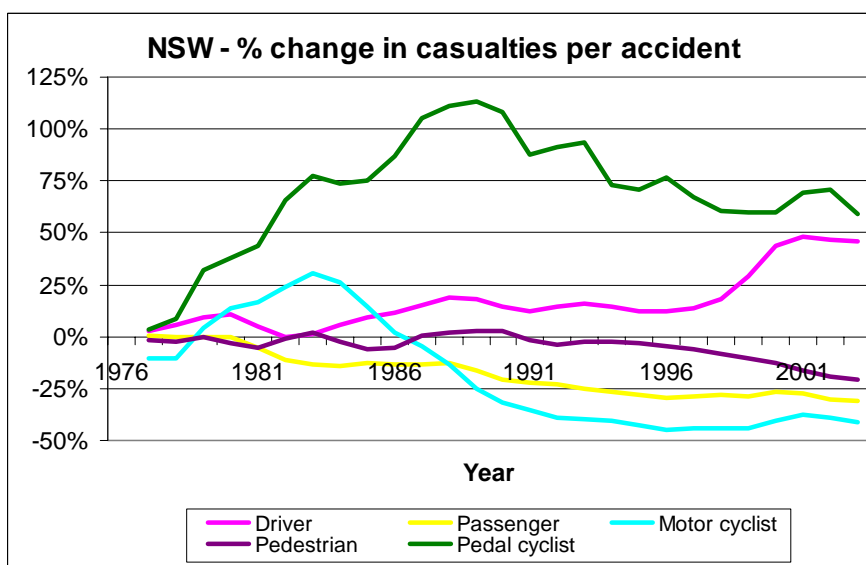
Note: Change in casualties is measured as the 2 year average, relative to the 1976-77 casualty rate per accident.

Casualties within each road user group can be impacted by different factors. For example, wearing of helmets became compulsory for motor cyclists by

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[10] http://www.atsb.gov.au/road/mgraph/mgraph11/index.cfm
[11] http://www.rta.nsw.gov.au/roadsafety/downloads. Annual Statistics statements

1973, and for pedal cyclists by 1992. For drivers and passengers, one would expect car design to have a similar impact on the casualty rates of the 2 groups. This is clearly not the case, with the driver casualty rate increasing, whilst passenger casualty rate has decreased.
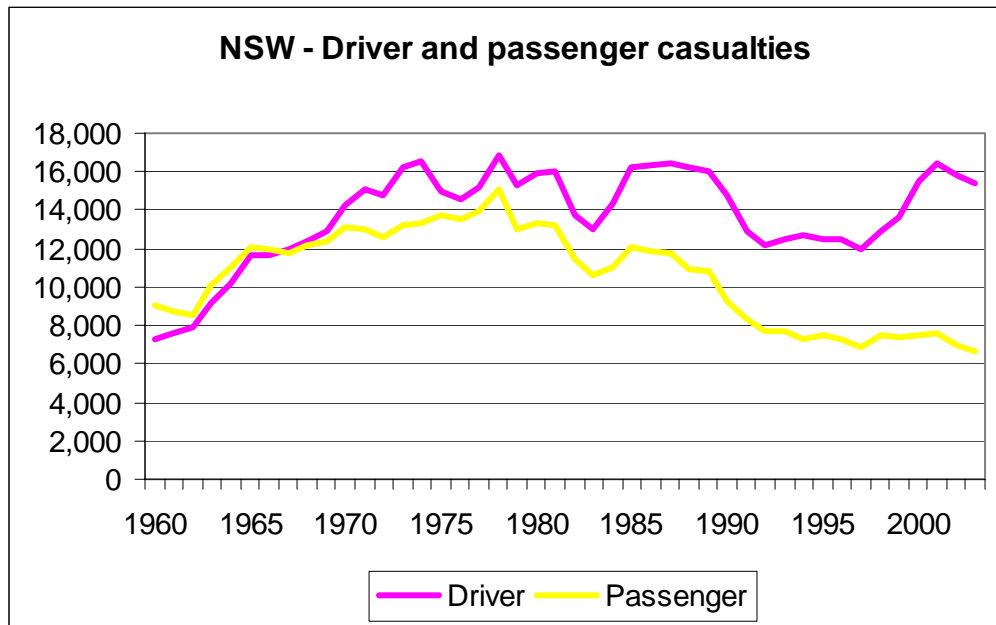
The raw casualty data for drivers and passengers is graphed below.

NSW - Driver and passenger casualties

Driver and passenger casualties began to diverge in the early 1970s, the divergence increasing through the 1980s and 1990s. In 1999 driver casualties increased by 6%, increasing again in 2000 by 14%, then continuing through to 2003 at or above this higher rate. At the same time, passenger casualties have not increased. Reasons for the increased divergence in recent years are not clear.

4.3 CTP Claims

4.3.1 CTP Claims per casualty by road user

NSW - s74 claims per casualty by road user
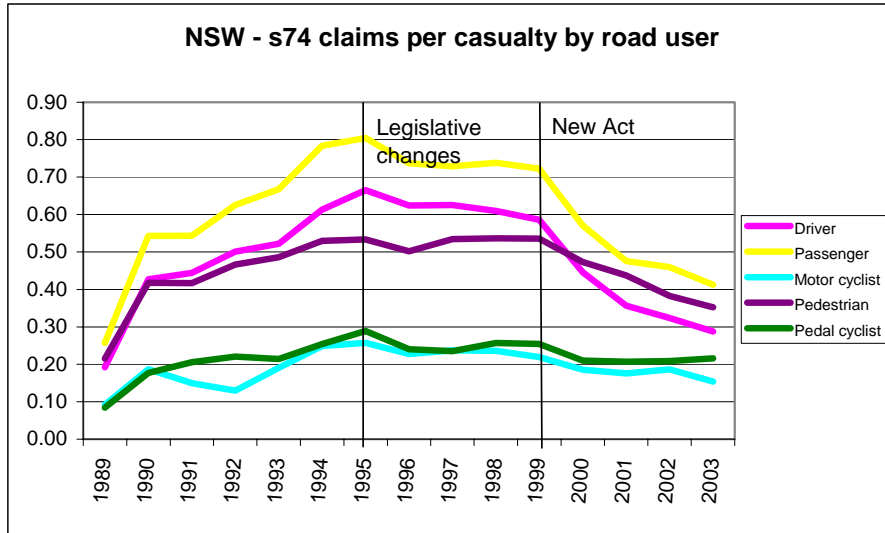
Note: From Sep-99, Section 74 claims are "full" claims. It is also possible for claimants to submit an accident notification form and obtain a low level of compensation.

Differing claim rates between road users are in part a reflection of eligibility to claim. For example, drivers will have a lower claim rate than passengers, as the NSW scheme is fault-based. Drivers in single-vehicle accidents (around 25% of all accidents) will be unable to claim. Changes in the claim rate over time reflect changes in the legislative environment.

Change in S74 claim rate (relative to 1993-94 claim rate)
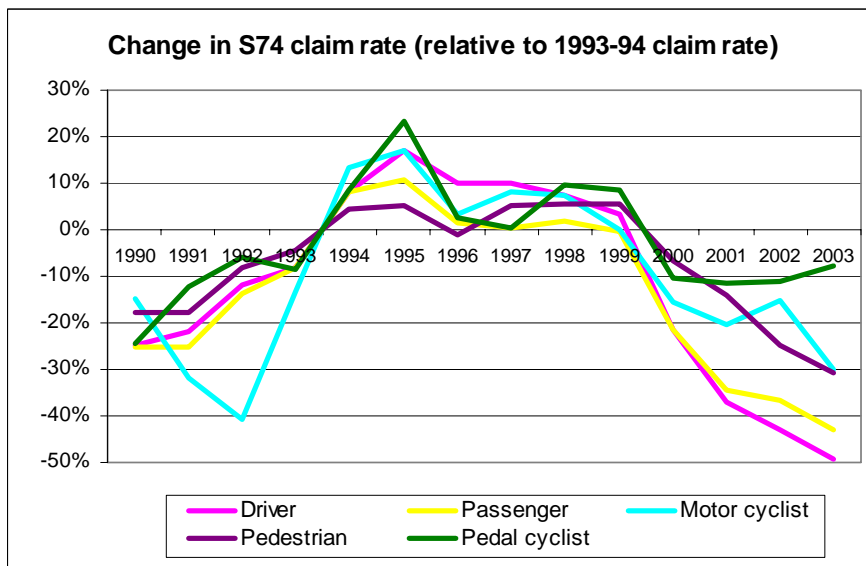
Relative to the claim rate of 1993 and 1994, the claim rate of drivers and of passengers in the New Act period has fallen by similar percentages. The claim rate of other road users has fallen by a lesser amount.

4.4 Influence of Rainfall

We wanted to examine the widely reported effect of weather on the claim experience. In particular we hypothesised that the recent drought in NSW may be a factor contributing to the low claim frequencies observed in the last few years. We wondered whether it would be possible to quantify the impact of the lower rainfall on the claim experience.

Investigating the effect on accidents of each individual factor is a difficult exercise; as we have noted above it is usually difficult to isolate a single cause for the event – more likely there are a number of contributing factors.

We reviewed the literature which suggests an approach of **matched sampling**[12] for analysing the effect of weather-related hazards. This approach recognises that there are many factors that impact on accident and claim rates and that it is difficult to control for these other factors.

The technique first identifies data covering events for which there is adverse weather and then pairs each event with a suitable control event where the weather was good. For example, experience during a rainy Monday in February could be paired with that during a dry Monday in February. The accident experiences for the periods with adverse conditions are then compared to that during the control periods. This approach attempts to negate the effects of other variables that will affect the overall accident rate. The estimate of the effect of the adverse factor is based on the combined data from many event-control pairs.

In this instance it is difficult to use the accident data we have because our data is only by month and it is difficult to establish a reasonable control month. Any monthly period is likely to have some rain and if we select a control month in the same year there will be other significant differences in hours of daylight etc. Alternatively, if we select control months from a different year trends in other factors (road design etc) will make the event-control comparison invalid.

Our alternative is to make use of our claim data which we have on a daily basis. We also made use of mainly rainfall data which we had for a number of weather stations across NSW.[13] Our data covered period 1st of January 1999 to 31st of December 2003. Before we tried the matched pair approach we did a number of simple analyses.

4.4.1 Ranking

For each region we ranked the days of experience by rainfall and plotted the following data for the claims in that region:
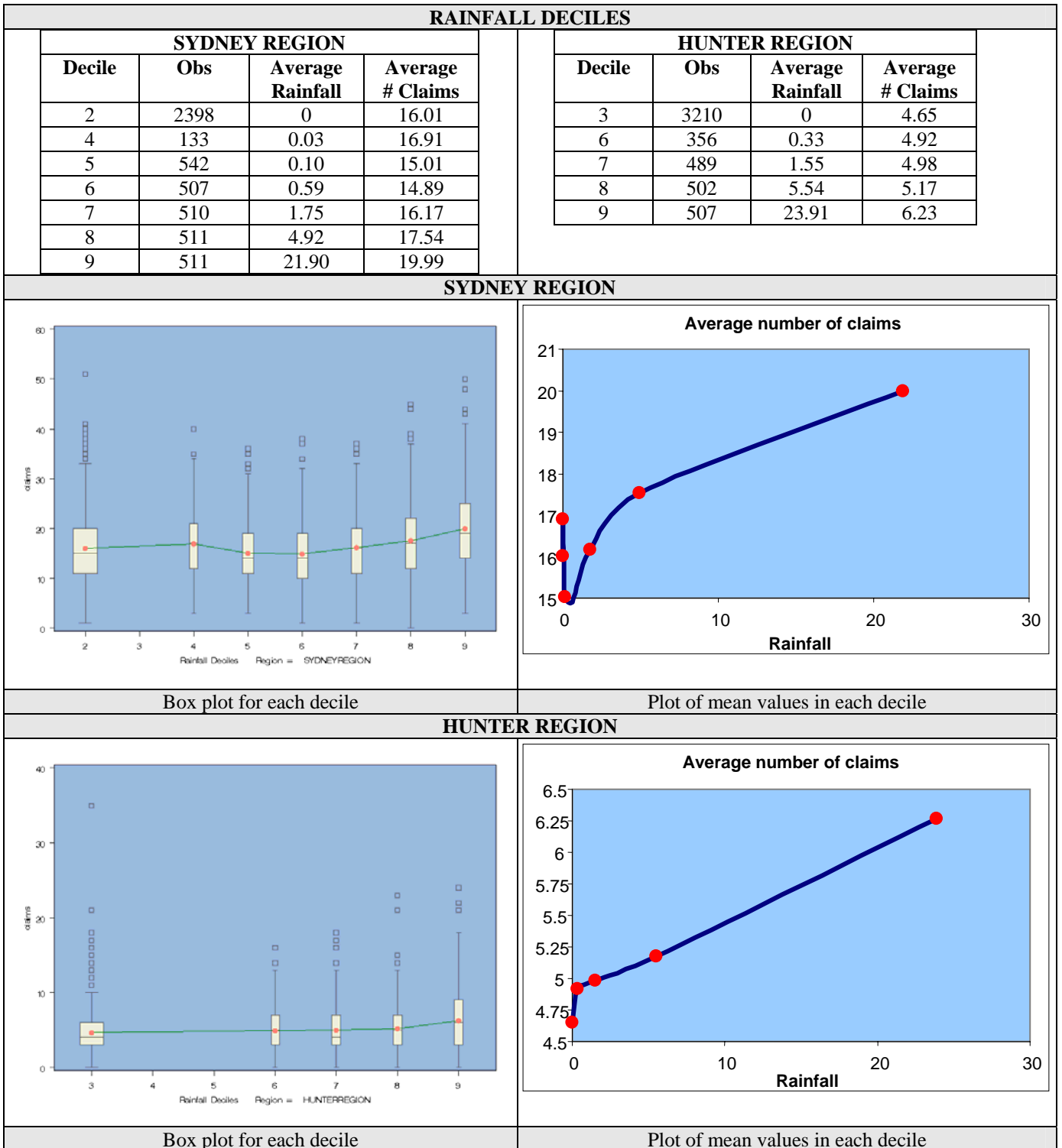- The average total numbers of claims in each decile

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[12] Matched Sampling and Weather Hazards – Dr J Andrey.
http://people.hofstra.edu/geotrans/eng/ch7en/ch7menu.html
[13] Bureau of Meteorology

- A box plot for each decile showing the daily number of claims

The graphs below show sample plots for the Sydney and Hunter regions.

RAINFALL DECILES								
SYDNEY REGION					**HUNTER REGION**			
Decile	**Obs**	**Average Rainfall**	**Average # Claims**		**Decile**	**Obs**	**Average Rainfall**	**Average # Claims**
2	2398	0	16.01		3	3210	0	4.65
4	133	0.03	16.91		6	356	0.33	4.92
5	542	0.10	15.01		7	489	1.55	4.98
6	507	0.59	14.89		8	502	5.54	5.17
7	510	1.75	16.17		9	507	23.91	6.23
8	511	4.92	17.54					
9	511	21.90	19.99					

SYDNEY REGION	
Box plot for each decile	Plot of mean values in each decile

HUNTER REGION	
Box plot for each decile	Plot of mean values in each decile

The mean value graphs look to have an upward slope from left to right which suggests that there is a trend of increasing claims with increasing rainfall but the relationship is by no means clear before the highest two deciles.

4.4.2 Correlations

A second simple test we did was to assess the correlation of the number of claims of different severities with the number of millimetres of rain recorded. We saw from the graph for Sydney above that the relationship between rainfall as measured in millimetres was unlikely to be a linear one so we also calculated the correlation of the claims variables with the log of the rainfall.

These correlations are shown in the table below.

Variable	Daily Rainfall	Log (1+daily rainfall)
Sev 0 claims	0.057	0.049
Sev 1 claims	0.076	0.077
Sev 2 claims	0.061	0.056
Sev 3 claims	0.034	0.031
Sev 4 claims	0.017	0.022
Sev 5 claims	0.006	0.008
Sev 6 claims	0.018	0.016
All claims	0.077	0.074

Given the unclear functional form of the relationship between the rainfall and claims variables it is difficult to draw strong conclusions from the numerical values calculated, however we noted the following:

- All the values shown are positive - confirming the expected result that more claims occur when there is more rainfall
- The correlations are stronger for the lower severity claims. This suggests that lower rainfall will have a greater impact on numbers of claims than on the total cost of claims

4.4.3 Matched Sampling

We used the matched sampling technique on our dataset of daily weather and claim information for NSW. The approach we took was as follows:

1. Identify reasonable categories for daily rainfall
2. For each region identify "events" where the daily rainfall was in a given category
3. Find a control day for each event where there was no rain by using the experience either one week or two weeks later
4. Sum up the number of claims of different severities and calculate the ratio of claims during the events to that during the controls

This approach should control for factors such as changes in road conditions and systems, vehicle safety and drivers attitudes over the 10 year observation period, for differing hours of daylight at different times of year and for differing patterns of road use over the week. We also excluded experience for 2 months either side of the time the New Act was introduced to ensure each of the event-control pairs were in the same legislative environment.

The daily rainfall and claims experience for each region in our data were as follows:

|	Days of Rainfall in Period ("Event days")				
Region	Nil	0 – 1.5 mm	1.5 – 5 mm	5 – 15 mm	15+ mm
Central Western	2,704	1,071	502	467	215
Hunter	3,121	611	433	440	354
Illawarra	3,039	726	485	429	280
Murray	3,154	789	452	413	151
New England	3,698	375	346	335	205
North Coast	2,639	712	620	552	436
Sydney	2,327	1,339	576	473	244
All claims	20,682	5,623	3,414	3,109	1,885
	Number of Claims during Event Days				
Region	Nil	0 – 1.5 mm	1.5 – 5 mm	5 – 15 mm	15+ mm
Central Western	5,057	1,958	928	983	542
Hunter	14,479	3,014	2,253	2,263	2,325
Illawarra	22,885	5,314	3,849	3,559	2,855
Murray	547	116	60	55	31
New England	7,635	785	696	798	564
North Coast	1,185	350	294	264	248
Sydney	37,077	20,313	9,639	8,678	5,120
All claims	88,865	31,850	17,719	16,600	11,685

We have examined the experience for all claims and then for claims of different severities. As there are comparatively few claims for the higher severity levels we have simply grouped them into three categories: Severity 0 & 1, Severity 2 & 3 and Severity 4, 5 & 6.

We have only shown the results for all regions combined and for Sydney as these have the most data. We would note that the impact of rainfall would be different in the other regions as factors such as road design, driver attitudes and vehicle mix would be likely to interact in some way with the effect of rain.

All Regions	Ratio of Event to Control Claim Numbers			
Severity	0 – 1.5 mm	1.5 – 5 mm	5 – 15 mm	15 + mm
Severity 0 & 1	0.96	1.06	1.10	1.38
Severity 2 & 3	0.96	1.05	1.12	1.26
Severity 4, 5 & 6	0.96	1.01	1.03	1.20
All claims	0.97	1.05	1.10	1.33

Event-Control Ratio for All Claims
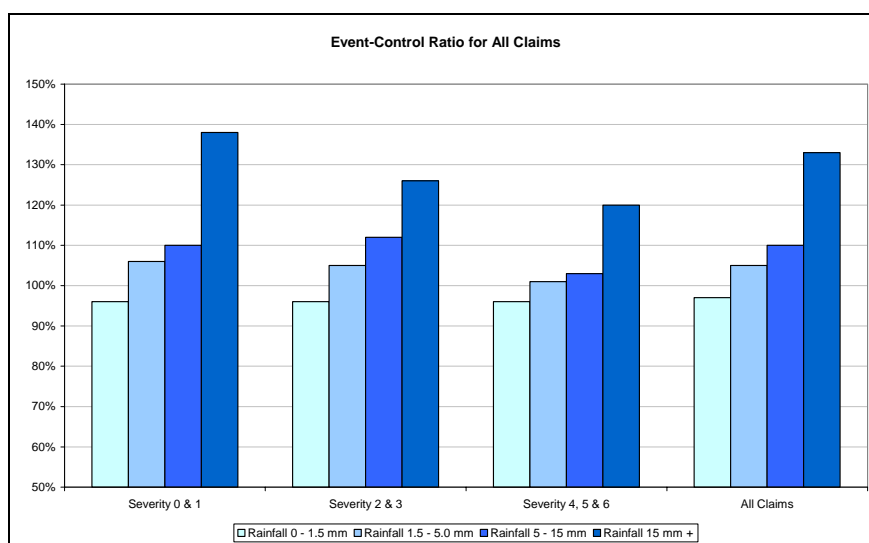
Sydney Region	Ratio of Event to Control Claim Numbers			
Severity	0 – 1.5 mm	1.5 – 5 mm	5 – 15 mm	15 – 30 mm
Severity 0 & 1	0.95	1.04	1.12	1.35
Severity 2 & 3	0.94	1.01	1.21	1.20
Severity 4, 5 & 6	1.02	1.00	0.98	1.07
All claims	0.96	1.03	1.14	1.28
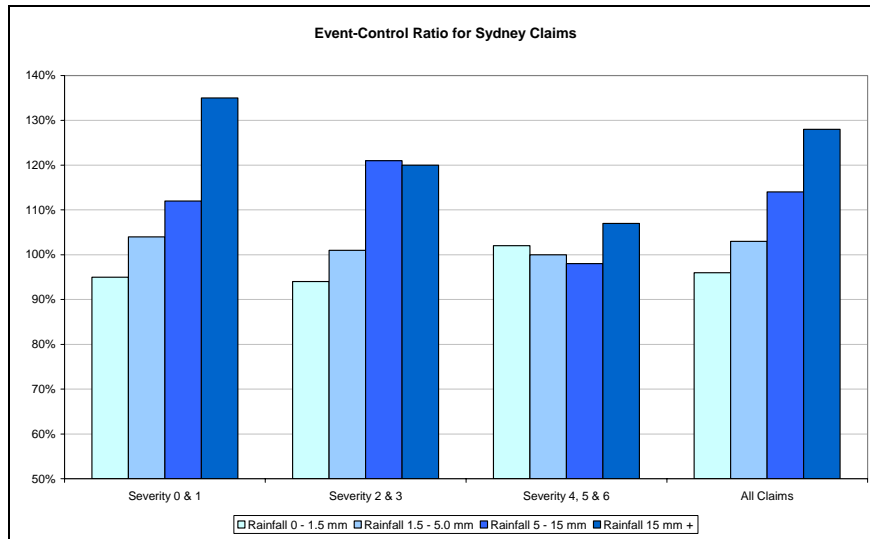
From these graphs we can see that:
- The first category representing very light rainfall (<1.5mm) showed there is little impact on the numbers of claims. In fact a number of regions showed reductions for numbers of claims on these days
- The second category representing light rainfall (1.5-5mm) showed a little impact on the numbers of claims. This was around 5% overall.
- The moderate rainfall category (5-15 mm) showed a definite increase in the numbers of claims. This was in the order of 10% overall.
- The heavy rainfall days (15mm+) showed a greater effect: around 30%.
- The trend in experience is clearest for the lower severity claims. For the higher severity categories there is much sparser data and it is difficult to draw concrete conclusions.

4.4.4 Generalised Linear Models (GLMs)

We also tried fitting models to our data to see if we could isolate the impact of the rainfall on the overall claim experience and that of claims of various severities.

We were aware from the work done looking at the correlations that there were a number of other factors masking the impact of the rainfall. The key factors we identified and included in the model were:
- Region
    - o when modelling numbers of claims the differing exposures in each region would be a critical factor

- o each region would also have different experience from different traffic volumes
- Year
  - o we know that CTP claim frequency has been decreasing over recent years, so a year variable would be a proxy for this trend in experience
  - o this would also allow for IBNR

We fitted two GLMs to model the number of claims, firstly with claims as a function of region and year and then as a function of region, year and rainfall. Adding rainfall as an explanatory variable only resulted in marginal improvements in the model fit as measured by the R^2 value and deviance, however the rainfall parameter was significant.

There were a number of difficulties encountered in fitting the GLM, in particular:

- A number of different models produced similar fits but fitted quite different functional forms
- It was difficult to isolate the rainfall variable as one would expect it to be correlated in some way with other possible explanatory variables such as region, month or year. However if we exclude all such variables in the modelling the explanatory ability of the rainfall information becomes lost.
- As a result of these difficulties we discarded this analysis in favour of the matched sampling approach.

4.4.5 Impact on Claim Frequency

The analyses show there is a significant impact of rainfall on claim frequency. However, we have not yet answered the question:

"Has the level of rainfall had a significant impact on the claim frequency reductions that we have observed in recent years?"

In order to examine this on a state-wide basis we would need good data on the number of registrations in each area. We therefore chose just to examine the Sydney region.

The annual total rainfall and average over the period examined are shown in the graph below.

Annual Rainfall - Sydney
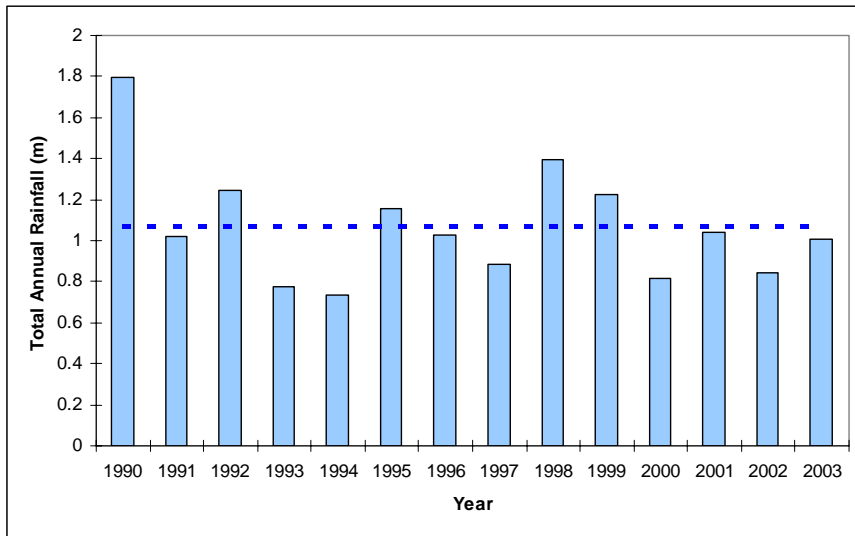
We can see that the last few years the rainfall has been below or close to the average but that this was also the case for much of the period from 1991 to 1997.

The numbers of days in each of our rainfall categories for the last three years are as shown below:

Year	Nil	<1.5mm	1.5-5mm	5-15mm	15mm+
2001	155	123	29	35	23
2002	180	108	34	28	15
2003	189	77	45	37	17
Average 1990-2003	171	98	43	35	18

The matched sampling analysis showed that there was little difference in the claim experience on a light rain day to that on a dry day, thus it is only the heavy rainfall days that make a significant difference. If we graph the experience in the higher rainfall categories for the last few years we can see that there have been below average numbers of days of high rain but that the variation from average is small.
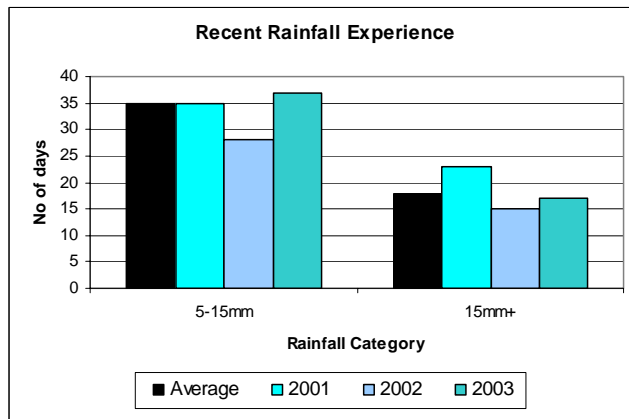
In order to quantify the impact this may have on the annual claim frequency we applied risk loadings of 5% to the 1.5-5mm category and 10% to the 5-15mm and 30% for the 15mm+ categories. These factors were selected using the matched sampling results.

We then applied the loadings to the number of days in each category for a given year and normalised for a year of average rainfall. This showed that we would expect the rainfall to have had the following impacts on claim frequency as compared to the long term average:
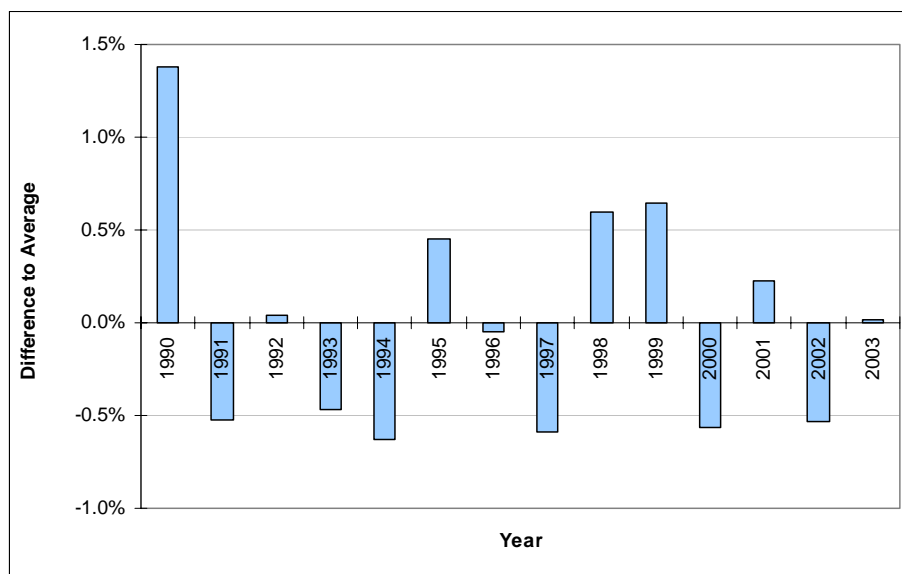
The frequency variations due to rainfall are less than 1% magnitude for all but one year in the period and in general the deviation from the long term average has only been by around 0.5%. These differences are comparatively small. For illustration in the recent NSW CTP environment a 1% change in frequency might mean a shift from 0.300% to 0.297%.

We would therefore conclude that weather may have been a contributing factor to the reductions in claim frequency but that it is unlikely to have been one of the major factors.

5 Summary

In Section 2 of our paper we showed that there have been significant reductions to the frequency of both casualties and third party claims from traffic accidents.

In Section 3 we developed a framework for examining the factors influencing this experience and investigated elements of this framework in Section 4.

Using this framework, we would suggest that the major difference between trends in numbers of casualties and numbers of claims is the changing propensity to claim.

5.1 Review of Investigations of NSW Experience

In Section 4.1 we showed that there had been a dramatic reduction in the numbers of accidents over the period 1975 to 1992 and a continued but slower reduction for the period since then. We have not been able to examine all the factors we think have contributed to this but have shown there is a clear correlation between trends in numbers of random breath test failures and numbers of fatal accidents.

In Section 4.2 we examined trends in the numbers of casualties per accident. The data for the last 25 years shows that although the overall casualty rate changed little the rates for more severe casualties have reduced.

We hypothesised that a key factor in the number of casualties is vehicle safety and used research done by Monash University to show the improvements in vehicle "crashworthiness" have been broadly consistent with the decline in numbers of fatalities. We also noted the increase in numbers of casualties from the late 1990's onwards and noted that this appears to be at least partially attributable to increased usage of 4WDs.

We also noted that there has been a divergence between the casualty experience for drivers and passengers but have not been able to explain this change.

In Section 4.3 we noted the legislative changes of 1999 have had greatest impact on the claim rate of drivers and passengers, reducing the claims per casualty by a greatest amount for this group than for other road users.

In Section 4.4 we examined the influence of rainfall on CTP claims in NSW. We demonstrated that there is some correlation between daily claim numbers and rainfall, in particular for the lower severity claims and used a matched sampling approach to show that the risk of claims may increase by up to 30% for days of heavy rain. However when we examined the impact this would

have on experience over a year we concluded that changes in rainfall would have caused the underlying claim frequency to vary by less 1% in most years.

5.2 Propensity to Claim

The framework we developed in Section 3 uses the term propensity to claim to represent the number of eligible third party casualties who become claimants.

The trends in the ratio of claimants to casualties are shown in the graph below.
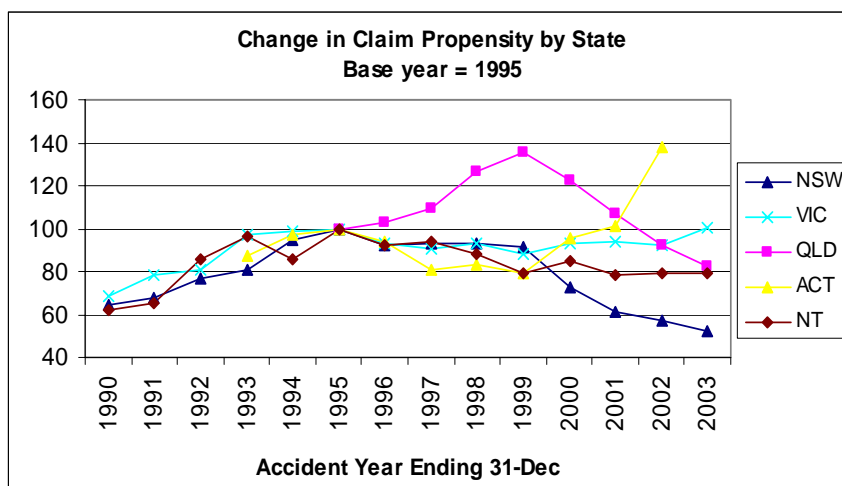
Note: This is not the same as the ratio of claimants to eligible third party casualties developed in our framework, but is a reasonable proxy for it and has the advantage of being readily available

This shows the following trends in experience:
- In New South Wales we have seen the propensity to claim fall steeply in recent years after the introduction of "Motor Accidents Compensation Act" in 1999, referred to as the "New Act".
- In Queensland we saw a rapid increase in propensity to claim in the 1990's followed by significant reductions since 1999.
- In the ACT we have seen rapid increases in propensity to claim over the period 1999-2002.
- In Victoria and the Northern Territory we have seen comparatively stable experience.

Changes in this actual propensity to claim are due to environmental and behavioural factors. The decision by a potential claimant to commence a claim will reflect an implicit cost-benefit analysis done by the claimant. They may be influenced by:
- The benefits available
- The difficulty or perceived difficulty in accessing the benefits
- Their own attitude and values
- The attitudes of other stakeholders
- The claimant's (including claimant's legal representative) knowledge of the system

It is interesting to note that in NSW the benefits available over the 5 year period following the introduction of the New Act in 1999 have not changed, however claimants' behaviour has changed over this period of time.

The effect of the provisions in the New Act was to reduce the benefits available to some potential claimants and also reduce the cost awards to legal representatives. Not surprisingly this has had the effect of reducing the numbers of claimants. More interesting is the length of time over which there has been a continued reduction as claimants and their advisors have gained understanding of the revised benefit entitlements.

Over the period since 1990 the magnitudes of the changes in propensity to claim has exceeded that of changes in the numbers of accidents and in the numbers of casualties. We suggest that the main cause of changing propensities to claim is the benefits available within the Scheme and takes no great leap of faith to conclude that changes to Scheme design have been the single largest factor contributing to the reductions in claim frequency in recent years.