National Motor Vehicle Theft Reduction Council

Benefits of Theft Reform- Technical Working Paper

7th Review of the NMVTRC

September 2020

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Informing Australia on vehicle crime.

Report outline

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Title	Benefits of Theft Reform- Technical Working Paper
Address	National Motor Vehicle Theft Reduction Council Suite 1, 50-52 Howard Street North Melbourne Victoria 3051
Email	info@carsafe.com.au
Type of report	Evaluation: Technical Working Paper
Objectives	To provide an independent assessment of the costs and benefits of vehicle theft reform in Australia and the NMVTRC's performance in overseeing the reform process.
NMVTRC program	2020 Review
Key milestones	Final Report

Abstract

In accordance with the terms of the inter-government/insurance industry agreement under which it operates, the NMVTRC is required to present an evaluation of its operations to State and Territory Ministers and the Insurance Council of Australia (ICA) during 2020/21. There are three discrete elements to the Review:

(a) This study of the economic and social benefits (the benefits element) of the NMVTRC's theft reform activities;
(b) A survey of stakeholders' perceptions of the NMVTRC's performance in meeting its objectives and support for its dissolution or extension (the stakeholder element); and
(c) The development of a set of recommendations by the NMVTRC on whether it should be wound-up or extended.

This report deals solely with the *benefits element*.

The report demonstrates the economic value of vehicle theft reform to Australia and the NMVTRC's considerable contribution to delivering those benefits.

Purpose	The study was commissioned to fulfil part of the NMVTRC's obligation for independent review under the terms of the intergovernmental/insurance industry agreement which establishes it.
Key words	Review, cost-benefit analysis, impacts, vehicle theft.

Summary

Introduction

This study was commissioned by the National Motor Vehicle Theft Reduction Council (NMVTRC), a joint initiative of Australian governments and the insurance industry to facilitate the implementation of strategic responses to combat vehicle theft in Australia.

The NMVTRC's term is subject to triennial review. Its current term ends in mid-2021. Under the terms of the current inter-government/insurance industry agreement, the NMVTRC is required to present an evaluation of its operations to State and Territory Ministers and the Insurance Council of Australia by the end of 2020.

This study deals solely with the economic and social benefits of the NMVTRC's theft reform activities to date and the report estimates the total benefits and costs of the reform process since 2015 which aligns the review period with the NMVTRC's performance indicator time series.

This study, together with a survey of stakeholders' perceptions of the NMVTRC's performance in meeting its objectives and support for dissolution or extension of the NMVTRC to be undertaken separately, will provide the Council with the appropriate information to formulate recommendations on whether the NMVTRC should be wound-up or extended.

Evaluation Period

The evaluation is undertaken from 2015/16 to 2024/25. This gives a 5 year period of actual theft reduction and a 5 year forecast period. This evaluation has adopted the same approach to previous evaluations by estimating the costs and benefits for the past five years and forecasting the next five years. The forecast period is used as many programs do not have one-off effects on the level of theft, rather their effects will be felt into the future. For example, once a vehicle has security devices fitted then it is protected from theft for the rest of its life. The benefits over the life of a vehicle from the security devices are relevant to the comparison of the cost of securing the vehicle not just the benefits in the year in which the expenditure on the security devices occurred. Other programs need to be repeated to continue to have an effect so their costs need to be continued into the future if the theft reduction benefit is to occur. For example, public education programs aimed at increasing awareness of motor vehicle theft and actions required to minimise the likelihood that a vehicle will be stolen.

Analysis Method

A cost-benefit analysis is undertaken that identifies all the gains and losses from an action to all members of society and attempts to express them in monetary terms so they can be combined into a single measure. If the total benefits exceed the total costs, implementation of the project will be economically worthwhile. All costs, whether incurred by the NMVTRC, other bodies or by motor vehicle owners should be included in the cost-benefit analysis if they contribute to the benefits, i.e. the reduction in motor vehicle theft. Cost-benefit analysis is not concerned with who pays for the costs or receives the benefits when measuring the economic worth of investing in theft reduction.

The NMVTRC's performance is assessed using cost-benefit analysis with respect to the reduction in motor vehicle theft, i.e. its costs relative to the reduction in motor vehicle theft. In other words, how effective the NMVTRC has been in meeting its objective to reduce motor vehicle theft, either by expending resources itself or by encouraging others to do so.

The evaluation examines, and to the extent possible distinguishes between, reform activity that:

- could be expected if the NMVTRC did not exist;
- has occurred without the input or influence of the NMVTRC; and
- has occurred as a result of the NMVTRC's direct action or influence.

Only the benefits from that proportion of vehicle theft reduction that is identified as occurring as a result of direct action or influence of the NMVTRC is included in the evaluation results.

Defining NMVTRC's Impact on Vehicle Theft

The NMVTRC's Strategic Plan and Work Program is structured around the two main outcomes it seeks to achieve, i.e. to reduce the:

- volume of vehicle crime – which is primarily driven by short-term thefts in which a vehicle is stolen for short-term uses such as transport or to commit another crime and has been recovered intact or subject to malicious damage. Vehicles that are stolen and recovered are 'counted' in this group; and

- cost of vehicle crime – which is primarily driven by profit-motivated thefts in which a vehicle is stolen and converted to cash in a variety of ways and never found in its original form. Vehicles that are stolen and not recovered are counted in this group.

All of the NMVTRC's reform activities and programs can be allocated to one or other of these theft types. Evaluation results are calculated and presented separately for each type and then combined for a total theft result.

Estimating the NMVTRC's Impact on Short-term theft

The basis of the theft reductions is outlined for short-term theft and profit-motivated theft. The theft reduction estimates for profit-motivated theft is confined to PLCs given that these vehicles comprise most of the professional vehicle crime whereas short-term theft includes all stolen vehicles.

The purpose of the forecasts is to determine the annual reduction of stolen vehicles and the proportion of the annual reduction that can be attributed to the NMVTRC.

As per previous reviews, the theft reduction estimates and forecasts cover the next five years. The last five years of actual theft data is included to provide a balanced approach to the evaluation of the economic benefits. The theft data are shown in financial years (12 months from April in one year to March in the next year). This convention is adopted to enable the latest data (March 2020) to be used.

The forecasts do not include Queensland. The forecasts are used in estimating the contribution of the NMVTRC to reducing vehicle theft. If jurisdictions are not fully participating in NMVTRC processes then what happens in them cannot be attributed to the NMVTRC. Queensland was not a participant from 2011 to 2019.

In the last five years, the reduction in short-term theft volumes is 0.8 per cent (when Queensland is excluded). This is significantly lower than the 4.8 per cent reduction forecasted in the previous Review. Table A shows the annual reduction in stolen vehicles with a total increase of 533 vehicle thefts. This is significantly lower than the reduction of 7,608 vehicles in the previous Review.

Table A: Short Term Motor Vehicle Theft, All Vehicles, 2014/15 to 2024/25

Year[1]	Stolen[2]	Reduction	Attributable to NMVTRC[3]
2014/15	29,104		
2015/16	32,298	3,194	767
2016/17	34,888	2,590	622
2017/18	29,989	-4,899	-1,176
2018/19	29,544	-445	-107
2019/20	30,852	1,308	314
2020/21	30,605	-247	-59
2021/22	30,360	-245	-59
2022/23	30,117	-243	-58
2023/24	29,877	-241	-58
2024/25	29,638	-239	-57
Total reduction		+533	

Notes:
1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.8 per cent pa growth.
3. 24 per cent of the reduction attributed to the NMVTRC.

The analysis conservatively attributes 24 per cent of the reduction in short-term theft nationally to the NMVTRC. That delivers an estimated net present value for the NMVTRC's Short-term theft Interventions of ($72.5) million or a benefit-cost ratio of -6.1. This is significantly lower than the $150.1 million net present value estimated in the previous Review. This is primarily due to the significant decline in the reduction of short-term stolen vehicles since the previous Review (from a reduction of 7,604 vehicle thefts to an increase of 533 vehicle thefts).

Estimating the NMVTRC's Impact on Profit-motivated theft

In the last twelve years, the reduction in profit-motivated theft for passenger and light commercial vehicles (PLCs) from zero to 15 years of age is 0.6 per cent (when Queensland is excluded). This is higher than the 2 per cent reduction forecasted in the previous Review. The last twelve years was used as there was an increase of 1.5 per cent over the past five years. Table B shows a total increase of 406 vehicle thefts. This is lower than the reduction of 1,086 vehicles in the previous Review.

Table B: Profit-motivated theft, PLCs less than 15 years of age, 2014/15 to 2024/25

Year[1]	Stolen[2]	Change pa	Attributable to NMVTRC[3]	Revised Damage Criteria	Trend plus Damage Criteria
2014/15	4,805				
2015/16	4,668	-137	-110	-196	4,472
2016/17	4,752	84	67	-294	4,458
2017/18	4,220	-532	-426	-294	3,926
2018/19	4,395	175	140	-98	4,297
2019/20	5,370	975	780	-98	5,272
2020/21	5,338	-32	-26	-98	5,240
2021/22	5,306	-32	-26	-98	5,208
2022/23	5,274	-32	-25	-98	5,176
2023/24	5,242	-32	-25	-98	5,144
2024/25	5,211	-31	-25	-98	5,113
Total reduction		+406			

Notes:

1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.6 per cent pa growth.
3. 80 per cent of the change in each year.
4. 40 per cent reduction in 2015/16, 60 per cent reduction in the following two years and 20 per cent reduction from 2018/19.

Similarly, the reduction in profit-motivated theft PLCs (more than 15 years of age) is 0.7 per cent (when Queensland is excluded). This is significantly lower than the 3 per cent reduction forecasted in the previous Review. Table C shows a total increase of 71 vehicle thefts.

Table C: Profit-motivated theft, PLCs more than 15 years old, 2014/15 to 2024/25

Year[1]	Stolen[2]	Reduction	Attributable to NMVTRC[3]
2014/15	3,178		
2015/16	2,633	-545	-436
2016/17	2,872	239	191
2017/18	2,718	-154	-123
2018/19	2,824	106	85
2019/20	3,365	541	433
2020/21	3,341	-24	-19
2021/22	3,318	-23	-19
2022/23	3,295	-23	-19
2023/24	3,272	-23	-18
2024/25	3,249	-23	-18
Total reduction		+71	

Notes:
1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.7 per cent pa growth.
3. 80per cent of the change in each year.

The analysis attributes 80 per cent of the trend changes in profit-motivated theft to the work of the NMVTRC based on the comprehensiveness of its related reform programs. That delivers an estimated net present value for the NMVTRC's Profit Motivated Interventions of ($36.8) million or a benefit-cost ratio of 0.1. This is significantly lower than the $76.2 million net present value estimated in the previous Review. This is primarily due to the significant decline in the reduction of profit-motivated stolen vehicles since the previous Review (from a reduction of 2,546 vehicle thefts to an increase of 477 vehicle thefts).

Unit Costs of Stolen Vehicles

A reduction in motor vehicle theft has the effect of reducing costs to vehicle owners whose vehicles would otherwise have been stolen. Very little new data were available to estimate the unit costs reported below and these costs have been mainly resulted from indexing the values from the 2014 review.

The unit costs comprise four categories: vehicle damage or loss, personal, injury and insurance administration costs. The estimated unit costs are for passenger and light commercial vehicles (PLCs):

- Of all ages for short-term theft (recovered vehicles);
- 15 years of age or less for profit-motivated theft (unrecovered vehicles); and
- More than 15 years of age for profit-motivated theft.

The costs are summarised in Table D for the three different categories of unit costs: short-term theft (all vehicles) and profit-motivated theft (PLCs 0-15 years and PLCs more than 15 years). The unit cost of newer vehicles subject to profit-motivated theft (0 to 15 years of age) are significantly higher than for short-term thefts; this is partly because only PLCs under 15 years of age are included but mainly because the whole value of the vehicle is included as it will not be seen again in its original form. Older vehicles subject to profit-motivated theft have the lowest unit cost as one would expect.

Table D: Unit Cost per Stolen Vehicle by Cost Component and Type of Theft

Cost Component	Short-term theft (All Vehicles)	Profit-motivated theft (PLCs 0-15 years)	Profit-motivated theft (PLCs > 15 years)
Vehicle damage or loss	$12,480	$17,330	$4,940
Personal	$1,730	$2,130	$2,130
Injury	$2,570	na	na
Insurance Administration	$520	$910	$910
Total unit cost	$17,300	$20,370	$7,980

The basis of the estimates for the vehicle damage or loss costs is the claims cost provided by insurance companies for the CARS database and analysis by CARS of the value of stolen vehicles using Glass's Guide. These costs were indexed using the CPI.

No new data were available to estimate personal costs. These costs were indexed from the 2017 Review costs using the CPI.

New data were available on fatalities involving stolen vehicles from the National Coronial Information System. The costs of all accidents (fatal and non-fatal) were indexed from the 2017 Review unit costs using the CPI and wage rate increases. The injury costs are only applied to recovered vehicles as it is less likely that professional thieves (profit-motivated theft) would be involved in road accidents compared with opportunistic thieves (short-term theft).

No new data were available to estimate insurance administration costs. These costs were indexed from the 2017 Review using the CPI.

Benefits of Reform

The estimated costs and benefits of the motor vehicle theft reform are shown in Table E. The overall returns from the reduction of profit-motivated theft are larger than for short-term theft as measured by the NPV and BCR. This is in stark contrast to the 2017 Review where the reduction of short-term theft was larger than profit-motivated theft.

Notwithstanding this, short-term and profit-motivated theft produced net costs of $72.5 million and $36.8 million respectively.

Table E: Cost benefit Analysis Evaluation Results, discounted at 5 per cent

Indicator	Short-term theft	Profit Motivated Theft	All Theft
Present value of costs ($m)	10.2	41.8	58.5
Present value of benefits ($m)	(62.4)	4.9	(57.4)
Net present value ($m)	(72.5)	(36.8)	(116.0)
Benefit-cost ratio	-6.1	0.1	-1.0

The corporate costs of the NMVTRC cannot be uniquely attributed to either short-term or profit-motivated theft and are included only in the all theft total. As can be seen, the overall costs of motor vehicle theft reform exceed the benefits by $116 million dollars.

The benefits of profit-motivated theft comprise:

- ($17.5) million for the trend reduction in motor vehicle theft;
- $19.7 million for the damage criteria benefit; and
- $2.8 million for the stronger controls on the disposal of older PLCs as scrap.

Beneficiaries of Theft Reform

Insurers and vehicle owners are normally the main beneficiaries from motor vehicle theft reform. As would be expected, insurers and vehicle owners have borne most of the cost from the overall increase in motor vehicle thefts. Insurers incur costs from vehicle loss and damage and administration totalling $27.2 million. Vehicle owners also incur costs from vehicle loss and damage and personal costs totalling $21 million.

The analysis only covers the unit costs of stolen vehicles as a benefit of motor vehicle theft reduction. It is likely that there are other non-quantified benefits that would improve the economic worth of the options.

Performance of the NMVTRC

The NMVTRC's performance with respect to the reduction in motor vehicle theft is calculated as its costs relative to the reduction in motor vehicle theft. This measures how effective the NMVTRC has been in meeting its objective to reduce motor vehicle theft, either by expending resources itself or by encouraging others to do so. In practice, the only difference to the cost-benefit analysis is that costs incurred by others are excluded.

The performance of the NMVTRC is shown in Table 15 with the results again shown separately for short-term and profit-motivated theft and the corporate costs of the NMVTRC included in only the totals for all theft. The NMVTRC posted an overall return of -3.2 (BCR), which is considerably lower than that achieved in the 2017 Review (19.1). The return of 1.2 (BCR) for profit motivated theft is impressive given the overall return of -3.2 (BCR). For the two types of theft, the comparisons with the 2017 Review show differences in performance as follows:

- For short-term theft, the NPV has declined by 145 per cent ($223.2 million) and the return (measured by the BCR) has declined by 136 per cent. Both benefits and costs have declined, with the former considerably lower than the latter.
- For profit-motivated theft, the NPV has declined by $138.8. million (99 per cent) and the return has declined from 37.5 to 1.2 (97 per cent).

Table F: Performance of the NMVTRC, discounted at 5 per cent

Indicator	Short Term Theft	Profit Motivated Theft	All Theft
Present value of costs ($ m)	7.0	4.1	17.7
Present value of benefits ($ m)	(62.4)	4.9	(57.4)
Net present value ($ m)	(69.4)	0.8	(75.2)
Benefit cost ratio	-8.9	1.2	-3.2

Reasonableness of the Results

A conservative approach to the short-term theft forecasts is adopted by selecting:

- a low rate of growth based on past trends;
- the same share attributable to the NMVTRC although the immobilisation data suggest that a higher share could be justified. The share would need to fall to 0.02 (from 0.24) for the costs to exceed the benefits.

As per the previous review, the theft reductions attributed to the damage criteria are reduced by about one half due to the non-participation of Queensland and Victoria. The 80 per cent benefit share due to the work of the NMVTRC is retained. It would need to halve for the costs to exceeds the benefits.

Sensitivity Analysis

The above negative result is primarily driven by the theft data for 2015/16 and 2016/17; the two years that Victoria was not a member of the NMVTRC. For these years, short-term theft increased 5,784 compared with 899 short-term thefts (excluding Queensland & Victoria).

In view of this, a sensitivity analysis was conducted to see the impact on the theft results under a range of different time periods and scenarios. The following time periods were selected: 10, 7, 5 and 3 years. These time periods were applied to three different scenarios: Australia, Australia excluding Queensland and Victoria, and Australia excluding Queensland.

The sensitivity analysis revealed the impact of theft reform has been positive over 10, 7 and 3 years under all scenarios. Only Australia excluding Queensland and Victoria produced a positive result over 5 years. This is consistent with the increased levels of theft in 2015 and 2016 particularly in Victoria.

An identical exercise was undertaken to test the impact on the performance of the NMVTRC which produced identical results but with higher benefit cost ratios. The costs, benefits, net benefits and benefit-cost ratio (BCR) for these scenarios can be found in Tables 16 & Table 17 in Chapter 5.

NMVTRC Funding Arrangements

The Terms of Reference requested an analysis of the impact of current fixed contributions on future operations. It noted the NMVTRC funding base and shares have remained at the $2.25 million level set in 1999. While this has assisted in strengthening the value proposition for government and insurance funders in the six reviews to date, it now poses major challenges in terms of program investment.

Using the Reserve Bank of Australia's Inflation Calculator, a basket of goods and services valued at $2.25 million in 1999 would cost $3.8 million in 2020 – a change of 68 per cent at an annual inflation rate of 2.6 per cent.

A detailed analysis of the NMVTRC's annual expenditure was undertaken from 2012/13 to 2019/20. Table G below shows NMVTRC annual expenditure in nominal dollars from 2012/13 to 2019/20, and in the second column, the NMVTRC annual expenditure indexed by June 2020 price levels. The third column shows the difference between the nominal and indexed annual expenditure. As can be seen, the NMVTRC's indexed annual expenditure in 2012/13 is not maintained for each subsequent year (other than for 2014/15) until 2019/20 when Queensland becomes a financial member. The total difference between nominal and indexed expenditure from 2012/13 to 2019/20 amounts to $847,750.

As a proportion of NMVTRC expenditure, corporate costs (employee and office administration costs) increased from 33 per cent in 2012/13 to 44 per cent in 2016/17. This has had a negative impact on the funding of the NMVTRC's programs. As previously noted, Queensland has not been a member and a financial contributor to the NMVTRC since 2011 and has only returned in 2019/20. Hence, the significant increase to the NMVTRC's budget in 2019/20. Also, Victoria withdrew its membership and financial contributions in 2015/16. With the return of Queensland, corporate costs have declined to 35 per cent of the NMVTRC's expenditure in 2019/20.

The SA Attorney-General's Department provides CARS Data and has advised that from 1 July 2021, the cost of this service will increase to $621,500 (inclusive of GST); an annual increase of $146,376. In addition, the cost of CARS Data will be CPI indexed from July 2022. Unless, this substantial increase is shared across member organisations, the funding will need to be drawn from across the four programs. The CPI index could amount to about $12,000 per annum (if the CPI is 2 per cent).

In view of the above, if the NMVTRC wants to retain the current 2020/21 expenditure in future years it would need to apply an annual CPI index. For example, if the CPI is 2 per cent, the additional cost would be about $50,000 shared amongst members organisations. Alternatively, if the NMVTRC wants to recover the CARS Data service CPI increases that will start in July 2022, the additional cost would be about $12,000 (if the CPI is 2 per cent) shared amongst member organisations.

Table G: Comparison of NMVTRC Expenditure in nominal dollars with real dollars as at June 2020 price levels

Year	NMVTRC Annual Expenditure	NMVTRC Annual Expenditure Indexed in June 2020 price levels	Difference
2012/13	1,999,069	2,242,476	243,407
2013/14	2,224,931	2,429,894	204,963
2014/15	2,259,886	2,426,482	166,596
2015/16	1,438,091	1,523,075	84,984
2016/17	1,788,125	1,864,951	76,826
2017/18	1,934,119	1,983,401	49,282
2018/19	1,929,729	1,951,421	21,692
2019/20	2,357,474	2,357,474	0
Total Difference			847,750

Acknowledgements

Margaret Starrs (MM Starrs Pty Ltd) for providing the data analysis and methodology for the 2017 Review. Most of the narrative in this report is from the 2017 report and has only been added to where appropriate, and to update the data analysis, cost-benefit analysis and the evaluation results.

Contents

1. Introduction

This study was commissioned by the National Motor Vehicle Theft Reduction Council (NMVTRC), a joint initiative of Australian governments and the insurance industry to facilitate the implementation of strategic responses to combat vehicle theft in Australia.

Established in 1999, the NMVTRC comprises representatives of the insurance industry, justice agencies, the automotive industry and trades, motoring associations and transport agencies.

The NMVTRC's term is subject to triennial review. Its current term ends in mid-2021. Under the terms of the current inter-government/insurance industry agreement, the NMVTRC is required to present an evaluation of its operations to State and Territory Ministers and the Insurance Council of Australia by the end of 2020.

This study deals solely with the economic and social benefits of the NMVTRC's theft reform activities to date and the report estimates the total benefits and costs of the reform process since 2015 which aligns the review period with the NMVTRC's performance indicator time series.

This study together with a survey of stakeholders' perceptions of the NMVTRC's performance in meeting its objectives and support for dissolution or extension of the NMVTRC to be undertaken separately will provide the Council with the appropriate information to formulate recommendations on whether the NMVTRC should be wound-up or extended.

1.1 Objectives

The Terms of Reference for this study state the objectives are to quantify the costs and benefits of motor vehicle theft reduction attributable to the NMVTRC in the five financial years from 2015/16 to the present. The evaluation examines, and to the extent possible, distinguishes between reform activity that:

- could be expected if the NMVTRC did not exist;
- has occurred without the input or influence of the NMVTRC; and
- has occurred as a result of the NMVTRC's direct action or influence.

These distinctions are important in identifying the benefits and costs of the motor vehicle theft reform as opposed to the benefits of the existence of the NMVTRC. Similar analyses were undertaken as part of the equivalent reviews in 2005, 2008, 2011, 2014 and 2017, i.e. two broad approaches to the analysis, with both being necessary to adequately satisfy the objective required outcomes of the project:

1. A cost-benefit analysis, which identifies all the gains and losses from an action to all members of society and attempts to express them in monetary terms so they can be combined into a single measure. If the total benefits exceed the total costs, implementation of the project will be economically worthwhile. All costs, whether incurred by the NMVTRC, other bodies or by motor vehicle owners should be included in the cost-benefit analysis if they contribute to the benefits, i.e. the reduction in motor vehicle theft. Cost-benefit analysis is not concerned with who pays for the costs or receives the benefits when measuring the economic worth of investing in theft reduction.

2. The NMVTRC's performance with respect to the reduction in motor vehicle theft, i.e. its costs relative to the reduction in motor vehicle theft. In other words, how effective the NMVTRC has been in meeting its objective to reduce motor vehicle theft, either by expending resources itself or by encouraging others to do so.

1.2 Approach to the project

The project involved two broad tasks: data collection and analysis to assess the costs and benefits of motor vehicle theft reduction. As in previous reviews, the NMVTRC's CARS database was used extensively and much analysis of stolen vehicle data was undertaken by the CARS team1.

Officers of the NMVTRC provided cost data for the estimates of costs to the NMVTRC and others as a result of its programs aimed at theft reduction. Officers of the Federal Chamber of Automotive Industries provided new vehicle sales data for calculating estimates of the costs associated with vehicle identification.

1.3 Analysis Framework

In practice, the available information and data do not permit such a wide-ranging framework for the evaluation. The approach adopted is to exclude the costs of the activities not related to the NMVTRC's programs and to make some

[1] CARS is the acronym given to the national vehicle theft statistical database and analysis service provided by the South Australia Attorney-General's Department under contract to the NMVTRC.

adjustments to the theft reduction figures for these exclusions. Activities undertaken by other bodies or individuals that have affected motor vehicle theft reduction and that have involved no resources of the NMVTRC include:

- Police Force campaigns as part of community policing initiatives;
- Western Australia requiring the fitting of immobilisers on the transfer of motor vehicle registration; and
- The installation of security and systems by some vehicle owners at their own expense.

Some of the costs included in the analysis are actual expenditures (NMVTRC operating and program costs). Some are estimates particularly for other parties such as the installation costs for secure labels and microdots and the costs associated with the written-off vehicle register's (WOVR) revised damage criteria.

The costs associated with the problem of stolen motor vehicles comprise four categories: vehicle damage or loss, personal, injury and insurance administration. These costs become benefits with measures that reduce motor vehicle theft. The costs for vehicle damage or loss comprise three categories: short-term theft (all vehicles), profit-motivated theft (PLCs 0-15 years) and (PLCs >15 years). The basis of the estimates for these costs is the claims costs provided by insurance companies to the CARS database and analysis by CARS of the value of stolen vehicles using Glass's Guide.

No new data were available to estimate personal, injury and insurance administration costs. These costs were indexed using ABS CPI. However, for the injury costs, the National Coronial Information System provided updated fatality data but no new data was available on the number of injuries and property damage associated with motor vehicle theft. As a result, 2017 review data was relied upon.

The evaluation is undertaken from 2015/16 to 2024/25. This gives a 5 year period of actual theft reduction and a 5 year forecast period. This evaluation has adopted the same approach to previous evaluations by estimating the costs and benefits for the past five years and forecasting the next five years. The forecast period is used as many programs do not have one-off effects on the level of theft, rather their effects will be felt into the future. For example, once a vehicle has security devices fitted then it is protected from theft for the rest of its life. The benefits over the life of a vehicle from the security devices are relevant to the comparison of the cost of securing the vehicle not just the benefits in the year in which the expenditure on the security devices occurred. Other programs need to be repeated to continue to have an effect so their costs need to be continued into the future if the theft reduction benefit is to occur. For example, public education programs aimed at increasing awareness of motor vehicle theft and actions required to minimise the likelihood that a vehicle will be stolen.

As the benefits of specific motor vehicle theft reform programs are not able to be determined, the approach taken in this review and in past reviews is to estimate the cumulative motor vehicle theft reduction over the designated 10 year period based on an annual per centage change that reflects the recent downward trendline for motor vehicle theft.

During the period of time of this review, there have been changes in membership of the NMVTRC which affect the analysis. The Queensland Government has not been a financial participant and has had limited involvement in programs since 2011 but recently re-joined the NMVTRC in 2019. The Victorian Government was not a participant in 2015 and 2016 and re-joined in 2017. In the 2017 review, Queensland and Victoria were mostly excluded from the national motor vehicle theft reduction data. While this was appropriate, it is also useful to understand the scenario if these jurisdictions were included on the basis that some of the NMVTRC measures such as immobilisers and WOVR damage criteria have been implemented in all jurisdictions regardless of their NMVTRC membership. As this is somewhat difficult to quantify, a sensitivity analysis is conducted in section 5.5 that tests the impact of theft reform over 10, 7, 5 and 3 years under several different scenarios: Australia, Australia excluding Queensland and Victoria, and Australia excluding Queensland.

As the costs and benefits occur over several years, it is necessary to express them in a common unit of account. This is achieved by discounting them at 5 per cent per annum and expressing them in current day price levels (June 2020). The evaluation criteria used are net present value (NPV) and benefit-cost ratio (BCR). The NPV is the difference between the discounted benefits and the discounted costs, and represents the overall economic worth of motor vehicle theft reform. The BCR is discounted benefits divided by the discounted costs, and can be a useful mechanism to rank projects where there are several of them competing for funds.

Rounding has been used in the data analysis and hence the data calculations in some tables may not appear accurate.

1.4 Report outline

The report contains a further five chapters following this introduction.

Chapter 2 contains a brief description of the programs aimed at reducing motor vehicle theft that have occurred in the recent past or are expected in the forecast period. The contribution of the NMVTRC, either in financial or support terms, is identified for each of the programs and their costs. As well, the costs borne by other parties are estimated where applicable in relation to the NMVTRC programs.

Chapter 3 provides an analysis of the number of stolen vehicles. This is the critical input to the assessment of the contribution of the NMVTRC to the reduction in theft that has occurred in the last five years. The analysis provides the basis for the estimation of theft reduction benefits together with the unit costs of stolen vehicles.

Chapter 4 outlines the estimates of the unit costs associated with each stolen vehicle with more details provided in Appendix B. These unit costs are used to estimate the monetary benefits of theft reduction estimated in Chapter 3.

The evaluation of benefits of motor vehicle theft reform, in terms of both cost-benefit analysis and the performance of the NMVTRC, is presented in Chapter 5. It draws on the costs and benefits estimated in the earlier chapters.

Chapter 6 provides an analysis of the NMVTRC's funding arrangements in real and nominal terms.

2. Programs

The NMVTRC has developed programs to deal with the two types of motor vehicle theft: short-term and profit-motivated theft.

Short-term theft is defined as stolen vehicles recovered, usually within one month of having being stolen (found and returned to the owner or the owner's insurance company). Vehicles that are stolen for profit are not recovered and may be used for re-birthing vehicles or parts, sold for scrap metal or be part of an insurance fraud, etc.

The NMVTRC has focussed on the following four programs since 2015/16.

Program	Type of Vehicle Theft
Disrupting separated parts markets	Profit Motivated
Disrupting vehicle laundering markets	Profit Motivated
Diverting young offenders	Short-term
Building stakeholder/community capacity	All vehicle theft

2.1 Disrupting separated parts markets

Rebirthing of vehicles has become progressively more difficult for criminals due to the prior actions of the NMVTRC in conjunction with bodies involved in motor trades, insurance and enforcement. As a result, criminals have moved to dismantling or stripping stolen cars for parts.

As a result, the NMVTRC devoted its attention to developing measures to disrupting motor vehicle theft for the purposes of separating and selling parts. In response, the NMVTRC commissioned DLA Piper to review the regulation of separated parts markets in Australia in 2013 and partnered with the Victorian Inter-Agency Task Force into Compliance with Local Laws and Illicit Export Activity (2014). These investigations revealed that stolen vehicles are a source of parts for the repair of vehicles and that regulatory regimes have significant deficiencies that has led to non-compliant trading in the scrap metal sector and the export of stolen vehicles.

Following these reviews, the NMVTRC engaged Duncan Lawyers to develop model legislation (2014) to remove the ambiguities and gaps in second-hand dealing laws across State and Territory Governments.

As a result, New South Wales (NSW) introduced the Scrap Metal Industry Act in March 2017; the first crime prevention law aimed at curbing the illicit trade in scrap metal. Following this, in 2018 Victoria amended its second-hand dealing laws to adopt key elements of the NSW approach, including banning cash payments and trading in de-identified vehicles.

The NMVTRC is currently working with Western Australian and South Australian Governments to adopt similar legislative approaches.

2.2 Disrupting vehicle laundering markets

This program is aimed at reducing/eliminating the pool of vehicles that can be potentially re-used for the re-birthing of stolen vehicles. The work being undertaken in this program covers:

- Improving written-off vehicle procedures;
- Improving vehicle and parts identification; and
- Improving information exchange

2.2.1 Written-off vehicles register (WOVR)

The WOVR is a national initiative to combat the practice of rebirthing where a badly damaged vehicle is bought for the purpose of using its compliance identification (VIN) to give stolen cars a new and legitimate identity. It is also used to ensure the safety of a repaired written-off vehicle. Whilst South Australia had established a form of WOVR as early as 1993, a consistent national scheme did not commence until 2002 when the first jurisdictions adopted a set of best practice principles developed by the NMVTRC and Austroads. Western Australia was the last jurisdiction to introduce the national model in 2004. The light vehicle WOVR applies to motor vehicles, motorcycles, caravans and trailers up to the age of 15 years with a gross vehicle mass (GVM) of up to 4.49 tonnes.

The WOVR is legislated and requires insurance companies, auction-houses, dealers, and auto recyclers that assess, buy, sell or repair written-off vehicles to notify the appropriate state/territory government authority when they write-off a vehicle. This information is recorded on the WOVR and can be accessed by anyone considering buying a used vehicle or by enforcement authorities to check whether a stolen vehicle has used the compliance identification of a written-off vehicle.

All jurisdictions share written-off vehicle data via NEVDIS. The introduction of the WOVR rendered the traditional form of rebirthing written-off vehicles virtually impossible to execute without detection. As a result, the NMVTRC estimates rebirthing has gone from the method of choice by organised criminals to less than 1 in 20 profit-motivated thefts.

The NMVTRC has been actively involved in improving the operation of the WOVR including-

- the introduction of improved engineering-based assessment criteria between 2012-2014;
- conducting in-field audits of the accuracy of insurance assessments[2]; and
- most recently in extending similar requirements for heavy vehicles. In May 2017, the Transportation and Infrastructure Council agreed to implement a Heavy Vehicle WOVR to improve vehicle safety and mitigate theft risks. Nationwide implementation is expected by 2022.

2.2.2 Identification

The NMVTRC has worked actively with technology suppliers and vehicle manufacturers to develop world-leading vehicle marking systems.

Improvements in vehicle identification were made with the development of the technical specification for secure compliance labels in 2004 and the adoption of the label by first volume vehicle manufacturers in 2007. The design of the label ensures that it crumbles if an attempt is made to remove it from the vehicle chassis. Hence, the label cannot be transferred between vehicles or be copied. The number of vehicles protected since the label's first introduction now exceeds 6 million (about 43 per cent of the PLC fleet).

Whole of vehicle marking (WoVM) involves the use of microdot technology to mark the body and vehicle components with a unique identification. Manufacturers including BMW, Ford Performance Vehicles, Audi, Lexus, Holden Special Vehicles, Mitsubishi Ralliart, Mini, Porsche, Subaru and Tickford applied WoVM from 2001. Whilst the global financial crisis of 2007-2009 saw many participants withdraw, the number of vehicles protected with WoVM now exceeds 1 million (about 7 per cent of the PLC fleet).

No high-volume local vehicle manufacturers ever fitted either the secure label or WoVM. However, a major insurer included the technology as a central element of its theft rating scheme. The rating scheme is also referenced by other insurers for policy pricing purposes.

2.2.3 Information Exchange

Real time access to accurate information on the registration status of vehicles is critical to law enforcement agencies, transport authorities, motor car traders, insurers and consumers if stolen vehicles are to be prevented from being on-sold.

In this regard, the NMVTRC played a significant role in establishing the National Exchange of Vehicle and Driver Information System (NEVDIS). This system is designed to provide a vital link in the national vehicle information grid by linking state and territory registration data bases to facilitate customer service, enforce road laws and reduce vehicle theft.

Similarly, the NMVTRC played a leading role in ensuring that the Commonwealth's Personal Property Securities Register (PPSR) included stolen and written-off status as core information in addition to the ownership and financing details about a motor vehicle. At the NMVTRC'S instigation in 2016 the PPSR introduced significant enhancements to help users interpret

[2] The most recent audits conducted in 2018 resulted in the development of further guidance for assessors in examining roof and rear pillar damage.

key information including the type of incident a vehicle was involved in and the severity of damage sustained. The PPSR processes more than 9 million motor vehicle checks per annum.

To assist insurers, the NMVTRC (in collaboration with AustRoads) developed an on-line registration data validation service (Vehicle Information Request System VIRS) to mitigate fraud risks. VIRS commenced operation in late 2010 and by the end of 2019 a redeveloped service is assisting insurers with more than 46 million vehicle checks per annum.

2.3 Diverting young offenders

High rate vehicle theft has been shown to be a strong indicator of a young person's likely involvement in other forms of crime. Car crime also kills; with more than 60 theft-related fatalities across Australia in the past five years. Half of those deaths were young people between the ages of 10 and 21. Most resulted from a combination of excess speed, drugs and alcohol. Five were associated with an active police pursuit.

For these reasons, the NMVTRC remains an advocate for the expert design and delivery of diversionary programs for young motor vehicle theft offenders based around technical training and the development of trade skills.

In addition, the NMVTRC developed a best practice model for effective diversionary programs for juvenile motor vehicle theft offenders, based on review and evaluation of various motor vehicle theft reduction projects in the UK and Australia, including Hand Brake Turn and Street Legal.

Following the development of the Best Practice Model Program for Young Offenders, U-Turn Tasmania opened in 2003. The program, which aimed to divert young people away from the criminal justice system through teaching life skills, successfully operated as a partnership between the NMVTRC, the Tasmanian Government and Mission Australia for over a decade and made a difference to the lives of over 500 young people and their families over this time.

Synergy Repairs (SR), the NMVTRC's joint venture with Mission Australia and the Suncorp Group was officially opened in May 2014. A social enterprise, SR aims to divert young offenders away from car crime by delivering on-the-job technical training, work experience and support to young car crime offenders. Since opening its doors SR has affected more than 3,000 customer repairs and placed more than 50 participants in trade apprenticeships.

In 2018/19, the NMVTRC commenced discussions with government in respect of possible procurement options for replication of the Synergy Repairs model in South Australia and Queensland. It is anticipated that a co-design procurement process could commence with Queensland in FY2021.

Over the past few years there has been a rise in the use of violence during motor vehicle thefts by some young offenders. In view of this, the NMVTRC engaged the expert assistance of Swinburne University's Department of Psychological Sciences, to conduct research into young car crime offender behaviour in Victoria. The primary focus of the research is to identify the factors that have led to the current offending cohort's propensity for violence when stealing or attempting to steal a motor vehicle and to inform the development of appropriate interventions to minimise the likelihood and harm of related offending.[3] The report includes the views of the young participants themselves on what could have been done differently to curtail their trajectory into related crime.

The NMVTRC also maintains resources for educators and others working with young people in their late primary and early secondary school years to promote a discussion about the serious legal and life consequences of becoming involved in vehicle crime. The Choose a Ride suite of materials links directly to the Australian Curriculum with a focus on the general capabilities of Ethical Understanding and Personal and Social Competence.

2.4 Building stakeholder/community capacity and encouraging innovation

The works undertaken in this program cover:

- community education and awareness initiatives;
- trials/tests of new technology and approaches to emerging threats; and
- data collection and analysis.

This program is aimed at reducing both short-term and profit-motivated theft.

[3] NMVTRC Theft Torque, Issue 59, July 2019

2.4.1 Community education and awareness initiatives

The following initiatives have been undertaken over the past five years:

Operation Bounce Back is the NMVTRC's public education-based program aimed at harnessing the efforts of local government and police to raise community awareness of vehicle theft and effective prevention measures in theft 'hotspots' nationally. The NMVTRC provides grants valued at $15,000 to participating municipalities. Over the past five years, 43 municipalities have participated, with most producing significant reductions in vehicle theft.

Car Security Begins at Home is an NMVTRC produced series of cinema and television advertisements to raise awareness of the growing incidence of car theft via house burglary. The advertisements commenced in 2015 and have been used in specific campaigns in the ACT and have formed a core part of Operation Bounce Back packages.

The Northern Territory has a very different built and climatic environment that local stakeholders argue requires a different approach to the populous east coast. The NMVTRC therefore worked with TIO Insurance and NT Police to develop specific resources for the NT. The "*Don't be the one caught out*", *"It's not worth the risk"* and *"Car security begins with you"* campaigns carried a customised NT message and ran between 2015 *and* 2019.

The good practice guide *Tackling Vehicle Crime for Local Communities Guide* was reviewed in 2015 with input from 22 municipalities that resulted in improvements to reflect the changing nature of vehicle crime via access to keys and more detailed information on CAR-SAFE resources and statistical tools.

Australia's Most Wanted was revamped in 2016 as an on-line resource with the campaign aimed at raising community awareness of the makes and models of vehicles most commonly targeted for short-term and profit-motivated theft across the country.

2.4.2 Trials/tests of new technology and approaches to emerging threats

Smart phone app & GPS tracking device

The trial of a low-cost vehicle tracking device linked to a theft alert application on smart phones was developed in 2014 in conjunction with WA Police and RAC Insurance. In 2017, this has been followed by the provision of a free tracking device to 1,000 high-risk vehicles in Victoria.

Autowatch Ghost aftermarket immobiliser

The NMVTRC formed a collaborative alliance with IAG's Research Centre (IAGRC) in 2018 to ensure that it could keep ahead of technological advances in vehicle architecture and e-theft methods. The partnership provides the NMVTRC with access to expert advice on cyber security risks, the practical testing of select, aftermarket security devices and/or Original Equipment Manufacture security features.

The collaboration's inaugural evaluation was of the Autowatch 'Ghost' aftermarket immobiliser. The CAN bus immobiliser was assessed on a range of factors including its utility, security and tamper resistance, user friendliness, ease of installation and value for money. The final report provides consumers with independent advice to assist them in choosing the most appropriate aftermarket security for their vehicle.

Australasian Vehicle Crime Managers' Network (AVCMN)

The AVCMN, established in July 2013 by the NMVTRC, provides a secure forum in which agencies can share tactical and intelligence information in respect of organised car crime syndicates. This network enables senior law enforcement officers and lead investigators to share information on the changing nature of vehicle crime such as the growing incidence of residential burglaries to primarily steal motor vehicle keys and the rise in vehicle cloning and theft by fraud.

Australian Vehicle Crime Conference

In April 2017, the NMVTRC hosted the Australian Vehicle Crime Conference in conjunction with the Victoria Police and IAATI. The Conference brought together 240 representatives from policing and law enforcement, crime prevention, academia, general insurance, motor trades, local government and community sectors to review current national and local strategic and operational responses to vehicle crime.

ICA's Insurance Fraud Bureau

The NMVTRC participated in the Insurance Council of Australia's Insurance Fraud Bureau in recognition that some vehicle thefts are in fact fraudulent claims against insurers.

2.4.3 Data collection and analysis

In 1999, the NMVTRC engaged the South Australian Attorney Generals Department to establish the national theft database. The Comprehensive Auto-theft Research System (CARS) database now contains more than 641 million records of vehicle data sources from police, registration, insurance and automotive intelligence data providers and has transformed over time from a rearward looking statistical database to a predictive investigative tool used by police services nationally.

A number of improvements have been made since 2016 to facilitate better data utilisation:

- inclusion of market segment profile tool to explore passenger light commercial (PLC) market segments and discover Glass's Guide to estimated vehicle values and top theft targets;
- inclusion of age profile tool to analyse PLC age profile of thefts and registrations across each State and Territory;
- impact of a motor vehicle's colour on theft rates;
- inclusion of a vehicle recovery filter on restricted dashboards for NSW, NT, QLD, Victoria and WA Police;
- deep analysis of vehicle crime trends in the Northern Territory;
- interactive Theft Watch;
- development of weekly and monthly intelligence reports for select police services;
- capture of Victorian number plate theft data;
- provision of in-house training of the expert data services and web tools for police authorities in NSW, NT, Victoria and WA.

The CARSAFE website had more than 100,000 unique visits and law enforcement use of restricted services increased 32 per cent.

The Vehicle Information Request System established by Austroads (with assistance from vehicle manufacturers and the NMVTRC) allows insurers to validate non-personal data (including VIN, make, model, year, stolen and written-off status) direct from the national registration system as a fraud mitigation tool.

In 2018, that system was redeveloped as part of a range of new commercial applications now approved by Austroads to access non-personal registration data based on a link between the vehicle's registration plate and its VIN. In 2018/19, approved information broker MotorWeb delivered more than 46 million vehicle status checks to insurers via its Auto Report and Auto Report Plus services.

2.5 NMVTRC Costs

The costs of NMVTRC programs and operations for the last 5 years and forecasts for the next 5 years are shown in Table 1. The lower expenditure from 2015/16 reflects the withdrawal of government financial support from Queensland in 2011 and Victoria in the financial year 2015/16[4]. Queensland re-joined in 2019/20 and it is assumed that Queensland will continue to provide government financial support during the five forecast years.

Table 1: NMVTRC Program and Operating Costs, 2015/16 to 2024/25 ($'000)

Year	DSPM	DVLM	DYO	BCEI	Corporate	Total
2015/16	146	151	161	394	671	1,523
2016/17	146	178	173	556	812	1,865
2017/18	155	217	377	412	821	1,983
2018/19	187	179	454	304	827	1,951
2019/20	226	169	334	795	832	2,357
2020/21	409	179	267	821	849	2,525
2021/22	374	374	283	645	849	2,525
2022/23	374	374	283	645	849	2,525
2023/24	374	374	283	645	849	2,525
2024/25	374	374	283	645	849	2,525

DSPM = Disrupting Separated Parts Market, DVLM = Disrupting Vehicle Laundering Markets, DYO = Diverting Young Offenders, BCEI = Building Stakeholder/Community Capacity and Encouraging Innovation.

2.6 Costs borne by other parties

Some of the projects of the NMVTRC require other parties to invest costs for their success. These projects include identification (labels and microdots), written-off vehicles and sponsoring young offender programs. The costs of these projects are summarised in Table 2 below.

Table 2: Costs to Others arising from NMVTRC Programs, 2015/16 to 2024/25 ($'000)

Year	Vehicle Identification	Written-off Vehicles	Young Offenders	Total
2015/16	1,772	1,971	451	4,194
2016/17	1,646	2,956	361	4,963
2017/18	1,833	2,956	239	5,028
2018/19	1,668	985	222	2,875
2019/20	1,349	985	320	2,654
2020/21	1,324	985	480	2,789
2021/22	1,339	985	480	2,804
2022/23	1,354	985	480	2,820
2023/24	1,370	985	480	2,835
2024/25	1,385	985	480	2,851

[4] A consequence of reduced government funding is a matched reduction in insurance contributions, i.e. overall funding is 50/50 shares.

2.6.1 Vehicle Identification

This section provides a breakdown of the vehicle identification costs from Table 2 into the costs associated with the installation of secure labels and microdots.

The secure labels, produced by Identitek, now being fitted to many imported motor vehicles are estimated to cost in the order of $1.80 per label more than the labels they are replacing (excluding GST). This is the same nominal cost used in the last three reviews reducing the cost in real terms. The costs in the last five years and the forecasts in the next five years are shown in the first column of Table 3.

The use of the microdot technology has declined from 53,000 in 2017/18 to 27,500 in 2019/20. The 2017 review forecasted zero installations as it was understood at the time that the only manufacturer fitting microdots was likely to cease doing so upon expiration of its contract with the supplier of microdots. Again, there is some uncertainty as to whether the manufacturer will continue with using microdots. However, at this time it continues and in the absence of advice to the contrary, it has been decided to include the microdot installations in the forecasted period. All of the current and future microdot installations cost $17.50 per vehicle. The costs in the last five years and the forecasts in the next five years are shown in the second column of Table 3.

- The assumptions made in making the forecasts for the costs associated with secure labels and microdots are that:
- new passenger vehicle sales will grow at 1.1 per cent per year. This is the long-term growth rate over the past 25 years which is lower than the 1.9 per cent growth rate used in the 2017 review; and
- sixty-five per cent of new passenger vehicles will be fitted with secure labels.

The long-term growth rate for new passenger vehicles has been used due to the exceptional circumstances experienced in 2019/20. The Covid-19 pandemic had a devastating impact on new passenger vehicle sales. If the annual growth rate for new passenger vehicles sales had been used for the last five years or last ten years, the annual growth rate would have been -5.4 per cent and -1.2 per cent respectively. The forecast period does not anticipate a continual decline in new passenger vehicle sales and hence the long-term growth rate has been applied. The forecast is used solely for the purposes for estimating the costs associated with the installation of secure labels and is not to be used for market guidance.

The proportion of new passenger vehicles fitted with a secure label has fluctuated from 49 to 84 per cent over the past five years and the average of 65 per cent has been used for the forecast period.

Table 3: Costs to Others for Identification Projects, 2015/16 to 2024/25 ($'000)

Year	Labels	Microdots	Total
2015/16	1,072	700	1,772
2016/17	806	840	1,646
2017/18	905	928	1,833
2018/19	1,073	595	1,668
2019/20	868	481	1,349
2020/21	837	487	1,324
2021/22	847	492	1,339
2022/23	856	498	1,354
2023/24	866	504	1,370
2024/25	876	509	1,385

2.6.2 Management of written-off vehicles

The changes to the WOVR and the revised damage criteria were introduced progressively between 2012 and 2015. In the 2017 review, the expected costs and benefits were included with some adjustments for changes in price levels and their timing. The same broad approach is used here with:

- the costs and benefits indexed using the CPI;

- the exclusion of New South Wales as it has prevented the use of any written-off vehicles for repair since January 2011;
- an adjustment downwards in the theft savings to reflect the omission of Queensland and Victoria in the theft forecasts; and
- the pattern over time allowing for a transitional phase followed by forecasts of the reduction in stolen vehicles.

The three components to the WOVR costs in Table 2 are:

- the changes in the returns from salvage vehicles to insurance companies;
- loss of profits to auction houses due to fewer salvage vehicle sales; and
- reduced vehicle inspection costs to States/Territories.

2.6.3 Young Offenders

The costs in Table 2 relate to the funding of Synergy Repairs. In the past, the NMVTRC has made substantial financial contributions to the establishment and ongoing costs to support the training of repeat offenders. The NMVTRC expects these training programs to transition to a blended funding model comprising repair income, a participating insurer annual subscription and a government contribution based on the successful placement of trainees in employment (or a return to the education system). The NMVTRC expects its direct financial contributions to cease by the end of 2020. Its involvement in any new start-ups in other jurisdictions is expected to be limited to advisory, advocacy or evaluation services. It is expected that the Qld and SA Government may seek to establish new enterprises by 2022.

2.6.4 Other projects

No costs are included for the fitting of immobilisers currently or in the future as part of Immobilise Now!. It is estimated that about 93 per cent of the fleet in 2019 is now fitted with immobilisers and the majority is due to the ADR requiring new vehicles to be fitted with immobilisers. The focus of Operation Bounce Back in partnership with local government has changed to key safeguarding rather than retro-fitting immobilisers.

No costs are included for other agencies for any of the more general community education and awareness programs supported by the NMVTRC. There are likely to be some costs incurred by agencies, particularly local governments, which are involved in Operation Bounce Back. The NMVTRC often seeks input from community, industry and government bodies more broadly to ensure that programs are well directed to their target audiences; costs of these contributions are also not included.

No costs are included for the investigating bodies that are encouraged and supported by the NMVTRC. This assumes that investigation of stolen vehicles would continue with or without action by the NMVTRC.

2.7 Summary

The costs of the programs have been allocated to profit-motivated theft and short-term theft as shown in Table 4 for the purposes of the cost-benefit analysis. This introduces some inaccuracy as all the costs of the Building Stakeholder/Community Capacity and Encouraging Innovation program are allocated solely to short-term theft.

The NMVTRC is responsible for 27 per cent of the costs of motor vehicle theft reform and is forecast to rise to 47 per cent. This is primarily due to other people and agencies incurring lower costs with the WOVR's revised damage criteria. Accordingly, other people and agencies are responsible for the remaining 73 per cent of costs and are forecast to decline to 53 per cent.

For 2019/20, short-term theft incurs 17 per cent of NMVTRC costs, and profit-motivated theft 48 per cent (the remaining 35 per cent is NMVTRC corporate costs jointly incurred by both types of theft). These shares vary from year to year but overall reform expenditure has been concentrated more on profit-motivated theft than short-term theft.

Table 4: Estimated & forecasted costs of vehicle theft reform, 2015/16 to 2024/25 ($'000)

Year	Reduce Profit Motivated Theft			Reduce Short Term Theft			NMVTRC Corporate	Grand Total		
	NMVTRC	Others	Total	NMVTRC	Others	Total		NMVTRC	Others	Total
2015/16	296	3,743	4,039	555	451	1,006	671	1,523	4,194	5,717
2016/17	324	4,602	4,926	729	361	1,090	812	1,865	4,963	6,828
2017/18	373	4,789	5,162	789	239	1,028	821	1,983	5,028	7,011
2018/19	367	2,653	3,020	758	222	980	827	1,951	2,875	4,827
2019/20	396	2,334	2,730	1,130	320	1,450	832	2,357	2,654	5,012
2020/21	588	2,309	2,897	1,088	480	1,568	849	2,525	2,789	5,314
2021/22	748	2,324	3,072	929	480	1,409	849	2,525	2,804	5,329
2022/23	748	2,340	3,087	929	480	1,409	849	2,525	2,820	5,345
2023/24	748	2,355	3,102	929	480	1,409	849	2,525	2,835	5,360
2024/25	748	2,371	3,118	929	480	1,409	849	2,525	2,851	5,376

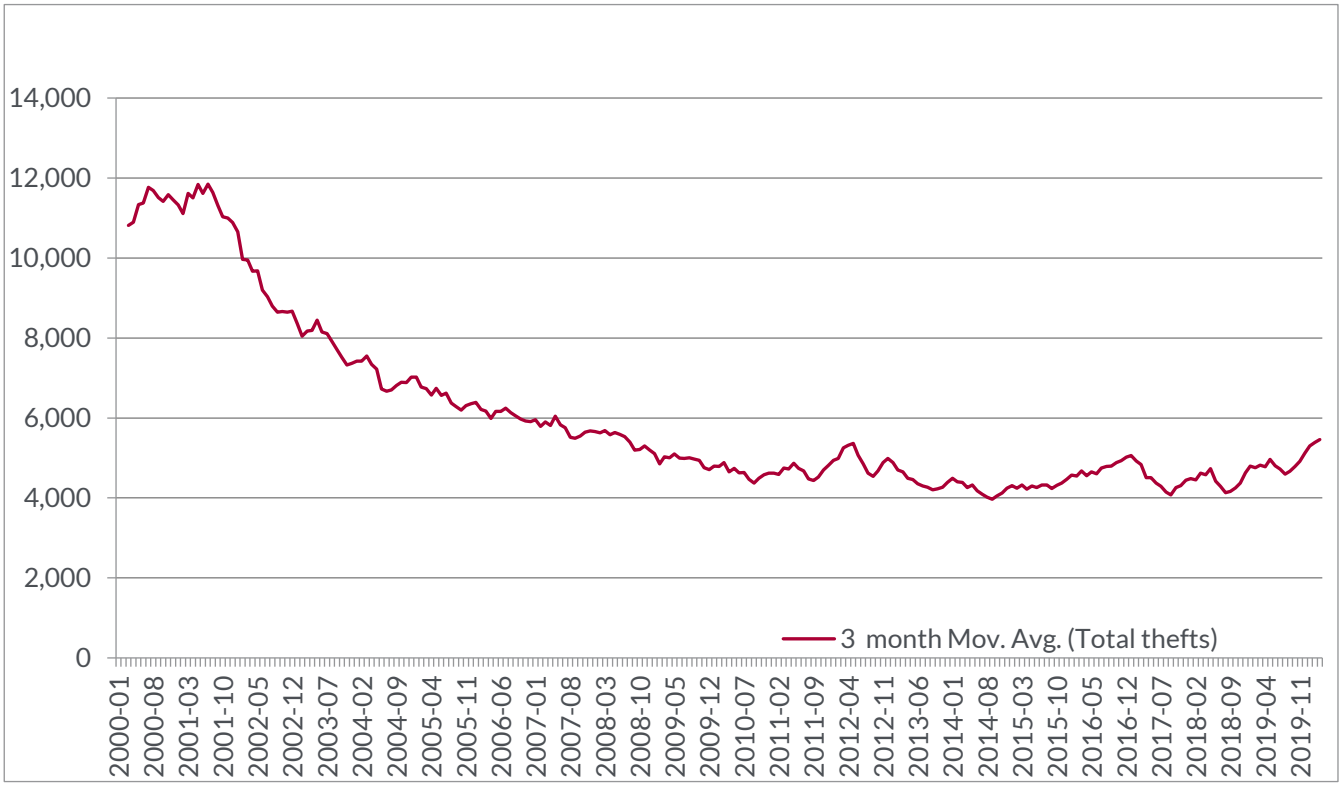
3. Motor Vehicle Theft

This chapter presents the results of the analysis of changes to the level of motor vehicle theft. The main aim of the analysis is to determine the size of any reduction and how much of that reduction could reasonably be attributed to the work of the NMVTRC. The analysis follows that undertaken for previous reviews, with some variations due to recent stolen vehicle activity, membership of the NMVTRC and NMVTRC programs.

3.1 The level of motor vehicle theft

The CARS service collects and analyses motor vehicle theft data provided by State and Territory Police. A complete data set exists from January 2000, 9 months after the establishment of the NMVTRC in March 1999. Figure 1 shows that the number of stolen vehicles has been subject to a dramatic fall since 2001 until 2011 when there was a more variable pattern and no sustained decrease overall. The peak number of thefts was around 12,000 stolen vehicles per month compared with the current number in the order of 5,600; a reduction of about 6,400 per month or 53 per cent.

Figure 1: Total motor vehicle thefts, 3 month moving average, Jan 2000 to Mar 2020, Australia

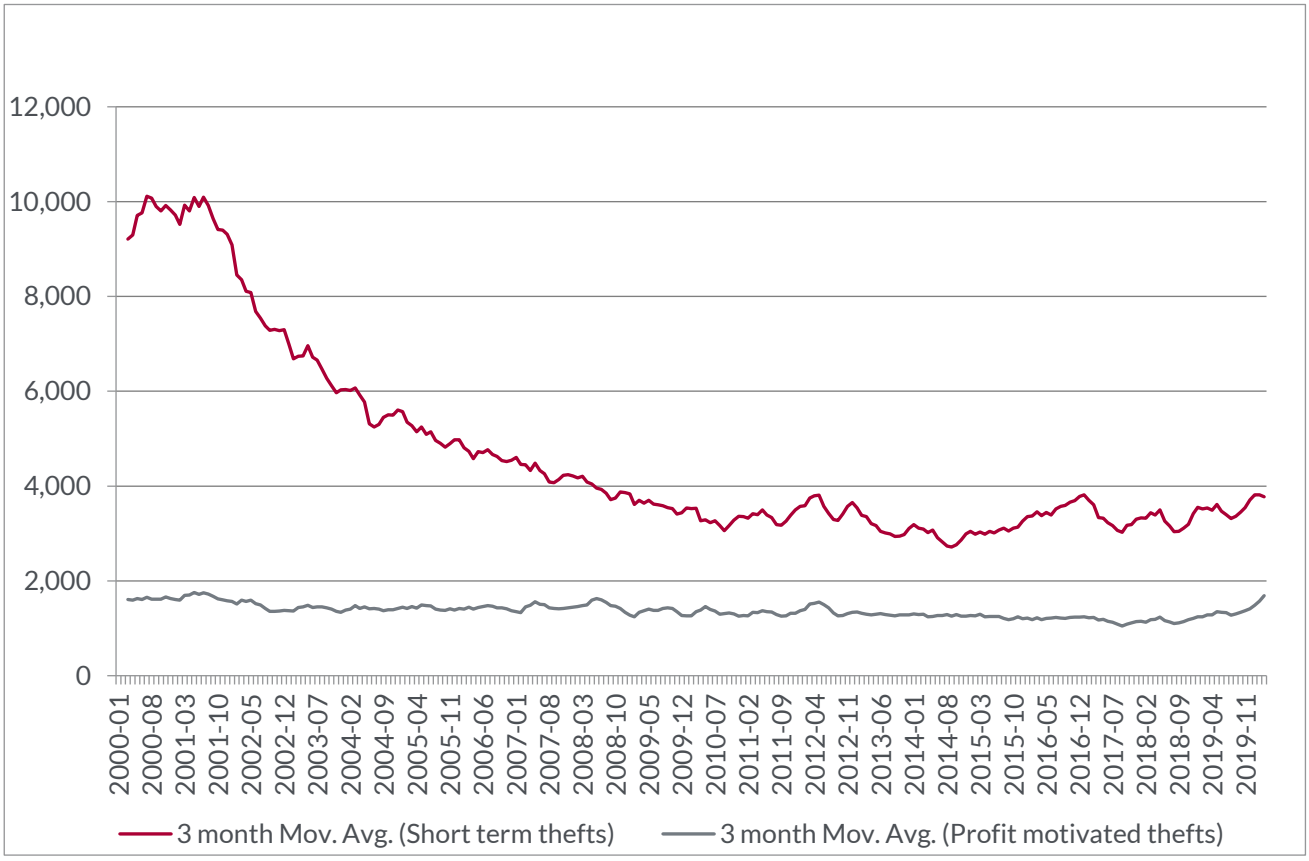


New South Wales has accounted for 51 per cent of the reduction in motor vehicle theft over the past twenty years followed by Victoria with 24 per cent. While most jurisdictions had motor vehicle theft reductions ranging from 50 per cent to 76 per cent from 2000 to 2020, Queensland had the lowest reduction with 13 per cent. In terms of the most motor vehicle thefts, Queensland has surpassed New South Wales and if the current trend is maintained is likely to surpass Victoria in the next few years.

Figure 2 shows a breakdown of stolen vehicles into two categories:

- profit-motivated theft represented by the number of unrecovered vehicles; and
- short-term theft represented by the number of recovered vehicles.

Figure 2: Motor vehicle thefts by recovery status, Jan 2000-Mar 20202, Australia



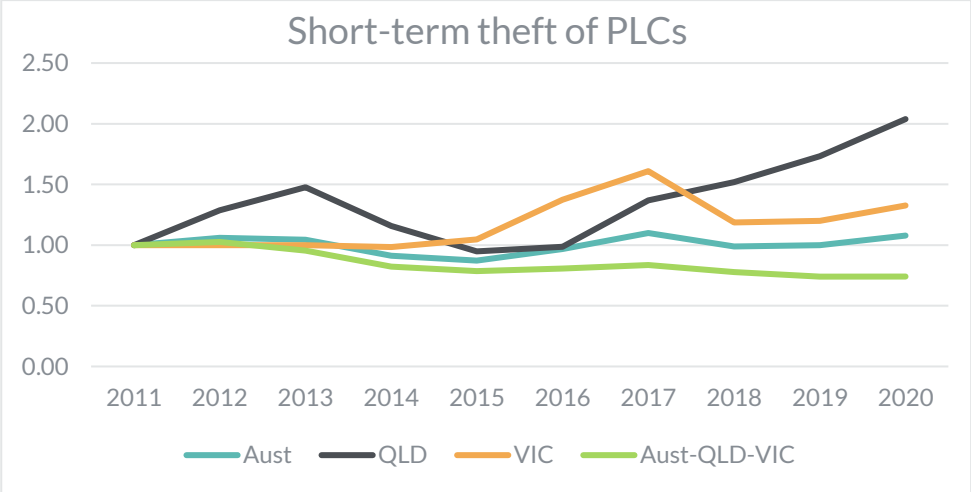
Short-term theft is currently 73 per cent of total theft (and was 86 per cent in 2000) so it is not surprising that its pattern closely follows that of all motor vehicle theft. The figure shows a decrease in 2001 which continued until the increases from 2015. Overall, there has been a 64 per cent reduction or 4.9 per cent per year. The trend rate of growth has decreased over time with the decrease being virtually zero in last several years.

While all jurisdictions have had short-term theft reductions, the following jurisdictions have made noticeable contributions to the national total:

- New South Wales reduced its share of the national total from 38 per cent to 20 per cent.
- Queensland increased its share of the national total from 13 per cent to 28 per cent.
- Victoria increased in its share of the national total from 26 per cent to 28 per cent.

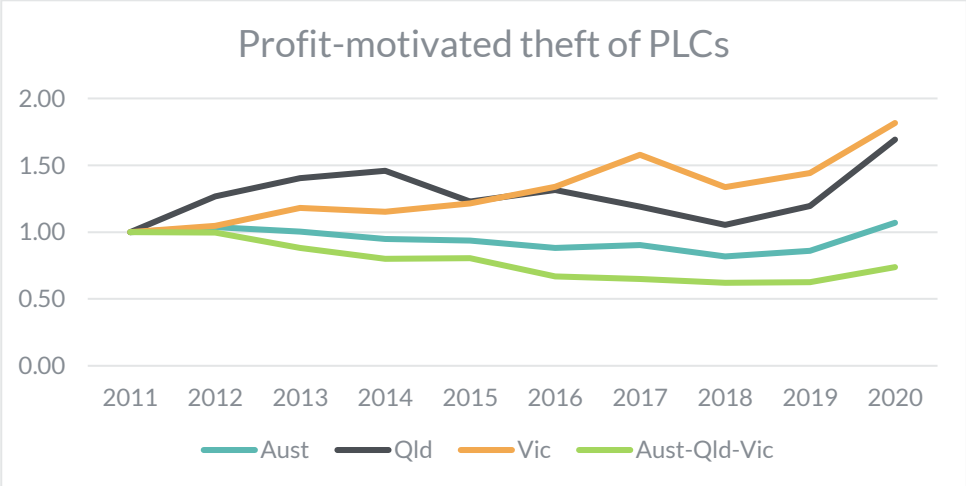
Profit-motivated theft is currently 27 per cent of total theft (and was 14 per cent in 2000). There has been a 17 per cent reduction or 0.9 per cent per year. However, since 2015 there has been a 1.6 per cent increase in profit-motivated theft.

The following charts show the rate of change in the thefts since 2010/11. This is achieved by setting 2010/11 to "1" for each State/Territory or combinations thereof, and calculating values relative to it for subsequent years. The charts clearly show the significant relative increases in the number of stolen passenger and light vehicles (PLCs) in Queensland and Victoria.

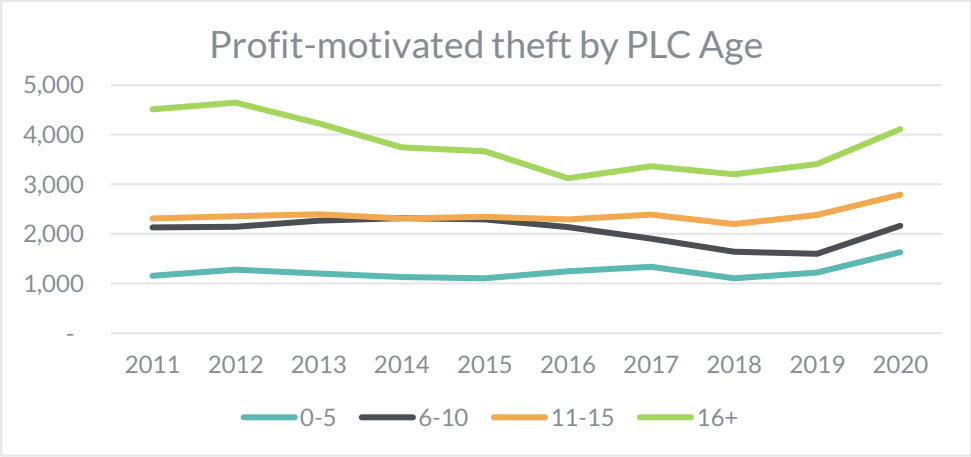


The trend line for short-term theft is reversed when the Queensland and Victorian figures are removed (AUS-QLD-VIC) and compared with the Aust figures in the top chart. The growth rate for Queensland, in particular, has doubled from 2011 to 2020.

Similarly, for profit-motivated theft the relative growth rates for Queensland and Victoria are significantly above the growth rates nationally (Aust). The trend line is reversed when the Queensland and Victorian figures are removed (AUS-QLD-VIC) despite the increase in profit-motivated theft from 2019.



The age distribution of PLCs stolen by criminals has changed in recent years. Up until 2015, the number in each of the age groups (other than vehicles 16+ years) did not change much over time. From 2015, there was a noticeable increase in new vehicles (0-5 years), perhaps reflecting the increase in stealing keys to steal immobilised vehicles. While there was a decrease in 2018, the increase for new vehicles has grown from 2019.



There was a substantial decrease in stolen PLC vehicles (6-10 years) from 2016 but the recent increases have seen a return to pre-2016 levels. Most of the decrease for this age group can be attributed to NSW. The combination of several measures including WOVR, the introduction of scrap industry legislation and the general capability and resourcing that the NSW Police Force has dedicated to the task have likely contributed to the decrease. It is too early to determine whether the recent increase is an aberration or whether criminals have found a loophole in the current legislative measures.

The trend line for older stolen PLC vehicles (11-15 years and 16+ years) has steadily increased from 2016. The NMVTRC considers that curtailing rebirthing via the WOVR and vehicle identification reforms has meant that criminals are targeting older vehicles to sell them as scrap metal. The introduction of scrap metal legislation in NSW (2017) and VIC (2018) appears to have had some impact with slight decreases in 2017 and 2018 before rising substantially in 2019 and 2020.

3.2 Correlation with other crime

Since 2001 motor vehicle theft and other property crime have decreased substantially. Arguably some of the motor vehicle theft reduction is due to factors other than specific programs aimed at reducing motor vehicle theft. Previous reviews have examined the growth rates in the various types of crimes and correlations between the numbers of crimes committed.

For the first time since 2001, property crime reductions are greater than motor vehicle theft reductions. From 2001, unlawful entry with intent (UEWI)) crimes declined by 60 per cent compared with 58 per cent for motor vehicle theft. Interestingly, the past three years have seen a steady reduction in UEWI crimes whereas motor vehicle theft has increased. In the 2017 review, motor vehicle theft had declined by 60 per cent compared with 57 per cent for UEWI crimes. This reduction in motor vehicle theft was 1.1 times more than the reduction in property crimes. This is no longer the case in 2020. In past reviews (2017 & 2014), when Queensland and Victoria were excluded, the reduction in motor vehicle theft was 1.2 times the reduction in property crime. However, by 2020, motor vehicle theft and property crime have both declined 67 per cent since 2001. However, this change has occurred primarily due to the spike in motor vehicle theft in 2020. The history of motor vehicle theft since 2001 shows that these spikes are short-lived, usually one year, before returning to a downward trend.

The correlation between motor vehicle theft and UEWI has also changed in recent years as shown below (detailed results are presented in Appendix B):

For the period 2001 to 2019, the correlation coefficient for short-term theft is 0.98 and for profit-motivated theft 0.86. The correlation coefficient for short-term theft is similar to previous reviews. However, the profit-motivated theft correlation has increased from 0.70 (2017 review). The 2014 review showed no relationship between profit-motivated theft and property crime. It is likely that the higher proportion of immobilised motor vehicles has led to criminals undertaking UEWI crimes to primarily steal the car keys from a household so that they can steal the immobilised motor vehicle.

Varying counting rules within police data systems do not necessarily automatically connect burglary/ vehicle data where the vehicle has been stolen in a burglary.

When the data is disaggregated by jurisdiction, short-term correlations are more similar than profit-motivated theft correlations. From 2001 to 2019, short-term correlations are all 0.84 or more except for the Northern Territory (0.26). For profit-motivated theft, three jurisdictions (QLD, WA & NT) had negative correlations and one jurisdiction (SA) was below 0.50.

The national results remain relatively strong for short-term theft although the results for individual jurisdictions vary due to the variable theft results. With respect to profit-motivated theft, there is also a strong national relationship with property crime.

The correlations that do exist are likely to be partly due to some outside factors affecting the movements in both theft and property crime, e.g. economic conditions. The correlation suggests some weight to outside factors relative to theft reduction measures, while the greater reductions in motor vehicle theft than UEWI up until 2017 (1.1 to 1.2 times) suggest specific measures aimed at motor vehicle theft reduction have some independent effect.

3.3 Effects of reform programs

As stated in previous reviews, the effects of specific motor vehicle theft reform programs or the overall reforms on levels of motor vehicle theft are not able to be determined. This still remains the case. The effect of the reforms instead is estimated from previous and on-going evaluations showing positive and significant effect on motor vehicle theft reduction but taking care to exclude other measures that have been implemented by some States and Territories independently of the NMVTRC.

3.3.1 Profit-motivated theft

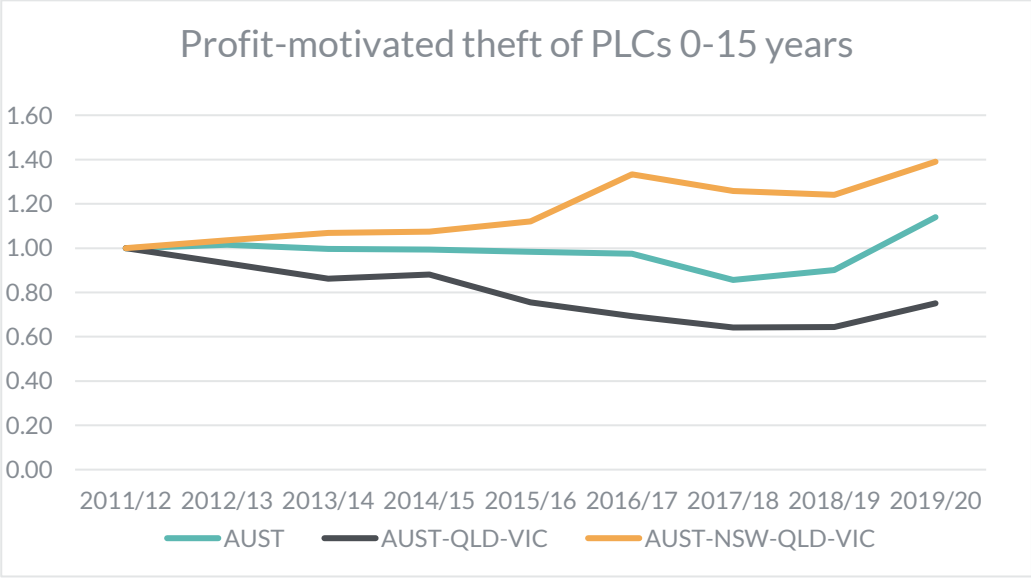
Improvements in vehicle identification are certain to reduce the likelihood of a vehicle being stolen for criminal purposes; if vehicles and vehicle parts can be traced then it follows that use for other purposes cannot occur. There is no analysis of the specific effects of secure labels but the NMVTRC estimated that the initial effect of microdots on theft was that fitted vehicles were at least 60 per cent less likely to be stolen and not recovered (profit-motivated theft) than non-fitted vehicles. Unfortunately, it is unlikely that microdots will be fitted to many more vehicles during the forecast period, with the share of the fleet remaining at about 7 per cent. A much higher proportion of the vehicle fleet, about 65 per cent, is expected to be fitted with secure labels.

A small, but transient, effect on profit-motivated motor vehicle theft occurred when WOVRs were introduced in each jurisdiction, starting in 1999. The size of the effect is difficult to determine because of the staggered implementation and the ability to transfer written-off vehicles between jurisdictions. Nevertheless, in the first two to three years following the introduction of the WOVR in each jurisdiction there were decreases in the number of stolen vehicles[5].

The reform of the management of written-off vehicles, implemented from September 2012 to May 2015, was expected to have a larger effect because the revised damage criteria meant that 30 per cent of written-off vehicles would no longer be able to be repaired and potentially used to rebirth stolen vehicles. In addition, national adoption of the reform means that vehicles cannot be easily transferred between jurisdictions.

The 2017 review acknowledged that the forecast reduction of 11 per cent[6] (later reduced to 10 per cent) appeared to remain too high. The CARS vehicle theft data for PLCs 0 to 15 years of age confirms the forecast reduction is too high. Figure 3 below shows at a national level, a reduction did not occur until 2017/18 and was short-lived. The exclusion of Queensland and Victoria would suggest that the reform exceeded the forecast reduction. However, New South Wales comprises most of the actual reduction and it is excluded from the forecast reduction as it has prevented the use of written-off vehicles for repair since 2011. When New South Wales is excluded along with Queensland and Victoria, the graph shows an actual increase in thefts other than in 2017/18 and 2018/19. This is primarily due to the increased thefts in Western Australia offsetting the reductions in the other jurisdictions.

Figure 3: Profit-motivated theft of PLCs 0-15 years, 2011/12 to 2019/20



The results shown in Figure 3 do not mean the reform has not been effective. In fact, an analysis of each jurisdiction reveal that the reforms did generate the expected forecast reduction, notably in the Australian Capital Territory and South Australia. Even in jurisdictions that showed no reductions five to six years after implementation, such as Victoria and Western Australia, there were considerable declines in the growth rate of vehicle theft but not enough to generate an overall reduction. In 2012/13, Victoria's theft growth rate declined from 21.9 per cent (2012/13) to 3.7 per cent in (2013/14). Similarly, Western Australia's theft growth rate declined from 15.7 per cent (2012/13) to 12.4 per cent (2013/14) and to 4.5 per cent (2014/15).

[5] In each jurisdiction (except Tasmania), for at least 3 years there was a decrease in the number of unrecovered stolen vehicles; in Tasmania there was an increase in the first year, then the numbers halved and remained approximately constant.

[6] NSW was excluded when this figure was estimated because it prevented the use of any written-off vehicles for repair in January 2011.

Similar to the introduction of the WOVR in 1999, the positive impact of the reforms to the damage criteria appear to only occur for several years with most jurisdictions having a greater number of thefts in 2019/20 than when the reforms were introduced progressively between 2012 and 2015.

As the WOVR and vehicle label requirements have made it difficult for criminals to rebirth stolen vehicles, they have turned to stealing vehicles older than 15 years where there are no identity and other regulatory requirements for the vehicle or the person selling the vehicle to the scrap dealer. Several states have introduced legislation to combat this growing trend. The New South Wales Scrap Metal Industry Act 2016 became effective from March 2017. Victoria's amendment to the Second Hand Dealer Act became effective from March 2018.

Table 5 below shows the number of stolen PLC vehicles (>15 years) following the introduction of legislation. Stolen vehicles in New South Wales declined by 1.4 per cent in the first year and 5.6 per cent in the second year before rising in the subsequent years. Whereas Victoria had an 11.8 per cent reduction in its first year with increases in subsequent years. It is noteworthy that both jurisdictions had reductions, albeit short-lived, when other jurisdictions ((AUS-NSW-VIC) had increased vehicle theft during this period.

Table 5: Profit-motivated theft, > 15 years of age, 2015/16 to 2019/20

Year[1]	NSW	Per cent Change pa	Vic	Per cent Change pa	AUS-NSW-VIC	Per cent Change pa
2015/16	883				1,203	
2016/17	871	-1.4	1,182		1,313	9.1
2017/18	822	-5.6	1,043	-11.8	1,338	1.9
2018/19	872	6.1	1,091	4.6	1,444	7.9
2019/20	998	14.4	1,296	18.8	1,815	25.7

It is also worth looking at stolen PLC vehicles 0-15 years following the introduction of legislation in New South Wales and Victoria. As can be seen in Table 6, in New South Wales stolen vehicles declined 21.6 per cent in the first year and 8.6 per cent in the second year before rising in subsequent years. In Victoria stolen vehicles declined 16.4 per cent in the first year before rising in subsequent years. However, stolen vehicles in other jurisdictions (AUS-NSW-VIC) also declined by 10.8 per cent.

Table 6: Profit-motivated theft, 0- 15 years of age, 2015/16 to 2019/20

Year[1]	NSW	Per cent Change pa	Vic	Per cent Change pa	AUS-NSW-VIC	Per cent Change pa
2015/16	1,991				1,985	
2016/17	1,561	-21.6	2,036		2,035	2.5
2017/18	1,427	-8.6	1,703	-16.4	1,816	-10.8
2018/19	1,453	1.8	1,868	9.7	1,880	3.5
2019/20	1,743	20.0	2,423	29.7	2,416	28.5

It is still too early to assess the full impact of this legislation as the latest year of data (2019/20) will decline over time as some of the profit-motivated vehicle thefts are recovered. Other jurisdictions such as Western Australia and South Australia are currently considering introducing legislation.

The introduction of the Vehicle Information Request System (VIRS) which enables insurers to access vehicle information and status through registration systems is also likely to make it more difficult for criminals to rebirth stolen vehicles. This reform is part of the continued development of improved vehicle identity, access to national registers and promotion of inter-agency cooperation in preventing criminal behaviour by the NMVTRC.

3.3.2 Short-term theft

Many of the programs initiated and/or sponsored by the NMVTRC have had or are expected to have a significant effect on the level of short-term motor vehicle theft.

Engine immobilisers have played a major role in reducing motor vehicle theft. The latest CARS data suggest that vehicles without an immobiliser fitted are 2.3 times more likely to be stolen compared with vehicles fitted with an immobiliser. This

rate (measured as the number of stolen vehicles per 1000 registered vehicles) is less than the 2.6 times recorded in 2017, prior to which it had fallen from 3.8 times in 2009. This provides some indication that the key security message promoted by the NMVTRC is working. Although the majority of the benefit of vehicle immobilisation is attributable to the requirements for new cars to be fitted with immobilisers and not the direct action of the NMVTRC, it has been a strong proponent of policies and actions to increase immobilisation since its inception.

Over the past decade, the proportion of the Australian fleet with immobilisers has grown from 72 per cent (2009) to 93 per cent (2019) (70 to 92 per cent respectively when Western Australia is excluded) and this has helped to underpin the continued decline in short-term vehicle thefts, particularly when Queensland and Victoria are excluded.

The Synergy Repairs program became operational in June 2014 and performs at a high level in terms of imparting life skills and providing employment pathways: over 50 per cent of participants completed their courses, and of those that did, over 80 per cent obtained employment. It is also thought that this program is curtailing recidivism, but figures are currently unavailable. As these programs are aimed at repeat offenders, there should be a positive effect on reducing short-term motor vehicle theft. The CARS data shows a 26.2 per cent decline in PLC thefts (vehicles of all ages) in 2017/18. This is substantially more than other jurisdictions for that year. It is unlikely that the program was the primary factor for the decline but it has probably contributed along with other programs such as community education initiatives such as Operation Bounce Back (OBB).

OBB has been subject to formal evaluations by the NMVTRC since 2007 to ensure that the program is operating efficiently and to assess its effects. The focus of the program shifted from encouraging the installation of immobilisers to safeguarding car keys and other theft prevention strategies in recognition that the majority of vehicle thefts occurs as a result of the thief stealing the car keys during a home burglary.

Since 2016/17 forty-six OBB projects have been undertaken. However, 18 of these projects have been postponed due to the impacts of the COVID-19 pandemic. Of the other 28 projects, 18 or 64 per cent achieved theft reductions with a combined reduction of 749 vehicles. By contrast, the 2017 review showed 80 per cent of the 75 projects achieved theft reductions with a combined reduction of 3,420 vehicles.

3.4 Theft reduction estimates and forecasts

In this section, the basis of the theft reductions is outlined for profit-motivated theft and short-term theft. The theft reduction estimates for profit-motivated theft is confined to PLCs given that these vehicles comprise most of the professional vehicle crime whereas short-term theft includes all stolen vehicle classes.

The purpose of the forecasts is to determine the annual reduction of stolen vehicles and the proportion of the annual reduction that can be attributed to the NMVTRC. This data is then incorporated into the cost-benefit analysis and shown later in section 5. The total number of stolen vehicles forecasted for each year does not have a bearing on the cost-benefit analysis.

As per previous reviews, the theft reduction estimates and forecasts cover the next five years. The last five years of actual theft data is included to provide a balanced approach to the evaluation of the economic benefits. The theft data are shown in financial years (12 months from April in one year to March in the next year). This convention is adopted to enable the latest data (March 2020) to be used.

The forecasts do not include Queensland. The forecasts are used in estimating the contribution of the NMVTRC to reducing vehicle theft. If jurisdictions are not fully participating in NMVTRC processes then what happens in them cannot be attributed to the NMVTRC. Queensland was not a participant from 2011 to 2019.

3.4.1 Profit-motivated theft

As can be seen in Table 7 (overpage), the downward trend in stolen PLCs less than 15 years of age in all of the States and Territories has reverted to a 0.3 per cent increase in the latest period. By comparison, when Queensland is excluded, there have been decreases in all periods, albeit a lower decrease of 0.6 per cent in the latest period. For PLCs that a more than 15 years of age, there are decreases in all periods shown with a significantly lower decrease of 0.7 per cent in the latest period.

Table 7: Changes in the Profit-motivated theft of PLCs, 2000/01 to 2019/20 (per cent)

Years	PLCs <15 Years All States & Territories	PLCs < 15 Years Excluding QLD	PLCs > 15 Years All States & Territories	PLCs > 15 years Excluding QLD
2000/01 to 2005/06	-7.0	-6.1	-0.5	0.1
2000/01 to 2010/11	-5.0	-4.7	-2.1	-1.1
2011/12 to 2016/17	-0.4	-0.7	-4.8	-5.4
2008/09 to 2019/20	0.3	**-0.6**	-1.0	-1.9
2012/13 to 2019/20	1.5	1.1	-0.1	**-0.7**

The forecasts in Table 8 show the forecast trend change and the forecast revised damage criteria for written-off vehicles for Australia excluding Queensland. The forecast for the trend component is based on the annual growth rate of 0.6 per cent. This is higher than the 2 per cent reduction forecasted in the previous Review. Table 8 shows a total increase in thefts of 406 vehicles. This is lower than the reduction of 1,086 vehicles in the previous Review.

The written-off vehicles component is based on the reduction in profit-motivated theft estimated to occur as a result of changes to the written-off vehicle damage criteria. This is based on a full year decrease of 490 vehicles, one half of that used in the 2014 and 2017 reviews to reflect the fact that Queensland is not included. The decrease of 490 vehicles does not occur in any year as the damage criteria are not applied nationally.

The assumption that 80 per cent of the trend changes in profit-motivated theft are attributable to the work of the NMVTRC remains from the previous reviews. It is based on the comprehensiveness of its activities in this area, and the success of reform programs discussed in 3.3.1.

Table 8: Profit-motivated theft, PLCs less than 15 years of age, 2014/15 to 2024/25

Year[1]	Stolen[2]	Change pa	Attributable to NMVTRC[3]	Revised Damage Criteria	Trend plus Damage Criteria
2014/15	4,805				
2015/16	4,668	-137	-110	-196	4,472
2016/17	4,752	84	67	-294	4,458
2017/18	4,220	-532	-426	-294	3,926
2018/19	4,395	175	140	-98	4,297
2019/20	5,370	975	780	-98	5,272
2020/21	5,338	-32	-26	-98	5,240
2021/22	5,306	-32	-26	-98	5,208
2022/23	5,274	-32	-25	-98	5,176
2023/24	5,242	-32	-25	-98	5,144
2024/25	5,211	-31	-25	-98	5,113
Total reduction		+406			

Notes:
1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.6 per cent pa growth.
3. 80 per cent of the change in each year.
4. 40per cent reduction in 2015/16, 60 per cent reduction in the following two years and 20 per cent reduction from 2018/19.

Table 9 below shows the forecast trend change in Australia excluding Queensland and Victoria for PLCs more than 15 years old with a total increase of 71 vehicles. The forecast is based on the annual growth rate of 0.7 per cent. Similar to the approach taken to PLCs less than 15 years, 80 per cent of the reduction in thefts is considered attributable to the NMVTRC.

Table 9: Profit-motivated theft, PLCs more than 15 years old, 2014/15 to 2024/25

Year[1]	Stolen[2]	Reduction	Attributable to NMVTRC[3]
2014/15	3,178		
2015/16	2,633	-545	-436
2016/17	2,872	239	191
2017/18	2,718	-154	-123
2018/19	2,824	106	85
2019/20	3,365	541	433
2020/21	3,341	-24	-19
2021/22	3,318	-23	-19
2022/23	3,295	-23	-19
2023/24	3,272	-23	-18
2024/25	3,249	-23	-18
Total reduction		+71	

Notes:
1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.7 per cent pa growth.
3. 80 per cent of the change in each year.

3.4.2 Short-term theft

The short-term forecasts exclude Queensland theft data. As can be seen in Table 10 below, there have been steady increases since 2011 with a significant increase since 2015 for all States and Territories. However, when Queensland is excluded, there are similar decreases in most periods other than in the 2015/16 to 2019/20 period in which a decrease of 0.8 per cent was achieved.

Table 10: Changes in the Short-term theft of All Vehicles, 2000/01 to 2019/20

Year	All States & Territories	Excluding QLD
2000/01 to 2005/06	-13.0	-11.2
2000/01 to 2010/11	-10.5	-9.8
2011/12 to 2016/17	0.7	0.7
2015/16 to 2019/20	2.3	-0.8

Table 11 shows the actual number of stolen vehicles from 2014/15 to 2019/20 and the forecasts are based on a 0.8 per cent reduction from 2020/21. The forecast reduction is based on the actual reduction that has been achieved over the past five years. Notwithstanding this, the forecast annual reduction in stolen vehicles is not significant enough to offset the large theft increases in 2015/16 and 2016/17; and result in an overall increase in the theft of 533 vehicles. This is in stark contrast to the reduction of 7,608 vehicles in the previous Review.

In determining the proportion of the annual reduction of stolen vehicles that can be attributed to the NMVTRC, previous reviews have determined that 40 per cent of the reduction in short-term motor vehicle theft is independent of the NMVTRC's theft reduction measures based on the analysis in section 3.2.

An estimate is required for the amount of the remaining reduction (60 per cent) that could be attributable to the NMVTRC. The method used in previous reviews is to exclude reductions attributable to engine immobilisers fitted to new vehicles by using theft rates for immobilised and non-immobilised vehicles to calculate the number of stolen vehicles if all were stolen at the non-immobilised theft rate. The calculations use CARS data for the last five years, with the result that there would be an increase in the number of stolen vehicles of 40 per cent over the five years, an indicator of the importance of the NMVTRC key security education and publicity campaigns. This implies that 60 per cent of the remaining reduction could be attributed to the work of the NMVTRC. However, the previous Review took a conservative approach and resorted to using 40 per cent from the 2014 Review. This review will also adopt 40 per cent as the measure. Therefore, the analysis suggests that 24 per cent of the reduction in short-term theft is attributable to the work of the NMVTRC (i.e. 40 per cent of the 60 per cent attributed to theft reduction measures).

Table 11: Short Term Motor Vehicle Theft, All Vehicles, 2014/15 to 2024/25

Year[1]	Stolen[2]	Reduction	Attributable to NMVTRC[3]
2014/15	29,104		
2015/16	32,298	3,194	767
2016/17	34,888	2,590	622
2017/18	29,989	-4,899	-1,176
2018/19	29,544	-445	-107
2019/20	30,852	1,308	314
2020/21	30,605	-247	-59
2021/22	30,360	-245	-59
2022/23	30,117	-243	-58
2023/24	29,877	-241	-58
2024/25	29,638	-239	-57
Total reduction		+533	

Notes:
1. The year April to March.
2. Actual theft data is from 2014/15 to 2019/20 and then forecast based on 0.8 per cent pa growth.
3. 24 per cent of the reduction attributed to the NMVTRC.

4. Unit Costs of Stolen Vehicles

A reduction in motor vehicle theft has the effect of reducing costs to vehicle owners whose vehicles would otherwise have been stolen. Very little new data were available to estimate the unit costs reported below and these costs have been mainly resulted from indexing the values from the 2014 review. More details of the estimation process are provided in Appendix C.

The unit costs comprise four categories: vehicle damage or loss, personal, injury and insurance administration costs. The estimated unit costs are for passenger and light commercial vehicles (PLCs):

- Of all ages for short-term theft (recovered vehicles);
- 15 years of age or less for profit-motivated theft (unrecovered vehicles);
- More than 15 years of age for profit-motivated theft.

The costs are summarised in Table 12 for the three different categories of unit costs: short-term theft (all vehicles) and profit-motivated theft PLCs 0-15 years and PLCs more than 15 years. The unit cost of newer vehicles subject to profit-motivated theft (0 to 15 years of age) are significantly higher than for short-term thefts; this is partly because only PLCs under 15 years of age are included but mainly because the whole value of the vehicle is included as it will not be seen again in its original form. Older vehicles subject to profit-motivated theft have the lowest unit cost as one would expect.

Table 12: Unit Cost per Stolen Vehicle by Cost Component and Type of Theft

Cost Component	Short-term theft (All Vehicles)	Profit-motivated theft (PLCs 0-15 years)	Profit-motivated theft (PLCs > 15 years)
Vehicle damage or loss	$12,480	$17,330	$4,940
Personal	$1,730	$2,130	$2,130
Injury	$2,570	na	na
Insurance Administration	$520	$910	$910
Total unit cost	$17,300	$20,370	$7,980

The basis of the estimates for the vehicle damage or loss costs is the claims cost provided by insurance companies for the CARS database and analysis by CARS of the value of stolen vehicles using Glass's Guide. These costs were indexed using the CPI.

No new data were available to estimate personal costs. These costs were indexed from the 2017 Review costs using the CPI.

New data were available on fatalities involving stolen vehicles from the National Coronial Information System. The costs of all accidents (fatal and non-fatal) were indexed from the 2017 Review unit costs using the CPI and wage rate increases. The injury costs are only applied to recovered vehicles as it is less likely that professional thieves (profit-motivated theft) would be involved in road accidents compared with opportunistic thieves (short-term theft).

No new data were available to estimate insurance administration costs. These costs were indexed from the 2017 Review using the CPI.

Compared to the unit costs used in the 2017 Review, short-term theft increased by 9 per cent, profit-motivated theft 0-15 years by 10 per cent and profit-motivated theft >15 years by 27 per cent. Compared to the 2017 Review, the following variations to the individual cost components occurred:

- vehicle damage or loss costs increased by $1,350 for short-term thefts, by $1,770 for profit-motivated thefts 0-15 years of age and $1,630 for profit-motivated thefts > 15 years of age;
- personal costs increased by $40 for short-term thefts and by $60 for profit-motivated thefts;
- injury costs increased by $263 due to mainly to the costs associated with fatalities; and
- insurance administration costs increased by $20 for short-term thefts and by $30 for profit-motivated thefts.

5. Evaluation Results

This chapter brings together the estimates and forecasts of benefits and costs outlined in earlier chapters to estimate the net benefit of motor vehicle theft reform associated with the NMVTRC.

5.1 Analysis framework

The framework is described in detail in Section 1.3. In summary, the results required are the:

- benefits of motor vehicle theft reform; and
- performance of the NMVTRC in reducing motor vehicle theft.

Cost benefit analysis is the evaluation method used with an evaluation period of 10 years to cover the last 5 years and the future benefits of existing programs over the next 5 years, discounting of benefits and costs at 5 per cent per annum, and valuation of benefits and costs in current day price levels (June 2020).

The main evaluation criterion is the net present value (NPV) or the overall economic worth of motor vehicle theft reform (calculated by discounting the benefits minus the discounted costs). The benefit-cost ratio (BCR) or the discounted benefits divided by the discounted costs is also reported.

Only one option is formally assessed based on the forecasts of motor vehicle theft in Chapter 3. As a consequence, some tests and commentary on the reasonableness of assumptions/results are reported.

5.2 Benefits of theft reform

The estimated costs and benefits of the motor vehicle theft reform are shown in Table 13. The overall returns from the reduction of profit-motivated theft are larger than for short-term theft as measured by the NPV and BCR. This is in stark contrast to the 2017 Review where the reduction of short-term theft was larger than profit-motivated theft. Notwithstanding this, short-term and profit-motivated theft produced net costs of $72.5 million and $36.8 million respectively.

Table 13: Cost benefit Analysis Evaluation Results, discounted at 5 per cent

Indicator	Short-term theft	Profit Motivated Theft	All Theft
Present value of costs ($m)	10.2	41.8	58.5
Present value of benefits ($m)	(62.4)	4.9	(57.4)
Net present value ($m)	(72.5)	(36.8)	(116.0)
Benefit-cost ratio	-6.1	0.1	-1.0

The corporate costs of the NMVTRC cannot be uniquely attributed to either short-term or profit-motivated theft and are included only in the all theft total. As can be seen, the overall costs of motor vehicle theft reform exceed the benefits by $116 million dollars.

The benefits of profit-motivated theft comprise:

- ($17.5) million for the trend reduction in motor vehicle theft;
- $19.7 million for the damage criteria benefit; and
- $2.8 million for the stronger controls on the disposal of older PLCs as scrap.

The component costs and benefits in Table 14 show that the economic results are dominated by the increase in costs associated with vehicle damage and loss, with insurers bearing about twice as many of those costs as owners. The NMVTRC costs are about 30 per cent of the total costs, a significant increase since the 2017 review (20 per cent) and the 2014 review (8 per cent) due to the reduction in the costs to others mentioned above (immobilisers and damage criteria).

Table 14: Components of Costs and Benefits ($ million), discounted at 5 per cent

Component	Short Term Theft	Profit Motivated Theft	All Theft
NMVTRC costs	-7.0	-4.1	-11.1
Costs of others	-3.2	-25.0	-28.2
Written-off vehicle costs	na	-12.6	-12.6
NMVTRC Corporate costs	na	na	-6.6
Vehicle loss & damage/Insurer	-28.8	3.0	-25.9
Vehicle loss & damage/Owner	-16.2	-0.3	-16.5
Personal	-6.2	1.7	-4.5
Injury	-9.3	na	-9.3
Insurance Administration	-1.9	0.6	-1.3
NPV	**-72.5**	**-36.8**	**-116**
BCR	**-6.1**	**0.1**	**-1.0**

Insurers and vehicle owners are normally the main beneficiaries from motor vehicle theft reform. As would be expected, insurers and vehicle owners have borne most of the cost from the overall increase in motor vehicle thefts. Insurers incur costs from vehicle loss and damage and administration totalling $27.2 million. Vehicle owners also incur costs from vehicle loss and damage and personal costs totalling $21 million.

The analysis only covers the unit costs of stolen vehicles as a benefit of motor vehicle theft reduction. It is likely that there are other non-quantified benefits that would improve the economic worth of the options.

5.3 Performance of the NMVTRC

The NMVTRC's performance with respect to the reduction in motor vehicle theft is calculated as its costs relative to the reduction in motor vehicle theft. This measures how effective the NMVTRC has been in meetings its objective to reduce motor vehicle theft, either by expending resources itself or by encouraging others to do so. In practice, the only difference to the cost-benefit analysis is that costs incurred by others are excluded.

The performance of the NMVTRC is shown in Table 15 with the results again shown separately for short-term and profit-motivated theft and the corporate costs of the NMVTRC included in only the totals for all theft. The NMVTRC posted an overall return of -3.2 (BCR), which is considerably lower than that achieved in the 2017 Review (19.1). The return of 1.2 (BCR) for profit-motivated theft is impressive given the overall return of -3.2 (BCR). For the two types of theft, the comparisons with the 2017 Review show differences in performance as follows:

- For short-term theft, the NPV has declined by 145 per cent ($223.2 million) and the return (measured by the BCR) has declined by 136 per cent. Both benefits and costs have declined, with the former considerably lower than the latter.
- For profit-motivated theft, the NPV has declined by $138.8. million (99 per cent) and the return has declined from 37.5 to 1.2 (97 per cent).

Table 15: Performance of the NMVTRC, discounted at 5 per cent

Indicator	Short Term Theft	Profit Motivated Theft	All Theft
Present value of costs ($ m)	7.0	4.1	17.7
Present value of benefits ($ m)	(62.4)	4.9	(57.4)
Net present value ($ m)	(69.4)	0.8	(75.2)
Benefit cost ratio	-8.9	1.2	-3.2

5.4 Reasonableness of the results

As noted above, the economic results and the performance of the NMVTRC are quite different to the 2017 Review, especially with respect to short-term theft. The absolute size of benefits and NPVs are much smaller due to the significant decline in the total reduction of short-term thefts; 7,608 vehicles in the 2017 Review compared with an increase of 533 vehicle thefts in this review.

A conservative approach to the short-term theft forecasts is adopted by selecting:

- a low rate of growth based on past trends;
- the same share attributable to the NMVTRC, although the immobilisation data suggest that a higher share could be justified. The share would need to fall to 0.02 (from 0.24) for the costs to exceed the benefits.

As per the previous review, the theft reductions attributed to the damage criteria are reduced by about one half due to the non-participation of Queensland. The 80 per cent benefit share due to the work of the NMVTRC is retained. It would need to halve for the costs to exceeds the benefits.

5.5 Sensitivity Analysis

The above negative result is primarily driven by the theft data for 2015/16 and 2016/17; the two years that Victoria was not a member of the NMVTRC. For these years, short term theft increased 5,784 compared with 899 short term thefts (excluding Queensland & Victoria).

In view of this, a sensitivity analysis has been conducted to see the impact on the theft results under a range of different time periods and scenarios. The following time periods were selected: 10, 7, 5 and 3 years. These time periods were applied to three different scenarios: Australia, Australia excluding Queensland and Victoria, and Australia excluding Queensland.

Table 16 shows the costs, benefits, net benefits and benefit-cost ratio (BCR) for these scenarios. The BCR needs to be greater than 1 for the benefits to exceed the costs. The BCR for All Theft has been highlighted in bold. As can be seen, the impact of theft reform has been positive over 10, 7 and 3 years under all scenarios. Only Australia excluding Queensland and Victoria produced a positive BCR over 5 years. This is consistent with the increased levels of theft in 2015 and 2016 particularly in Victoria.

An identical exercise was undertaken to test the impact on the performance of the NMVTRC. As can be seen in Table 17, the NMVTRC has identical results but with higher BCRs.

Table 16: Evaluation Sensitivity Analysis: 10, 7, 5 & 3 years

	10 Years			7 Years			5 Years			3 Years		
	STT	PMT	All Theft	STT	PMT	All Theft	STT	PMT	All Theft	STT	PMT	All Theft
Australia												
Costs ($m)	36	45	88	10	35	51	6	30	39	3	16	22
Benefits($m)	112	54	167	67	47	114	(119)	36	(83)	32	6	38
Net Benefit($m)	77	9	79	58	12	64	(124)	6	(122)	28	(10)	16
BCR	3.1	1.2	**1.9**	6.9	1.3	**2.3**	-21.4	1.2	**-2.1**	9.2	0.4	**1.7**
Australia excluding QLD & VIC												
Costs ($m)	36	45	88	10	35	51	6	30	39	3	16	22
Benefits($m)	222	190	412	114	107	221	3	83	86	20	8	27
Net Benefit($m)	187	145	324	104	72	170	(2)	53	47	16	(8)	6
BCR	6.2	4.2	**4.7**	11.6	3.0	**4.4**	0.6	2.8	**2.2**	5.7	0.5	**1.3**
Australia excluding QLD												
Costs ($m)	36	45	88	10	35	51	6	30	39	3	16	22
Benefits ($m)	176	104	280	49	50	99	(50)	35	(15)	59	10	70
Net Benefits($m)	140	59	192	39	14	48	(56)	5	(54)	56	(6)	48
BCR	4.9	2.3	**3.2**	5.0	1.4	**1.9**	-9.0	1.2	**-0.4**	17.1	0.6	**3.2**

Table 17: Performance of the NMVTRC Sensitivity Analysis:10,7,5 & 3 years

	10 Years			7 Years			5 Years			3 Years		
	STT	PMT	All Theft	STT	PMT	All Theft	STT	PMT	All Theft	STT	PMT	All Theft
Australia												
Costs ($m)	9	5	22	6	3	16	4	2	13	3	1	6
Benefits ($m)	112	54	167	67	47	114	(119)	36	(83)	32	6	38
Net Benefit($m)	103	49	145	61	44	99	(123)	34	(95)	29	5	32
BCR	12.1	11.4	**7.7**	10.9	17.4	**7.3**	-29.9	20.4	**-6.6**	11.8	5.5	**6.0**
Australia excluding QLD & VIC												
Costs ($m)	9	5	22	6	3	16	4	2	13	3	1	6
Benefits ($m)	222	190	412	114	107	221	3	83	86	20	8	27
Net Benefit($m)	213	185	390	108	104	205	(1)	81	74	17	6	21
BCR	23.9	40.0	**19.1**	18.4	39.6	**14.0**	0.8	47.2	**6.9**	7.4	6.7	**4.3**
Australia excluding QLD												
Costs ($m)	9	5	22	6	3	16	4	2	13	3	1	6
Benefits ($m)	176	104	280	49	50	99	(50)	35	(15)	59	10	70
Net Benefits($m)	166	99	258	43	47	83	(54)	33	(28)	57	9	63
BCR	18.9	21.9	**13.0**	7.9	18.3	**6.3**	-12.6	19.9	**-1.2**	22.1	9.0	**11.0**

6. NMVTRC Funding Arrangements

The Terms of Reference requested an analysis of the impact of current fixed contributions on future operations. It noted the NMVTRC funding base and shares have remained at the $2.25 million level set in 1999. While this has assisted in strengthening the value proposition for government and insurance funders in the six reviews to date, it now poses major challenges in terms of program investment.

Using the Reserve Bank of Australia's Inflation Calculator, a basket of goods and services valued at $2.25 million in 1999 would cost $3.8 million in 2020 – a change of 68 per cent at an annual inflation rate of 2.6 per cent.

A detailed analysis of the NMVTRC's annual expenditure was undertaken from 2012/13 to 2019/20. Table 18 below shows NMVTRC annual expenditure in nominal dollars from 2012/13 to 2019/20, and in the second column, the NMVTRC annual expenditure indexed by June 2020 price levels. The third column shows the difference between the nominal and indexed annual expenditure. As can be seen, the NMVTRC's indexed annual expenditure in 2012/13 is not maintained for each subsequent year (other than for 2014/15) until 2019/20 when Queensland becomes a financial member. The total difference between nominal and indexed expenditure from 2012/13 to 2019/20 amounts to $847,750.

As a proportion of NMVTRC expenditure, corporate costs (employee and office administration costs) increased from 33 per cent in 2012/13 to 44 per cent in 2016/17. This has had a negative impact on the funding of the NMVTRC's programs. As previously noted, Queensland has not been a member and a financial contributor to the NMVTRC since 2011 and has only returned in 2019/20. Hence, the significant increase to the NMVTRC's budget in 2019/20. Also, Victoria withdrew its membership and financial contributions in 2015/16. With the return of Queensland, corporate costs have declined to 35 per cent of the NMVTRC's expenditure in 2019/20.

The SA Attorney-General's Department provides CARS Data and has advised that from 1 July 2021, the cost of this service will increase to $621,500 (inclusive of GST); an annual increase of $146,376. In addition, the cost of CARS Data will be CPI indexed from July 2022. Unless this substantial increase is shared across member organisations, the funding will need to be drawn from across the four programs. The CPI index could amount to about $12,000 per annum (if the CPI is 2 per cent).

In view of the above, if the NMVTRC wants to retain the current 2020/21 expenditure in future years it would need to apply an annual CPI index. For example, if the CPI is 2 per cent, the additional cost would be about $50,000 shared amongst members organisations. Alternatively, if the NMVTRC wants to recover the CARS Data service CPI increases that will start in July 2022, the additional cost would be about $12,000 (if the CPI is 2 per cent) shared amongst member organisations.

Table 18: Comparison of NMVTRC Expenditure in nominal dollars with real dollars as at June 2020 price levels

Year	NMVTRC Annual Expenditure	NMVTRC Annual Expenditure Indexed in June 2020 price levels	Difference
2012/13	1,999,069	2,242,476	243,407
2013/14	2,224,931	2,429,894	204,963
2014/15	2,259,886	2,426,482	166,596
2015/16	1,438,091	1,523,075	84,984
2016/17	1,788,125	1,864,951	76,826
2017/18	1,934,119	1,983,401	49,282
2018/19	1,929,729	1,951,421	21,692
2019/20	2,357,474	2,357,474	0
Total Difference			847,750

Table 19 provides the actual NMVTRC expenditure in further detail and Table 20 shows the same expenditure indexed in June 2020 price levels. Note: Corporate costs are the sum of employee costs and admin and office expenses.

Table 19: Actual NMVTRC Expenditure, 2012/13 to 2019/20

Year	Employee Costs	Admin & Office Expenses	Corporate	Comms & Marketing	CARS Data	DSPM	DVLM	DYO	SCC	Total
2012/13	496,035	156,456	652,491	147,251	463,844	28,030	258,953	281,970	166,530	1,999,069
2013/14	525,000	124,900	649,900	151,000	475,000	235,000	62,396	238,244	413,391	2,224,931
2014/15	587,586	186,604	774,190	254,659	475,124	0	26,045	338,418	391,450	2,259,886
2015/16	494,980	139,008	633,988	103,071	475,909	861	5,000	13,636	205,626	1,438,091
2016/17	616,552	162,043	778,595	150,166	475,278	0	26,534	22,778	334,774	1,788,125
2017/18	645,388	155,587	800,975	206,600	475,124	5,000	54,543	182,182	209,695	1,934,119
2018/19	495,018	322,722	817,740	164,850	475,124	39,105	32,294	263,636	136,980	1,929,729
2019/20	581,500	250,850	832,350	185,000	475,124	80,000	30,000	175,000	580,000	2,357,474

Table 20: NMVTRC Expenditure Indexed in June 2020 price levels, 2012/13 to 2019/20

Year	Employee Costs	Admin & Office Expenses	Corporate	Comms & Marketing	CARS Data	DSPM	DVLM	DYO	SCC	Total
2012/13	556,432	175,506	731,939	165,180	520,322	31,443	290,483	316,303	186,807	2,242,476
2013/14	573,363	136,406	709,769	164,910	518,757	256,648	68,144	260,191	451,473	2,429,894
2014/15	630,902	200,360	831,262	273,432	510,150	0	27,965	363,366	420,307	2,426,482
2015/16	524,231	147,223	671,454	109,162	504,033	912	5,295	14,442	217,777	1,523,075
2016/17	643,042	169,005	812,047	156,618	495,698	0	27,674	23,757	349,157	1,864,951
2017/18	661,833	159,551	821,384	211,864	487,230	5,127	55,933	186,824	215,038	1,983,401
2018/19	500,582	326,350	826,932	166,703	480,465	39,545	32,657	266,600	138,520	1,951,421
2019/20	581,500	250,850	832,350	185,000	475,124	80,000	30,000	175,000	580,000	2,357,474

7. References

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Nexus Research Pty Ltd (2008) *Awareness and Perceptions of Car Theft and Preventative Measures* prepared for the NMVTRC.

NMVTRC (2017) Operation Bounce Back, Review Report 2016-2017, prepared by Caitlin Hrambanis, September 2017.

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NMVTRC (2020) Operation Bounce Back, Review Report 2019-2020, prepared by Caitlin Hrambanis, May 2020.

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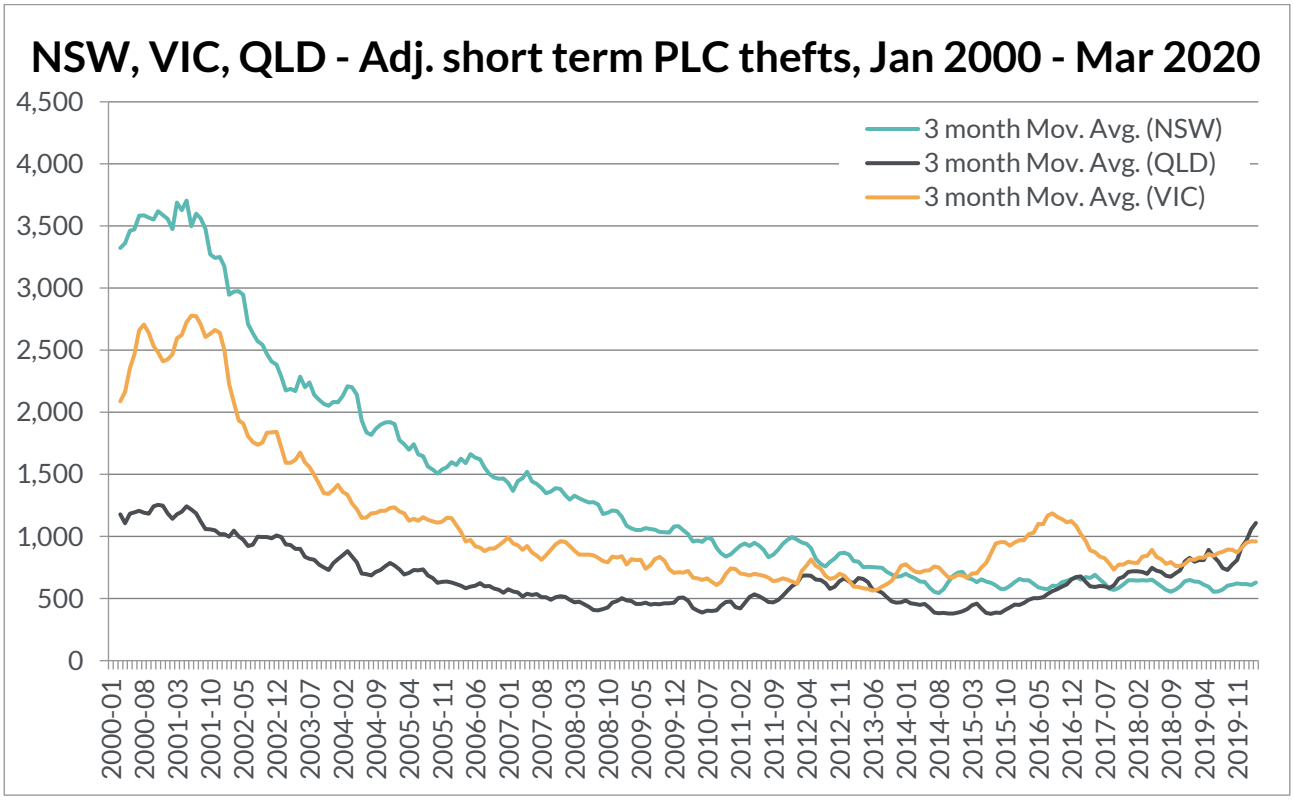
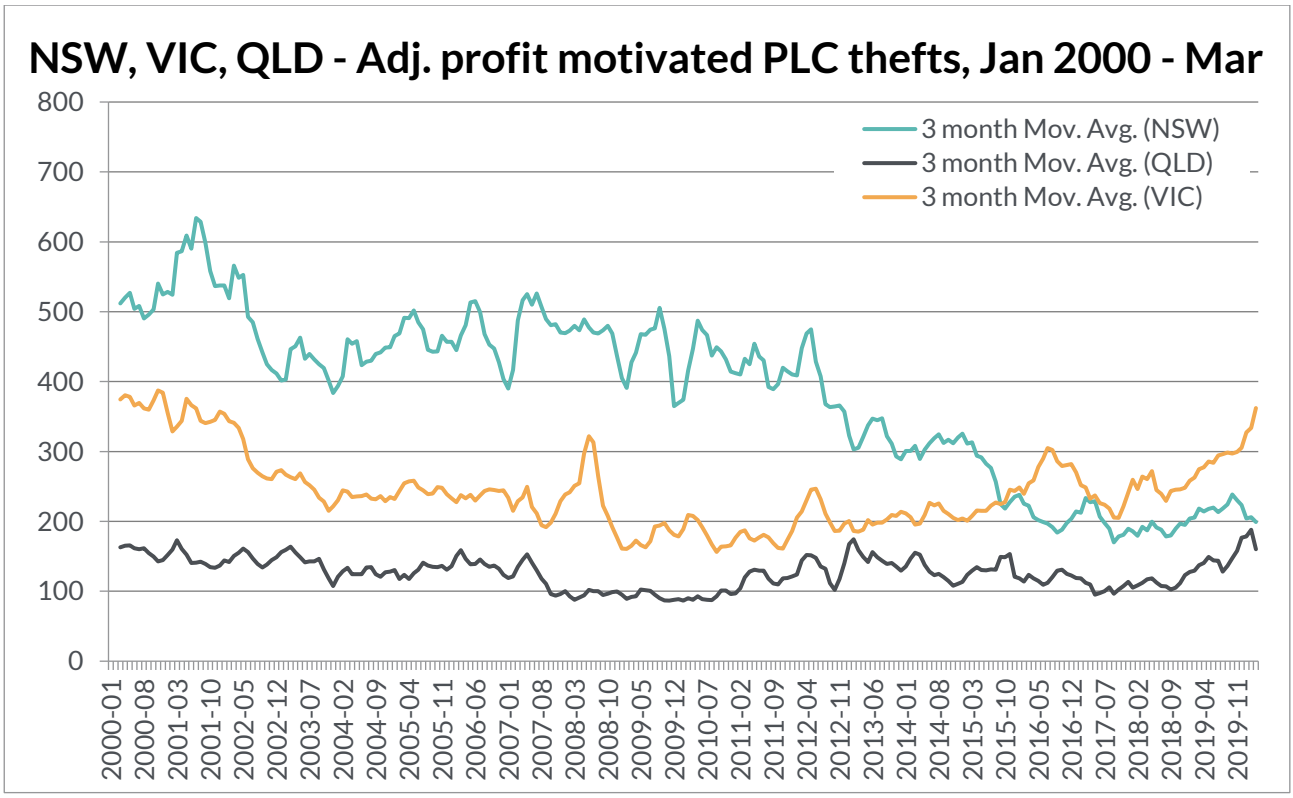
Appendix A: State/Territory Stolen Vehicle Charts

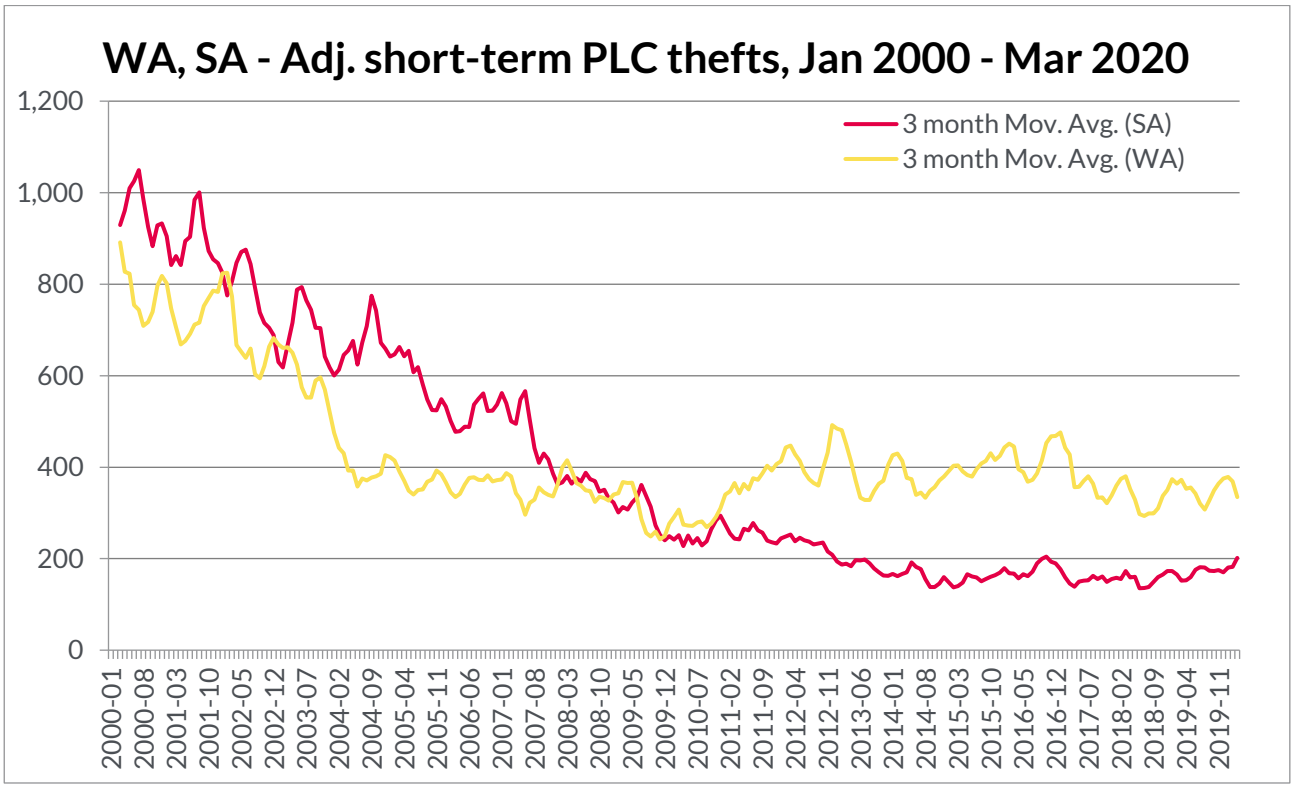
Short-term theft in New South Wales, Victoria and Queensland



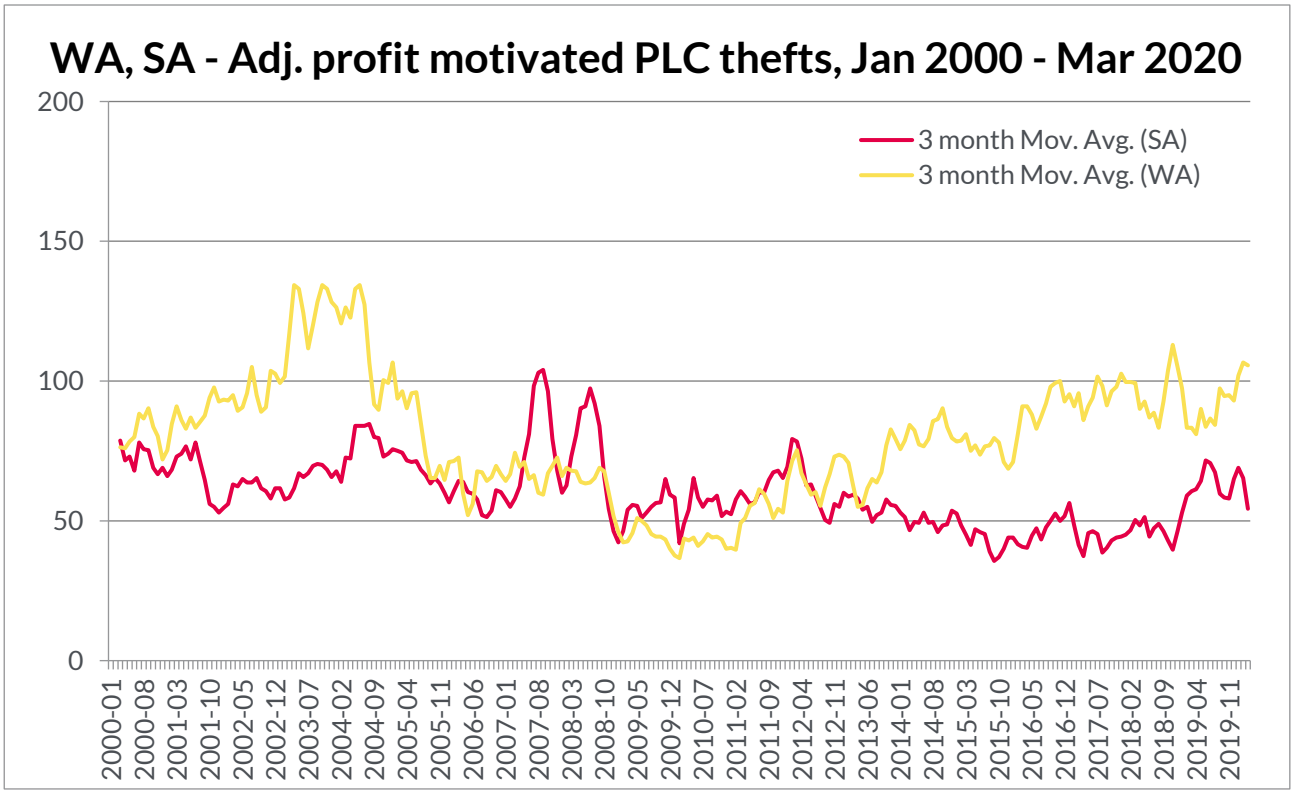
Profit-motivated theft in New South Wales, Victoria and Queensland



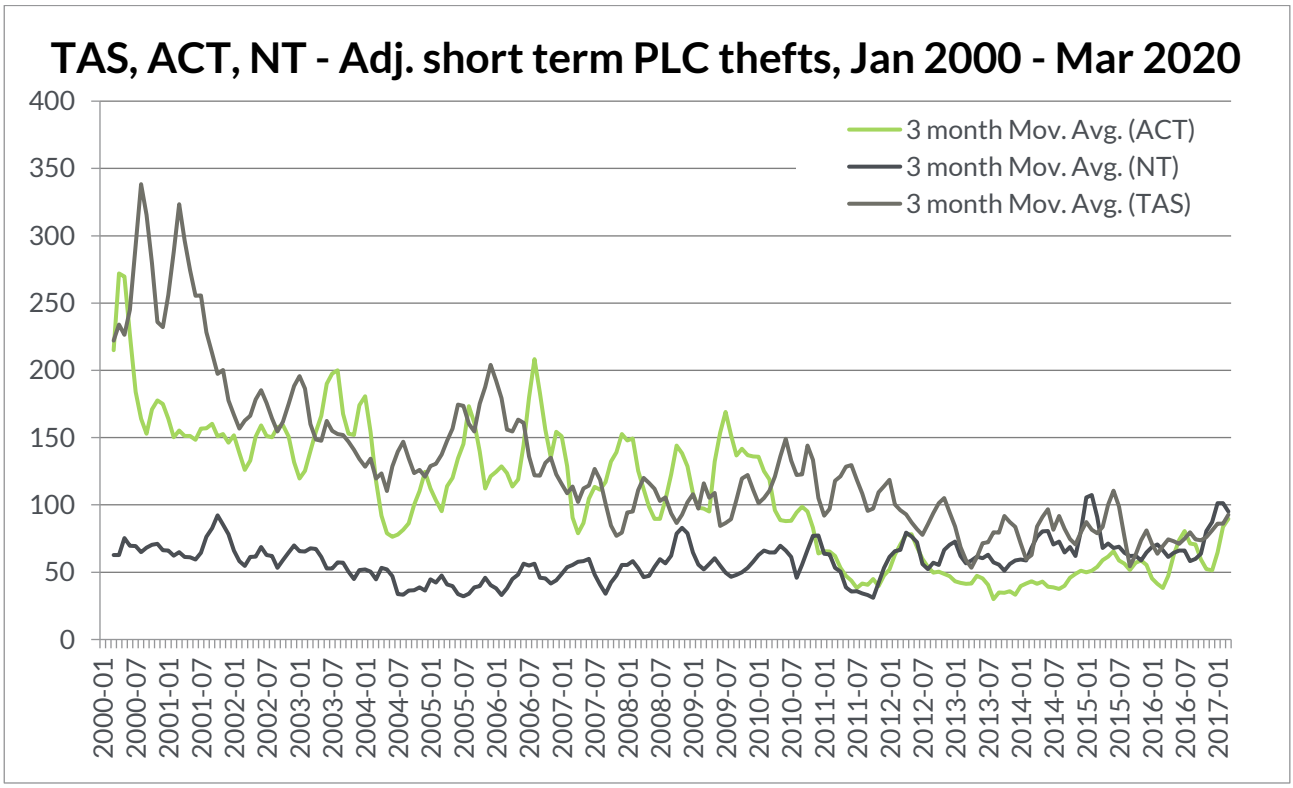
Short-term theft in Western Australia and South Australia



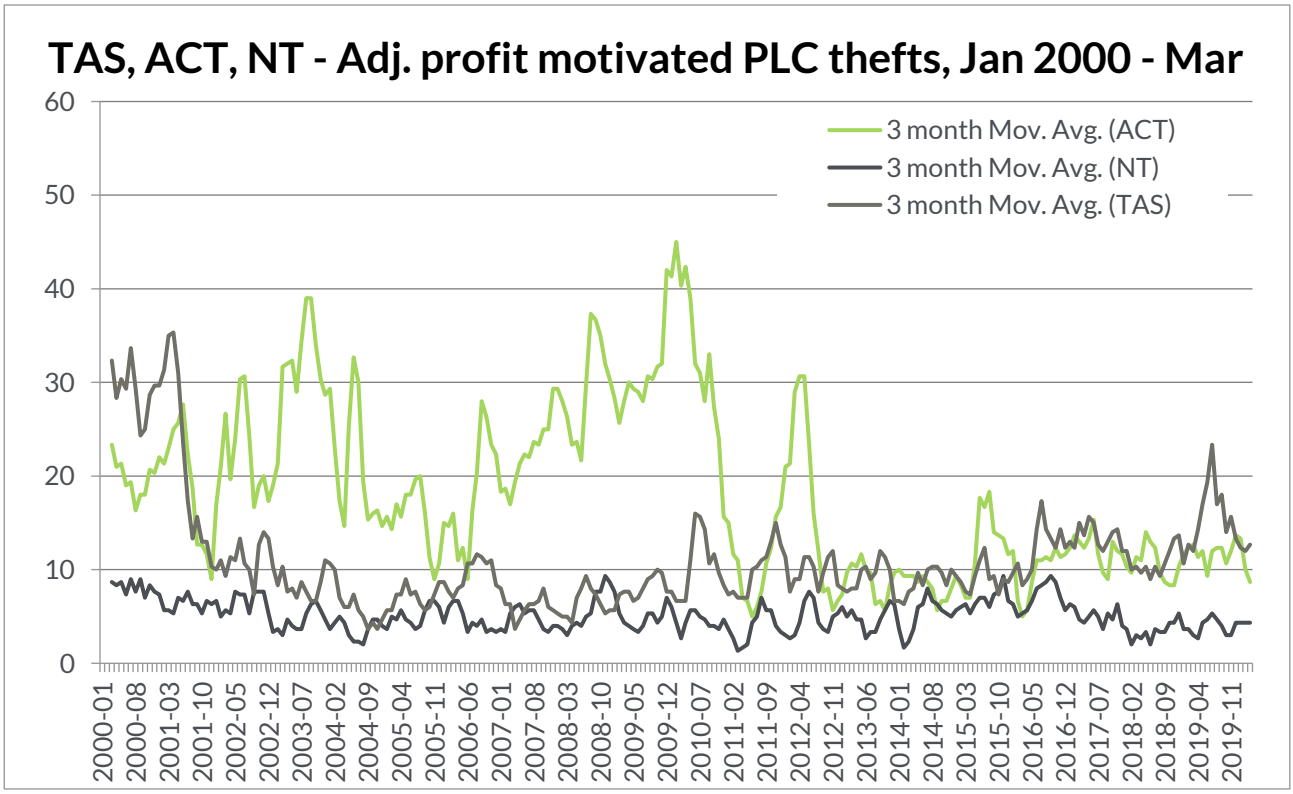
Profit-motivated theft in Western Australia and South Australia



Short-term theft in Tasmania, Northern Territory and the Australian Capital Territory



Profit-motivated theft in Tasmania, Northern Territory and the Australian Capital Territory



Appendix B: Other Crime Correlations

Table B1: Correlation between the Numbers of Stolen Vehicles and UEWI, 2001 to 2016

State/Territory	Short-term theft	Profit-motivated theft
New South wales	0.94	0.70
Victoria	0.99	0.69
Queensland	0.75	-0.50
South Australia	0.97	0.39
Western Australia	0.83	-0.01
Tasmania	0.89	0.45
Northern Territory	0.29	-0.02
Australian Capital Territory	0.92	0.80
Australia	0.99	0.83

UEWI = Unlawful entry with intent

Table B2: Correlation between the Numbers of Stolen Vehicles and UEWI, 2001 to 2019

State/Territory	Short-term theft	Profit-motivated theft
New South wales	0.98	0.75
Victoria	0.96	0.58
Queensland	0.84	-0.05
South Australia	0.99	0.41
Western Australia	0.86	-0.22
Tasmania	0.94	0.57
Northern Territory	0.26	-0.08
Australian Capital Territory	0.93	0.70
Australia	0.98	0.86

UEWI = Unlawful entry with intent

Appendix C: Stolen Vehicle Unit Costs

C.1 Introduction

When a vehicle is stolen the following potential costs experienced by the victim are:

- vehicle damage or loss;
- extra time spent as a consequence of the theft, e.g. Reporting the theft, rearranging activities, using different travel modes;
- direct costs, e.g. hiring a car
- loss of quality of life as a result of the experience of being subject to motor vehicle theft; and
- medical costs if some injury occurs as part of the theft.

These costs are discussed below in three categories: vehicle damage or loss, injury and personal costs. In addition, there is the cost of the administration to insurance companies of handling claims for stolen vehicles.

C.2 Vehicle damage or loss

The basis of the estimates of these costs is the claims costs provided by insurance companies for the CARS database and analysis by CARS of the value of stolen vehicles using Glass' Guide. The estimates are undertaken for the last three years but only reported here in Table C.1 for 2019. There are not significant differences from year to year. CARS estimates are provided separately for all PLCs, PLCs aged zero to 15 years, and PLCs aged more than 15 years of age.

The costs of insurance claims are adjusted in two ways to obtain the average cost of vehicle damage or loss: firstly, the excess paid by vehicle owners is added, and secondly, the salvage value obtained by insurance companies is deducted.

The following assumptions and calculations are made in respect to the estimations:

- The proportion of PLCs that are subject to an insurance claim, that are not subject to an insurance claim and are not insured are taken from the Nexus (2014) survey. The same proportions were used in the 2014 and 2017 reviews.

	Short-term theft	**Profit-motivated theft**
Insurance claim	58 per cent	72 per cent
No insurance claim	8 per cent	5 per cent
Uninsured	34 per cent	23 per cent

- The average claim costs for vehicles subject to short-term and profit-motivated thefts are taken directly from the CARS insurance claims database.
- By definition there are no claim costs for vehicles not subject to an insurance claim or uninsured vehicles; Glass' values of vehicles are used to make estimates of the costs involved. In the case of no insurance claim, the median values are adjusted by the median values of insured vehicles, e.g. the median value of all PLCs not subject to an insurance is 63 per cent of the median value of all PLCs subject to an insurance claim. In the case of uninsured vehicles, the same procedure is used but average values replace median values, e.g. the average value of all PLCs not subject to an insurance claim is 77 per cent of the average value of PLCs subject to an insurance claim. Median values are generally lower than average values so the procedure means that the cost is lower for vehicles which are insured but for which no claim is made compared with the cost for vehicles which are uninsured. It is expected that the costs would be low where a vehicle is insured but there is no claim otherwise a claim would have been made.

Table C.1 shows the estimated average vehicle damage or loss cost per stolen vehicle for use in the cost-benefit analysis.

Table C.1: Vehicle Loss and Damage Cost per Stolen Vehicle, 2019 price levels

Insurance Status/Responsibility	Short-term theft (All Vehicles)	Profit-motivated theft (0-15 years)	Profit-motivated theft (>15 years)
Insurance claim	$14,210	$18,800	$5,410
No insurance claim	$4,930	$7,820	$3,070
Uninsured	$11,290	$14,860	$3,870
Average cost	**$12,480**	**$17,330**	**$4,940**
Insurance company	$8,000	$13,240	$3,690
Vehicle owner	$4,480	$4,090	$1,250

C.3 Personal costs

Personal costs include the following potential costs to the victim of motor vehicle theft:

- Extra time spent as a consequence of the vehicle theft;
- Direct costs; and
- Loss of quality of life as a result of the experience of being subject to motor vehicle theft.

As no new data is available, the 2014 review data is used to estimate the personal costs and is indexed to 2019 price levels using ABS CPI data. This results in estimated personal cost per recovered stolen vehicle (short-term theft) of $1,730 and $2,130 for vehicles that are not recovered (profit-motivated theft).

C.4 Injury costs

In earlier reviews, injury costs estimations involving stolen vehicles were based on all accident types (fatalities, injuries and property damage only (PDO)). The costs were estimated based on analysis of Coroners reports into fatalities and the number of injuries and PDOs on analyses by CARS of non-fatal accidents in New South wales, South Australia and Queensland.

Since the 2017 review the only new data are the number of fatalities involving stolen vehicles. This remains the same for this review.

The data from coronial investigations of fatal road accidents show an increase in the average number of fatalities to 14.4 per year compared with 14.1 per year in the 2017 review. The data cover the years 2000 to 2017.

As shown in Table C.2, there are significantly more injuries and PDO accidents than fatalities but the unit costs of those accidents are lower than the unit costs of fatalities. The unit costs are derived from the 'Road crash costs in Australia' report published by the Bureau of Infrastructure, Transport and Regional Economics and the unit costs for 2006 have been indexed using ABS wages data for fatality unit costs and ABS CPI data for the injury and PDO unit costs.

The overall effect on the estimated injury costs in the table is a minor increase in the unit cost per stolen vehicle from $2,550 (2017) to $2,570 or 0.8 per cent.

is injury cost is only applied to vehicles subject to short-term theft as previous reviews made the assumption that it was unlikely that profit-motivated thieves would be involved in road accidents.

Table C 2: Injury Costs associated with Vehicles subject to Short-term theft

	Fatal	Injury	PDO	Total
Number	14.4	499	1,977	2,491
Unit cost ($'000)	3,380	27	13	na
Total costs ($'000)	48,630	13,410	25,470	87,510
Cost per recovered stolen vehicle ($)	na	na	na	2,570

C.5 Insurance administration

The estimated unit costs are calculated for passenger and light commercial vehicles (PLCs):

- of all ages for short-term theft (recovered vehicles);
- 15 years of age or less for profit-motivated theft (unrecovered vehicles); and
- 16 years of age or more for profit-motivated theft.

Similar to the 2017 review, no new information on the cost of administering insurance claims for stolen vehicles was sought for this review. The combined costs from four insurance entities used in previous reviews are indexed using ABS CPI data. This indexation results in an estimated administration cost per stolen vehicle of $890 for recovered vehicles (short-term theft) and $1,260 for vehicles that are not recovered (profit-motivated theft).

To calculate an average cost over all stolen vehicles, the administration costs should be adjusted for the proportion of vehicles that are subject to an insurance claim. The Nexus (2014) survey reported that 52 per cent of short-term theft vehicles and 72 per cent of profit-motivated theft vehicles are subject to an insurance claim. This results in average insurance administration costs of $520 for short-term theft vehicles and $910 for profit-motivated theft vehicles. The same cost of $910 is used for vehicles of all ages subject to profit-motivated theft as the Nexus survey did not provide data on stolen vehicles by age. The unit cost for older vehicles is likely to be overestimated relative to the unit cost for newer vehicles.