

TITLE: The Crime Drop and the Security Hypothesis

Abstract

Major crime drops were experienced in the United States and most other industrialised countries for a decade from the early to mid-1990s. Yet there is little agreement over explanation or lessons for policy. Here it is proposed that *change in the quantity and quality of security* was a key driver of the crime drop. From evidence relating to vehicle theft in two countries it is concluded that electronic immobilisers and central locking were particularly effective. It is suggested that reduced car theft may have induced drops in other crime including violence. From this platform a broader security hypothesis, linked to routine activity and opportunity theory, is outlined.

Introduction

From the early to mid-1990s many industrialised countries experienced major falls in crime. They occurred first in the United States where serious violent crime including homicide fell by 40 percent. This received a great deal of media attention and remains a focus for much of the academic research. Yet other street crimes also fell dramatically in the US, while crime reductions of similar magnitude occurred in many other industrialised countries. With variation by country and crime type there were significant declines in crime across the European countries for which reliable comparison could be made using the International Crime Victims Survey (van Dijk et al. 2007, van Dijk, 2006a, 2006b). In England and Wales, violent crime fell 49 percent, burglary 59 percent and vehicle theft 65 percent between 1995 and 2007 (Hoare, 2009; 21). Significant falls in crime have been identified in other countries including Australia, Canada and Japan and elsewhere (see e.g. Zimring, 2007; Rosenfeld, 2009; Rosenfeld and Messner, forthcoming; Tseloni et al., forthcoming).

There is a now maturing body of work seeking to explain the drop in violence in the United States. Blumstein and Wallman (2000, 2006), for example, offered a landmark collection of studies complementing the overview by LaFree (1999). Reviewing the literature on the factors causing the violent crime drop in 2004, Levitt concluded, however, that,

“Most ... actually played little direct role in the crime decline, including the strong economy of the 1990s, changing demographics, better policing strategies, gun control laws, concealed weapons laws, and increased use of the death penalty. Four factors, however, can account for virtually all of the observed decline in crime: increases in the number of police, the rising prison population, the waning crack epidemic and the legalization of abortion”. (Levitt, 2004; 163-4).

Levitt himself had previously argued (Donohue and Levitt, 2001) that the legalization of abortion in the early 1970s meant that, by the 1990s, there were fewer youth in the groups most at-risk of committing crime. Yet Blumstein and Rosenfeld (2008) in a more recent review conclude this had only a small effect on crime. They cited studies which found that indicators such as school performance and labour force participation, which might also be expected to be affected by abortion, did not show any similar effects.

Blumstein and Rosenfeld (2008) found little support for the hypothesis that the lead-free gasoline introduced in the 1970s reduced lead levels in brains and that this in turn induced less violence in adulthood. They conclude that any effect may be confounded with demographic change, noting “the arrival and waning of the baby boom generation from the high crime ages – coincided roughly with the arrival and departure of leaded gasoline” (p.27). Their main conclusion about the cause of the fall in violent crime in the US is that while increased imprisonment and increased police numbers may have played some role, changes in the crack cocaine market were the key. Youths wanted to avoid the mistakes and consequences of gun violence experienced by the early-80s cohort, and so reduced their gun usage and serious violence accordingly.

Increased levels of police staffing and of imprisonment, while having political momentum and some inverse correlation with crime in the US context, do not appear to be relevant as explanatory factors elsewhere. Van Dijk and colleagues wrote in relation to imprisonment that:

“Prison populations have since the early nineties gone up in many EU countries but not consistently so. Between 1995 and 2000 rates went down, for example, in Sweden, France, Poland and Finland (European Sourcebook, 2003). Sentencing policies in Europe as a whole are considerably less punitive than in the USA (Farrington, Langan, and Tonry, 2004) and yet crime is falling just as steeply in Europe as it is in the USA. No relationship between the severity of sentencing of countries and trends in national levels of crime is therefore in evidence.” (van Dijk et al. 2007; 23).

Rosenfeld and Messner (forthcoming) compare imprisonment rates in Europe and the US relative to burglary rates and, in keeping with van Dijk et al.’s suggestion, find no significant relationship. Rosenfeld and Messner found, however, that burglary tracked changes in consumer confidence both for the US and a set of European countries. They hypothesise that economic upturns reduce acquisitive crime because consumers turn less often to second-hand goods markets which are fed, at least in part, by stolen goods. Conversely in recession, demand for second-hand and stolen goods increases and drives acquisitive crime upwards. Rosenfeld (2009) proposes that growth in acquisitive crime in turn leads more people to adopt risky lifestyles and that this

indirectly increases violent crime. Overall, therefore, Rosenfeld and his colleagues conclude a negative correlation between consumer confidence and crime is causally connected via the demand for stolen goods. We remain uncertain how this hypothesis reconciles with the improving economies and increasing crime rates of the second half of the twentieth century, and the hypothesis appears largely untested in the absence of evidence relating to stolen goods. To the present authors it also seems that violent crime in the US tracks motor vehicle theft rather better than it does an aggregate set of acquisitive crimes, and that this may turn out causally to be more important.

The need for further research

The present authors tend to agree with Blumstein and Rosenfeld, and with Levitt, that there is little evidence that demographic change, better policing, gun control, concealed weapons laws, or the death penalty can account for the widely-observed crime drops. We also concur with Blumstein and Rosenfeld's review of work finding little support for the abortion hypothesis or the childhood-lead hypothesis. At the same time, there seems no reason to disagree with Levitt's finding that the economy was not a major determinant, or with van Dijk et al.'s suggestion and Rosenfeld and Messner's finding that imprisonment cannot explain crime drops across countries. This cross-national comparative argument can be extended to suggest that change in street crack cocaine markets is unlikely to have been a significant factor outside of the US where such crack markets were never nearly as prominent, which in turn may cast further doubt on its validity in the US context.

Although the various crime drop hypotheses would appear to have largely cancelled each other out by the time we enter the fray, some further comment is warranted. The tendency of much previous research to focus on violence means that acquisitive crimes that fell dramatically have received comparatively little attention. In addition, many single-factor explanations, particularly those that are offender-based, fail what we term the 'phone theft test'. That is, they cannot explain why many crime types fell in the 1990s while others including phone theft and e-crimes increased. If there are fewer likely offenders as suggested by, inter alia, the abortion hypothesis and the childhood lead hypothesis, then why would some types of robbery, theft and fraud increase while others decreased? Explanations that look primarily at the number or motivation of likely offenders seem insufficiently nuanced to offer an explanation.

We would suggest that technological progress brought new criminal opportunities that caused increases in phone theft, e-crime, and other new-technology crimes. This opportunity-theory explanation is compatible with the security hypothesis outlined below wherein opportunity was reduced concurrently for other crime types.

The Security Hypothesis

In relation to the cross-national nature of the crime drop, Clarke and Newman (2006) suggest:

“In fact, the one thing in common amongst all these countries, including the United States, is that they have all made a huge investment in security during the past 25 years, affecting almost every aspect of everyday life.” (Clarke and Newman, 2006; 220).

Clarke and Newman provide a list of security-related developments in an insightful short section of a book on preventing terrorism. Van Dijk (2006) proposed security as the cause of the crime drops and re-stated it later when reviewing other explanations and some preliminary evidence:

“Perhaps a more significant factor inhibiting crime across the Western world is the universal growth in the possession and use of private security measures by households and companies over the past few decades. ICVS-based trend data on the use of precautionary measures confirm that in all Western countries, without exception, the use of measures to prevent property crimes such as car thefts and household burglaries has risen drastically over the past 15 years”. (van Dijk et al., 2007; 23)

The present work draws upon that of Clarke and Newman, van Dijk, and others including Felson’s (1998) insights from a routine activity perspective. It is proposed that changes in the quantity and quality of security have played a major part in driving crime falls in most industrial societies. More specifically:

1. Security improvements, including specific security devices, vary for different crimes but have been widely implemented.
2. Different security measures work in different ways to reduce the crimes to which they are applied: they increase actual or perceived risk to the offender;

and/or they reduce actual or perceived reward for the offender; and/or they increase actual or perceived effort for the offender.

3. The different ways in which security measures work produce variations in expected changes in crime patterns associated with crime drops. These comprise expected security device crime change 'signatures'.
4. The specific falls in crime produced by improvements in security alongside their associated diffusions of benefit (preventive effects spilling out beyond the operational range of measures) to other targets and methods of committing crime are not matched by equivalent displacement.

The following section presents case studies of the security hypothesis. Motor vehicle theft fell 60 percent in the United States in the decade from 1991. Beginning two years later, a distinctly similar drop occurred in England and Wales. From 2001, motor vehicle theft in Australia likewise plummeted and had fallen 55 percent by 2007. These trends are shown in Figure 1, and prior to this each country had a long-term upward trend. Data for the US are from the National Crime Victimization Survey, and those for England and Wales and Australia are police recorded crimes. Recorded crime data are a reliable indicator for motor vehicle theft due to its high level of reporting because of insurance requirements, and the England and Wales findings are corroborated by the British Crime Survey (Walker et al. 2006).

INSERT FIGURE 1 ABOUT HERE

In what follows, a series of analyses are presented that, it is concluded, indicate the reductions in motor vehicle theft in England and Wales and Australia were due to more and better vehicle security, particularly electronic immobilisers and central locking systems. It is then suggested that there is no reason to suppose another explanation underpinned the drop in the US. Following that, the security hypothesis is extended to suggest broader implications for other crime types including the drop in violent crime in the US.

The security hypothesis applied to vehicle theft

Four commonly used vehicle security devices are examined here: mechanical and electronic immobilizers, alarms and central locking. The working hypothesis is that

immobilizers have greater impact on theft of than theft from cars (immobilizers do not make it harder to steal from cars), that alarms impact on theft from cars rather than theft of cars (alarms do not make it harder to drive cars away), and that central locking affects both but has a distinct impact on modus operandi (cars with central locking can still be entered in other ways). Whilst the security of the vehicle itself is the focus of this paper, the security of the environment in which the vehicle is parked is also relevant to its vulnerability (Mayhew and Braun 2004; Webb 2005), but changes in this are not considered here. Likewise, while there is a long history of car security improvements (Newman, 2004) with some partial successes such as steering-wheel locks (Mayhew et al., 1976; Webb, 1997), it is our contention that more recent devices, particularly the combination of good quality central-deadlocks, electronic immobilisers and alarms, have had far greater success.

The data for England and Wales are from The British Crime Survey (BCS) which is a nationally representative survey conducted in 1982, 1984, 1988, 1992, 1996, 1998, and annually since 2000. The BCS collects information on crime experiences including vehicle crime – attempted and actual theft of vehicles, theft from vehicles, and vandalism of vehicles. It collects information on the security features of the vehicles targeted in the crime, and a separate module of the BCS asks a sub-set of respondents about the security of the main vehicle in a household. The data drawn on for Australia are from The Comprehensive Autotheft Research System (CARS) database, held by the National Motor Vehicle Theft Reduction Council (NMVTRC). It contains police recorded crime data from 1997 onwards for the state of South Australia and from 2000 onwards for all Australian states. The data incorporate cars, buses, trucks and vans, but not motorcycles.

In what follows, rather than present two separate country-level ‘stories’, a series of data vignettes, paired by country where possible, examines the mechanisms underpinning the reductions in car theft. Triangulation is the overarching approach, examining the crime falls, their timing and trajectories from various theoretical and empirical coordinates.

Trends in vehicle security

The changing prevalence of security devices fitted to cars in England and Wales since 1991 is shown in Figure 2. Close to 90 per cent of cars had central locking in 2006-7 compared to 35 per cent in 1991. Over 60 per cent had alarms in 2006-7 compared to 23 per cent in 1991. In 1999, 45 per cent of cars had an electronic immobilizer, rising to over two-thirds (69%) by 2006-7, although over the same period the proportion of cars with mechanical immobilizers declined from 40 to 33 per cent. Simple visual extrapolation of the trend in electronic immobilizers suggests they attained prominence somewhat later than alarms and central locking but then increased in prevalence more rapidly. By 2006-7 cars were more than twice as likely on average to have an electronic as opposed to mechanical immobilizer. Overall, the rate of vehicle theft in England and Wales declined as the prevalence of vehicle security increased. This crude correlation requires further examination via additional indicators to explore the possibility of causation.

INSERT FIGURE 2 HERE

Information on the implementation of vehicle security in Australia was qualitatively different and focused on immobilizers. A strength of the information is that it allows an examination of incremental change in the prescription of security by national security standards. This information provides valuable insight into the role of the *quality* rather than solely the prevalence of security. Devices such as immobilizers vary in specification and quality. Of particular note is that it was in 2001 that the good quality Australian Standard immobilizer was required to be fitted to all new vehicles nationally, and concerted effort made to encourage widespread retro-fitting of immobilisers. The detailed specifications that underpin good quality security should not be under-estimated, and it is only for clarity in the main text that a summary of key details of the Australian standard are relegated to Appendix 1. The proportion of vehicles with such immobilizers rose sharply from a quarter (27.4%) in 2000 to two-thirds (64.7%) by 2004 (Kriven and Ziersch, 2007; 115).

From 1997, the provincial government of Western Australia introduced subsidies for car owners to encourage electronic immobilisers. Minimum standard immobilizers were then mandated in Western Australia in 1999 (Forbes, 2000). This facilitates the construction of a natural experiment. Trends in vehicle theft in Western Australia and

the remainder of Australia from 1997 to 2007 are shown in Figure 3. Data were only available from the second half of 1997 and so are presented in six-monthly units labelled as 'a' and 'b' for each year. Drop lines show that Western Australia made minimum standard immobilisers for vehicles mandatory before the rest of the country. It can be seen that this, together presumably with the effect of earlier subsidies and perhaps some anticipatory action in advance (see Smith et al 2002 on 'anticipatory benefits'), was associated with the onset of a steady decline in car thefts in Western Australia.

INSERT FIGURE 3 HERE

Permanent and temporary thefts

Our working hypothesis would suggest that improved security in general and immobilizers in particular tend to reduce temporary theft (for joyriding, theft for transportation) more than permanent theft (for re-sale or breaking for parts).

Figure 4a shows the falls in temporary and permanent theft of vehicles in England and Wales from 1995 to 2006/7. Two thirds of the drop is accounted for by a fall in temporary theft where cars were recovered. That is, the decline was disproportionately in joyriding and theft for transportation such as taking a car to get home at night, which declined by three-quarters. Such opportunistic and amateur car thieves would be less able or motivated to break into cars and drive them away when faced with better locks and/or immobilizers. Hence this signature is consistent with an explanation that electronic immobilizers and central locking were the cause of the drop in car theft. It is also noteworthy that permanent theft, presumably for parts or re-sale, also experienced a decline of over 50 percent.

INSERT FIGURE 4a AND b ABOUT HERE

In Australia, shown in Figure 4b, the temporary/permanent theft signature is uncannily similar to that identified for England and Wales. The timing of the fall in theft was several years later but appropriately coincides with the later introduction of immobilisers. As in England and Wales, the fall in vehicle thefts was

disproportionately in recovered cars which fell by 60.1 per cent rather than unrecovered vehicles which fell by only 15.3 per cent.

The greater fall in temporary as against permanent thefts of vehicles in both locations is consistent with immobilizers having greater impact upon more opportunistic thefts, with thefts for re-sale or parts still being reduced but proving more resistant (perhaps due to some displacement or due to efforts to overcome immobilizers). However the fact that there were falls also in numbers of permanent thefts suggests that even so-called professional car thieves can be stopped by designing-out crime efforts.

Rick Brown and colleagues (Brown and Thomas, 2003, Brown, 2004; see also Webb, 2005) developed the temporary/permanent theft indicator of the differential effect of security upon car theft. They also suggested that there had been a shift towards the theft of older vehicles as a result of improvements in security to newer ones, and this is the indicator that follows.

The age of stolen vehicles

The working hypothesis would suggest that, if recent security is effective, the average age of stolen cars will have increased. That is, as newer cars become harder to steal, the average age of stolen cars will increase. This was an element of the analysis by Kriven and Ziersch (2007) who tracked the age of vehicles stolen in Australia between 2000 and 2004. We were able to include an additional three years of data, up to 2007. . Our analysis, as with that of Kriven and Ziersch, found that amidst the overall reduction in thefts there has been a general increase in the age of stolen vehicles. However this is not an entirely unambiguous indicator because the impact of mandatory immobilizers (fitted to vehicles manufactured since 2001) would, by 2007, be expected primarily for vehicles aged six years or less. The more general ageing of stolen vehicles between 2000 and 2007 could reflect voluntary immobilisation by manufacturers and the retro-fitting of immobilizers on newer vehicles, as well as more general improvements in vehicle security that are more prevalent in newer than older vehicles. The BCS does not gather information on the age of stolen vehicles and so this indicator was not developed for England and Wales.

Modus operandi

The working hypothesis suggests that better locks cause a change in entry method from door forcing to window breaking. Likewise, it has been suggested that theft of keys may increase when it is otherwise too difficult to break into a car (Brown 2004). This would comprise what is generally referred to as tactical displacement (Repetto 1976).

Successive sweeps of the BCS suggest that the bulk of the decline in theft of cars in England and Wales was accounted for by a decline in the forcing of door locks. Other entry methods declined but to a lesser extent (see Figure 5a). This signature is consistent with central locking as the cause of the decline because better locks would reduce door-forcing more than window-breaking. There is, though, no evidence that tactical displacement to use of keys has been a prominent feature in vehicle theft trends. As part of the general decline, the number of thefts using keys fell 46.8 per cent from 1993 to 2006/7 while window-breaking fell 46.1 per cent. However, there was no change in thefts where the door was already unlocked which was around 18 thousand in both 1993 and 2006-7. The proportional increase in other entry methods in Figure 5a reflects primarily the dramatic decline in locks being forced: The proportion of entries where windows were broken went from 13 per cent to 20 per cent, use of keys went from 9 per cent to 15 per cent, and thefts where the door was unlocked increased from 3 per cent to 10 per cent.

INSERT FIGURE 5a AND 5b ABOUT HERE

INSERT TABLE 1 ABOUT HERE

For attempts in England and Wales, lock-forcing decreased at the same time that window-breaking and other entry methods increased. This is consistent with stronger locks causing a shift to other entry methods, with completion of the endeavour then thwarted by an immobilizer (Table 1).

The Australian police data on recorded vehicle thefts contained method of entry information for recovered vehicles. Figure 5b shows indexed trends in the main entry

methods for recovered vehicles stolen after 2001¹. While all methods have declined, that of lock-forcing is most pronounced (a 68.3% drop), followed by reductions in window-breaking (a 58.0% drop) and entry to unlocked vehicles (a 54% drop). The decline was least pronounced in the use of keys which experienced only a 29.7 per cent drop. These findings suggest improvements in central locking may have complemented the use of immobilizers in generating the overall decrease in car theft. The findings correspond extremely well with those from England and Wales.

Types of crime risk

The working hypothesis would suggest that different security devices impact differentially by crime type: immobilizers reduce most the risk of theft of cars; alarms reduce most the risk of theft from cars, and central locking will reduce the risk of both theft of and theft from cars. The survey of England and Wales allowed further examination of this issue. By 2006-7, central locking was the most prevalent car security device. This is shown in the top left numeric cell of Table 2 where 87.8 per cent of all cars have central locking. The security devices shown in Table 2 are ranked by prevalence among all cars. Hence 62.9 per cent had alarms, with the least prevalent security device being tracking devices in 3.4 per cent of cars. Note that cars with electronic immobilizers are shown separately from cars with mechanical immobilizers but that 22.8 per cent of cars had both. Many cars will have multiple security devices in different combinations. One would expect a greater likelihood that cars with tracking devices also have central locking, an alarm and an electronic immobilizer. It can reasonably be inferred from the trajectory of implementation rates that cars with electronic immobilizer also have central locking and an alarm, but that central locking and alarms were also installed without electronic immobilizers. The other columns in Table 2 show the prevalence of the security devices among cars that experience crime. Hence 59.5 per cent of stolen cars had central locking and 41.2 per cent had an alarm, through to 0.8 per cent having a tracking device installed. The third and fourth columns show the prevalence of security devices among cars which experienced theft from the car and attempted theft respectively.

¹ ‘Jemmied’ locks were excluded from the chart due to low numbers and high variability. In any year they accounted for only between 1 and 4 percent of entries with no consistent trend.

Comparing the prevalence of security devices in *all* cars to that of *victimized* cars allows us to gauge the relative protective effects. If 87.8 per cent of cars have central locking then, *ceteris paribus*, one would expect 87.8 per cent of stolen cars to also have central locking if the central locking itself made no difference. The fact that only 59.5 per cent of stolen cars had central locking suggests that cars with central locking were less likely to be stolen. In fact they were 34.5 per cent less likely to be stolen (that is, 59.5% is 65.5% of 87.8%, or 34.5% less), which is our measure of the protective effect.

INSERT TABLES 2 AND 3 ABOUT HERE

The protective effect is shown for each security device in Table 3, ranked by impact upon car theft, the first data column. Only 3.4 per cent of cars had tracking devices, but tracking devices had the greatest impact according to this indicator, reducing risk by 77.3 per cent, a finding that squares with that of Ayres and Levitt (1998). The second most effective device by this indicator is electronic immobilizers which reduced risk of car theft by 48.4 per cent. Not surprisingly, if a vehicle had both an electronic and mechanical immobilizer, the risk reduction effect was similar at 45.8 per cent. However, mechanical immobilizers were the least effective device for reducing theft of cars with only 7.3 per cent less observed than expected thefts. The performance of window security etching was relatively poor by this measure and reduced risk of car theft by only 13.8 per cent.

Confirmatory evidence of the validity of the indicator of protection is provided by the findings relating to theft from cars and attempted thefts. Electronic immobilizers have less effect upon theft from vehicles or attempts, and presumably that is artificially high due to the overlap with alarms. Car alarms, in contrast, confer a similar level of protection against both theft of and theft from a car. This finding fits well with the way in which alarms work – producing a more general deterrent against both theft of cars and theft from cars.

Electronic immobilizers are a third again (32.7%) more effective in reducing car theft than alarms and 42.2 per cent more effective than central locking. All of these are many more times more effective than mechanical immobilisers or window security

etching in reducing car theft. Tracking devices appear effective against theft of cars but not theft from cars or attempts, as might be expected, but had been fitted to relatively few vehicles.

Ideally, we would be able to distinguish the pure effects of individual security devices but also their interaction effects, and this is a potential area for future research. Nevertheless, not only are the protective effects distinguishable for each device, but the variations across crime type and device accord with theoretical expectations.

DISCUSSION

Triangulation can be a powerful means of evaluation. With, say, only one dataset and only one data signature, few readers would be convinced that security caused the fall in car theft. After all, if crime falls fairly consistently for a decade there would be expected to be many correlates. However, with multiple data signatures of different types and approach, from different data sources in two countries, each signifying crime falls of similar magnitude but with distinct timings and characteristics that concord with their expected mechanisms of operation, the case is far stronger. That is, the likelihood that the findings are spurious or that there is a major plausible alternative hypothesis, now appears low.

Analysis of data for other countries with and without drops in car theft would be needed more unequivocally to confirm the security hypothesis. It is our hope that the present work stimulates some replication and attempts at falsification. We conclude that the evidence presented here is sufficient that the burden is now on anyone challenging the specific security hypothesis relating to car crime reduction to provide counter-evidence or more compelling evidence for an alternative explanation.

Extending the security hypothesis

Whether or not the security hypothesis can be extended to other crime types is a different question. Clearly the case is not established here, though Clarke and Newman (2006) provided a long list of security tactics that could have reduced many different types of crime and which warrant further investigation. The present study gives cause for speculation about the falls in other crime types where we anticipate the mechanism of change is necessarily different. In so doing we also extend the

security hypothesis so that it is a general hypothesis, based within a routine activity framework, and within which nestle a range of inter-locking and specific hypotheses. The first point of note, however, is that further *specific security hypotheses* warrant development and exploration in relation to other crime types including burglary, robbery, theft and violence.

Burglary and car crime are debut crimes (Svensson, 2002) that novices commit as a low rung on the offending ladder. The present authors suspect that security played a significant role in burglary reductions that were evident in many industrialised countries, perhaps combined with changes in the value and availability of goods likely to be stolen. If these crimes are more difficult or less tempting to commit then perhaps novices do not progress to other crime types. Measures of the prevalence and frequency of offending would be appropriate to develop relevant indicators. This is here termed the *debut crime hypothesis*.

A further conjecture relates to the role of car crime in particular as a facilitator of other crime types. Stolen cars make offenders more mobile, less constrained by public transport's times and routes. They are used in burglaries to transport stolen goods, to drive to drug markets to make a purchase, for drive-by shootings and other crimes. Likewise, when offenders cannot commit burglary they do not go to fences, do not have cash to buy drugs, and do not interact with other offenders to the same extent in other contexts. Hence car crime (and potentially burglary) may be 'keystone' crimes which facilitate and encourage other crime types. Their prevention may have a knock-on effect to other crime types in a manner akin to a diffusion of benefits (Clarke and Weisburd, 1994). This is here termed the *keystone crime hypothesis*.

Lifestyle and routine activity theories, which link to the security hypothesis via their influence on criminal opportunities, warrant further exploration in relation to the crime drops. The rise of the Internet roughly coincided with the crime drops, but whether or not this is a coincidence remains to be seen. Perhaps the huge criminal opportunities presented by the Internet sucked some offenders away from traditional street crimes into online offending that is less routinely or easily recorded. The deterrent effect of a perceived increase in risk due to new forensic techniques, widely promoted in the media, may also need to be considered: Perhaps there was increased

uncertainty, and hence honesty, among offenders, even if actual risk of detection increased only marginally. What about other changes in technology and lifestyles? Portable telephones allow potential victims and passersby to mobilise guardianship far more efficiently, for example, while integrated cameras and video threaten digitised proof of any offender's identity. There are almost certainly many other routine activity-related changes that warrant attention, as Felson (1998) noted a decade ago, although his comments on these do not appear to have been taken up.

In short, the overall security hypothesis incorporates a set of specific conjectures that are linked to routine activity and opportunity theory. We propose that the security hypothesis offers the best chance of generating useful information from the crime drops. Hence the reader should not be misled by the parsimonious name we offer for the set of hypotheses. However, at this early stage of the necessary research we acknowledge that additional country-level studies are likely to produce diverse findings. We suspect that Canada, for example, may provide evidence in support of a securitization hypothesis but not the debut crime hypothesis. Some crimes in Canada fell from the mid-1990s but car theft remained fairly stable, appearing to fall only after electronic immobilisers were promoted in more recent years (Tilley et al. 2009).

Implications for the United States

As observed earlier (Figure 1), motor vehicle theft in the United States dropped by 60 percent in the 1990s. The fall began about two years before that in the UK and a decade before that in Australia. Blumstein and Rosenfeld (2008) observed that motor vehicle theft trends were similar to those of serious violence but not burglary:

“The trend in motor vehicle theft, with a turning point in the early 1990s, is more similar to those for robbery and homicide than to the burglary trend, and it is consistent with qualitative accounts of stolen cars traded for drugs during the crack era (Jacobs, 1999) or for use by drug dealers to avoid having their own cars confiscated as forfeited assets. A clear need exists for research on the divergence between burglary and motor vehicle theft trends over the past 25 years.” (Blumstein and Rosenfeld, 2008; 19).

Our conjecture is that the 60 per cent drop in US car theft in the 1990s was a result of improved car security, particularly electronic immobilisers plus central locking,

alarms and tracking devices. If better vehicle security caused the drop in car theft then, following Blumstein and Rosenfeld's line of reasoning, perhaps it reduced violence too: There would be fewer cars to trade for drugs and for dealers to drive around. There would be fewer stolen cars for use by potential drug-market customers, and fewer for use in drive-by shootings, robberies and other crimes. This expectation is consistent with the fact that the drop in vehicle theft preceded that of violence including homicide as shown in Figure 6a which shows police-recorded Uniform Crime Report (UCR) data from 1960 onwards. More generally, the tendency for crimes to be linked and for one crime to produce a multiplier effect that generates others has been termed a 'Van Dijk chain' (Felson and Clarke, 1998; 19).

If preventing car theft reduced violence including homicide, this fits with the keystone crime hypothesis.

INSERT FIGURES 6a AND 6b ABOUT HERE

Figure 6a shows that the drop in car theft was accelerating to 2008. This may reflect the growth of in-car telemetry systems (such as General Motors' OnStar) that are linked to a control center (Economist, 2009). Such devices have now been around for over a decade and allow vehicle engines to be slowed and remotely deactivated, so a car can be stopped and located even if the thief has the key. They might be expected to impact on car-jacking and key theft as a modus operandi, thereby reducing key-theft burglaries as a bonus. Figure 6a appears to suggest that the continuing fall in car theft has diverged from the trend for violence. However, our preliminary analysis of the first and second differences (for brevity, not included here) suggests violence may be continuing to follow a similar pattern to car theft and that, if so, further falls in violence may be experienced in the US.

When crime trends for the US are examined using the survey data of the National Crime Victimization Survey (NCVS) which is available since the 1970s, there are distinct patterns, shown in Figure 6b (which also includes UCR data on homicides).² Theft and burglary track each other and have been in steady decline since the early

² NCVS property crime and violent crime data (including UCR data on murder and non-negligent manslaughter) from <http://www.ojp.usdoj.gov/bjs/cvict.htm> accessed 19 July 2009.

1980s. Serious violence (including homicide) tracks motor vehicle theft, increasing in the 1980s then falling sharply in the 1990s. Trends in homicide track those of motor vehicle theft even more closely. While much of the research on the US crime drop has focused on violence, there seems good reason to suggest that focusing on other crime types, particularly vehicle theft, may be rewarding. More generally, we suggest there is a need for further research to explore the relationship between securitization of various types and the crime drops experienced in the US and elsewhere.

Conclusion

This study presented a set of security hypotheses, then case studies for one crime type in two countries. Following this, the hypothesis was extended to incorporate an interlocking set of hypotheses within the framework of routine activity and opportunity theory. Routine activity theory provided what is probably the most convincing explanation, against expectations, for the coincidence between increasing crime levels and increasing levels of wealth and welfare in the second half of the twentieth century (Cohen and Felson, 1979). It is odd that it has been rarely drawn on as a starting point for looking at the equally unexpected falls in crime since the early 1990s. In this context the security hypothesis is, we suggest, a promising one to pursue in efforts to explain the variations in upward and downward crime trajectory for different crimes and places. Across-the-board explanations or ones that generalise from single countries or single crime types, and which lack the flexibility to explain why some crimes go up while others go down, seem to us unlikely to be adequate. Further research on the crime drop should explore the following hypotheses:

- that securitization reduces the number and suitability of targets for other crime types
- that reductions in car theft (and, we suspect, burglary) disrupt the routine activities that facilitate other crimes including violence
- that reduced criminal opportunities stifle the onset and truncate the duration of criminal careers
- that key changes in routine activities, and in potential offenders' perceptions of benefits and costs, have reduced crime

There is a clear policy lesson to be harnessed from the crime drop. It is well-established that properly-developed situational crime prevention can have a dramatic effect on crime. However, more concerted effort to incentivise prevention by manufacturers and businesses may prove a particularly fruitful policy line. It took years of concerted effort by consumer groups, victim advocates and others, car theft indices and a vision of the crime-free car (e.g. Southall and Ekblom, 1985), plus the threat or introduction of regulation, to nudge car manufacturers into better security. Once it became a competitive issue this security improved rapidly and appears to have become tremendously effective. In particular, the data presented here suggest that good quality electronic immobilisers became car theft's killer technology. The recent levelling-off and small increases in violence in the US (which incidentally preceded the recession underway at completion of this paper) seem likely due to 'iCrime' (Roman and Chalfin, 2007) and the increased availability of valuable portable high-risk electronic goods. Consider if manufacturers can be encouraged to ensure such goods, including but not limited to MP3 players, smart-phones, GPS-systems and laptops, can be remotely tracked and disabled if stolen. Consider if architects and urban planners can be encouraged to ensure public and private buildings and environments discourage crime. To date, efforts to encourage designing-out crime by manufacturers, businesses, planners, and designers more generally, have been partial and uncoordinated. Further policy effort to instil prevention into the design stages for property, services and other products and systems is likely to prove a cost-effective means of tackling crime and can be directly influenced by government policy-makers. Society has a major comparative advantage and better resources than even the more adaptive offenders, but needs to stay ahead of the curve. This may be the lesson of the crime drop.

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Appendix Box 1: Extract from Vehicle Standard (*Australian Design Rule 82/00*) – *Engine Immobilizers 2006* (Lloyd 2006).

31. GENERAL SPECIFICATIONS

31.5. It shall not be possible to permanently override an immobilizer.

31.7. An immobilizer shall be designed and built such that, when installed on a vehicle, according to the manufacturer's instructions, it cannot rapidly and without attracting attention be rendered ineffective or destroyed by.... It shall be difficult and time consuming to replace a major component assembly in order to bypass the immobilizer....

32. PARTICULAR SPECIFICATIONS

32.1.1. An immobilizer shall be designed so as to prevent the operation of the vehicle under its own power by at least one of the following means:

32.1.1.1. disable, in the case of after-market fitting, or vehicle equipped with diesel engine, at least two separate vehicle circuits that are needed for vehicle operation under its own power (e.g. starter motor, ignition, fuel supply etc.);

32.1.1.2. interference by code of at least one control unit required for the operation of the vehicle...

32.2. Operating reliability

Operating reliability shall be achieved by suitable design of the immobilizer, account being taken of specific environmental conditions in the vehicle....

32.4. Setting of the immobilizer

32.4.1. The immobilizer must be set without supplementary action from the driver by at least one of the following means:

- at rotation of the ignition key into the "0" position in the ignition lock and activation of a door; in addition, immobilizers which unset immediately before orduring the normal starting procedure of the vehicle are permitted to set on turning the ignition off.
- a maximum of 5 minutes after removing the key from the ignition lock.

32.5. Unsetting

32.5.1. Unsetting shall be achieved by using one or a combination of the following devices. Other devices with an equivalent level of security giving equivalent performance are permitted.

32.5.1.1. A key pad for inputting an individually selectable code having at least 10,000 variants.

32.5.1.2. Electrical/electronic device, e.g. remote control, with at least 50,000 variants and shall incorporate rolling codes and/or have a minimum scan time of ten days, e.g. a maximum of 5,000 variants per 24 hours for 50,000 variants minimum.

32.5.1.3. If unsetting can be achieved via a remote control, the immobilizer must return to the set condition within 5 minutes after unsetting if no supplementary action on the starter circuit has been undertaken.' (Lloyd: 33-4)

The standard also requires that immobilizers have to be tested and approved.

Table 1. Entry method for attempted car theft, England and Wales 1995-2007

Method	1995 (%)	1997 (%)	1999 (%)	2001/2 (%)	2002/3 (%)	2003/4 (%)	2004/5 (%)	2005/6 (%)	2006/7 (%)
Forced lock	76	80	68	61	66	61	67	64	61
Broke window	10	12	18	27	21	22	22	25	26
Other	8	5	11	4	9	14	8	7	6
Door unlocked	2	2	2	6	3	3	2	4	5
Used key	4	1	1	2	1	1	1	0	1
Window open	0	0	0	0	0	0	0	0	0
Total %	100	100	100	100	100	100	100	100	100

Note: Where columns do not sum to 100 this is due to rounding.

Table 2: Prevalence (%) of car security devices, BSC 2006-7

Security device	Percent of cars with various security types			
	All cars	Stolen cars	Theft from	Attempted theft
Central locking	87.8	59.5	74.4	67.6
Car alarm	62.9	41.2	41.3	46.5
Window security etching	52.0	44.9	51.2	55.7
Electronic immobilizer (only)	45.7	23.6	36.0	36.9
Electronic and mechanical immobilizer	22.8	12.4	20.6	21.3
Mechanical immobilizer	9.9	9.2	10.2	11.4
Tracking device	3.4	0.8	3.4	3.1

Note: Columns sum to more than 100 because vehicles often have more than one security device.

Table 3: Protective effect of security devices, BSC 2006-7

Security device	Percent risk reduction effect		
	Car Theft	Theft from	Attempts
Tracking device	77.3	0.1	9.7
Electronic immobilizer	48.4	21.3	19.3
Electronic and mechanical immobilizer	45.8	9.7	6.6
Car alarm	34.5	34.4	26.1
Central locking	32.2	15.2	23.0
Window security etching	13.8	1.6	-6.9
Mechanical immobilizer	7.3	-3.0	-15.7

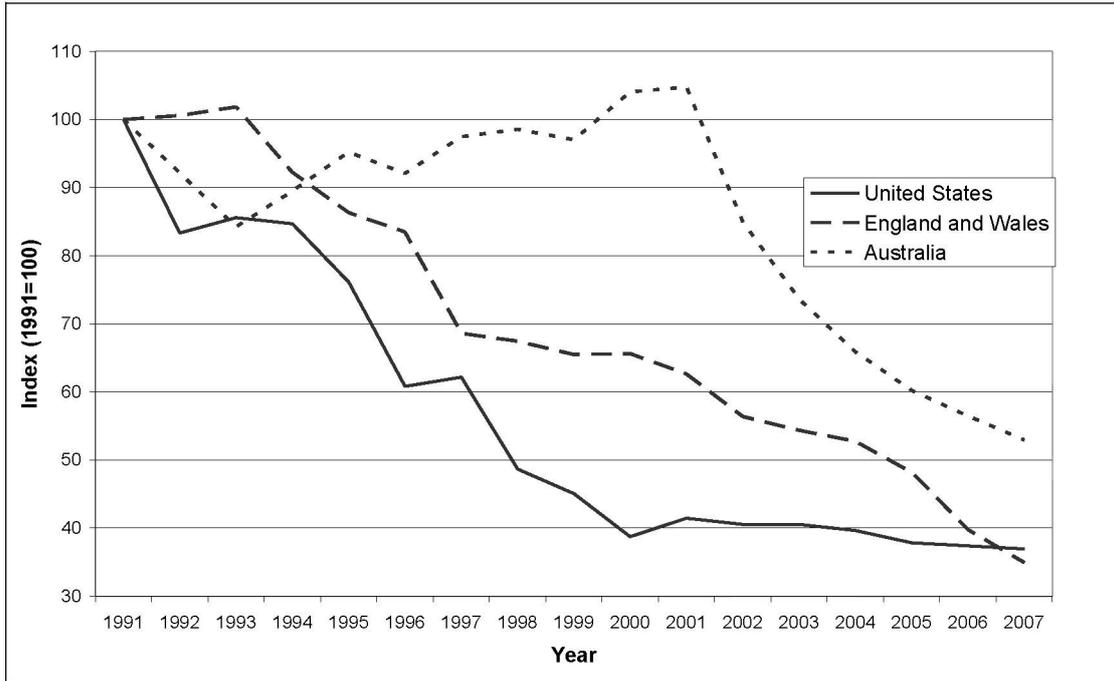


Figure 1: Motor vehicle theft in the United States, England and Wales, and Australia

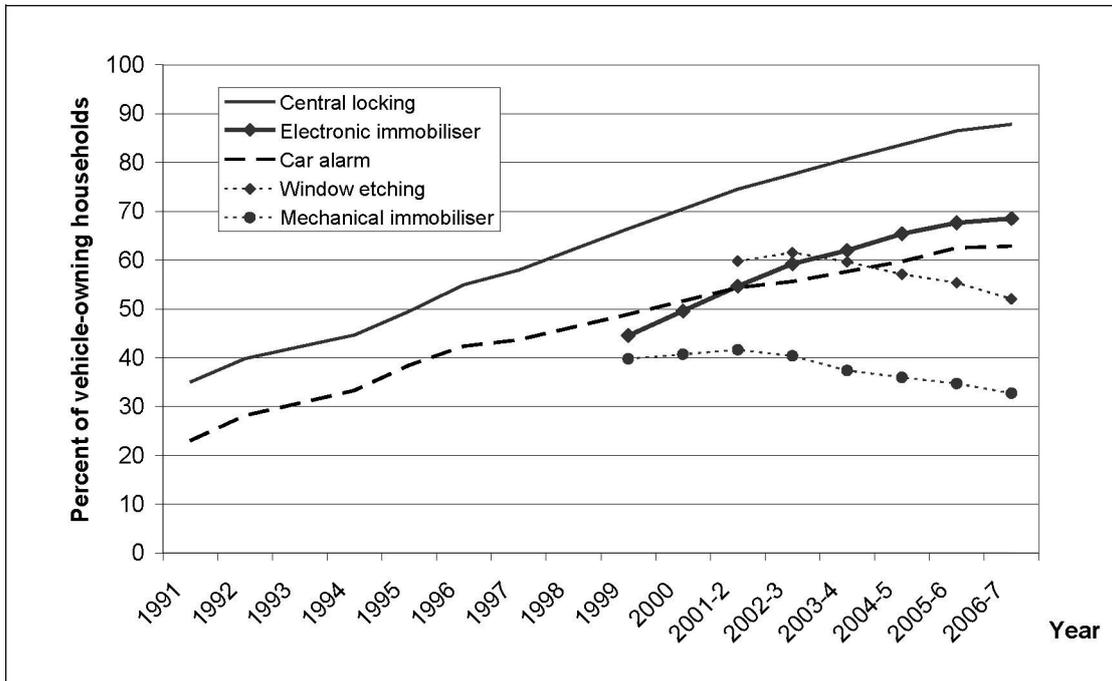


Figure 2: Prevalence of car security in England and Wales 1991-2006 (Source: BCS)

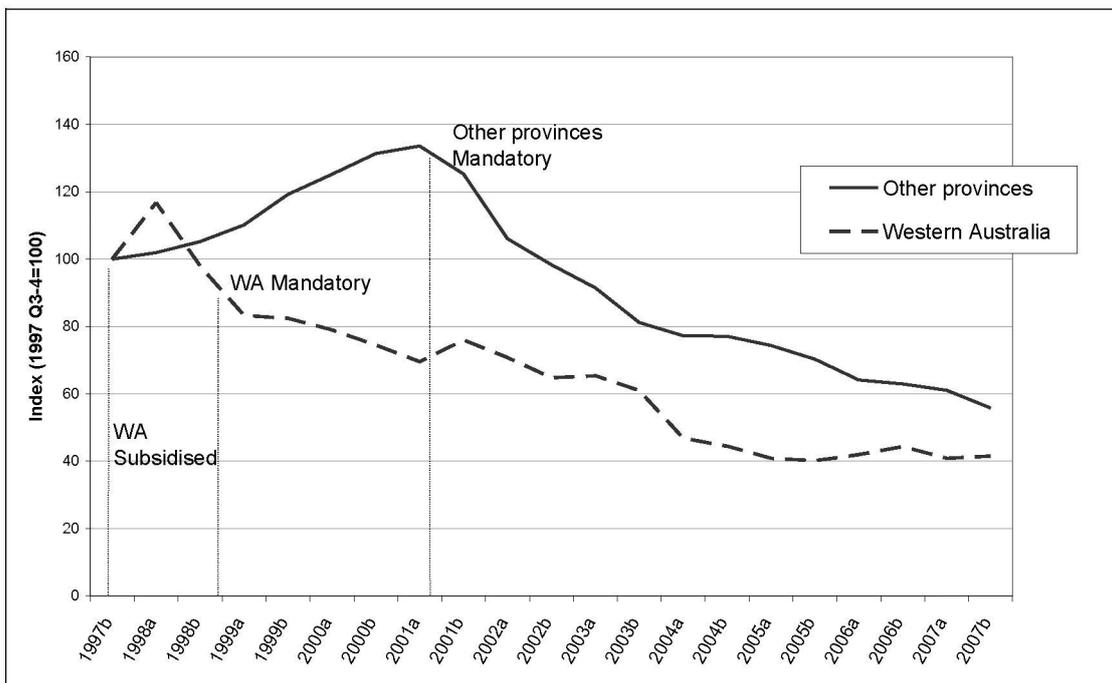


Figure 3: Vehicle theft in Australia 1997-2007 (Source: CARS)

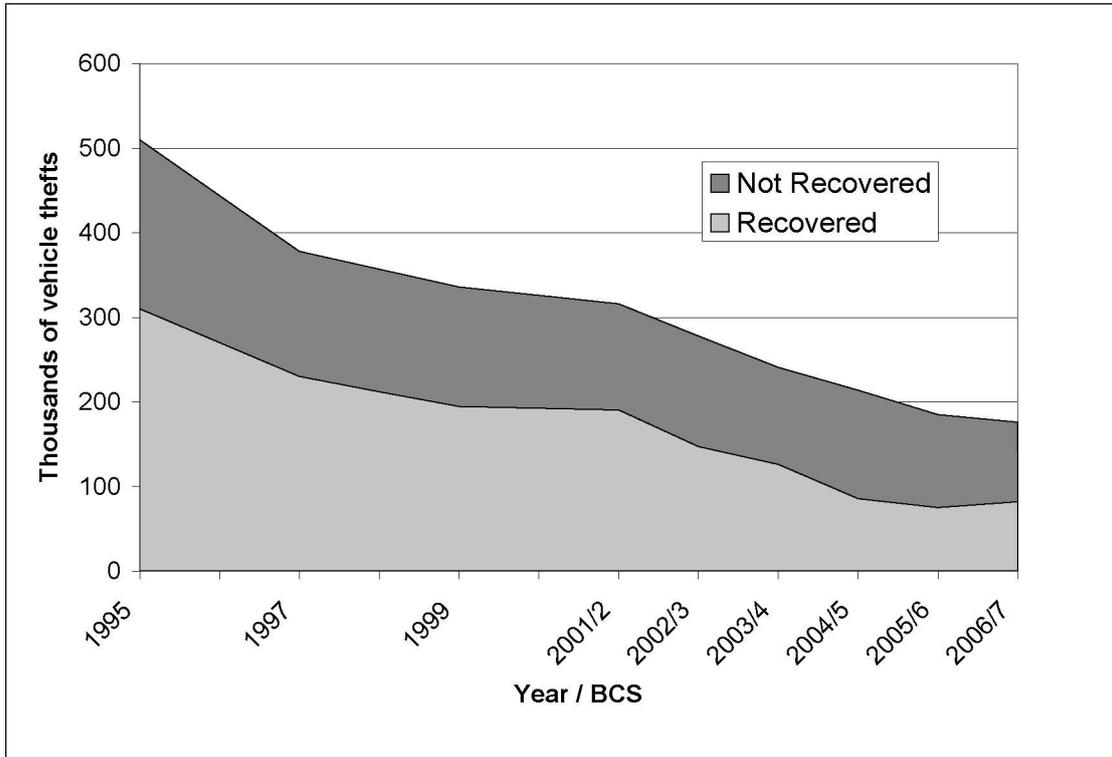


Figure 4: Temporary and permanent car theft in England and Wales, 1995-2007 (Source: BCS)

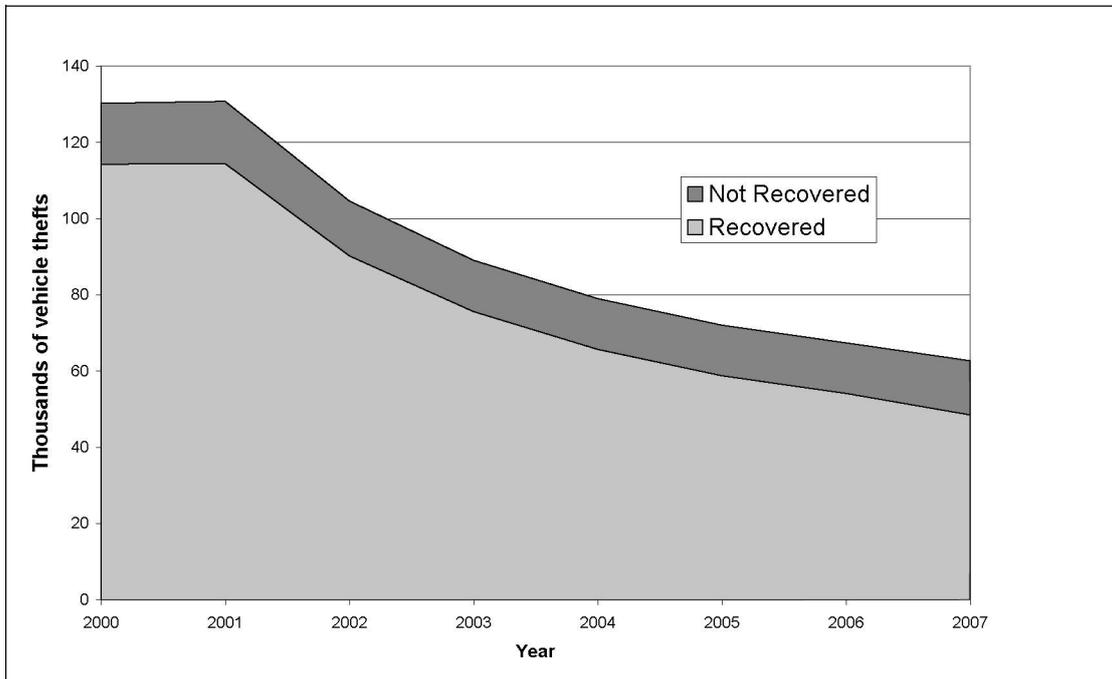


Figure 4: Temporary and permanent car theft in Australia, 2000-2007 (Source: CARS)

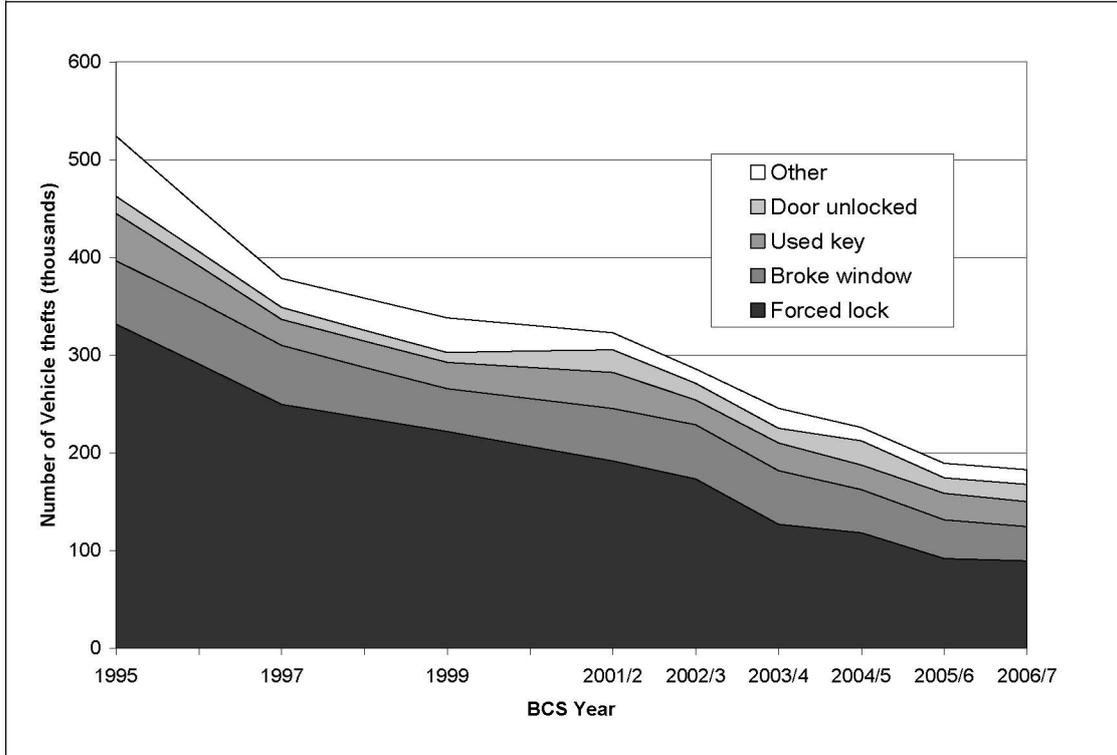


Figure 5a: Entry method for car theft in England and Wales 1995-2007 (Source: NCS)

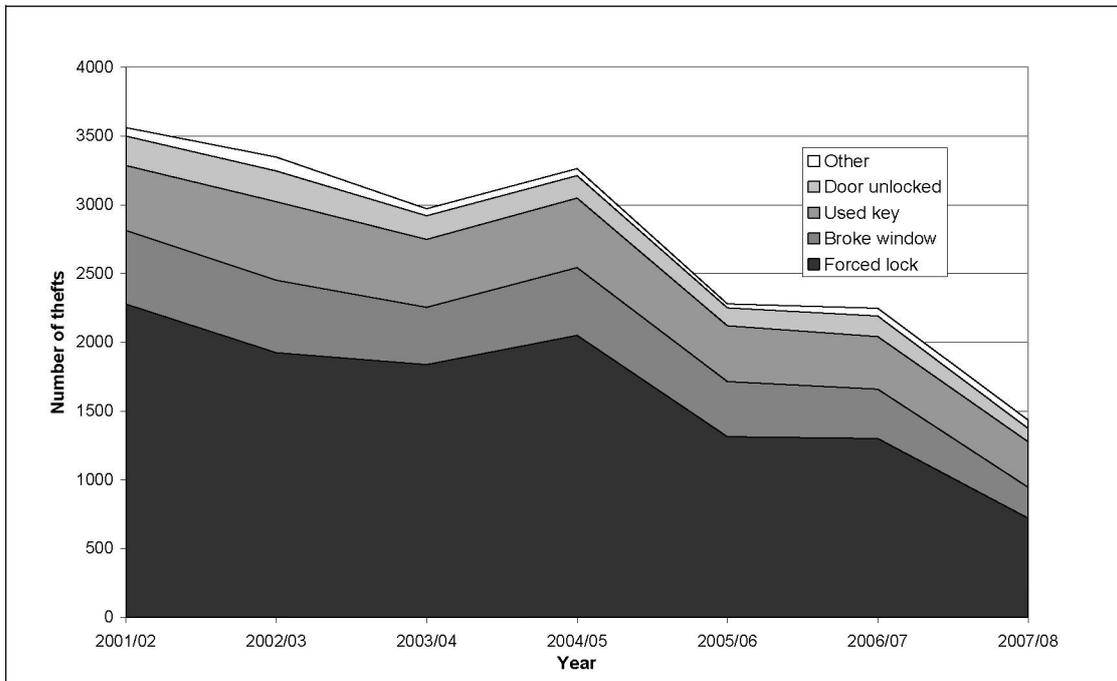


Figure 5a: Entry method for car theft in Australia 2001-2007 (Sources: CARS)

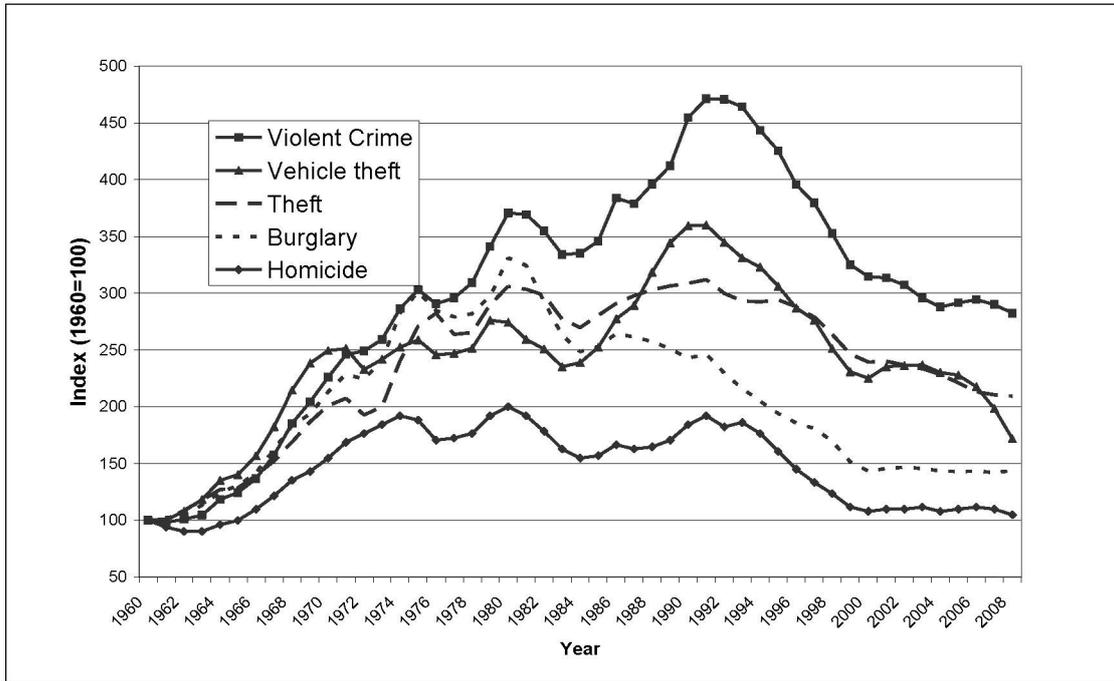


Figure 6a: United States 1960-2008 (Source: UCR)

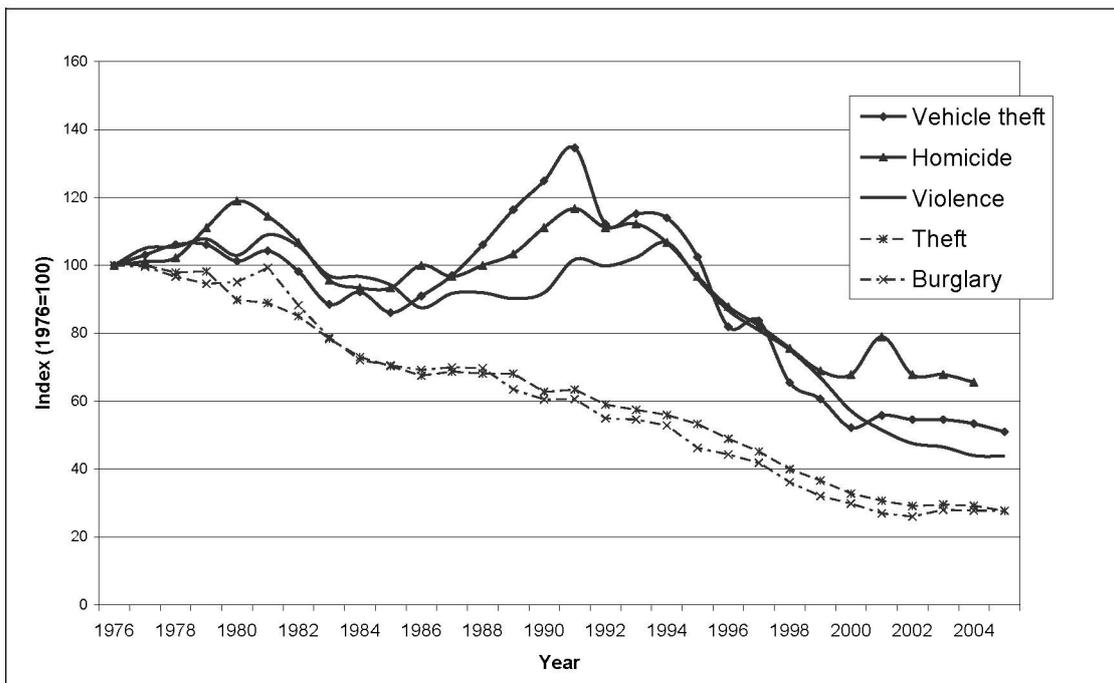


Figure 6b: United States 1976-2005 (Source: NCVS plus UCR homicides)