Crime and Macroeconomic Performance in Scotland

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Executive Summary

- This paper analyses the relationship between macroeconomic performance and crime in Scotland.
- Economic theory suggests that there may be a link between economic conditions and crime. This relationship is based upon the basic principle that the relative payoffs to committing crime increase when there are fewer opportunities to engage in legitimate activities, or the returns from engaging in these are diminished.
- It is through this reasoning that there may be an assumption that in a period of poor economic performance, especially one brought about by a recession, we will invariably experience an increase in the prevalence of crime, particularly acquisitive crime.
- This paper points out that in fact the relationship is not as clear cut as one may expect, with neither the current literature on the subject nor our own analysis leading to the conclusion that there is an unambiguous relationship between the economy and crime.
- A variety of different factors affect the incentives and propensity to commit crime, and it is apparent from this work that it is difficult to separate out these competing impacts. The probability and severity of punishment, imprisonment, police numbers and drug use, along with more intangible factors such as social norms and human capital, amongst others, all influence criminal activity.
- The available literature and research on the relationship, while extensive, is unable to come to a definitive conclusion regarding the association between crime and the economy. The evidence leans towards a link existing, but not to a great enough degree that it can be said with certainty that it does.
- The strongest evidence from the literature review points towards inequality having the greatest influence on crime. However, it is unclear how inequality and income distribution will be affected by the current economic downturn.
- Analysis of Scottish specific data on the impact of unemployment and national output on recorded crime rates is unable to conclude whether a relationship between the variables does or does not exist with a high degree of confidence, so similar to the literature review is ambiguous in its findings.
- The finding that there is no certain link between economic performance and crime is an important one in and of itself, allowing us to dismiss the belief that the current recession will undoubtedly lead to a rise in criminal activity - although not discount the possibility completely - and therefore formulate policy accordingly. Nevertheless, the evidence tends to suggest that Solidarity, along with sustainable economic growth, forms one of the key foundations of a Safer and Stronger society.

1. INTRODUCTION

1.1 The recession in Scotland technically began in 2008 Q3, and Scottish GDP declined by 5.9 per cent between then and 2009 Q3[1], remaining fairly stagnant thereafter. Unemployment has increased sharply in both Scotland and the UK. In 2010 Q2 the ILO unemployment rate for Scotland was 8.4%, slightly higher than the UK figure of 7.8%. These figures represent an increase of 3.9 and 3 percentage points, respectively[2], from their previous lows in 2007 and 2005. This recession is globally synchronised, and is widely regarded as being the worst in the post-war period.

1.2 One policy question that has arisen from the severity of this recession is the impact that it might have on crime in Scotland. While economic theory suggests that there might be a rise in crime because of increased unemployment, other factors also influence crime and different crime types may react in differing ways to economic factors. There is a large literature that attempts to assess the relationships between economic variables and criminal activity. However, most of this evidence does not relate directly to Scotland[3]. This paper explores the links between crime and economic factors, and tries to relate these findings to Scotland. It represents a preliminary attempt to answer the following research questions:

1) How might macroeconomic performance affect crime?
2) What types of crime might be affected by macroeconomic performance?
3) What evidence is there that macroeconomic performance affects crime?
4) Do trends in Scottish crime and macroeconomic data suggest a link between crime and macroeconomic performance?

1.3 Part 1 of the paper considers the first three research questions by discussing the economic theory on how crime can be influenced by economic factors, its limitations, and by examining the available empirical evidence. Part 2 addresses the fourth question by examining Scottish crime and macroeconomic data to explore the links between crime and economic performance at a national and sub-national level. Tentative conclusions are then drawn about the possible impact of the current recession on crime in Scotland.

[1] Scottish Government GDP Statistics
[2] Labour Force Survey, Office of National Statistics
[3] The only studies found analysing Scottish data are Reilly and Witt (1992) and Deadman and Pyle (1994). However, in both papers the only variable analysed is unemployment, and the two studies find opposite results. The latter study is in fact a critique of the former, and concludes that by extending the dataset to include three additional years, the positive significant relationship between crime and unemployment dynamics (found in the former study) disappears.

2. THE EXISTING EVIDENCE BASE

2.1 This section attempts to answer the first three research questions. It discusses how economic factors might influence crime, and the limitations of this approach. The section then explores published literature on the topic, looking at the influence of macroeconomic variables (such as unemployment, GDP, wages, etc.), and other factors (such as prevention mechanisms – policing; punishment mechanisms – imprisonment; social factors – education, social interaction; and demographics – size of the age of the cohort with highest propensity to offend) on crime.

How Might Macroeconomic Performance Affect Crime?

2.2 The traditional approach used by economists to explain the impact of economic factors on crime is based on the work of Becker (1968). In this theory, an individual when considering the possibility of committing a crime tries to establish whether or not it is worthwhile to commit the crime, taking into account all the determinant factors. These include the probability of apprehension and the severity of punishment, the returns from legal or illegal activity, and the willingness to engage in illegal activity[4]. Under this theory, individuals compare the possible gains from committing the crime (monetary and non-monetary) against the possible losses associated with committing the crime (including the lost opportunities for legal earnings and the potential lost earnings from punishment - the opportunity cost). If the benefits outweigh the costs, the individual commits the crime[5].

2.3 Economic factors have a determinant role in this framework. Rational individuals with economic opportunities from legal activity (e.g. jobs providing them with a source of income and prospective career) will have a higher opportunity cost of committing a criminal act. Their propensity to engage in criminal behaviour will be *lower* than that of an unemployed or underemployed individual, because, if apprehended, they will have more to lose. At first glance, this framework may suggest that the types of crime affected are primarily acquisitive crimes. However, violent crimes could also be included in this framework[6].

2.4 This theory has been subject to criticism for its relatively simplistic assumptions about criminal behaviour[7]. These criticisms are not limited solely to criminal theories, but are aimed at the wider body of 'rational choice' models in which an individual takes into account all the information available to them to form a judgment based on their preferences, beliefs and the constraints facing them to maximise their personal utility. It is argued that in reality not everyone who stands to gain from engaging in crime as predicted by these models does so, as the models fail to fully take into account psychological and sociological factors, and fail to stand up to empirical evidence[8]. Other theories should therefore also be considered when linking economic factors to crime. Strain theory (the possible conception by a given individual of a disparity between the individual's goals and the means to attain such

[4] Becker (1968:177)
[5] Assuming a non risk-preferring individual.
[6] Becker (1968:185); Ehrlich (1973)
[7] Hansen and Machin (2001:6-7)
[8] Green and Shapiro (1994)

goals)[9] suggests that, during recessions, acquisitive crimes may become a substitutive means of attaining an individual's goals should they become unemployed. However, this approach may also apply to individuals who remain employed during recessions[10]. Social Control Theory[11] considers an individual's bond to society and the mechanisms that may render this individual more or less attached to society. Several elements (family, peers, schools) exert an influence and thus some type of control on an individual, and if these elements do not have the necessary impact, he or she may commit acquisitive or violent crimes. However, if these social elements are present but exert a negative influence on the individual, it is also possible that he adapts to them and engages in criminal behaviour.

What Evidence is There that Macroeconomic Performance Affects Crime?

Unemployment

2.5 The basic economic theory predicts a positive relationship between unemployment and crime: a rise in unemployment would lead to an increase in crime. However, the evidence appears to be equivocal, with a variety of studies finding contradictory results. For instance, several studies have found either no significant relationship between unemployment and crime, or only very *weak* results in support of a link between them[12]. On the other hand, other studies have instead found the *positive* relationship to hold, particularly for acquisitive crimes[13]. It is even the case that a small amount of studies have however found a *negative* relationship between unemployment and crime[14], implying more employment leads to greater crime levels.

2.6 For acquisitive crimes specifically, there is stronger evidence that there is a significant but relatively small relationship between these and unemployment. Levitt (2004) looks at a number of studies[15] and finds that for property crime a typical estimate would be that a one percentage point rise in the unemployment rate is associated with a one percent increase in property crime. However, and as theory would tend to suggest, violent crime does not follow this same relationship.

2.7 The evidence is not unanimous and several reasons have been suggested for this ambiguity. One reason is that unemployment may be too narrow an indicator, as it makes no distinction between voluntary and involuntary unemployment, which may provide different motivations for committing offences. Use of unemployment indicators are not qualified by the presence or absence of social assistance mechanisms such as benefits, and focusing on it as a measure may overlook the idea that offences can be committed by those already in employment. Another

[9] Strain theory was first developed by Merton (1938)
[10] Arvanites and Defina (2006:142) quoting Bushway and Paternoster (2001)
[11] This builds on the work of Hirschi (1969)
[12] Ehrlich (1973); Cohen et al (1980); Hale (1989); Freeman (1983); Levitt (1997); Deadman and Pyle (1994); Fox (1978) and Orsagh (1980) in Chiricos (1987:188); Cullen and Levitt (1999)
[13] Chiricos (1987); Sjoquist (1973); Witt and Reilly (1996); Witt et al (1998); Danziger (1975); Gould et al (2002); Engberg (1999) finds negative relationship employment-homicide; Raphael and Winter-Ebmer (2001) find strong positive relationship with property crimes but mixed results for violent crimes
[14] Britt (1994); Allen (1996); Land et al. (1995)
[15] Freeman (1995), Machin and Meghir (2000), Gould, Weinberg and Mustard (1997), Donohue and Levitt (2001) and Raphael and Winter-Ebmer (2001)

reason for the ambiguous results may be to do with the distinction between the motivation effects and opportunity effects of unemployment on crime[16]. The former effect suggests that unemployment increases an individual's incentives to commit crime because of the now lower opportunity cost of committing the crime. The latter effect suggests increases in unemployment reduce opportunities for acquisitive crimes, as individuals may have less money or property to steal, and more individuals are present at home for longer. Also, while the opportunity effect occurs contemporarily, the motivation effect might instead be lagged: it may take some time for an unemployed individual to turn to crime. It has been suggested that differing strengths of these effects might cause the ambiguity in the evidence base, although studies into this hypothesis have been inconclusive[17].

2.8 A final reason relates to the different research approaches taken. The nature and magnitude of the unemployment-crime relationship may depend on the types of crime considered, the measure of unemployment used, the time period considered, the research methodology used, and whether the study is considering crime and unemployment levels, or crime and unemployment rates[18]. Overall, despite the volume of research in this area, the relationship between crime and unemployment is ambiguous.

Gross Domestic Product, Consumption, Consumer Sentiment

2.9 Several studies have considered the relationship between Gross Domestic Product (GDP) – a measure of the national output of goods and services – and crime. Here again some of these have found GDP significant in explaining variations in criminal activity[19] but some have not[20]. The most common explanation is that GDP may be too broad an indicator. As described in this section, a multitude of factors may affect variations in criminal activity. These different factors may somewhat reflect GDP dynamics (e.g. higher incomes, less unemployment, increased police resources) but may also not (e.g. changes in the criminal justice system, such as variations in sentence lengths, or inequality). This implies that it is often not easy to assess the effect of GDP on crime since GDP is not the most proximate cause of criminal activity dynamics. However, the 'broadness' of GDP also means it captures economic conditions such as job security, hours worked, and wages which other more narrow indicators do not, and therefore acts as a proxy for overall economic health. It therefore has its limitations, but also advantages as an explanatory variable.

2.10 Consumption expenditure may represent a more direct economic variable reflecting crime dynamics. Some studies have found that in periods where consumption grows, acquisitive crimes appear to decline[21]. These studies suggest that in the short run, when consumption is increasing and acquisitive crimes are

[16] Cantor and Land (1985)
[17] Kleck and Chiricos (2002:650)
[18] Chiricos (1987: 192, 195, 202)
[19] Deadman and Pyle (1994); Arvanites and Defina (2006)
[20] Levitt (1996:339) finds that 'increases in per capita income are positively correlated with violent crime, but are not strongly correlated to property crime'; Levitt (2004) finds no significant impact of economic activity for the crime decline of the 1990s in the USA
[21] Field (1990, 1999); Hale (1998)

declining, the 'motivation effect' is occurring: individuals consume more, implying that they have higher resources to spend, hence less motivation to engage in acquisitive crime. It will only be at a successive stage, once more individuals possess more goods, that the 'opportunity effect' might occur – where there are a greater number of more 'profitable' targets for crime and therefore an increased expected payoff to engage in criminal activity[22]. If recessions tend to bring periods of declining consumption these results may suggest that acquisitive crimes are likely to increase in the short-run (because of the motivation effect) but that they will then decline (due to the opportunity effect).

2.11 The effect of consumer sentiment has also been considered[23]. Consumer sentiment measures the degree of confidence consumers have in future economic conditions and their personal financial prospects, and is therefore somewhat independent from official GDP and unemployment statistics. It is this reason that has been put forward to partially explain the decline in property crime rates in the US in the 1990s: GDP growth, and rising prison population are found to have contributed to the decline in crime, however, the authors make clear that these do not explain the totality of this decline and find that the rise in consumer sentiment 'probably contributed to one fifth to one half of the reduction in robbery and property crime'[24].

Wages and Inequality

2.12 The wage level, and in particular the level of low wages (measured, for example, by the average wage of workers with only a high school degree or less; by the 25th percentile of the wage distribution; etc.) is considered to be a potential factor explaining variation in criminal activity. Most of the studies found in literature analysing this link have found a significant negative relationship between the level of low wages and crime: increasing the relative wages for the lowest paid, and therefore reducing inequality, would reduce crime. Most of these studies have found significant effects on acquisitive crimes[25], but a few have also found there to be a significant link between low wages and violent crimes[26]. The latter category includes a study testing the link between wages of less-skilled men and crime. The study concludes 'a sustained long-term decrease in crime rates will depend on whether the wages of less skilled men continue to improve. These results are robust to the inclusion of deterrence variables (arrest rates and police expenditure)'[27]. An increase in low wages can therefore be considered an important factor in reducing acquisitive crimes, and possibly also in reducing violent crimes.

2.13 Analysis in 'The Spirit Level'[28] used cross country data to examine the effects of inequality on a range of social outcomes, ranging from obesity to the number of

[22] Eide (1999)
[23] Rosenfeld and Fornango (2007)
[24] Rosenfeld and Fornango (2007:758)
[25] Hansen and Machin (2001:2) tested the effects of the introduction of a National Minimum Wage in the UK and found that 'changes in crime rates before and after the minimum wage introduction in April 1999 are seen to be lower in areas with more workers affected by the introduction of the NMW. Perhaps not surprisingly, the negative association is seen to be much stronger statistically for property and vehicle crimes than for violent crimes'; Machin and Meghir (2000); Grogger (1998)
[26] Gould et al. (2002)
[27] Ibid. (p58)
[28] Wilkinson and Pickett (2009)

teenage births. It found that more unequal countries had a tendency to have higher rates of drug abuse, homicides and imprisonment. The analysis has been criticised for its limited statistical methodology, but the authors argue that presenting the bigger picture across a range of variables illustrates the strong narrative.

2.14 Other measures are also used to quantify inequality. Income inequality is commonly calculated with measures such as the Gini coefficient (a measure of the statistical dispersion of a distribution) or the quantity of households with income below a given percentage of the median (e.g. ten percent); however other measures of inequality could also be considered (e.g. inequality in human capital or, more generally, inequality of opportunities). One rationale for inequality leading to increased crime is as follows; for a given median wage across a region, higher inequality implies a larger differential between the expected payoffs from legal and illegal activities.[29] Individuals in areas of high inequality may also have lower expectations about their chances of improving their social or economic status, and thus have a lower perceived opportunity cost of engaging in criminal activity. Overall, it is recognised that a positive relationship between inequality and crime exists: a rise in inequality often corresponds to a rise in crime[30].

What Other Factors Might Influence Crime?

2.15 The empirical literature also suggests that factors other than economic variables have a bearing on crime. Below a number of these influences are examined, but with so many potential factors this list is by no means exhaustive.

Imprisonment

2.16 One such factor is the imprisonment of offenders. The effect of imprisonment on crime is two-fold: imprisonment has an incapacitation effect (in which someone incarcerated is unable to reoffend outwith the prison) and a deterrence effect (the higher the probability of being imprisoned and the more severe the punishment, the less the individual will be tempted to commit the crime). Although the theory suggests that increased imprisonment should unambiguously decrease crime with all else held equal, the evidence is more mixed. The uncertainty lies not on the first effect, the incapacitation effect, for which there appears to be a consensus, but rather on the deterrence effect. Dynamic effects may also exist, such as the 'school of crime' theory in which prisoners learn criminal techniques and develop networks with fellow inmates which could result in greater reoffending upon release from prison. At present, empirical work does not provide sufficient evidence of an unambiguous deterrent effect of incarceration. Whilst some studies confirm the negative relationship between imprisonment and crime from a deterrence perspective, these studies do not provide a consensus upon the types of crime

[29] Fliesher (1966), Ehrlich (1973)

[30] Sala-i-Martin (1992, 1997), Imrohoglu et al. 2004 (only property crimes analysed); Hansen and Machin (2003) find a strong positive relationship between property crime and wage inequality in the UK; Clarke et al. (1999) positive relationship inequality acquisitive crimes (study did not include shoplifting because the authors found no relationship with shoplifting in previous study); Chiricos (1987) and Freeman (1983, 1995) reviews; Freeman (1996:33); Land et al. (1990) homicide rates correlated with inequality across cities; Fowles and Merva (1996); Hsieh and Pugh (1983); Clarke et al. (1999); Imrohoglu et al. (2004); McAdams (2007)

significantly affected[31]. Moreover, other studies provide rather ambiguous results for all forms of crime[32].

Apprehension probability and punishment severity

2.17 The aforementioned deterrence effect can be broken down into two main constituents, the probability of punishment (e.g. likelihood of being apprehended and convicted) and the severity of punishment - both factors that could have a deterrence effect on an individual's propensity to engage in criminal behaviour. Although the literature contains more evidence on the deterrence effect of the probability of punishment[33], other studies[34] also provide evidence of the strength of the severity of punishment in deterrence consistent with economic theory. As above, the evidence mainly points towards a negative relationship between both certainty of punishment and severity of punishment on one side and crime on the other side for certain forms of crime, but again is by no means overwhelming.

Police force (number of police officers)

2.18 Some studies have found[35] limited evidence of a direct relationship between police numbers and crime. However, these studies have been criticised for being methodologically flawed as they fail to take into account "endogeneity" – that is where there is a two-way causation effect between the variables in question. For instance, in the case of police officer numbers this would stem from more crime leading to pressure to increase the size of the police force to tackle it, but at the same time that a greater number of police officers could reduce crime levels through deterrence if all else was equal[36]. The 'instrumental variable' approach attempts to address this problem through using a variable which is highly correlated with the one of interest, but does not suffer from the same dual causality. When evaluating whether the number of police officers *leads to* a reduction in crime, one such variable would be the number of fire-fighters - given that their numbers are highly correlated with the size of the police force, but presumably an increase in crime would not lead to the need for more fire-fighters. Studies correcting for these methodological

[31] Byrne and Sampson (1986) 'finds a significant negative relationship between jail populations and robbery rates, but not between jail populations and murder rates' in Levitt (1996:323); Devine et al. (1988); Besci (1999); Spelman (2000); Marvell and Moody (1994) find greater effect on property crimes than on violent crimes; Levitt (1996,2004); Howard (1996), Murray (1997); Kessler and Levitt (1999)

[32] Nagin (1978) points out the distinction between 'absolute deterrent effects' recognising that 'there is little doubt that such effects are present and are frequently of substantial magnitude' (p341) and 'marginal deterrent effects' which he finds to be insignificant in reducing crime rates (p359,361-363); Clear and Rose (1998) find that imprisonment could even increase crime in Arvanites and Defina (2002:636); Currie (1998)

[33] Imrohoglu et al. (2004); Farrington et al. (1994)

[34] Levitt (1998); Machin and Meghir (2000); Sjoquist (1973); Tauchen et al. (1994)

[35] Cameron (1988)

[36] These studies' flaws stem from their not addressing a common problem of this type of study, that is the endogeneity problem. This problem relates, in this context, to the fact that crime and police levels are evidently correlated but the causality between the two is ambiguous: higher levels of crime may cause an increase in police numbers (tending to make the relationship a positive relationship) but this does not mean that an increase in police force increases crime. More modern studies have tried to solve this problem using an instrumental variables approach.

concerns[37] have found evidence that increases in police numbers reduce crime[38] for both property and violent crime (but not for rape and larceny). Although these results have been criticised[39], a successive paper by the same author[40] using the number of fire-fighters as an instrumental variable confirms and strengthens the author's previous results: there seems to be a negative relationship between police and property and violent crime. This is confirmed by other studies that utilise different techniques to assess such causality[41].

Human Capital

2.19 Human capital appears to be an important variable in determining an individual's propensity to commit a crime.

2.20 One source of human capital is education. Education provides the fundamental knowledge that will then be extremely useful in order to engage in a legitimate activity. Moreover, education provides at least three additional effects that may impact on an individual's probability of committing a crime. First, an individual being at school should have less time available to engage in criminal activity. Second, a school is a form of social control, which as mentioned above appear to be important an factor in determining an individual's likelihood of participating in criminal behaviour. And the third, which concerns in particular higher education, relates to the increased opportunity cost of committing the crime given the higher expected returns of legitimate activity. The evidence seems to confirm the theory as relevant studies demonstrate the presence of a significant negative relationship, notably between education and 'blue-collar crimes'[42].

2.21 Human capital can also be accumulated in other circumstances than through schooling. As some studies have pointed out[43], work may well be a way of increasing one's stock of practical skills and knowledge through 'on the job training' type effects. Although being in a job and gaining the accumulation of skills associated with it increases the opportunity costs of engaging in criminal activity, it

[37] Levitt (1997)
[38] Levitt (1997:286)
[39] McCrary (2002), Levitt (2002)
[40] Levitt (2002)
[41] Griesinger et al. 1994; Marvell and Moody (1996) use Granger causation to contrast simultaneity bias and find significant causality police levels-crime; Corman and Mocan (2000) also use Granger causation; Hansen and Machin (2003) find a negative relationship property crime and number of police officers; Levitt (2004) recognises the increase in police levels as being one of the significant elements leading to the decline in crime of the 1990s in the USA; Machin and Marie (2005:4) assess the impact on crime of the 'Street Crime Initiative' launched in a selected number of areas of England and Wales at the start of the 2002-03 financial year and find the policy to be effective in reducing crime (number of robberies recorded by the police), and also from a cost/benefit standpoint. This seems to be an important conclusion as the study controls also for 'displacement/diffusion to other crimes' (e.g. from robberies to burglaries, theft from and of vehicles) and for 'displacement/diffusion to other areas', the so-called non-SCI areas.
[42] Lochner and Moretti (2004); Bukenya (2005); Lochner (2004:831) in particular finds that whilst 'estimates from Lochner and Moretti (2004) imply that a 1-year increase in average schooling levels would reduce both violent and property arrest rates by slightly more than 10 percent (both estimates are statistically significant at 0.05 levels), our estimates suggest that white collar arrest rates would *increase* by 11 percent'
[43] Flinn (1986)

also presents the individual with opportunities to commit crime that may well not have existed previously, such as theft from the workplace and fraud. In that respect employment and crime can be either substitutes or complements.

2.22 Therefore, although it seems true from the empirical evidence that the relationship between human capital and crime is a negative one, that is human capital accumulation tends to render individuals adverse to criminal behaviour, this appears to be true only for some crime types. If indeed higher levels of human capital reduce 'street crimes' (or 'unskilled crimes') the same cannot be said for so-called 'white collar crimes' (e.g. fraud, embezzlement) .

Social interaction

2.23 Another factor considered is social interactions between individuals. In the company of like minded individuals, a sense of invulnerability and a willingness to violate social norms and take risks can materialise[44]. This phenomenon refers to the principle of 'co-offending' in which individuals commit crimes along with other individuals, a typical example being that of gangs. This represents indeed an important social problem; however, it is also possible to observe the effect of social interactions on crime in a broader perspective. Individuals exert influence on other individuals, and themselves bear the influence of other individuals. If some of these engage in criminal activity and successfully modify the way the criminal act is perceived by their peers, rendering it an 'acceptable' act, then the crime may soon become an integral part of the social norms. Therefore, if these negative interactions spread across an area (neighbourhood, town) they may well forge the social norms present in that area at a given moment in time[45]. If committing a given crime becomes socially common and more acceptable then it is more likely that an individual will commit the crime.

Drug use

2.24 There is a widely held belief that drug 'addiction' simply causes crime, but the true manner of their relationship is more complex[46]. Literature reviews[47] on the relationship between crime and drug use confirm that causality running from drug use to crime (and in particular to acquisitive crime) is too simplistic a theory, which veils other fundamental aspects of this relationship.

2.25 It is agreed among researchers that there is indeed a relationship between (non-recreational) drug use and crime, however the nature of this relationship appears rather unclear. Drug use seems to cause crime, but also crime seems to cause drug use. The theory behind the former hypothesis is simple; drug addiction requires means to finance this addiction and if the legal means are not sufficient to cover these expenses, then the drug-addict will resort to acquisitive crime.

2.26 The latter hypothesis however is also interesting. It implies that criminals may engage in drug use mainly for two reasons. First, criminals are usually integrated in a

[44] Glaeser et al. (1996:511)
[45] Ormerod (2005)
[46] Hammersley et al. (1990 :1583)
[47] Hammersley et al. (1989, 1990); Seddon (2000)

'criminal network' of which drug use is a rather common feature. Criminals might therefore be tempted to make use of drugs themselves. Second, (successful) criminal activity produces monetary gains and drugs may well represent a way of spending the gains. If so, as (successful) criminal activity increases, drug use will also increase. In this optic, another argument is that often drugs are used as a means of exchange instead of money. A criminal may find it easier to exchange stolen goods for drugs. And although he might sell these drugs for money, it is also very likely that he may end up consuming (at least a portion of) the drug. Both theories may be valid, and both find support in the empirical evidence[48], suggesting that neither theory is in fact exhaustive. It seems moreover possible, and plausible, that the two elements, drug use and crime, sustain and develop each other. A criminal may find drugs as a way of spending the extra income, and may consequently need to finance his addiction with additional criminal acts.

Technological impacts

2.27 Advances in technology have also led to acquisitive crimes becoming both more difficult to commit and also less attractive due to falls in the potential payoffs, all else equal. For instance, improvements in security systems in both households and vehicles has made housebreaking, theft from a vehicle and theft of a vehicle physically more difficult. While technological progress in computer and electrical engineering has led to consumer electronics becoming relatively less valuable over time, and therefore decreasing the potential payoffs to breaking into the property.

[48] Parker and Newcombe (1987); Parker and Bottomley (1996); Burr (1987); Edmunds et al. (1997); Mott and Taylor (1974)

Summary

2.28 This section has provided a description of the relevant basic economic theory linking the economy to criminal behaviour – while also expanding into more complex theories relating to, amongst other things, the influence of social factors. The section then presented a summary of the empirical evidence analysing the relationship between economic variables and crime, and then presented a more general overview of the evidence regarding the impact of a variety of other factors on crime.

2.29 In conclusion the evidence appears to point to a link between economic conditions and crime, but this evidence is relatively weak and struggles to separate the varying effects of different economic variables from both other economic variables as well as from non-economic factors such as drug use, education, severity of punishment, and police officer numbers. Given there is such a multitude of factors which influence crime it is not surprising that the evidence and literature is unable to perfectly extract and unequivocally quantify the effect of economic specific variables.

2.30 In terms of the effect on crime of different economic factors, there are certain variables which appear to represent better determinants than others: for instance the literature identifies a certain amount of ambiguity in relation to the impact of both unemployment and output (GDP) on crime in general, and acutely so when looking at their impact on different categories of crime, whereas the strongest and most consistent evidence seems to point towards the adverse effects of low wages and inequality on the crime rate.

2.31 Recessions however come with varying characteristics, and although it is safe to say that output falls and unemployment usually rises, it is hard to predict the impact the current recession will have on low wages and inequality. Given the relative strength of influence these variables have on crime according to the literature, not fully understanding how the current recession will impact them leaves us somewhat in the dark as to what the effects of the economic downturn on crime will be.

3. DATA ANALYSIS

3.1 In this section, data on recorded crime and macroeconomic performance for Scotland and its main cities (Aberdeen, Dundee, Edinburgh and Glasgow) are analysed to assess whether a relationship between crime and macroeconomic variables exists in Scotland and, if so, what the nature of this relationship is. The crime types analysed in this section are mainly acquisitive crimes. This is due to acquisitive crimes appearing to be more likely to be affected by macroeconomic conditions, as indicated in the preceding section. Within this category, data for total crimes of dishonesty and sub-categories such as housebreaking, shoplifting, theft *from* and *of* motor vehicles, are considered. Also, the levels and changes in total violent crimes and in drug crimes (supply/possession with intent to supply, and possession) are analysed.

3.2 The macroeconomic variables utilised to conduct the analysis are unemployment, (Claimant Count unemployment rate) and national output (Gross Value Added[49]). These variables were selected due to their continuity - lack of methodology changes over time in their calculation - and hence comparability, and also as data is available for them over a long time period, including quarterly figures.

3.3 It should be emphasised that recorded crimes do not take account of all crimes committed in Scotland, just those which have been recorded by the police. There have been changes over time which make it easier for members of the public to report low level crime and standardising of the way in which police forces record crimes, however we have assumed that the underlying trends of recorded crimes should follow those of actual crimes to a close enough degree for the following analysis to be informative.

3.4 Two different sets of time series data are used. First, long-term trends of crime, unemployment and GDP are analysed in the period ranging from 1976 to 2009 (utilising annual data). Second, medium and short term trends will be analysed through the use of quarterly[50] crime and economic data from 1995 (Q3) to 2010 (Q1)[51]. This latter time period will be particularly useful in the context of this paper as a focus will be placed on the years 2008 through 2010 to analyse the effects of the economic recession. This will be done both at a national level and at a city-level.

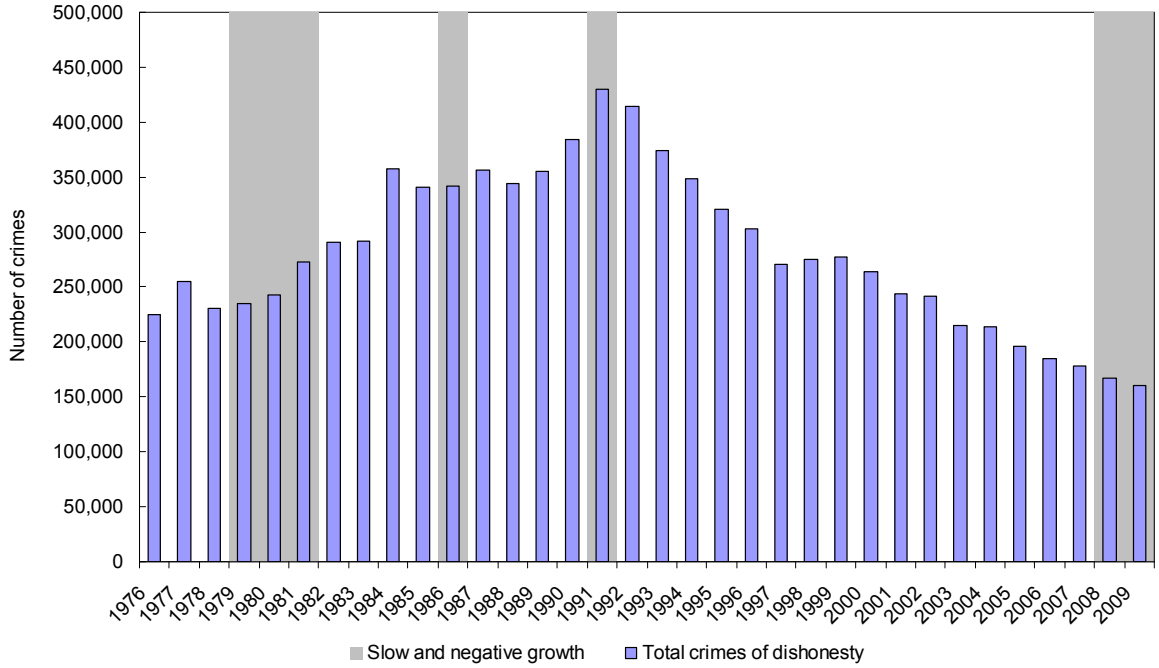
[49] the equivalent of GDP at basic prices

[50] Both the claimant count data and recorded crime data have been seasonally adjusted. This will mean that intra-quarter fluctuations are not the result of seasonal patterns which occur on some regular cycle and helps identify the effects of the variables in questions with less noise.

[51] Although more recent data is available for the macroeconomic variables, this is the most recent published recorded crime data available.

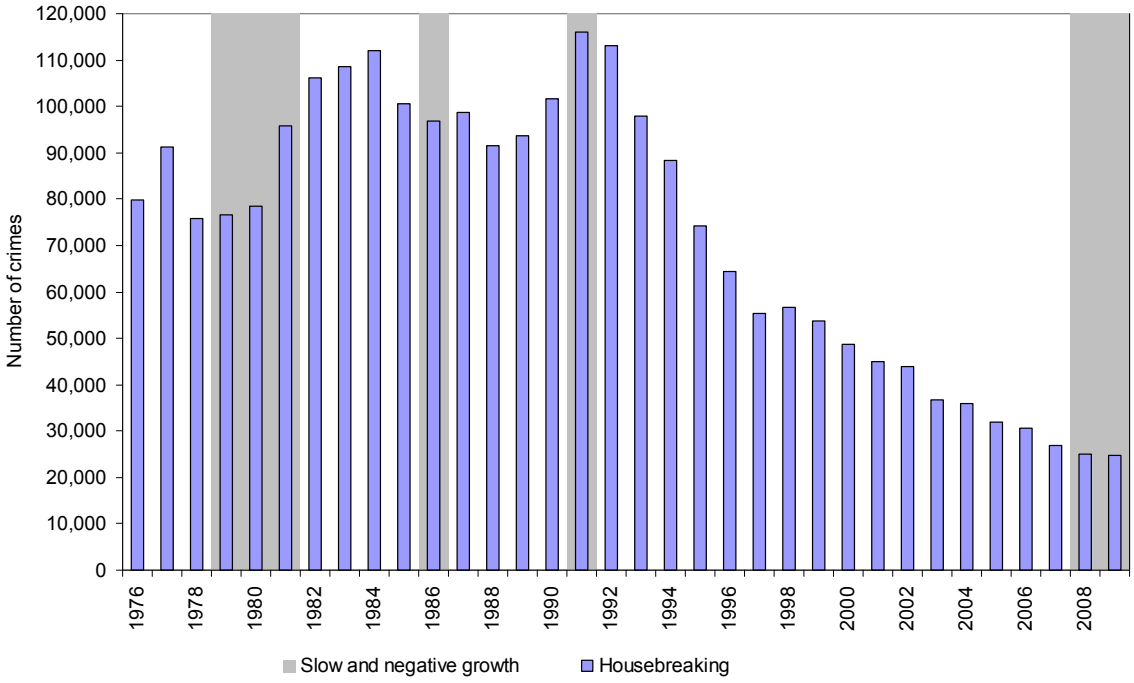
Long Term Crime Trends

Figure 1 Total Crimes of Dishonesty – Scotland (1976-2009)



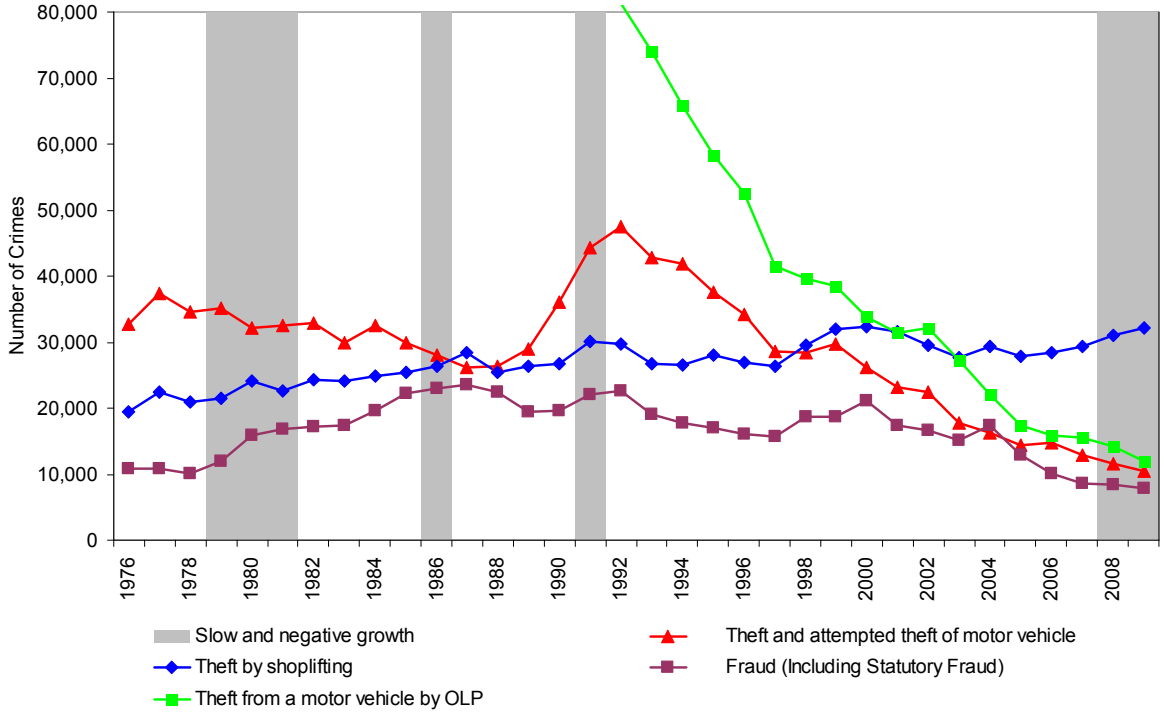
3.5 The level of total crimes of dishonesty (which include housebreaking, theft by opening a lockfast place (OLP), theft from a motor vehicle by OLP, theft of a motor vehicle, shoplifting, other theft, fraud, and other crimes of dishonesty) increased from 1976 to 1991, when the figure peaked at almost 430,000 (Figure 1). Within this period there were a few years during which crimes of dishonesty declined (e.g. 1978, 1985, 1988), however the general trend was an upward one, with the number of crimes rising by 91%. After 1991, the levels of total crimes of dishonesty declined sharply until 1997, and then more gradually from 1999 to 2009. At the end of 2009, total recorded crimes of dishonesty were 160,157, a fall of 63% from their peak in 1991. Years where national output growth was below 1% or negative are shaded in grey in the above and following charts.

Figure 2 Housebreaking – Scotland (1976-2009)



3.6 Within the broad category of crimes of dishonesty, housebreaking represented the largest portion of these crimes over the period from 1976 to 2007, being overtaken by shoplifting in 2008. The long-term trend for housebreaking is similar to that of total crimes of dishonesty, especially after 1991, when recorded housebreaking started to decline from its peak of 116,130 to just below 25,000 at the end of 2009, a fall of 78% (Figure 2).

Figure 3 Other crimes of dishonesty – Scotland (1976-2009)

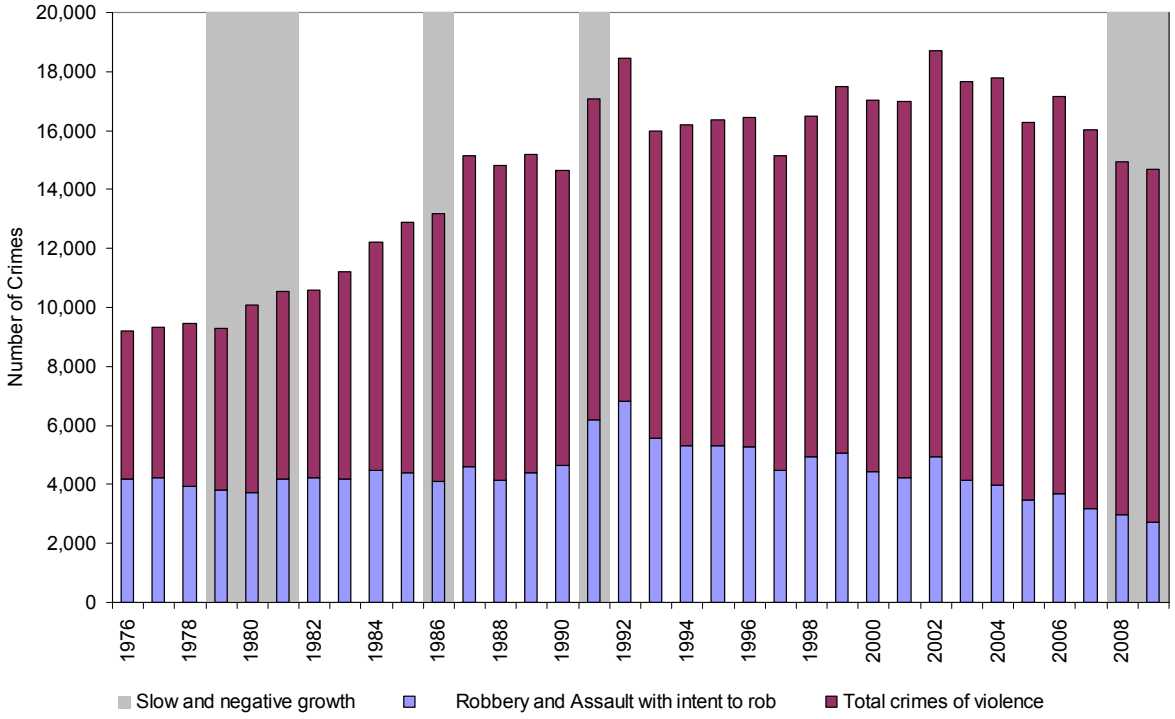


3.7 For the remaining crimes of dishonesty, theft and attempted theft of motor vehicle followed a slight downward trend from 1977 to 1988, falling by 29% over this time, and then dramatically increased in the early 1990s, jumping by 80% over the 4 years to 1992, from 26,395 to 47,433. Over the following 17 years, the trend in recorded theft and attempted theft of motorvehicles turned downward, falling 78% to 10,550 in 2009 (Figure 3). Since 1992, when the figures first became available, recorded thefts from a motorvehicle by OLP have more than quartered, from over 80,000 to just under 12,000, with only one year experiencing an increase (2002).

3.8 Shoplifting and fraud followed similar long-term trends until 2004, then there is divergence with shoplifting increasing by nearly 3,000, or 10%, until 2009 whereas fraud experienced a decline of almost 10,000, or 55%. Neither of these crime types witnessed the dramatic increase of the early 1990s nor the sharp declines thereafter seen with the overall recorded crimes of dishonesty (Figure 3).

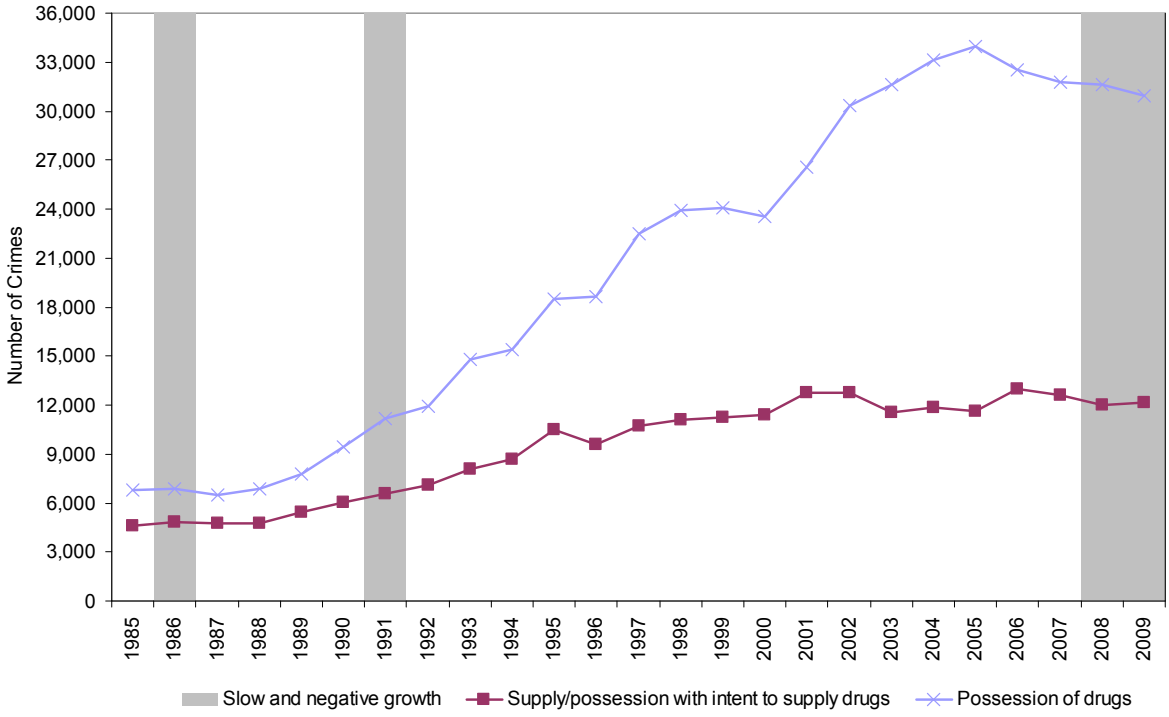
3.9 Advances in technology and security, such as vehicles becoming harder to break into and steal, could also partly explain the falls witnessed in crimes associated with motor vehicles since the early 1990s. Similarly, the cost of consumer electronics have fallen substantially in real terms over the last two decades and this could explain a fall in housebreaking: if the value of the stolen goods decreases this lowers the expected returns and incentives to break in. This is examined further later in the paper.

Figure 4 Total crimes of violence and robbery and assault with intent to rob – Scotland (1976-2009)



3.10 Figure 4 shows total violent crimes increased from the early 1980s until 1992, more than doubling over the period. Subsequently recorded crime followed an irregular pattern, including years of strong decline (e.g. 1997, 2005) and increase (e.g. 1998, 2002) but overall recorded violent crime fell by 20% from its peak in 1992 to 2009.

Figure 5 Drug crimes – Scotland (1985-2009)



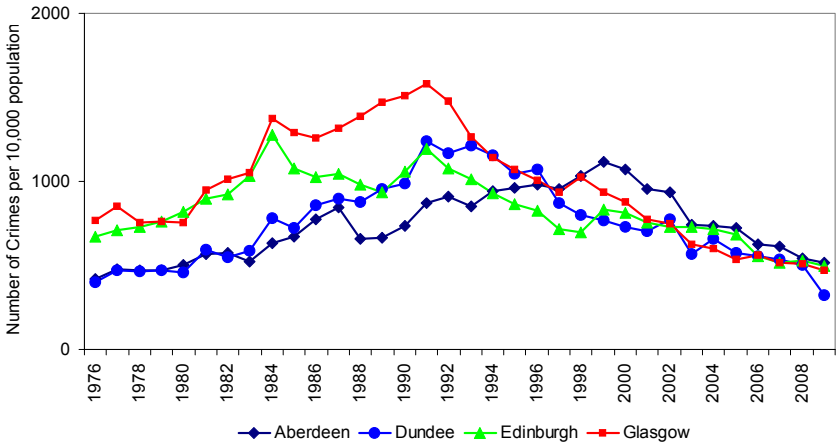
3.11 The last category of crimes analysed is drug crimes[52]. The general long-term trend is upwards for these crime types, with possession of drugs increasing by over 750% between 1985 and 2009 (Figure 5). The recorded levels of supply/possession with intent to supply has stabilised since 2001, while possession of drugs sharply increased in the early 2000s reaching almost 34,000 in 2005 (representing a 54% increase since 2000).

[52] Crime code for these crime types has been in use only from 1985

BOX A: Crime Trends - Subnational Level

For city level analysis the crime rates are presented as crimes per 10,000 population to allow like-for-like comparisons. Looking at **total crimes of dishonesty**, a striking feature from Figure A1 is that the number of crimes of dishonesty per capita in the various cities seem to converge at the end of the period analysed after having experienced relatively large variations over time. At the beginning of the period Aberdeen and Dundee had a similar crime level to one another, as did Edinburgh and Glasgow at a higher amount. However, over the middle section of the period the crime rates appear to diverge from one another, with Glasgow and Dundee's rates increasing at a faster pace than the others until the beginning of the 90's.

Figure A1 Total crimes of dishonesty – Scottish Cities (1976-2009)



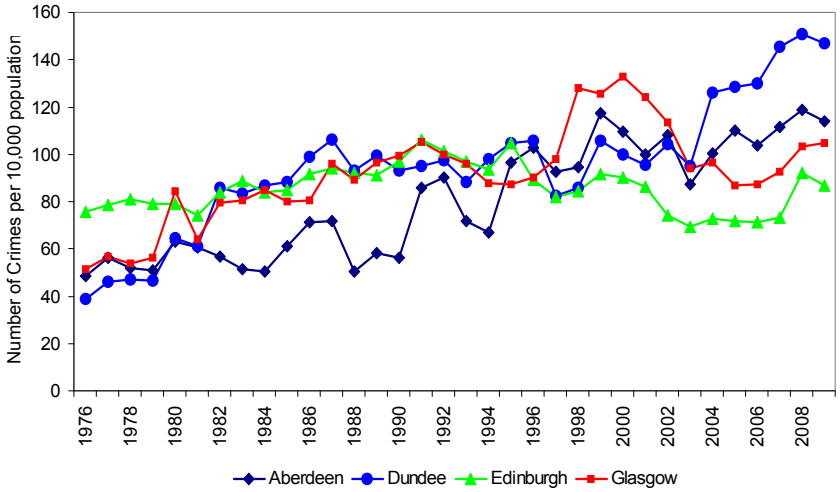
Over the later period the rates all began to become closer together, and in 2008 they were separated by only 35 crimes per 10,000 population, ranging from 504 to 539 as opposed to from 870 to 1579 in 1991.

All cities followed the national trend of rising and then falling to varying degrees, with total crimes of dishonesty per capita peaking at a later date in Aberdeen than the other 3 cities. While the rates reached their maximum in 1991 for the other cities and then began a trend of general decline, Aberdeen's rate carried on rising until 1999 before beginning to fall.

Amongst crimes of dishonesty, **housebreaking and thefts related to motor vehicles** appear to follow similar patterns, especially since 1992. These crime types have been decreasing, in particular in Glasgow and Edinburgh, with a sharp decrease in Glasgow having led to a reduction in the gap between Glasgow and the other three cities. These different categories of crimes of dishonesty also all exhibit the same convergence as at the overall level.

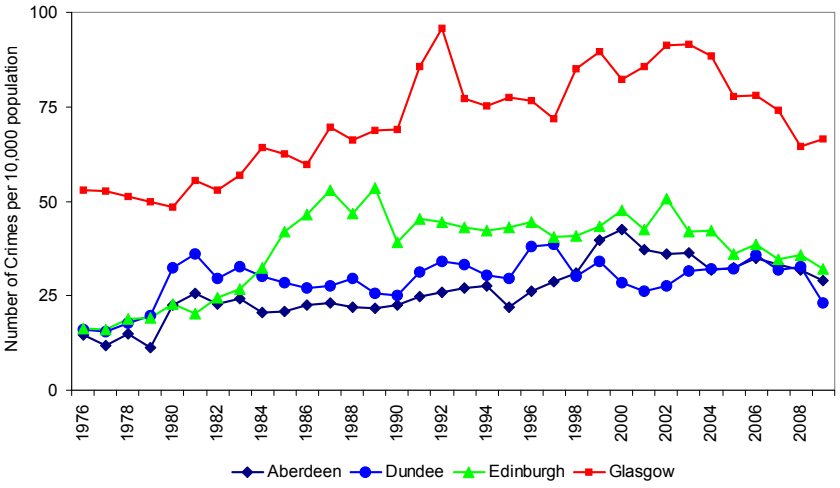
Theft by shoplifting differs from the other crimes of dishonesty at a sub-national level in that it doesn't have the same up-and-down pattern over the period, instead rising gradually over the majority of the time across all cities, with this increase accelerating over the past few years (Figure A2). For instance, over the past 5 years recorded shoplifting per capita has increased by 21% in Edinburgh and Glasgow, 14% in Dundee and 3% in Aberdeen.

Figure A2 Theft by shoplifting – Scottish Cities (1976-2009)



Total crimes of violence per capita have witnessed large differences across cities, predominately through Glasgow consistently having a higher rate, often being more than double that of the other cities. However in the last three years (2007 through 2009), whilst violent crimes per capita have stabilised in Edinburgh and Aberdeen, they have decreased by 27% in Dundee and 10% in Glasgow. (Figure A3).

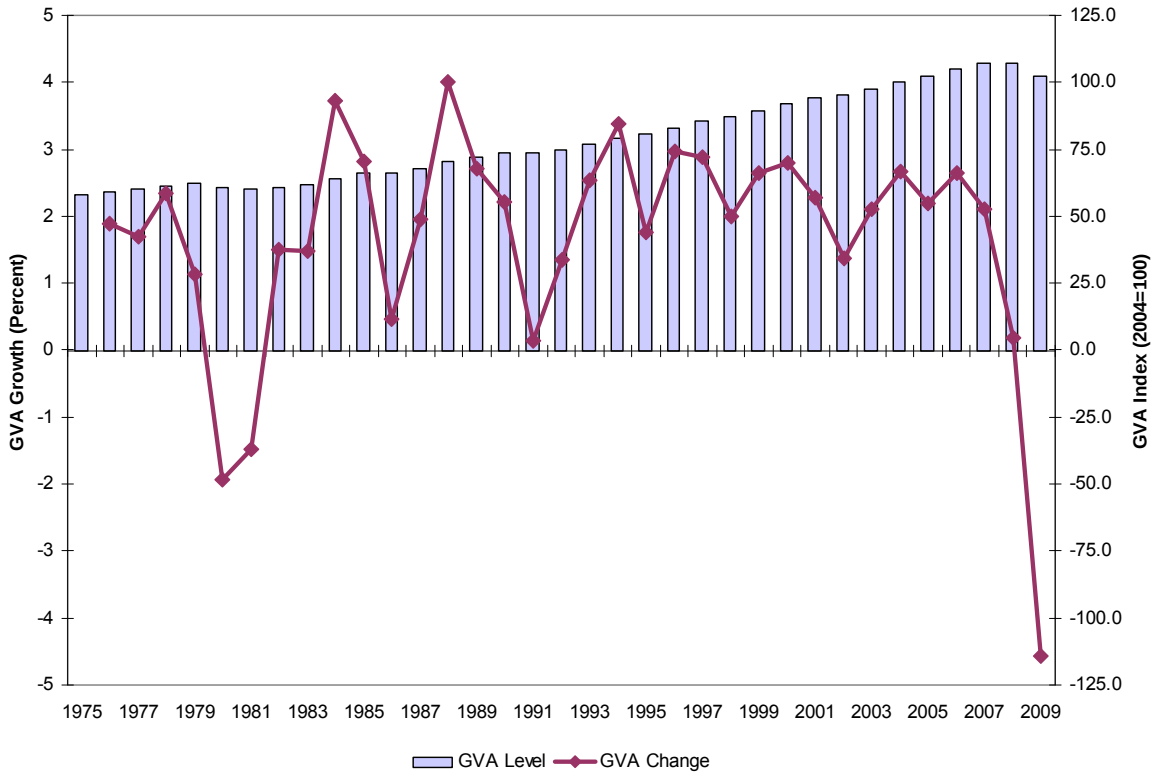
Figure A3 Total crimes of violence – Scottish Cities (1976-2009)



Long Term Macroeconomic Trends

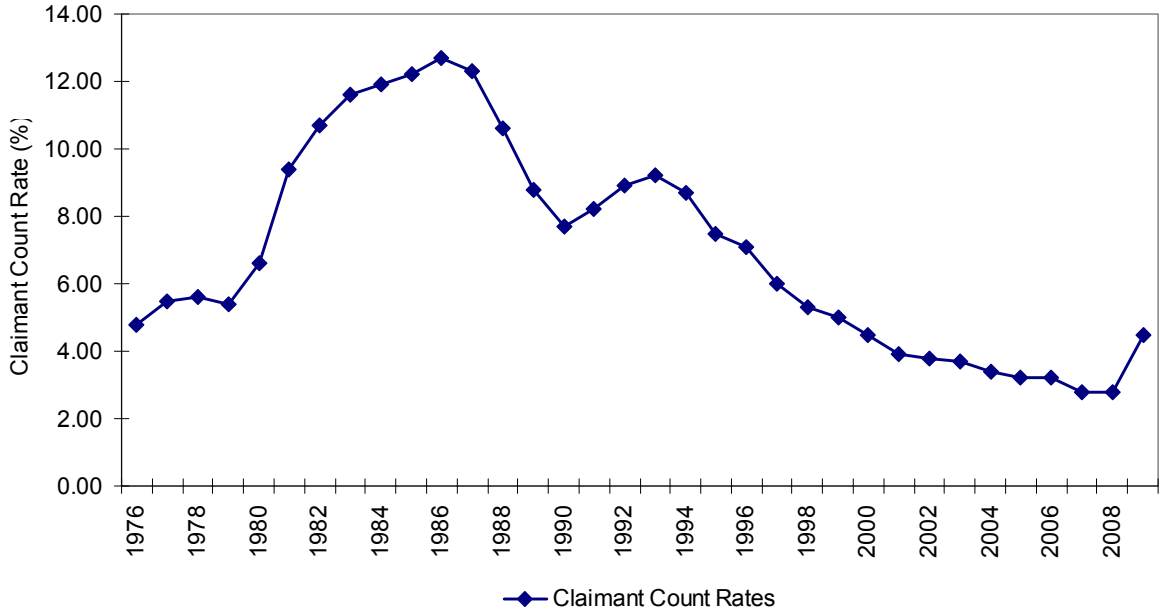
3.12 To analyse long-term macroeconomic trends, two variables are utilised in this project. These are Scottish Gross Value Added, a measure of variation in national production, and Claimant Count rate, a measure of unemployment.

Figure 6 Gross Value Added Percentage growth – Scotland (1976-2009)



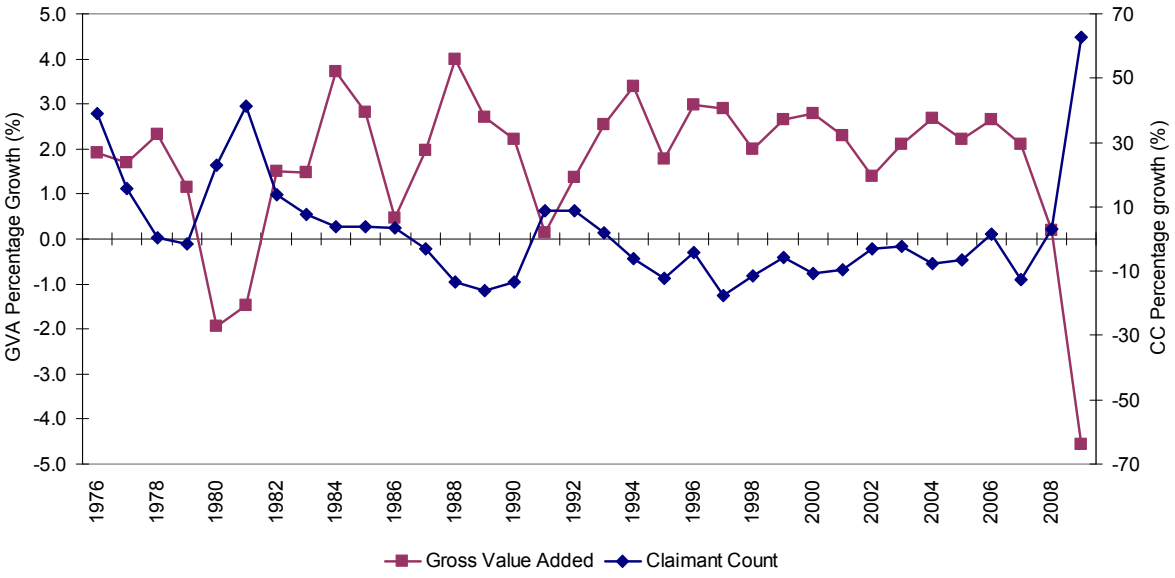
3.13 In the past 30 years, GVA growth has slowed on several occasions (1979-80, 1985-86, 1989-91, 1995, 1998, 2001-02, 2005, 2007-09). However, only two of these periods corresponded to a period of *negative* growth rates, and these are the years 1980 and 1981 along with 2009. (Figure 6)

Figure 7 Claimant Count Rates – Scotland (1976-2009)



3.14 During this time period, claimant count *levels* in Scotland have varied, with a marked upward trend from 1979 to 1986, and a sharp decline in the following four years. From 1991 to 1993 CC levels increased once again, but subsequently have been decreasing, more or less gradually until the sharp rise in 2009. (Figure 7).

Figure 8 Gross Value Added and Claimant Count Percentage growth – Scotland (1976-2009)



3.15 Comparing *changes* in Claimant Count and *changes* in GVA figures, there appears (Figure 8) to exist a relationship between the two macroeconomic variables in Scotland. Given that a decline in output would likely mean a fall in employment as there is lower demand for goods and services, and vice-versa, a fall in employment would mean less capacity to produce goods and services, this result is to be expected.

Methodology and Limitations of Analysis

3.16 To identify and quantify the strength of any relationship between variables such as the unemployment rate and the crime rate we will use the correlation coefficient. This simple statistical tool provides a measure of linear dependence between the variables – i.e. the degree to which their movement is related to one another. However, establishing a correlation exists between two variables is *not enough* to establish that a casual relationship exists, in either direction, between the two or that both are not affected by some other factor. This limitation means that from the following results we can not necessarily infer that, for instance, unemployment causes crime, but the presence, or lack of, a correlation or dependence between the variables is in itself a useful and informative result.

3.17 The correlation coefficient can range from -1 to +1. A coefficient of +1 implies a perfect positive linear dependence between the two variables. Likewise, a coefficient of -1 implies a prefect negative linear relationship, whereas a value of 0 implies no linear relationship whatsoever.

3.18 In-between these figures the value of the coefficient is strictly speaking arbitrary in that its implications for the 'strength' of the relationship depends on the variables in question and the context they are in. However, for simplicity, the following table could be used as a rule of thumb for looking at the strength of correlation if caveated with the above limitations:

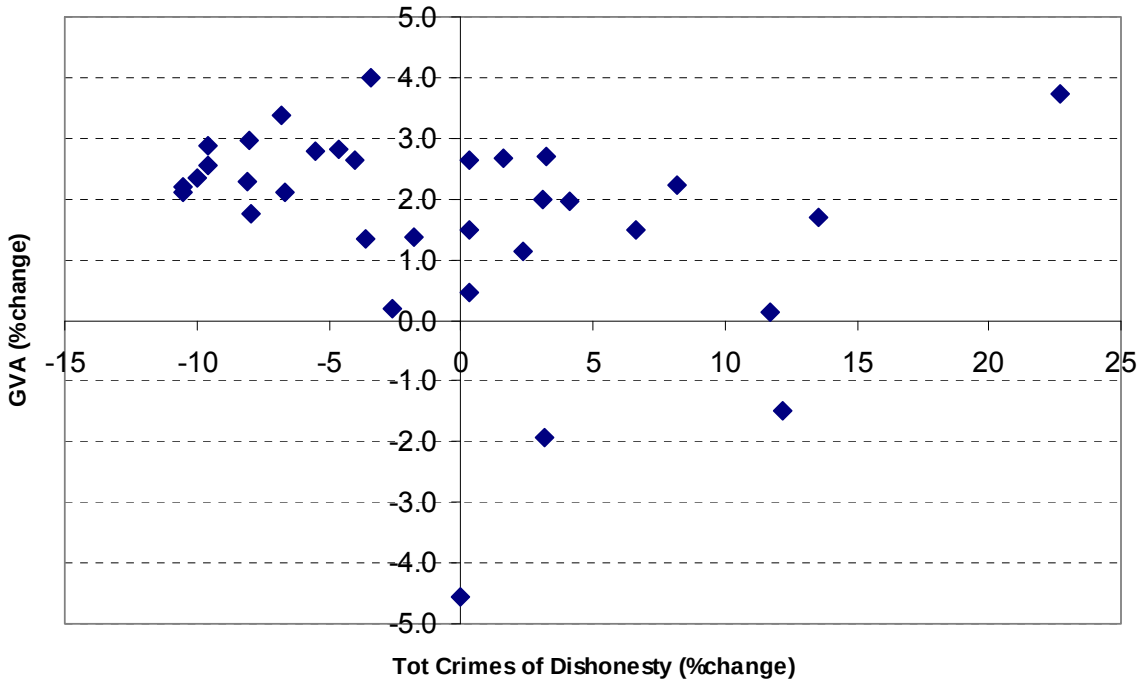
Correlation	***Negative***	***Positive***
None	−0.09 to 0.0	0.0 to 0.09
Weak	−0.3 to −0.1	0.1 to 0.3
Medium	−0.5 to −0.3	0.3 to 0.5
Strong	−1.0 to −0.5	0.5 to 1.0

A correlation only implies the variables have some relationship, but not the magnitude of this relationship.

Linking Crime and the Economy

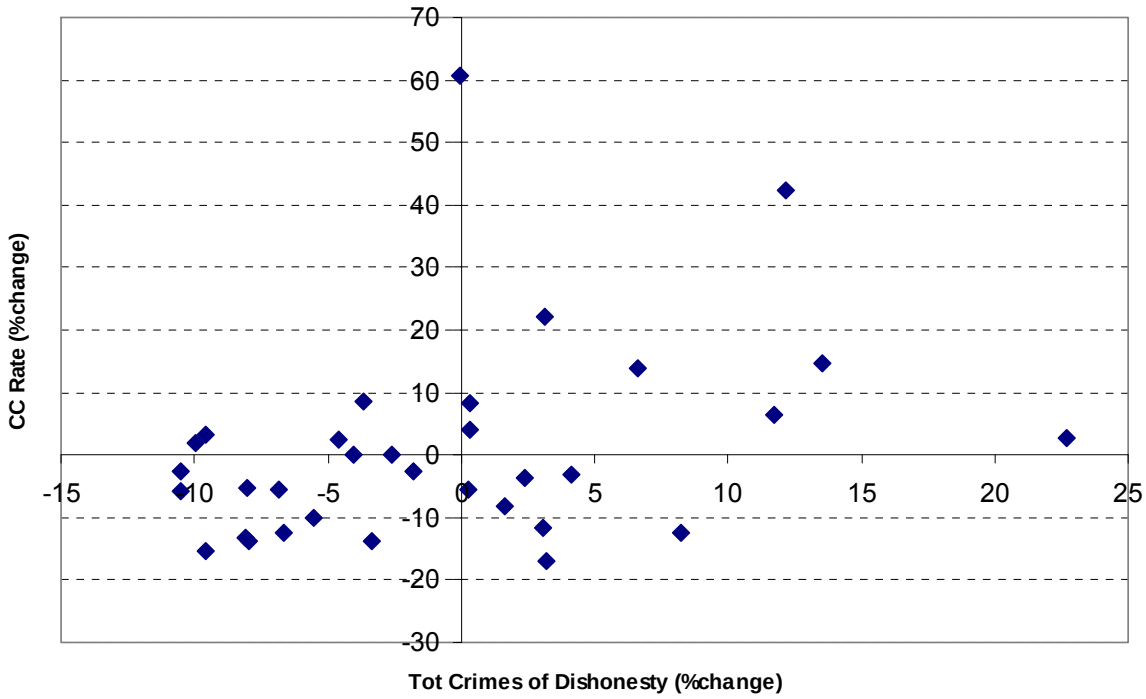
3.19 Comparing *changes* in GVA and total crimes of dishonesty, Figure 9 plots the changes in both variables at a point in time against one another, so each point represents the respective growth rates in a particular year. If there was a negative relationship between GVA and crimes of dishonesty we would expect to find the majority of the points contained within the top left and bottom right quadrants. Visually the diagram does exhibit this characteristic, but only to a slight degree, with a large number of points also found in the top right quadrant (years which witnessed increases in both GVA and crimes of dishonesty).

Figure 9 Total crimes of dishonesty and Gross Value Added Percentage growth – Scotland (1977-2009)



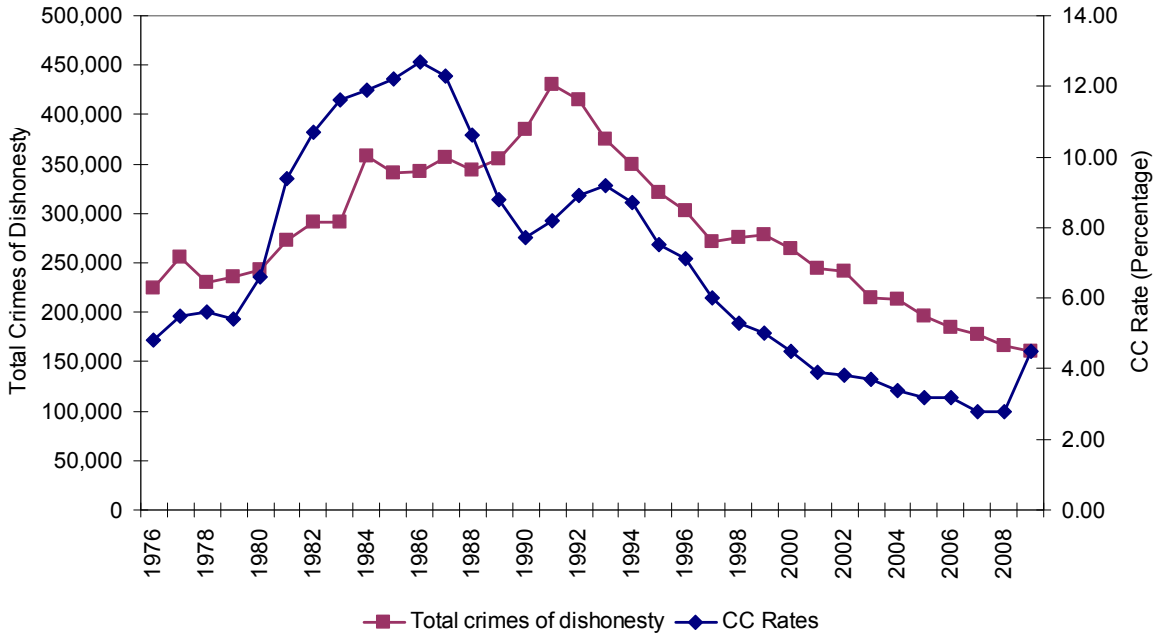
3.20 This explains the rather low level of the correlation coefficient (-0.22) between the two variables. From these long-term trends it is therefore *not* possible to reject the hypothesis that no negative relationship exists between *changes* in total crimes of dishonesty and *changes* in GVA in Scotland. Analysing *levels*, instead of changes, the correlation coefficient improves (-0.54), however this is to be expected given that when analysing levels the time trends in both series will lead to a correlation being picked up, but looking specifically at changes you are in a sense looking more closely by examining the movements around the trend. In that respect the correlations of the changes and levels are non-comparable, with the correlation of the changes being a more useful and informative result.

Figure 10 Total crimes of dishonesty and Claimant Count percentage growth – Scotland (1977-2009)



3.21 The relationship between total crimes of dishonesty and a measure of Scottish unemployment, i.e. claimant count rates, appears to be a positive from Figure 10. This would reflect the basic economic theory, for which increases in unemployment would cause increases in acquisitive crimes. However, similar to GVA, the strength of the relationship is far from clear cut. The correlation coefficient between *changes* in total crimes of dishonesty and *changes* in the CC rate is greater in absolute terms than that between *changes* in total crimes of dishonesty and *changes* in GVA (0.35 against -0.22) which would suggest unemployment is a stronger explanatory variable than GVA.

Figure 11 Total crimes of dishonesty and Claimant Count – Scotland (1976-2009)



3.22 This relationship can be better observed in Figure 11, which relates total crimes of dishonesty *levels* and CC rates across time. The long-term trends of the two variables appear very similar. The correlation coefficient between these two variables is positive and relatively high (0.78).

3.23 Figure 11 also shows that the relationship is not a straightforward one, with the movements in the two levels not consistently in check. For instance, between 1986 and 1990 there was a sharp fall in the unemployment rate, a 39% drop, however over this period crimes of dishonesty failed to demonstrate the same decline, and actually increased by 12% over the same time frame.

3.24 On top of this, there are also concerns that the claimant count measure of unemployment fails to fully capture the true unemployment level – through only measuring those individuals who have signed up to claim benefits and excluding those who have given up looking for work, those who left their job voluntarily, those only looking for part time work etc – and that these problems may have been particularly acute during the late 1980s.

Regression Analysis

A simple linear regression analysis was also performed on the main variables of interest, modelling the change in total crimes of dishonesty as dependent on, firstly, the change in the CC rate and, secondly, the change in the GVA level. This is not intended as a comprehensive regression analysis, but rather complementary to the correlation analysis and designed to illustrate and reinforce the narrative.

Lagged values of both the dependent variable (1 year lag) and of the independent variable used (1 year and 2 year lags) were included with the possibility in mind that the effect of the independent variable may take time to feed through to the crime rate if a relationship existed.

R1:

$$\Delta CrimesDishonesty_t = \alpha_1 \Delta CCRate_t + \alpha_2 \Delta CCRate_{(t-1)} + \alpha_3 \Delta CCRate_{(t-2)} + \alpha_4 \Delta CrimesDishonesty_{(t-1)} + c$$

The first regression (R1) resulted in the coefficient for the change in CC rate (α_1) being positive and having a having a p-value of 0.07, meaning that it is statically significant at the 10% level. The lags of both the dependent and independent variables ($\alpha_2, \alpha_3, \alpha_4$) had very high p-values, supporting an argument that the effects of unemployment on acquisitive crime are immediate rather than taking a long time to feed through.

R2:

$$\Delta CrimesDishonesty_t = \beta_1 \Delta GVA_t + \beta_2 \Delta GVA_{(t-1)} + \beta_3 \Delta GVA_{(t-2)} + \beta_4 \Delta CrimesDishonesty_{(t-1)} + d$$

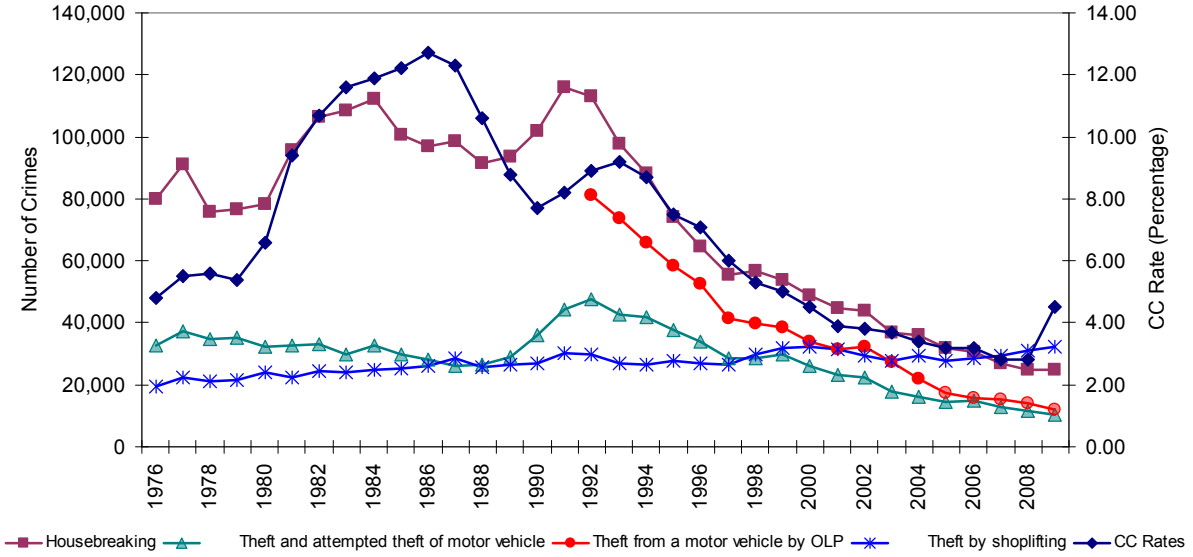
The second regression (R2) resulted in the coefficient for the GVA growth rate (β_1) being negative, but having a large p-value of 0.53. It is in fact the 1-year lagged GVA growth rate (β_2)which has the lowest p-value and also a positive value. However, the p-value is still relatively high at 0.19 making it insignificant statistically speaking.

R3:

$$\Delta CrimesDishonesty_t = \chi_1 \Delta CCRate_t + \chi_2 \Delta CCRate_{(t-1)} + \chi_3 \Delta CCRate_{(t-2)} + \delta_1 \Delta GVA_t + \delta_2 \Delta GVA_{(t-1)} + \delta_3 \Delta GVA_{(t-2)} + \delta_4 \Delta CrimesDishonesty_{(t-1)} + e$$

The more interesting results appear when you include *both* the changes in CC rate and the changes in GVA, along with their lagged values, in the regression (R3). Doing so pushes the p-values of both the change in CC rate (χ_1) and the lagged GVA growth rate (δ_2) even higher, to 0.56 and 0.39 respectively, and makes it hard to reject the hypothesis that neither the GVA growth rate nor the change in CC rate are responsible for the change in the level of crimes of dishonesty.

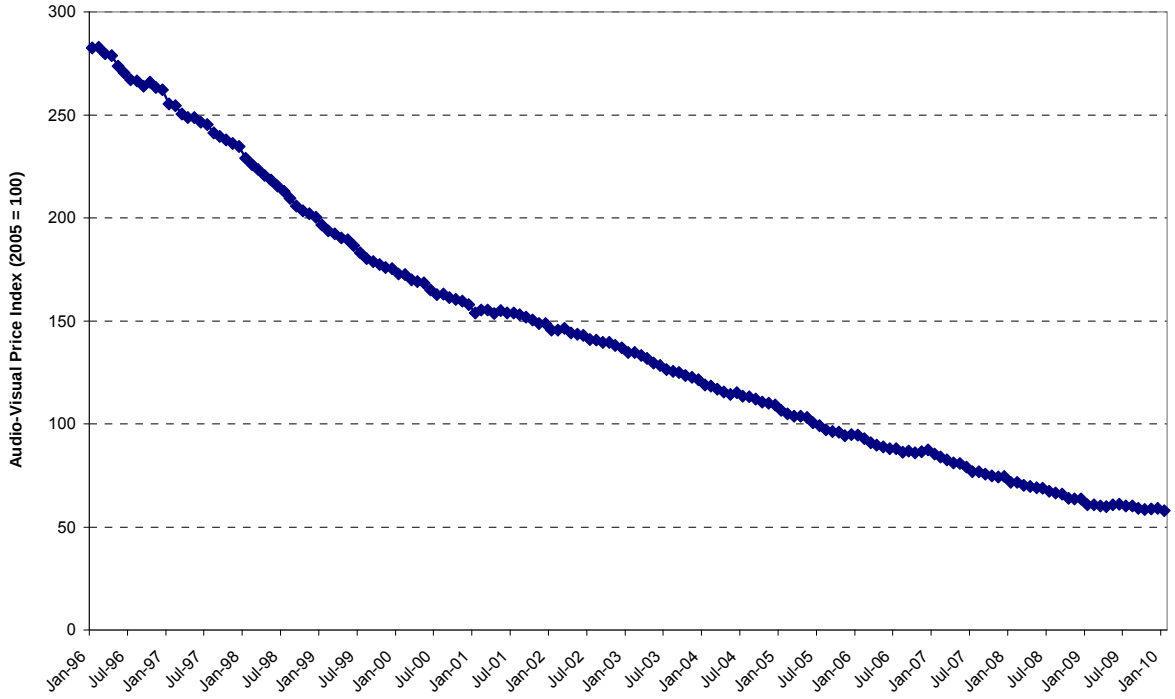
Figure 12 Crimes of dishonesty and Claimant Count – Scotland (1976-2009)



3.25 The relationship between CC rates and the specific crime types within the broad category of crimes of dishonesty is presented in Figure 12. Housebreaking, among all crime types appears to be the most strongly correlated with CC rates. This is particularly true in the pre-1993 period, after which all crime types (apart from theft by shoplifting) have followed a downward trend. The correlation coefficients reflect this impression: 0.86 between housebreaking and CC rate; 0.53 between theft and attempted theft of motor vehicle and CC rate; 0.33 between theft by shoplifting and CC rate.

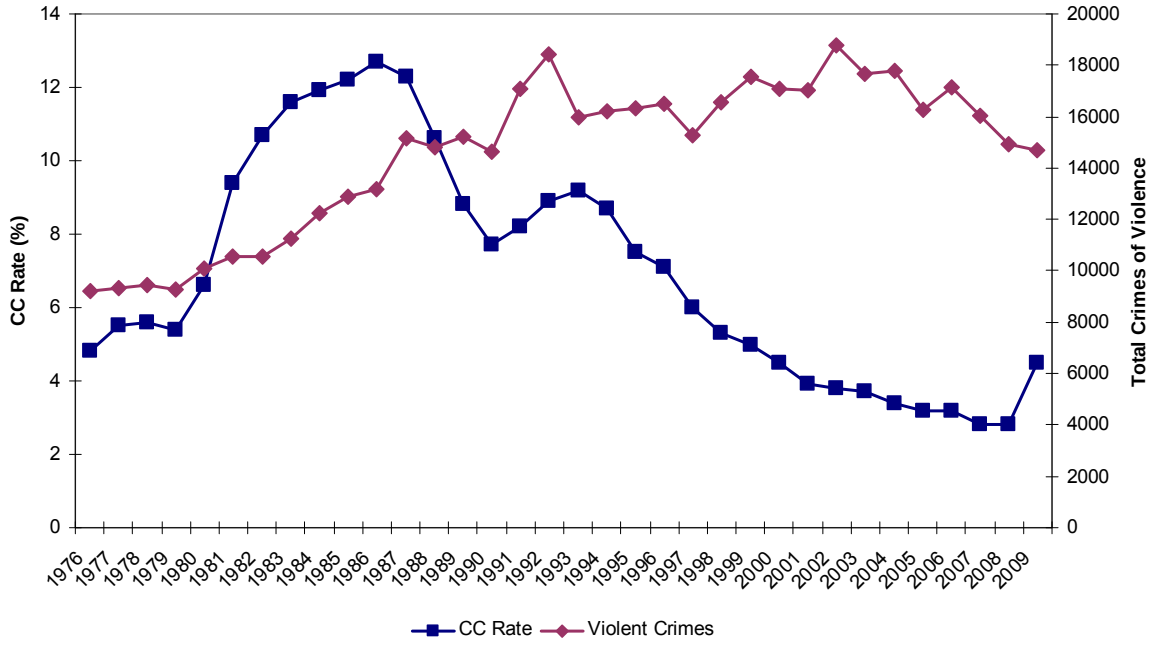
3.26 Acquisitive crimes did increase in past recessions and in periods when economic growth sharply decreased (1980-82; 1986; 1991-92). However, it appears that these increases in recorded crimes may have been caused not only by poor economic conditions but also by other factors. In fact the upward trend of acquisitive crimes in these periods had already begun in the years preceding economic downturns. It is therefore possible to infer that if economic circumstances do influence crime dynamics, these are also affected by a multitude of other factors. This evidence related to Scotland is consistent with the summary of the literature presented in the previous section.

Figure 13 Audio-Visual Goods Consumer Price Index (CPI) Category (1996-2010)



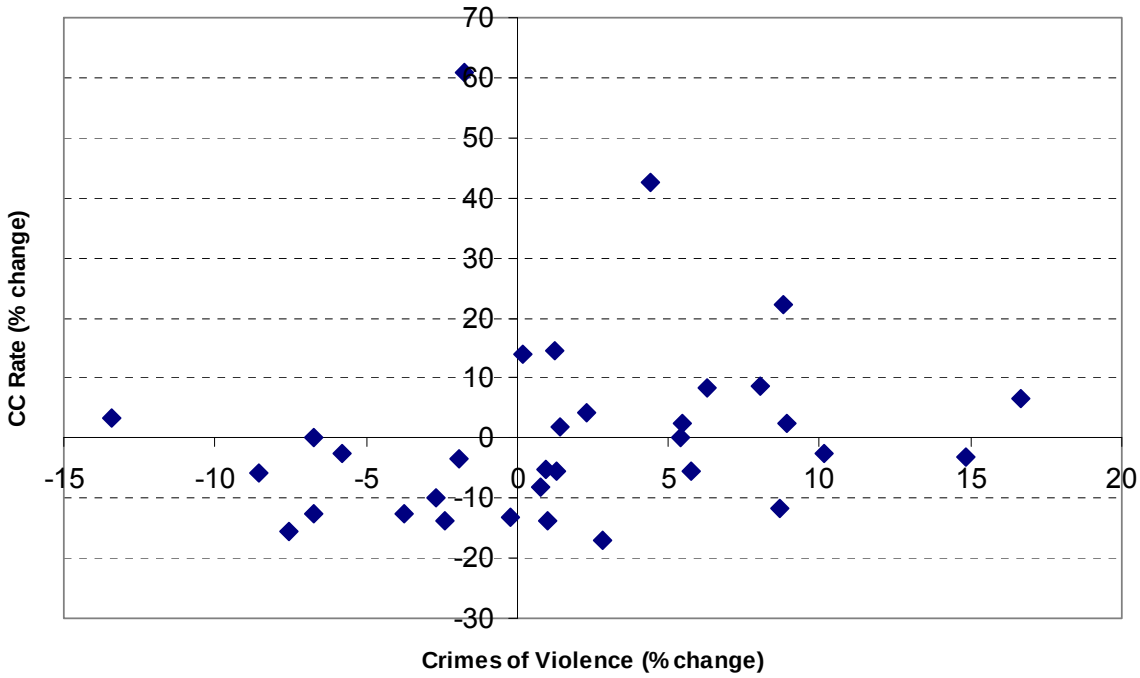
3.27 Breaking down crimes of dishonesty into its constituent parts, as done in Figure 12, also highlights that the decrease in crimes of dishonesty since 1990 is predominantly down to falls in housebreaking and theft from a motor vehicle, while shoplifting actually increases slightly. Taking a step back from the possible link between acquisitive crimes and macroeconomic conditions, an alternative explanation for these falls could arise from a decrease in the payoffs from housebreaking and theft from motorvehicles due to a fall in the value of the potential stolen goods, specifically consumer electronics. Figure 13 details the large fall in the value of consumer electronics, with the 'Audio-Visual Goods' category of the Consumer Price Index (CPI) decreasing by 79% between 1996 and the end of 2009. This highlights the variety of factors which could influence the level of crimes of dishonesty other than solely economic conditions, and illustrates that things are often not as simple as they appear at first glance, as in Figure 11.

Figure 14 Total crimes of violence and Claimant Count rate– Scotland (1976-2009)



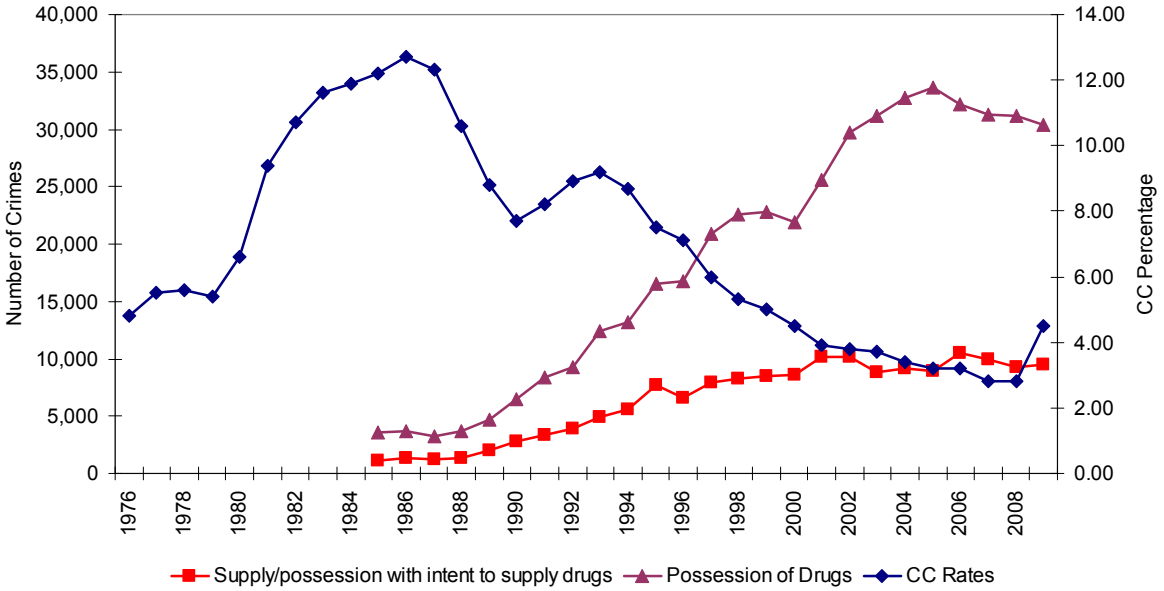
3.28 Figure 14 plots the number of violent crimes against the claimant count rate over time. From the chart there does not appear to be a strong relationship between the two, with total crimes of violence exhibiting a general upwards trend while the claimant count rate varied to a much greater degree, rising and falling sharply over the first half of the data set and then consistently falling gradually over the second half.

Figure 15 Total crimes of violence and Claimant Count rate growth – Scotland (1977-2009)



3.29 *Changes* in violent crimes do *not* seem to be strongly correlated with either *changes* in GVA, or with *changes* in CC rates in Scotland between 1976 and 2009, and if anything the relationship appears to be in the opposite direction to what we may expect. This is true for both 'total violent crimes' (Figure 15) and the sub-category 'robbery and assault with intent to rob'. The correlation coefficients associated with the relationships are as follows: total violent crimes and CC rates 0.17; robbery and CC rates 0.20; total violent crimes and GVA -0.14; robbery and GVA -0.23.

Figure 16 Drug crimes and Claimant Count – Scotland (1976-2009)

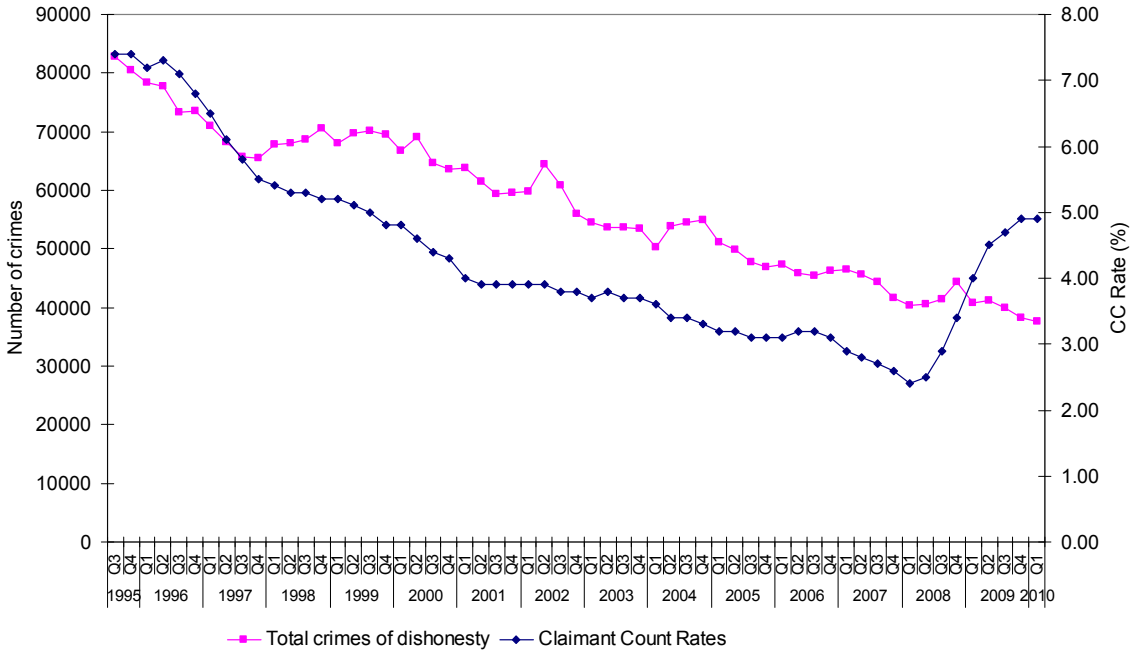


3.30 There does not seem to be a clear negative relationship between drug crimes and macroeconomic conditions in Scotland for the period analysed, and if anything the most visible relationship is a positive one. Figure 16 shows that both in times when CC rates were following a downward trend (1987-90, 1994-2005) and an upward trend (1985-86, 1991-93), drug crimes generally increased. One could hypothesise that a greater number of people in work means that more people can afford to purchase drugs, although the rise could also result from an increase in police activity and enforcement in this area.

Medium and Short Term Trends

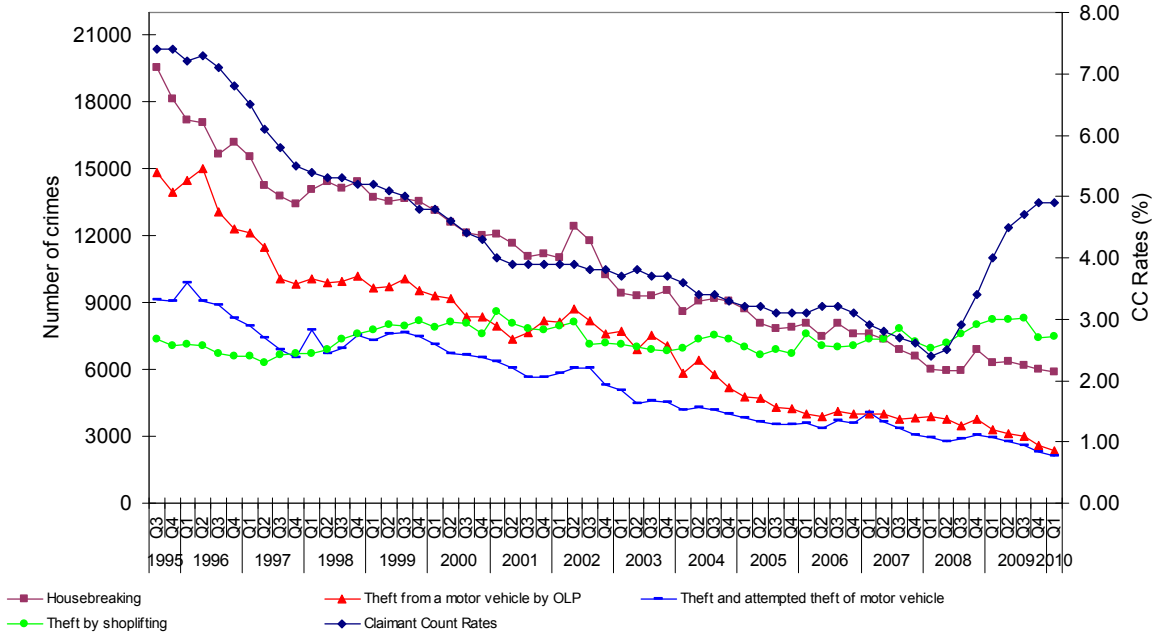
3.31 The general trend witnessed between 1995Q3 and 2010Q1 for both total crimes of dishonesty and claimant count rates has been downwards (Figure 17). Claimant count rates appear to have had a more smooth trend in these years, whereas total crimes of dishonesty have had a much more irregular trend, including large increases followed by large decreases within a given year. Since 2008, CC rates have started to increase dramatically going from 2.5 percent in 2008Q1 to nearly 5 percent in 2010Q1. Over this period, total crimes of dishonesty rose in 4 quarters, but also fell in 4 quarters. Further data points would be needed in order to determine whether or not this increase in CC rates, caused by the current economic recession, will be reflected in a longer-term increase in total crimes of dishonesty. As of today the evidence is weak, as recent trends in these two variables have not been consistent; however, it could be the case that there is a time-lag between unemployment and acquisitive crime, which may explain why total crimes of dishonesty have not yet risen (although this finding does not arise from the earlier long term regression analysis).

Figure 17 Total crimes of dishonesty and Claimant Count – Scotland (1995Q3-2010Q1)



3.32 The relationship between the specific crime types of dishonesty and CC rates is presented in Figure 18. The crimes that appear most correlated with CC rates are housebreaking, and thefts related to motor vehicles (theft from a motor vehicle by OLP; theft and attempted theft of a motor vehicle). Given that housebreaking follows a very similar trend to total crimes of dishonesty we need not repeat the analysis of its relationship with CC rates, however the other categories shall be looked at in further detail below.

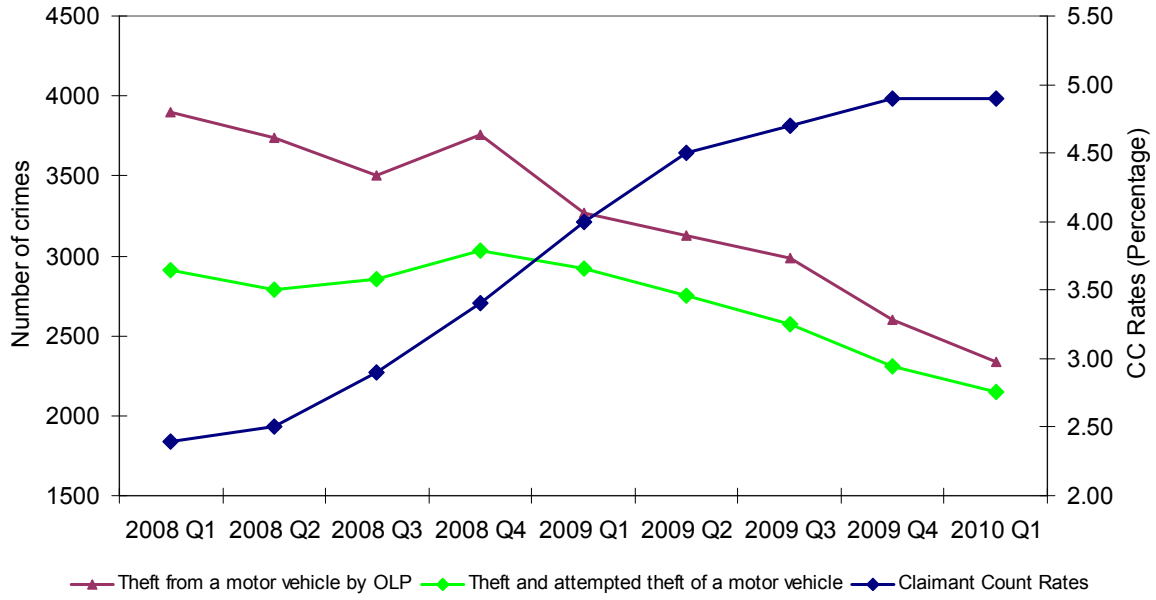
Figure 18 Crimes of dishonesty and Claimant Count – Scotland (1995Q3-2010Q1)



3.33 The correlation coefficients between both theft and attempted theft of a motor vehicle and theft from a motor vehicle by OLP, and CC rates for the period 1995Q3 to 2010Q1 are strong (0.82 and 0.85 respectively). However, when focusing on the last nine quarters of the dataset, from 2008Q1 to 2010Q1, that is from when CC rates started to increase with the recession, the relationship is clearly no longer apparent.

3.34 It can be seen that over this period of rising CC rates both theft and attempted theft of a motor vehicle and theft from a motorvehicle by OLP fell. While the CC rate doubled between 2008Q1 and 2010Q1, theft and attempted theft of a motor vehicle declined by at total of 26% and theft from a motor vehicle by OLP fell by over 40%. (Figure 19)

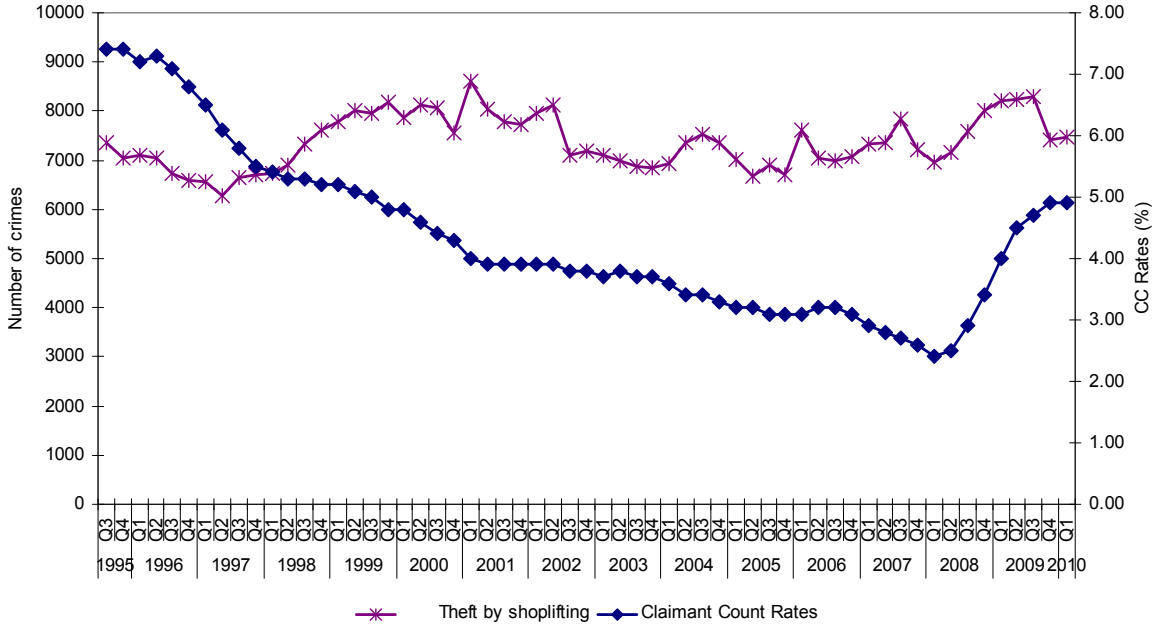
Figure 19 Motor vehicle related thefts and Claimant Count – Scotland (2008Q1-2010Q1)



3.35 Over the medium term, since 1995, theft by shoplifting does not appear to be dependent on the CC unemployment rate. As seen in Figure 20, although the CC rate had been decreasing steadily over the period to 2008 the number of reported shoplifting crimes was fluctuating around a stable (2000-2007) or increasing (1997-2000) trend. This leads to the relatively weak and negative correlation coefficient of -0.17 over the whole period.

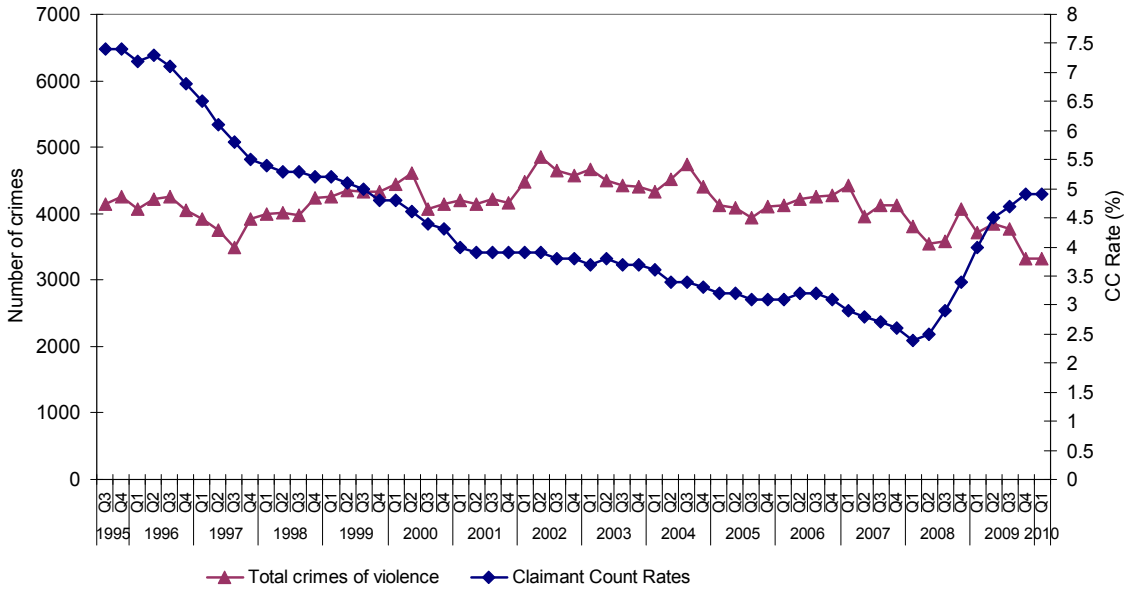
3.36 In the short run since CC rates began to increase there were 6 corresponding quarters of increasing shoplifting but to a much smaller degree, and they appear to have since dropped back to around their trend level in the last two quarters of data.

Figure 20 Theft by shoplifting and Claimant Count – Scotland (1995Q3-2010Q1)



3.37 Visually, the number of 'total crimes of violence' does not appear to be strongly correlated with CC rates in Scotland across this time-period (Figure 21), and this is backed up by a weak correlation coefficient of -0.12. When looking solely at the last 2 years in which CC rates have doubled the level of crimes of violence have actually decreased by nearly 500, or 13%, between 2008 and 2010.

Figure 21 Total crimes of violence and Claimant Count – Scotland (1995Q3-2010Q1)



3.38 As seen from Figure 22, 'Robbery and assault with intent to rob' appears to be more related to the CC rate over the medium run than total crimes of violence. Although the 'robbery and assault' level is more volatile and has periods of moving in the opposite direction from the CC rate, both demonstrate a general trend of decline over the majority of the period, falling 47% and 40% respectively up until 2008. Given the acquisitive nature of this crime, this dependence would have greater grounding in theory than for violent crimes in general. However since then, while CC rates have doubled the level of recorded robberies and assaults with intent to rob had fallen by 17%, suggesting the earlier downwards trends may in fact have been independent of one another.

Figure 22 Robbery and assault with intent to rob and Claimant Count – Scotland (1995Q3-2010Q1)

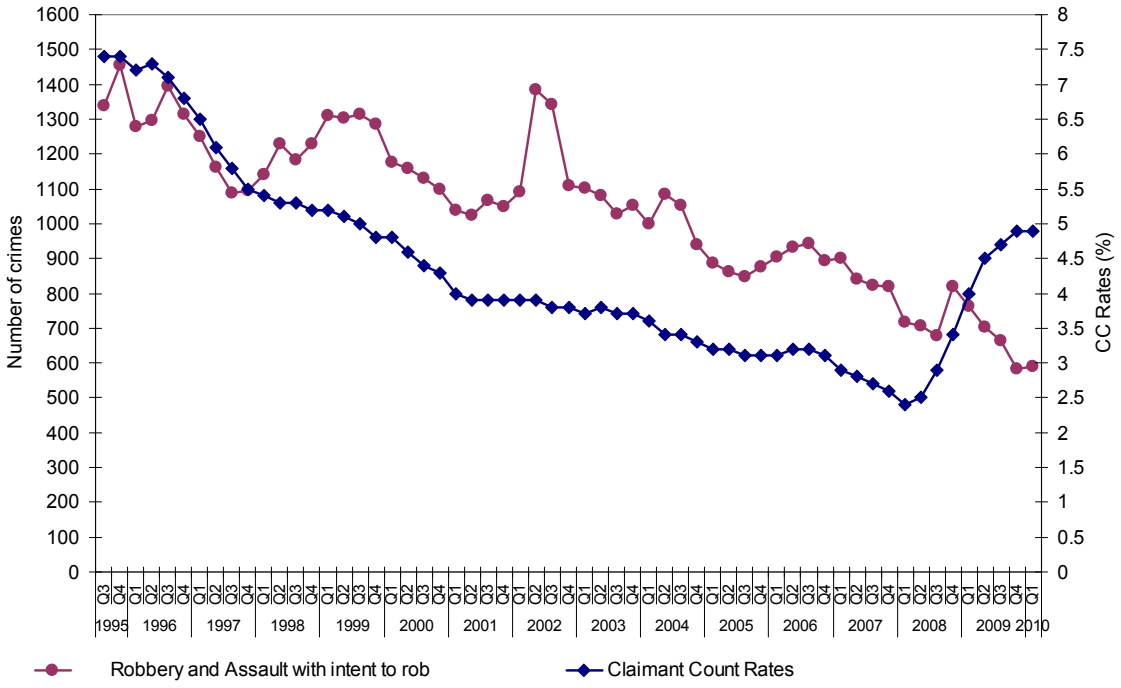
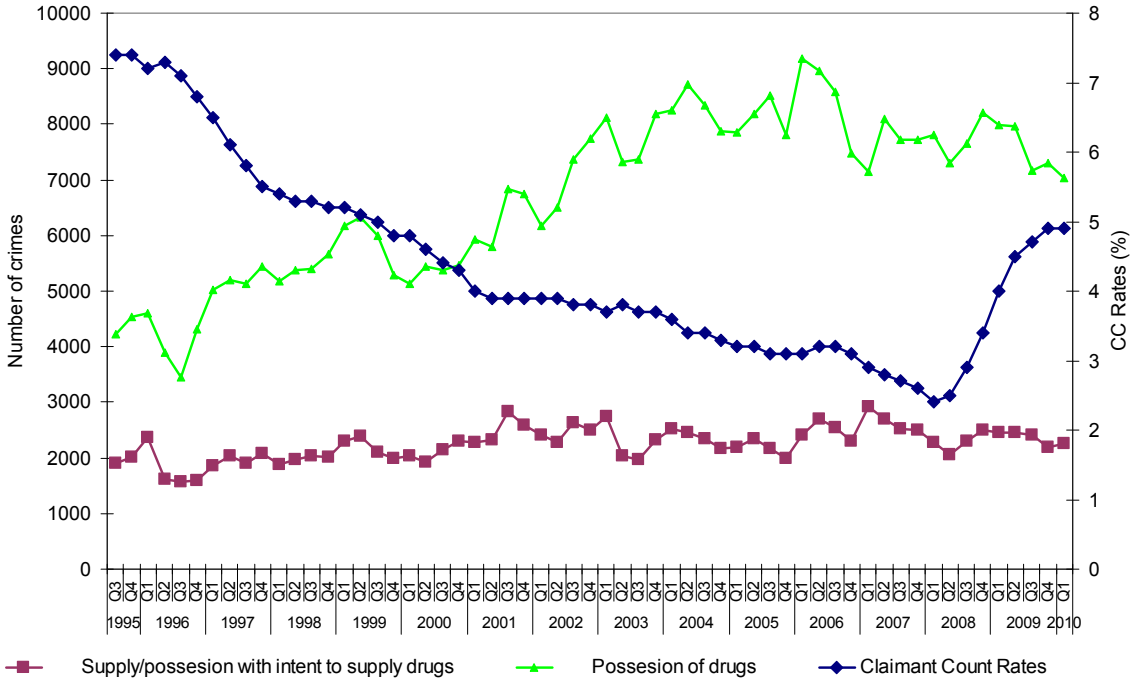


Figure 23 Drug crimes and Claimant Count – Scotland (1995Q3-2010Q1)

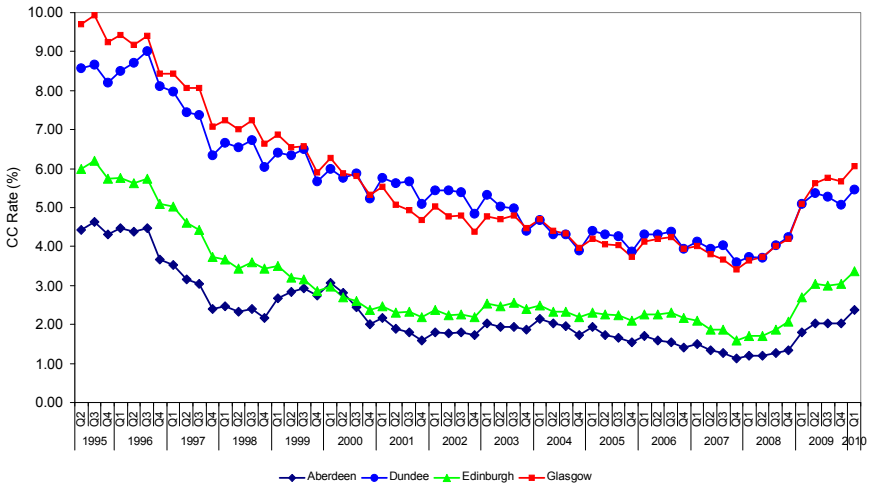


3.39 Drug crimes and CC rates do *not* seem to be strongly correlated in the 1995Q2 – 2010Q1 period. This is consistent with what was found in the analysis of long-term trends. Supply/possession with intent to supply drugs appears to have a very irregular trend across quarters and does not appear to move in relation to either the smoothly falling or sharply rising CC rate (Figure 23). It is a similar story with supply/possession with intent to supply drugs which has a predominantly stable trend over the whole period, including the period between 2008Q1 and 2010Q1 when CC rates doubled.

BOX B: Economy and Crime – Subnational Trends

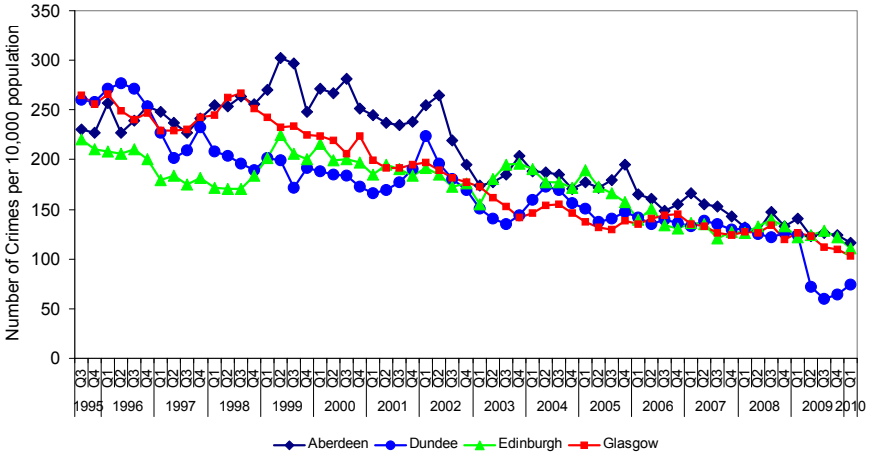
The macroeconomic variable that is consistently available at city level is the claimant count. CC reflects well, as described earlier, changes in GVA (which is not available at a city level for all areas). **CC rates** have, across cities, generally followed the national trend (Figure B1). CC rates are below the national level in Aberdeen and Edinburgh whereas they are above the national level in Dundee and Glasgow.

Figure B1 Claimant Count Rates – Scottish Cities (1995-2010)



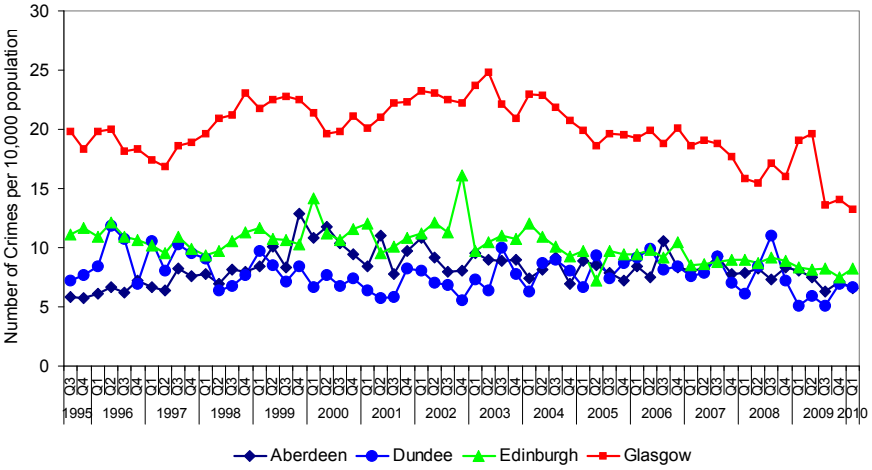
This consistent short-term trend in CC rates is not reflected in recorded **total crimes of dishonesty**; the trend since 2008Q1, when CC rates started to increase in all four cities, is in fact stable or decreasing (Figure B2). Recorded total crimes in Glasgow, Edinburgh and Aberdeen have fallen slightly between 2008Q1 and 2010Q1 (20%, 12% and 12% respectively) while in Dundee have fallen by a dramatic 43% at a time when CC rates have increased by 47%.

Figure B2 Crimes of Dishonesty – Scottish Cities (1995-2010)



Total crimes of violence have followed very irregular trends in each of the four cities considered. Also since the start of the recession there has been no clear pattern across cities, with total violent crimes decreasing in Glasgow, Aberdeen and Edinburgh between 2008Q1 and 2010Q1 (by 16%, 16% and 8% respectively) while in Dundee they rose by 16% over the same period (Figure B3).

Figure B3 Crimes of Violence – Scottish Cities (1995-2010)



4. CONCLUSION

4.1 Notwithstanding the inherent limitations of both the data and the analytical techniques used, the combination of reviewing the current literature and looking at Scottish specific data on the relationship between economic conditions and crime levels has led to important findings. The main conclusion drawn from the analysis is that the evidence is by no means conclusive in favour of a particular theory or certain economic variable having a relationship with overall crime. This is an important finding in itself as it dispels the idea that worsening economic conditions will inevitably result in a rise in crime, and therefore has implications for policy formulation which may have taken this into account.

4.2 Crime results from the combination of a huge variety of different contributing factors and their intricate interactions with one another, making it extremely difficult to pinpoint the exact relationship between individual variables. Past recessions have been accompanied by varying additional circumstances and this makes predicting the impact of the current recession on crime rates based solely on these risky. Unfortunately, given the usual short term nature of recessions, it is likely that the full effects of the current downturn on crime will only be visible after the event.

4.3 Although the evidence in general leans towards there being some relationship between crime and the economy, amongst other things, it is to a degree which does not allow solid conclusions or predictions to be drawn about future patterns.

4.4 The literature review identified low wages and inequality as perhaps being the strongest determinant of offending levels amongst the economic variables, however due to data limitations we were unable to test this with Scottish specific data. This is something we plan to investigate to a greater extent on the back of this paper.

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