Assessing the relative effect of inflation on UK crime.

Csct Masters Project

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# Introduction

*“The history of prices is the history of change”* (Fischer, 1996)*.* Over the last 60 years, there has been a sharp uptake in the use of quantitative methods for the study of living standards. With the growing accessibility of data, scholars have been able to transform what was before a conundrum challenging power of qualitative philosophical deduction to one of empirical questioning.

Fleisher’s 1963 paper on “The effect of unemployment on juvenile delinquency” was among the first to stress the importance of understanding economic predictors of crime. The paper presents an empirical approach to estimating the opportunity cost of policy decisions. In 1974 Becker took this methodology of inferential modelling further with his “economic approach” to crime and punishment which formulised a model for criminal choice, claiming some persons become criminals if the expected utility derived from the offense exceeds the potential they would expect to achieve from engaging in a legitimate alternative (Becker, 1974).

Since then, inferential studies identifying determinants of criminal behaviour and crime rates has supported, although often known to be ignored by, policy makers. Recent research on crime has been dominated by studies on unemployment and its effect on crime rates with some consideration being shown to other measures: economic output, wages, and consumer sentiment.

Research concerning inflation as a predictor for crime is uncommon and generally focused on the United States. Through application of Becker’s theory that models crime as a function of the opportunity cost of illegal activities against the risk of conviction and the cost of punishment it can be deduced that the relative price level increase may provide a strong predictor for crime rate. By applying basic knowledge of market economics, we can attribute a fair amount of reason to the assumption that demand for cheaper stolen goods increases with increasing price level and in turn causes a growth of property and violent crimes as transactions along the criminal supply chains increase. We’d also assume that this demand-supply interaction is compounded by the injurious consequences of financial hardship on mental health, creating an even more volatile platform upon which the rationalisation of the unfavourable criminal choice is stronger (Martin-Carrasco *et al.*, 2016).

With the ongoing cost of living crisis arising due to a scarcity of energy and other essential commodities in the wake of the covid pandemic and the global response to Vladimir Putin’s invasion of Ukraine, research in this area will provide a context upon which to develop an effective policy response.

# Background

## Measuring Inflation

In macroeconomics inflation is defined by the general increase in the price of goods and services in an economy. It is often employed as a broad measure through which we could visualize the relative change in the cost of living in an economy but can also be applied within a narrower scope that focuses on specific goods or services. The price of a haircut from my local barber over a period of my childhood, 2005 to 2011, had increased from £5 to £10. I was surprised to find out upon a recent visit home that the price of my usual barbering service had increased to £15. If we apply the formal definition for inflation:

where is the original price of the good/ service and is its price after some time period , we can state that the price of my haircut had inflated at a rate of 100% through the 5-year period beginning 2005 and a further 50% since then.

Calculating inflation for a single product or service is simple arithmetic exercise but only provides very little perspective when assessing the state of prices in an economy. Calculating the “general” inflation rate of all the prices of goods and services in an economy is more complicated.

At the UKs office of national statistics consumer price inflation is estimated by the percentage change in the price of an average basket of goods and services in each period, often yearly or monthly. The CPIH (consumer price index including owner occupiers’ housing costs) is regarded the most comprehensive measure of that price and is the ONS’s favored price indicator over the CPI (that ignores housing costs) and the retail price index or RPI (which accounts for mortgages and is therefore highly correlated to interest rates) (*Consumer price inflation, UK - Office for National Statistics*., n.d.).

This basket of goods used to compute the CPIH, sometimes called a market basket, is a representative sample of over 700 goods and services, collected by surveying household expenditure. Items are weighted depending on their relative importance such that a price in the change of petrol would produce a greater contribution to the index than an equivalent change in the price of English tea bags. The items and weights are evaluated and updated yearly such that they remain representative of household expenditure with changes in lifestyle over time. The growing popularity of vegetarian and vegan diets has seen the introduction of canned beans, lentils and chickpeas to basket this year, along with meat free sausages. While this year’s removals included men’s suits, reflecting the impact of the global pandemic on working life.

Owner occupiers’ housing cost, often abbreviated to OHH in ONS publications, are the costs of housing services associated with owning, maintaining, and living in one’s own home. Rental equivalence is applied and favored over the inclusion of mortgage payments, that change with interest rates, and is given by the amount of rent a homeowner would pay for an equivalent property.

The index describes the change in the price of this market basket from a base year and is given by the formula:

where is the cost of the market basket in the current period and is its cost in the base period.

This measure for price index was introduced in 2005. Prior to this, the RPI, retail price index, was used as the ONS’s main indicator for inflation calculations. CPIH timeseries figures going back to 1988 were modelled on the existing CPI timeseries after it’s release in 2005 and later, a more extensive back dating of the series, modelled on RPI figures was produced.

## National Context

The current cost of living crisis has seen widespread media coverage in the last months. The compounding effects of the costly pandemic and supply chain disruptions due to the ongoing Russian war in Ukraine are most often referenced as the most significant contributors of inflationary pressure. The annual rate of inflation of CPIH in June 2022 hit a 40-year high 9.4% up from May at 9.1% with the ONS saying that the main driver for the increase being the rising price of fuel.

Graphical user interface, application, Word

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Figure - CPIH Annual Rate (Consumer price inflation, UK - Office for National Statistics., n.d.)

Since 1992, monetary policy has been based on the maintenance of an explicit numerical target, now 2%. For much of this period prices had been fairly stable. During the inaugural LSE Bank of England lecture, then Governor of the Bank of England, Robin Leigh Pemberton presented “The case for price stability” in which he cited many of the costs of inflation and argued that policies that prioritized price stability would be supportive of economic efficiency.

Alan Blinder, former vice chairman of the federal reserve, cleverly defined price stability as a when ordinary people stopped talking about and worrying about inflation. By this definition, considering the very low chance that anyone reading this report would have not had, at the very least, small talk about inflation at some point the last two months, there is strong evidence that prices are currently unstable.

The previous 25-year period saw a general price increase of over 750% due to the collapse of Bretton Woods and other related and compounding effects (King, 2002). The reintroduction of price instability or apparent inflation proneness in the UK necessitates an assessment of policy priority with studies such as this that act to challenge political assumptions.

## Measuring Crime

The difficulty in collecting data on crime is that a crime committed to “plan” would, in most cases, see the occurrence unreported. The ONS’s preferred method of data collection is by TCSEW (Telephone-operated Crime Survey for England and Wales), which recently replaced the in person CSEW due to the unfavorable global event. Results from the Crime survey are unaffected by changes in levels of reporting to police or police recording practices and it is therefore preferred over police recorded offenses, which are not designated national statistics.

Despite this it is notoriously difficult to gain access to reliable and consistent data.

## Measuring Causation

Granger causality testing is often used in econometrics, psychology, and criminology to determine the ability of a time series to forecast a target variable. The test should be employed as an assessment of predictive causality, or temporal relation, as opposed to a question of “true causality”, which is considered a more philosophical topic.

If we let y and x be stationary time series. To test the null hypothesis that x does not Granger-cause y one must prove, according to their t-statistic, that individual lagged values of x add explanatory power to the regression of y such that:

The null hypothesis that x does not Granger-cause y is accepter if none of the lagged values of x are retained.

# Literature Review

## Crime during Historical Price revolutions

Price records are amongst the most abundant source of quantifiable data for study of historical change. Fischer (1996) traces a link with inflation and crime back to the crisis of the 14th century. The destabilizing of the Western Europe economic zone, which was actuated by the collapse of large Tuscan banks under the strain of borrowing from British Monarchs, through the first years of the 14th century was a dark foreshadowing for the coming decades. The existing disorder was exacerbated with the failure of subsequent harvests, during years 1314 and 1315, that instigated a continent-wide famine. The price of essential commodities such as wheat grew 8 times. In the wake of material scarcity, crime began to rise across the continent. Fischer (1996) presents a strong causal link between the price of wheat and criminal indictments in Norfolk. The increased criminal activity extended beyond just acquisitive crimes with an increase in the number of homicides, assaults, and acts of rapes. The occurrences show consistency with the traditional theory of social strain (Merton, 1938) in that the resulting social pressures associated with inequality and rising prices drives individuals towards crime.

Again, during the 17th century, with the onset of what eventually became none as *“the little ice-age”* scarcity induced supply-side inflationary pressures caused another distinct increase in prices across the continent. Fischer (1996) provides evidence for another strong causal link between prices and the number of indictments for property crimes between the years 1566 to 1602 in Essex, citing the growing material inequality through these periods of hardship as a driving factor for social unrest.

A similar relationship was also observed during the revolutionary crisis of the 18th century. Again, uncertain weather causing supply-side instability and inflation alongside, falling real wages and growing unemployment. Lower classes looked towards feudal lords for blame. Rising inequality inspired increases of acquisitive crime whose temporal dependent structure was similar to cycles of price inflation through the period.

The works of Fischer (1996) is an invaluable aggregation of several price indices, all of which show close links with crime. A common factor through those periods is the widening of the inequality gap. Too often, when scarcity is introduced, those who own the means of production and property respond by increasing prices in desperate attempts to maintain profits through difficult times despite the suffering it causes to the lower classes. The increasing prices contribute to an increase in the opportunity cost of criminal activities. This becomes particularly dangerous when there is significant inequality between social classes.

## Crime and Inflation

By applying rudimentary understanding of market economics, formulating logical arguments linking higher crime rates with conditions associated with economic hardship is relatively straight forward. Research regarding the effect of economic markers on the crime rate goes back to the 1960s. Most recent research suggests, in line with logical expectations, that periods of higher crime rates coincide with times of economic struggle.

The 1999 work by David Hackett Fischer identifies four occasions of significant increase in the price level in Western History. Both violent crime and property crime increased during these periods and fell when the price level stabilized (Fischer, 1996), explaining that widespread deprivation, discontent, and stress brought on by inflation created a more potent environment for the inspiration of criminal behaviors. Literature suggests that relatively low inflation rates explain the absence of crime increases through the most recent recession (Rosenfeld, 2014).

Fischer’s research, despite receiving positive reviews, has not yet made any significant influence on criminological research. Other studies also confirm our logical conclusion that eroding economic conditions are linked with increased criminal incidences.

Arvanites claims that:

*“the possibility that economic conditions influence the rate of street crime was central the modern criminology theory.”*

Their research (Arvanites and Defina, 2006) describes the inverse relationship between economic growth and street crime, introducing inflation-adjusted, per capita growth as a measure for the “state of the economy”, a departure from previous methodologies that had focused on the use of unemployment as a predictor. The conclusion presents a strong argument for the price level dependent economic measures being a stronger predictor for crime than unemployment. They also explain that a worsening economy will struggle to support effective social infrastructure and law enforcement, thus creating inequality and further motivation for criminal activities.

The 1999 paper on “Consumer Misbehavior” which models the behavior of consumers who decide to purchase illicit goods, identifies price as a significant predictor for willingness to buy. (Albers‐Miller, 1999). The resulting increase in demand for cheaper goods following rises in aggregate price should strengthen incentives to obtain such merchandise by illegitimate means. Therefore, causing an increase in acquisitive crimes and associated violent crime that are necessitated by completely unregulated markets. In this realization the report concludes with a rather interesting recommendation, that policy makers should lobby for stricter enforcement of criminal sanctions against consumers to reduce demand side pressure that is apparently a significant driver for profit in those markets.

## The Unemployment Obsession

Since Fleisher’s seminal work in 1963 uncovering the relationship between juvenile delinquency and labour market conditions, much of the research on crime has focused on unemployment. For some reasons, the most significant being recent relative price stability, inflation has largely been overlooked as a measure that could incentivize the criminal choice.

The 1987 review of literature (Chiricos, 1987) discussed the existence of a time dependent component of the unemployment-crime (U-C) relationship. Having aggregated the results of 63 studies, Chiricos was able to uncover a distinct change in the proposed correlation between the variable after 1970. His discussion does not go as far as to undermine the consensus but highlighting how little was known about the link between these specific variables. Arvanites and Defina (2006) explains that while unemployment may provide a metric upon which to evaluate the performance of specific social and economic policies. It’s value does not capture the various causes of social strain (Arvanites and Defina, 2006) which could be caused, for example, by changes in work hours or pay.

The inconsistencies discovered in U-C during studies following 1970 supported the growth in a consensus of doubt in the metric for predicting crime. Cantor and Land (1985) proposed that the persistence of this finding, of a weak and often negative U-C relationship, suggests that this fact, in its temporalness, should provide considerable context in its exploration. Unemployment as an explanatory variable may perhaps find better place, if any within studies focused on quantitative analysis, within multivariate models.

Cantor and Land (1985) theorized a more complex U-C relationship in that unemployment could elicit a positive or negative impact on crime rates, by simultaneously increasing the motivation and decreasing the opportunity for criminal activity.

The motivation effect theory not only supports the logical theory that economic hardship creates a platform for crime but is also mirrored by neo-classical models of criminal choice (Becker, 1974), neo-Marxist models of economic constraint (Gordon, 1973) and even has roots in theories of strain (Merton, 1938).

The opportunity effect theory suggests that a rise of unemployment would mean fewer economic goods, or those prone and unfortunate enough to be targeted by criminals. By removing individuals from employment outside the home an increase in the rate of unemployment may see homes and persons with a reduced risk to victimization, with a higher concentration of the population remaining in residential properties or local neighborhoods. In addition, as an indicator whose fluctuations coincide with business cycles, higher unemployment generally indicates a fall in consumption, the lower rate of circulation of people and property that may accompany a rising unemployment rate could reinforce this opportunity effect and reduce crime in the short term.

Cantor and Land’s results indicated a small, but significant, total effect of the unemployment rate on acquisitive crimes (burglary, larceny-theft, and robbery). The apparent absence of influence upon violent crimes was not particularly surprising considering the highly individualistic factors associated with those actions. Their results also produce little evidence of theorized “lagged” motivation effect but did not lead to a conclusion that eliminated the possibility of the effect existing. Rather, they concluded that for the post-World War II US, the net result of a change in unemployment would produce a dominant opportunity effect leading to a negative response in crime.

The variance of opinion presented in studies through the 70s and 80s necessitates further study to truly understand the “state of economy”-crime relationship. Geographical scope and time seem to be significant contributing factors when assessing U-C. There’s little one can be sure about concluding when considering the aggregate discussion of the literature except, within a national context, unemployment alone does not abstract enough of the economic condition and its effect on individuals lives such that would make it an effective predictor for crime.

# Hypothesis

Despite the research regarding these predictors of crime being so apparently contradictory in many cases. They do provide some useful insight in that the relationship of crime to these aggregate metrics is far more complex then would allow one to describe a simple sign-wise relationship. It is apparent that the modelling of crime would be better performed by some multivariate model that could better capture the state of the economy and therefore provide a better model for the quality of life. Even so, in the instance that a perfect multivariate model could be created, we would expect its predictive strength to correlate with a time dependent component as the nature of society evolves with changing lifestyle, technology and consumer habits.

Regardless the computation of the relationship between crime and these economic measures, even in its transience, can provide insight into the expected response of a population from changes in policy. This will surely provide some predictive insight for consideration when constructing policy proposals and when measuring their success after implementation.

Having considered the existing research it is hypothesized that increasing price level will yield a positive response from acquisitive crimes. However, due to improvements in crime prevention policies and infrastructure, the most significant being law enforcement, surveillance and improving social insurances, we would expect this response to be considerably less severe than any of those documented by Fisher in his 1996 works.

# Data and Method

Models were created for both violent and acquisitive crimes using the crown prosecution service’s defined “violent crimes” and burglary as index measures for each respectively. Granger causality testing was then performed using the statsmodel package in python. The test would produce values to accept or reject the hypothesis that a change in the explanatory variable would granger cause a response in the target. The input variables would be given by the inflation rate.

The data was collected from an archive that appears on ukcrimestats.com (Lewis, n.d.) which aggregates data collected from the UK police’s open data API. The data is, unfavorably, a record of police recorded crime as data from the ONS’s TCSEW is particularly difficult to source.

The series for violent crimes accounts for murder and manslaughter, throwing of corrosive substances, assault, gun and knife crime, and robbery as defined by the crown prosecution service. Burglary is the illegal entering of a property for the purpose of theft of goods. Values were divided by the millions of national residence to reduce the effect of a changing population and differenced to obtain the change month on month as opposed to absolute values.

Data values for inflation was taken from the ONS’s open data portal. CPIH values were used as they provide the most holistic description of living costs.

# Results

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