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What Is Inflation?

This book is largely concerned with the use of a statistical tool, Index Numbers, to measure a particular economic phenomenon which is typically referred to as inflation. This chapter will focus on what inflation is, why it matters and why it might be important that we have a good measure of the phenomenon in the form of an Official Statistic, and in turn, why it might be important to read the rest of this book! Economists will likely be familiar with much of the content in this chapter; however, it is worth making sure that we begin our discussion of the measurement of inflation on a common footing with those readers who may have less training in this area.

Typically in this book, we will be concerning ourselves with a specific measure of inflation: the percentage change in an index of prices encountered by consumers for the same set of goods and services across two differing time periods. Measures of inflation need not be restricted to the context of the prices faced by consumers; for example, the Office for National Statistics (ONS) produces several measures of inflation, for example, for imports and exports and producer prices as well as multiple measures of inflation in prices faced by consumers, such as the Retail Prices Index (RPI) and Consumer Prices Index (CPI). In this chapter, we will use the term inflation synonymously with a percentage change in an index of consumer prices.

2.1 Why Does Inflation Matter?

Imagine trying to negotiate a pay rise with your boss without knowing what the recent level of inflation has been. You might tell your boss that the cost of the things you buy has increased over the course of the past year, while they might argue that their experience has been that prices are falling. If we then abstract this argument to a broader level and consider the bargaining positions of unions and management teams, it may help to make it clear what might be a sensible wage increase to maintain the purchasing power of workers' wages.¹ Such concerns do not only affect those working but also affect those in receipt of benefits. A pensioner who is given a pension on retirement will see their ability to purchase consumer goods fall if price levels rise, and so they are likely to be keen to make sure that benefit payments keep pace with changes in the level of prices in a given area during a given passage of time.

2.2 The Language of Inflation

Before moving on it is useful to consider the common definition of inflation and the definitions of related terms as they are commonly understood by economists, who are likely to make the most frequent use of such terms. The OED definition of inflation (relating to economics) is that it defines a general increase in prices and a fall in the purchasing value of money, see OED (2017). Similar definitions of inflation are offered by some of the leading textbooks aimed at students of economics² although their focus is much more on the first part of this definition—that inflation is defined as a general increase in price levels.

For many people, a definition of inflation as the increase in the price levels experienced in an economy may be enough for them to be happy that they understand it. However, for those of a statistical mindset, the

¹We note here that we are deliberately keeping away from the contentious phrase 'maintaining a fixed standard of living', which will be discussed more fully in later chapters.

²See, for example, Mankiw and Taylor (2017), p. 583 or Sloman et al., p. 262.

definition of inflation we have offered is likely to call to mind questions regarding what the price level experienced by people in an economy is and how we go about measuring it when we are in a situation in which we do not have complete information regarding prices and quantities involved in economic transactions. It is, however, worth noting that the rest of this book is focused on how changes in price levels are measured by statisticians and how they relate to the original concept of inflation which we often see defined at a fairly high level. If these questions did not come to mind when you read or heard the definition of inflation mentioned above then it is hoped that this book will help you see that they are important for understanding the phenomenon of inflation and its measurement. If you immediately questioned how the price level might be measured, we hope this book will provide at least a partial solution to the questions you are asking.

Alongside the definition of inflation, we will also often hear economists make use of the term *deflation* which the OED defines as a reduction in the level of prices in an economy.³ This refers to periods of time in which the level of prices, however measured, is declining, rather than increasing as is the more common situation in modern economies. This definition of deflation can cause some confusion for students of Index Numbers as deflation can also be used to refer to the practice of dividing a series of values measured in nominal⁴ money at different periods of time by one plus the percentage change in a price index measured as a decimal so that the effect of changes in the price level between the periods is removed and the amounts are measured at a constant price level. Where there is any ambiguity in the course of this book, we will attempt to clarify our meaning in the context of the situation being discussed.

Economists will often also make reference to a period of disinflation which represents a period in which inflation is falling from a previous level to a new lower level (for an example of this being used in context see

³Surprisingly, the definition seems incomplete compared the earlier statement referring to inflation. However, deflation might also be defined as an increase in the purchasing power of money.

⁴By this we mean the amounts measured in money in the time period they occur, so for example, company accounts are stated in nominal amounts, and the value of the pounds values are measured in changes across the years due to inflation.

Roger 2009). For example, in the past three decades, the UK has experienced a period of disinflation as inflation has fallen to a relatively very small, but generally positive, level. Hence, where we talk about a period of disinflation, we should be careful not to confuse this term with deflation as prices are still rising across the economy, however, at a slower rate than in some comparator period.

It is worth considering how these terms are typically used when talking about the phenomenon of inflation as it is measured and reported by National Statistical Institutions (NSIs) such as the Office for National Statistics. Typically, the headline measure of inflation, the annual change in the Consumer Prices Index, will be released to the press, and their reports will talk about inflation rising, falling or staying constant. It is worth noting that in all three of these cases, the price level is still increasing, although at a different rate. If inflation falls from 3% to 2%, then it does not mean that prices have fallen, only that the rate of change in the price level has slowed down. The case in which prices are falling would occur only if the inflation rate itself was reported as a negative number. Hence, we should be careful when referring to a falling inflation rate that we do not assume that this is synonymous with falling prices and subsequent increases in the purchasing power of money.

2.3 The Role of Inflation in Monetary Economics

Monetary Economics is the branch of economics which is concerned with the role played by money in economies. Its influence in recent decades has been significant in the development of economic policies by governments and central banks (for more on the history of Monetary Economics see: Dimand 2008). As a result of the focus this area of study has on the role of money, it has been the main area of economics which has made use of and developed the thinking around inflation. In this section, we will attempt to highlight the main principles developed in this area so that the measurement of inflation can be better understood and related to discussions of macroeconomic theory. However,

given restrictions of space, it will, by necessity, be a high-level summary of some key statements related to the area.

One of the key theories related to the study of inflation in Economics is the quantity theory of money,⁵ which, broadly stated, posits that an increase in the quantity of money in an economy, or money supply, will lead to an increase in the level of prices. From our definition of inflation, we can see that this price level increase will also result in a fall in the purchasing power of money, hence defining a reciprocal relationship between the price level and the purchasing power of a unit of currency or its value.

As individuals will tend to want to hold more units of a currency as the purchasing power of that currency falls, it is fair for us to expect the demand for money to exhibit a negative correlation with the purchasing power of money. This is the same as saying there will be a positive relationship between the price level and the amount of money which people would like to hold. Given this, if we assume that the supply of money is set for the economy by some central bank, then we can see that the equilibrium point, where quantity of money demanded is equal to the amount supplied, will be related to a lower level of purchasing power as we increase the supply of money and will be related to a higher level of purchasing power as the supply of money is decreased.

The above demonstration of the effect of an increase in the money supply is somewhat artificial, and in the real world, the mechanisms which governments and central banks have for managing the supply of money in a given economy are much more varied. The money supply can be increased by central banks, such as the Bank of England, buying assets from financial institutions, offering issues of debt to be repaid in future, adjusting the rate of interest at which the bank is willing to lend to other financial institutions and various other means. The effect of changes will also take some time to filter through the markets until the full effect of any policies is felt. However, we will not examine the mechanisms by which this takes place in this book.

⁵First discussed by economists in the seventeenth and eighteenth centuries.

2.4 Is Inflation Bad?

Most people will naturally assume that an increase in the price level in the country they are living in is a bad thing. This might well be true in some circumstances; however, there are others in which this need not be the case. Imagine the case in which your monthly salary is paid to you on the morning following the announcement of the official measure of inflation and that each month your salary is increased by the rate of inflation. In this case, you have little reason to fear an increase in the price level as you will find that you are able to buy (approximately) the same amount of things as last month. Where wages and prices are both automatically linked to inflation, and a significant period of time does not pass between the inflation being measured and spending being undertaken, then there should be little impact on people's consumption.

The above idea is taken to its logical conclusion in the idea of monetary neutrality in that the prices of things don't really play much of a factor in real economic decisions. This would imply that the nominal prices that people might pay for things will change, however, the level of real economic activity underlying these prices need not change in conjunction with the change in the purchasing power of money. In this view of the world, there is little to fear from inflation as it does not affect the real economic interactions underpinning the world we live in and is not a practical problem.

Unfortunately, we do not live in a world which is as neat as this and as a result, there are several costs which are thought to result from inflation, impacting an economy and the people affected by its workings. For example, if inflation was regularly large, and prices change significantly on a regular basis, then businesses would be forced to regularly revise their prices and publish them accordingly. Advertising such changes comes at a cost to businesses, and as a result of these *menu costs*, price lists will not necessarily adjust to reflect changes in the purchasing power of money immediately.

In addition to menu costs, economists will also talk about the experience of *shoe leather costs* being related to periods of inflation. This reflects the fact that as prices change investors will have to shop around

for the best deals and that the time used is a cost to economic agents as they have to allocate some of their valuable economic resources, particularly time, to disentangle the effects of inflation.

It is possible for inflation to bring about some redistribution of the wealth across the economy, whether these redistributions are good or bad may be a matter of personal judgement regarding the position of the parties involved. Imagine an individual obtains a mortgage from a bank which has a fixed rate of interest of 5% per annum. If the house is purchased for £200,000 and (for the sake of simplicity) we assume no repayments are made over the 5 years for which the interest is fixed, then the value of the debt at the end of the 5 year period is £255,263. Now, assume that the person's salary is £50,000 at the start of the period and their salary increases in line with inflation. If inflation soars, due to an unexpected event, and inflation is 20% per annum⁶ then the final salary will be £124,416. At the beginning of the period, the person owed 4 times their annual income, while at the end of the period they owe only 2.05 times their annual income, while the value of the debt to the bank has increased in terms of the amount owed but has decreased in real terms. This is an example of a wealth transfer from the bank to the individual, although no money has changed hands in the five-year period. This is an artificial example, however if inflation shifts suddenly, smaller changes in relative wealth will occur due to fixed price contracts across the economy. Other people may lose out. Consider, for example, a person who had their savings in a 5-year bond issued by the bank with an annual interest rate of 5%. In this case, there will be a transfer of wealth from the individual to the bank.

In the UK, the Bank of England is set an inflation target of 2%, based on the annual change in the CPI, and will consider monetary policy tools to achieve the target in line with its wider remit regarding the UK economy. It is therefore not uncommon for non-economists to ask the question that if inflation can be harmful why is there a target of positive inflation rather than price stability? The economist's response to

⁶This now seems like a very high rate of inflation in the UK. However, in living memory inflation was at this level for several years.

this question would be along the lines that a small amount of inflation associated with growth in the economy, which is desirable. One possible argument to support this is that inflation allows some flexibility in the pricing of labour in less productive industries. As wages are increased by less than inflation in some jobs and more than inflation in others, the relative value of labour in these occupations is allowed to change and there can be a reallocation of labour to more productive endeavours. If inflation was around zero, this would be harder (though not impossible) to achieve as it might mean wage decreases for some roles which are more difficult for employers to enact.

Having considered the harmful effects of inflation, it might be worth considering the alternative situation brought about by a period of deflation. Deflation can have several effects but consider you are running a business with a significant bank loan and that you had based your repayments on the price level you charge your customers. If the price level decreases and the price of your own goods is pushed down, then you will need to sell more units in order to be able to pay off your debt. You would also have to negotiate price decreases for the inputs to your business, which may be a fraught process. As your debt rises in real terms (the number of units you have to sell to cover the debt), then it will become more and more difficult for you to pay off what you owe, especially, if consumers expect the prices of consumer goods and services to carry on falling and in anticipation of this decide to start putting off purchases. It is therefore possible that businesses that were operating on the margins of efficiency before the period of deflation go under very quickly, increasing unemployment and decreasing demand at the same time and further pushing the economy along a deflationary path. Before long more businesses would be in significant trouble. Hence, although the idea of falling prices may initially sound like a good thing, deflation can be at least as harmful as inflation. Note that many of the costs of inflation described above may also be applied to deflation, such as shoe leather costs and menu costs.

As prices in the past few decades have been relatively stable, it is interesting to consider the confusion that a sustained period of price changes might wreak on people's everyday life. Imagine if the price of food items could change by 30% every month while your mortgage

payment increased by 7% and the price of petrol increased by 19% while your income increased by 15% and that you didn't know about any of this before the start of the month, but knew prices were liable to change. It would be very difficult to plan consumption and making decisions would be much more difficult. It would be very stressful for some people who had restricted incomes or no savings to absorb potentially harmful price rises. If you were planning consumption on larger items, you might want to put these off as long as possible and save some of your income to help stave off the effect of future price changes. In order to do this, you would need to find an investment product which compensated you for changes in the price level. None of this effort and stress will increase the real value of GDP and in some cases may mean less is consumed than otherwise. As a result, the confusion and worry which pervades as prices are changing rapidly represent another cost to the economy as a whole. Many such problems would also occur in the case of deflation.

2.4.1 The Rise of Monetarism

When discussing the effects of changes in the money supply, economists will often make reference to the Fisher⁷ Equation of Exchange, derived from the work of other late nineteenth and early twentieth-century economists. This equation specifies the long run relationship between four economic variables: the velocity of money (V), the level of output (Y), the money supply (M) and the price level (P). The relationship between these variables is then commonly stated to be:

$$MV = PY$$

Hence, the two sides of this identity must be balanced in order to maintain the stated relationship. Economists believe that, in the short term at least, the velocity of money is relatively stable and hence an increase in the supply of money (via any of the mechanisms we

⁷This is named for Irving Fisher who was the first to specify the relationship algebraically.

discussed above) will lead to an increase in the product of price and output. This will relate to the amount of output in current prices in an economy. In the short run it is expected that both prices and output will increase, with the increase in output stimulated by the falling interest rates as the money supply increases. As this happens, demand will increase and in the long-run output will shrink back towards its original level. As this occurs, and in order to maintain the identity, it is again the price level which will increase.

Having considered the above we note that nothing has really changed regarding the real economic activity we are seeing, in the short term at least. This leads us back towards the idea of monetary neutrality and the idea, espoused by the Nobel Prize-winning economist Milton Friedman in his famous quote that “inflation is everywhere and always a monetary phenomenon” (Friedman 1970). Friedman was an avowed advocate of a method for approaching the management of national economies by a collection of concepts, ideas and tools which together have been labelled as monetarism, and its advocates are usually identified as monetarists. Friedman espoused his ideas on monetarism over much of his career⁸ and most importantly in Friedman and Schwartz (1963) on the monetary history of the USA in which much of the groundwork for his later ideas was laid.

At his most forceful Friedman would hold that it was government's inability to properly manage the money supply which could lead to severe problems in the economy. Most notably, when Friedman analysed the financial crisis of 1929, which gave rise to the great depression of the 1930s, he claimed that it was instances in which the money supply was not adequately managed which brought about contractions in economic output, and that the crisis could have been ameliorated had a more active monetarist stance been taken.⁹

⁸For a brief biography of Friedman's impact on economics see the address on his 90th birthday made by Bernanke (2002).

⁹For a readable account of this argument, which is not written with only academics in mind see Chap. 7 in Friedman and Friedman (1980).

In the practice of macroeconomic theory in the second half of the twentieth-century, monetarism became the dominant way of thinking about managing the economy, particularly in the USA and UK, where the policies have become attached to the legacy of leaders such as Margaret Thatcher and Ronald Reagan. This growing prominence was due to the inability of traditional Keynesian economic theory to explain the stagflation (stagnation in growth coupled with high inflation) which was experienced by some countries in the 1970s. The ideas of monetarism became ever more influential in this context, and as Roger (2009) describes, this growing prominence was emphasised when New Zealand adopted a formal inflation targeting regime, in which monetary policies were set in relation to the rate of inflation experienced. Several other countries followed, such as the UK and USA and the growing acceptance of the theory of monetarists saw it exported to other countries via the work of multinational organisations such as the International Monetary Fund (IMF) and World Bank. As Roger (2009) notes, the acceptance of such policies was questioned in the light of 2008 financial crisis. However, inflation targeting remains a valid part of the macroeconomic environment for several countries. In the UK the Bank of England still has an inflation target of 2% and the Governor of the Bank of England must report to the Chancellor of the Exchequer if annual CPI inflation falls more than 1% away from the target in either direction.¹⁰

The rise of monetarism means that management of the money supply has become a critical issue to economists over the past 50 years and as a result, it is clear that a measure of inflation which allows for effective inflation rate targeting is of critical importance to such a system of management. The Governor's August 2016 letter to the Chancellor of the Exchequer begins by quoting official measures of inflation and includes results from sub-indices prepared by the ONS. This demonstrates the important and explicit role that inflation statistics plays in the management of the economy using an inflation targeting regime, such as that

¹⁰The letters are published, along with the Chancellor's responses, see <http://www.bankofengland.co.uk/monetarypolicy/Pages/letters.aspx>.

adopted by the UK government. Hence an understanding of both what inflation is, and how it is measured should be of interest to economists who use this measure for important decisions, although often the detail of such arguments is overlooked even by those who regularly make use of them. Of course, inflation measurement is also of interest to those monitoring the economy in countries which have not adopted an inflation targeting regime.

2.4.2 Hyperinflation

In recent years, as some countries have adopted inflation targeting regimes, the rate of price changes in these countries has been relatively modest; however, several countries have historically experienced instances of extreme inflation, called hyperinflation. The word hyperinflation often calls to mind a number of historical episodes, such as the rampant inflation in 1920s Germany which saw banknotes have such a low value that some people were willing to use them to paper their walls or use blocks of money as toys,¹¹ according to famous photographs from the time. It therefore seems useful to have a definition to distinguish between periods of high inflation and these periods, when inflation reaches to another level.

Cagan (1956) was the first to propose a formal definition for the conditions under which a country (or any identifiable region) could be considered to be experiencing hyperinflation. Cagan (1956) claimed that a hyperinflation commences in a month when the price increases by 50% or more in a month and lasts until the monthly index falls below this level and subsequently stays below the cut-off of 50% for 12 months. Hence, it is not possible to say an economy has exited hyperinflation until price increases have reduced considerably for a period. Cagan (1956) admits that these rules are arrived at arbitrarily in a footnote to his work, however, it would be difficult to argue that any economy seeing such a high level of price changes is not experiencing some form

¹¹See for example <http://rarehistoricalphotos.com/children-playing-stacks-hyperinflated-currency-weimar-republic-1922/>.

of inflationary crisis. Having identified seven periods of hyperinflation, Cagan (1956) considers the monetary dynamics of such periods which are beyond the scope of this brief review.

Hanke and Krus (2013) adopt Cagan's definition of hyperinflation and attempt to collect a complete and reproducible list of hyperinflations which have occurred and can be documented based on published economic statistics. They note the difficulty of finding documentable cases and emphasise that as periods of hyperinflation can often be linked to periods of geopolitical instability, the existence of an uninterrupted stream of economic statistics cannot always be guaranteed. Despite problems with identifying data, Hanke and Krus (2013) identify 56 separate instances of hyperinflation, with the first taking place in France in 1795 and the most recent in Zimbabwe, which had the dubious honour of hosting the first hyperinflation of the twenty-first century. Bernholz (2015) and Cagan's (1956) definitions identify twenty-nine instances up to 2001. Bernholz (2015) notes that other episodes could be included in this class of events if the criteria were expanded by defining a range of qualifications commonly associated with very high rates of inflation.

According to the calculations of Hanke and Krus (2013), Hungary had the ever documented inflation with a monthly inflation rate of $4.19 \times 10^{16}\%$ in July 1946, which means that prices were doubling around once every 15 hours, if we make the assumption that the pattern of price changes was smooth over the month. What is clear is that hyperinflation represents a very different price regime than most of us are used to and therefore is worth considering for anyone setting out to think about inflation measurement. Hanke and Kwok (2009) demonstrate the problems of measuring even contemporary hyperinflation rates in the case of Zimbabwe, where in 2008 standard data was not available, as they rely on measuring inflation rates via exchange rate changes, underpinned by the concept of purchasing power parity. It is worth bearing in mind that many of the tools and arguments we will consider surrounding inflation in this book were developed in times less dramatic than those considered in this section; however, when considering how inflation is measured, it is worth considering how the techniques and arguments might be applied in an economy exhibiting hyperinflation.

2.5 Some Questions About Inflation

Inflation, as we have defined it so far, has largely been a single macroeconomic variable, and we have treated it as though in many cases we can apply our description of the variable in a very general sense. However, we might be left with a number of questions about inflation to consider as we look at how inflation is currently measured and has been measured in the past.

One question is whether an aggregate measure of inflation is useful for reflecting the inflation experience of several groups of individuals across several parts of the UK, which itself is made up of several nations. Is the measure of inflation, as reported by the ONS and considered by politicians and the Bank of England's Monetary Policy Committee detailed and reliable enough for decisions to be made which are fair and just? One important example of this is the inflation experience of pensioners in the UK. It is likely that their expenditure patterns will be significantly different to those of other groups who are well represented in the expenditure weights used in the CPI; this is discussed in some detail for UK consumers in Flower and Wales (2014a, b). Is it therefore fair to use a general measure of inflation in deciding changes to pensions when there is no corresponding measure for only pensioner households? We might then go on to note that the population of pensioners in the UK is also heterogeneous, with some heavily reliant on state pensions and others having alternative sources of income. Similar arguments might be made for a number of other groups. For example, is the inflation experience of a 50-year-old nurse with two children likely to be significantly different to that of a 22-year-old investment banker living alone? How do geographical considerations factor into such questions—will the difference in inflation vary if these two people live next door to each other or are separated by several hundred miles? All of these questions will naturally arise as we begin to consider the way in which inflation is used and constructed. It seems that they require further consideration in defining what inflation is, and this is reflected, as has been seen in recent recommendations to develop a family of price indices to better represent the inflation experience of groups within the UK as we shall see in Chap. 8.

We might also want to question what an inflation measure represents and how well it summarises information about the complex economy we live in. When a chocolate bar is made smaller, and the price remains the same, many people rightly consider this to be inflation and we will see how such a situation would be reflected in inflation measurement. We also consider some more difficult questions about what represents a price and what represents a change in that price. We might struggle to identify a change in price as goods change significantly in quality. For example, many electrical products are released each year with new functionality so how do we compare the price of these items to prices of the old items? When a new mobile phone is released with extra features, yet the price is similar to an existing model would this represent a price drop in terms of the existing functionality? If so, how much would an equivalent model be priced at? Such issues become even more complex when there are features of products aside from their technical specifications. Consider a new smartphone, which has been effectively marketed for some months; at least part of the initial price is likely to be related to how fashionable it is. As the smartphone becomes older and less fashionable, the price may drop. The phone might well then be considered to have two elements, the technical features which remain unchanged, and one which is based on how fashionable the phone is, which is time varying. Disentangling such effects is difficult which might be why inflation estimation tends to use baskets containing goods whose prices are more easily handled.

These examples show behind the estimation of inflation lies a very complex economy, with interactions between a great many groups of people with a range of wants and needs. It is therefore important for the user to consider whether the inflation statistic we have discussed so far is able to reflect the underlying economic reality of the UK. If not, do we need more detail in order to make the use of the statistic more appropriate? Are we likely to be misled if we use the statistics for evaluating our own economic position? These are important questions, and before we can answer them fully, we will need to make sure we have an understanding of what inflation is as we refer to it in our own lives and how it is calculated in the measures produced by organisations such as the ONS.

2.6 The Common Uses of Inflation

Having considered the theoretical basis for inflation and how it might be thought about by economists, it is also useful to think about the common uses of the statistics which come out of the measurement of inflation. In this section, we will more generally consider how price indices measure the change in the price of consumer goods and services are used. In doing this, we will expand our scope beyond the annual change in the CPI to changes in some related indices, which regardless of their status are still used as measures of price change in some way. The intention of this list is to indicate the breadth of the uses of statistics which measure price change, and further examples can be found in Evans and Restieaux (2013).

- Companies use price indices in their setting of contracts. In some cases, we can see this as explicit¹² while in others expectations about the future changes in a price index may impact price setting behaviour. Consider, for example, large aerospace projects which may take many years, and so the company undertaking the work wants to make sure that during the period of construction the amount they are being paid makes the work worthwhile. In this case, the contract might include a clause to increase payments in line with inflation.
- We have seen that the MPC explicitly considers the level of inflation, as measured by the CPI. It would be simplistic to suggest that this is all the members look at, as they consider a range of information and will often consider their expectations about the future alongside information about the current state of the world.
- The Government often explicitly uses inflation statistics, although they may seem inconsistent in their application. CPI is used as part of the triple lock for pension payments,¹³ and uprating of other benefits. In addition, Government oversees the annual increase in some

¹²See for example, Vodafone's use of RPI in updating the price of contracts, see <https://www.vodafone.co.uk/explore/costs/rpi/>.

¹³This states that pensions will increase by the lower of the annual increase in the CPI, average wages and 2.5%.

prices such as rail fares. Recently as part of the Teaching Excellence Framework,¹⁴ there is a proposal that tuition fees for students will increase for some students in line with the RPI. As the RPI usually reports a higher rate of inflation than the CPI, the judicious choice of inflation statistics allows the Government to manage the public purse by utilising the difference which exists between the CPI and RPI, which will be discussed in subsequent chapters.

- Unions and individuals often use inflation statistics as a point of reference when negotiating pay increases. On the opposite side of the table, employers are also likely to use inflation statistics in constructing their own negotiating position. The complication in the UK is that we have two measures of consumer price inflation which are well known and have been used in a variety of contexts, the RPI and CPI. As the RPI inflation is often greater than the CPI inflation, it is natural to expect that employees will base their requested pay increase on the RPI while employers are more likely to argue for a price rise in line with the CPI. This no doubt leads to some tense negotiations, and it is unlikely either side is particularly concerned with the technical differences in these two indices. However, in the rest of this volume, we hope to help make them clear.
- Economists make a lot of use of economic data, in their analysis of the economy and in their academic research which helps them in understanding the economic world around them. This can take many forms, from the forecasting of inflation rates to the determination of the interplay between other factors and the rate of inflation. Without this data from a central source, it would be difficult for such research to be conducted and be of a high quality, which itself would have an impact on the quality of decisions made by a range of economic agents. The impact of research using inflation goes far beyond the world of academia.
- Media sources report on inflation statistics as part of their coverage of the economy. These regular reports are part of the way in which the general public stay aware of the economic conditions in their country and provides a foundation for their expectations regarding future levels of inflation.

¹⁴For more information on the Teaching Excellence Framework, see <http://www.hefce.ac.uk/tef/>.

2.7 Why Is an Accurate Measure of Inflation Important?

As we have begun to understand what inflation is, the costs of decisions based on it and the role that it plays in the world around us, it should hopefully be clear that measuring the change in the price level in an accurate manner is an important task. As with other economic statistics, it is important for inflation to accurately reflect the reality of the world around us. If this is not the case, then either the statistic will become disregarded, possibly to be replaced by an alternative measure, see, for example, *The Economist* (2016) or alternatively bad decisions will be made which can be costly for organisations or individuals, or even for society as a whole.

While many people will never be fascinated by the construction of inflation statistics, it is very likely that their life has been affected by them, whether it be in their mortgage interest rate reflecting changes in the interest rates set by the Monetary Policy Committee, or their union negotiating their wage on the basis of recent inflation measures. Indeed, many economists never go beyond considering inflation or Index Numbers at a very high level. While every student of economics need not consider where the statistics come from, and how the decisions about measurement have led to the current form of the statistics, we hope that through this book the users of inflation statistics are better able to understand them by considering some of the detail of the methods used for measuring inflation, and how these measures have developed in the UK as this will reveal interesting aspects of the history and practice of measurement.

2.8 Perceptions of Inflation

Producers of Official Statistics strive to ensure that the statistics they produce meet user needs and the methods employed adhere to best practice. There is another aspect that is important for producers public confidence in official measures. Some important Official Statistics, by their nature, are detached from personal experience; for example, it is

not possible to relate Gross Domestic Product to an individual's experience. The situation for inflation is different as we do all experience paying for the products and services we buy. In Chap. 1, the point was made that as individuals we all buy different items in different quantities to others, and it is impossible for any one of us to have a comprehensive picture of price change. While this is recognised by many members of the public, it is only natural to take account of our own experiences and form a personal view. The construction of the official measures is oriented towards their use as indicators at the aggregate level, for example, for deflating expenditure aggregates. The weighting is plutocratic, which means that households with greater expenditure have a greater influence on the index than a lower spending household. An approach oriented to an individual would adopt democratic weighting where each household is given an equal influence.

2.8.1 Investigating Perceptions of Inflation

How does the public's perception relate to the official figures? In a study from 2007, O'Donoghue (2007) notes that people tend to believe inflation is higher than the official figures and attributes this to a number of factors. Firstly, individual household spending patterns differ from official figures which are based on averages across households. Secondly, the frequency at which households purchase certain goods and services leads to a different perception of the rate of inflation, with more frequently bought items having a greater influence on perceptions than items bought infrequently.

O'Donoghue (2007) divided goods and services into four categories according to the cumulative frequency of purchase: at least monthly, at least quarterly, at least annually and all purchases. Using the Retail Prices Index, the study calculated the 12-month percentage change in prices for these categories over the ten-year period 1996–2007. The results showed that the most frequently purchased items had the highest rate of inflation for almost the whole of the time period. While this doesn't prove a link between perception and the frequency of purchase, it offers a possible explanation.

2.8.2 Personal Inflation Calculators

To help people understand how the prices of their own pattern of purchasing are changing, the ONS launched a personal inflation calculator in January 2007. The calculator allowed people to enter their household spending on different categories of goods and services; from these inputs, households weights were calculated and used to combine the price indices for each category. The calculator was also hosted by the BBC. A later version on the BBC website was developed in conjunction with Warwick University; this used household characteristics to estimate a rate of inflation for the household. O'Donoghue (2007) describes a methodology for doing this. Other organisations provide inflation calculators; however, they simply allow the user to enter a sum of money at one date and use a consumer price index to calculate the value at a different date.

2.8.3 German Index of Perceived Inflation

The Federal Statistics Office in Germany used an approach developed by Brachinger (2005). This was based on the insights of perception psychology using three principles: individuals compare prices to the last time they bought a product and not a specific reference period used in the official measure. Individuals put more weight on price increases than price falls. Inflation is perceived more strongly for price increases in frequently bought goods than goods bought infrequently. These hypotheses are used to adjust weights which are then used in conjunction with data from the German CPI to calculate an index of perceived inflation. Looking at the year just before and after the introduction of the Euro, that is January 2000 and December 2001, it showed a perceived rate of inflation four times higher than the official measure (for details see sDestatis 2007).

2.8.4 Official vs. Perceived

The analysis of the frequency of price changes described above and the German Index of Perceived Inflation provide insight into possible

reasons for individuals believing that their experience of price change is different to the official measures. The use of personal inflation calculators provides insight for individuals to investigate how their own profiles of household expenditure might differ from the official, average measure.

While these three initiatives won't resolve the difference between individual perceptions and the official measures, they do help to explain why their might be differences. Perhaps this work has contributed to the public confidence in the official measures.

2.8.5 Variations of Inflation Across Households

An insight into how different types of households experience inflation was provided by work carried by Flower and Wales (2014a, b). They used household expenditure data to identify how different types of household spend their money; this provided different sets of weights across households which could be combined with price data to estimate the variation of price indices and inflation rates between 2003 and 2014 (Flower et al. 2014).

The work showed found that the inflation experience of UK households differed widely over this period with low-spending households experiencing faster rates of price increase than high-spending households. For the lowest income decile, prices rose by 39.3% between 2003 and 2013 compared with a rise of 31.4% for the seventh decile. The work also found higher average rates of inflation for retired households at 2.8% against 2.5% for non-retired households.

This analysis also provides insight into how individual household experiences might differ from the official, average inflation rates.

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