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DEPARTMENT OF ECONOMICS

The UK in Flux: An Analysis of Post-Covid Inflation

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ABSTRACT

In October 2022, inflation in the United Kingdom reached 11.1%, marking the highest level in 41 years. While global inflation shocks, particularly affecting food and energy prices, as well as shortages, drove the rise in prices, factors unique to the UK exacerbated their impacts. There is a plethora of literature, news, and data that describe specific elements of inflation in detail, but not the full picture. This thesis will address that gap by contributing a clear, concise narrative that identifies and explains the factors driving UK inflation since the onset of the Covid-19 pandemic. First, a roadmap for the analysis is created by utilizing two different decompositions of inflation for reference. These decompositions are analyzed in detail by breaking inflation down to its core, energy, and food components. The various drivers of core inflation are revealed through an examination of wage inflation, import prices, and supply shortages. Energy inflation is analyzed using the UK price cap mechanism and natural gas dependency, while food inflation is found to be driven by supply shocks from the Russo-Ukraine War and worsened by non-tariff barriers from Brexit. Finally, post-Covid inflation is compared to that of the 1970s to evaluate the importance that effective monetary policy had in lowering inflation after significant price shocks.

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Chapter 1

Introduction

The global economy has experienced several unprecedented events that have triggered inflation since 2020. The first was the Covid-19 pandemic in early 2020, which slowed down economies across the world and caused massive lockdowns. As major economies reopened in 2021, pandemic-related supply chain problems collided with strong goods demand. Millions of people who stopped working did not come back, and the result was global inflation. Then, the Russian invasion of Ukraine in February 2022 roiled energy and food markets, breathing new life into inflation as energy prices reached record highs in Europe.

Despite these common global shocks, factors unique to the United Kingdom exacerbated their impacts. Brexit, for example, led to the UK formally leaving the single market of its neighbor and largest trading partner, the European Union, on January 31st, 2020. This raised non-tariff barriers to trade and immigration that had inflationary effects as trade was disrupted and migration patterns were changed. Additionally, the UK also had its own unique fiscal responses to inflation that worsened price levels for its consumers, such as those for energy and food markets.

There have been countless news articles, data, and pieces of journal articles that have reported on, quantified, and analyzed the many elements of UK inflation in this time period. The intense scrutiny of this inflation is warranted, as it engendered an intense cost of living crisis in the country, with real wages dropping to their lowest point in 20 years at the end of 2022 (ONS, 2024a). In fact, the UK's Office for National Statistics (ONS) found in a survey from 27 April to 22 May 2022 that 77% of adults reported feeling "very or somewhat worried about the rising cost

of living" (ONS, 2022e). Despite the abundance of reporting and analysis, this author has not found a broad analysis of inflation in the UK that describes its driving factors and causes of those factors. This thesis aims to contribute such an analysis in a comprehensive, coherent, and concise manner to help make sense of such a tumultuous time.

The structure of this thesis is as follows. Decompositions by Bunn et al. (2022) and Haskel et al. (2023) are reviewed in Chapter 2 to identify how energy and food price shocks, shortages, and labor market tightness were contributors to inflation since the pandemic. Brexit costs and high import prices are found to play a role as well. They show that energy price shocks and shortages are found to have been the primary drivers of UK inflation in 2021, with these pressures compounded in 2022 and 2023 by food price shocks and labor market tightness. By splitting inflation into its core, energy, and food components, these trends are discussed in more detail and linkages can be found between various factors.

Chapter 3 examines core inflation through the lens of wage inflation, import prices, and supply shortages. Wage inflation is explained by ongoing labor shortages from the Covid-19 pandemic conflicting with demand for workers, with contributions from Brexit. Import price inflation beyond energy-related indirect effects were connected to Brexit-related goods flow changes. Inflation from shortages was a result of pandemic lockdowns in 2021.

Energy inflation is analyzed in Chapter 4, where the energy price shock from the Russian invasion of Ukraine was worse in the UK than other European countries due to the UK's reliance on natural gas for electricity generation and the Ofgem price cap mechanism. In Chapter 5, food inflation is found to be driven by supply shocks, indirect energy effects from the war, and non-

tariff barriers from Brexit. Food inflation rates are then compared to rates in other European countries.

Chapter 6 seeks to place this post-pandemic bout of inflation into context by comparing it to that of the 1970s, which also had a large energy price shock after a geopolitical conflict. Monetary policy is found here to be the key differentiator, explaining why inflation was successfully combated in the 2020s but remained elevated throughout the 1970s. Chapter 7 concludes.

Chapter 2

Inflation Decompositions

To best illustrate the driving forces of inflation in the UK since Covid-19, two analyses will be used. One is a study from Bunn et al. (2022) of Bank of England (BoE) firm-level data from a Decision Maker Panel (DMP) of thousands of UK firms. In this study, the authors decompose UK inflation by analyzing DMP response data that asked respondents about how the average price that they charge has changed over the last year. The results, shown in Figure 1, display the variety of factors that have contributed to broader inflation as it was experienced by British companies. As highlighted in dark blue, pink, and green respectively, there were large effects from energy input prices, supply shortages, and Brexit costs. The vertical axis reflects inflation data measured from the DMP and closely tracks the UK Consumer Price Index (CPI). For example, the DMP data puts 2021 Q4 and 2022 Q1 inflation at roughly 3.5% and 4% respectively while UK CPI data shows 4.4% and 5.5% inflation respectively in those quarters.

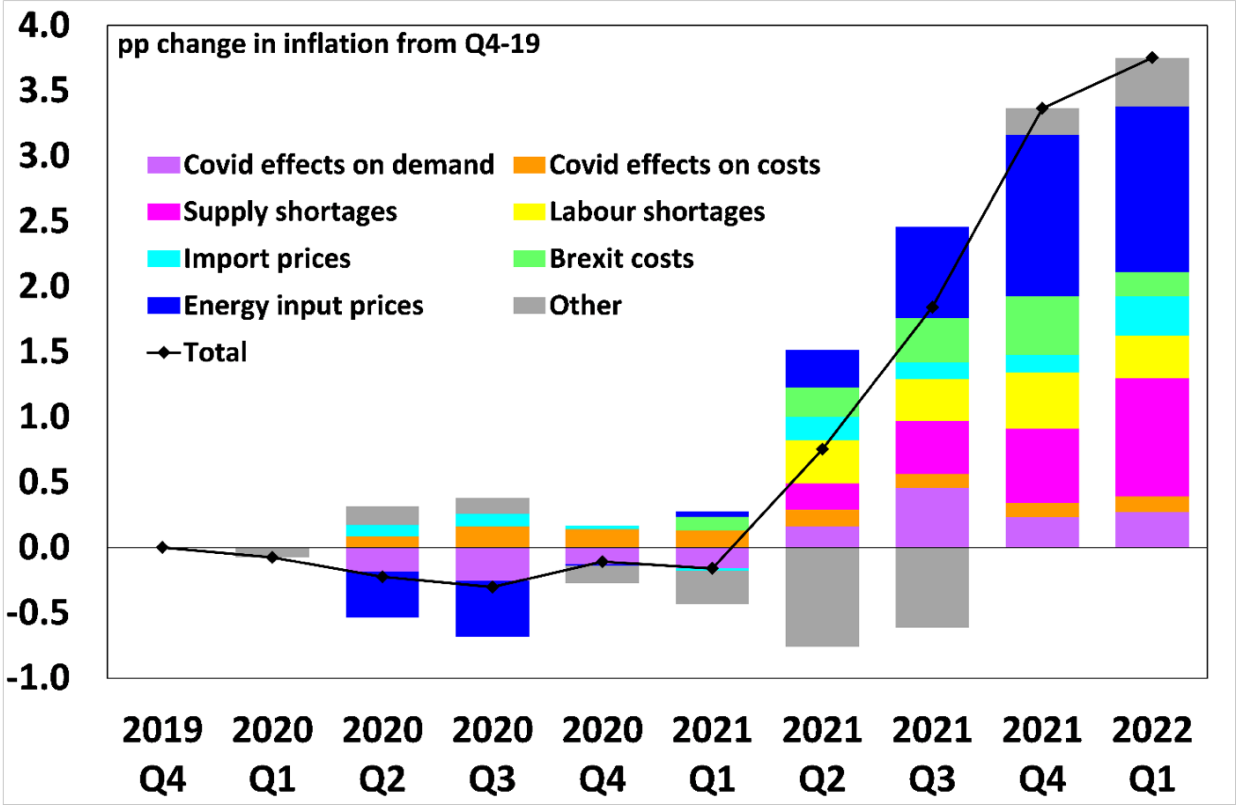

Figure 1. UK contributions to changes in inflation Since 2019 Q4
Based on DMP survey.
Source: Bunn et al., 2022

The other analysis is a decomposition of UK inflation conducted by Haskel et al. (2023), shown in Figure 2. Here, we see that food, energy, and shortages are key. Energy price inflation and shortages drove price inflation in 2021. They find that 2022 saw a huge energy shock in Q2 and shortages, food inflation, and labor market tightness (in red, as measured by the vacancies/unemployment ratio) also contributed to inflation. In 2023, food inflation and a tight labor market acted as major contributors while falling energy prices put downward pressure on inflation. The grey bar illustrates what inflation would have been if labor market tightness remained at its relatively high pre-pandemic level, growing from 2.8% in 2020 Q1 to 4.6% by 2023 Q2.

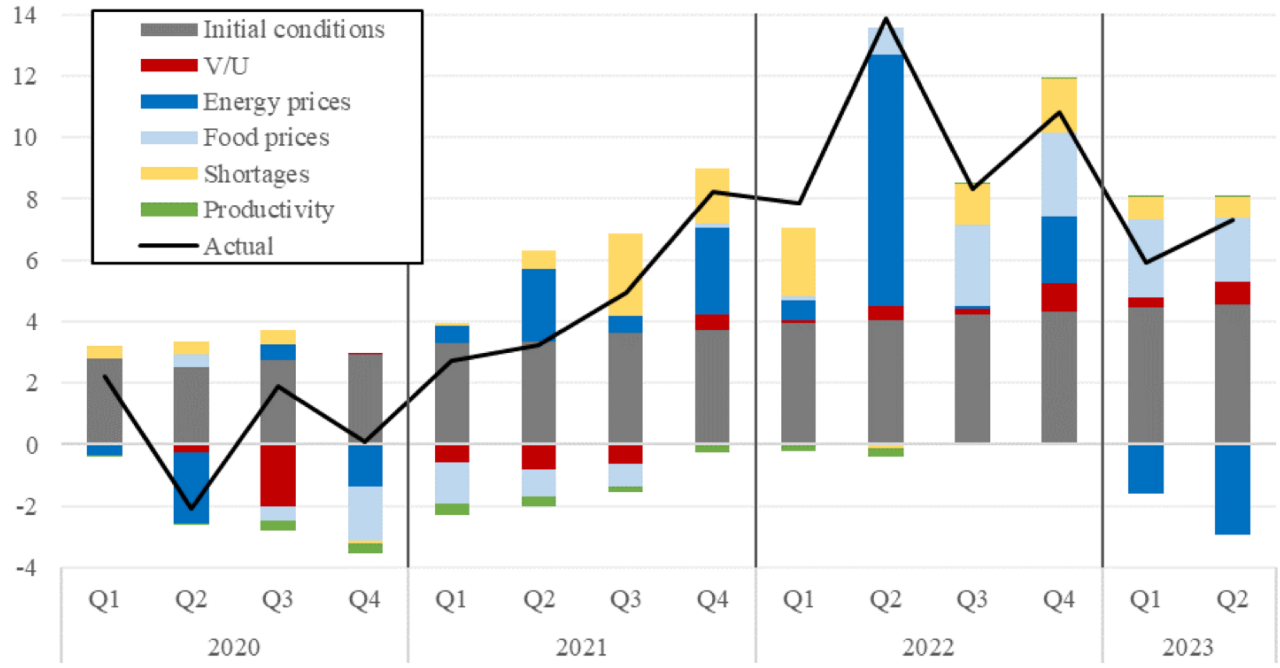

Figure 2. Decomposition of price inflation, 2020 Q1 to 2023 Q2
Source: Haskel, 2023

Both analyses show us that energy prices and shortages were major factors driving inflation. The DMP response decomposition suggests that Brexit costs and high import prices, perhaps also linked to Brexit, may have contributed to the shortage-driven inflation. They also both suggest that labor shortages contributed to wage inflation while Haskel et al. add to the Bunn et al. study by revealing food inflation to be a major factor since 2022 Q3. Overall, energy price shocks and shortages are found to explain UK inflation in 2021, while those are compounded in 2022 and 2023 by food price shocks and a tight labor market.

This paper will examine these drivers of inflation by focusing on core, energy, and food inflation, why they were so potent in the UK, and how Brexit and other unique UK elements made

an impact on each. In the core inflation section, we will look at inflation from labor shortages, high import prices, and supply shortages.

Chapter 3

Core Inflation

Core inflation in the UK peaked in May 2023 at 7.1%. In contrast, headline CPI peaked at 11.1% seven months prior, in October 2022. While headline inflation (Figure 3), which includes volatile food and energy data, began to move downwards as the energy crisis from Russia's invasion of Ukraine abated, core inflation continued its rise upwards. Core components comprise most of the CPI basket. For reference, about 80.5% of it consists of core goods and services, while energy products (fuels and lubricants, and electricity, gas, and other fuels) are weighted at 7.2% and 12.3% is dedicated for food, including beverages and tobacco. What drove this stickier core inflation was wage inflation, import price inflation, and supply shortages.

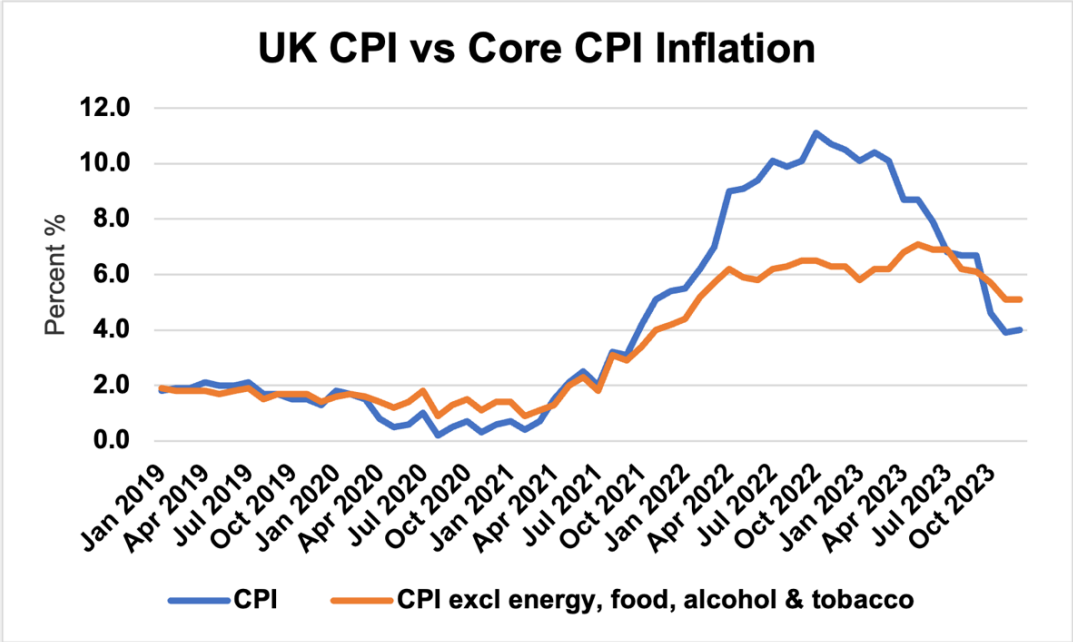

Figure 3. UK CPI versus core inflation
January 2019 to December 2023. Percent change from the year prior.
Source: ONS

Wage inflation has been a persistent driver of core inflation since 2021. As Figure 4 shows, nominal regular pay inflation, which excludes additional payments such as overtime, bonuses, or commissions, jumped to 7.3% in 2021, before receding again. This coincided with a large and sustained drop in the labor force due to Covid-19 and the effects of Brexit. Then, as the economy reopened after the pandemic, wage inflation began to climb again to 8.0% in the year to June-August 2023 and coincided with the sharp rise in vacancies that can be seen in late 2021 to early 2022, reflecting the difficulties firms had in attracting workers for open positions. The drop in real regular pay during this period reflects how much inflation bit into wages, with it reaching -2% in early 2022.

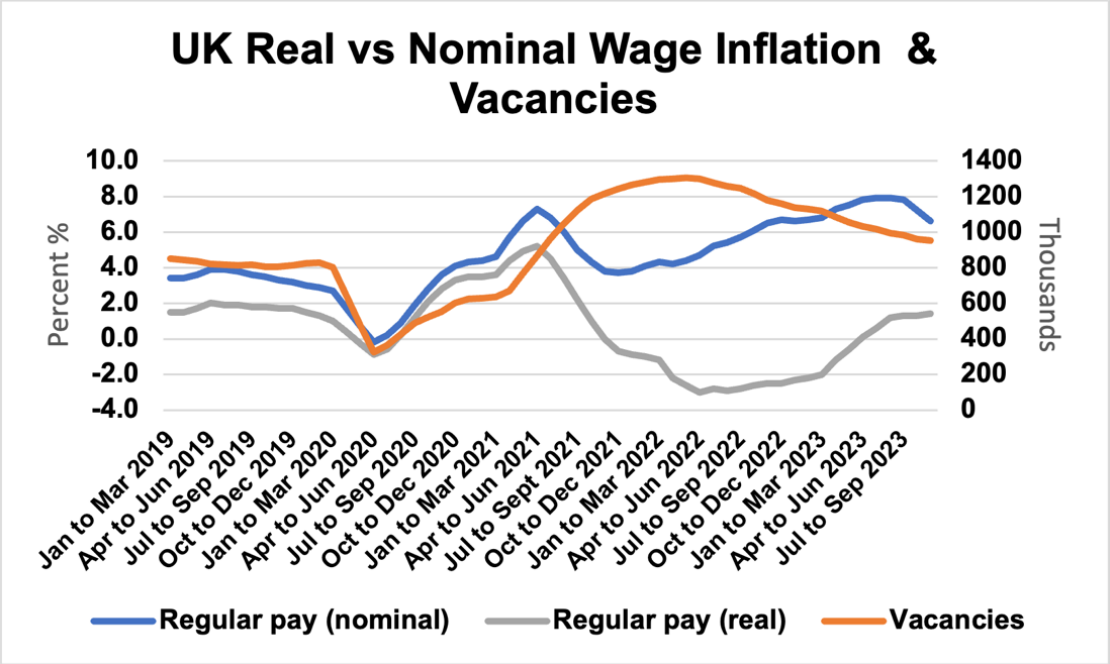

Figure 4. Real versus nominal wage inflation (left axis) and vacancies (right axis)
Average weekly earnings annual growth rate January to March 2019 to September to November 2023 and vacancies in thousands.
Source: ONS

Job vacancies reached a record high of 1.3 million between November 2021 and January 2022. In this time, an ONS survey found that 37% of large businesses reported having difficulties hiring enough staff (ONS, 2024b). The pandemic undoubtedly drove these vacancies as coronavirus lockdowns kept thousands of people out of the labor market. In 2020, the number of people in work fell by 825,000 people while unemployment rose by 400,000 people (House of Commons Library, 2022).

After lockdowns ended in mid 2021, the labor market still struggled to fully recover. Throughout 2021 and 2022, employment slowly rose but remained below pre-pandemic levels as there were 352,000 fewer people in employment in January-March 2022 than in January-March 2020. Despite rising employment levels, there were 500,000 more people inactive in the labor market in 2022 than before the pandemic (Bank of England, 2022). This labor market tightness can be shown (Figure 5) by comparing the labor force participation rate (LFPR) to the vacancies to unemployment (V/U) ratio, which is a measure of job availability relative to jobseekers. A high V/U ratio means that more businesses are competing over fewer searchers, suggesting an inflationary pressure on wages. During the pandemic, the LFPR dropped from 64.3% in January 2020 to 63% two years later. LFPR remained low for an extended period after its initial fall. The Bank of England attributed this to a “sharp and persistent increase in those stating they were not active in the labour market due to long-term sickness,” presumably to Covid-related illness (Bank of England, 2024). As the participation rate decreased, the V/U ratio jumped from a low of 0.2 to climbing over 1.0 in early 2022, well above its immediate pre-pandemic level of 0.6, which was already judged in Figure 2 (grey bars) to be tight as it hovered from the 0.2-0.5 level from 2013-

2017. This tightening of the labor market in 2022 clearly put an upward pressure on wage inflation, which began its rise at this time.

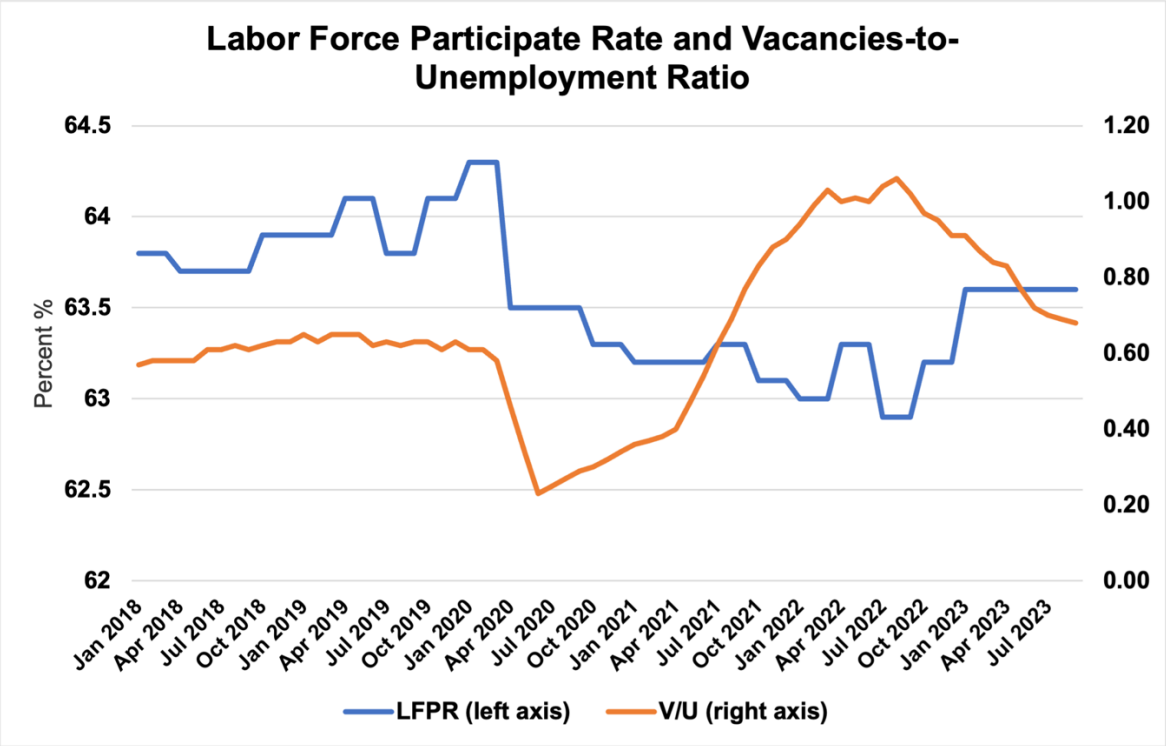

Figure 5. Labor force participation rate versus vacancies to unemployment ratio
From January 2018 to September 2023
Source: Bank of England, ONS

Brexit also had a part to play in depressing the UK's labor supply. The UK's withdrawal from the European Union, which was implemented in January 2021 through the Trade and Cooperation Agreement (TCA), introduced changes to UK immigration policy and ended automatic free movement for EU nationals not already settled in the United Kingdom. The ONS estimates that the country experienced a 171,000 person drop in the number of EU nationals employed in the U.K. between June 2019 and June 2021 (ONS, 2022a). During this time, the unemployment rate in the UK reached a 40-year low of 3.9% (ONS, 2024d). As Figure 6 displays,

nominal wage inflation experienced an increase as total EU employment suddenly fell, suggesting that the sudden decrease in EU workers around the time of the TCA fed wage inflation as firms struggled to find workers for open positions. The low LFPR after the pandemic could also be partially explained by this drop in the EU workforce, many of whom may have returned to their home countries.

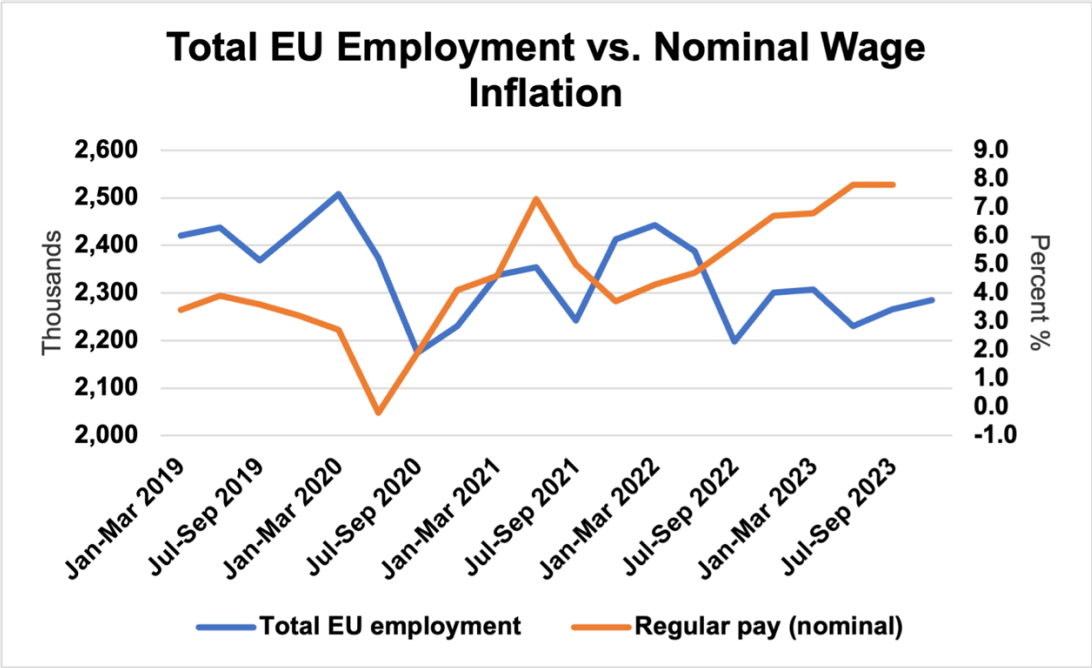

Figure 6. Total EU employment (left axis) vs nominal wage inflation (right axis)
Average weekly earnings annual growth rate January to March 2019 to October to December 2023.
Source: ONS

An analysis by Forester-van Aerssen & Spital (2023) has found that Brexit and the pandemic prompted a slowdown in the employment of EU workers in the UK as many of them found it less attractive to work there. They found that EU workers' opinions about the UK worsened after the implementation of the TCA in 2021 and that the rise in vacancies and labor market tightness was the strongest in sectors that relied most heavily on EU workers.

One such sector is the UK's Heavy Goods Vehicle (HGV) driving industry (i.e., commercial truckers), of which 10% of workers were EU nationals pre-pandemic. Between March 2020 and March 2021, the UK's EU-national HGV driver workforce fell by 37% compared to a fall of 5% for UK-born drivers (Institute for Government, 2021). While the pandemic contributed to the reduction by forcing some workers to return to their home countries, Brexit worsened the situation due to its immigration changes and border controls (UK in A Changing Europe, 2021). The culmination of these problems resulted in HGV drivers receiving pay increases of 13.1% in 2022 from the year prior, compared with all other UK employees receiving only a 4.7% pay increase (Department of Transport, 2023).

In addition to labor market disruptions, rising import prices were an important factor of inflation. The Bank of England calculated the annual growth rate of import prices to be roughly 2% in 2020 and 2021, before rising 12.5% in 2022 and falling back down to -1% in 2023 (Bank of England, 2024). Supply chain disruptions and energy and food inflation contributed to this overall import price inflation, and those impacts will be discussed in Chapter 4 and 5. For import inflation in core goods, however, trade disruptions from Brexit were a significant factor. This is because, in addition to tighter immigration policy, Brexit forced the UK to leave the EU's single market and customs union, which raised non-tariff barriers to trade because there were new regulatory and customs frameworks increasing trade frictions.

In their analysis, Freeman et al. (2022) find that, following the implementation of the TCA, UK imports from the EU relative to UK imports from the rest of the world dropped by about 25% in 2021. This was because the increase in UK-EU trade costs due to the TCA led to a shift in UK import activity away from the EU. They also found that Brexit has hurt goods exports from the

UK to the EU, particularly for small exporters likely due to increases in fixed costs such as meeting rules of origin requirements and filling out paperwork. While their analysis shows only a temporary decline in UK exports to the EU, there was a large drop in low-level export relationships. What these disruptions resulted in was an increase in import prices. To elaborate, Bakker et al. (2022a) find that "the implementation of the TCA aligns perfectly with a sharp, statistically significant increase in prices for more-exposed products relative to those less-exposed."

Inflation in pharmaceutical products helps provide evidence of these Brexit impacts. Prior to Brexit, 75% of the UK's pharmaceutical imports were from the EU (Bakker et al., 2022b). Because imports from the EU were on average four times more than imports from non-EU countries, it would be difficult for the UK to fill the gap in supply. There was a steep drop in pharma imports after Brexit was fully implemented in 2021 and imports took time to recover (Bakker et al., 2022b). In this way, the goods flow disruption drove inflation. As Figure 7 reveals, pharmaceutical products CPI rose significantly after the implementation of the TCA in May 2021. Anecdotal evidence supporting this trend comes from the chief of Community Pharmacy England (2023), a trade group, who revealed in a press statement that Brexit, in addition to the pandemic and the war in Ukraine, "put extra stress on the medicines supply chain, stretching community pharmacies financially."

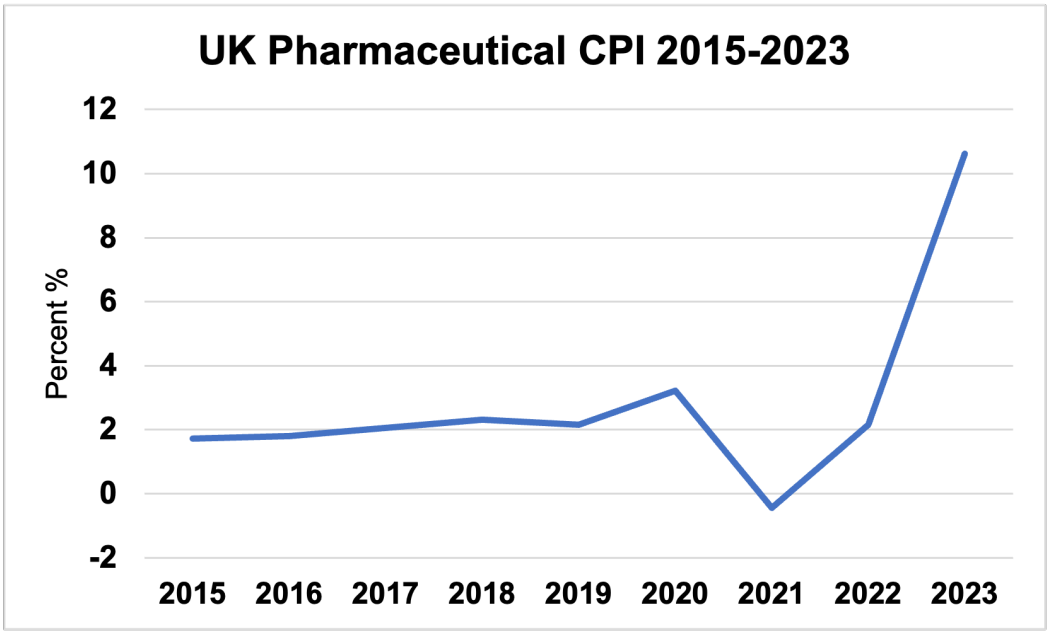

Figure 7. UK Pharmaceutical CPI inflation 2015-2023
Percentage change from the year prior.
Source: ONS

The UK's supply shortage issues since 2020 began when the pandemic placed extraordinary stress on international supply chains. Coronavirus lockdowns drove a global shortage of materials and shipping delays that occurred at the same time as sharp growth in demand for consumer goods (House of Commons Library, 2022). While inflation did not increase in 2020, it did begin rising in 2021 as demand rose quickly while goods-exporting countries enacted pandemic restrictions. The decomposition by Haskel et al. (as seen in Figure 2) reveals that shortages contributed 1.3 percentage points (pp) of inflation on average in 2021, with an additional impact in Q1 2022.

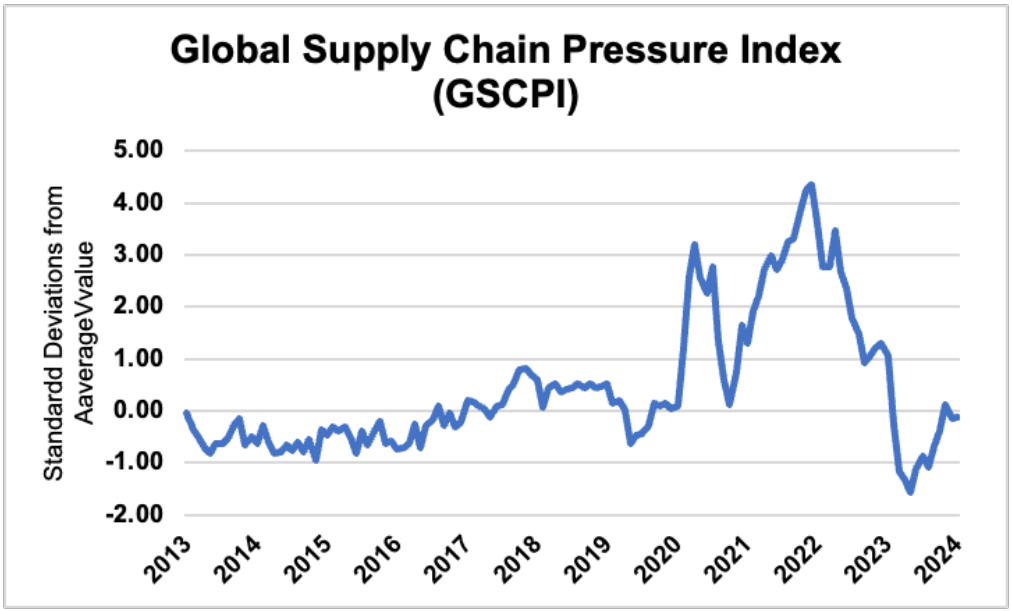

Figure 8. The Fed's Global Supply Chain Pressure Index from 2013 to 2024
Source: ONS

The Fed's Global Supply Chain Pressure Index (GSCPI) is an index that integrates global transportation cost data and manufacturing indicators to provide a comprehensive summary of supply chain disruptions in the world economy. Specifically, components of the index include shipping and airfreight indices, and supply chain components of Purchasing Managers' Index surveys across seven interconnected economies: China, the euro area, Japan, South Korea, Taiwan, the United Kingdom, and the United States. Figure 8 measures standard deviations from the index's historical average. During the onset of the pandemic in 2020, the index climbed 3 standard deviations, reaching its 2020 high in April. The index experienced its peak of 4.3 standard deviations from its historical average in December 2021, before Russia invaded Ukraine in February 2022. The magnitude of these deviations highlights the severity of the global supply chain crisis considering movements outside of one standard deviation were rare before the pandemic.

Despite the supply shock in 2020, inflation did not rise that year. The Bank of England attributed this muted inflationary response to a spending slowdown from Covid restrictions (Bank of England, 2021). In 2021, demand for goods became hot but outbreaks of the Covid-19 virus caused significant disruptions at major shipping ports and manufacturing facilities in Asia (House of Commons Library, 2022). By August 2021, a government survey found that almost one in five UK businesses were either not able to get materials, goods, or services they needed (House of Commons Library, 2022). In 2021, the GSCPI peaked, core inflation rose from 0.9% in February 2021 to 5.2% in February 2022, and shortages contributed to 27% of overall inflation in 2021 (Haskel et al., 2023).

After the Russian invasion, core inflation began a run upwards from 5.2% in February 2022 to its peak of 7.1% in May 2023 despite the GSCPI falling from 2.7 to -1.6 respectively. The most likely reason why supply chain disruptions fell while core inflation rose after the invasion was that the invasion roiled energy and food markets more so than it did supply chains. Though the components of the GSCPI may have seen some disruption from the rise in energy prices (particularly shipping and airfreight costs), they were aided greatly by the easing of global supply chain pressures as Covid lockdowns grew rarer. For example, the Baltic Exchange Dry Index, an index in the GSCPI that tracks shipping costs, peaked at 5,500 in late 2021 and fell to 1500 before the Russian invasion. After the Russian invasion, it peaked at 3,300 and quickly fell back to 1500 by the summer. The difference in the magnitude of the index's highs illustrates the more intense impact of Covid on supply chains than the energy crisis. Also, the rise in energy prices could have simply moved through the supply chain and increased core inflation prices through indirect effects of higher input costs on the broader CPI basket (Bank of England, 2023). For example, high energy

prices from 2021 to 2022 had a knock-on effect on the pricing of other commodities, contributing to a rise in prices across most goods (ONS, 2022d).

Analyzing core inflation through wage inflation, import price inflation, and supply shortages reveals a multifaceted set of inflation drivers. Wage inflation saw its beginnings during the pandemic and rose in 2021 and 2022 when people kept out of the workforce, due to illness and Brexit, did not reenter the labor force. In 2022, import price inflation reached highs and can be explained to be a result of Brexit-induced goods flow disruptions. Finally, supply shortages were a major driver of the inflation experienced in 2021 and early 2022, as ongoing pandemic restrictions snarled supply chains. Since then, import prices and supply chain disruptions have moderated, but the labor market is still tight as of February 2024 with wage inflation at the 6-7% range (Bank of England, 2024).

Chapter 4

Energy Inflation

The rise in energy prices in 2022 following the war in Ukraine was a huge driver of inflation in the UK. Energy prices rose 9% in 2021 before climbing an incredible 47% in 2022. Peak energy inflation in the UK reached nearly 60% in late 2022 from the year prior while it hovered around 40% for the EU during that same period. As the graph below reveals, the UK experienced higher energy inflation for a longer period compared to the EU despite the common shock to energy supply. The country's reliance on natural gas as a source of energy generation and the nature of its price cap, which can move energy prices sharply, made it vulnerable to the energy crisis.

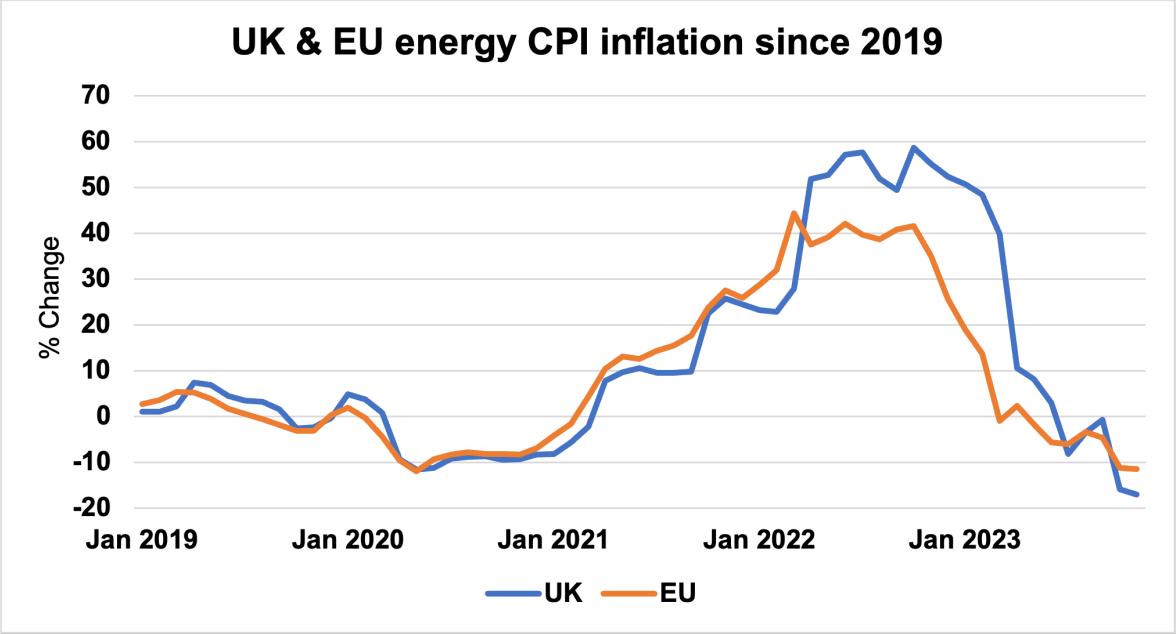

Figure 9. Monthly UK and EU energy CPI inflation
From the twelve months prior, 2019-2023.
Source: OECD

For much of the ten years prior to the war, energy prices were stable or falling until they began to rise in late 2021. The average gas bill in 2021 was £564 compared to almost £700 in 2014 while the average electricity bill only rose 36% between 2010 and 2021 (House of Commons, 2024). This changed when the gas and electricity price cap, which was introduced in 2019 to prevent price volatility and was set every six months by The Office of Gas and Electricity Markets (Ofgem), increased by 54% in April 2022 (House of Commons, 2024). Ofgem was set to increase it by another 80% in October 2022, but the Energy Price Guarantee (EPG) announced by PM Liz Truss capped prices at £2,500 a year for typical levels of consumption. Figure 10 illustrates how the EPG prevented prices from rising further for UK consumers. The red bars signify what the Ofgem cap increase would have been had the EPG not been implemented. While the April 2022 price cap of £1900 raised prices by £700 for customers with typical levels of gas and electricity consumption, the October cap of £3,500 would have been an increase of almost £1,600 (BBC, 2024). The inflationary impact of the April price cap increase can be seen in Figure 2, where energy prices are the main contributor of inflation in Q2 2022.

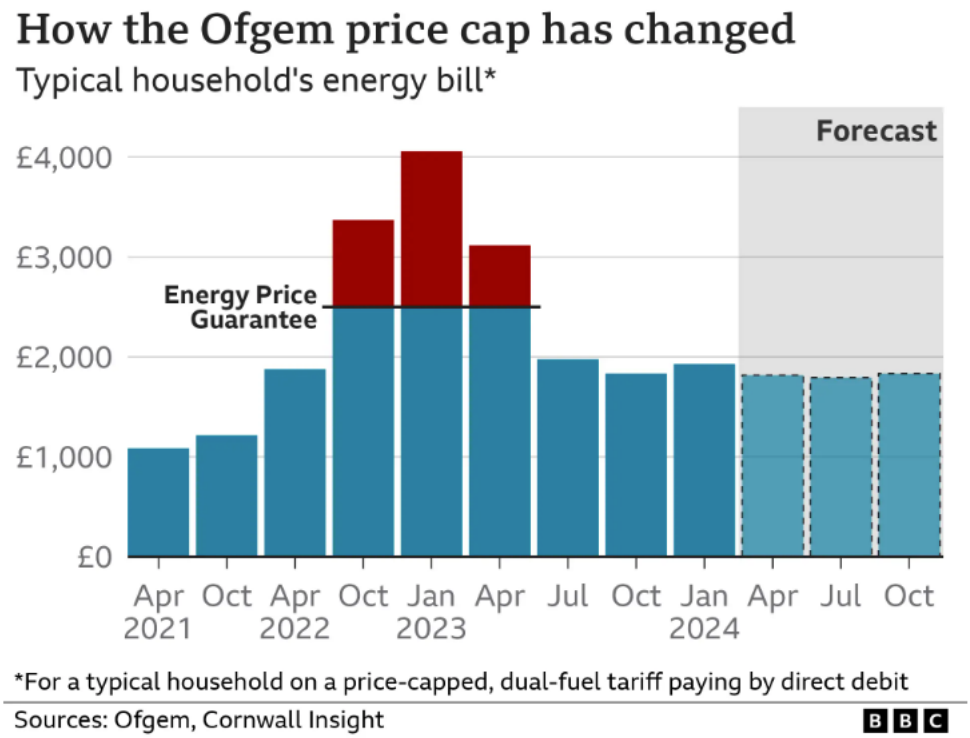

Figure 10 How the Ofgem price cap has changed for typical energy consumers
Since April 2021.
Source: BBC, 2024

These increases in consumer energy bills were driven by skyrocketing natural gas prices (Figure 11), which rose from 100 pounds/therm in early 2021 to close to 600 pounds/therm at its peak. Household energy prices in the UK are driven by gas prices because gas accounts for about 40% electricity generation (Department for Energy and Net Zero, 2023). Another 40% of electricity generation comes from renewable sources and 15% comes from nuclear power. Gas is also the marginal source of energy when renewable sources don't meet demand, consequently playing a large role in determining overall consumer energy prices (Haskel, 2022). Additionally, gas accounts for over 60% of household energy use in the UK versus less than 40% for the Euro area (Haskel, 2022).

While the UK domestically produces half of its gas, the commodity is traded around Europe and prices in the UK are closely linked to European prices (Haskel, 2022). Russia met 40% of the EU's gas demand in 2021. That year, Russia's Gazprom slowed down deliveries to the continent and, after its invasion of Ukraine in 2022, Russia cut pipelined gas supplies entirely. By 2023, Russia met only 12% of EU gas demand and the EU had to contend with a 160 billion cubic meter deficit in gas supply (International Energy Agency, n.d.). This supply shortage caused the spike in European gas prices. In the UK, these gas price spikes led to the value of fuel imports to increase by £63.6 billion (119.1%) in 2022 compared to 2021 despite inflation-adjusted imports of fuels, which reflects changes in quantity imported, only increasing by £8.4 billion (20.4%) and gas import quantities hardly increasing at all (ONS, 2022d; ONS, 2024c).

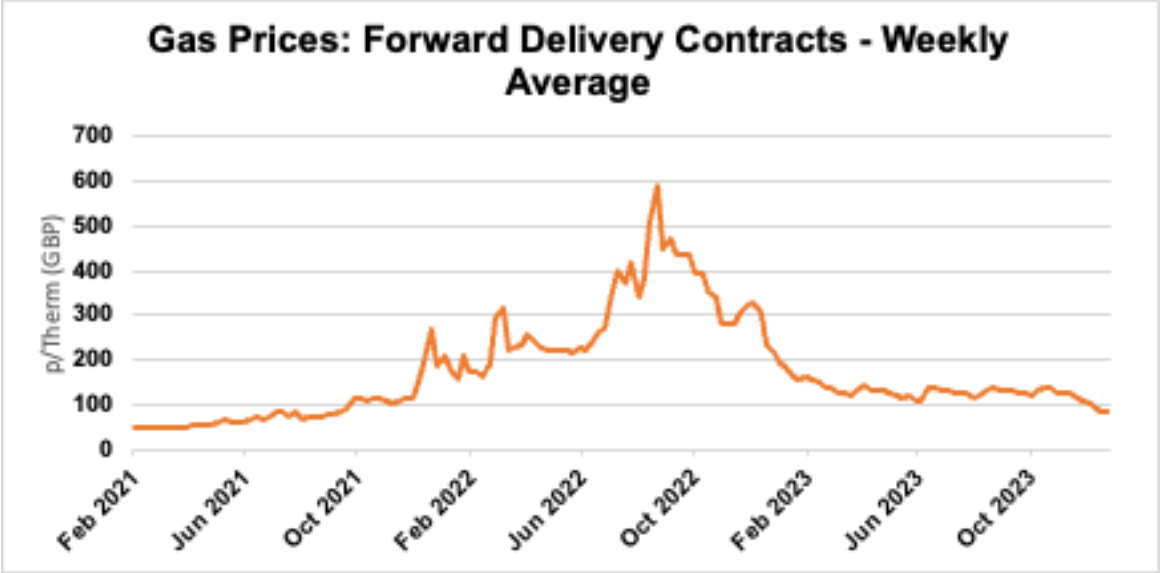

Figure 11. Weekly averages of gas prices in Great Britain
As priced by forwards delivery contracts.
Source: Ofgem

Due to the nature of the UK's price cap and its dependence on natural gas, consumers in that country experienced worse energy inflation than they did in other developed countries. Figure 12 highlights this difference in utility bills between the UK, EU, and US. UK utility prices are shown to be higher for longer in 2022 and 2023 while the EU and the US experience lower inflation. The sharp rises and plateaus in the UK's prices are because of the Ofgem price cap. Though it was reduced by the Energy Price Guarantee, the cap is clearly much higher than what Euro area consumers were paying. As a country outside of Europe that supplies most of its own natural gas, the US's consumers experienced lower utility bill prices.

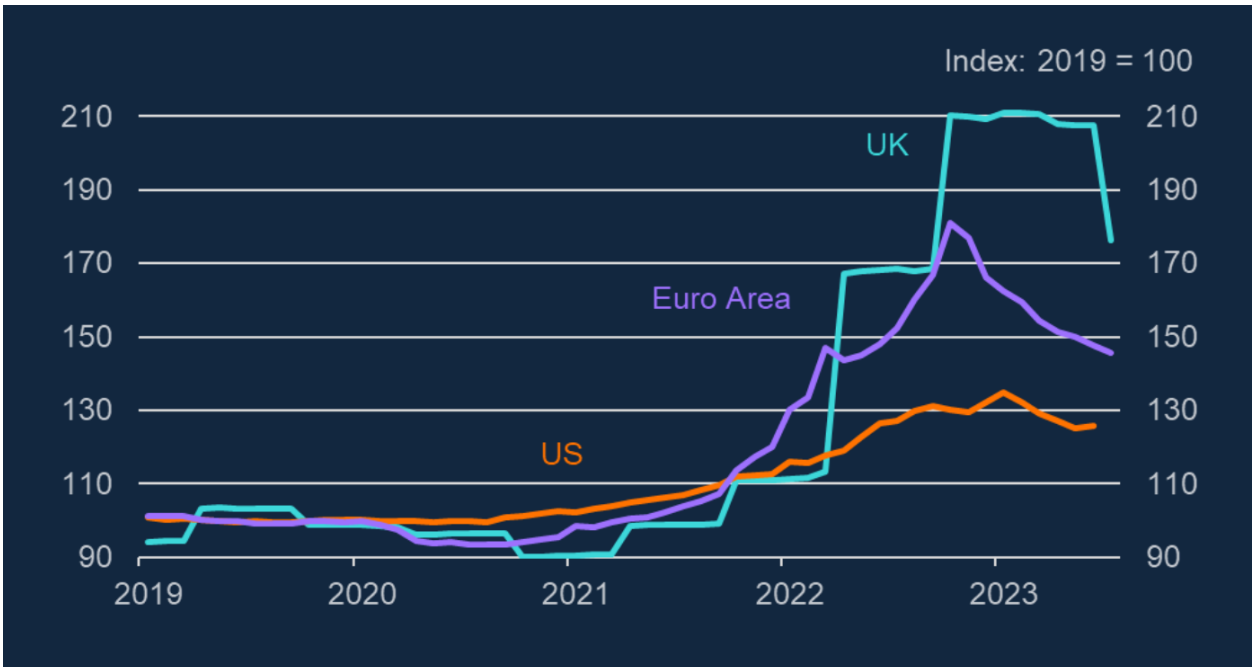

Figure 12. Utility bill prices between the UK, the Euro Area, and the US
From 2019 to late 2023.
Source: Broadbent, 2023

What Figure 12 suggests is that, despite experiencing a common energy shock, EU consumers paid significantly lower utility bills than their UK counterparts. This is supported by

Figure 13, which breaks down the average household electricity price in Europe. The UK (in pink) is shown to have higher prices than most other countries except for Germany and the Netherlands, who were highly reliant on Russian gas (Smith & Sheppard, 2022).

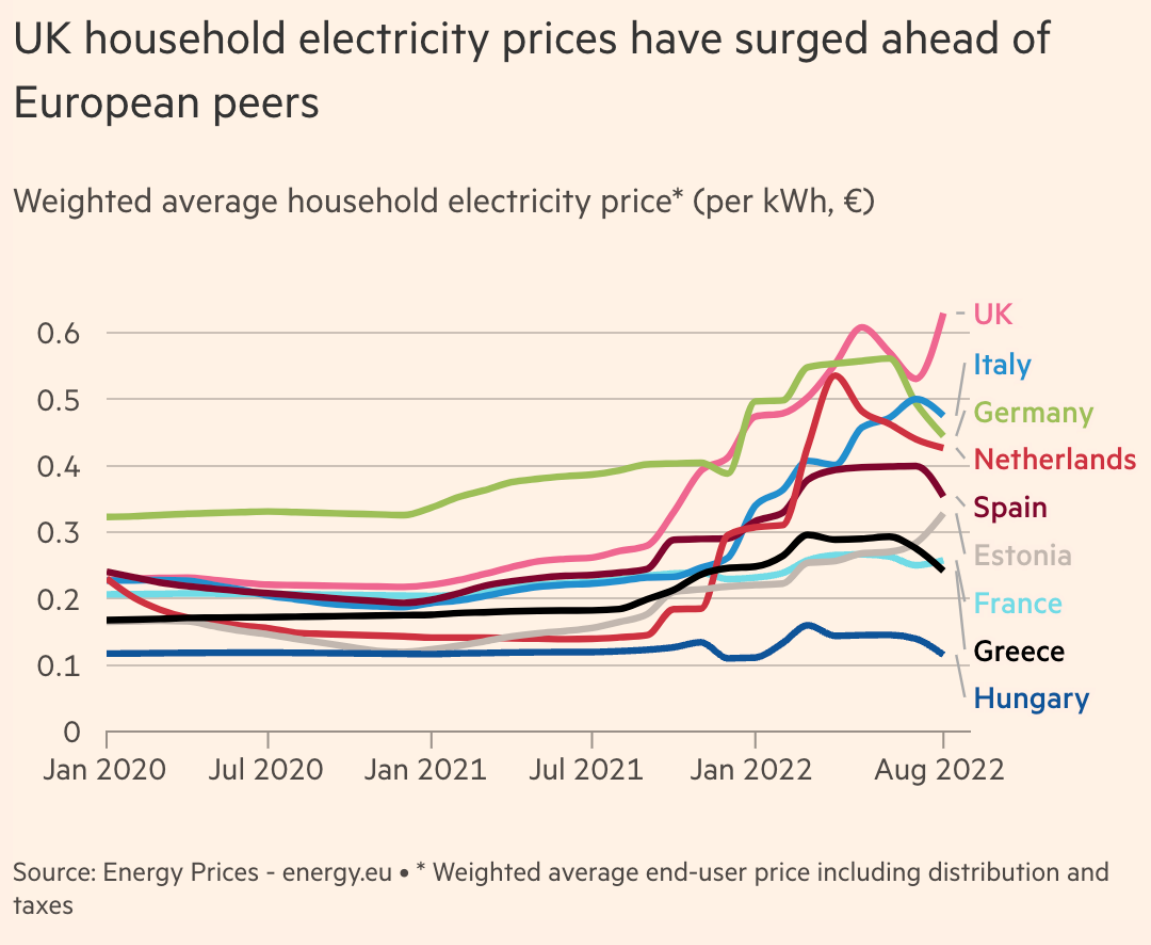

Figure 13. UK average household electricity prices were higher than Europe's
Source: Smith & Sheppard, 2022

One reason for this price gap could be that many governments in Europe were more effective at shielding households from energy price increases. France, for example, forced its state-owned energy provider to limit electricity price rises to 4% a year, with their price cap lasting till December 2022 (Askew, 2022). Germany reduced natural gas taxes by 12% while passing energy

relief packages totaling €30 billion. Spain heavily taxed energy companies while dropping gas taxes by 17% in 2022. That being said, the UK Government did spend a huge amount on energy relief as well, with all programs amounting to £78.2 billion from 2022 and 2023.

Figure 14 shows that the UK (yellow bars) had one of the largest energy support packages relative to GDP in Europe. The left y-axis describes the size of energy support packages as a percentage of GDP while the right y-axis is the percent of natural gas consumption. The most recent Office for Budget Responsibility (2023a) estimate (leftmost yellow bar) puts the UK spending a higher percent of GDP on energy relief than France and Germany, and slightly lower than Italy. What distinguishes the UK then are its diamonds (yellow), which show a natural gas consumption rate that is much higher than most European countries. This suggests that, while the UK Government could have possibly done more to give energy relief to consumers, the country's reliance on gas was a larger factor in its energy inflation than a lack of fiscal spending.

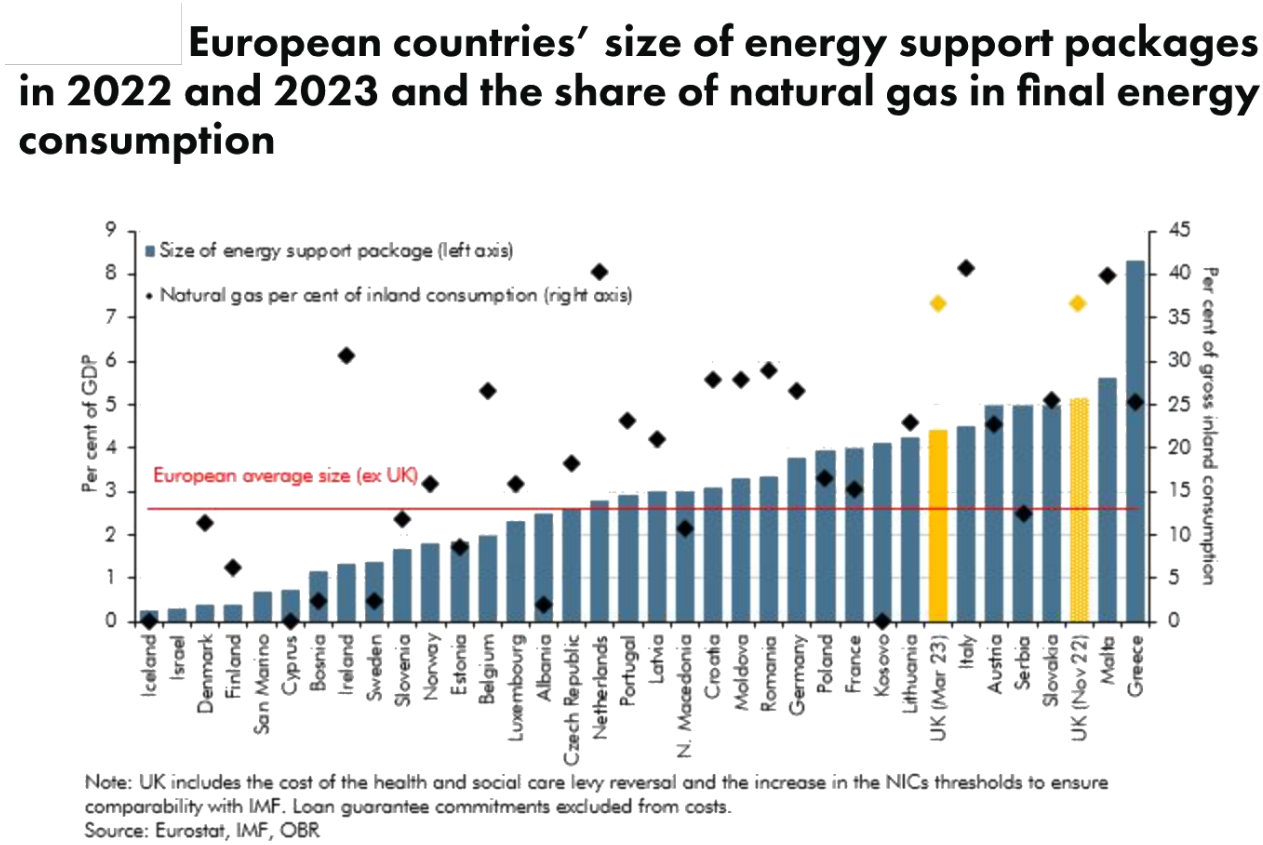

Figure 14. UK's energy support package size and share of natural gas usage
Compared to the rest of Europe.
Source: Office for Budget Responsibility

In conclusion, energy price shocks from the Russian invasion of Ukraine were the driving forces behind the UK's inflation since 2022. What made energy inflation worse relative to the rest of Europe, who also experienced this shock, was the country's reliance on natural gas as a source of electricity generation. Though the UK spent a large amount relative to GDP on energy relief, the energy price cap and Energy Price Guarantee were not enough to prevent consumers from paying relatively high utility bills. The result of these factors was energy price inflation that reached nearly 60% in late 2022. The ultimate impact this had on CPI inflation can be seen in Figure 15, which finds (in purple bars) energy to have a direct contribution of nearly four percent

of total inflation in certain quarters of 2022 and 2023. As energy prices moderated in mid 2023, energy had a lower contribution to inflation until it ultimately began helping overall inflation come down in late 2023. Inflationary risks do remain for energy markets. In particular, the violence in the Middle East following the attack on Israel by Hamas on October 7th could foment instability in the region, creating upside risks for energy prices.

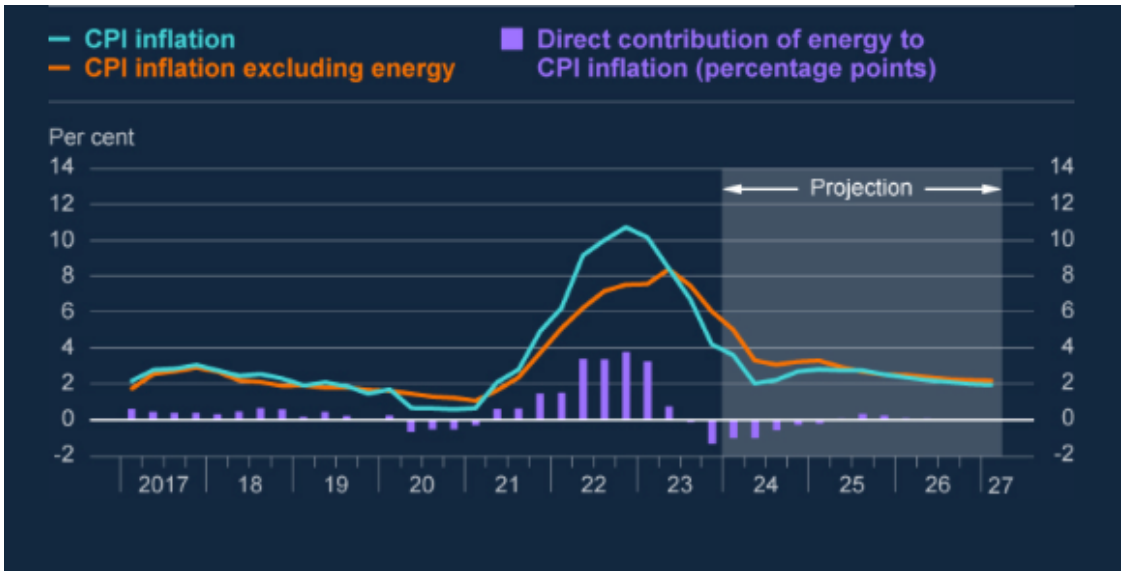

Figure 15. CPI inflation vs. CPI inflation excluding energy
Energy includes fuels and lubricants, electricity, gas and other fuels. The direct contribution of energy prices includes fuels and lubricants, electricity, gas and other fuels.
Source: Bank of England, 2024

Chapter 5

Food Inflation

Inflation in the price of food has been a strong contributor to overall inflation. In March of 2023, annual food price inflation reached a peak of about 19% and contributed more than 2% to overall inflation that year (Bailey, 2023). Food inflation (Figure 16) began its drastic increase after the Russian invasion of Ukraine in 2022 affected supply, with moderate increases in the year following the pandemic. Non-tariff barriers (NTBs) from Brexit and indirect energy effects also accentuated food inflation in the UK. While the UK did not have worse food inflation than the EU, European countries that implemented food price relief policies did see lower inflation.

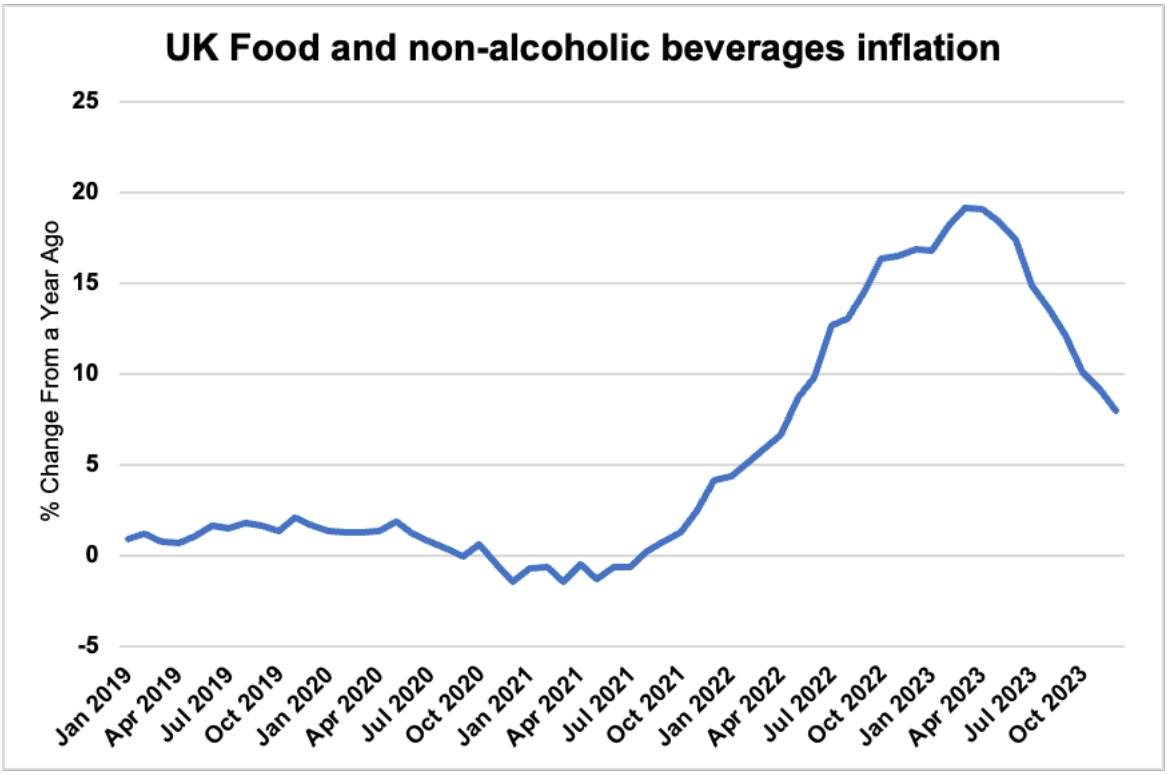

Figure 16. UK Food and non-alcoholic beverages inflation
From Jan 2019 to Dec 2023, percent change over 12 months
Source: ONS

While the pandemic was a major shock to the global economy and severely strained supply chains, it was not the main driver of food inflation. Though global food prices were driven up as agricultural commodity prices rose by 20% in 2021, annual food price inflation in the UK increased to just 4.3% by January 2022 compared to 1.5% over the previous three years (Bailey, 2023).

The main driver of food inflation was the Russian invasion of Ukraine in February 2022, after which food inflation began a rise upwards from 5.1% that month to 19.2% in March 2023 from the year prior. The war disrupted food supply and created significant uncertainty in already tight global food and energy markets. Ukraine and Russia are the world's breadbaskets as they provide around 30% of the world's wheat and barley, 20% of its maize, and 50% of its sunflower oil (United Nations, 2022). As a result of the war, a United Nations (2022) brief reported that global food prices were 34% higher in April 2022 than the year prior. During this time crude oil prices increased by 60% and gas and fertilizer prices doubled as well.

The impact of these events on trade flows was pronounced. Nominal imports of food and live animals in the UK increased by £8.0 billion (19.7%) in 2022 compared with 2021, with imports from non-EU countries growing significantly due to the war (ONS, 2022d). After adjusting for inflation, real imports of food and live animals decreased by £0.6 billion (1.4%) in 2022 compared with 2021. The nominal value of imports of animal and vegetable oils and fats increased by 54.9% in 2022 compared to 2021, driven by a £0.9 billion (91.8%) increase in imports from the EU because the UK could no longer rely on Ukraine for supplies. After adjusting for inflation, these imports increased by £0.4 billion (30.3%) (ONS, 2022d). What these data broadly suggest is

that the global food shortages did not have a strong negative impact on the quantity of food the UK was importing, but did have a strong pressure on the prices consumers paid.

Increasing energy costs had important implications for the food supply chain. Energy is a huge factor in various stages of food supply chains from fertilizer production to crop management and food processing. Figure 17 shows an estimate of the indirect effect that energy had on consumer prices. These effects contributed up to 1.5% of food and non-alcoholic CPI (blue line). The indirect effects that energy prices had on consumer prices are much higher for food compared to other sectors of the economy such as core goods (in orange) and services (in purple).

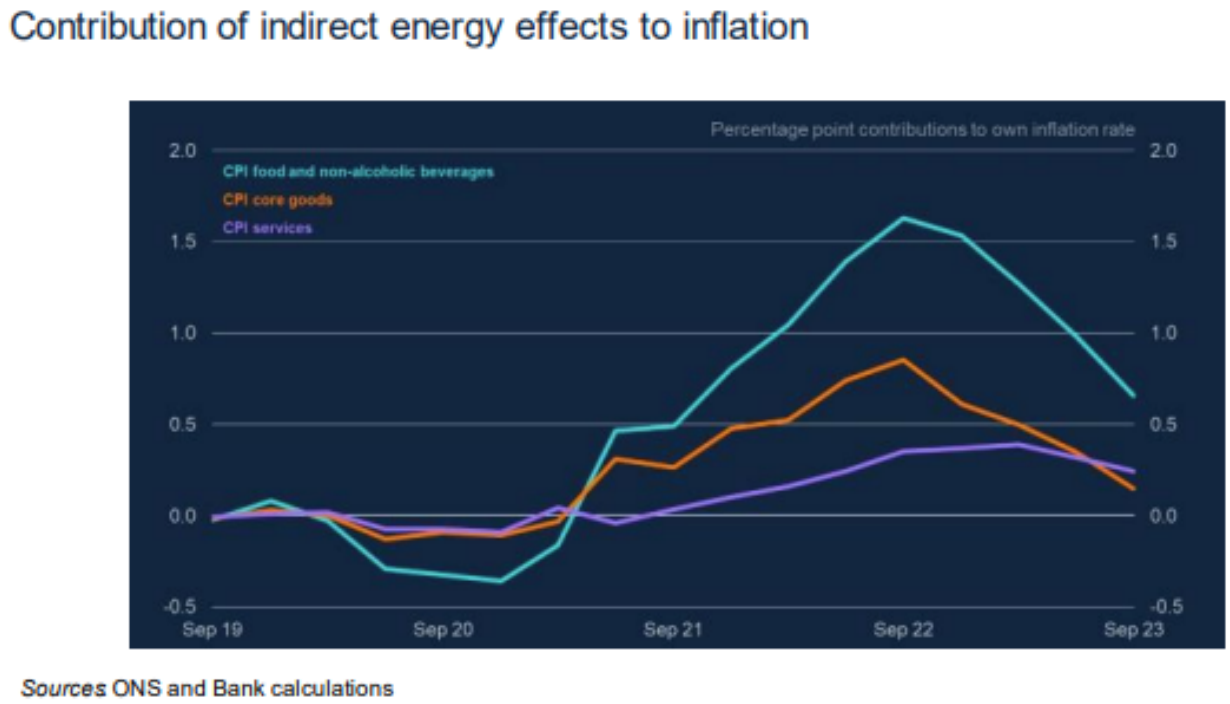

Figure 17. Energy prices have had large indirect effects on food prices
From September 2019 to September 2023
Source: (Bailey, 2023)

Adding to the war, non-tariff barriers from Brexit also increased food inflation in the UK. While still in the European Union, the UK was able to minimize NTBs by mutually recognizing standards, having a common external tariff with the EU, and having the free movement of people and capital (Bakker et al., 2022). Leaving the EU's single market and customs union raised non-tariff barriers and had a serious effect on food prices because 77.5% of UK food imports are from the EU (Bakker et al., 2022c).

A team of economists at the LSE's Center of Economic Performance have sought to quantify Brexit's influence on the 25% of food inflation that occurred in the UK between December 2019 and March 2023. Their analysis finds that food inflation would have been 8% lower in the absence of Brexit, and the cost of Brexit to each household is £250 when only considering the impacts on food since December 2019, aggregating to a £6.95 billion overall cost for UK households (Bakker et al., 2023). They also find that all the price action came from the Brexit-induced non-tariff barriers. Richard Davies, a co-author of the report, told The Guardian in an interview that, while domestic food producers now face less competition from European imports, "The gains to domestic firms are outstripped by the loss to domestic consumers by more than £1bn [in deadweight loss]" with NTBs generating no additional revenue for the government (O'Carroll, 2022).

The UK did not have significantly different food inflation from the EU. As Figure 18 displays, inflation in the EU (blue) tracked the UK (black). Unlike with energy prices, the UK did not implement price-controls or other fiscal policy to lower food costs. European countries that did, however, saw lower inflation rates. France (purple), for example, worked with major supermarkets to introduce 5,000 priced capped products (Ataman, 2023). Spain (orange) abolished

their value-added tax on essential products and halved the tax on cooking oil and pasta to 5% (Barry, 2023).

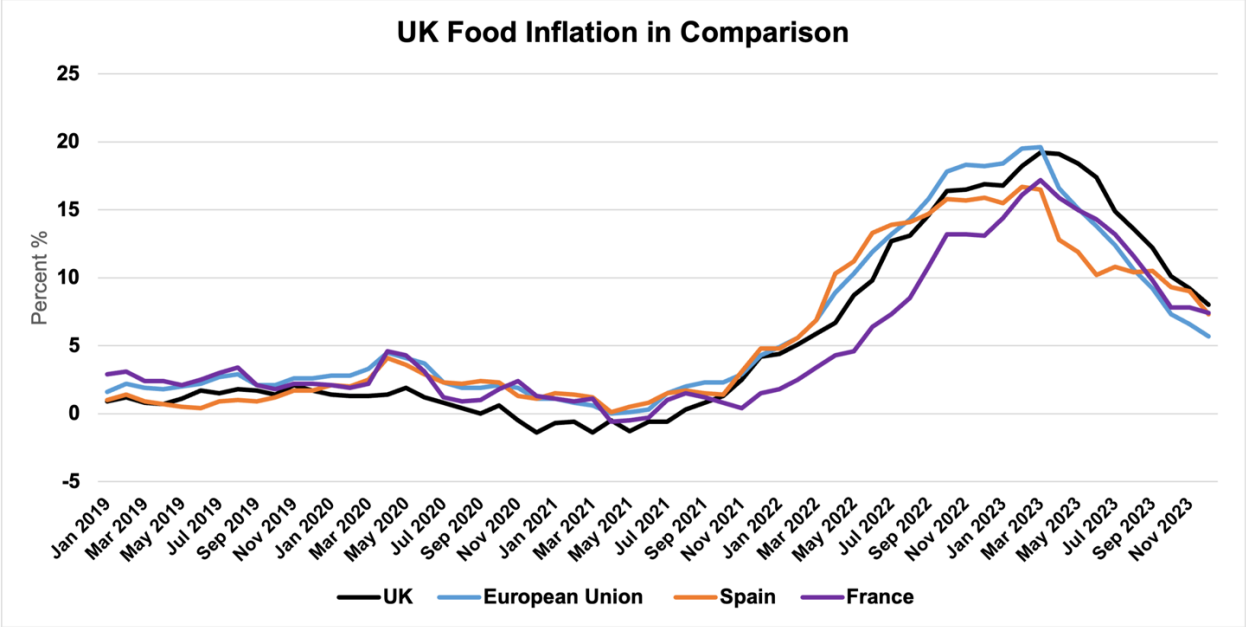

Figure 18. Food inflation in the UK, EU, Spain, and France
Food and non-alcoholic beverages inflation. Percentage change compared with the same month of the previous year
Source: ONS, Eurostat

Examining food price inflation reveals the complexity of understanding the causes of UK inflation as a whole because of the variety of factors to consider. To elaborate, food prices were hit by one shock, the Covid pandemic. Before they had an opportunity to recover, they were struck by another through the war in Ukraine. The supply chain disruptions, high agricultural commodity prices, and high energy prices associated with these events all had a part to play in the record-high food price inflation experienced in the UK. Brexit also had a marked impact, creating an additional variable in understanding food inflation. While the UK experienced similar levels of food inflation as the EU, inflation would have been significantly lower in the absence of Brexit. Fortunately,

food inflation fell to 10.1% in October 2023 and the Bank of England forecasts it to fall to 3% by March 2024 (Bailey, 2023). Unfortunately, upside risks to food prices do remain. Britain has postponed the full implementation of Brexit food controls five times due to inflation concerns (Davey, 2024). As the country resumes these controls throughout 2024, there is a potential for more food market disruption as NTBs such as customs paperwork requirements and physical checks on goods could lead to import delays.

Chapter 6

Comparison to the 1970s

Comparing post-Covid UK inflation to that of the 1970s helps greatly in contextualizing the price-rises of recent years. Both periods were similar in that they experienced inflationary price shocks, but they had drastically different monetary policy that led to different paths of inflation. During the pandemic, the Bank of England's use of monetary policy as an effective policy tool to combat inflation, introduction of inflation targeting, and establishment of operational independence to gain credibility were all factors that allowed it to fight inflation and manage inflation expectations. In the 1970s, the government did not effectively use monetary policy. It kept interest rates low during periods of high inflation and pursued expansionary fiscal and monetary policy to boost aggregate demand. These differences in policy are the primary reasons why inflation was effectively quelled in the 2020s but wasn't in the 1970s.

The inflation experienced by the UK after Covid pales in comparison to that of the 1970s. As Figure 19 displays, the post-pandemic surge reached very high levels relative to the decades of low inflation experienced since the early 1990s. Fortunately, CPI inflation fell to 4.0% by early December 2024 and has continued to fall since. The 1970s, on the other hand, are another story. While inflation averaged 3.5% during the 1960s, it began to steadily rise from the early 1970s until it reached a peak of 24.5% in August of 1975. Price inflation remained above double digits for the next three years until it briefly fell to the 6-8% level from 1978 to early 1979, only for it to jump again to 17.4% by June of 1980. By the mid 1980s, inflation finally stabilized to the 4-6% level.

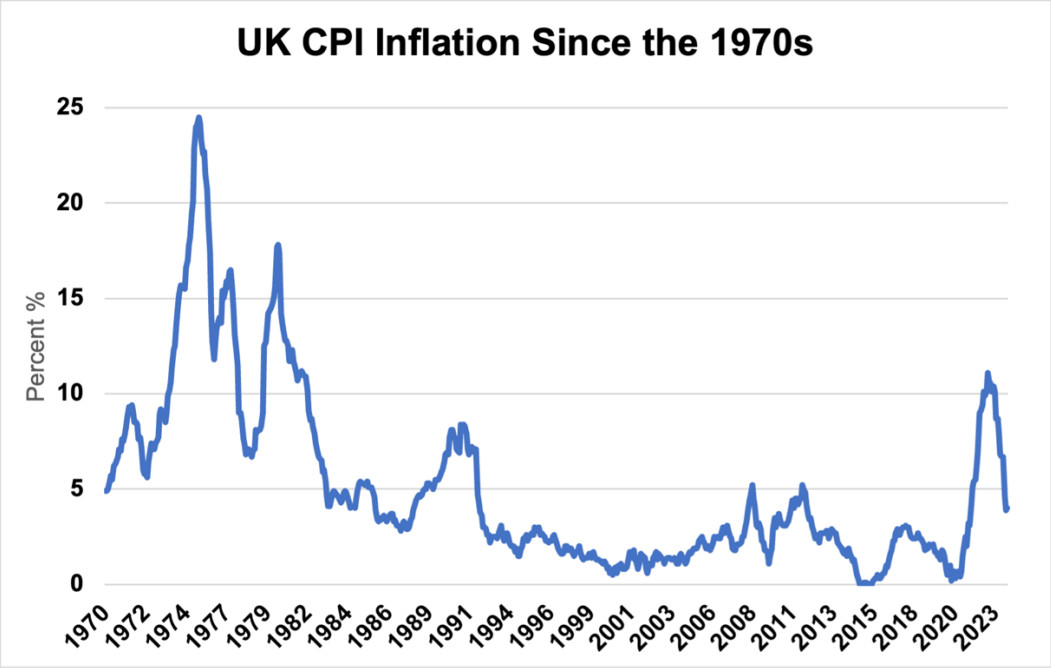

Figure 19. UK CPI, January 1970 to December 2023
Percentage change from the year prior. Data from 2006 is complemented by a modeled series for consumer price inflation from 1950 to 2005, which are purely indicative and were created for analytical purposes.
Source: ONS

Both periods experienced big real factors of inflation through energy price shocks. Figure 20 illustrates that, much like with natural gas in the 2020s, inflation spikes were preceded by severe crude oil price shocks in the 1970s. Following the invasion of Israeli occupied areas on October 6th, 1973 during the Yom Kippur War, several Arab oil exporters announced an embargo on Western nations that supported the country. These supply disruptions caused the 12-month growth rate of crude oil prices to jump from 44% in September 1973 to 119% by November that year, before peaking at 525% from January-March 1974. By 1975, oil price inflation returned to single digit levels, but its price per barrel was left four times higher than before the war and overall inflation was higher than 20% (ONS, 2022b). Following the Iranian Revolution in 1979, a second oil shock hit the UK. Iranian oil output declined by 4.8 million barrels, which constituted 7% of

the world's production, causing market uncertainty and price increases (ONS, 2022c). Crude oil prices doubled in the year following the war and monthly inflation figures increased from the single digit level in late 1978 to a peak of 209% in November of 1979. By May of 1980, oil price inflation returned to the single digits while inflation remained high until late 1982.

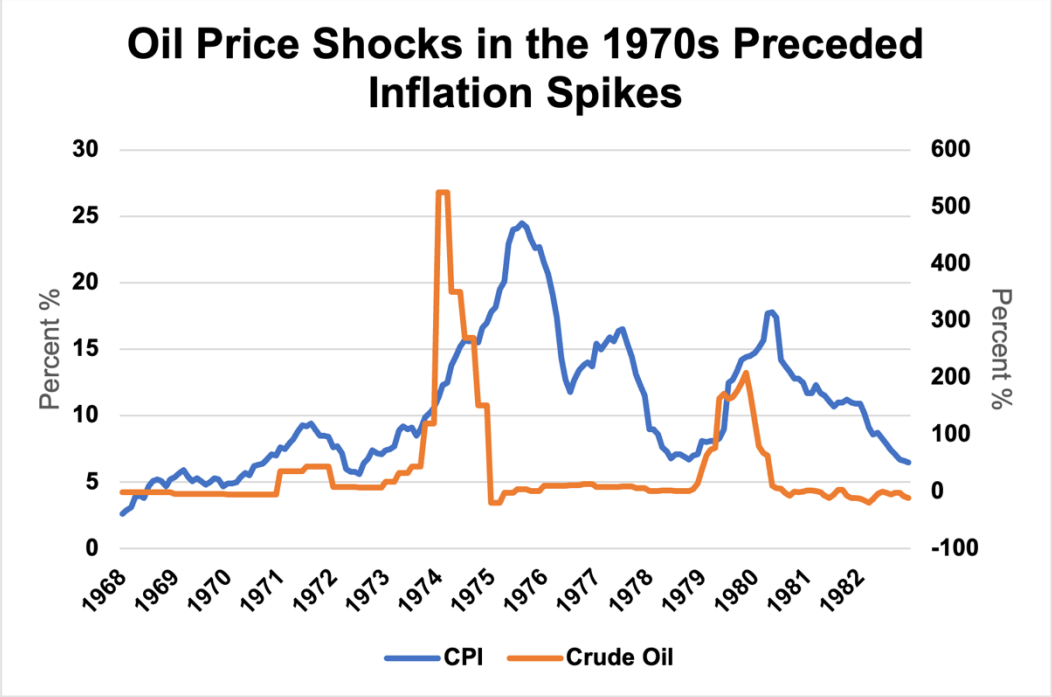

Figure 20. Oil Price Shocks in the 1970s Preceded Inflation Spikes
12-month growth rates of crude oil prices and the 12-month growth rate of modeled CPI, UK, January 1961 to December 1988
Source: ONS

It may seem like the inflation experienced by the UK in the 1970s could be explained solely through the lens of these massive energy price fluctuations. After all, there were two shocks that decade and they lasted longer than the one in 2022. Even after a sharp decline in oil price inflation in the 1980s, it remained several times higher than it was in the early 70s (ONS, 2022c). That said, the magnitude of the 2022 energy shock was stronger than the one in 1973, with natural

gas prices increasing by a factor of 6 (see Figure 11). Though natural gas prices did recede within a year and a half of the Russian invasion, which was quicker than oil prices in 1973, they were still double what they were before. Despite this, price inflation in the 2020s experienced a sustained fall after the energy shock and was on track to the Bank of England's 2% target within two years. In the 1970s, inflation remained high for many years after the shocks. Differences in monetary policy between these eras can explain this disparity.

In the mid-1960s, inflation was kept low partly because the UK was still subject to the Bretton Woods fixed-exchange rate system. Since a fixed change rate had to be maintained with other currencies, there was a check on loose monetary and fiscal policies as an over-expansion of money supply could force the government to abandon the peg. In this way, the system created a highly visible commitment to an exchange rate, and thus there was a political cost to bad policymaking as it would damage credibility. Generally, countries that adopted a fixed change rate achieved significantly lower rates of inflation than those with floating exchange rates (International Monetary Fund, 1996).

Around the time that the Bretton Woods system began to break down, the British pound experienced devaluations and oil prices began skyrocketing. Inflation rose sharply everywhere in the developed world, but it was particularly bad in the UK. During the 1970s, UK inflation averaged 13% compared with 7% in the US and 5% in Germany (Broadbent, 2020). Though UK interest rates were higher than in the 1960s, as shown in Figure 21, they were far below the rate of inflation for many years. In short, while inflation was rapidly climbing, real rates were deeply negative (Figure 22). It is hard to believe that a central bank today would have kept rates so low throughout a time of such high inflation.

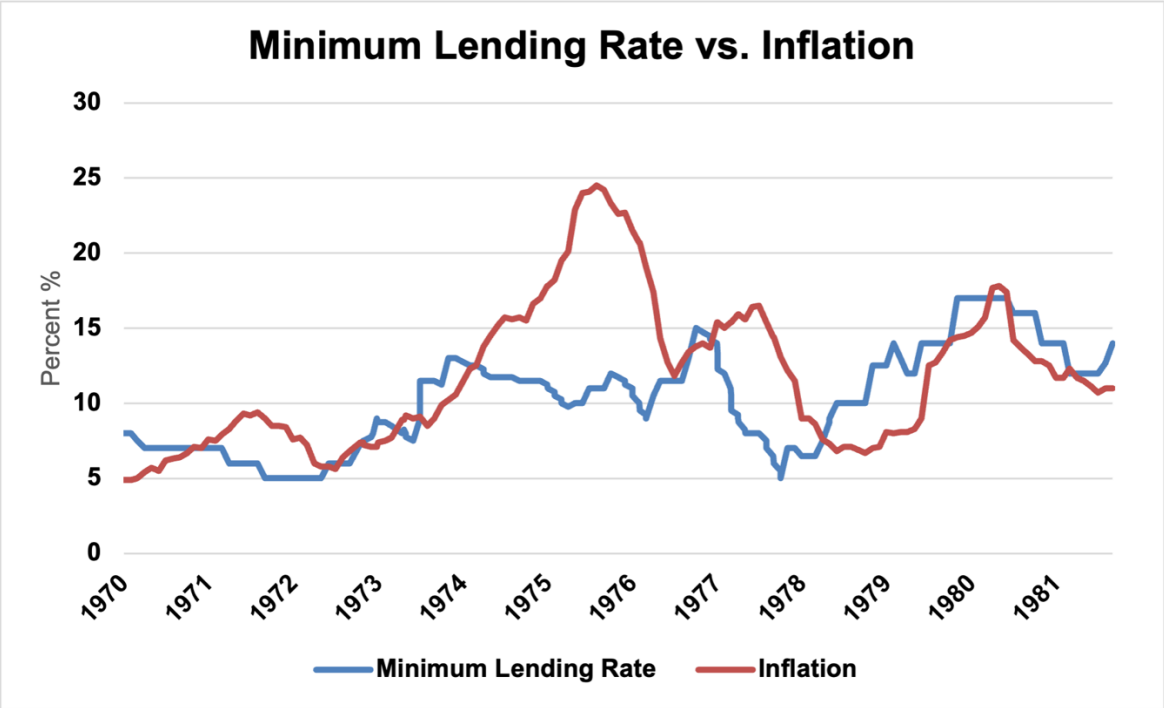

Figure 21. Minimum lending rates versus annual inflation
From January 1970 to September 1981
Source: ONS, Bank of England

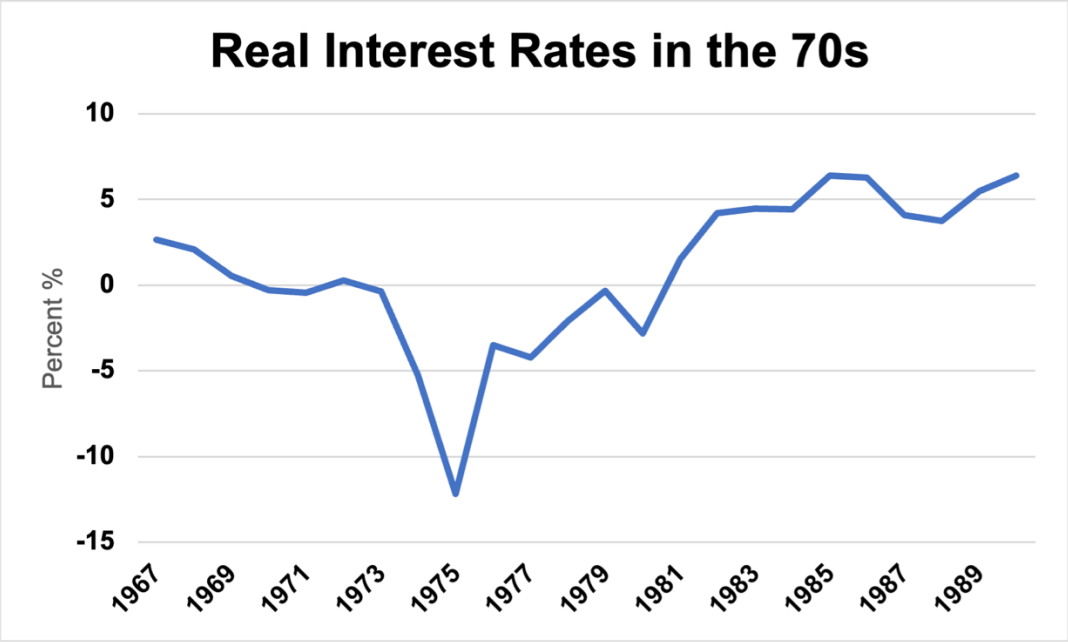

Figure 22. Real Interest Rates in the UK during the 1970s and early 1980s
Source: World Bank

In an analysis of policy attitudes at the time, Nelson (2004) finds that the economy was widely thought to have been very weak in the 1970s. Cost-push explanations of inflation were dominant and price rises were thought to be a product of wage demands by unions following devaluations in the pound and the oil price shocks (Nelson, 2004). In response, government policy packages sought to get the UK out of recession by boosting aggregate demand and managing inflation through other tools. Under that view, there was little role for monetary policy to prevent those factors from impacting inflation by slowing demand. The goal for policy makers in this period was to prevent stagflation by lowering unemployment rates and getting the economy out of recession, even if it incurred higher inflation. Figure 23 supports this narrative as it reveals that unemployment was kept very low in the 1970s to boost growth. Inflation was very high in the 1970s compared to the 1980s, when unemployment reached as high as 12% and real rates were kept consistently high (Figure 22).

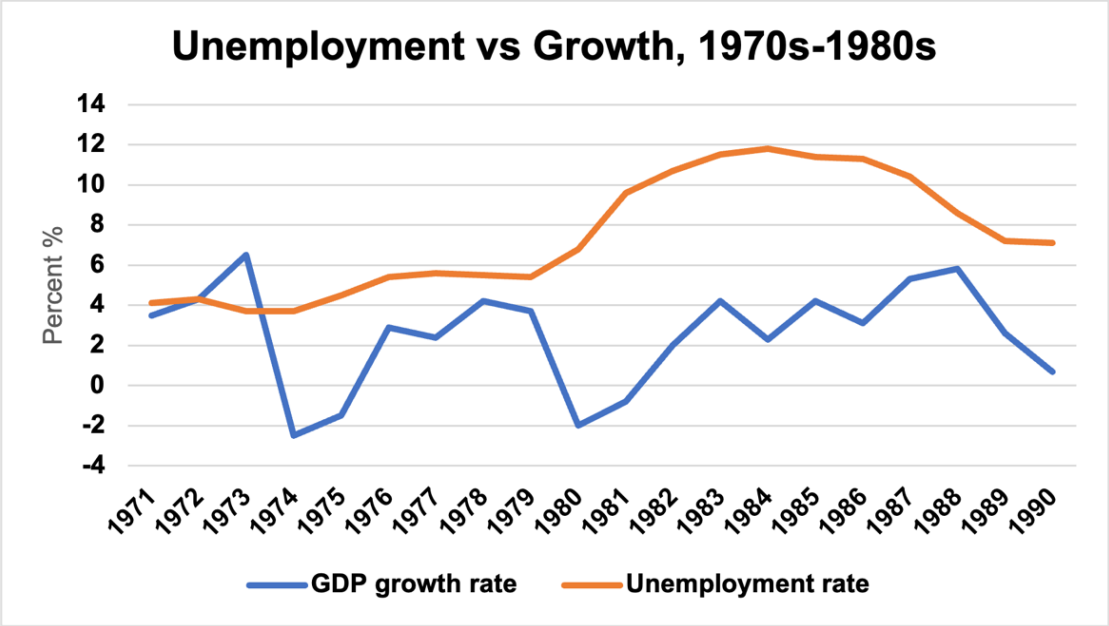

Figure 23. Unemployment rate vs annual GDP growth from 1971-1990
Source: ONS

During this period, the elected government had control of both monetary and fiscal policy (the BoE was not independent like it is today) and implemented direct wage and price controls to combat inflation while simultaneously having fiscal and monetary expansion. For example, from 1977 to 1979, while the government was instituting strict incomes policy for wage growth (trying to limit it to 5%), it cut interest rates by 9% despite inflation being in double digits (Nelson, 2004). Monetary base growth reflected this easy money policy as it grew from the single digits in 1977 to 17% in July 1978 (Nelson, 2000). In this time, inflation had a steady rise till 1980, where it stood at nearly 18%. Thus, the government's anti-inflationary policies were in direct conflict with its expansionary monetary policy.

In the face of such policymaking and prices, it is not surprising that groups forming future views of inflation, such as households and labor unions, would increase their expectations of

future inflation and reflect it in their wage demands. In this way, long term inflation expectations grew as poor monetary policy allowed external inflationary shocks such as those to oil prices become entrenched within the domestic economy. Worker bargaining was much stronger in the 1970s as well. In those days, 50% of British workers were in unions as opposed to the 20% today (Goodwin, 2022). Unions would often negotiate contracts to peg salaries to the cost of living, leading to huge wage growth as workers defended their incomes from higher inflation. The impact of this can be seen in Figure 24, where annual wage growth peaked at 29% in 1975. Overall, the 1970s saw an average wage growth at nearly 16%, the highest in the post-World War II era.

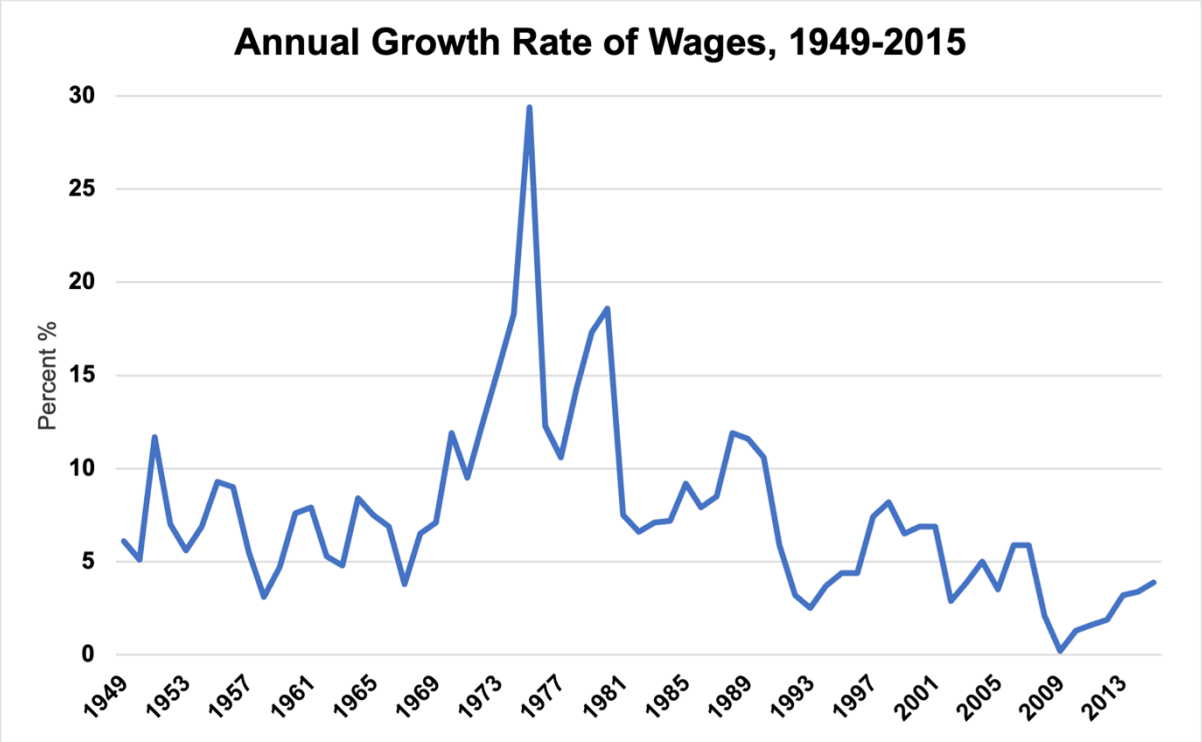

Figure 24. Annual growth rate of wages and salaries from 1949-2015
Source: ONS

Inflation in the 1970s was finally quelled by the Thatcher administration, which ran on a platform supporting monetary policy as a tool to fight inflation instead of wage and price controls (Nelson, 2004). Both nominal and real interest rates increased sharply after she came into office in May of 1979. Nominal rates increased from 12% to 17% within six months and real rates quickly rose to the 5% level. Inflation began a clear path downwards and eventually reached single digits by March of 1982 and fell below 5% by April of 1983. It is hard to imagine that inflation would have been as high in the 1970s if monetary policy had been properly addressed. Fortunately, significant reforms were made in the guiding framework for monetary policy since those days that have allowed the modern Bank of England to effectively tackle post-pandemic inflation.

By establishing a clear inflation target, gaining operational independence, and effectively using monetary policy, the Bank of England was able to address the most recent bout of inflation. The nominal anchor for inflation was clearly quite weak in the 1970s as large increases in inflation took place amidst unclear and opaque monetary policy. That changed in 1992, when the Bank of England adopted an inflation target of 2.5% (now 2%). This target engendered price stability because it created a transparent and strict standard to hold the BoE against. Since its adoption, the BoE has seen historically low interest rates that have hovered around the target. In fact, UK inflation averaged 2.48% from 1992 to 2023.

Another reform that improved the transparency and credibility of the BoE occurred in 1997, when it gained operational independence and set up the Monetary Policy Committee (MPC). Prior to 1997, control over monetary policy lay with the government. There was always the opportunity for it to interfere with policy for political benefit. In an opinion piece published in the Financial Times, Mervyn King, who joined the BoE as chief economist in 1991 before becoming

its Governor from 2003-2013, wrote that, “After a satisfactory reception of a Budget, for example, governments would ‘reward themselves’ with a rate cut” (King, 2017). As such, the political cycle could influence the nature and timing of interest rate decisions. After the reform granting independence, the BoE created its nine member MPC and a regular schedule on which it could vote on interest rate decisions. These reforms helped give the Bank credibility by giving households and firms more reason to believe that it could bring low inflation without political influence. This credibility helped the BoE manage inflation expectations in the years since and was invaluable after the pandemic.

Figure 25 shows that the Bank of England managed inflation expectations after the pandemic. Despite the high inflation pushing up one-year inflation expectations to 4%, long-run expectations remained very well anchored around the 2% target (Figure 25). As the shocks to energy prices and shortages in 2021 and 2022 worked their way through the economy and interest rates were increased, inflation expectations quickly began to fall. As of spring 2024, the BoE has gauged the short-term inflation expectations of households and businesses to be at the 3% level and falling (Bank of England, 2024).

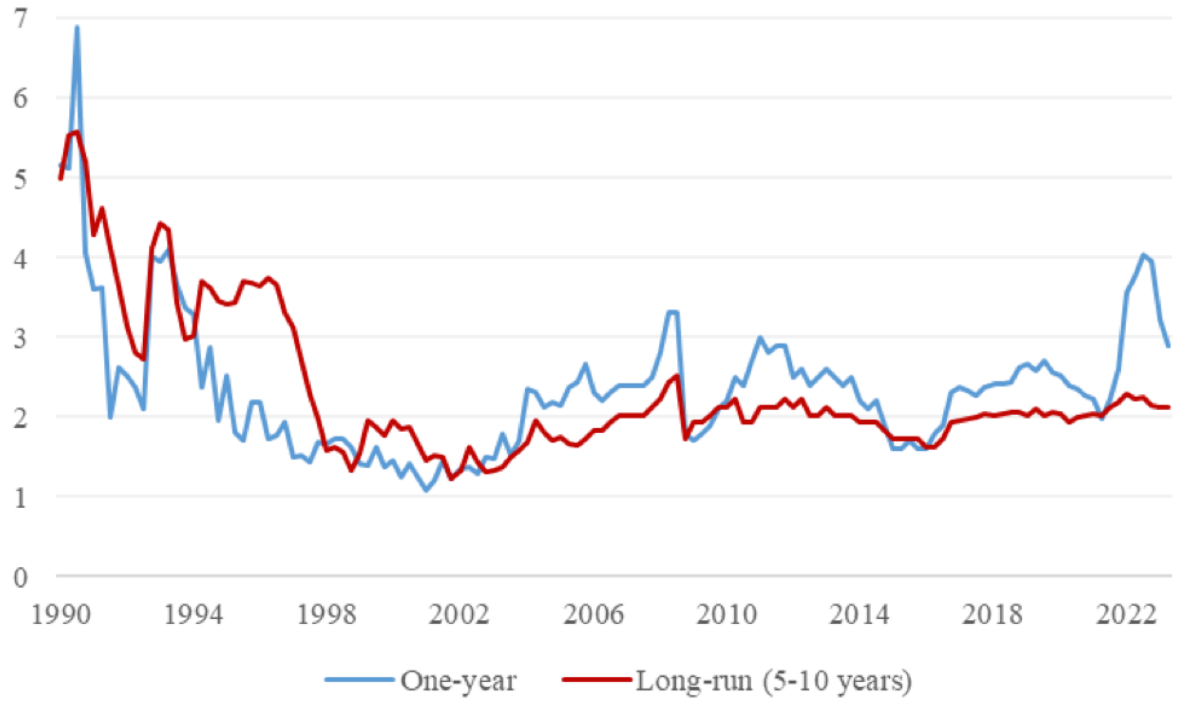

Figure 25. One-year and long-run inflation expectations, 1990 Q1 to 2023 Q2
Calculated from two composite series covering expectations of households, professional forecasters, and financial markets.
Source: Haskel, 2023

Another reason why the BoE was able to manage inflation expectations so well was because of its strong monetary policy to stamp out inflation. In December of 2021, it became the first major central bank to hike rates after the pandemic when the MPC voted to raise the Bank Rate from 0.1% to 0.25% (Milliken et al., 2021). This hike came amidst an inflation rate of 5.4%, which rose quite quickly from the 2% it was six months before. Given the rapid rise in inflation, there was a narrative that the BoE was wrong to treat the inflation in 2021 as transitory. Countering this, an analysis by Haskel (2023) finds that, given that the average effect on UK inflation from energy or food price shocks and shortages since the 1990s was small and short-lived, it was "perfectly reasonable" for the MPC to look through such shocks in 2021. What was unique during

the pandemic was that the magnitude of the shocks was greater than before, and that they were repeated and co-incident (for example, both energy and food prices jumped after the Russian invasion).

Unlike in the 1970s, the BoE hiked rates quickly in 2022 to counter the surge of inflation, taking no chances of inflation expectations becoming de-anchored. Figure 26 illustrates how the MPC increased the Bank Rate from 0.25% in January 2022 to 3.5% by December while inflation rose from 5.5% to 10.5% over that period. In October 2022, as inflation reached its peak of 11.1%, the bank hiked by 0.75%, the largest in three decades. As inflation began falling from its peak, officials continued warning of more hikes. Price rises slowed down quickly in 2023, dropping from 10.1% in January 2023 to 4.0% by the end of the year. In that time, rates increased from 3.5% to 5.25%, where they remain as of the writing of this paper. This series of steep rate hikes coincided with a quick drop in inflation and a remarkable anchoring of inflation expectations, highlighting their effectiveness.

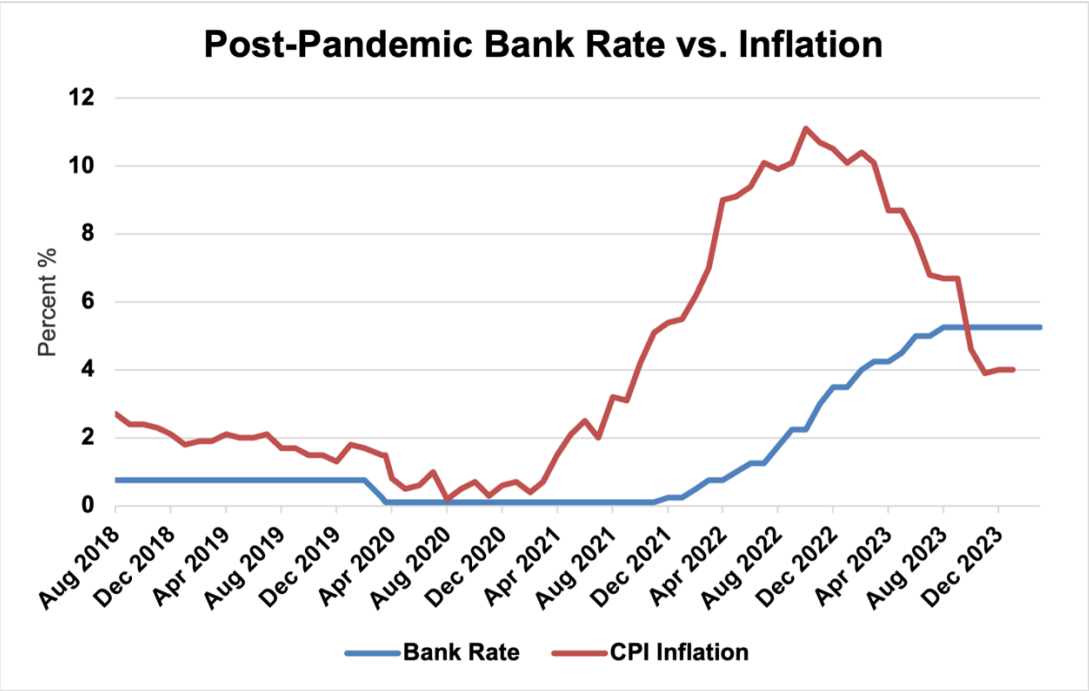

Figure 26 Post-Pandemic Bank Rate versus Inflation
The official bank rate paid on commercial reserves, August 2018 to January 2024.
Source: Bank of England, ONS

An important thing to add is that Brexit did not have the disruptive effect on the UK's monetary policy that it had on trade or immigration. While it did have inflationary impacts on prices, it did not fundamentally alter how the UK could fight inflation. This is because the UK did not adopt the Euro when it joined the EU, and thus did not give up control of monetary policy to the European Central Bank. In this way, there was a limited impact of Brexit on the conduct of monetary policy and financial system stability.

As of March 2024, the BoE has forecasted inflation to fall to 2.75% by the end of the year but drop below 2% for a brief period during the summer due to lower energy prices (Feb 2024 MPR). In its February meeting, the MPC kept the Bank Rate at 5.25% and removed a warning that it might have to raise rates again, suggesting that it is preparing for cuts while waiting for

clearer signals that inflation is subdued (Hannon, 2024). The market has fully priced in a quarter-point cut in August, but many commentators are forecasting a move in the second quarter. Bloomberg analysts, for example, see a move in May with 1.25% of cuts in 2024 as headline inflation falls.

Contrasting the inflation of the 1970s with the 2020s reveals the impact that effective monetary policy had on fighting post-Covid inflation. Despite experiencing a larger energy shock than any single year during the 1970s, the UK dealt with much lower inflation after the pandemic. This is because the BoE after the pandemic had credibility, the belief among households and firms that it could keep inflation close to the clear and transparent target rate of 2%. The strong rate hikes by the BoE MPC starting in 2021 helped keep those expectations low. In the 1970s, on the other hand, the government failed to slow down inflation and manage expectations in the absence of effective monetary policy. It also had little credibility, and the powerful unions at the time contributed to record high wage inflation as they had little reason to believe the government could lower price increases. As things stand in 2024, the BoE is set to begin lowering rates as inflation quickly approaches the target rate, marking what appears to be the end of an effective campaign against post-Covid inflation.

Chapter 7

Conclusion

The Covid-19 pandemic in 2020 and the invasion of Ukraine by Russia in 2022 were a set of unprecedented, black swan events that had significant inflationary impacts on the UK. This paper analyzes that inflation and identifies the UK-specific factors that worsened it. In doing so, it provides a holistic and coherent analysis of inflation during this period.

A review of two decompositions reveals that the inflation in 2021 was characterized by energy price shocks and shortages, while those were compounded in 2022 and 2023 by food price shocks and labor market tightness. Analyzing core inflation helps reveal some of the nuanced elements driving inflation beyond those energy and food price shocks. Wage inflation, import prices, and supply shortages are scrutinized, and it is evident that Brexit and the pandemic had a significant impact on all three. In the case of wage inflation, those two factors kept LFPR low and the V/U ratio very high. Covid-19 lockdowns drove supply chain disruptions that contributed to much of the inflation in 2021, and Brexit-related changes in the flow of goods contributed to the high import inflation for core goods in 2022, with pharmaceutical goods CPI serving as an example.

The narratives for energy and food inflation are simpler, as both correspond to massive price shocks following the Russian invasion of Ukraine. The 47% rise in energy CPI inflation in 2022 came as natural gas prices rose 600%. The Ofgem price cap and the UK's reliance on natural gas for electricity generation explains why the severity of the energy crisis was worse in the UK relative to other large European countries, despite relatively high fiscal spending through measures such as the Energy Price Guarantee. Much like energy inflation, food inflation is revealed to be

driven by supply shocks from the Russo-Ukraine War. Indirect energy effects as well as non-tariff barriers from Brexit were the main drivers. Food inflation rates in the UK are found to track rates in the EU as a whole but surpass those of the selected large European economies that implemented food relief programs.

Comparing post-Covid inflation to that of the 1970s provides a necessary historical context and highlights the impact that effective monetary policy had on fighting inflation. Through this policy, the BoE kept inflation expectations low as it raised interest rates quickly from 0.1% to 5.25% to slow down price rises. It also had more credibility than in the 1970s because of the implementation of an inflation target and independence. The government in the 1970s did not conduct monetary policy well, and rates remained deeply negative while inflation reached up to 24.5%.

The Future of Brexit

As more time passes, and the impacts of the pandemic and the war fade, a more complete understanding of this period will emerge. Regardless, some conclusions are apparent. Most clearly, the economic consequences of Brexit as they pertain to inflation are positioned to the downside. Within two years after the passage of the TCA, deleterious impacts on trade were already clear. Food inflation was the most egregious consequence of Brexit, but inflation from labor market disruption and core goods flows disruptions have connections to it as well. It takes firms quite a bit of time to adjust to trade barriers, and it is possible that we are not seeing the full negative effect yet of Brexit on imports. As the TCA continues to be fully implemented, more disruptions can be expected.

The future of Brexit is quite unclear. Keir Starmer, the leader of the Labour party, has made it clear that the party will not try to rejoin the EU single market or customs union and will instead aim for incremental advances (Shirmsley, 2024). These could include agreements on veterinary regulations for food imports, a mutual recognition of qualifications, and certain worker mobility schemes, but nothing close to the level of integration that existed before. Regardless, those agreements could potentially lower inflation in the future. For example, veterinary agreements for food imports would lower the complications associated with importing food from the EU, such as physical checks and paperwork. Worker mobility schemes could put a downwards pressure on wage inflation by allowing UK industries to address demand for foreign workers more in industries such as hospitality or, as analyzed in Chapter 3, HGV driving. While the potential gains from these incremental changes are relatively small, they will make progress in reducing inflationary pressures on the economy. Of course, the biggest potential gain though would be to rejoin the EU single market and customs union, with the most recent estimate by the Office for Budget Responsibility (2023b) putting the boost to GDP at 4%. Unfortunately, that seems like a distant possibility.

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