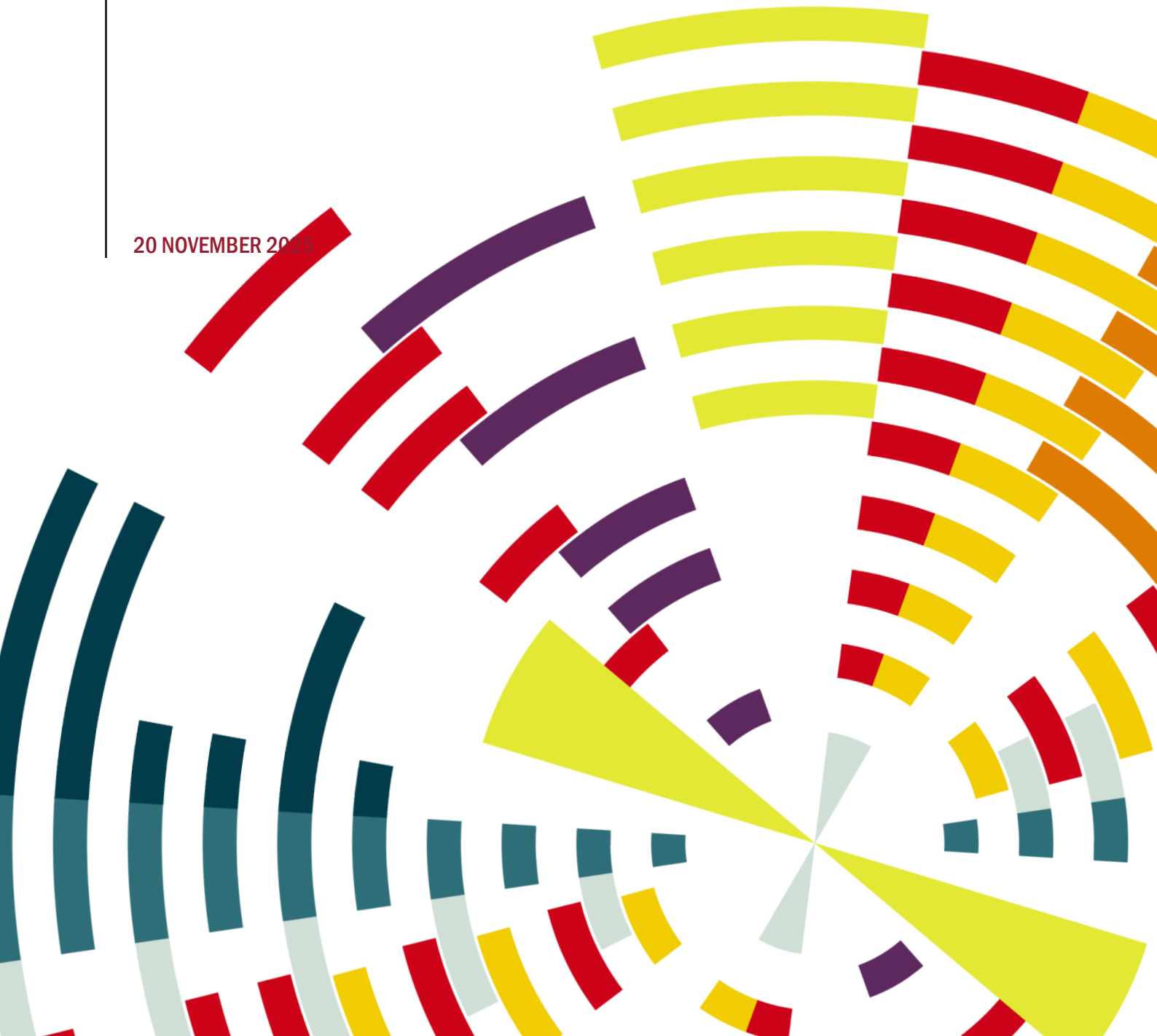


THE IMPACT OF THE NATIONAL LIVING WAGE ON PRICES

20 NOVEMBER 2025



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This work uses statistical data from ONS which is Crown Copyright. The use of ONS data does not imply that the ONS endorses the interpretations or analyses presented here. Some of the research datasets used may not exactly match National Statistics aggregates.

EXECUTIVE SUMMARY

Context

The National Minimum Wage (NMW) and the subsequent National Living Wage (NLW) have been central to the UK's labour market policy for more than two decades. As their level has risen in relation to median pay, questions have grown about their wider economic impacts, such as on employment, productivity, and prices.

Early research on the minimum wage concentrated on employment effects, with most UK studies finding little overall impact on employment levels. In recent years, attention has shifted towards its impact on hours worked, productivity, profitability, and prices.

This paper studies the price channel, extending the work of Wadsworth (2010) and Frontier Economics (2020). The pandemic and its subsequent data disruptions have made it more difficult to assess recent employment impacts with confidence. In contrast, price data recovered relatively quickly, enabling a more reliable examination of post-pandemic minimum wage upratings.

This paper covers both this and earlier periods, providing an updated view of the evolving relationship between the minimum wage and inflation in the UK.

Data and approach

Using data from the Office for National Statistics (ONS), we obtain an item-level panel dataset of inflation observations. Through the Annual Business Survey (ABS) and the Annual Survey of Hours and Earnings (ASHE) we identify a sample of sectors that are more or less likely to be exposed to minimum wage increases. Joining these two sources, we construct datasets of item inflation at the national and regional level, and we test whether the items from the most exposed sectors experience higher inflation in minimum wage uplift months.

The dependent variable is month-on-month consumer inflation. We consider this both at the national and regional level. The level of analysis is an 'item' – the product categories used to construct the Consumer Price Index. This allows us to observe highly granular data (examples of items are 'Hair gel 150-200ml' or 'Electrician daytime rate per hour').

We focus our analysis on non-tradable goods and services - those that must be consumed where they are produced, such as hospitality or beauty services - and exclude tradable goods, such as grocery products or electronics, which face international competition that limits domestic firms' ability to pass on minimum wage cost increases (Harasztosi and Lindner, 2019). This reduced our sample from 1,184 to 156 monthly item observations.

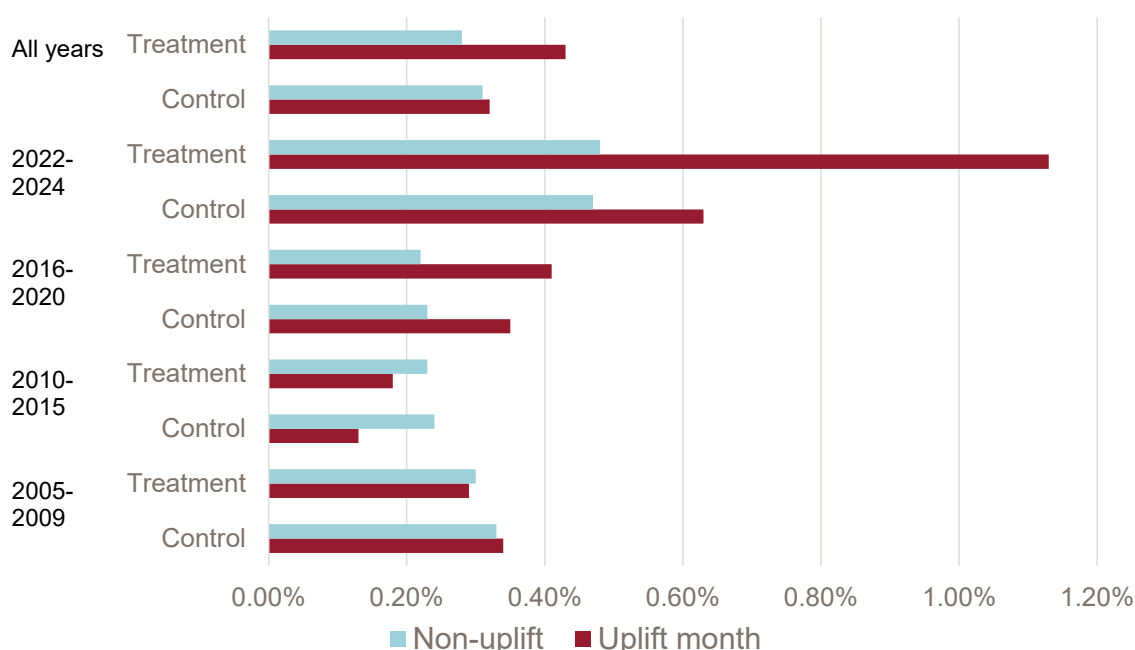
The main independent variable is exposure to the minimum wage at the sector and sector-region level. We define exposure as the share of minimum-wage labour costs out of total costs in the product market. This share is calculated as the product of two terms. First, the share of

employees earning at or below the incoming minimum wage, which we obtain from the Annual Survey of Hours and Earnings (ASHE) and Low Pay Commission (LPC) data. Second, the share of labour costs over total costs, which we obtain from the Annual Business Survey (ABS).

Findings

Descriptively, month-on-month inflation for items in sectors highly exposed to the minimum wage (treatment group) is higher in uplift months than during the rest of the year, as shown in Figure 1. This ‘uplift effect’ has strengthened over time. In 2022-24, uplift-month inflation for treated items averaged 0.43%, 0.14 percentage points higher than the 0.28% observed in other months. Prior to the introduction of the National Living Wage in 2016 and the shift of the uprating month from October to April, no uplift effect was observed in either the treatment or control group. Since then, both groups have experienced higher inflation during uplift months.

Figure 1 Monthly inflation in the minimum wage uplift month (compared to non-uplift months)



Source: Frontier Economics through LPC, ABS, and ASHE data.

Note: Results not sensitive to the choice of exposure measure.

Using panel data econometrics, we study the relationship between these two variables. The approach of our **main specification is difference-in-differences** (equation 10 in section 2.2, results in Table 6 in section 3.3), in which we test whether inflation in the uplift month is higher in the sectors most exposed to the minimum wage compared to those that are less exposed. We also carry out regional analysis in which we test whether inflation is higher in more exposed sector-regions compared to less exposed sector-regions.

The results from the econometric analysis are generally consistent with previous work, as we **find a modest positive relationship between highly exposed sectors and higher inflation in the minimum wage uplift month, and no significant difference in other months**. This effect varies over time and depends on the model specification. The main specification of our study identifies that in 2022-24 inflation in highly-exposed sectors was 0.16 percentage points higher than in less exposed sectors in the uplift month, although this result does not meet traditional statistical significance thresholds. The results indicate an inelastic relationship between minimum wage and prices – that is, the increase in prices is not directly proportional to the increase in costs. For 2022-24, 1pp increase in a company's cost base due directly to a minimum wage uprating is associated with around 0.1pp higher monthly increase in consumer prices.

This paper also sheds light on other facets of the relationship between minimum wages and inflation in the UK. Firstly, we do not find evidence of strong anticipatory or delayed effects – most of the pass-on to prices occurs solely in the minimum wage uprating month. Secondly, we find evidence that since the minimum wage uplift changed from October to April with the introduction of the National Living Wage (NLW) in 2016, estimates of its relationship with prices might be conflating it with other April upratings – e.g., utilities. This means that a descriptive relationship between both variables will likely overestimate their elasticity. Thirdly, we observe a stronger pass-through of other input prices (e.g., energy) to consumer prices since the Covid 19 pandemic.

1 Background and context

1.1 Literature review

There is a small body of literature testing the relationship between wage floors and consumer prices in the UK. Wadsworth (2010) studies the introduction and uprating of the UK minimum wage on the price of goods and services, comparing sectors where minimum wage workers account for a substantial share of total costs to those where it does not. He finds limited evidence that prices were higher in the months corresponding to the minimum wage uplift, but stronger evidence of a long-term effect in the years following the introduction of the minimum wage.

Draca et al. (2005) examine the impact that the 1999 introduction of the National Minimum Wage (NMW) had in three 'exposed' sectors (restaurants, canteens and takeaway food) but find no evidence of a price effect. Machin et al. (2003) looks at the effect in the residential care sector and also finds no effect, although they note that the sector was price regulated.

Elsewhere, there is stronger evidence of price effects; see Lemos (2008) or MaCurdy (2015) for a summary. Harasztosi & Lindner (2019) exploits a large increase in the minimum wage in Hungary and firm-level data, finding that the doubling of the minimum wage led to a 7% to 14% increase in prices over a four year period. The authors also find strong evidence that prices of non-tradable products are more likely to rise than those of products that are exposed to international competition. Aaronson, French and MacDonald (2008) use store-level data on restaurant prices in the USA to show an unambiguous price effect that is stronger where the store employs more minimum wage workers and when the minimum wage increase is larger.

Card and Krueger (1994) find that minimum wages led to a small price increase in their sample of affected New Jersey fast-food restaurants. Aaronson (2001), also examining fast food prices, finds that a 10% increase in the minimum wage raises prices by <1%, particularly when overall inflation is high. MacDonald and Aaronson (2005) find most fast food restaurants only raised prices on a subset of their product range in response to higher minimum wages, suggesting item-specific fixed costs.

Two recent studies exploit supermarket scanner data in the US to estimate the relationship between minimum wage increases and grocery prices – a 10% increase of the former is associated with 0.6-0.8% and 0.36% increases of the latter in Leung (2021) and Renkin et al. (2022), respectively. Ashenfelter and Jurajda (2021), using price and wage data from US McDonald's restaurants, find an elasticity of hourly wage rates with respect to minimum wages of 0.7, indicating that restaurants also aim to preserve the "premium" of certain job roles over the minimum wage as it increases. They also find a 0.2 price elasticity with respect to wage increases, which implies an elasticity of prices with respect to minimum wages of about 0.14.

1.2 Institutional context

In April 1999, the UK Government introduced a universal statutory minimum wage on employers. The Low Pay Commission (LPC), an independent public body, makes recommendations to government on the size of any minimum wage uplift, based on monitoring and evaluation evidence. The LPC typically makes its recommendation in October the previous year, with the Government announcing its response to the recommendation in November. There are now three minimum wage rates:

- The National Living Wage - £12.21 per hour as of April 2025;
- Age-specific minimum wages for those aged 16-17 (£7.55), and 18-20 (£10.00).
- an apprenticeship rate (£7.55).

Figure 2 displays the nominal value and annual growth rate of the main (or ‘adult’) minimum wage rate between 1999 and 2025, showing its substantial increase since its introduction: from £3.60 in 1999 to £12.21 in 2025, equivalent to an average annual increase of about 4.8% in nominal terms. The annual uplift was relatively high in the early part of the 21st century, but growth slowed to an average annual increase of 2.5% in the years during and following the financial crisis (2008 to 2015).

Minimum wage growth has strengthened again since 2016, when the UK government introduced a new National Living Wage (NLW) applicable to those aged 25 or over with a target for it to reach 60% of medians earnings by 2020, a target that was later increased to 66% by 2024¹. The introduction of the NLW also brought a change to the annual uprating date - while previously minimum wages were uprated in October, the NLW is uprated in April.

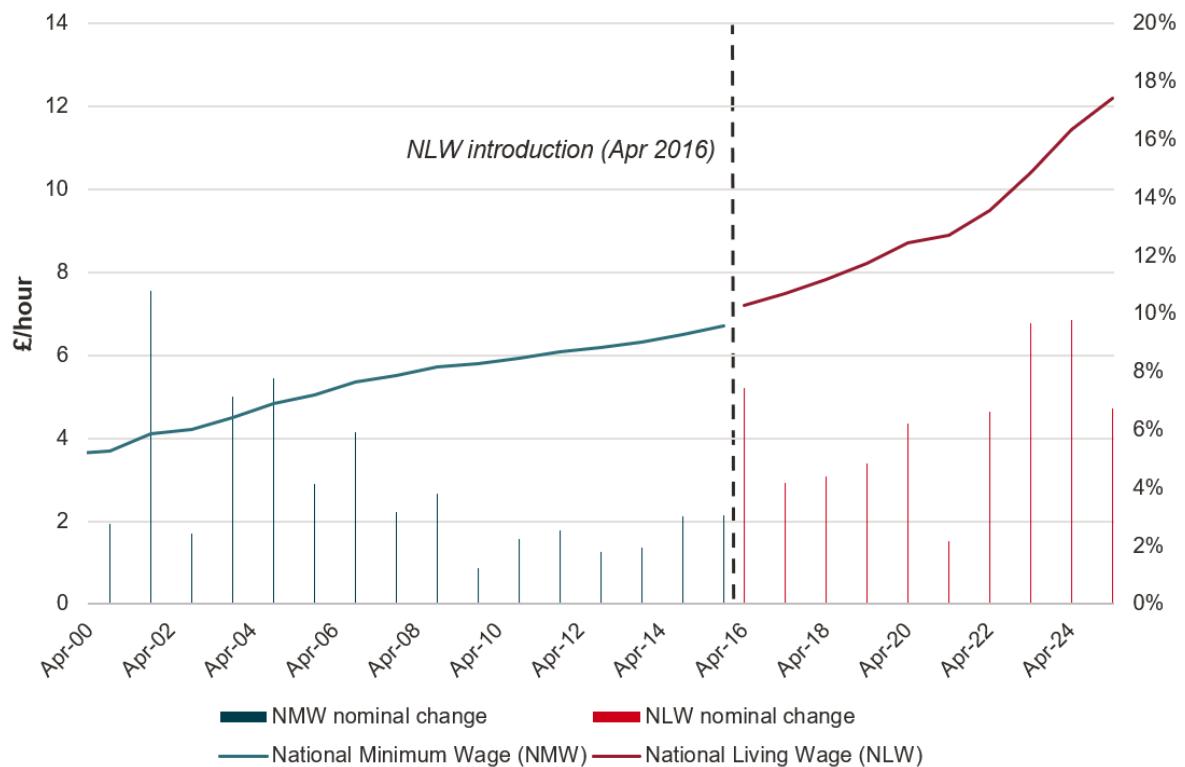
The introduction of the NLW increased the wage floor applicable to individuals aged over 25 by 7.5% and, since its introduction, the NLW has averaged out a 6% annual increase. In 2024, the Low Pay Commission estimated around 1.9 million people, or 6.5% of all UK workers, were paid at or below the NLW or youth rates of the minimum wage².

Since its introduction, the NLW age threshold has been progressively lowered: from 25 to 23 years of age in April 2021, and to 21 from April 2024. In 2024, the government pledged to progressively extend its eligibility to all workers aged 18 or above.

¹ <https://www.gov.uk/government/publications/national-minimum-wage-and-national-living-wage-low-pay-commission-remit-2020/national-minimum-wage-and-national-living-wage-low-pay-commission-remit-2020>

² <https://commonslibrary.parliament.uk/research-briefings/cbp-7735/>

Figure 2 Minimum wage for those aged 25 or above over time



Source: Frontier Economics from ONS data.

Note: Nominal prices

1.3 Theoretical framework

Microeconomic theory suggests that a firm's ability to raise prices in response to an increase in input costs depends on a number of factors:

- the consumer price elasticity of demand for the good;
- the degree of competition in the product market, and the extent to which competitors are subject to the price shock; and
- the firm's ability to substitute to alternative inputs or increase factor productivity.

We formalise this framework using a stylised version of the Hicks-Marshall style model described in Harasztosi and Lindner (2019). We consider a market of monopolistically competitive firms in a partial equilibrium framework, assuming that firms have identical, constant return-to-scale production functions and operate in perfectly competitive labour markets. This stylised example is intended to illustrate the mechanisms through which minimum wage increases impact consumer prices, and where these impacts are likely to be

more apparent. Clearly, passthrough dynamics may be different if these assumptions do not hold. However, the validity of the empirical findings does not rest on the details of the precise theoretical model.

Consumer problem. Harasztosi and Lindner (2019) show that if consumers have a nested constant elasticity of substitution utility function, the demand response to a price increase (e_i) depends on the fraction of firms that raise prices.

If only one firm raises prices, then the demand response for that firm will be relatively high as consumers can readily substitute with similar products. The demand response is given by the following equation, where $-\kappa$ is the elasticity of substitution between different varieties within the product market:

$$e_i = \frac{\partial q_i}{\partial p_i} \frac{p_i}{q_i} = -\kappa \quad (1)$$

We can show that if all firms in a product market raise their prices, the demand response for a given variety will be smaller, such that $e_i \in (-\kappa, 0)$, reflecting consumers' willingness to substitute for other goods outside the product market.

Firm problem. We know that if firms face a constant return-to-scale production function with three inputs (minimum wage labour l_m , high-wage labour l_h and capital k with costs w_m , w_h and r respectively), marginal cost is given by:

$$MC_i = l_m w_m + l_h w_h + kr \quad (2)$$

Also, in perfectly competitive markets, profit-maximising firms set marginal revenue to equal marginal cost:

$$MR_i = \frac{\partial R_i}{\partial q_i} = \frac{\partial (p_i q_i)}{\partial q_i} = p_i + q_i \frac{\partial p_i}{\partial q_i} = p_i \left(1 + \frac{\partial p_i}{\partial q_i} \frac{q_i}{p_i} \right) = p_i \left(1 + \frac{1}{e_i} \right) \quad (3)$$

$$p_i \left(1 + \frac{1}{e_i} \right) = MC_i \quad (4)$$

$$p_i = \frac{MC_i}{1 + e_i^{-1}} = \frac{MC_i}{1 - \kappa^{-1}} \quad (5)$$

So, as κ is a constant, the relationship between prices and minimum wages can be defined as:

$$\frac{\partial \log p_i}{\partial w_m} = \frac{\partial \log MC_i}{\partial w_m} = \frac{\partial MC_i}{\partial w_m} \frac{1}{MC_i} = \frac{l_m}{MC_i} \quad (6)$$

Multiplying through by the minimum wage in order to express the left-hand side as the percentage change in price resulting from a percentage change in minimum wages, we see that this is equal to s_i , the share of minimum wage labour costs in marginal costs:

$$\frac{\partial p_i}{\partial w_m} \frac{w_m}{p_i} = \frac{l_m w_m}{MC_i} = s_i \quad (7)$$

From this identity, we can infer that the effect of a minimum wage increase on prices will be proportional to the importance of minimum wage labour costs in the production function (minimum wage ‘exposure’). This informs our overall identification strategy, which is to exploit variation in exposure, by comparing inflationary dynamics above or below a certain exposure threshold.

Price-adjustment mechanism. In our stylised model, firms do not incur price-adjustment costs, and therefore respond instantaneously to a minimum wage shock without lags or anticipation. However, empirical evidence suggests that firms adjust prices only once or twice per year with larger firms and firms operating in competitive markets likely to adjust prices more often, see e.g. Hall et al. (2000), Bils and Klenow (2004), Nakamura and Steinsson (2013). Alvarez et al. (2006) note that firms in the food service sector adjust their prices most often, with non-food service industry sectors adjusting prices least often. These frictions may make it more difficult to empirically observe the effect of the minimum wage uplift in the month that it occurs. However given that minimum wage upratings are typically announced four to five months in advance, firms are able to plan for the cost increase in advance.

2 Data and methodology

Our empirical strategy consists of identifying sectors more and less exposed to the minimum wage uplift, constructing item-level panel datasets of price observations at the regional and national level, and testing the relationship between being in a highly exposed sector and monthly inflation in the minimum wage uplift months. We describe the data sources and methodology used for this exercise in this chapter.

2.1 Data sources

This study draws on the following datasets:

- ONS Consumer Price Inflation indexes by ‘item’ and month, published on the ONS website³.
- Annual Survey of Hours and Earnings (ASHE) microdata on a sample of hourly wages by sector, accessed from the ONS Secure Research Service.
- Annual Business Survey (ABS) aggregated data on turnover, gross value added and employment costs by sector, published on the ONS website⁴
- Information on the adult minimum wage over time, published in House of Commons National Minimum Wage Statistics.⁵

This section describes how these sources were used to construct the dependent and independent variables for the empirical analysis.

Dependent variable

First, we construct a measure of month-on-month and year-on-year price inflation. The unit of analysis is ‘items’, the product categories used by the ONS to construct the consumer price index. Items are one level of granularity below sub-classes in the United Nations’ Classification of Individual Consumption by Purpose (COICOP). For example, ‘Minicab fare for 2 miles’, ‘Hair gel 150-200ml’, ‘Electrician daytime rate per hour’. Items can be aggregated into sub-classes, classes, groups and divisions.

³ ONS, ‘Consumer price inflation item indices and price quotes’, accessed 1 March 2020, <https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindicescpian retailpricesindexrpiitemindicesandpricequotes>

⁴ ONS (2019), ‘Annual Business Survey: Non-financial business economy UK, 2018 provisional results’, <https://www.ons.gov.uk/releases/nonfinancialbusinessseconomyukannualbusinesssurvey2018provisionalresults>

⁵ Francis-Devine, B. (2025, February 12). *National Minimum Wage statistics* (Commons Library Research Briefing No. 7735). House of Commons. <https://researchbriefings.files.parliament.uk/documents/CBP-7735/CBP-7735.pdf>

We extract monthly item indices from January 2005 to January 2025 inclusive for all available items. Around 700 to 750 items are in the basket in any given month, although the composition changes over time. Overall, around 1,180 items are included over the period in total. Regional quote data is also extracted and processed similarly, and chain linked using stratum weights to give a consistent price index. Note that the pandemic had some impacts on collection of price data. In particular, there were some months for which data were not collected for hospitality establishments. National indices were still published but not updated, introducing some lags in the data that cannot easily be filtered out, so the affected years (2020 and 2021) are excluded from the national analysis. In the case of regional price quote data, these data points, which represent around 10% of our sample in this period, are simply missing and will drop out from the analysis. This will mean that affected periods will not cover the same set of items/sectors as periods on either side.

Independent variables

Next, we use data from ASHE, ABS and the LPC to identify sectors that are more or less likely to be exposed to an increase in the minimum wage, on the basis of minimum wage labour costs as a share of total costs (see equation 7, Section 2). By mapping sectors to items, we can then distinguish between exposed and less-exposed items (discussed further below).

To measure exposure at the sectoral level, we extract employee-level data from ASHE and match this with Low Pay Commission's timeseries data on the minimum wages applicable to workers aged 25 and over to construct a measure of the share of workers earnings less than or equal to the incoming minimum wage in each sector. For example, an employee earning £12.00 per hour in April 2024 would be considered earning below the 'incoming' minimum wage of £12.21 (the rate introduced in April 2025), and would have a binding wage increase when the April 2025 uprating came into effect. The 'incoming minimum wage' approach is intended to correspond directly to binding changes, but other approaches such as a fixed interval above the prevailing minimum wage will give similar results.

We construct at sector, or sector-region, level a variable measuring proportion of employees paid below incoming minimum wage by combining successive waves of ASHE, from 2015 to 2024.⁶ Use of multiple years should minimise measurement error, in terms of whether the employee sampled in ASHE is representative of the population. We exclude sectors (at 5-digit SIC level) for which there were fewer than 100 observations, resulting in 149 of 707 5-digit SIC codes being dropped. Of those remaining, the median sector has 674 wage observations.

Second, sectors for which employment costs constitute a high share of total costs are also more likely to be affected by an increase in the minimum wage. To account for this, we construct a measure of employment costs as a share of total turnover at the 4-digit sector level

⁶ Note that ASHE data during the pandemic will be affected by furlough, although the impact of this should be reduced by basing estimates on multiple years.

using published ABS aggregates.⁷ For example, in 2016, SIC 45.20 (Maintenance and repair of motor vehicles) employment costs and turnover were £4.2 billion and £24.1 billion respectively, implying an employment cost share of 17.6%. We take the average cost share for 2015 to 2023, the latest year available. Note that this approach implicitly assumes that the exposure of a sector to minimum wages is constant over time - although the sectors identified under this approach are virtually the same as in Frontier Economics (2020).

Finally, we take the product of these two values to construct a measure of how ‘exposed’ each sector is to an increase in the minimum wage. This measure is a proxy for the share of minimum wage labour costs in total costs; the s_i term in equation 8.

$$\frac{L_m}{L_m + L_h} \times \frac{L_m w_m + L_h w_h}{\text{Revenue}} \approx \frac{l_m w_m}{MC_i} = s_i \quad (8)$$

where L_m and L_h are the total quantities of minimum wage and high wage labour employed at wages w_m and w_h respectively, and l_m is the quantity of minimum wage labour required to produce one product.

It is an imperfect proxy for three reasons:

- The first term is based on the share of workers earning less than or equal to the incoming minimum wage in a sector, rather than the share of the sector/region’s wage bill attributable to workers earning less than or equal to the incoming minimum wage. We expect that the ratio between the share of workers and the share of wages to be relatively consistent between sectors and leave this refinement for future work, which could make this calculation using ASHE.
- The second term is calculated as a share of turnover, rather than as a share of total costs, because of limitations in published ABS data. Given mark-up assumes constant return to scale production functions, revenue is proportional to marginal cost.
- The measure does not account for the share of the product market that is not required to pay the minimum wage: notably overseas firms. This limitation is addressed by excluding tradable items from the sample, as discussed in more detail under “Data linking” in this chapter.

By constructing an ordinal ranking of this measure, we are able to identify sectors that are more likely to be affected by an increase in the minimum wage, and those that are less likely.

In the national analysis, we consider the 20 most exposed sectors as those ‘treated’ in the econometric analysis. Figure 3 presents the exposure measure for these sectors, alongside with their share of employees that are low-paid and employment cost share. Note that we remove all ‘Libraries, archives, museums and other cultural activities’ (SIC 91) for which turnover is not a reliable proxy for total costs.

⁷ Since ASHE is at 5-digit level, ideally employment costs as a share of turnover would be measured at this level, but 4-digit level is the most granular available for published ABS.

Figure 3 List of sectors highly exposed to increases in the minimum wage

Rank	Sector	Low-paid share	Labour cost share	Exposure measure
1	General cleaning of buildings	58%	61%	35%
2	Child day-care activities	50%	65%	32%
3	Pre-primary education	42%	62%	26%
4	Window cleaning services	63%	39%	24%
5	Hairdressing and other beauty treatment	57%	42%	24%
6	Take-away food shops and mobile food stands	75%	31%	23%
7	Washing and (dry-)cleaning of textile and fur products	57%	39%	22%
8	Residential nursing care facilities	39%	56%	22%
9	Other food services	47%	44%	21%
10	Restaurants and mobile food service activities	66%	31%	20%
11	Other building and industrial cleaning activities	51%	39%	20%
12	Social work activities without accommodation for the elderly and disabled	27%	73%	20%
13	Other cleaning services	51%	38%	19%
14	Activities of amusement parks and theme parks	55%	33%	19%
15	Other residential care activities n.e.c.	30%	61%	18%
16	Residential care activities for the elderly and disabled	33%	54%	18%
17	Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores	57%	31%	18%
18	Residential care activities for learning difficulties, mental health and substance abuse	28%	62%	18%
19	Beverage serving activities	60%	29%	17%
20	Specialised cleaning services	44%	39%	17%

Source: Frontier Economics

The most exposed sectors are those related to hospitality, care services, and cleaning services. This is broadly consistent with the sectors identified in Wadsworth (2010), and almost identical to Frontier Economics (2020). The differences with respect to Wadsworth (2010) reflect different approaches to constructing the labour-cost share variable: we use employment costs as a share of turnover while Wadsworth (2010) uses employment costs as a share of value added (profit before interest plus wage bill). The non-tradable sectors that have lower exposure are in areas such as building trades, equipment hire and repair, transport and personal health services.

For robustness, we explored alternative measures of minimum wage exposure:

- First, using an alternative measure of labour-cost share; dividing employment costs by approximate gross value added (GVA), rather than turnover.
- Second, limiting the ASHE sample to employees aged 25 and over. Younger employees face lower minimum wages (although age thresholds vary over time). Excluding young employees reduces the risk that the share of low-paid employees is overstated for certain sectors.

The list of the top 20 most exposed sectors is not particularly sensitive to the choice of measure:

- Using GVA as the denominator for the labour cost share results in more retail-based sectors entering the analysis, as turnover as a share of output is higher in these sectors, which means a smaller denominator when GVA is used instead of turnover and a higher ratio. Six sectors are affected by this change.
- Using only data for employees aged 25 and over results in some sectors dropping out because there are too few observations in ASHE. Only one sector changes exposure classification under this approach.

As discussed, our analysis employs a national and regional dataset. The latter contains inflation and minimum wage exposure measures for Scotland, Wales, and the 9 regions of England. **In the regional econometric analysis, we consider ‘treated’ as the 100 sector-regions with the highest exposure to the minimum wage.**

Sectoral variation explains treatment status more strongly than regional variation - that is, a given sector tends to be either treated or untreated across all regions. Of the 156 items in our sample, only 21 are classified as both treated and untreated across different regions, and only 6 with a split across both categories less extreme than 80-20%. Accordingly, the sectoral classification shown in Figure 3 provides an accurate representation of the sectors that are considered treated in the regional dataset.

Some specifications also control for producer price inflation (PPI), which measures the input inflation that producers face. This is reported separately for inputs of food, fuel, beverages and tobacco, chemicals, equipment, other materials, and other inputs. Note these inputs themselves may be affected by minimum wage increases, although the impact is likely to be second-order.

An industry-specific PPI measure is calculated, reflecting industries’ different input mixes. For example, food service sectors will be more affected than other sectors by food input costs. The industry-specific PPI is calculated using the formula below:

$$ppi_{monthly} = \sum_i(input_PPI_i \times share_of_value_added_i)$$

The PPI series by component are multiplied by the share of the input in industry value added, from national input output tables. The resulting components are then summed together. The monthly inflation is therefore specific to sectors’ cost structure – e.g., if the inputs represent

30% of value added and across them their inflation rate is 1 percentage point, then the PPI variable would be equal 0.3 percentage points. The measure therefore reflects sectors' different exposure to inflation in input costs.

Note that the PPI controls included here relate to goods inputs, and do not include services input. Goods such as fuel and food are tradable and are likely to have the sharpest spikes, and hence have the strongest need to be controlled. They are also less likely to be affected by changes in the minimum wage, whereas service inputs are likely to be more affected by minimum wage increases. While ONS publishes SPPI series, at the time of analysis SPPI data were not available on a monthly basis.

Data linking

Finally, we link the dependent variables (item consumer inflation) to the independent variable (minimum-wage exposure by sector) in order to construct a consistent dataset for empirical analysis.

The objective of this linking is to assign each item/region a measure of exposure to changes in the minimum wage. Ideally, this would be done using published UK or international correspondence tables identifying the combination of sectors that are collectively responsible for producing, distributing and/or retailing a given item.

However, in the absence of such tables, this process is completed manually with each item being linked to the sector judged to account for the highest share of gross value added at the point of consumption. For example:

- 'Dry cleaning-man's suit' is mapped to SIC 96.01 (Washing and (dry-)cleaning of textile and fur products).
- 'Washing machine repair' is mapped to SIC 95.22 (Repair of household appliances and home and garden equipment).
- 'Fish & chips takeaway' is mapped to SIC 56.10/3 (Take away food shops and mobile food stands).

While the manual mapping is a pragmatic and intuitive approach, it is reductive and does not take into account minimum wage exposure of inputs further up the supply chain. A more systematic approach could incorporate input usage, but would be more intensive and still require extensive manual resource combining and mapping different tables.

Of the 1,180 items in the dataset, approximately 1000 are considered tradable, in that a substantial share of the inputs to the finished product are subject to international competition. For example, 'Canned tomatoes 390-400g', 'Liquid soap 200-300ml' and 'Home office desk'. While the retail component of these items is largely non-tradable, we would expect that firms producing the items to face competition from international firms, making it difficult for domestic firms to pass on the cost of a minimum wage increase to consumers (see Section 2). Harasztosi and Lindner (2019) demonstrate this empirically using evidence from a minimum wage shock in Hungary.

Moreover, the prices of tradable items are likely to be more affected by a range of macroeconomic factors such as exchange rates and oil prices that render them an inappropriate control group for non-tradable items. For this reason they are not mapped to a particular sector/region and are excluded from the core analysis. A full correspondence table from non-tradable items to sectors is presented in the Annex.

Importantly, constructing the dataset at the item level has implications for the interpretation of the findings. An item level dataset may overweight some items with respect to their share of economic activity (the ONS over-samples some classes where the between-item price variability is high). Conversely, a sector level dataset might overweight sectors that account for a relatively smaller share of economic activity. This could be addressed in further research by applying weighting to each item or sector.

In total:

- There are 58 non-tradable items which map to the ten most exposed sectors. A large number of these are food service items.
- There are a further 22 non-tradable items which map to the next ten most exposed sectors. These largely cover care and building services sectors.
- There are a further 76 non-tradable items which spread across the rest of the sector-exposure distribution. This is the 'control group' and includes areas such as transport, equipment repair and maintenance, building trades, accommodation, private health services and recreation.

In the regional dataset, where we define our treatment group as those items coming from the top 100 most exposed sector-regions, we have:

- There are 340 non-tradable items which map to the 100 most exposed sector-regions.
- There are 621 non-tradable items who do not map to the 100 most exposed sector-regions.

As discussed earlier in this section, sector is a much stronger predictor of treatment assignment than region. Hence, the most common item categories in the treated and untreated group are broadly in line with those detailed above for the national dataset.

2.2 Methodology

To estimate the impact of minimum wages on prices, we employ two panel regression approaches.

- Limiting the sample to treated items only and testing if inflation is higher in uplift month than in the rest of the year for items in highly-exposed sectors.

- We apply the formula below, where:

$$inflation_{m,i} = \alpha + \beta_1 \times uplift_m + \gamma_i + \delta_m + \epsilon_{m,i} \quad (9)$$

- $inflation_{m,i}$ is the month-on-month percentage change in price index for each item/region i and month m ;
- $uplift_m$ is a binary variable equal to one if the minimum wage increased in that month and zero if it did not;
- γ_i is an item/region fixed effect (to capture between-item/region variation in inflation);
- δ_m is a month fixed effect (to capture seasonality);

- The parameter of interest in this regression, β_1 , captures the additional inflation experienced in the uplift month by those sectors whose costs should be more exposed to such uplift.

- Extending the sample to treated and untreated items, we employ a difference-in-differences approach to test whether inflation in the NLW uplift month is higher for treated items than for untreated ones.

- We apply the formula below, where:

$$inflation_{m,i} = \alpha + \beta_1 \times uplift_m + \beta_2 \times treated_i + \beta_3 \times uplift_m \times treated_i + \gamma_i + \delta_m + \epsilon_{m,i} \quad (10)$$

- $uplift_m$ is again a binary variable equal to one if the minimum wage has been increased in that month.
- $treated_i$ is a binary variable equal to one if an item is in a highly-exposed sector or sector-region in the national and regional analysis, respectively.

- The parameter of interest in this regression, β_3 , captures any difference in inflation in the uplift month between items in sectors highly exposed to the minimum wage and items in less exposed ones. This allows us to control for any April inflation premium arising from other input costs up-ratings.

We consider the difference-in-differences approach in equation 10 applied to the regional dataset and the period after the introduction of the NLW to be the main specification of this study. Results from this exercise can be found in Table 6 of section 4.2.

For each of these specifications, we test the inclusion of inflation lags, measures of input inflation, April-specific effects, standard-error clustering at more and less conservative levels, and different choices of fixed effects.

We also test whether the underlying assumption to our specification, that most of the pass-on to prices happens in the uplift month, is reasonable by conducting an event-study analysis that explores if there was a significant inflation gap between treated and untreated items in the preceding and subsequent months to the NLW uprating, following the equation:

$$inflation_{m,i} = \alpha + \sum_{k=-3}^3 \gamma_k \times month_k \times treated_i + \gamma_i + \delta_m + \epsilon_{m,i} \quad (11)$$

where we regress the interaction of the treatment variable with the uplift month (referred to as month_k with k equal to zero) and three months preceding and succeeding it. As in the previous approaches, we include item-region and time fixed effects. We perform this exercise separately for 2022, 2023, and 2024. Each yields seven coefficients, γ_k with integer $k \in [-3,3]$. They identify the relationship between monthly inflation and the interaction of January to July with the treatment assignment, quantifying if inflation in the treated group was significantly higher or lower in these months.

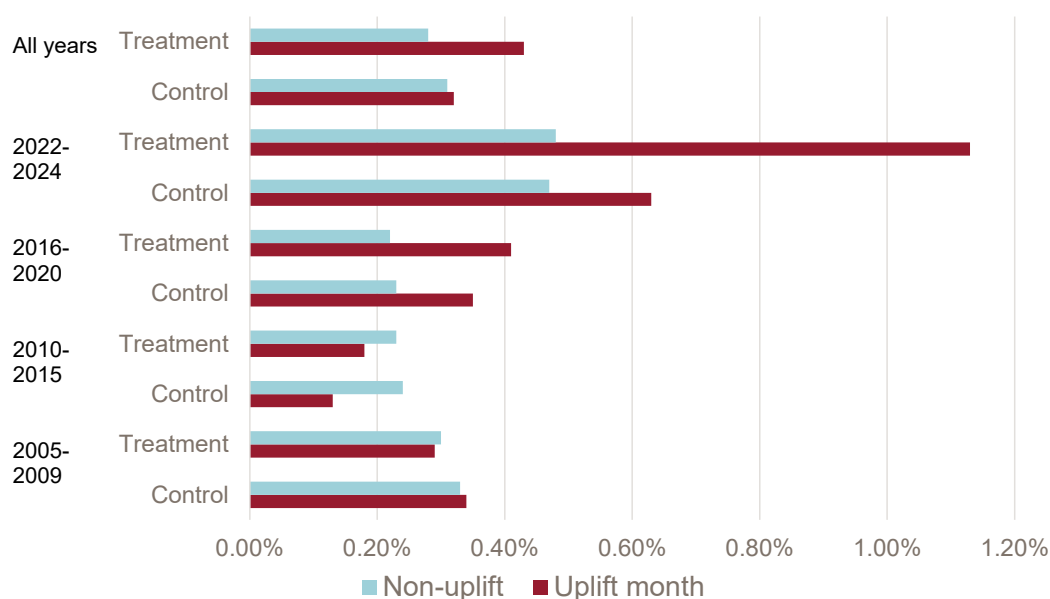
3 Findings

3.1 Descriptive results

Descriptively, we can see that month-on-month inflation for our sample of non-tradable items is higher in minimum wage uplifts months, particularly for our treatment group of items in sectors highly exposed to it. Figure 4 below compares inflation in the uplift month with the rest of the year for treated and untreated items and across different timespans. It reveals a 0.14 ‘uplift effect’ for exposed items in 2022-24, as uplift-month and non-uplift-month inflation averaged 0.43% and 0.28% in this period, respectively.

Disaggregating the results by several time cuts show interesting dynamics. As can be seen in Figure 4, uplift-month inflation is only higher from 2016 onwards, while in 2005-2015 we do not observe evidence of an ‘uplift effect’. A plausible hypothesis is the change in the annual minimum wage uprating date with the introduction of the NLW – the minimum wage increased in October until 2015, and since then it has increased in April. In the UK, April is typically the month when many input costs are revised, including regulated utility prices, council tax, and excise duties. These concurrent adjustments may therefore have contributed to the rise in uplift-month inflation observed after 2016, rather than this being driven solely by minimum wage changes. However, minimum wage upratings were higher on average from 2016, which may also lead to a greater impact on prices.

Figure 4 Monthly inflation in the minimum wage uplift month (compared to non-uplift months)



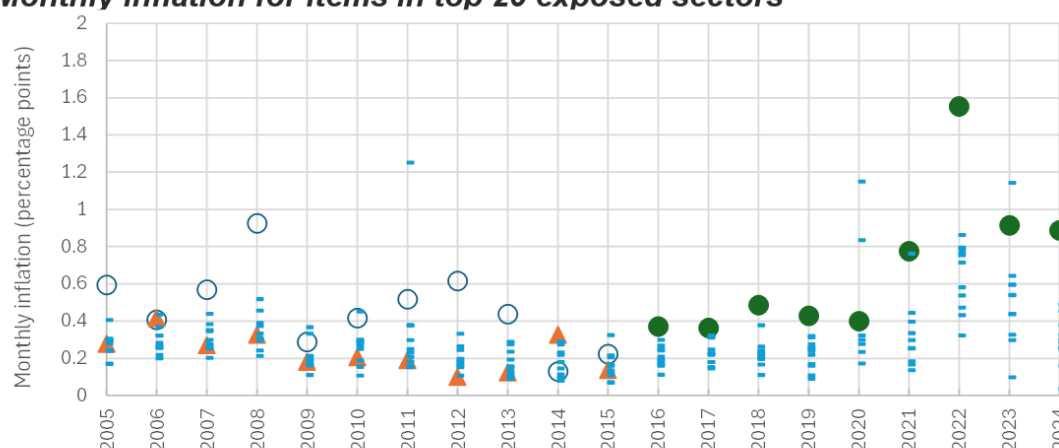
Source: Frontier Economics through ONS, ASHE, ABS

Note: Results not sensitive to choice of exposure measure or whether turnover or GVA are used in forming exposure ratio.

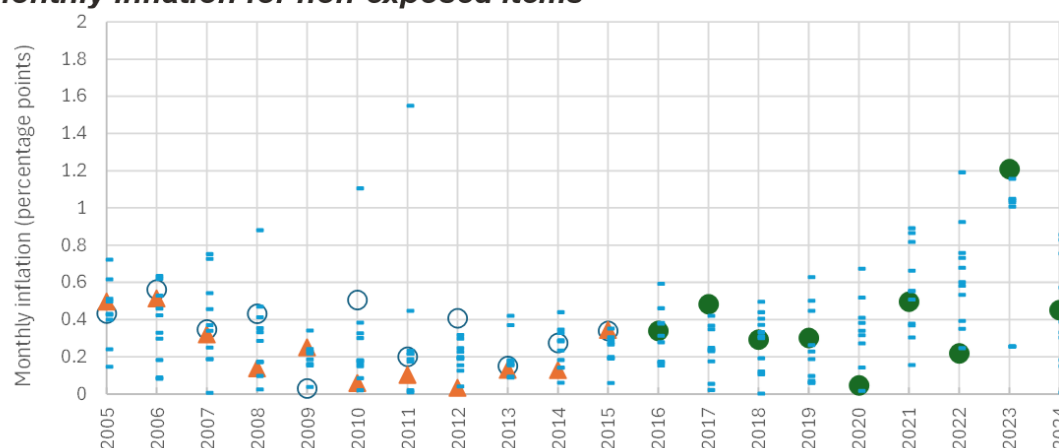
To explore whether there are other factors not related to minimum wage that are driving April inflation, Figure 5 compares month-on-month April and October inflation with that of the rest of the months and across exposed and non-exposed sectors. It shows that April inflation tended to be higher even before it became the minimum-wage uprating date with the introduction of the NLW. Although inflation peaks most often in April uplift months, April inflation was also higher than the one of most months before 2016. Contrarily, inflation was mostly on the lower end in NMW uplift Octobers. For non-exposed items, April effects are much less pronounced, regardless of whether the minimum wage is adjusted. In the following sub-section, we disentangle the minimum wage uplift effect from the inherent ‘April effect’ on inflation through an econometric approach.

Figure 5 April and October inflation rates across the period

Monthly inflation for items in top 20 exposed sectors



Monthly inflation for non-exposed items



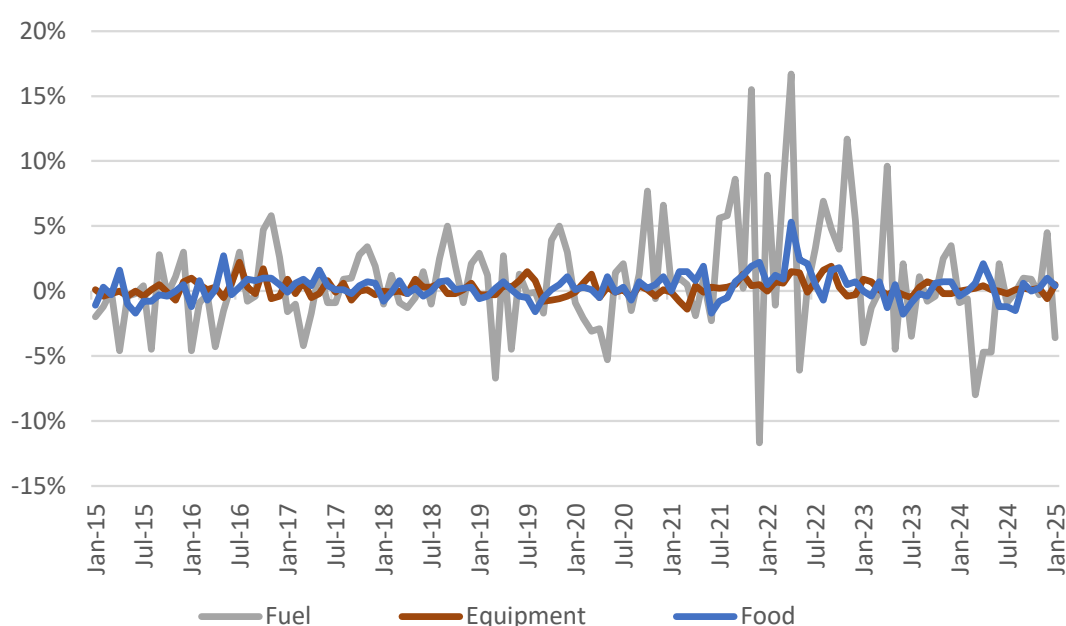
○ April (non-uplift) ▲ October uplift ● April uplift ■ Other months

Source: Frontier Economics from ONS inflation data.

To account for other sources of input cost inflation that could distort the relationship between minimum wage increases and consumer inflation, we construct and include in our regression an industry-specific measure of producer price inflation (PPI). This measure allows us to control for variation in costs such as food and energy, which affect sectors differently. This control is particularly important in the context of the energy price crisis of 2022. Note that these inputs in turn may be affected by minimum wage increases, though this is likely a smaller share of their value, given their input cost structure.

Figure 6 shows the raw PPI for the inputs in our sample between 2015 and 2025, disaggregating it between its fuel, equipment, and food component. It shows that fuel input costs rose by 15.5% in November 2021 (vs October 2021) and 16.7% in April 2022 (vs March 2022). Fuel inputs typically rise in price as winter approaches. Food input costs rose 5.3% in April 2022. This coincides with a minimum wage increase, which may be driving part of the estimated effect, however the global spike in food prices at this time⁸ is undoubtedly a more important factor.

Figure 6 Monthly PPI for selected inputs



Source: Frontier Economics through ONS data

⁸ [FAO Food Price Index | Food and Agriculture Organization of the United Nations](#), accessed 30 October 2025

3.2 Regression results

National analysis

The starting point of the national analysis is simply the descriptive analysis in regression form: estimating the effect of minimum wage uplift months relative to other months, stripping out April effects, comparing this for different time periods, and comparing these effects for treated and non-treated items. This is supplemented with item fixed effects and lag variables, and finally controls for PPI.

The first set of regressions is shown in 2 below. The sample is initially confined to treated items only, i.e. items in the top 20 exposed sectors. The dependent variable is monthly inflation in percentage point terms.

The coefficient of 0.145 for 'MW uplift' in specification (1) means that if monthly inflation was 0.28% in other months, in an uplift month it is 0.425% - i.e., 0.145 percentage points higher. This is the raw difference observed in the descriptive statistics. Specifications (2)-(4) add lagged inflation for the item, and then item fixed effects. These have very little effect on the results. Given econometric concerns around lagged dependent variables alongside unit fixed effects, and for consistency with later analysis and ease of exposition, item fixed effects are retained and the lagged dependent variable is dropped.

Table 1 National results – within treated items only

Variable	(1)	(2)	(3)	(4)	(5)	(6)
MW uplift	0.145*** (0.0263)	0.148*** (0.0237)	0.145*** (0.0264)	0.149*** (0.0237)	0.0378* (0.0198)	0.0378* (0.0198)
Lag of monthly Inflation		-0.277*** (0.0331)		-0.286*** (0.0318)		
April					0.273*** (0.0462)	0.273*** (0.0463)
Constant	0.284*** (0.009)	0.365*** (0.01)	0.237*** (0.002)	0.304*** (0.007)	0.270*** (0.009)	0.223*** (0.004)
Item FEs			Yes	Yes		Yes
Observations	13,236	13,169	13,236	13,169	13,236	13,236
R-squared	0.002	0.079	0.009	0.091	0.008	0.016

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Specifications (5) and (6) add an April dummy, measuring whether inflation is higher in April than in other months. The ‘MW uplift’ then tests whether the post-2016 Aprils (coinciding with the MW uplifts) have higher inflation than pre-2016 Aprils, and the effect of the pre-2016 October uplifts. The effect is a lot smaller, but is significant at the 10% level. Clearly, this is a tenuous identification strategy, but it nevertheless illustrates the relative magnitude of uplifts over time.

The model is then run for different time periods in turn, with results in Table 3. This shows considerable variation in the magnitude of uplift effects. Columns (1)-(4) show results for the 2005-09 and 2010-15 periods, with small or negative effects of the October uplift. The Aprils in that time period (which do not coincide with uplifts) have positive effects on inflation, reinforcing the notion that April is a higher inflation month. This could be for a number of reasons, including tax rate changes, seasonal changes and menu costs. Columns (5) and (6) show that uplifts have a positive and large effect in the 2016-19 and 2022-24 periods. In part this will reflect April effects, but the uplifts in these years are generally larger and are more binding than in earlier years. Note that the period 2020-21 is excluded from the analysis, as some national indices for some items were not updated in this time due to Covid, but were nevertheless published, which would affect the analysis.

Table 2 National results by time period – within treated items only

Variable	(1) 2005-09	(2) 2005-09	(3) 2010-15	(4) 2010-15	(5) 2016-19	(6) 2022-24
MW uplift	-0.0206 (0.0229)	0.00364 (0.0221)	-0.0507** (0.0198)	-0.0348* (0.0202)	0.192*** (0.0431)	0.642*** (0.0901)
April		0.262*** (0.0532)		0.175*** (0.0512)	n/a	n/a
Constant	0.285*** (0.0019)	0.261*** (0.0047)	0.193*** (0.0016)	0.177*** (0.0049)	0.244*** (0.0036)	0.463*** (0.0075)
Item FEs	Y	Y	Y	Y	Y	Y
Observations	3,818	3,818	3,515	3,515	2,680	1,888
R-squared	0.035	0.062	0.031	0.046	0.071	0.103

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Since the April effect may be driven in part by input cost increases coming through in that month, we seek to control for this by including the production price index (PPI). This measures the changing cost of intermediate inputs used in production. This is shown in Table 4 below. Most of the results do not change. However, for the period 2022-24, the minimum wage uplift

effect is around a third smaller, 0.41 instead of 0.64. This will reflect the PPI variable explaining some of the inflationary impact (some of which may reflect minimum wage input costs, but these are likely to be small relative to other factors, particularly global price changes).

Table 3 National results by time period with PPI – within treated items only

Variable	(1) 2005-09	(2) 2005-09	(3) 2010-15	(4) 2010-15	(5) 2016-19	(6) 2022-24
MW uplift	-0.0157 (0.0226)	0.00395 (0.0218)	-0.056*** (0.0200)	-0.0408* (0.0204)	0.195*** (0.0431)	0.414*** (0.0914)
April		0.261*** (0.0545)		0.166*** (0.0511)		
PPI	-0.0423** (0.0199)	-0.00316 (0.0214)	0.428*** (0.0516)	0.413*** (0.0509)	0.0788 (0.0750)	0.729*** (0.105)
Constant	0.289*** (0.0033)	0.261*** (0.0063)	0.187*** (0.0016)	0.172*** (0.0050)	0.239*** (0.0055)	0.339*** (0.014)
Item FEs						
Observations	3,818	3,818	3,515	3,515	2,680	1,938
R-squared	0.036	0.062	0.051	0.064	0.071	0.144

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

We then embark on a difference-in-differences analysis by broadening the analysis to include less-exposed items as a control group. This allows time fixed effects to be added, controlling for time-varying shocks. With time and item fixed effects, the uplift month and group dummies drop out and the variable of interest becomes the additional inflation that occurs for treated items in uplift months.

This is shown in Table 5 below. The first column includes time and item fixed effects reports the value of 0.146 in model (1) is very similar to the raw differences observed previously, which we saw treated items having an April effect whereas non-treated did not. The model then adds April terms for the treated (April drops out as collinear with time fixed effects), which substantially reduces the size of the uplift effect, though it is still positive and significant at the 10% level. However, when the PPI term is added, the uplift effect becomes smaller still.

Note that a PPI term is retained in the model, because there is panel variation in it is not absorbed by the time fixed effects. This is because sectors have different weights of the inputs. The PPI*treated term is positive and significant. It implies that 40% of input costs are passed

through for treated items in the month they arise. However, the inflationary dynamics vary over time.

Table 4 National results – DID with inflation

Variable	(1)	(2)	(3)
MW uplift * treated	0.146*** (0.0460)	0.0683* (0.0378)	0.0364 (0.0379)
April * treated		0.195*** (0.0619)	0.222*** (0.0598)
PPI			-0.257 (0.193)
PPI * treated			0.395** (0.163)
Constant	0.246*** (0.0342)	0.251*** (0.0343)	0.272*** (0.0367)
Item FEs	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes
Observations	3,818	3,818	3,515
R-squared	0.036	0.062	0.051

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

We now estimate the model for different time periods in turn – the results of this exercise displayed in Table 6. Earlier years (models 1-2) show small impacts of the October uplifts, while April effects are strong. 2016-19 and 2022-24 models shows larger impacts of minimum wage uplifts, but they are not statistically significant. The PPI terms are positive in all periods, and significant for 2010-15 and 2022-24. Since we are in a difference-in-differences setting, it shows that even when controlling for time fixed effects, thus picking up average inflation, more input-inflation-exposed items (within treated) have higher consumer inflation. This is largely driven by food service costs being passed through quickly.

Table 5 National results – DID by time period

Variable	(1) 2005-09	(2) 2010-15	(4) 2016-19	(6) 2022-24
MW uplift * treated	0.0173 (0.0361)	0.0354 (0.0648)	0.1000 (0.0852)	0.228 (0.188)
April * treated	0.217*** (0.0780)	0.130* (0.0743)		
PPI	-0.176 (0.156)	-0.263 (0.260)	-1.214 (0.804)	0.0397 (0.313)
PPI * treated	0.148 (0.130)	0.446** (0.208)	0.948 (0.678)	0.789*** (0.257)
Constant	0.160*** (0.0380)	1.446*** (0.125)	0.0826 (0.101)	0.399*** (0.120)
Item FEs	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes
Observations	7,235	6,576	5,127	3,874
R-squared	0.056	0.089	0.037	0.041

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regional analysis

Main specification

In this section, we move to the regional dataset and study whether inflation has been higher for items in sector-regions highly exposed to the minimum wage. As described in section 3.2, we consider the **difference-in-differences approach detailed in equation 10 applied to the regional dataset and to the period after the introduction of the NLW to be the main specification of this study.**

- The dataset is restricted to January 2016 onwards to capture the period after the introduction of the NLW (April 2016).
- The dataset is then split into the periods around the 2016-19 uplifts, 2020-21 uplifts, and 2022-24 uplifts.

- The main independent variable captures the interaction between two binary variables that take value equal to one if the month of the observation is April and the item is in the top 100 most exposed sector-regions to the minimum wage increase.
- We include item-region and monthly fixed effects.
- Following Abadie et al., (2022), we cluster standard errors at the sector level (given the clustered nature of ONS sampling approach) and item-region (the level of treatment-assignment).

The results show that the 100 most exposed sector-regions to the NLW uplifts experienced 0.4 percentage points higher month-on-month April inflation in 2020-21. **For 2022-24, whilst we obtain results around 0.16 percentage points higher inflation in the 2022-24 period, they do not meet traditional statistical significance thresholds.** With item-region clustering the p-value is 0.106, narrowly missing the 10% significance threshold.

Table 6 Regional results – difference-in-differences

Variables	2016-19 (1)	2016-19 (2)	2020-21 (1)	2020-21 (2)	2022-24 (1)	2022-24 (2)
Treated*April	-0.017 (0.089)	-0.017 (0.056)	0.433** (0.197)	0.433*** (0.159)	0.158 (0.150)	0.158 (0.098)
Constant	0.221*** (0.003)	0.221*** (0.002)	0.244*** (0.004)	0.244*** (0.003)	0.452*** (0.004)	0.452*** (0.003)
Observations	35,595	35,595	16,957	16,957	28,590	28,590
R-squared	0.015	0.015	0.040	0.040	0.028	0.028
Fixed Effects	Item-region + Time	Item-region + Time	Item-region + Time	Item-region + Time	Item-region + Time	Item-region + Time
Clustering	Item	Item-region	Item	Item-region	Item	Item-region

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at sector and item-region level)

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

We therefore treat this as suggestive but still weak and inconclusive evidence that highly exposed sectors faced a higher April inflation in 2022-24. Regarding 2020-21, while the evidence of a significant effect is stronger, confidence in the data is weaker. As discussed in

the national analysis (Section 3.1), some national indices were not updated during this period due to COVID-19-related data collection issues but were nevertheless published. In our regional dataset, these indices are instead missing from the sample. While this approach avoids incorporating potentially inaccurate price estimates, it also results in missing observations, which could bias our results if the excluded items experienced systematically different price movements during this period.

These results allow us to estimate the extent to which firms' cost increases from the NLW uplift are passed through to consumer prices. Our estimate of 0.016 indicates a **pass-through rate of at least 8% in 2022-24**, implying that a 1pp increase in a company's cost base due to the NLW uplift is associated with 0.08pp higher consumer prices. This indicates an inelastic relationship between minimum wage uplifts and prices - that is, the increase in prices is not directly proportional to the increase in costs - though the estimated pass-through should be treated as indicative given that the coefficient narrowly misses the 10% significance threshold.

These estimates follow a back-of-the-envelope calculation that we illustrate here using the results for the period 2022-24 as an example. The average NLW uplift across these three years as of 8.68%. Given that the coefficient of interest takes value 0.158, this indicates each 1 percentage point increase in the NLW would be associated with 0.018 higher inflation (i.e., $0.158\text{pp} / 8.68 = 0.0182\text{pp}$).

Our exposure measure (share of employees earning at or below NLW * share of labour over total costs) is 26% for the treated group and 7% for the control group, a difference of 19 percentage points. A 1% increase in NLW would therefore be associated with 0.19 percentage points higher costs relative to control group. Dividing the 0.018pp price increase by the 0.19pp cost increase suggests a passthrough of around 8%.

The fact that our exposure measure uses number of employees earning at or below the NLW instead of the share of the wage bill they represent, however, might be biasing downward our estimation of pass-through rate. Suppose 50% of employees earn £10/hr and the others £15/hr. Then minimum-wage earning employees actually represent 40% of the wage bill ($\text{£}10 \cdot 0.5 / (\text{£}10 \cdot 0.5 + \text{£}15 \cdot 0.05)$). Hence, in this case, the cost increase will be smaller than what our exposure measure suggests, and the pass-through will be higher. Previous research has suggested that increases in the minimum wage also affect the wages of those further up the pay distribution⁹, which will offset this effect to some extent by increasing the overall impact of the NLW on the wage bill.

Additional specifications

In addition to the split in three time periods of 2016-19, 2020-21, and 2022-24, we also explore the effect of year uplift in the latter period. We follow a similar regression approach as in the main specification, studying through a difference-in-differences with sector-time and region-

⁹ For example, Giupponi, Joyce, Lindner, Waters, Wernham, and Xu (2024): [The employment and distributional impacts of nationwide minimum wage changes | Institute for Fiscal Studies](#)

time fixed effects and standard errors clustered at the sector and item-region level whether inflation is higher in the 100 most exposed sector-regions to the NLW.

This exercise, shown in Table 9, yields significant coefficients for 2022, a year in which highly exposed sectors experienced 0.5 percentage points higher April inflation than the rest of the economy. The parameter of interest, however, is not significant for 2023 and 2024. This stands in contrast to the size of the NLW uprating, which was larger in these two more recent years – increasing 6.6% in 2022, 9.7% in 2023, and 9.8% in 2024.

Table 7 **Regional analysis – difference-in-differences (annual uplifts)**

Variables	2022 (1)	2022 (2)	2023 (3)	2023 (4)	2024 (1)	2024 (2)
Treated*						
April	0.510** (0.210)	0.510*** (0.159)	-0.079 (0.219)	-0.079 (0.139)	0.117 (0.212)	0.117 (0.136)
Constant	0.474*** (0.003)	0.474*** (0.002)	0.482*** (0.003)	0.482*** (0.002)	0.382*** (0.003)	0.382*** (0.002)
Observations	17,468	17,468	17,869	17,869	16,271	16,271
R-squared	0.039	0.039	0.037	0.037	0.034	0.034
Fixed Effects	Item-region + time	Item-region + time	Item-region + time	Item-region + time	Item-region + time	Item-region + time
Clustering	Item	Item-region	Item	Item-region	Item	Item-region

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at sector and item-region level).

Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Finally, our main specification is based on the assumption that most or all of the pass-through from costs to prices as a result of NLW increases happens in the uplift month. To test this assumption, we develop an event-study regression for each of the years 2022 to 2024 in which we interact the treatment variable with the three months preceding and succeeding the uplift. Our aim is identifying whether a specification that interacts treatment only with April is missing part of the inflationary impact of the NLW uprating.

Our results, found in Table 8, however, show no significant and positive relationship between the months preceding and succeeding to the NLW uplift – in fact, we observe a negative and significant coefficient in March and May 2023, indicating inflation was lower for the treated

group in those months. This provides evidence that our main specification is not underestimating the inflationary impact of the NLW uplift by focusing solely in April.

Table 8 Regional analysis – difference-in-differences in non-uplift months

	2022	2023	2024
Variables	(1)	(2)	(3)
Treated*January	0.0291 (0.901)	-0.0134 (0.958)	-0.3442 (0.103)
Treated*February	-0.2647 (0.179)	-0.2219 (0.104)	-0.0558 (0.787)
Treated*March	-0.1941 (0.284)	-0.2700* (0.084)	-0.1945 (0.179)
Treated*April	0.4190* (0.054)	-0.2078 (0.402)	0.0415 (0.870)
Treated*May	0.2360 (0.103)	-0.4135* (0.056)	0.0344 (0.855)
Treated*June	0.1168 (0.500)	-0.0925 (0.562)	-0.1513 (0.522)
Treated*July	-0.0452 (0.727)	-0.1802 (0.337)	-0.1786 (0.355)
Observations	10,002	10,151	10,035
R-squared	0.0623	0.0573	0.0458
Fixed Effects	Item-region + Time	Item-region + Time	Item-region + Time
Clustering	Sector	Sector	Sector

Source: Frontier analysis of ONS price index data, ASHE, ABS

Note: Robust standard errors in parentheses (clustered at item-region level). Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Results are not sensitive to the inclusion of PPI as a control variable.

4 Conclusions

This paper explores the relationship between minimum wage increases and consumer inflation in the UK. We construct an item-level dataset of inflation observations for a sample of sectors that are more or less likely to be exposed to minimum wage increases. We then test the relationship between minimum wage increases and prices using a panel approach, considering both national and regional item prices.

We find a modest positive relationship between highly exposed sectors and higher inflation in the minimum wage uplift month, and no significant difference in other months. This effect varies over time and depends on the model specification. The main specification of our study identifies that, in 2022-24, inflation in highly-exposed sectors was 0.16 percentage points higher than in less-exposed sectors in the uplift month; however this result does not meet traditional statistical significance thresholds. These results indicate an inelastic relationship between minimum wage and prices – that is, the increase in the price of products and services is not directly proportional to the increase in costs. For 2022-24, we estimate that a 1pp increase in a company's cost base due directly to a minimum wage uprating is associated with around 0.1pp higher monthly increase in consumer prices in 2022-24.

This paper also sheds light on other facets of the relationship between the minimum wage and consumer inflation in the UK. First, we identify that this impact seems to largely happen in the minimum wage uplift month, and does not spill over to preceding or succeeding months. Secondly, we find that the shift in the timing of the uprating from October to April, following the introduction of the National Living Wage (NLW) in 2016 causes estimates to conflate minimum wage effects with other April price adjustments, such as utilities, potentially biasing descriptive estimates of the impact of the minimum wage on consumer prices.

Future research could focus on refining the measurement of treatment exposure. Potential approaches include measuring the share of labour costs attributable to minimum wage workers (rather than the share of minimum wage workers) and by accounting for the share of minimum wage labour costs in respective supply chains (rather than assuming that all inputs are tradable).

Future research could also explore heterogeneity in minimum-wage pass-through dynamics across firms and consumers. First, it could explore how the impact of the uplift is being internalised by firms – e.g., lower margins, quality downgrades, or labour-capital substitution. It could also explore if and how this internalisation changes across markets depending on their level of competition. Finally, future research could also explore the distributional impacts of these price changes by exploring consumption basket composition across income groups.

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Annex A: item and sector mapping

Table 9 **Item and sector mapping**

Item ID	Item name	SIC code	SIC name
640230	Horseracing admissions	93.12	Activities of sport clubs
310313	Bottle of champagne	56.3	Beverage serving activities
310112	Bottle of lager in nightclub	56.3	Beverage serving activities
310306	Bottle of mixer 125-200ml	56.3	Beverage serving activities
310305	Bottle of wine 70-75cl	56.3	Beverage serving activities
310315	Bottle of wine 70-75cl	56.3	Beverage serving activities
310111	Bottled premium lager 4.3-7.5%	56.3	Beverage serving activities
310114	Cider 4.5%-5.5% abv pint/bottl	56.3	Beverage serving activities
310106	Cider-1/2pt or 275-340ml bot	56.3	Beverage serving activities
310102	Draught bitter (per pint)	56.3	Beverage serving activities
310104	Draught stout per pint	56.3	Beverage serving activities
310316	Gin per nip	56.3	Beverage serving activities
310109	Lager - pint 3.4-4.2%	56.3	Beverage serving activities
310307	Liqueur per nip specify ml	56.3	Beverage serving activities
310110	Premium lager - pint 4.3-7.5%	56.3	Beverage serving activities
220106	Pub: cold filled roll/sandwich	56.3	Beverage serving activities
220127	Pub-roll/sandwich hot or cold	56.3	Beverage serving activities
310309	Spirit based drink 275ml	56.3	Beverage serving activities
310302	Vodka (per nip) specify ml	56.3	Beverage serving activities
310301	Whisky (per nip) specify ml	56.3	Beverage serving activities
310310	Wine, per 175 - 250 ml serving	56.3	Beverage serving activities

440202	Estate agent fees (percentage)	68.1	Buying and selling of own real estate
440130	After school club charges	88.91	Child day-care activities
440120	Child minder - hourly rate	88.91	Child day-care activities
440128	Home care assistant hrly rate	88.91	Child day-care activities
440232	Nursery fees: child 0-4	88.91	Child day-care activities
440129	Playgroup fees - per session	88.91	Child day-care activities
640214	Playgroup fees-per session	88.91	Child day-care activities
440126	Weekly nanny fees	88.91	Child day-care activities
520326	Private dental examination	86.23	Dental practice activities
440105	Driving lesson 1 hour	85.53	Driving school activities
640118	Digital tv installation fee	43.21	Electrical installation
410509	Electrician-daytime rate/hour	43.21	Electrical installation
440121	Catering-50 set menu per head	56.21	Event catering activities
440121	Event catering, set menu, cost	56.21	Event catering activities
640244	Climbing wall session	93.13	Fitness facilities
640233	Leisure centre membership	93.13	Fitness facilities
640226	Private health club annual fee	93.13	Fitness facilities
640232	Squash court- evening	93.13	Fitness facilities
440227	Funeral-cremation	96.03	Funeral and related activities
440101	Domestic cleaner hourly rate	81.21	General cleaning of buildings
520331	Basic manicure	96.02	Hairdressing and other beauty treatment
520323	Full leg wax (both legs)	96.02	Hairdressing and other beauty treatment
520301	Man's haircut	96.02	Hairdressing and other beauty treatment
520311	Womens highlighting	96.02	Hairdressing and other beauty treatment
520303	Women's hrdressing-cut/blowdry	96.02	Hairdressing and other beauty treatment
640406	Hotel 1 night price	55.1	Hotels and similar accommodation

640404	Uk holidays self catering	55.1	Hotels and similar accommodation
640405	Uk holidays-excl self catering	55.1	Hotels and similar accommodation
640403	Youth hostel association	55.1	Hotels and similar accommodation
410518	Carpenter hourly rate	43.32	Joinery installation
440125	Gardener hourly rate	81.3	Landscape service activities
640207	Nightclub entry-saturday	56.30/1	Licensed clubs
220107	Pub -hot meal	56.30/1	Licensed clubs
610229	Auto car wash	45.2	Maintenance and repair of motor vehicles
610240	Brake fitting fast fit centre	45.2	Maintenance and repair of motor vehicles
610234	Brake fitting in fast fit	45.2	Maintenance and repair of motor vehicles
610227	Car mot test fee, vat exempt	45.2	Maintenance and repair of motor vehicles
610236	Car repairs local garage	45.2	Maintenance and repair of motor vehicles
610235	Car repairs main dealer	45.2	Maintenance and repair of motor vehicles
610231	Car service- local garage	45.2	Maintenance and repair of motor vehicles
610232	Car service- main dealer	45.2	Maintenance and repair of motor vehicles
610238	Car wash hand or automatic	45.2	Maintenance and repair of motor vehicles
610242	Exhaust fitting fast fit	45.2	Maintenance and repair of motor vehicles
610239	Exhaust fitting fast fit cent	45.2	Maintenance and repair of motor vehicles
610233	Exhaust fitting in fast fit	45.2	Maintenance and repair of motor vehicles

610228	Roadside recovery service	45.2	Maintenance and repair of motor vehicles
610241	Wheel alignment	45.2	Maintenance and repair of motor vehicles
220324	Cinema popcorn	59.14	Motion picture projection activities
640222	Exercise class upto 1hr	93.11	Operation of sports facilities
640219	Swimming pool adm stnd adult	93.11	Operation of sports facilities
640224	Ten-pin bowling per game	93.11	Operation of sports facilities
640243	Soft play session time period	93.29	Other amusement and recreation activities n.e.c.
440243	Educational classes	85.59	Other education n.e.c.
220209	Primary school- fixed charge	56.29	Other food services
220210	Secondary school- cafeteria	56.29	Other food services
430621	Annual booster injection	86.9	Other human health activities
520329	Cosmetic surgery	86.9	Other human health activities
520332	Non nhs chiropractor	86.9	Other human health activities
520313	Non-nhs medicine- physiotherapy	86.9	Other human health activities
440127	Monthly self storage fee	68.20/9	Other letting and operating of own or leased real estate
440226	Home-buyers survey- rsdntl ppty	74.90/9	Other professional, scientific and technical activities n.e.c.
620315	Car park charges	52.21/9	Other service activities incidental to land transportation, n.e.c.
430622	Dog kennel fees daily charge	93.19/9	Other sports activities
620102	Gb rail fares	49.1	Passenger rail transport, interurban
620103	Northern ireland rail fares	49.1	Passenger rail transport, interurban
620104	Oap rail fares	49.1	Passenger rail transport, interurban
640236	Live music	90.01	Performing arts

410511	Gas - call out charge	43.22	Plumbing, heat and air-conditioning installation
410512	Gas - service charge	43.22	Plumbing, heat and air-conditioning installation
410516	Gas service charge local	43.22	Plumbing, heat and air-conditioning installation
410508	Plumber-daytime hourly rate	43.22	Plumbing, heat and air-conditioning installation
630411	Evening newspapers	58.13	Publishing of newspapers
440233	Newspaper ad non trade 20 word	58.13	Publishing of newspapers
630410	Provincial morning newspapers	58.13	Publishing of newspapers
630436	Provincial newspapers	58.13	Publishing of newspapers
440123	Home removal- 1 van	49.42	Removal services
620307	Self-drive car hire basic 24hr	77.11	Renting and leasing of cars and light motor vehicles
620303	Self-drive van hire	77.11	Renting and leasing of cars and light motor vehicles
410623	Hire dom steam wlpapr stripper	77.29/9	Renting and leasing of other personal and household goods
410632	Hire of domes carpet cleaner	77.29/9	Renting and leasing of other personal and household goods
440132	Men's clothing hire-see help	77.29/9	Renting and leasing of other personal and household goods
440118	Pc repair	95.11	Repair of computers and peripheral equipment
440117	Tv repair	95.22	Repair of household appliances and home and garden equipment
440116	Washing machine repair	95.22	Repair of household appliances and home and garden equipment
520319	La supported res in ret homes	87.3	Residential care activities for the elderly and disabled
520324	Residential home	87.3	Residential care activities for the elderly and disabled

520325	Nursing home	87.1	Residential nursing care facilities
220117	Bottled mineral water	56.1	Restaurants and mobile food service activities
220111	Burger in bun-eat in	56.1	Restaurants and mobile food service activities
220115	Fruit juice	56.1	Restaurants and mobile food service activities
220125	Fruit juice bottle 250-350ml	56.1	Restaurants and mobile food service activities
220120	In store cafeteria meal	56.1	Restaurants and mobile food service activities
220116	Lemonade/cola draught	56.1	Restaurants and mobile food service activities
220124	Muffin/individual cake	56.1	Restaurants and mobile food service activities
220310	Potato crisps-individual pack	56.1	Restaurants and mobile food service activities
220122	Restaurant - sweet course	56.1	Restaurants and mobile food service activities
220121	Restaurant cup of coffee	56.1	Restaurants and mobile food service activities
220128	Restaurant main course	56.1	Restaurants and mobile food service activities
220118	Restaurant main course 1	56.1	Restaurants and mobile food service activities
220119	Restaurant main course 2	56.1	Restaurants and mobile food service activities
220112	Restaurant-main course-evening	56.1	Restaurants and mobile food service activities
220114	Restaurant-main course-lunch	56.1	Restaurants and mobile food service activities
220113	Restaurnt-sweet course-evening	56.1	Restaurants and mobile food service activities

220211	Staff restaurant fizzy drink	56.1	Restaurants and mobile food service activities
220205	Staff restaurant main course	56.1	Restaurants and mobile food service activities
220214	Staff restaurant main course	56.1	Restaurants and mobile food service activities
220213	Staff restaurant pudding	56.1	Restaurants and mobile food service activities
220212	Staff restaurant sandwich	56.1	Restaurants and mobile food service activities
220208	Staff restaurant hot snack item	56.1	Restaurants and mobile food service activities
220126	Vegetarian main course	56.1	Restaurants and mobile food service activities
520320	Florist - delivery cost	47.76	Retail sale of flowers, plants, seeds, fertilizers, pet animals and pet food in specialised stores
630524	Internet flowers/bouquet	47.76	Retail sale of flowers, plants, seeds, fertilizers, pet animals and pet food in specialised stores
430623	Small caged mammal	47.76	Retail sale of flowers, plants, seeds, fertilizers, pet animals and pet food in specialised stores
440240	Basic will for a single person	69.10/2	Solicitors
440254	Hourly rate for solicitor	69.10/2	Solicitors
410517	Decorator-daily rate;spec hrs	74.1	specialised design activities
220328	Burger in a bun eat in or take	56.10/3	Take-away food shops and mobile food stands
220322	Burger in bun-takeaway	56.10/3	Take-away food shops and mobile food stands
220319	Chinese takeaway	56.10/3	Take-away food shops and mobile food stands

220304	Coffee -take-away	56.10/3	Take-away food shops and mobile food stands
220301	Fish & chips takeaway	56.10/3	Take-away food shops and mobile food stands
220329	Hot drink take away specify ty	56.10/3	Take-away food shops and mobile food stands
220318	Indian takeaway	56.10/3	Take-away food shops and mobile food stands
220323	Kebab- takeaway	56.10/3	Take-away food shops and mobile food stands
220317	Pasty/savoury pie - takeaway	56.10/3	Take-away food shops and mobile food stands
220316	Pizza takeaway or delivered	56.10/3	Take-away food shops and mobile food stands
220303	Sandwich-take-away (cold)	56.10/3	Take-away food shops and mobile food stands
220326	Takeaway chicken & chips	56.10/3	Take-away food shops and mobile food stands
220321	Takeaway coffee latte	56.10/3	Take-away food shops and mobile food stands
220320	Takeaway soft drink	56.10/3	Take-away food shops and mobile food stands
220327	T'away cooked savoury pastry	56.10/3	Take-away food shops and mobile food stands
220305	Tea -take-away	56.10/3	Take-away food shops and mobile food stands
620308	Minicab fare for 2 miles	49.32	Taxi operation
440104	Dry cleaning-man's suit	96.01	Washing and (dry-)cleaning of textile and fur products
440114	Watch repair-clean and service	81.22/1	Window cleaning services
440113	Window-clean 3-bed semi	81.22/1	Window cleaning services

Source: Frontier Economics based on ONS data

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