UCD CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2023

When and Where do Minimum Wage Hikes Increase Hours? Evidence from Ireland

Kevin Devereux
Peking University

Zuzanna Studnicka
University College Dublin

WP23/08

April 2023

UCD SCHOOL OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD
DUBLIN 4

When and Where do Minimum Wage Hikes Increase Hours? Evidence from Ireland

Kevin Devereux* Zuzanna Studnicka†‡

April 1, 2023

Abstract

Monopsonists suppress employment and wages so as to avoid matching higher wages to their existing employees. Minimum wage hikes force them to pay their existing employees more, reducing the marginal cost of hiring and increasing both wages and employment. However, once the minimum wage exceeds the marginal product of labour, employment effects become negative. We find that the first two National Minimum Wage (NMW) hikes in Ireland over the course of 2016 to 2019 increased hours worked for minimum wage workers (MWWs) in concentrated local labour markets (LLMs), while the third hike had a null or negative effect. MWWs in non-concentrated LLMs and non-MWWs were unaffected. Higher-income, more productive regions drove hours increases, while other regions showed reductions in hours following NMW hikes.

*Peking University

†University College Dublin

‡This report is funded by the Low Pay Commission. We use statistical data from Ireland's Central Statistics Office (CSO). The permission for controlled access to confidential micro data sets has been granted in line with the Statistics Act, 1993. The use of these statistical data does not imply the endorsement of the CSO in relation to the analysis or interpretation of the statistical data. We would like to thank Jim Dalton, Morgan O'Donnell, Sam Scriven, Barry Sobey, Rory Cramp, and Brian Lenehan for support with the data. **Contact:** kevin.devereux@pku.edu.cn or zuzanna.studnicka@ucd.ie

1 Introduction

Minimum wage legislation plays a key role in redistribution. In January 2023 Ireland embarked on a multi-year plan to raise the National Minimum Wage (NMW) to 60% of the median wage, from around 52% in 2022.[1] The UK policy that apparently inspired this has met the 60% target and proceeded towards two-thirds.[2] Proponents frame these as "living wages"; although not explicitly calculated based on living costs, they are intended to improve the lot of low-income earners whose living standards are threatened by high prices and inflation. Comparable initiatives have sprung up around the US at the state and municipal level,[3] and a recent EU directive promotes adequate statutory minimum wages in order to improve living conditions for workers.[4]

To benefit from higher wages, workers must remain employed. Economic theory says that minimum wage hikes can either increase or decrease employment depending on a) market structure and b) whether the minimum wage exceeds the marginal productivity of labour. The vast literature estimating employment effects of minimum wages looks mostly for average effects – across markets and over successive minimum wage changes – pooling together effects with potentially different signs. In this light the lack of consensus on the employment effect of minimum wages is unsurprising.

We investigate when and where the employment effects of minimum wage hikes are positive, negative, or zero. As predicted by classical monopsony theory, employer-concentrated markets show hours increases in response to hikes up to a certain level, beyond which employment gains stall or reverse. Figure 1 illustrates these results.[5] Higher-income, more productive regions drive employment gains

[1] Low Pay Commission (2022).

[2] Francis-Devine (2023).

[3] Lathrop (2020).

[4] The European Parliament and the Council of the European Union (2022).

[5] We find suggestive evidence that hikes to a high enough level cause hours reductions even in concentrated markets, but these effects are statistically insignificant and sensitive to the choice of control group.

in concentrated markets, while low-income, low productivity regions show fewer gains overall – even showing losses in non-concentrated markets. These results demonstrate both the power of modest minimum wage hikes to benefit low income workers without negative side effects, as well as the risk excessive minimum wage hikes pose to employment.

We identify hours effects on minimum wage workers (MWWs) using a difference-in-difference design, with non-MWWs as the control group. We identify differential effects on MWWs in concentrated local labour markets (LLMs) with two alternative difference-in-difference designs – comparing them to MWWs in non-concentrated LLMs, and non-MWWs in concentrated LLMs – as well as a triple-difference specification that uses both comparisons. The characteristic advantage of our dataset – reporting of minimum wage status at the worker level – allows us not only to estimate the treatment effect on the relevant population (rather than using proxies for minimum wage status, such as teen workers or employment in low-wage industries) but also to identify hours effects within region using within-LLM variation, avoiding comparisons between regions with potentially different labour productivity and labour supply. We also estimate the effects of successive minimum wage hikes separately rather than combining them into a single treatment effect. Even in a monopsonistic market, while hikes up to the full-employment wage increase employment, further hikes must reduce it. By estimating the effect of each hike separately, we allow for the possibility of finding diminishing employment returns to successive hikes in monopsonistic markets.

Our identification approach combines the strengths of several strands of the literature. McGuinness et al. (2019) use a subset of our data to identify the employment effect of minimum wage hikes on MWWs in general, without separating effects by market concentration. Cengiz et al. (2019) and Dustmann et al. (2022) use similar identification approaches, comparing the response of low-wage workers to that of higher earners, who are not directly affected by minimum wage hikes.

Azar et al. (2019) and Corella (2020) allow employment effects of minimum wage hikes to vary by market concentration. Both use US data, and pool successive hikes to estimate an average effect within market concentration bin. Azar

et al. (2019) define a LLM as an occupation-county, in contrast to our definition as an industry-region. Past literature has shown that using occupation or industry yields similar results on earnings,[6] and the NUTS 3 unit of geography upon which we base our definition is closer in size to US commuting zones, which are preferred geographic units to capture LLMs, although not explicitly designed to minimize cross-region commuting.[7] They do this because minimum wages vary at the county level in their data.[8] Corella (2020) does not calculate the HHI exactly, but rather an upper-bound.[9] Neither study observes MWWs directly; Azar et al. (2019) uses workers in low-wage occupations to identify effects, and Corella (2020) uses teen workers.

Jardim et al. (2017) analyse separately the employment effects of two successive minimum wage hikes in Seattle. They find no discernable effect of the first hike, but a statistically significant disemployment effect of the second. The localized nature of the legislation cannot rule out cross-municipality commuting as the driver of the second effect. Deere et al. (1995) and Burkhauser et al. (2000) use time period fixed effects to estimate the employment effect of national minimum wage hikes in the US, but do not find countervailing effects following subsequent hikes: the employment effects are consistently negative. Manning (2021) and others have included squared terms to allow the effect of the minimum wage to

[6]Azar et al. (2020) and Rinz (2020) find similar results using occupation-commuting zones and industry-commuting zones to define a LLM respectively. Arnold (2021) shows that allowing cross-industry spillovers yields similar results to Rinz (2020).

[7]Tolbert and Sizer (1996).

[8]Azar et al. (2019) make use of federal, state, and county-level minimum wage changes. Commuting zones may straddle state borders while counties do not.

[9]Corella (2020) does not observe employment at the firm level, but at the industry level. The author calculates the squared share of four-digit NAICS industries within a three-digit NAICS industry. This is an upper bound on the HHI at the three-digit NAICS level. For example, suppose there are two four-digit NAICS industries in a region, nested within a given three-digit NAICS industry. Suppose they have equal employment. The minimum number of firms in that three-digit NAICS industry is two, although there may be more. Therefore calculating the squared share of the four-digit industries within the three-digit yields a HHI of one-half, the maximum possible HHI using the available information.

be nonlinear.

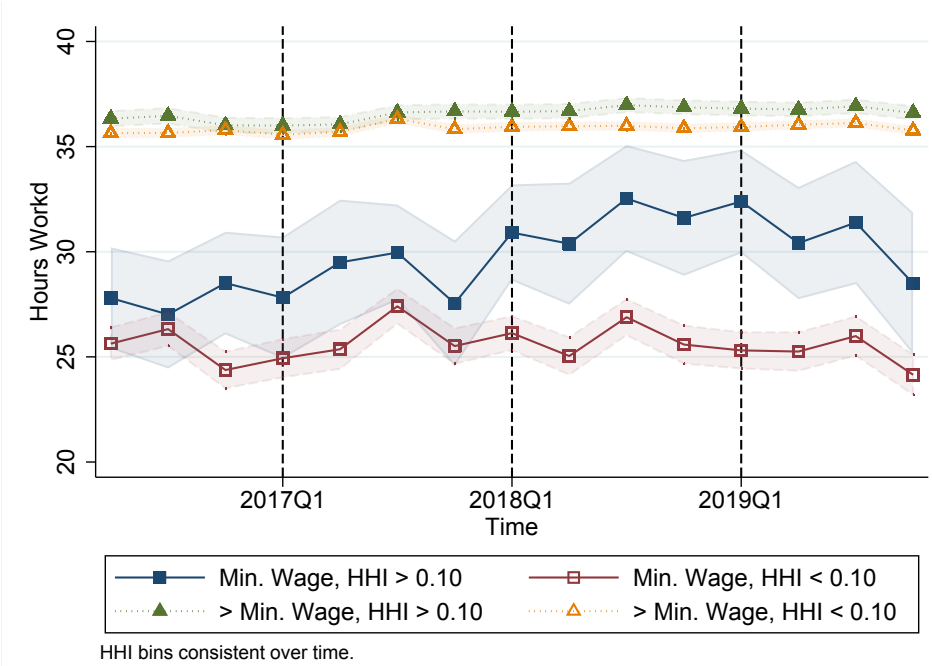
A brief review of the theory illustrates the risk of combining employment responses across different markets and subsequent minimum wage hikes into a single treatment effect. Competitive labour markets pay workers their marginal product, so any binding minimum wage hike must decrease employment. However, a monopsonist – the only employer in a market – declines to bid up wages in order to attract marginal workers as it would create pressure to match those wages for its existing workforce. This suppresses both wages and employment below competitive levels. In this case a binding minimum wage hike forces the monopsonist to pay existing workers more, lowering the marginal cost to recruiting new workers and causing the monopsonist to voluntarily increase employment. This positive employment effect holds until the minimum wage reaches the marginal product of labour, after which further hikes reduce employment as in competitive markets.[10] This inflection point occurs at the full-employment wage, corresponding to the equilibrium wage in a competitive market. This is determined by the intersection of the downward-sloping marginal product of labour curve, and the upward-sloping aggregate labour supply curve, implying that minimum wage hikes to the same nominal wage can have opposite effects in markets that differ in productivity or labour supply parameters.

The rest of the paper proceeds as follows. Section 2 describes the institutional setting of the NMW in Ireland. Section 3 describes our data sources, and section 4 our empirical model and identification strategy. Section 5 presents the main results, including regional and sectoral disaggregations, and section 6 subgroup analysis on different types of workers. Section 7 concludes.[11]

[10]This argument extends to oligopsonies wherein a small number of employers dominate employment.

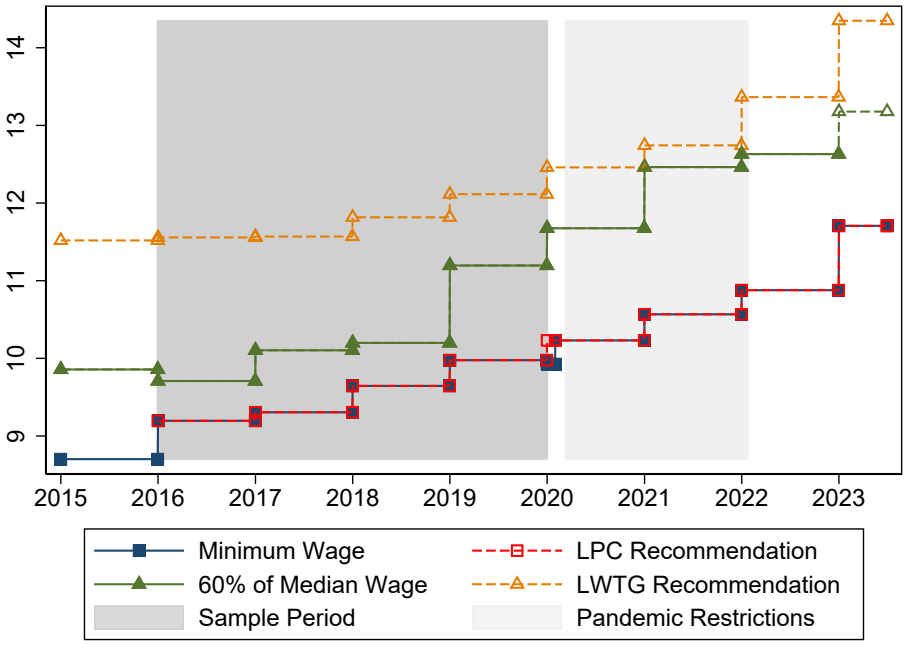
[11]We also present year-on-year employment changes – a simple reframing of our main results – and robustness checks in the appendix.

Figure 1: Minimum Wage Workers in Concentrated LLMs



HHI bins consistent over time.

Figure 2: Minimum Wage Levels in Ireland (Constant 2016 €)



Median wage figures for 2023 are projections based on McQuinn et al. (2022).

2 Institutional Background

The Low Pay Commission (LPC) of Ireland was established in 2015 to make recommendations to the Irish government regarding minimum wage policy. It consists of industry and labour representatives, as well as academics. The LPC's primary aim is as follows.

> "To have a minimum wage that provides an incentive to work, is set at a rate that is both fair and sustainable, and helps as many people as possible, without a significant adverse effect on competitiveness or a significant negative effect on employment."

Governments take their recommendations seriously. Table 2 shows that the LPC recommendation for the National Minimum Wage (NMW) has been adopted every year since its inception. Only in 2020 has the recommendation not been implemented on the first day of the year; because of concerns over Brexit, the government delayed implementation until February. The following month, the Irish government implemented the first COVID-19 pandemic restrictions (Leahy et al. 2020), which persisted in various forms into January 2022 (Horgan-Jones et al. 2022). Because the restrictions limited business operations – particularly in low-wage sectors such as *accommodation and food services* and *wholesale and retail* – we doubt that the NMW is a primary determinant of employment and hours worked during this period, and therefore exclude these years from our study.

Figure 2 also plots recommendations from the Living Wage Technical Group (LWTG), established in 2014. The LWTG consists of members from various charitable and social organisations, and its recommendations are based exclusively on living cost calculations. Recently the Irish government has embraced the concept of mandating a living wage, announcing a plan to raise the NMW to 60% of the median wage by 2026 (Doris et al. 2022). The first step towards this has been taken, with a €0.80 NMW hike implemented in January 2023.

3 Data

We use data from the Irish Labour Force Survey (LFS) and Business Register (BR) over the course of 2016 to 2019. From the former we get worker characteristics and employment outcomes, and from the latter information on employment shares used to measure employer concentration in local labour markets (LLMs).

The LFS contains quarterly data on employment status, hours, industry and region of employment, income decile, demographic characteristics including age, sex, and education level, and crucially, from 2016 on: whether the worker earns the minimum wage or not. This allows us to precisely identify the workers directly affected by minimum wage changes, providing an advantage over commonly used US data in which wages are inferred by dividing earnings by hours worked. We consider hours worked and employment as outcomes and demographics as controls, and use the two-digit NACE industry and NUTS 3* region of employment to assign workers to a LLM, which we define as the combination of the two. Our definition of NUTS 3* regions follows the NUTS 3 regional definitions used to allocate EU structural funds, except that we combine Dublin and the Mideast into a single region, which we term 'Greater Dublin'. This is because of extraordinarily high rates of commuting between these regions (see Devereux and Studnicka 2023). The other six regions, which coincide exactly with NUTS 3 regions, are: the Border, West, Midwest, Midlands, Southeast, and Southwest. We also consider sex, occupation, country of origin, and temporary versus permanent contract status for subgroup analysis.

The BR contains an entry for every formal sector business in Ireland every year. Each business reports the county (or sub-county jurisdiction) in which it is registered, the industry in which it operates, and the number of employees. We define a LLM as a two-digit NACE industry in a NUTS 3* geographical region. For each LLM in year, we calculate the Herfindahl-Hirschmann Index (HHI) of market concentration (defined in section 4), which we match to worker outcomes from the LFS at the LLM-year level.[12]

[12]While the resulting dataset contains worker data at the quarterly level, with the HHI varying only

Table 1: Summary Statistics

	Mean	Median	Stdev	Min	Max	N
Hours Worked	35.19	39	10.41	1	95	175887
Minimum Wage Worker	.08	0	.27	0	1	175887
Male	.49	0	.5	0	1	175887
Age	40	39	12.13	15	87	175887
Secondary School	.13	0	.34	0	1	175887
University	.52	1	.5	0	1	175887
Has Children	.42	0	.49	0	1	175887
HHI	.09	.03	.14	0	1	175887
HHI $\geq$ 0.25	.09	0	.29	0	1	175887
HHI $\geq$ 0.10	.2	0	.4	0	1	175887
HHI $\geq$ Median	.54	1	.5	0	1	175887
Year	2017.67	2018	1.08	2016	2019	175887

Unit of observation: a worker-quarter

Table 1 shows summary statistics for the combined dataset. The average worker works 35 hours per week. Only 8% of workers earn the minimum wage, and 9% of all workers work in LLMs with a HHI above 0.25, the threshold for the US Federal Trade Commission's definition of a highly-concentrated market – equivalent to four equally-sized employers. When estimating heterogeneous effects of minimum wage hikes by LLM, we use this threshold as a baseline to divide concentrated from non-concentrated LLMs. We also consider a HHI threshold of 0.1, equivalent to ten equally-sized employers, above which 20% of LLMs fall. The median LLM has a HHI of 0.03, equivalent to 33 equally-sized employers; we consider this threshold also.

annually, the HHI is stable within LLM during our sample period; most of our identifying variation comes from the cross section. We reproduce the main results nearly exactly using time-averaged HHI. This robustness check is not yet approved for disclosure by the CSO.

4 Empirical Model

We estimate changes in hours for minimum wage workers (MWWs) in concentrated and non-concentrated local labour markets (LLMs) before and after the successive National Minimum Wage (NMW) hikes of 2017, 2018, and 2019. To estimate the causal effect of NMW hikes, we employ two alternative difference-in-difference designs, which we combine into a triple-difference design to construct our preferred estimates.

We measure market concentration using the Herfindahl-Hirschman Index (HHI). At a given point in time, consider a market m which contains some number of firms, each of whom is indexed by f. A firm f employs n_f employees. The HHI of market m is given by

$$HHI_m = \sum_{f \in m} \left(\frac{n_f}{\sum_{g \in m} n_g} \right)^2$$

which is the sum of squared employment shares of each firm.

4.1 Minimum Wage Hikes and Hours Worked for Minimum Wage Workers

First consider the effect of NMW hikes on MWWs compared to non-MWWs. This excludes any measure of concentration, estimating the same effect as McGuinness et al. (2019) and others, albeit with minimal differences in control variables.

$$\begin{aligned} E_{imt} = \alpha_0 + \alpha_1 MWW_{imt} \\ + \alpha_2(\mathbb{1}[y = 2017]) + \beta_1(MWW_{imt} \times \mathbb{1}[year = 2017]) \\ + \alpha_3(\mathbb{1}[y = 2018]) + \beta_2(MWW_{imt} \times \mathbb{1}[year = 2018]) \\ + \alpha_4(\mathbb{1}[y = 2019]) + \beta_3(MWW_{imt} \times \mathbb{1}[year = 2019]) \\ + \mu_m + \tau_t + X\Delta_{imt} + \varepsilon_{imt} \end{aligned} \tag{1}$$

The outcome E_{imt} gives hours worked for worker i in market m during time t. The binary variable MWW_{imt} indicates whether the worker earns the minimum wage, while $\mathbb{1}[year = y]$ indicates that the present year is y. The parameters

of interest are β_n, $n = \{1, 2, 3\}$, that fall on the interactions between minimum wage status and year indicators. These give textbook two-by-two difference-in-difference estimates.[13] The identifying assumption is that trends in hours worked are parallel for MWWs and non-MWWs over the sample period.

The above specification therefore considers 2016 as the base year, so each estimate β_n gives the cumulative effect of successive NMW hikes since 2016, as in Redmond and McGuinness (2022).[14] We include fixed effects for market and time period given by μ_m and τ_t respectively, with one category omitted for each (and additionally, one time period in each year from 2017 to 2019 omitted so as to avoid colinearity with the respective year indicators, which we include for the sake of exposition). Our effects of interest are therefore estimated within market, with flexible controls for seasonal cycles in employment as well as longer-term time trends. Finally, we include a set of demographic controls including a set of dummy variables for age, and indicators for sex, college attainment, and the presence of children.

4.2 Minimum Wage Hikes and Hours Worked for Minimum Wage Workers in Concentrated Markets

Now consider the differential effect of NMW hikes on MWWs in concentrated markets. Suppose we limit the sample to MWWs and estimate the following

[13] We do not combine the difference-in-difference estimates into a average treatment effect – a subject of much recent literature (see de Chaisemartin and d'Haultfoeuille 2022 for a review). As monopsony theory predicts a nonmonotonic relationship between the minimum wage level and employment, taking a weighted average of the three treatment effects may conceal the actual effects.

[14] We present year-on-year differences in appendix A.

equation.

$$
\begin{aligned}
E_{imt} = \alpha_0' + \alpha_1' HHI_{mt} \\
&+ \alpha_2'(\mathbb{1}[y = 2017]) + \gamma_1'(HHI_{mt} \times \mathbb{1}[year = 2017]) \\
&+ \alpha_3'(\mathbb{1}[y = 2018]) + \gamma_2'(HHI_{mt} \times \mathbb{1}[year = 2018]) \\
&+ \alpha_4'(\mathbb{1}[y = 2019]) + \gamma_3'(HHI_{mt} \times \mathbb{1}[year = 2019]) \\
&+ \mu_m' + \tau_t' + X\Delta_{imt}' + \varepsilon_{imt}'
\end{aligned} \tag{2}
$$

The above contains a variable measuring the HHI of the market m in time t. We consider several variations, including HHI in levels, ranging continuously from zero to one, and sets of indicators for HHI above and below the thresholds of 0.25, 0.10, and 0.03 – the latter being the median.[15] Other variables are identical to equation (1).

The parameters γ_n', $n = \{1, 2, 3\}$ give the differential effect on hours of MWWs in concentrated markets compared to MWWs in non-concentrated markets. The identifying assumption is that trends in hours worked are parallel between these two groups over the sample period.

Our preferred estimates come from a triple-difference specification that compares the differential effect on MWWs in concentrated markets over MWWs in non-concentrated markets to non-MWWs in concentrated markets over non-MWWs in non-concentrated markets. The identifying assumption is that whatever the difference in trends between MWWs in concentrated and non-concentrated markets, this difference is parallel to the difference in trends between non-MWWs in concentrated and non-concentrated markets. Equivalently, the difference in trends between MWWs and non-MWWs in concentrated markets is parallel to

[15] We also consider time-averaged versions of each, that do not vary within market over the sample period. As HHI varies mostly over the cross section during our sample period, the results are virtually identical. These results are not yet approved for disclosure by the CSO.

that same difference in non-concentrated markets.

$$
\begin{aligned}
E_{imt} = {} & \alpha_0^* + \alpha_1^* MWW_{imt} \\
& + \alpha_2^* \mathbb{1}[y = 2017] + \beta_1^* (MWW_{imt} \times \mathbb{1}[y = 2017]) \\
& + \alpha_3^* \mathbb{1}[y = 2018] + \beta_2^* (MWW_{imt} \times \mathbb{1}[y = 2018]) \\
& + \alpha_4^* \mathbb{1}[y = 2019] + \beta_3^* (MWW_{imt} \times \mathbb{1}[y = 2019]) \\
& + \alpha_5^* HHI_{mt} + \alpha_6^* (MWW_{imt} \times HHI_{mt}) \\
& + \alpha_7^* (HHI_{mt} \times \mathbb{1}[y = 2017]) + \gamma_1^* (MWW_{imt} \times HHI_{mt} \times \mathbb{1}[y = 2017]) \\
& + \alpha_8^* (HHI_{mt} \times \mathbb{1}[y = 2018]) + \gamma_2^* (MWW_{imt} \times HHI_{mt} \times \mathbb{1}[y = 2018]) \\
& + \alpha_9^* (HHI_{mt} \times \mathbb{1}[y = 2019]) + \gamma_3^* (MWW_{imt} \times HHI_{mt} \times \mathbb{1}[y = 2019]) \\
& + X\Delta_{imt}^* + \mu_m^* + \tau_t^* + \varepsilon_{imt}^*
\end{aligned} \tag{3}
$$

The coefficients β_n^*, γ_n^*, $n = \{1, 2, 3\}$ estimate the effect of NMW hikes on MWWs, and the effect of NMW hikes on MWWs in concentrated markets, respectively. These correspond to the treatment effects estimated using the same notation in equations (1) and (2) respectively (albeit using different identifying assumptions/samples/controls).

5 Results

This section presents estimates of the effects of the three National Minimum Wage (NMW) hikes during 2016 to 2019 on hours worked for minimum wage workers (MWWs) in concentrated local labour markets (LLMs). We measure employer concentration in LLMs using the Herfindahl-Hirschman Index (HHI), given in section 4.

Table 2 presents the main results. The first column shows the difference-in-difference specification of equation (1), which estimates the effect of NMW hikes on MWWs compared to non-MWWs, averaged over all LLMs. We find small and statistically insignificant effects in all years. The remaining columns give the triple-difference specification of equation (3) with concentration measured continuously as HHI in levels, and with LLMs grouped into bins above and below HHI

thresholds of 0.25, 0.10, and 0.03 (the latter being median HHI across markets) respectively. For comparison, we include the difference-in-difference estimates of NMW hikes on MWWs compared to non-MWWs. These are near zero and statistically insignificant in all specifications.

The cumulative effect of NMW hikes from 2016 to 2018, and from 2016 to 2019, increase hours worked for MWWs in concentrated markets according to all specifications. Additionally, the 2017 hike increased hours worked for MWWs in LLMs above median concentration (see column five). Interpret the magnitudes as follows. The second column of table 2 measures HHI continuously in levels; a unit increase in HHI is equivalent to going from a perfectly competitive market to a monopsonistic one. Therefore this column says that the hikes from 2016 to 2018 increased hours worked for a MWW in a monopsonistic market by 11 hours more than a MWW in a perfectly competitive market (for whom the hikes had no effect on hours worked, according to the coefficient estimate in the second row). This large hours effect is potentially misleading, because although LLMs do range in HHI from close to zero to one, fewer than 10% of LLMs exceed a HHI of 0.25 (see table 1); since most of the variation in HHI falls within a narrow range, the OLS coefficient effectively extrapolates beyond the HHI range of most LLMs onto the unit interval.

The remaining columns of table 2 are simpler to interpret. They say respectively that the two NMW hikes between 2016 and 2018 increased hours by an average of five hours for MWWs in markets with HHI ≥ 0.25, and by an average of three hours for MWWs in markets with HHI ≥ 0.10 and markets with HHI above median. Notably, the cumulative effect including the additional hike of 2019 – although positive and statistically significant compared to 2016 for all specifications – yields a smaller hours effect for HHI thresholds of 0.25 and the median than the same effects up to 2018. This suggests that the 2019 hike decreased hours compared to 2018. However, year-on-year effect from 2018 to 2019 is statistically insignificant (see table 10 in appendix A) so we do not find conclusive evidence that the minimum wage's ability to increase employment had been exhausted by 2019.

Table 2: Hours Effects on Minimum Wage Workers in Concentrated LLMs

	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.42	0.26	0.41	0.29	-0.025
	(0.25)	(0.31)	(0.28)	(0.30)	(0.18)
Min. Wage × 2018	0.50	0.046	0.34	0.27	-0.26
	(0.53)	(0.54)	(0.55)	(0.51)	(0.50)
Min. Wage × 2019	0.37	-0.021	0.26	0.098	-0.070
	(0.39)	(0.39)	(0.39)	(0.43)	(0.37)
HHI × Min. Wage × 2017		4.46			
		(3.18)			
HHI × Min. Wage × 2018		11.0***			
		(1.20)			
HHI × Min. Wage × 2019		11.0**			
		(2.97)			
HHI $\geq$ 0.25 × Min. Wage × 2017			0.19		
			(1.89)		
HHI $\geq$ 0.25 × Min. Wage × 2018			5.17**		
			(1.60)		
HHI $\geq$ 0.25 × Min. Wage × 2019			3.95***		
			(0.66)		
HHI $\geq$ 0.10 × Min. Wage × 2017				1.37	
				(1.30)	
HHI $\geq$ 0.10 × Min. Wage × 2018				3.08*	
				(1.47)	
HHI $\geq$ 0.10 × Min. Wage × 2019				3.52**	
				(1.34)	
HHI $\geq$ Median × Min. Wage × 2017					1.92**
					(0.69)
HHI $\geq$ Median × Min. Wage × 2018					3.06***
					(0.72)
HHI $\geq$ Median × Min. Wage × 2019					2.49***
					(0.61)
Constant	17.1***	17.4***	17.2***	17.4***	17.6***
	(2.15)	(2.20)	(2.15)	(2.22)	(2.32)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes
HHI Measure	No	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	No	Yes	Yes	Yes	Yes
HHI Measure × Year FE	No	Yes	Yes	Yes	Yes
N	175887	175887	175887	175887	175887
R^2	0.29	0.29	0.29	0.29	0.29

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

We present robustness to the main result in appendix B. In the following subsections we exame individual regions and industries.

5.1 Regional Effects on Hours

Table 3 reports results for each of the seven NUTS 3* regions that we use to approximate commuting zones. We calculate median HHI separately for each region. As there is substantial regional variation in concentration distributions, this ensures each region has sufficient identifying variation to estimate differential effects. It also guarantees relevance to regional interests, as each estimated effect covers half of LLMs in that region.[16] We report the median for each region in the third row from the bottom, ranging from 0.020 in the Border to 0.054 in the West.

There is substantial heterogeneity across regions in the effect of NMW hikes on hours. Greater Dublin, the Southeast, and Southwest show effects most in line with the national results, with large and statistically significant increases in hours for MWWs in concentrated markets by 2018. We find no statistically significant effects in the Border region. The West and Midlands both show hours decreases among MWWs overall – the West by 2019 and the Midlands in the years prior. In the Midlands, MWWs in concentrated markets show an offsetting hours increase (no overall change for MWWs in concentrated markets), but in the West they do not. Finally, in the Midwest, we find no evidence of hours reductions, and an increase by 2019 in non-concentrated markets.

These results differ from the similar regional analysis of Redmond and McGuinness (2022) for three reasons. The first is that we consider differential effects by LLM concentration, while they do not. However, we find widespread hours reductions across LLMs of all concentration levels in certain regions. The difference is likely driven by different regional delineations: the data they analyse indicates province, rather than NUTS 3* region.[17] Outside of the Greater Dublin area,

[16] We present regional results using the other three measures of concentration in appendix B, with which these results largely agree.

[17] Redmond and McGuinness (2022) use the Labour Force Survey combined with the Earnings Anal-

Table 3: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Region – HHI $\geq$ Median

	G. Dublin	Border	West	Midwest	Southeast	Southwest	Midlands
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.091	0.51	0.64	0.41	-1.37	0.43	-2.56**
	(0.41)	(0.89)	(0.84)	(0.78)	(0.95)	(0.68)	(1.30)
Min. Wage × 2018	-0.43	0.12	-0.77	0.38	-1.22	2.29***	-5.14***
	(0.40)	(0.88)	(0.82)	(0.81)	(0.93)	(0.68)	(1.31)
Min. Wage × 2019	0.56	-0.45	-1.96**	1.75**	-0.36	0.31	-0.77
	(0.41)	(0.90)	(0.83)	(0.81)	(0.94)	(0.69)	(1.29)
HHI $\geq$ Median × Min. Wage × 2017	2.94***	-0.51	-1.93	0.63	2.89*	2.94**	3.50
	(0.86)	(1.51)	(1.61)	(1.46)	(1.62)	(1.22)	(2.14)
HHI $\geq$ Median × Min. Wage × 2018	4.26***	-2.00	-0.81	2.24	4.12***	3.69***	5.25**
	(0.84)	(1.54)	(1.57)	(1.49)	(1.56)	(1.25)	(2.09)
HHI $\geq$ Median × Min. Wage × 2019	2.63***	0.75	2.50	-1.27	3.37**	1.73	-0.72
	(0.90)	(1.51)	(1.62)	(1.60)	(1.69)	(1.36)	(2.17)
Constant	10.1***	34.9***	17.6***	20.1***	21.9***	19.8***	10.8
	(2.34)	(7.53)	(5.17)	(6.35)	(4.26)	(4.49)	(9.02)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year × HHI FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Median HHI	0.029	0.020	0.054	0.039	0.036	0.030	0.025
N	83111	11663	15988	17096	13387	26140	8502
R^2	0.28	0.32	0.29	0.30	0.32	0.31	0.31

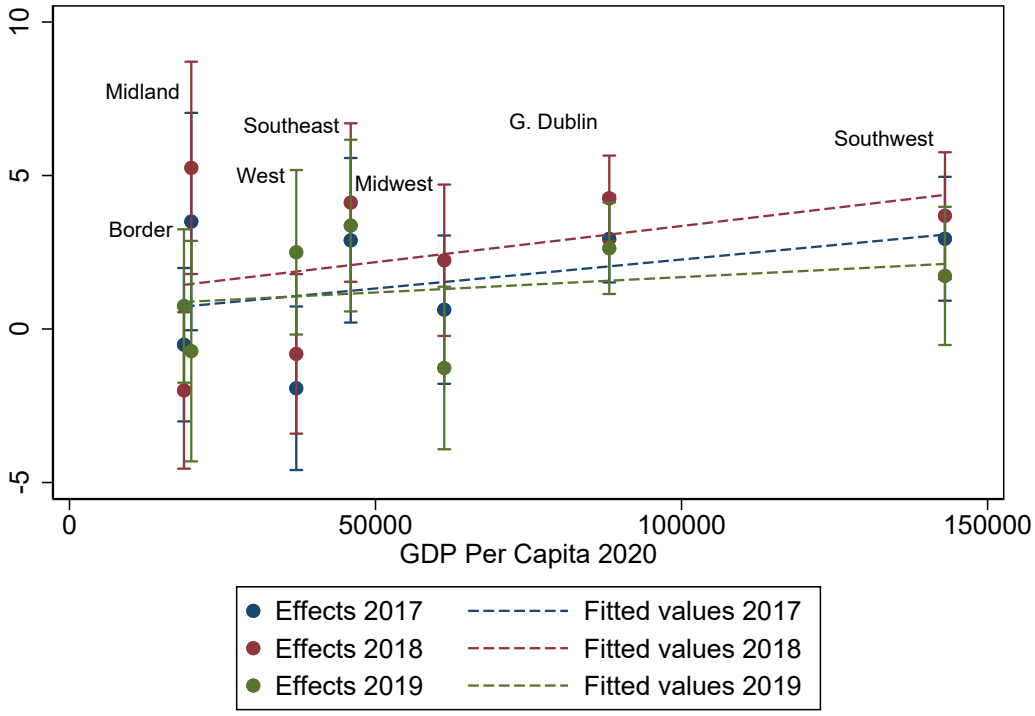
This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases for each NUTS 3* region in Ireland. We calculate the median threshold separately for each region. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

which roughly corresponds to their two regions of Dublin and Leinster, we consider six regions while they consider three. This alone allows us the potential to unmask underlying heterogeneity. Moreover, if NUTS 3* regions correspond more closely to commuting zones, they may provide a better grouping to discover local effects. Finally, they calculate hourly wage by dividing earnings by self-reported hours; while the former comes from administrative sources, the latter is potentially subject to measurement error. We believe that the direct question regarding minimum wage status provided on the LFS allows cleaner measurement of the treatment group.

ysis from Administrative Data Sources (EAADS).

Figure 3: Hours Effect by Regional GDP Per Capita



Source: CSO Table RAA05.

Figure 3 plots the estimated regional effects from table 3 against GDP per capita. Higher-income regions tend to have greater hours gains in every year, and this effect diminishes with each successive hike. This is in line with the prediction of classical monopsony theory that the marginal product of labour – and thus the full-employment wage – should be higher in higher-productivity regions, raising the threshold at which minimum wage hikes decrease employment. These results hold using gross value-added per person or per worker (see appendix B).

5.2 Sectoral Effects on Hours

Table 4 shows results for the low-wage one-digit NACE sectors of *wholesale and retail*, *accommodation and food services*, and *manufacturing*, as well as a catch-all category for all other sectors. We continue to define LLMs as two-digit NACE industries in a given region; these LLMs are nested within a one-digit NACE category. We calculate separate median HHI thresholds for each sector, displayed in the row third from the bottom. *Wholesale and retail* and *accommodation and food services* have very low median HHI, indicating that these sectors are competitive. *Manufacturing* has a much higher median HHI of 0.11.

Wholesale and retail shows small and statistically insignificant responses in both concentrated and non-concentrated markets. *Accommodation and food services* shows hours reductions across all markets from the cumulative effects of NMW hikes by 2018 and 2019, without offsetting hours increases in concentrated markets. *Manufacturing* shows an anomalous pattern, with a small increase in hours across all markets in 2017, and a reduction in hours in concentrated markets by 2018. Together, the remaining sectors show hours increases in all markets in 2017 and 2018, with an even greater increase among concentrated markets in 2018.

Table 5 presents results for selected other one-digit NACE industries, with the HHI threshold for concentrated LLMs given as the median HHI for that industry. There is greater variation in median HHI across industry than across region; this ranges from 0.016 for *other services* to 0.055 for *administrative and support*

Table 4: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Low-Wage Industry

	Wholesale and retail	Accommodation and food services	Manufacturing	Other
	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.22	-1.07	1.45**	1.41**
	(0.36)	(0.65)	(0.55)	(0.47)
Min. Wage × 2018	0.55	-1.98**	1.24	0.93**
	(0.79)	(0.63)	(1.55)	(0.37)
Min. Wage × 2019	0.21	-2.39***	-0.90	1.62
	(0.81)	(0.38)	(1.10)	(0.91)
HHI ≥ Median × Min. Wage × 2017	-0.53	0.90	-3.00	0.53
	(0.77)	(1.26)	(2.00)	(0.61)
HHI ≥ Median × Min. Wage × 2018	-0.62	2.91	-3.75*	2.86***
	(1.16)	(1.66)	(1.56)	(0.55)
HHI ≥ Median × Min. Wage × 2019	1.23	2.26	-1.76	2.29
	(1.12)	(1.17)	(2.69)	(1.36)
Constant	9.19	9.75	4.18	17.8***
	(6.94)	(5.10)	(3.39)	(1.40)
Year × Quarter FE	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes	Yes	Yes
Year × HHI FE	Yes	Yes	Yes	Yes
Median HHI	0.0079	0.0065	0.11	0.036
N	24501	12226	21573	117587
R^2	0.33	0.32	0.16	0.25

This table shows hours effects of NMW hikes for LLMs within low-wage one-digit NACE sectors. Median thresholds are specific to the sector in question.

*** $p < .01$, ** $p < .05$, * $p < .1$

service activities in the private sector, to 0.078 for *education* and 0/38 for *public administration and defence; compulsory social security.*

Information and communication, *real estate*, and *administrative and support service activities* show patterns most consistent with monopsony theory: hours reductions for MWWs in non-concentrated markets, with hours increases that more than offset these for MWWs in concentrated markets.

The overall null effect on hours of NMW hikes in non-concentrated markets (see table 2) masks underlying heterogeneity, and the surge in hours following NMW hikes in concentrated markets is not evenly distributed across regions and sectors. As two-digit NACE industries are nested within one-digit NACE sectors, and our definition of a LLM is an industry-region, all analysis so far has

Table 5: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Industry

	Information	Real estate	Professional	Administrative	Public admin.	Education	Health	Entertainment	Other services	Households employers
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	-10.8***	0.55	4.94**	-2.97*	3.58	5.03**	2.27**	0.41	2.03	-4.37
	(0.82)	(1.31)	(1.69)	(1.38)	(2.77)	(2.03)	(0.72)	(1.08)	(2.18)	(5.03)
Min. Wage × 2018	-4.68**	-18.2***	2.58*	-3.59	19.2***	8.33***	0.60	-0.024	0.60	-8.91*
	(1.78)	(2.11)	(1.16)	(1.87)	(0.83)	(1.61)	(1.51)	(2.69)	(2.24)	(3.87)
Min. Wage × 2019	-12.2***	-7.26	4.42**	-2.45*	11.4***	4.46***	1.97*	1.41	1.84	2.16
	(1.00)	(5.88)	(1.77)	(1.11)	(1.11)	(0.43)	(0.81)	(1.70)	(1.86)	(3.54)
HHI $\geq$ Median × Min. Wage × 2017	9.76***	2.84	-11.0**	4.30**	-1.47	-4.46	-0.18	6.08**	-2.58	11.0
	(1.80)	(1.67)	(3.21)	(1.70)	(4.13)	(2.77)	(2.20)	(2.02)	(2.21)	(6.63)
HHI $\geq$ Median × Min. Wage × 2018	5.85*	26.8***	-7.67	6.21**	-5.82*	2.04	5.30	5.04	-2.62	20.7***
	(2.93)	(4.84)	(4.61)	(1.87)	(2.62)	(4.00)	(2.92)	(2.60)	(3.18)	(4.14)
HHI $\geq$ Median × Min. Wage × 2019	14.7**	18.2**	-9.53**	3.63	-4.71	2.23	3.70*	8.70**	-1.34	2.99
	(4.86)	(6.07)	(3.17)	(2.28)	(6.56)	(3.37)	(1.83)	(3.22)	(2.64)	(7.27)
Constant	0.024	21.4*	32.8***	22.4**	22.2***	3.98	6.56	17.8***	14.7***	-3.09
	(2.93)	(11.0)	(0.94)	(7.48)	(3.55)	(3.45)	(5.95)	(4.46)	(3.24)	(3.90)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year × HHI FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Median HHI	0.025	0.022	0.023	0.055	0.38	0.078	0.036	0.031	0.016	0.047
N	8581	737	9512	6758	11207	17084	25937	3462	3461	453
R^2	0.16	0.45	0.23	0.34	0.15	0.10	0.18	0.36	0.26	0.43

This table shows hours effects of NMW hikes for LLMs within selected one-digit NACE sectors. Median thresholds are specific to the sector in question.

*** $p < .01$, ** $p < .05$, * $p < .1$

pooled together hours responses by MWWs within a given LLM to estimate coefficients. In the following section we study heterogeneous effects based on worker characteristics, which vary within LLM.

6 Subgroup Analysis

In this section we analyse differential hours responses to NMW hikes by worker characteristics. These include age group, sex, nationality, occupation, and temporary versus permanent contract status.

Table 6 splits the sample into young (younger than 25), prime age, and old (55 and older) workers. We find that hours increases in concentrated markets (HHI$\geq$0.25) are larger and statistically significant for prime age workers, with the cumulative NMW hikes by 2018 and 2019 increasing hours by 6.5 and 4.6 hours per week respectively. This complements the results of Corella (2020), who finds similar effects in US data using teenagers as a proxy for low earners.

Table 7 considers hours responses for men and women separately. Male MWWs in concentrated markers see a statistically significant hours increase following the 2017 NMW hike, while female MWWs see a near-zero and statistically insignificant effect. Responses in subsequent years show similar in magnitude, though statistically insignificant increases among both groups.

Table 8 shows that Irish nationals are the primary beneficiaries of NMW hikes among MWWs in concentrated markets. This group sees statistically significant hours increases over 2016 in each year; there is no corresponding hours reduction for Irish MWWs in non-concentrated markets. Other nationals see a fall in hours among MWWs in non-concentrated markets by 2019, though this is offset among MWWs in concentrated markets.

Finally, table 9 estimates separate effects for temporary and permanent MWWs. We find no consistent pattern, with positive estimates of similar magnitudes in all years for MWWs in concentrated markets, except for a small negative effect among temporary workers by 2019. The only statistically significant estimate among these is the increase of two hours among permanent workers by 2018.

Table 6: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Age Group

	Under 25	25 - 54	55+
	b/se	b/se	b/se
Min. Wage × 2017	-0.24	0.87	2.62**
	(0.45)	(0.75)	(0.77)
Min. Wage × 2018	0.46	-0.018	1.90
	(0.80)	(0.71)	(1.58)
Min. Wage × 2019	0.38	0.095	2.54
	(0.27)	(0.93)	(1.52)
HHI $\geq$ 0.25 × Min. Wage × 2017	0.19	-0.10	-1.54
	(3.35)	(1.91)	(3.97)
HHI $\geq$ 0.25 × Min. Wage × 2018	1.67	6.45**	1.35
	(2.27)	(1.98)	(4.90)
HHI $\geq$ 0.25 × Min. Wage × 2019	2.32	4.62**	-3.56
	(2.21)	(1.60)	(5.83)
Constant	24.0***	32.9***	33.9***
	(1.57)	(2.69)	(0.58)
Year × Quarter FE	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes
HHI Measure × Min. Wage	Yes	Yes	Yes
HHI Measure × Year FE	Yes	Yes	Yes
N	18925	127652	29310
R^2	0.42	0.24	0.29

We calculate the median threshold separately for each group. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 7: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Sex

	Female	Male
	b/se	b/se
Min. Wage × 2017	0.44	-0.42
	(0.32)	(0.32)
Min. Wage × 2018	-0.89	0.80
	(0.61)	(0.61)
Min. Wage × 2019	-0.69	0.82
	(0.44)	(0.53)
HHI ≥ Median × Min. Wage × 2017	0.41	2.65*
	(1.25)	(1.24)
HHI ≥ Median × Min. Wage × 2018	2.34	2.35
	(1.44)	(1.66)
HHI ≥ Median × Min. Wage × 2019	2.19	1.53
	(1.18)	(1.31)
Constant	24.9***	17.6***
	(3.98)	(1.95)
Year × Quarter FE	Yes	Yes
LLM FE	Yes	Yes
Demographic Controls	Yes	Yes
Min. Wage	Yes	Yes
HHI Measure	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes
Year × HHI FE	Yes	Yes
Median HHI	0.033	0.026
N	91863	84024
R^2	0.25	0.25

We calculate the median threshold separately for each group. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Nationality

	Other	Ireland
	b/se	b/se
Min. Wage × 2017	0.035	0.043
	(0.61)	(0.28)
Min. Wage × 2018	-1.23	0.050
	(0.69)	(0.51)
Min. Wage × 2019	-2.28*	0.51
	(1.13)	(0.38)
HHI ≥ Median × Min. Wage × 2017	2.05	2.41***
	(1.43)	(0.43)
HHI ≥ Median × Min. Wage × 2018	1.32	4.48***
	(1.06)	(0.79)
HHI ≥ Median × Min. Wage × 2019	3.18*	2.96***
	(1.36)	(0.73)
Constant	26.0***	15.6***
	(2.36)	(2.37)
Year × Quarter FE	Yes	Yes
LLM FE	Yes	Yes
Demographic Controls	Yes	Yes
Min. Wage	Yes	Yes
HHI Measure	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes
Year × HHI FE	Yes	Yes
Median HHI	0.025	0.032
N	20306	155581
R^2	0.28	0.30

We calculate the median threshold separately for each group. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 9: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Contract Status

	Temporary	Permanent
	b/se	b/se
Min. Wage × 2017	-0.060	0.40
	(0.53)	(0.33)
Min. Wage × 2018	0.60	-0.0089
	(0.95)	(0.61)
Min. Wage × 2019	0.51	0.42
	(0.75)	(0.88)
HHI $\geq$ Median × Min. Wage × 2017	1.27	0.91
	(0.70)	(0.64)
HHI $\geq$ Median × Min. Wage × 2018	1.17	2.04**
	(1.55)	(0.77)
HHI $\geq$ Median × Min. Wage × 2019	-0.36	1.08
	(0.65)	(1.06)
Constant	18.2***	18.6***
	(2.09)	(2.86)
Year × Quarter FE	Yes	Yes
LLM FE	Yes	Yes
Demographic Controls	Yes	Yes
Min. Wage	Yes	Yes
HHI Measure	Yes	Yes
Min. Wage × HHI Measure	Yes	Yes
Year × HHI FE	Yes	Yes
Median HHI	0.025	0.036
N	14206	161336
R^2	0.40	0.26

We calculate the median threshold separately for each group. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

7 Conclusion

We study the change in hours for minimum wage workers (MWWs) in concentrated local labour markets (LLMs) in Ireland over the period of 2016 to 2019. For the nation overall, the successive hikes in the National Minimum Wage (NMW) increased hours for these workers through 2018 without negative effects for MWWs in non-concentrated LLMs. The 2019 NMW hike caused no further increase in hours, with negative – albeit statistically insignificant – point estimates for some specifications.

Both results – hours increases for workers in concentrated markets, with a declining (and perhaps nonmonotonic) hours response to successive minimum wage hikes – are consistent with classical monopsony theory. The first result shows the potential for minimum wage hikes to benefit low-wage workers without employment losses. This is in line with a large, though contested, literature showing positive employment effects of minimum wages. The second result provides suggestive evidence on nonmonotonicity is the relationship between minimum wage level and hours, a less studied topic. Monopsony theory predicts that even in concentrated labour markets, minimum wage hikes will reduce employment after exceeding a certain threshold. Our results suggest that Ireland's NMW may have reached this threshold by 2019, but the small and statistically insignificant effects are hardly conclusive. The onset of the pandemic and accompanying restrictions in 2020 makes analysis of the subsequent NMW hikes difficult.

Together our results a) show the viability of the Irish NMW to increase wages for low-wage workers in concentrated LLMs without negative side effects in non-concentrated LLMs; and b) suggest that by 2019 the Irish NMW had reached a level somewhere around the national average full employment wage for MWWs, above with further hikes risk employment losses. The latter is less certain, and does not provide a strong caution against further NMW hikes, as much has changed in the Irish economy since 2019. Changes in industrial composition, career interruptions and retirements, and reorganisations of the workplace – including remote work and shortened work weeks – may affect productivity in such

a way as to change the full employment wage.

Our main results mask substantial underlying heterogeneity across regions, industries, and groups of workers. The headline results are driven by Greater Dublin (the combination of Dublin and the Mideast region), the Southeast, and Southwest. However, the West and Midlands show negative hours responses, suggesting vulnerability to further hikes. Surprisingly, typical low-wage sectors – *wholesale and retail*, *accomodation and food services*, and *manufacturing* – do not drive the overall responses; these are driven by MWWs in other sectors. In a companion paper, we note that these sectors have relatively low levels of concentration (Devereux and Studnicka 2023). Among worker groups, the main results are driven by prime age workers, as well as Irish nationals.

At €0.80, the recent NMW hike of 2023 was larger than the respective hikes from 2017 to 2019 of €0.10, €0.30, and €0.25 that we consider. Pandemic restrictions make the intervening years difficult to analyse, since disruptions to workplaces overshadow any effect the 2020 to 2022 NMW hikes had on hours and employment relationships. The coming months will provide fresh evidence relevant to the viability of future hikes.

References

Arnold, D. (2021). Mergers and acquisitions, local labor market concentration, and worker outcomes. *Local Labor Market Concentration, and Worker Outcomes (October 27, 2019)*.

Azar, J., Huet-Vaughn, E., Marinescu, I., Taska, B., and Von Wachter, T. (2019). Minimum wage employment effects and labor market concentration. Technical report, National Bureau of Economic Research.

Azar, J., Marinescu, I., and Steinbaum, M. (2020). Labor market concentration. *Journal of Human Resources*, pages 1218–9914R1.

Burkhauser, R. V., Couch, K. A., and Wittenburg, D. C. (2000). A reassessment

of the new economics of the minimum wage literature with monthly data from the current population survey. *Journal of Labor Economics*, 18(4):653–680.

Cengiz, D., Dube, A., Lindner, A., and Zipperer, B. (2019). The effect of minimum wages on low-wage jobs. *The Quarterly Journal of Economics*, 134(3):1405–1454.

Corella, L. F. M. (2020). Minimum wages in monopsonistic labor markets. *IZA Journal of Labor Economics*, 9(1).

de Chaisemartin, C. and d'Haultfoeuille, X. (2022). Two-way fixed effects and differences-in-differences with heterogeneous treatment effects: A survey. Technical report, National Bureau of Economic Research.

Deere, D., Murphy, K. M., and Welch, F. (1995). Employment and the 1990-1991 minimum-wage hike. *The American Economic Review*, 85(2):232–237.

Devereux, K. and Studnicka, Z. (2023). Local labour market concentration and earnings in ireland. *UCD Economics Working Papers*.

Doris, A., O'Neill, D., Sweetman, O., et al. (2022). The introduction of a living wage in ireland. *Economics Department Working Paper Series*, (316):22.

Dustmann, C., Lindner, A., Schönberg, U., Umkehrer, M., and Vom Berge, P. (2022). Reallocation effects of the minimum wage. *The Quarterly Journal of Economics*, 137(1):267–328.

Francis-Devine, B. (2023). National minimum wage statistics.

Horgan-Jones, J., McQuinn, C., and Clarke, V. (2022). 'time to be ourselves again': Taoiseach confirms end to almost all covid-19 restrictions. *The Irish Times*.

Jardim, E., Long, M. C., Plotnick, R., Van Inwegen, E., Vigdor, J., and Wething, H. (2017). Minimum wage increases, wages, and low-wage employment: Evidence from seattle. Technical report, National Bureau of Economic Research.

Lathrop, Y. (2020). Raising the minimum wage leads to significant gains for workers, not to 'benefits cliffs'.

Leahy, P., Cullen, P., Lynch, S., and Kelly, F. (2020). Coronavirus: Schools, colleges and childcare facilities in ireland to shut. *The Irish Times*.

Low Pay Commission (2022). Living wage report.

Manning, A. (2021). The elusive employment effect of the minimum wage. *Journal of Economic Perspectives*, 35(1):3–26.

McGuinness, S., Redmond, P., and Delaney, J. (2019). *The prevalence and effect on hours worked of the minimum wage in Ireland: a sectoral and regional analysis*. Number 93. Research Series.

McQuinn, K., O'Toole, C., Disch, W., Shiel, E., and Kenny, E. (2022). Quarterly economic commentary, summer 2022. Technical report, ESRI Forecasting Series.

Redmond, P. and McGuinness, S. (2022). Heterogeneous effects of a minimum wage increase on hours worked. Technical report, Research Series.

Rinz, K. (2020). Labor market concentration, earnings, and inequality. *Journal of Human Resources*, pages 0219–10025R1.

The European Parliament and the Council of the European Union (2022). Directive (eu) 2022/2041 of the european parliament and of the council of 19 october 2022 on adequate minimum wages in the european union.

Tolbert, C. M. and Sizer, M. (1996). Us commuting zones and labor market areas: A 1990 update. Technical report.

Appendix

A Year-on-Year Hours Changes

The main results in section 5 estimate changes on hours for minimum wage workers (MWWs) in concentrated local labour markets (LLMs) resulting from the cumulative increase in the National Minimum Wage (NMW) from 2016 to the year in question. Here, we recreate these results, instead using the previous year as the base. For 2017, our estimates are identical, as the previous year is the same. For 2018, we estimate hours changes compared to 2017. This means that the coefficient presented in the main body is equal to the sum of the 2017 and 2018 effects presented here. Likewise for 2019, the coefficients in the main body are equal to the sum of the three effects presented here. The value of presenting this variation on the main specification is that it highlights which year-on-year effects are statistically significant.

Table 10 shows that only the cumulative 2016 to 2018 hikes yield a significant effect using the 0.25 HHI threshold for concentration, while the 2017 as well as the cumulative hikes up to 2018 yield significant effects for the median threshold specification. No year-on-year effects are statistically significant for the specification using the continuous measure of HHI in levels, nor the 0.10 threshold. Notably, the 2019 hike does not statistically significantly reduce hours compared to 2018, although the point estimate is negative using the 0.25 and median thresholds.

These results casts doubt on the notion that the 2019 hike may have exceeded the full employment wage. However, the problem with limiting the control group to lower-income workers is that this group is more likely to be affected by the minimum wage hikes; in order to retain pay differentials among workers of different ranks, employers may raise wages for non-MWWs in lower income deciles.

Table 10: Hours Effects on Minimum Wage Workers in Concentrated LLMs

	b/se	b/se	b/se	b/se	b/se
Min. Wage × ≥ 2017	0.42	0.26	0.41	0.29	-0.025
	(0.25)	(0.31)	(0.28)	(0.30)	(0.18)
Min. Wage × ≥ 2018	0.082	-0.21	-0.073	-0.012	-0.23
	(0.39)	(0.45)	(0.40)	(0.39)	(0.44)
Min. Wage × ≥ 2019	-0.12	-0.067	-0.081	-0.18	0.19
	(0.50)	(0.50)	(0.47)	(0.48)	(0.56)
HHI × Min. Wage × ≥ 2017		4.46			
		(3.18)			
HHI × Min. Wage × ≥ 2018		6.52			
		(3.66)			
HHI × Min. Wage × ≥ 2019		-0.022			
		(3.86)			
HHI ≥ 0.25 × Min. Wage × ≥ 2017			0.19		
			(1.89)		
HHI ≥ 0.25 × Min. Wage × ≥ 2018			4.98**		
			(1.78)		
HHI ≥ 0.25 × Min. Wage × ≥ 2019			-1.21		
			(1.61)		
HHI ≥ 0.10 × Min. Wage × ≥ 2017				1.37	
				(1.30)	
HHI ≥ 0.10 × Min. Wage × ≥ 2018				1.71	
				(0.89)	
HHI ≥ 0.10 × Min. Wage × ≥ 2019				0.44	
				(1.34)	
HHI ≥ Median × Min. Wage × ≥ 2017					1.92**
					(0.69)
HHI ≥ Median × Min. Wage × ≥ 2018					1.14***
					(0.23)
HHI ≥ Median × Min. Wage × ≥ 2019					-0.58
					(0.83)
Constant	17.1***	17.4***	17.2***	17.4***	17.6***
	(2.15)	(2.20)	(2.15)	(2.22)	(2.32)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes
HHI Measure	No	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	No	Yes	Yes	Yes	Yes
HHI Measure × Year FE	No	Yes	Yes	Yes	Yes
N	175887	175887	175887	175887	175887
R^2	0.29	0.29	0.29	0.29	0.29

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

B Robustness

In this appendix we present robustness checks to the main results. Hours increases for minimum wage workers (MWWs) in concentrated markets following National Minimum Wage (NMW) hikes are robust to excluding workers in top income deciles from the control group, but the hours decrease by 2019 less so. Regional results are robust to each of the alternative concentration definitions we consider.[18]

Table 11 recreates the main results, excluding workers from the top two income deciles. This provides a potentially better comparison group for MWWs, since it excludes the highest earners. This comes with the drawback of substantially reducing sample size. Moreover, the validity of our triple-difference specification only requires that MWWs in concentrated versus non-concentrated markets exhibit similar trends to non-MWWs in concentrated versus non-concentrated markets.

Excluding the top two income deciles, the 2017 NMW hike increased hours for MWWs across all LLMs by about one hour. This effect is statistically significant in all specifications except that using the median concentration threshold, which places more of the less-concentrated LLMs in the upper bin. The differential effect of the 2017 hike on MWWs in concentrated LLMs is positive for this specification but negative for the others, and statistically insignificant in all. The cumulative effect of the hikes is statistically significant by 2019 using the continuous measure of the Herfindahl-Hirschman Index (HHI) and the 0.25 threshold, and by 2018 using the median threshold. No specification exhibits hours reductions from 2018 to 2019.

[18] We have also recreated the main results restricting the sample to the first two quarters of each year, the last three, or to workers observed both before and after NMW hikes. The results are consistent with those using the full sample, but are not yet approved for disclosure by the CSO.

Table 11: Hours Effects on Minimum Wage Workers in Concentrated LLMs – Excluding Top Two Income Deciles

	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.96**	1.10**	1.03**	1.13**	0.71
	(0.33)	(0.39)	(0.30)	(0.42)	(0.49)
Min. Wage × 2018	0.68	0.51	0.62	0.72	0.14
	(0.93)	(0.88)	(0.90)	(0.86)	(1.01)
Min. Wage × 2019	0.68	0.25	0.56	0.45	0.23
	(0.65)	(0.71)	(0.63)	(0.65)	(0.81)
HHI × Min. Wage × 2017		-3.97			
		(5.68)			
HHI × Min. Wage × 2018		4.93			
		(3.36)			
HHI × Min. Wage × 2019		11.5*			
		(5.57)			
HHI $\geq$ 0.25 × Min. Wage × 2017			-2.25		
			(2.22)		
HHI $\geq$ 0.25 × Min. Wage × 2018			3.16		
			(2.50)		
HHI $\geq$ 0.25 × Min. Wage × 2019			5.01*		
			(2.31)		
HHI $\geq$ 0.10 × Min. Wage × 2017				-2.20	
				(2.53)	
HHI $\geq$ 0.10 × Min. Wage × 2018				-0.014	
				(2.03)	
HHI $\geq$ 0.10 × Min. Wage × 2019				2.69	
				(2.13)	
HHI $\geq$ Median × Min. Wage × 2017					1.20
					(0.72)
HHI $\geq$ Median × Min. Wage × 2018					2.38**
					(0.83)
HHI $\geq$ Median × Min. Wage × 2019					2.31
					(1.21)
Constant	17.1***	17.4***	17.2***	17.3***	18.0***
	(1.06)	(1.15)	(1.12)	(1.13)	(1.13)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes
HHI Measure	No	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	No	Yes	Yes	Yes	Yes
HHI Measure × Year FE	No	Yes	Yes	Yes	Yes
N	57927	57927	57927	57927	57927
R^2	0.29	0.29	0.29	0.29	0.29

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

B.1 Robustness of Regional Effects on Hours

This sub-appendix extends the regional analysis presented in subsection 5.1 to alternative concentration measures. The results are robust to the region-specific median threshold for HHI that we present in the main results.

Table 12 shows regional results using the continuous measure of the HHI. Greater Dublin and the Southeast show large hours increases for MWWs in more concentrated markets by 2018 that continue into 2019, suggesting that the NMW had not exceeded the maximum-employment wage in these regions. The West shows a surge for the same group by 2019 that is not present using the median threshold, and the Border a sharp drop in 2017. Despite a few other differences in magnitude or statistical significance compared to the main results, this table presents a picture consistent with the result that MWWs in concentrated markets experience hours surges following NMW hikes in certain regions but not others.

Table 13 presents results using the 0.25 HHI threshold. This moves many more LLMs into the 'lower category' of non-concentrated in every region compared to the main results using the region-specific medians. We are therefore more likely to find hours increases for MWWs in the lower category for regions that did not show such a pattern in the main results, but did for the upper category. We find patterns consistent with this for Greater Dublin and the Southwest. Overall little else changes, including the hours reduction by 2018 for the Midlands.

Finally, table 14 presents results using the 0.10 threshold. This shifts LLMs across the theshold as in previous table, but to a lesser extent, with similar results.

The overall picture of hours increases for MWWs in Greater Dublin, the Southeast, and Southwest, with hours decreases in the West and Midlands – albeit offset in the Midlands in concentrated markets – holds throughout. The signs are consistently negative for non-concentrated LLMs in the Midlands. Large coefficients on the MWW by concentrated LLM interaction term by 2018 are due to either the continuous measure of HHI extrapolating beyond its range, or the small number of observations in the upper bin using the 0.25 and 0.10 thresholds. The West shows hours losses across all LLMs by 2019 (albeit offset in concen-

Table 12: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Region – HHI Level

	G. Dublin	Border	West	Midwest	Southeast	Southwest	Midlands
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.71*	0.48	0.17	-0.12	-1.28	1.04*	-1.70
	(0.40)	(0.80)	(0.81)	(0.72)	(0.85)	(0.62)	(1.18)
Min. Wage × 2018	0.17	-1.21	-1.19	0.55	-0.76	2.61***	-4.50***
	(0.39)	(0.80)	(0.79)	(0.74)	(0.81)	(0.63)	(1.18)
Min. Wage × 2019	0.57	-0.93	-2.07**	0.89	-1.08	0.48	-1.29
	(0.40)	(0.81)	(0.81)	(0.75)	(0.86)	(0.64)	(1.17)
HHI × Min. Wage × 2017	0.64	-20.6*	-3.26	12.8**	16.3**	3.69	8.58
	(6.30)	(11.8)	(8.81)	(6.04)	(7.99)	(6.68)	(9.49)
HHI × Min. Wage × 2018	11.3**	3.94	5.18	8.45	12.2*	13.9**	26.4***
	(5.75)	(9.68)	(8.41)	(5.36)	(6.64)	(6.56)	(9.00)
HHI × Min. Wage × 2019	17.6***	-2.52	18.2**	5.16	25.4***	7.32	8.43
	(6.05)	(10.5)	(8.64)	(5.63)	(7.82)	(6.82)	(8.35)
Constant	10.1***	32.4***	16.9***	19.7***	21.6***	19.8***	9.69
	(2.34)	(7.52)	(5.16)	(6.35)	(4.25)	(4.49)	(9.01)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	83111	11663	15988	17096	13387	26140	8502
R^2	0.27	0.32	0.29	0.30	0.32	0.31	0.31

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases for each NUTS 3* region in Ireland. Standard errors are clustered at the LLM (industry-region) level.
*** $p < .01$, ** $p < .05$, * $p < .1$

trated LLMs using the continuous HHI specification). In Greater Dublin and the Southwest, raising the threshold to even 0.10 puts LLMs where hours increase for MWWs in the upper bin, while in the Southeast, these increases are driven by the most concentrated LLMs.

B.2 Regional Effects and Value-Added

Figures 4 and 5 plot the estimated regional effect on hours from the main results against gross value-added per worker and per capita respectively. In line with the GDP results presented in the main text, higher-productivity regions show more positive hours effects in response to minimum wage hikes, and this relationship decreases with successive hikes.

Table 13: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Region – HHI ≥ 0.25

	G. Dublin	Border	West	Midwest	Southeast	Southwest	Midlands
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.81**	-0.21	0.061	0.22	-0.68	1.18**	-1.30
	(0.36)	(0.72)	(0.71)	(0.67)	(0.77)	(0.57)	(1.07)
Min. Wage × 2018	0.51	-1.49**	-1.11	0.72	-0.33	2.96***	-3.27***
	(0.35)	(0.72)	(0.70)	(0.69)	(0.75)	(0.57)	(1.05)
Min. Wage × 2019	0.99***	-1.11	-1.33*	0.83	-0.31	0.69	-0.96
	(0.36)	(0.72)	(0.71)	(0.70)	(0.78)	(0.59)	(1.07)
HHI ≥ 0.25 × Min. Wage × 2017	-7.75**	-2.74	-0.71	5.13	4.71	0.17	3.86
	(3.71)	(6.19)	(4.18)	(3.16)	(3.58)	(3.18)	(4.38)
HHI ≥ 0.25 × Min. Wage × 2018	-0.67	12.3**	4.11	5.47*	3.44	4.94	9.07**
	(3.32)	(5.04)	(3.91)	(2.79)	(3.27)	(3.27)	(4.57)
HHI ≥ 0.25 × Min. Wage × 2019	1.34	3.80	2.25	3.87	6.71**	2.89	4.34
	(3.21)	(5.09)	(3.95)	(2.96)	(3.17)	(3.63)	(4.37)
Constant	10.1***	31.8***	16.6***	19.3***	21.4***	19.8***	9.33
	(2.34)	(7.52)	(5.16)	(6.35)	(4.24)	(4.49)	(9.00)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	83111	11663	15988	17096	13387	26140	8502
R^2	0.28	0.32	0.29	0.30	0.31	0.31	0.31

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases for each NUTS 3* region in Ireland. Standard errors are clustered at the LLM (industry-region) level.

*** $p < .01$, ** $p < .05$, * $p < .1$

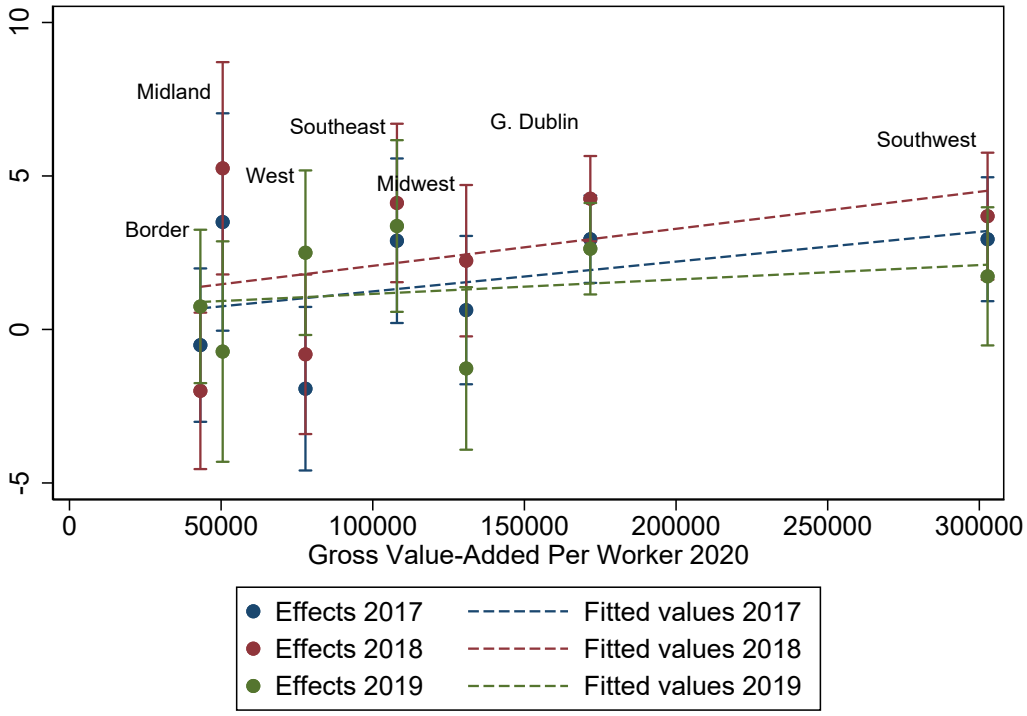
Table 14: Hours Effects on Minimum Wage Workers in Concentrated LLMs by Region – HHI ≥ 0.10

	G. Dublin	Border	West	Midwest	Southeast	Southwest	Midlands
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
Min. Wage × 2017	0.70*	0.046	0.48	0.050	-1.49*	1.00*	-1.63
	(0.37)	(0.73)	(0.76)	(0.69)	(0.79)	(0.60)	(1.15)
Min. Wage × 2018	0.49	-1.30*	-0.32	0.86	-1.11	2.75***	-3.65***
	(0.36)	(0.74)	(0.75)	(0.72)	(0.76)	(0.61)	(1.14)
Min. Wage × 2019	0.88**	-1.05	-1.84**	1.08	-1.15	0.54	-0.60
	(0.37)	(0.73)	(0.77)	(0.73)	(0.81)	(0.62)	(1.15)
HHI ≥ 0.10 × Min. Wage × 2017	0.40	-5.05	-3.09	3.89*	11.0***	1.60	1.31
	(1.38)	(3.25)	(2.08)	(2.08)	(2.70)	(1.80)	(2.64)
HHI ≥ 0.10 × Min. Wage × 2018	0.40	2.91	-3.50*	1.32	11.9***	4.51**	4.01
	(1.72)	(2.81)	(2.03)	(2.04)	(2.62)	(1.82)	(2.49)
HHI ≥ 0.10 × Min. Wage × 2019	5.84***	0.22	2.06	0.48	13.6***	2.57	-1.72
	(1.77)	(2.90)	(1.99)	(2.19)	(2.40)	(1.94)	(2.60)
Constant	10.1***	32.0***	16.9***	19.5***	21.3***	19.9***	10.2
	(2.34)	(7.53)	(5.16)	(6.35)	(4.24)	(4.49)	(9.01)
Year × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LLM FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Min. Wage	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HHI Measure × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	83111	11663	15988	17096	13387	26140	8502
R^2	0.27	0.32	0.29	0.30	0.32	0.31	0.31

This table give the response of weekly usual hours worked for minimum wage workers, and minimum wage workers in concentrated labour markets, following the 2017, 2018, and 2019 National Minimum Wage increases for each NUTS 3* region in Ireland. Standard errors are clustered at the LLM (industry-region) level.

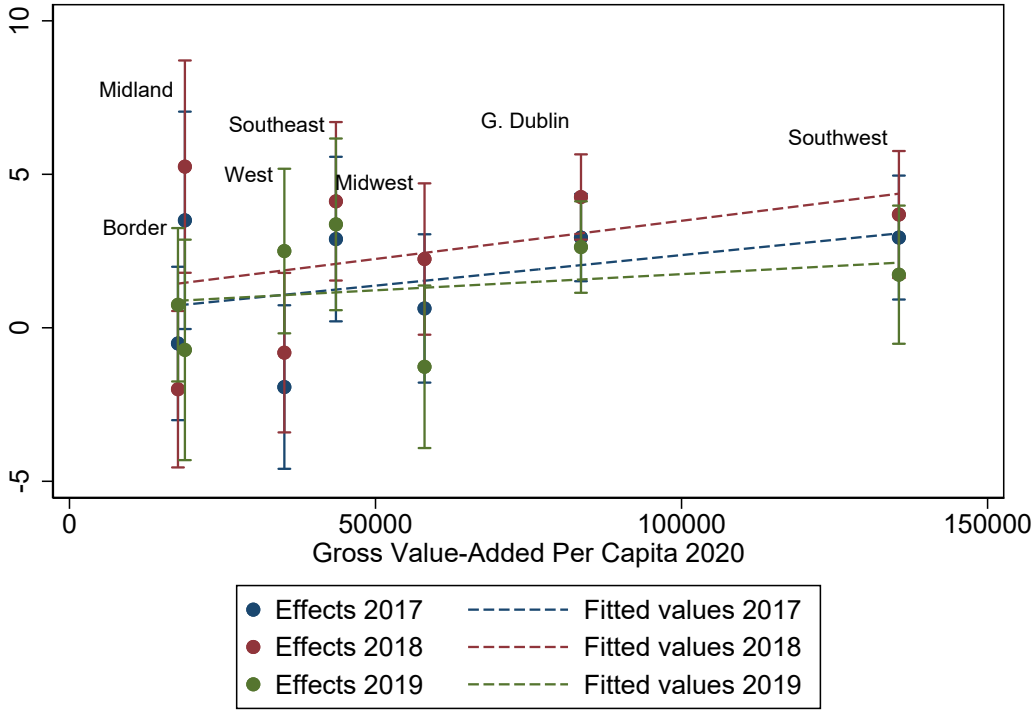
*** $p < .01$, ** $p < .05$, * $p < .1$

Figure 4: Hours Effect by Regional Gross Value-Added Per Worker



Source: CSO Table RAA05.

Figure 5: Hours Effect by Regional Gross Value-Added Per Capita



Source: CSO Table RAA05.

UCD CENTRE FOR ECONOMIC RESEARCH – RECENT WORKING PAPERS
WP22/11 Lena Susanne Specht: 'International trade effects of student migration' March 2022
WP22/12 Dimitrios Bermperoglou, Yota Deli, Sarantis Kalyvitis: 'Investment Tax Incentives and Their Big Time-to-Build Fiscal Multiplier' April 2022
WP22/13 Tadgh Hegarty, Karl Whelan: 'The Wisdom of No Crowds: The Reaction of Betting Markets to Lockdown Soccer Games' April 2022
WP22/14 Manthos D. Delis, Yota D. Deli, José-Luis Peydró, Adele Whelan: 'Education and Credit: A Matthew Effect' April 2022
WP22/15 Diane Pelly: 'Worker well-being and quit intentions: is measuring job satisfaction enough?' April 2022
WP22/16 Kevin Devereux, Margaret Samahita: 'Gender, Productivity, and Promotion in the Irish Economics Profession' June 2022
WP22/17 Manuel E. Lago, Santiago Lago-Peñas, Jorge Martinez-Vazquez: 'On the Effects of Intergovernmental Grants: A Survey' June 2022
WP22/18 Judith M. Delaney, Paul J. Devereux: 'Gender Differences in STEM Persistence after Graduation' June 2022
WP22/19 Karl Whelan: 'Where Do We Stand With "Whatever It Takes"?' July 2022
WP22/20 Neil Cummins, Cormac Ó Gráda: 'The Irish in England' July 2022
WP22/21 Yota Deli, Manthos D. Delis, Iftekhar Hasan, Panagiotis N. Politsidis, Anthony Saunders: 'Corporate tax changes and credit costs' July2022
WP22/23 Karl Whelan: 'US Taxation of GamblingWinnings and Incentives to Bet' August 2022
WP22/23 Karl Whelan:'Risk Aversion and Favorite-Longshot Bias in a Competitive Fixed-Odds Betting Market' August 2022
WP22/24 Diane Pelly, Orla Doyle: 'Nudging in the workplace: increasing participation in employee EDI wellness events' October 2022
WP22/25 Margaret Samahita, Kevin Devereux: 'Are economics conferences gender-neutral? Evidence from Ireland' October 2022
WP22/26 Michele Gubello, Nora M. Strecker: 'Weakly Progressive: Disproportionate Higher Education Attendance and the Structure of Income Taxes' November 2022
WP22/27 David Madden: 'Mental Health in Ireland During the Covid Pandemic: Evidence from Two Longitudinal Surveys' December 2022
WP22/28 Ronald B. Davies, Zuzanna Studnicka: 'Tariff Evasion, the Trade Gap, and Structural Trade' December 2022
WP23/01 Xidong Guo: 'An Analysis of a Rural Hospital's Investment Decision under Different Payment Systems' January 2023
WP23/02 Emanuele Albarosa, Benjamin Elsner: 'Forced Migration and Social Cohesion: Evidence from the 2015/16 Mass Inflow in Germany' January 2023
WP23/03 Xidong Guo: 'Hospital Efficiency and Consultants' Private Practices: Analysing the Impact of a Voluntary Reform' February 2023
WP23/04 Tadgh Hegarty, Karl Whelan: 'Calculating The Bookmaker's Margin: Why Bets Lose More On Average Than You Are Warned' February 2023
WP23/05 Tadgh Hegarty, Karl Whelan: 'Forecasting Soccer MatchesWith Betting Odds: A Tale of Two Markets' February 2023
WP23/06 Karl Whelan: 'How Do Prediction Market Fees Affect Prices and Participants?' March 2023
WP23/07 Kevin Devereux, Zuzanna Studnicka: 'Local Labour Market Concentration and Wages in Ireland' March 2023

UCD Centre for Economic Research
Email economics@ucd.ie