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Multinational Enterprises and Between-Firm Wage Inequality Across European Regions

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ABSTRACT

This paper examines the impact of multinational enterprises (MNEs) on wage inequality between firms across European regions. Using firm-level data from the Orbis Europe dataset over the period 2012–2021, we uncover a pattern of rising between-firm wage dispersion coinciding with increasing MNE presence. To identify causal effects, we address potential endogeneity through the use of instrumental variables. The results of this analysis indicate that the regional presence of MNEs significantly contributes to increased wage inequality between firms across European regions. The effects are more pronounced for MNE parent firms and top-performing foreign affiliates, underscoring the role of international superstar firms in driving regional wage disparities. This research advances the understanding of distributional impacts of foreign direct investment and its implications for regional inequalities.

JEL Classification: F23, R12, R15

1 | Introduction

A well-established literature has examined the effects of foreign direct investment (FDI) flows on a range of outcomes in the host economies, including economic growth (Paul and Feliciano-Cestero 2021; Alfaro et al. 2010, 2004; Chakraborty and Nunnenkamp 2008; Borensztein et al. 1998), productivity gains (Amiti et al. 2024; Fons-Rosen et al. 2021; Stojčić and Orlić 2020; Newman et al. 2015; Suyanto et al. 2009) and the adoption of new technologies (Ambos et al. 2006; Lee and Rugman 2012). Nonetheless, and despite a growing literature on trade-induced wage inequality, there is scarce evidence on the effects of FDI on wage inequality in the host economies. While the existing literature tends to focus on the effects of FDI on wage inequality between workers at the industry or firm level in specific countries (Feenstra and Hanson 1995, 1997; Figinini and Görg 1999; Taylor and Driffield 2005; Girma and Görg 2007b; Chen et al. 2011), recent studies have pointed at international investments as

a driver of regional inequalities (Buchholz and Bathelt 2024; Bathelt et al. 2024) and between-firm inequality as the main driver of overall wage inequality (Akerman et al. 2013; Card et al. 2013; Helpman et al. 2016; Sampson 2014; Song et al. 2019). Incorporating these two elements in the analysis of the wage inequality effects is of particular importance. On the one hand, international investment is highly unevenly distributed across regions, with disparities in FDI shown to surpass those in gross domestic product (GDP) or productivity (OECD 2022), making it challenging to grasp its economic effects without considering this regional dimension. On the other hand, FDI can affect wages by increasing firms' revenue in a similar fashion as the exporter revenue premium mechanism studied in the international trade literature (Akerman et al. 2013), thus becoming a source of between-firm and overall wage inequality.

Against this background, this paper examines the causal effect of the presence of multinational enterprises (MNEs) on

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between-firm wage inequality across European regions. MNEs are identified using firm-level data from the Orbis Europe data set over 2012–2021.¹ Among MNEs, we distinguish those holding dominant market shares (i.e., the international superstar firms).

We begin by documenting two empirical trends over the analysed period: (i) between-firm wage dispersion has increased and has been driven by average wages in the top 90th and 95th percentiles; (ii) the regional presence of MNEs shows an upward trend, which is stronger for the top-performing foreign affiliates, both in terms of labour and turnover shares. We then study the effect of the presence of MNEs across European NUTS-2 regions² on regional between-firm wage inequality using measurements such as Gini coefficients and wage percentile ratios. To account for potential endogeneity, we instrument changes in MNEs' presence at the regional level with predicted changes based on the local presence of MNEs in a given industry and the sample-wide change in the MNE labour shares for that industry. Moreover, we control for region-specific determinants of wage inequality identified in the literature, such as technological change and innovation capacity.

To the best of our knowledge, the effects of MNEs and international superstar firms on between-firm wage inequality across regions and countries have not been analysed so far. The novelties of our contribution to the literature are threefold. First, we focus on the dispersion of average wages (wage bill per employee) between firms, which allows us to go beyond existing analyses of wage inequality between industries. Our approach using average wages (computed using data from the Orbis dataset) follows De Loecker et al. (2022) and is motivated by recent research pointing to the rising dispersion of wages between firms as the main driver of rising overall wage inequality (Zwysen 2022; Song et al. 2019; Akerman et al. 2013; Helpman et al. 2016, 2010). However, a limitation of our analysis is that we cannot observe differences in workforce composition across firms and thus empirically determine the role of the within-firm component in addition to the between-firm component of wage inequality. Despite this limitation and given the absence of available linked employer-employee data at region-year level, we believe that our approach is justified by the abundant evidence on the role of the between-firm component in accounting for the rise in wage inequality.³

Second, by exploiting data on firm-level characteristics, we distinguish between different types of MNEs, such as parent firms, foreign-owned firms and foreign-owned firms with dominant market shares (i.e., market power), to determine whether the effects are stronger for these top-performing foreign affiliates. In that regard, our findings point at the parent MNEs and top-performing foreign affiliates as superstar firms which are considerably larger than domestic firms in terms of fixed assets and number of employees, have substantial wage premia, and whose regional presence has sizable effects on between-firm wage inequality.

Third, our paper adds to the literature on the effects of FDI on host economies, particularly on host regions. Specifically, we generate new knowledge on the effects of the presence of MNEs and international superstar firms on between-firm wage

inequality across European regions. The regional and the cross-country approach is also a novelty in the emerging literature on between-firm wage inequality. In that regard, our work relates to the literature on the regional impacts of FDI, which has focused on economic growth and technology spillovers (Stojčić and Orlić 2020; Carbonell and Werner 2018; Y. Wang et al. 2016; Oscar Bajo-Rubio and Díaz-Roldán 2010). Understanding the causal impact of FDI on wage inequality in host regions is also important given increasing evidence on rising regional inequalities (Iammarino et al. 2018; Rosés and Wolf 2021; Bathelt et al. 2024) and increasing concerns about the distributional effects of globalisation that have materialised in a political 'globalisation backlash' (Colantone et al. 2022).

We find that increases in the regional presence of MNEs significantly raise between-firm wage inequality. On average, over and above other factors and using 3-year differences, a 1 percentage point (pp) increase in the foreign affiliates' employment share leads to a 0.3% increase in the Gini coefficient of between-firm wage inequality, while an equivalent increase in the labour share of MNEs parents increases the Gini coefficient by 0.5%. These findings are robust to several model specifications using alternative measures of regional MNE presence, data sources and additional control variables. Importantly, we also find that the effects increase in magnitude when comparing the overall presence of foreign-owned companies to the presence of top-performing foreign-owned companies measured as those in the top quartile and percentile of revenue by region and year.

The remainder of this paper is organised as follows. Section 2 discusses existing related literature. Section 3 presents our empirical approach. Next, Section 4 describes the data and measures used for the analysis and discusses trends of between-firm wage inequality and of foreign affiliates and international superstar firms across European regions. Section 5 discusses our empirical results. Section 6 summarises the key findings and policy implications.

2 | Related Literature

Our work relates to several literatures. Existing studies on the impact of FDI on wage inequality at the industry- or firm-level are country-specific (Feenstra and Hanson 1995, 1997; Figini and Görg 1999; Taylor and Driffield 2005; Girma and Görg 2007b; Chen et al. 2011), while cross-country studies have focused on differences at the macroeconomic level (Pan-Long 1995). Country studies have focused on the impacts of FDI on relative wages and wage inequality between skilled and unskilled workers: Feenstra and Hanson (1997) for Mexico; Figini and Görg (2011) for Ireland; Taylor and Driffield (2005) and Girma and Görg (2007a) for the United Kingdom; Chen et al. (2011) for China. In a cross-country study, Figini and Görg (1999) examine the effects of inward FDI on wage inequality between sectors and workers. They find that inward FDI initially increases wage inequality in developing countries, but this effect diminishes over time, while in developed countries, inward FDI decreases wage inequality.

Several recent studies provide evidence on rising regional inequalities (Iammarino et al. 2018; Kemeny and Storper 2020;

Feldman et al. 2020; Rosés and Wolf 2021; Kemeny et al. 2022; Bathelt et al. 2024). Some of these studies point to technological change and globalisation as the main drivers of the rising regional inequalities without a specific focus on regional wage inequality (Iammarino et al. 2018; Kemeny et al. 2022). Buchholz and Bathelt (2024) argue that international investment can enhance intra-regional inequalities given that the benefits of global connectivity are not equally distributed across workers and space. To support their argument, they cite evidence provided by Boschken (2023) who finds that some of the most globally connected cities in the US have the highest levels of inequality. Crescenzi and Iammarino (2017) point out that openness and global connectivity impact regional development and they put forward a new analytical framework to understand regional development trajectories in this context. Rosés and Wolf (2018) provide evidence on increasing income inequality across EU NUTS-2 regions. Existing studies on increasing wage inequalities within countries over the past decades (Card et al. 2013; De Loecker et al. 2022; Guvenen et al. 2022; Deb et al. 2024) do not relate these inequalities to FDI.

An emerging literature strand focuses on firm heterogeneity as a driver of within-country wage inequality across firms and workers. A key outcome of this literature is that the rise in overall wage inequalities has been driven mainly by increased between-firm inequality (Akerman et al. 2013; Card et al. 2013; Helpman et al. 2016; Sampson 2014; Song et al. 2019). Song et al. (2019) estimate that the increased dispersion of average firm earnings explains two-thirds of overall earnings inequality in the US. Card et al. (2013) find that the rise in the dispersion of firm-level pay premiums has contributed to the increased wage inequality in Germany. This literature has built on previous studies showing that some firms pay higher wages for the same skills (Van Reenen 1996) and that controlling for differences in the composition of observed and unobserved worker characteristics, differences in average firm-level pay between firms have contributed significantly to wage inequality (Abowd et al. 1999; Goux and Maurin 1999). Firm heterogeneity has also been uncovered as a channel through which international trade enhances the dispersion of revenues across firms and increases wage inequality (Akerman et al. 2013; Amiti and Davis 2012; Sampson 2014).

More generally, our paper relates to an extensive literature on the sources of wage inequality. As discussed by Helpman et al. (2016), research in this area highlights differences in workforce composition and labour market frictions as the main sources of wage dispersion across firms. Assuming competitive labour markets, several studies examine wage variation as a consequence of the sorting of workers across firms with different labour demand. Another set of studies introduces labour market imperfections such as search and matching frictions or efficiency or fair wages, leading to wage variation across firms for workers with similar characteristics. Empirically, there is increasing evidence of the between-firm component (i.e., earning variation within sector and occupation) accounting for most of the overall wage inequality (Akerman et al. 2013; Helpman et al. 2016; Song et al. 2019), although recent research also highlights the role of compositional changes in the workforce such

as sorting and segregation of high-skilled workers in explaining wage variation across firms (Song et al. 2019).

Most closely related to our paper is a growing literature on firm heterogeneity, international trade and wage inequality. This literature strand studies international trade as a source of dispersion of revenues across firms that contributes to the between-firm component of wage inequality (Akerman et al. 2013). At the core of this trade-related inequality mechanism is the fact that exporters are larger, more productive and pay higher wages than non-exporters. Hence, the exporter premium occurs due to the selection of larger and more productive firms into exporting (selection effect) and the increased market access of the exporters (market access effect) (Helpman et al. 2016). In this paper, we explore a related channel by focusing on foreign-owned companies belonging to multinational firms, which have been documented to be larger and more productive than non-multinational exporters and domestic firms, which allows them to succeed in an external environment (Amiti et al. 2024; Keller 2021; Taylor and Driffield 2005; Driffield and Taylor 2000). In that regard, the main channel leading to increased between-firm wage dispersion is the presence of larger firms paying higher wages and additionally benefiting from increased market access.

Our paper is also related to recent literature studying the consequences of the rise of large and dominant companies known as ‘superstar firms’ (Autor et al. 2020). While superstars are usually defined as the largest firms by industry (Autor et al. 2020), Amiti et al. (2024) extend the definition to exporters and multinational firms. We build and extend these definitions by identifying the top-performing foreign affiliates at the regional level. In line with the FDI wage premium mechanism described above, we expect the presence of these dominant foreign affiliates to have a larger effect on local between-firm wage inequality.

3 | Empirical Approach

In order to quantify the impact of MNEs presence on between-firm wage inequality across regions, we use an instrumental variables (IV) approach. Specifically, we instrument the change in MNEs presence over 3 years with predicted changes in regional MNEs presence. To eliminate unobserved regional heterogeneity which may be correlated with the presence of MNEs, we difference the variables of interest across 3 years and control for baseline regional characteristics.⁴ We prefer this model to a fixed-effects regression since we can account for unobserved region-specific and time-invariant factors potentially correlated to wage inequality without incurring dimensionality issues. More precisely, we estimate:

$$\Delta \log(\text{Inq}_{jt}) = \beta_0 + \beta_1 \Delta \text{MNE}_{jt} + \Gamma \mathbf{X}_{jt}^0 + \alpha_t + \epsilon_{jt} \quad (1)$$

where Δ is a 3-year difference operator, t denote end-years, t^0 denote base years, and j indexes regions. Inq_j is a measure of between-firm wage inequality; MNE_{jt} is a measure of the presence of foreign affiliates or parent MNEs; \mathbf{X}_{jt}^0 is a vector of regional characteristics in the base years; α_t denote end-year fixed effects; and ϵ_{jt} is an error term.

Our coefficient of interest is β and it quantifies the effect of the changes in the presence of MNEs on between-firm wage inequality across regions once we account for other determinants of wage inequality. Year fixed effects α_t absorb unobserved time-specific shocks affecting between-firm wage inequality across all regions.

We measure the outcome variable in Equation (1) in different ways using Gini coefficients, 90/10 and 90/50 wage percentile ratios. To measure MNE_{jt} we first use regional labour shares of all foreign-owned firms and parent MNEs. In the case of the foreign affiliates, we also look at the regional labour shares of the firms with the top quartile and top percentile revenue in each region and year. The vector of regional characteristics X_{jt}^0 includes the third-level education attainment (the share of the population aged 25–64 with third level education) capturing the sorting of high-skilled workers across regions, the share of employment in knowledge-intensive sectors and the number of employees in Human Resources in Science & Technology per inhabitant as a proxy for the innovation capacity of a given region (Berkes and Gaetani 2023).

A potential identification concern regarding Equation (1) is that MNE presence might increase more in regions with growing between-wage inequality due to time-varying shocks that we cannot control for, such as the presence of production amenities. To address this identification concern, we instrument the actual change in regional MNE presence with a predicted change based on the local presence of MNEs in a given industry and the sample-wide change in the MNE labour shares for that industry. While the literature has typically used lagged values as instruments (D. Wang et al. 2013; Taylor and Driffield 2005; Alfaro et al. 2004), recent research has highlighted that using these instruments requires additional and equally untestable identifying assumptions (Bellemare et al. 2017). Therefore, we prefer a shift-share instrument exploiting the variation of MNE presence across industries and regions. The intuition behind the instrument is that if there is an overall increase in the MNE presence in a certain industry, the resulting increase in MNE presence will be more pronounced in regions with higher pre-existing presence of these firms which reflects the existence of production advantages or know-how. More precisely, we construct:

$$\Delta \widetilde{MNE}_{jt} = \sum_k \eta_{kjt}^0 \cdot \Delta \overline{MNE}_{kt} \quad (2)$$

where η_{kjt}^0 is the MNE employment share of industry k in region j at a reference year t^0 and $\Delta \overline{MNE}_{kt}$ is the mean change of MNE presence in industry k across all the regions in our sample. With our shift-share instrument in hand, we estimate the regression model described in Equation (1) using the instrumental variables two-stage least squares (IV-2SLS) estimator.

4 | Data and Descriptive Statistics

Our analysis uses firm-level data from the Orbis Europe dataset (2012–2021), including firm-level information on ownership, number of employees, wage bill, turnover, total fixed assets and incorporation year for all active firms in 21 EU countries and the UK. Aggregated at the NUTS2 regional level, our dataset

comprises 195 regions. Orbis, provided by Bureau van Dijk-Moody's, covers over 200 million companies and includes firms' location details, enabling geographic analysis used in prior studies (Stavropoulos et al. 2020; Cortinovis and Van Oort 2015; Temouri 2012).

Nonetheless, there are different data limitations related to Orbis, such as the variation in coverage across counties that have been previously identified in the literature (Kalemli-Ozcan et al. 2015). This setback can be amplified when focusing on sub-national level geographic units. To mitigate concerns about coverage variation over space and time, we look at the sample average share of regional employment from Eurostat's Structural and Business Statistics (SBS) accounted for by Orbis and further restrict the sample by dropping countries with very low average coverage, such as Iceland, Luxembourg and Malta. Additionally, we weight all regression models by SBS employment to further alleviate concerns about our results being altered by uneven coverage. Finally, as a robustness check, we show that our results hold when restricting the sample to countries with at least 50% employment coverage, as identified by Kalemli-Ozcan et al. (2015) and construct our dependent variable using CompNet average labour costs per employee aggregated at the NUTS2 level. CompNet provides micro-aggregated indicators at industry level computed based on confidential firm-level data by national data providers for 14 European countries in our sample.

The outcome variable of interest in the empirical analysis is the 3-year log difference in the between-firm inequality of mean wages (i.e., wage bill per employee) at the regional level, which we measure using Gini coefficients, 90/10 and 90/50 wage percentile ratios. We exclude the top and bottom five percentiles when differencing the data in order to remove the outliers. To construct these regional inequality measures, we adjust firm-level observed wages with firms' observable characteristics such as size and age. While this approach is conservative in that part of the wage premium between MNEs and domestic firms can be due to differences in these observable characteristics, it allows for accounting for potential differences that can directly arise from variation of these factors across sectors of activity or regional industry concentration. More precisely, we adjust wages per employee by using a firm-level regression with the following specification:

$$W_{ijt} = F_{ijt}\gamma + e_{ijt} \quad (3)$$

where W_{ijt} are observed mean wages per employee for firm i located in region j in year t , F_{ijt} is a vector of individual characteristics including size, age and age squared, and e_{ijt} is an error term. We refer to the residuals of this regression as the residualised wages and use them to construct the measures of between-firm wage inequality in each region j and time t .⁵ When using CompNet, since we cannot observe firm-level characteristics, we use the 10th, 50th and 90th percentiles in observed wages to construct 90/10 and 90/50 observed wage percentile ratios.

The main explanatory variable is the 3-year change in the regional presence of MNEs. For the baseline estimates, following a common approach in the literature, we define foreign affiliates as firms with at least 10% of foreign direct ultimate ownership and with 10 or more employees, excluding those in health,

education and government sectors.⁶ Similarly, parent MNEs are defined as shareholders with more than 10% ultimate ownership and at least 10 employees. In the case of foreign affiliates, we further define superstar foreign-owned firms as those with revenues in the top quartile and decile by region and year, respectively. Since the ownership status could have changed over the studied period, we use the Orbis M&A dataset to update the status to domestic/foreign before the M&A transaction occurs whenever the firm identifier can be traced.⁷ At the region level, we use labour shares of these MNEs in regional employment as a measure of FDI local presence. Since superstar firms can display lower employment shares (Autor et al. 2020), we also substitute them with regional turnover shares as a robustness exercise.

Regarding our regional control variables, we obtain the population shares with third-level education attainment, the share of employment in high-technology sectors, and the number of employees in Human Resources in Science & Technology (ST) per inhabitant from the Eurostat Regional database. Detailed definitions of variables and data sources are given in Table A1 in Appendix A.

In Table 1, we report summary statistics for individual firm characteristics by distinguishing between domestic, foreign affiliates and parent MNEs. On average, foreign affiliates are two times larger than domestic firms in terms of number of employees and fixed assets, and they pay about 15% higher wages. Among these foreign affiliates, those in the top quartile of revenue reported in column 3 are nearly three times larger and pay 30% higher wages than the average foreign-owned firms. Additionally, these foreign affiliates have a higher average regional labour share than the domestic firms. The last column reports the average outcomes for parent MNEs and documents that these firms are substantially larger than their mean wages, which are nearly double those paid by foreign affiliates.

We next document trends in between-firm wage dispersion and MNE presence across regions over time. Figure 1 plots the average of different wage percentiles across NUTS2 regions weighted

by regional employment and shows that between-firm wage dispersion has increased over the analysed period. Mean wages in the 90th and 95th percentiles have persistently increased, while those in the 50th percentile have remained stagnant after 2013. This increase in wage inequality⁸ between firms is also captured by increasing trends in mean regional Gini coefficients and the mean 90/10 wage percentile ratio (Figure 2). Finally, we report the trends in the employment shares of MNEs in Figure 3 which documents that the mean regional employment share of both foreign affiliates and parent MNEs has consistently increased during the studied period⁹.

5 | Estimation Results

5.1 | Baseline Estimates

We start by presenting the results when measuring regional between-firm wage inequality using the Orbis Europe database. All models are weighted by regional employment and standard errors are clustered at the region level. Table 2 presents the results when the explanatory variable of interest is the regional labour share of foreign-owned firms and parent MNEs. The outcome variable is the regional Gini coefficient in models (1–2), the 90/10 wage percentile ratio in models (3–4) and the 90/50 wage percentile ratio in models (5–6). OLS estimates in Panel A document that regions with an increasing presence of foreign affiliates and parent MNEs experienced, on average, over and above other factors, higher between-firm wage inequality measured with the Gini coefficient and the 90/10 wage percentile ratio. According to these estimates, a 1 pp increase in the regional labour share of foreign affiliates is associated with a 0.33% increase in the Gini index and a 0.05% increase in the 90/10 ratio. Similarly, a 1 pp increase in the labour share of parent MNEs is associated with a 0.49% increase in the Gini index and a 0.07% increase in the 90/10 ratio.

Panel B reports the 2SLS estimates which are slightly smaller but remain statistically significant at the 5% level. Moreover,

TABLE 1 | Firm-level summary statistics.

	Domestic	Foreign affiliates	Foreign affiliates top performers	Parent MNEs
Employees	28.15 (320.48)	56.24 (541.79)	86.26 (761.32)	497.91 (2724.84)
Fixed assets (euro mn)	6.59 (213.74)	12.16 (227.34)	20.49 (326.97)	199.47 (1483.55)
Log average wages	4.22 (0.96)	4.37 (0.74)	4.53 (0.67)	5.29 (0.61)
Turnover (euro mn)	5.20 (77.03)	11.12 (225.57)	19.57 (307.06)	149.42 (1408.40)
Regional labour share (%)	0.09 (0.82)	0.15 (1.25)	0.17 (1.14)	1.06 (4.47)
Observations	1,752,467	92,835	41,422	32,403

Note: Standard deviations in parentheses. Monetary values are in constant 2018 prices calculated using the Eurostat harmonised CPIs. Wages are adjusted using Equation (3).

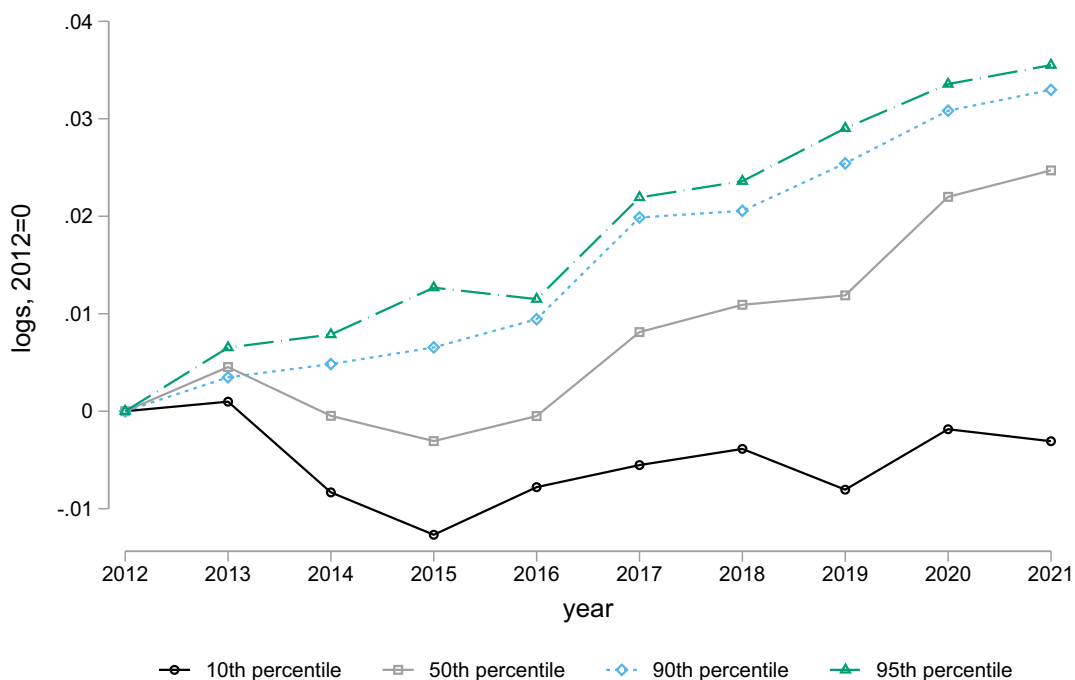


FIGURE 1 | Wage percentiles across regions. Weighted average firm wages across NUTS2 regions in 21 EU countries and the UK. Series are winsorised at the 5th and 95th percentiles by year. *Source:* Authors' calculations using data from the Orbis Europe. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

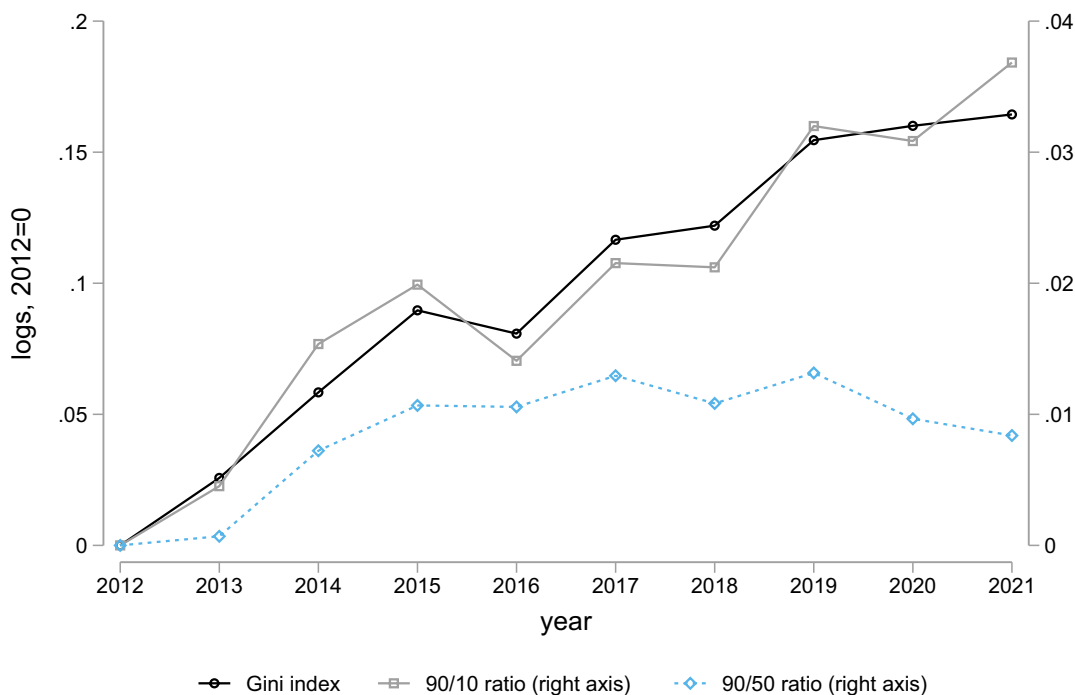


FIGURE 2 | Between-firm wage inequality across regions. Weighted average firm wages across NUTS2 regions in 21 EU countries and the UK. Series are winsorised at the 5th and 95th percentiles by year. *Source:* Authors' calculations using data from the Orbis Europe. [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

the shift-share instruments are strong predictors of the regional labour shares of both types of international firms as suggested by the heteroskedasticity-robust Kleibergen–Paap F statistics reported in Panel B which exceed the cutoff of 10 Staiger and Stock (1997).

We next investigate whether the effects differ when considering the regional presence of foreign affiliates with dominant market shares. Table 3 presents the results when we focus on the labour shares of the foreign-owned firms within the top quartile and percentile of revenue by year and region, respectively. We

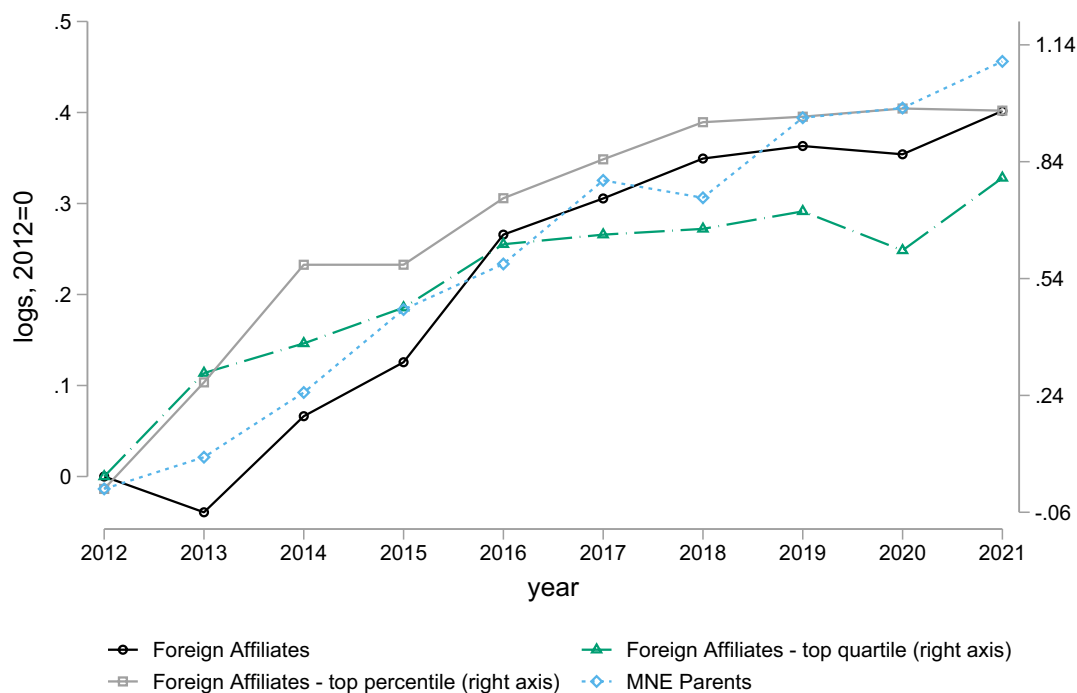


FIGURE 3 | MNE regional labour shares across regions. Weighted average firm wages across NUTS2 regions in 21 EU countries and the UK. Series are winsorized at the 5th and 99th percentiles by year. Foreign affiliates and parent MNEs defined with a > 10% threshold for direct ownership. Top performers foreign affiliates are defined given revenue shares by region and year. *Source:* Authors' calculations using data from the Orbis Europe and Eurostat. [Colour figure can be viewed at wileyonlinelibrary.com]

find that the IV estimates are larger than the ones obtained with the overall labour share of foreign-owned firms, suggesting that the effects are driven by the presence of these superstar international firms. Namely, a 1 pp increase in the regional labour share of the foreign affiliates with the top 25% revenue increases the Gini coefficient by 0.39%, while the effect increases to 0.46% when considering the employment share of the foreign affiliates within the top 10% revenue.

To gain a more granular understanding of the impact of foreign firm presence on the wage distribution, we estimate separate regressions for a range of percentiles of the regional wage distribution instead of focusing solely on summary statistics like the 90/10 and 90/50 ratios. Specifically, we regress the log wage levels at each 10th, 50th and 90th percentile on the regional labour shares of foreign affiliates and parent MNEs. Table A5 presents the results, highlighting heterogeneity across the distribution. We find that a higher regional labour share of foreign affiliates and parent MNEs is associated with a decline in wages at the lower end (10th percentile), no significant effect at the median (50th percentile) and a positive effect at the upper end (90th percentile).

5.2 | Robustness

We conduct several robustness checks. First, we use the CompNet database to obtain wage percentile ratios instead of aggregating firm-level wages from the Orbis dataset. CompNet provides micro-aggregated indicators computed on the basis of firm-level data by national data providers for 14 countries in our sample. Although the sample size is smaller given the number of countries that are covered, CompNet indicators are constructed

using nationally representative firm-level datasets and allow us to further control for additional regional determinants of between-firm wage inequality. We use the 10, 50 and 90 percentiles to construct comparable 90/10 and 90/50 wage percentile ratios. Table 4 reports the 2SLS estimates when we use this alternative data source and shows a positive and significant effect of the regional presence of foreign affiliate firms on between-firm wage inequality. The estimates also increase in magnitude when considering the top-performing firms in the top quartile and percentile. However, in contrast to our baseline estimates, the coefficients for the parent MNE regional employment shares are not statistically significant.

Moreover, using CompNet data, we also control for average regional labour markdowns to proxy for employer market power, defined as the ratio between firms' marginal revenue product of labour and its wage (Yeh et al. 2022). Table A6 shows that our main results are robust to adding this regional control.

Second, we define the ownership link with a 50% ownership instead of 10% as a threshold, another common cutoff used in the literature (Fons-Rosen et al. 2021) and using turnover regional shares instead of labour shares since superstar firms' labour shares can decline over time (Autor et al. 2020). Estimates reported in Tables A8 and A7 confirm our findings are robust to these alternative measures.

Finally, we restrict our sample to countries with at least 50% employment coverage as identified by Kalemli-Ozcan et al. (2015) in order to address potential concerns related to the uneven coverage of Orbis. Estimation results reported in Table A9 show that the estimates are similar in magnitude and more precisely

TABLE 2 | Regional MNE presence and between-firm wage inequality.

Outcome variable	Gini index		90/10 ratio		90/50 ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A. OLS estimates</i>						
Δ Foreign aff. employment share	0.333** (0.1342)		0.051*** (0.0195)		0.021 (0.0151)	
Δ Parent MNE employment share		0.486*** (0.1338)		0.067*** (0.0162)		0.044*** (0.0093)
Third level education	-0.292*** (0.0807)	-0.310*** (0.0827)	-0.034** (0.0131)	-0.036*** (0.0134)	-0.018** (0.0093)	-0.020** (0.0091)
HR in ST per capita	0.502*** (0.1182)	0.526*** (0.1192)	0.060*** (0.0183)	0.063*** (0.0183)	0.028** (0.0129)	0.031** (0.0127)
High tech employment share	-0.074*** (0.0263)	-0.070*** (0.0263)	-0.007 (0.0048)	-0.006 (0.0047)	-0.004 (0.0039)	-0.004 (0.0037)
<i>N</i>	1031	1031	1032	1032	1032	1032
<i>R</i> ²	0.111	0.161	0.070	0.096	0.047	0.084
<i>Panel B. 2SLS estimates</i>						
Δ Foreign aff. employment share	0.315** (0.1350)		0.050** (0.0201)		0.101 (0.0883)	
Δ Parent MNE employment share		0.472*** (0.1362)		0.066*** (0.0169)		0.051 (0.0749)
<i>N</i>	1031	1031	1032	1032	1032	1032
<i>R</i> ²	0.111	0.161	0.070	0.096	0.059	0.056
Kleibergen–Paap <i>F</i> stat	49.135	36.694	49.097	36.588	49.097	36.588
First stage coefficient	0.415*** (0.0592)	0.483*** (0.0797)	0.415*** (0.0592)	0.483*** (0.0798)	0.415*** (0.0592)	0.483*** (0.0798)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional labour shares are instrumented in Panel B using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

** $p < 0.05$.

*** $p < 0.01$.

estimated when we restrict the sample to the regions in these countries.

5.3 | Heterogeneity

In this subsection we explore the heterogeneity of the estimated effects across regions of different characteristics. First, we consider two broad income groups by splitting the sample into regions above and below the median GDP per capita. Using the 2SLS model, Table 5 reports that the estimated coefficients are consistently significant for regions above the median income. These heterogeneous effects across regions with different income levels likely reflect underlying differences in the ability of regions to attract and absorb foreign investment. In particular, this finding is consistent with earlier evidence from district-level analyses of FDI location decisions (Mukim and

Nunnenkamp 2012), which show that foreign investors are more likely to enter areas with existing foreign investment, stronger infrastructure and better institutional conditions, which in turn should be more prevalent for the more productive MNEs.

6 | Conclusions

In this paper, we examined between-firm wage inequality across European regions, focusing on the role of foreign direct investment and international top firms with dominant market shares within the region where they are located. For this purpose, we used firm-level data from the Orbis Europe and CompNet datasets combined with economic and social data for European regions from 2012 to 2021. In terms of empirical methodology, to identify causal effects, we use a shift-share instrumental variables empirical approach.

TABLE 3 | Top performing foreign affiliates and between-firm wage inequality across regions—IV estimates.

Outcome variable	Gini index		90/10 ratio		90/50 ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Foreign aff.—Q1 employment share	0.386** (0.1637)		0.062*** (0.0236)		0.124 (0.1071)	
Δ Foreign aff.—P1 employment share		0.463** (0.1924)		0.074*** (0.0271)		0.149 (0.1264)
Third level education	-0.338*** (0.0871)	-0.341*** (0.0855)	-0.041*** (0.0133)	-0.042*** (0.0132)	-0.167*** (0.0500)	-0.168*** (0.0499)
HR in ST per capita	0.576*** (0.1281)	0.585*** (0.1262)	0.072*** (0.0188)	0.073*** (0.0186)	0.296*** (0.0718)	0.299*** (0.0719)
High-tech employment share	-0.079*** (0.0272)	-0.083*** (0.0272)	-0.008 (0.0049)	-0.008* (0.0049)	-0.016 (0.0241)	-0.017 (0.0239)
<i>N</i>	1031	1031	1032	1032	1032	1032
<i>R</i> ²	0.084	0.071	0.066	0.050	0.054	0.050
Kleibergen–Paap <i>F</i> stat	40.850	41.123	41.090	41.110	41.090	41.110
First stage coefficient	0.338*** (0.0528)	0.282*** (0.0440)	0.338*** (0.0527)	0.282*** (0.0440)	0.338*** (0.0527)	0.282*** (0.0440)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional labour shares are instrumented using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

TABLE 4 | Regional MNE presence and between-firm wage inequality—IV estimates using CompNet data.

Outcome variable	90/10 ratio				90/50 ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Foreign aff. employment share	0.108** (0.0465)				0.083*** (0.0306)			
Δ Parent MNE employment share		0.070 (0.0430)				0.010 (0.0295)		
Δ Foreign aff.—Q1 employment share			0.130** (0.0545)				0.100*** (0.0370)	
Δ Foreign aff.—P1 employment share				0.160** (0.0667)				0.123*** (0.0477)
Third level education	-0.175*** (0.0502)	-0.174*** (0.0498)	-0.154*** (0.0505)	-0.157*** (0.0499)	-0.024 (0.0269)	-0.030 (0.0280)	-0.008 (0.0273)	-0.010 (0.0281)
HR in ST per capita	0.196*** (0.0746)	0.195*** (0.0754)	0.162** (0.0773)	0.166** (0.0761)	0.013 (0.0399)	0.022 (0.0422)	-0.014 (0.0415)	-0.011 (0.0424)
High tech employment share	0.005 (0.0161)	0.003 (0.0164)	0.009 (0.0161)	0.010 (0.0160)	0.011 (0.0097)	0.008 (0.0104)	0.014 (0.0097)	0.015 (0.0098)
<i>N</i>	651	651	651	651	651	651	651	651
<i>R</i> ²	0.207	0.201	0.204	0.196	0.069	0.048	0.068	0.050
Kleibergen–Paap <i>F</i> stat	39.128	33.939	29.715	21.471	39.128	33.939	29.715	21.471
First stage coefficient	0.427*** (0.0682)	0.512*** (0.0879)	0.352*** (0.0646)	0.286*** (0.0618)	0.427*** (0.0682)	0.512*** (0.0879)	0.352*** (0.0646)	0.286*** (0.0618)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices from the CompNet database. Differences in MNE regional labour shares are using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

** $p < 0.05$.

*** $p < 0.01$.

TABLE 5 | Regional MNE presence and between-firm wage inequality—heterogeneity.

	Below median GDP per capita				Above median GDP per capita			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A. Outcome variable: Gini index</i>								
Δ Foreign aff. employment share	0.204 (0.2237)				0.364** (0.1585)			
Δ Parent MNE employment share		0.611** (0.2670)				0.427*** (0.1532)		
Δ Foreign aff.—Q1 employment share			0.251 (0.2676)				0.442** (0.1924)	
Δ Foreign aff.—P1 employment share				0.321 (0.3283)				0.522** (0.2257)
<i>N</i>	517	517	517	517	514	514	514	514
<i>R</i> ²	0.176	0.267	0.192	0.176	0.098	0.125	0.034	0.028
Kleibergen–Paap <i>F</i> stat	33.957	5.271	25.937	60.446	24.130	19.757	18.147	26.310
<i>Panel B. Outcome variable: 90/10 ratio</i>								
Δ Foreign aff. employment share	0.038 (0.0342)				0.058** (0.0234)			
Δ Parent MNE employment share		0.045 (0.0304)				0.072*** (0.0205)		
Δ Foreign aff.—Q1 employment share			0.047 (0.0411)				0.071*** (0.0271)	
Δ Foreign aff.—P1 employment share				0.060 (0.0511)				0.083*** (0.0309)
<i>N</i>	517	517	517	517	515	515	515	515
<i>R</i> ²	0.129	0.135	0.136	0.118	0.068	0.099	0.046	0.035
Kleibergen–Paap <i>F</i> stat	33.957	5.271	25.937	60.446	24.111	19.741	18.251	26.297
First stage coefficient	0.415*** (0.0592)	0.483*** (0.0797)	0.338*** (0.0528)	0.282*** (0.0440)	0.415*** (0.0592)	0.483*** (0.0798)	0.338*** (0.0527)	0.282*** (0.0440)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional labour shares are instrumented using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

** $p < 0.05$.

*** $p < 0.01$.

We document that between-firm wage dispersion has increased over the analysed period, and it has been driven by average wages in the top 90th and 95th percentiles. Consequently, we observe increased wage inequality between firms, as shown by upward trends in the 90/10 wage percentiles ratio and Gini coefficients across regions. Furthermore, we document that mean regional employment shares of foreign-owned companies have consistently increased between 2012 and 2021.

Our estimates indicate that, on average, over and above other factors, a one percentage point increase in the foreign affiliates' employment share increases the Gini coefficient of between-firm

wage inequality by 0.3% over a 3-year period, while an equivalent increase in the labour share of parent MNEs increases the Gini coefficient by 0.5%. The effects increase in magnitude when considering other indices of between-firm wage inequality and the regional presence of superstar firms among those with foreign ownership.

Taken together, the key findings of this paper suggest that FDI and international superstar firms have contributed to increased wage inequality between firms across European regions over the period 2012–2021. While increased wage inequality between firms might appear to be less of a concern (see, for example, De

Loecker et al. 2022), as discussed in the Introduction, international evidence indicates that it can lead to increased overall income inequality (see, for example, Song et al. 2019). As documented in a large literature, overall income inequality is negatively correlated with health outcomes and life expectancy, access to education and equal opportunities, and it can also adversely affect economic performance, social cohesion and political stability (OECD 2015a, 2015b). To mitigate such potential unfavourable economic, social and political effects associated with increased between-firm wage inequality, we suggest that policy measures aimed at enhancing spillovers from highly innovative and productive international superstar firms to domestic firms could foster productivity and wages and thus help achieve a more equal income distribution across firms. Such policy measures include strengthening the absorptive capacity of domestic firms (Cohen and Levinthal 1989; Barrios et al. 2005; Girma and Görg 2007b) and enabling supply chain linkages between superstar firms and domestic firms (Havranek and Irsova 2011; Di Ubaldo et al. 2018; Alfaro-Ureña et al. 2022; Amiti et al. 2024).

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

This study used third-party data made available under a licence that the authors do not have permission to share. Requests to access the data should be directed to Bureau van Dijk for the Orbis Europe data sets and to the CompNet Secretariat for the CompNet data set.

Endnotes

- ¹ Access to the Orbis Europe data set is provided by under a Licence Agreement from Bureau van Dijk-Moody's.
- ² NUTS-2 regions are defined using the Nomenclature of Territorial Units for Statistics, the Eurostat's classification of geographical units in European countries.
- ³ In particular, Zwysen (2022) documents that the increase in earnings inequality across EU member states between 2005 and 2018 is disproportionately driven by rising variation between establishments using data from the Structure of Earnings Survey (SES). Using the SES database as an alternative input to compute wage dispersion is not feasible in our setting since it is carried out every 4 years and it is only available at the NUTS1 level.
- ⁴ While a model of 10 or 5 years differences would be preferable to capture longer term changes within regions, we opt for 3-year differences to maximise the number of regions included given our sample period.

⁵ The estimation results of this regression are shown in Table A4 in the Appendix.

⁶ Restricting the analysis to firms with more than 10 employees also helps to alleviate concerns related to non-productive inward FDI with non-physical presence in the destination region. Our results are robust to including all foreign affiliates.

⁷ We are able to identify nearly 1500 firms involved in M&A in our sample, which amounts to 0.6% of the total number of firms.

⁸ Table A3 in the Appendix presents summary statistics for the dependent and control variables, across regions over the studied period.

⁹ Table A2 in the Appendix presents the country coverage of each dataset.

References

- Abowd, J. M., F. Kramarz, and D. N. Margolis. 1999. "High Wage Workers and High Wage Firms." *Econometrica* 67, no. 2: 251–333.
- Akerman, A., E. Helpman, O. Itskhoki, M.-A. Muendler, and S. Redding. 2013. "Sources of Wage Inequality." *American Economic Review* 103, no. 3: 214–219.
- Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek. 2004. "FDI and Economic Growth: The Role of Local Financial Markets." *Journal of International Economics* 64, no. 1: 89–112.
- Alfaro, L., A. Chanda, S. Kalemli-Ozcan, and S. Sayek. 2010. "Does Foreign Direct Investment Promote Growth? Exploring the Role of Financial Markets on Linkages." *Journal of Development Economics* 91, no. 2: 242–256.
- Alfaro-Ureña, A., I. Manelici, and J. P. Vasquez. 2022. "The Effects of Joining Multinational Supply Chains: New Evidence From Firm-to-Firm Linkages." *Quarterly Journal of Economics* 137, no. 3: 1495–1552.
- Ambos, T. C., B. Ambos, and B. B. Schlegelmilch. 2006. "Learning From Foreign Subsidiaries: An Empirical Investigation of Headquarters' Benefits From Reverse Knowledge Transfers." *International Business Review* 15, no. 3: 294–312.
- Amiti, M., and D. R. Davis. 2012. "Trade, Firms, and Wages: Theory and Evidence." *Review of Economic Studies* 79, no. 1: 1–36.
- Amiti, M., C. Duprez, J. Konings, and J. Van Reenen. 2024. "FDI and Superstar Spillovers: Evidence From Firm-to-Firm Transactions." *Journal of International Economics* 152: 103972.
- Autor, D., D. Dorn, L. F. Katz, C. Patterson, and J. Van Reenen. 2020. "The Fall of the Labor Share and the Rise of Superstar Firms." *Quarterly Journal of Economics* 135, no. 2: 645–709.
- Barrios, S., H. Görg, and E. Strobl. 2005. "Foreign Direct Investment, Competition and Industrial Development in the Host Country." *European Economic Review* 49, no. 7: 1761–1784.
- Bathelt, H., M. Buchholz, and M. Storper. 2024. "The Nature, Causes, and Consequences of Inter-Regional Inequality." *Journal of Economic Geography* 24, no. 3: 353–374.
- Bellemare, M. F., T. Masaki, and T. B. Pepinsky. 2017. "Lagged Explanatory Variables and the Estimation of Causal Effect." *Journal of Politics* 79, no. 3: 949–963.
- Berkes, E., and R. Gaetani. 2023. "Income Segregation and the Rise of the Knowledge Economy." *American Economic Journal: Applied Economics* 15, no. 2: 69–102.
- Borensztein, E., J. De Gregorio, and J.-W. Lee. 1998. "How Does Foreign Direct Investment Affect Economic Growth?" *Journal of International Economics* 45, no. 1: 115–135.
- Boschken, H. L. 2023. "Economic Inequality in US Global Cities." *Journal of Urban Affairs* 45, no. 10: 1785–1803.

- Buchholz, M., and H. Bathelt. 2024. "Relational Hinterlands in the USA Have Become Disconnected From Major Global Centres." *Cambridge Journal of Regions, Economy and Society* 17, no. 1: 219–234.
- Carbonell, J. B., and R. A. Werner. 2018. "Does Foreign Direct Investment Generate Economic Growth? A New Empirical Approach Applied to Spain." *Economic Geography* 94, no. 4: 425–456.
- Card, D., J. Heining, and P. Kline. 2013. "Workplace Heterogeneity and the Rise of West German Wage Inequality." *Quarterly Journal of Economics* 128, no. 3: 967–1015.
- Chakraborty, C., and P. Nunnenkamp. 2008. "Economic Reforms, FDI, and Economic Growth in India: A Sector Level Analysis." *World Development* 36, no. 7: 1192–1212.
- Chen, Z., Y. Ge, and H. Lai. 2011. "Foreign Direct Investment and Wage Inequality: Evidence From China." *World Development* 39, no. 8: 1322–1332.
- Cohen, W. M., and D. A. Levinthal. 1989. "Innovation and Learning: The Two Faces of R&D." *Economic Journal* 99, no. 397: 569–596.
- Colantone, I., G. Ottaviano, and P. Stanig. 2022. "The Backlash of Globalization." In *Handbook of International Economics: International Trade*, edited by G. Gopinath, E. Helpman, and K. Rogoff, vol. 5, 405–477. Elsevier.
- Cortinovis, N., and F. Van Oort. 2015. "Variety, Economic Growth and Knowledge Intensity of European Regions: A Spatial Panel Analysis." *Annals of Regional Science* 55, no. 1: 7–32.
- Crescenzi, R., and S. Iammarino. 2017. "Global Investments and Regional Development Trajectories: The Missing Links." *Regional Studies* 51, no. 1: 97–115.
- De Loecker, J., T. Obermeier, and J. Van Reenen. 2022. "Firms and Inequalities." *Institute for Fiscal Studies* 1: 1–41.
- Deb, S., J. Eeckhout, A. Patel, and L. Warren. 2024. "Walras–Bowley Lecture: Market Power and Wage Inequality." *Econometrica* 92, no. 3: 603–636.
- Di Ubaldo, M., M. Lawless, and I. Siedschlag. 2018. "Productivity Spillovers From Multinational Activity to Local Firms in Ireland." OECD Productivity Working Papers, 16.
- Driffield, N., and K. Taylor. 2000. "FDI and the Labour Market: A Review of the Evidence and Policy Implications." *Oxford Review of Economic Policy* 16, no. 3: 90–103.
- Feenstra, R. C., and G. H. Hanson. 1995. "Foreign Investment, Outsourcing and Relative Wages." NBER Working Paper Series, 5121.
- Feenstra, R. C., and G. H. Hanson. 1997. "Foreign Direct Investment and Relative Wages: Evidence From Mexico's Maquiladoras." *Journal of International Economics* 42, no. 3: 371–393.
- Feldman, M., F. Guy, and S. Iammarino. 2020. "Regional Income Disparities, Monopoly and Finance." *Cambridge Journal of Regions, Economy and Society* 14, no. 1: 25–49.
- Figini, P., and H. Görg. 1999. "Multinational Companies and Wage Inequality in the Host Country: The Case of Ireland." *Weltwirtschaftliches Archiv* 135, no. 4: 594–612.
- Figini, P., and H. Görg. 2011. "Does Foreign Direct Investment Affect Wage Inequality? An Empirical Investigation." *World Economy* 34, no. 9: 1455–1475.
- Fons-Rosen, C., S. Kalemli-Ozcan, B. E. Sørensen, C. Villegas-Sanchez, and V. Volosovych. 2021. "Quantifying Productivity Gains From Foreign Investment." *Journal of International Economics* 131: 103456.
- Girma, S., and H. Görg. 2007a. "Evaluating the Foreign Ownership Wage Premium Using a Difference-In-Differences Matching Approach." *Journal of International Economics* 72, no. 1: 97–112.
- Girma, S., and H. Görg. 2007b. "Multinationals' Productivity Advantage: Scale or Technology?" *Economic Inquiry* 45, no. 2: 350–362.
- Goux, D., and E. Maurin. 1999. "Persistence of Interindustry Wage Differentials: A Reexamination Using Matched Worker-Firm Panel Data." *Journal of Labor Economics* 17, no. 3: 492–533.
- Guvenen, F., L. Pistaferri, and G. L. Violante. 2022. "Global Trends in Income Inequality and Income Dynamics: New Insights From GRID." *Quantitative Economics* 13, no. 4: 1321–1360.
- Havranek, T., and Z. Irsova. 2011. "Estimating Vertical Spillovers From FDI: Why Results Vary and What the True Effect Is." *Journal of International Economics* 85, no. 2: 234–244.
- Helpman, E., O. Itskhoki, M.-A. Muendler, and S. J. Redding. 2016. "Trade and Inequality: From Theory to Estimation." *Review of Economic Studies* 84, no. 1: 357–405.
- Helpman, E., O. Itskhoki, and S. Redding. 2010. "Inequality and Unemployment in a Global Economy." *Econometrica* 78, no. 4: 1239–1283.
- Iammarino, S., A. Rodriguez-Pose, and M. Storper. 2018. "Regional Inequality in Europe: Evidence, Theory and Policy Implications." *Journal of Economic Geography* 19, no. 2: 273–298.
- Kalemli-Ozcan, S., B. Sørensen, C. Villegas-Sanchez, V. Volosovych, and S. Yesiltas. 2015. "How to Construct Nationally Representative Firm Level Data From the Orbis Global Database: New Facts and Aggregate Implications." NBER Working Paper Series, 21558.
- Keller, W. 2021. "Knowledge Spillovers, Trade, and FDI." NBER Working Paper Series, 28739.
- Kemeny, T., S. Petralia, and M. Storper. 2022. "Disruptive Innovation and Spatial Inequality." *Regional Studies* 59, no. 1: 1–18.
- Kemeny, T., and M. Storper. 2020. "The Fall and Rise of Interregional Inequality: Explaining Shifts From Convergence to Divergence." *Scienze Regionali, Italian Journal of Regional Science* 19: 175–198.
- Lee, I. H., and A. M. Rugman. 2012. "Firm-Specific Advantages, Inward FDI Origins, and Performance of Multinational Enterprises." *Journal of International Management* 18, no. 2: 132–146.
- Mukim, M., and P. Nunnenkamp. 2012. "The Location Choices of Foreign Investors: A District-Level Analysis in India." *World Economy* 35, no. 7: 886–918.
- Newman, C., J. Rand, T. Talbot, and F. Tarp. 2015. "Technology Transfers, Foreign Investment and Productivity Spillovers." *European Economic Review* 76: 168–187.
- OECD. 2015a. *All on Board: Making Inclusive Growth Happen*. OECD Publishing.
- OECD. 2015b. *In It Together: Why Less Inequality Benefits All*. OECD Publishing.
- OECD. 2022. "The Geography of Foreign Investment in OECD Member Countries." OECD Business and Finance Policy Papers, 20.
- Oscar Bajo-Rubio, C. D.-M., and C. Díaz-Roldán. 2010. "Foreign Direct Investment and Regional Growth: An Analysis of the Spanish Case." *Regional Studies* 44, no. 3: 373–382.
- Pan-Long, T. 1995. "Foreign Direct Investment and Income Inequality: Further Evidence." *World Development* 23, no. 3: 469–483.
- Paul, J., and M. M. Feliciano-Cestero. 2021. "Five Decades of Research on Foreign Direct Investment by MNEs: An Overview and Research Agenda." *Journal of Business Research* 124: 800–812.
- Rosés, J. R., and N. Wolf. 2018. "Regional Economic Development in Europe, 1900–2010: A Description of the Patterns." In *The Economic Development of Europe's Regions*, 3–41. Routledge.

- Rosés, J. R., and N. Wolf. 2021. "Regional Growth and Inequality in the Long-Run: Europe, 1900–2015." *Oxford Review of Economic Policy* 37, no. 1: 17–48.
- Sampson, T. 2014. "Selection Into Trade and Wage Inequality." *American Economic Journal: Microeconomics* 6, no. 3: 157–202.
- Song, J., D. J. Price, F. Guvenen, N. Bloom, and T. Von Wachter. 2019. "Firming Up Inequality." *Quarterly Journal of Economics* 134, no. 1: 1–50.
- Staiger, D., and J. H. Stock. 1997. "Instrumental Variables Regression With Weak Instruments." *Econometrica* 65, no. 3: 557–586.
- Stavropoulos, S., F. van Oort, and M. Burger. 2020. "Heterogeneous Relatedness and Firm Productivity." *Annals of Regional Science* 65: 403–437.
- Stojčić, N., and E. Orlić. 2020. "Spatial Dependence, Foreign Investment and Productivity Spillovers in New EU Member States." *Regional Studies* 54, no. 8: 1057–1068.
- Suyanto, S., R. Salim, and H. Bloch. 2009. "Does Foreign Direct Investment Lead to Productivity Spillovers? Firm Level Evidence From Indonesia." *World Development* 37, no. 12: 1861–1876.
- Taylor, K., and N. Driffield. 2005. "Wage Inequality and the Role of Multinationals: Evidence From UK Panel Data." *Labour Economics* 12, no. 2: 223–249.
- Temouri, Y. 2012. "The Cluster Scoreboard: Measuring the Performance of Local Business Clusters in the Knowledge Economy." OECD Local Economic and Employment Development (LEED) Papers.
- Van Reenen, J. 1996. "The Creation and Capture of Rents: Wages and Innovation in a Panel of UK Companies." *Quarterly Journal of Economics* 111, no. 1: 195–226.
- Wang, D., F. F. Gu, K. T. David, and C. K. B. Yim. 2013. "When Does FDI Matter? The Roles of Local Institutions and Ethnic Origins of FDI." *International Business Review* 22, no. 2: 450–465.
- Wang, Y., J. L. Luta Ning, and M. Prevezer. 2016. "Foreign Direct Investment Spillovers and the Geography of Innovation in Chinese Regions: The Role of Regional Industrial Specialization and Diversity." *Regional Studies* 50, no. 5: 805–822.
- Yeh, C., C. Macaluso, and B. Hershbein. 2022. "Monopsony in the US Labor Market." *American Economic Review* 112, no. 7: 2099–2138.
- Zwysen, W. 2022. "Wage Inequality Within and Between Firms: Macroeconomic and Institutional Drivers in Europe." ETUI Research Paper-Working Paper 2022.02.

Appendix A

TABLE A1 | Variables definitions and data sources.

Variable	Description	Data source
Regional units	Nomenclature of Territorial Units at the second level (NUTS2)	Eurostat
Wage per employee	Cost of employees over number of employees windsorized at the 5th and 95th percentiles in each region	Own calculations based on Orbis Europe
Wage inequality indices	Gini coefficients, 90/10, and 90/50 wage percentile ratios. Indices are constructed using wages adjusted using firm-level data from Orbis Europe. In the case of CompNet, 90/10 and 90/50 percentile ratios are available at the region level and correspond to observed wages	CompNet and own calculations based on Orbis Europe
Firms' age	Number of years between the date of incorporation and the reference year	Own calculations based on Orbis Europe
Firms' size	Total assets in constant 2015 prices	Own calculations based on Orbis Europe
Foreign affiliates	Firms with 10% (50%) or higher direct ultimate ownership	Orbis Europe
Foreign affiliates—top performers	Foreign-owned companies with the top percentile (quartile) revenues in each year and region	Own calculations based on Orbis Europe
Parent MNEs	Shareholders with more than 10% (50%) or higher ultimate foreign ownership	Orbis Europe
Third-level education attainment	Share of population aged 25–64 with third level educational attainment	Eurostat regions database
Knowledge-intensive share	Share of employees in knowledge-intensive sectors	Eurostat regions database
Productivity	Gross Domestic Product per capita	Eurostat regions database, Office of National Statistics
HR in science & technology	Employees in Human Resources in Science & Technology per inhabitant	Eurostat regions database
Regional employment	Total number of individuals working or belonging to the corresponding NUTS2 region	Structural business statistics (SBS)

TABLE A2 | Countries in the sample.

Country	Orbis	CompNet	Eurostat
Austria	✓		✓
Belgium	✓	✓	✓
Bulgaria	✓		✓
Germany	✓	✓	✓
Denmark	✓	✓	✓
Estonia	✓		✓
Finland	✓	✓	✓
France	✓	✓	✓
Croatia	✓	✓	✓
Hungary	✓	✓	✓
Ireland	✓		✓
Italy	✓	✓	✓
Netherlands	✓		✓
Norway	✓		✓
Poland	✓	✓	✓
Portugal	✓	✓	✓
Romania	✓	✓	✓
Slovakia	✓	✓	✓
Sweden	✓	✓	✓
Spain	✓	✓	✓
United Kingdom	✓		✓

Note: CompNet data for Netherlands is not available at the NUTS2 level.

TABLE A3 | Region-level summary statistics.

	Mean	SD	Obs.
Gini coefficient	0.055	0.03	2018
90–10 ratio	1.336	0.79	2018
90–10 ratio CompNet	1.752	0.41	1223
90–50 ratio	1.124	0.10	2018
90–50 ratio CompNet	1.214	0.13	1223
Foreign aff. employment share	0.411	0.20	2018
Foreign aff.—top q1 emp. share	0.266	0.17	2018
Foreign aff.—top p1 emp. share	0.178	0.15	2018
MNE parent employment share	0.169	0.20	2018
Third level education	0.309	0.10	1954
High tech employment share	0.037	0.02	1908
HR in ST per capita	0.245	0.06	1937

TABLE A4 | Individual wage estimations.

Outcome variable: log wage per employee	
	(1)
Size (total fixed assets)	0.209*** (0.0004)
Age	−0.046*** (0.0014)
Age squared	0.090*** (0.0023)
Constant	1.476*** (0.0029)
Obs.	1,436,926
R ²	0.299

Note: Standard errors clustered at the region level are shown in parentheses.
*** $p < 0.01$.

TABLE A5 | Wage percentiles—IV estimates.

Outcome variable	90th percentile			50th percentile			10th percentile					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δ Foreign aff. employment share	0.029** (0.0154)				-0.053 (0.0341)				-0.078* (0.0403)			
Δ Parent MNE employment share		0.004 (0.0268)				-0.007 (0.0280)				-0.066* (0.0401)		
Δ Foreign aff.—Q1 employment share			0.036*** (0.0423)				-0.064 (0.0124)				-0.095* (0.0488)	
Δ Foreign aff.—P1 employment share				0.044** (0.0524)				-0.079 (0.0227)				-0.116** (0.0588)
Third level education	0.076* (0.0412)	0.074* (0.0422)	0.082** (0.0409)	0.081** (0.0412)	0.100* (0.0512)	0.104** (0.0517)	0.090* (0.0522)	0.091* (0.0519)	0.252*** (0.0717)	0.248*** (0.0714)	0.236*** (0.0727)	0.238*** (0.0718)
HR in ST per capita	-0.158** (0.0638)	-0.154** (0.0656)	-0.167*** (0.0639)	-0.166*** (0.0641)	-0.170** (0.0808)	-0.177** (0.0817)	-0.153* (0.0822)	-0.155* (0.0819)	-0.354*** (0.1103)	-0.350*** (0.1115)	-0.329*** (0.1121)	-0.332*** (0.1109)
High tech employment share	0.019 (0.0208)	0.018 (0.0212)	0.020 (0.0207)	0.020 (0.0207)	0.008 (0.0221)	0.010 (0.0219)	0.006 (0.0226)	0.006 (0.0226)	0.014 (0.0283)	0.015 (0.0282)	0.011 (0.0287)	0.011 (0.0287)
N	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032
R ²	0.101	0.098	0.104	0.101	0.153	0.149	0.147	0.144	0.231	0.231	0.226	0.225
Kleibergen–Paap F stat	39.128	33.939	29.715	21.471	39.128	33.939	29.715	21.471	39.128	33.939	29.715	21.471
First stage coefficient	0.427*** (0.0682)	0.512*** (0.0879)	0.352*** (0.0646)	0.286*** (0.0618)	0.427*** (0.0682)	0.512*** (0.0879)	0.352*** (0.0646)	0.286*** (0.0618)	0.427*** (0.0682)	0.512*** (0.0879)	0.352*** (0.0646)	0.286*** (0.0618)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional turnover shares are instrumented using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

* $p < 0.1$.
 ** $p < 0.05$.
 *** $p < 0.01$.

TABLE A6 | Robustness check—regional markdowns using CompNet Data—IV estimates.

Outcome variable	90/10 ratio				90/50 ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Foreign aff. employment share	0.091** (0.0452)				0.077*** (0.0298)			
Δ Parent MNE employment share		0.048 (0.0396)				0.003 (0.0275)		
Δ Foreign aff.—Q1 employment share			0.111** (0.0544)				0.095*** (0.0367)	
Δ Foreign aff.—P1 employment share				0.136** (0.0667)				0.116** (0.0475)
Third level education	-0.106*** (0.0381)	-0.106*** (0.0397)	-0.092** (0.0392)	-0.093** (0.0384)	-0.003 (0.0240)	-0.006 (0.0258)	0.009 (0.0248)	0.008 (0.0250)
HR in ST per capita	0.139** (0.0641)	0.140** (0.0665)	0.113* (0.0672)	0.116* (0.0659)	-0.005 (0.0371)	0.003 (0.0399)	-0.027 (0.0391)	-0.025 (0.0395)
High tech employment share	0.001 (0.0149)	-0.001 (0.0155)	0.004 (0.0150)	0.004 (0.0149)	0.010 (0.0095)	0.007 (0.0103)	0.013 (0.0097)	0.013 (0.0097)
Regional mark-downs	-0.082*** (0.0199)	-0.082*** (0.0199)	-0.077*** (0.0197)	-0.078*** (0.0198)	-0.025** (0.0128)	-0.028** (0.0130)	-0.021* (0.0126)	-0.022* (0.0126)
<i>N</i>	651	651	651	651	651	651	651	651
<i>R</i> ²	0.238	0.232	0.232	0.227	0.077	0.059	0.075	0.058
Kleibergen–Paap <i>F</i> stat	38.606	33.068	30.213	21.686	38.606	33.068	30.213	21.686
First stage coefficient	0.425*** (0.0685)	0.510*** (0.0886)	0.348*** (0.0632)	0.283*** (0.0608)	0.425*** (0.0685)	0.510*** (0.0886)	0.348*** (0.0632)	0.283*** (0.0608)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices from the CompNet database. Differences in MNE regional labour shares are using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

TABLE A7 | Robustness check—50% foreign ownership threshold—IV estimates.

Outcome variable	Gini index				90/10 ratio				90/50 ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δ Foreign aff. employment share	0.315** (0.1350)				0.050** (0.0201)				0.101 (0.0883)			
Δ Parent MNE employment share		0.472*** (0.1362)				0.066*** (0.0169)				0.051 (0.0749)		
Δ Foreign aff.—Q1 employment share			0.386** (0.1637)				0.062*** (0.0236)				0.124 (0.1071)	
Δ Foreign aff.—P1 employment share				0.461** (0.1921)				0.074*** (0.0271)				0.149 (0.1259)
Third level education	-0.293*** (0.0800)	-0.309*** (0.0819)	-0.338*** (0.0870)	-0.340*** (0.0859)	-0.034*** (0.0129)	-0.036*** (0.0133)	-0.041*** (0.0133)	-0.041*** (0.0133)	-0.152*** (0.0483)	-0.153*** (0.0479)	-0.167*** (0.0501)	-0.167*** (0.0497)
HR in ST per capita	0.503*** (0.1172)	0.525*** (0.1180)	0.577*** (0.1280)	0.584*** (0.1267)	0.060*** (0.0182)	0.063*** (0.0182)	0.072*** (0.0188)	0.073*** (0.0186)	0.272*** (0.0689)	0.271*** (0.0684)	0.297*** (0.0719)	0.298*** (0.0715)
High tech employment share	-0.074*** (0.0261)	-0.070*** (0.0260)	-0.079*** (0.0272)	-0.083*** (0.0272)	-0.007 (0.0047)	-0.006 (0.0047)	-0.008 (0.0049)	-0.008 (0.0049)	-0.014 (0.0240)	-0.012 (0.0241)	-0.016 (0.0241)	-0.017 (0.0239)
N	1031	1031	1031	1031	1032	1032	1032	1032	1032	1032	1032	1032
R ²	0.111	0.161	0.084	0.072	0.070	0.096	0.066	0.051	0.059	0.056	0.054	0.052
Kleibergen–Paap F stat	49.171	36.694	40.884	41.500	49.133	36.588	41.125	41.488	49.133	36.588	41.125	41.488
First stage coefficient	0.415*** (0.0591)	0.483*** (0.0797)	0.338*** (0.0528)	0.283*** (0.0439)	0.415*** (0.0591)	0.483*** (0.0798)	0.338*** (0.0527)	0.283*** (0.0439)	0.415*** (0.0591)	0.483*** (0.0798)	0.338*** (0.0527)	0.283*** (0.0439)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional turnover shares are instrumented using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

TABLE A8 | Robustness check—regional turnover shares—IV estimates.

Outcome variable	Gini index			90/10 ratio			90/50 ratio					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δ Foreign aff. turnover share	0.362** (0.1520)				0.058*** (0.0222)				0.117 (0.0995)			
Δ Parent MNE turnover share		0.472*** (0.1362)				0.066*** (0.0169)				0.051 (0.0749)		
Δ Foreign aff.—Q1 turnover share			0.411** (0.1779)			0.066*** (0.0252)					0.132 (0.1122)	
Δ Foreign aff.—P1 turnover share				0.470** (0.1986)				0.075*** (0.0279)				0.151 (0.1270)
Third level education	-0.284*** (0.0835)	-0.309*** (0.0819)	-0.346*** (0.0937)	-0.363*** (0.0933)	-0.032** (0.0137)	-0.036*** (0.0133)	-0.042*** (0.0141)	-0.045*** (0.0140)	-0.149*** (0.0490)	-0.153*** (0.0479)	-0.170*** (0.0509)	-0.175*** (0.0516)
HR in ST per capita	0.480*** (0.1221)	0.525*** (0.1180)	0.580*** (0.1359)	0.609*** (0.1347)	0.056*** (0.0192)	0.063*** (0.0182)	0.073*** (0.0197)	0.077*** (0.0193)	0.265*** (0.0703)	0.271*** (0.0684)	0.298*** (0.0729)	0.306*** (0.0738)
High tech employment share	-0.072*** (0.0273)	-0.070*** (0.0260)	-0.080*** (0.0287)	-0.086*** (0.0287)	-0.006 (0.0048)	-0.006 (0.0047)	-0.008 (0.0050)	-0.009* (0.0051)	-0.013 (0.0240)	-0.012 (0.0241)	-0.016 (0.0244)	-0.018 (0.0242)
N	1031	1031	1031	1031	1032	1032	1032	1032	1032	1032	1032	1032
R ²	0.076	0.161	0.042	0.034	0.044	0.096	0.033	0.020	0.065	0.056	0.043	0.049
Kleibergen-Paap F stat	37.023	36.694	30.572	27.890	36.965	36.588	30.716	27.880	36.965	36.588	30.716	27.880
First stage coefficient	0.361*** (0.0593)	0.483*** (0.0797)	0.318*** (0.0575)	0.278*** (0.0526)	0.361*** (0.0593)	0.483*** (0.0798)	0.318*** (0.0574)	0.278*** (0.0526)	0.361*** (0.0593)	0.483*** (0.0798)	0.318*** (0.0574)	0.278*** (0.0526)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional turnover shares are instrumented using predicted changes following Equation (2). Robust standard errors are shown in parentheses, clustered at the region level.
 *p < 0.1.
 **p < 0.05.
 ***p < 0.01.

TABLE A9 | Robustness check—Orbis high coverage countries—IV estimates.

Outcome variable	Gini index				90/10 ratio				90/50 ratio			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δ Foreign aff. employment share	0.315** (0.1350)				0.050** (0.0201)				0.101 (0.0883)			
Δ Parent MNE employment share		0.472** (0.1362)				0.066** (0.0169)				0.051 (0.0749)		
Δ Foreign aff.—Q1 employment share			0.386** (0.1637)				0.062** (0.0236)				0.124 (0.1071)	
Δ Foreign aff.—P1 employment share				0.463** (0.1924)				0.074** (0.0271)				0.149 (0.1264)
Third level education	-0.292*** (0.0799)	-0.309*** (0.0819)	-0.338*** (0.0871)	-0.341*** (0.0855)	-0.034*** (0.0129)	-0.036*** (0.0133)	-0.041*** (0.0133)	-0.042*** (0.0132)	-0.152*** (0.0482)	-0.153*** (0.0479)	-0.167*** (0.0500)	-0.168*** (0.0499)
HR in ST per capita	0.502*** (0.1170)	0.525*** (0.1180)	0.576*** (0.1281)	0.585*** (0.1262)	0.060*** (0.0181)	0.063*** (0.0182)	0.072*** (0.0188)	0.073*** (0.0186)	0.272*** (0.0688)	0.271*** (0.0684)	0.296*** (0.0718)	0.299*** (0.0719)
High tech employment share	-0.074*** (0.0260)	-0.070*** (0.0260)	-0.079*** (0.0272)	-0.083*** (0.0272)	-0.007 (0.0047)	-0.006 (0.0047)	-0.008 (0.0049)	-0.008* (0.0049)	-0.014 (0.0240)	-0.012 (0.0241)	-0.016 (0.0241)	-0.017 (0.0239)
<i>N</i>	1031	1031	1031	1031	1032	1032	1032	1032	1032	1032	1032	1032
<i>R</i> ²	0.111	0.161	0.084	0.071	0.070	0.096	0.066	0.050	0.059	0.056	0.054	0.050
Kleibergen–Paap <i>F</i> stat	49.135	36.694	40.850	41.123	49.097	36.588	41.090	41.110	49.097	36.588	41.090	41.110
First stage coefficient	0.415*** (0.0592)	0.483*** (0.0797)	0.338*** (0.0528)	0.282*** (0.0440)	0.415*** (0.0592)	0.483*** (0.0798)	0.338*** (0.0527)	0.282*** (0.0440)	0.415*** (0.0592)	0.483*** (0.0798)	0.338*** (0.0527)	0.282*** (0.0440)

Note: All models are weighted by regional employment and include year fixed effects. Outcome variables are 3-year log changes of the wage inequality indices constructed with mean residual wages adjusted using Equation (3) using Orbis Europe data. Differences in MNE regional turnover shares are instrumented using predicted changes following Equation (2). The sample is restricted to Belgium, Finland, France, Germany, Spain, Italy, Norway, and Sweden. Robust standard errors are shown in parentheses, clustered at the region level.

p* < 0.1.*p* < 0.05.****p* < 0.01.