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Cross-occupational effects of immigration on native wages in the UK

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ABSTRACT

This article estimates the effect of immigration into an occupation on the wages of natives working in other, better-paid occupations. Using Annual Population Survey data from the UK we rank occupations by the Standard Occupation Classification provided by the ONS and find that increases in the migrant/native ratio raise average wages of natives working in the next higher ranked occupation by around 0.332%. Our findings have important implications for policy and public discourse. They suggest that debates over the economic impacts of migration often ignore the potential spill-over benefits that a migrant can bring to the outcomes for native workers elsewhere in the wage distribution, particularly in lower wage occupations.

KEYWORDS

Immigration; impact; wage distribution

JEL CLASSIFICATIONS

J21; J31; J61

I. Introduction

The impact of immigration on native wages remains an intense topic of debate. Many studies investigate whether or not migrants either compete with or complement natives in the same part of the wage distribution – i.e. within the same cell. However, whether or not these same migrants yield benefits or costs to native workers just above or below them in the wage distribution – i.e. in an adjacent cell – has remained relatively unexplored.

We estimate the effect of immigration into an occupation on wages of natives working in higher paid occupations. Such *cross-occupational* effects of immigration may arise by migrants increasing the productivity of workers (Peri, Shih, and Sparber 2015; Ottaviano, Peri, and Wright 2018) or by migrant inflows allowing natives to specialize in more complex, better remunerated tasks (Peri and Sparber 2009). Such effects may be more likely in countries such as the UK, where migrants tend to downgrade upon arrival leading to an inflow of over-qualified workers (Dustmann, Frattini, and Preston 2013).

To estimate this, we define and rank 9 occupational categories using the 2010 Standard Occupational Classification (SOC) with Managers, Directors and Senior Officials at the top and Elementary Occupations at the bottom. For each occupation o, we define the occupation *below* $(o-1)$ one rank lower than o. Similarly, the occupation *above* $(o+1)$ is one rank higher than o.

Using these definitions, we regress yearly regional changes in native wages in occupation o on yearly regional changes in the migrant-native ratio in occupations o, $o-1$, $o+1$. This article builds upon Dustmann, Frattini, and Preston (2013). in trying to identify the underlying cross-effects of migration within regions. Following standard practice in the literature, we instrument migration flows using the supply-push instrument first detailed in Card (2001).

Whilst we do not detect any meaningful effect of immigration within the same occupation-region group, we find that immigration into one occupation increases wages of natives working in the occupation ranked above by around 0.332%. Moreover, we find that this positive wage effect is concentrated in occupations located at the lower end of the wage distribution. However, likely due to a smaller sample size, our results are insignificant.

II. Methods and data

We investigate the cross-occupational impacts of migration on native wages, firstly across all occupations and lastly in high and low occupations separately. We use the Annual Population Survey

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(APS) from 2004–2017 to obtain data on wages, country of origin, occupations and other characteristics for those between ages 16 to 64. The SOC approximates skill levels by considering the formal training, qualifications and experience that may be required for the job. It then groups occupations by the factors associated with the competent performance of work tasks. [1]

We rank these nine occupations as follows: (i) managers, directors and senior officials; (ii) professionals; (iii) associate professional and technical; (iv) administrative and secretarial; (v) skilled trades; (vi) caring, leisure and other services; (vii) sales and customer service; (viii) process, plant and machinery; and (ix) elementary occupations.[2] To maintain a consistent occupational coding, observations coded according to SOC 2000 occupations from 2004–2010 are converted to SOC 2010 coding using a probabilistic matching approach used in Goos and Manning (2007).

To highlight our methodology, consider professional occupations as an illustrative example. The occupation adjacent and above to *Professionals* are *Managers, Directors and Senior Officials,* whereas the occupation adjacent and below to *Professionals* are *Associate Professionals and Technical Occupations*. Since managers are the highest and elementary the lowest occupations, we are dropping these occupations from our estimations. By using occupations to define skill groups we overcome the issue of downgrading.

For each occupation *o,* we estimate whether changes in the migrant stock in occupations *below* and *above* occupation *o* have an effect on natives working in occupation *o*. Following the literature, we estimate equation 1. Our dependent variable is the yearly change in average log native wage, ΔlnW^N_{ort}, in occupation group *o* in region *r* in year *t*. We first difference out any time-invariant differences between regions and occupations. We further control for any variation overtime for the UK as a whole by including time-fixed effects, γ_t. Using the occupational ranking outlined previously, we relate changes in native wages to three migration measures: i) yearly changes in the migrant-native ratio in the same occupational group *o* (Δm_{ort}), ii) yearly changes in the migrant-native ratio in the occupational group above *o* (Δm_{o+1rt}) iii) yearly changes in the migrant-native ratio in the occupational group below *o* (Δm_{o-1rt}) in region *r* and year *t* as follows

$$\Delta lnW^N_{ort} = \alpha + \beta_1 \Delta m_{ort} + \beta_2 \Delta m_{o+1rt} + \beta_3 \Delta m_{o-1rt} + \beta_4 \Delta X_{ort} + \gamma_t + \Delta \in_{ort} \quad (1)$$

Further controls, X_{ort}, include the average age for natives and migrants and education controls, defined by the age they left education, for the proportion of migrants and natives with higher (≥25), high (20–24), intermediate (16–19) and low education (<16) all within an occupation-region-time group. We estimate robust standard errors clustered at the occupation-specific regional level. One issue allowing for spatial variation is that our coefficient may be biased towards zero if native outflows react to migration. We follow Dustmann, Frattini, and Preston (2013) and use broad definitions of spatial regions which will reduce the likelihood of this being the case.

A common concern when estimating the impact of migration on native wages is the endogenous allocation of migration into occupations and regions. Following Card (2001, we use a shift-share instrument to capture migrant flows exogenous to local demand shocks. In Equation 2, we construct historical regional shares, λ_{jr91}, of migrants from 10 broad regions of origin, *j*, using the 2% Sample of Anonymised Records for the 1991 Census where we would expect the network effect to be stronger between migrants from similar regions.[3] For each origin group, we multiply past regional shares with occupation shares, τ_{jot}, and UK wide migrant inflows, ΔM_{jt}, for year *t* which is summed across origin groups to obtain total exogenous migrant inflows. This is normalized by the overall occupation-region specific labour force lagged three times. This instrument is valid when

[1]Office for National Statistics (2010), Standard Occupational Classification 2010: Volume 1 - Structure and description of unit groups, Palgrave Macmillan, ISBN 978-0-230 -24,819-9 https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2010/soc2010volume1structureanddescriptionsofunitgroupsWeb Link.

[2]We have replicated the results ranking occupations by average real hourly wages and report broadly similar results for below occupations.

[3]Republic of Ireland, Old Commonwealth, Western Europe and Cyprus, Central Europe, Turkey and Former USSR, Africa, Indian Subcontinent, Caribbean and Other America, Middle East, Other Asia, Rest of the World.

past immigrant shares do not correlate with recent changes in economic growth within regions.

$$SP_{jort} = \frac{\sum_j \lambda_{jr91}\tau_{jot}\Delta M_{jt}}{L_{ort-3}} \quad (2)$$

Unlike previous studies, we must also instrument for the endogeneity of migration into below and above occupations. Finally, following Dustmann, Frattini, and Preston (2013), we do not use the APS sample weights which are calculated for the whole population, and not migrants and natives separately.

III. Results

Table 1 Panel A reports results for equation 1 for all occupations. Columns 1 and 2 presents our OLS and Columns 3 and 4 present our Two-Stage Least Squares (2SLS) results with time-fixed effects, where even and odd columns are with and without controls, respectively. It also reports first-stage results for our three instruments, showing a Kleibergen–Paap *F*-stat of 24.99. Panels B and C do the same for high- and low-paid occupations.[4]

In Panel A, we find that across all four models, the change in the migrant-native ratio in the same region and occupation are insignificant. By contrast, in our preferred model in Column 4, a 1% point increase in the migrant-native ratio in the occupation *below* a native's own occupation, within the same region and time, resulted in a statistically significant increase in native wages of 0.332%. Whereas for migration into above occupations, the coefficient is negative, insignificant and produces a coefficient just under half the size of our below coefficient.

Table 1. Impact of migration on native wages: Standard ONS SOC 2010 ordering.

Dependent Variable	OLS		IV	
Δ Log Real Hourly Wages	(1)	(2)	(3)	(4)
Panel A: All Occupations				
Δ migration: own occupation	0.0741	0.0365	0.00931	−0.135
	(0.0941)	(0.0893)	(0.138)	(0.154)
Δ migration:below occupation	0.157*	0.166*	0.312***	0.332**
	(0.0604)	(0.0668)	(0.0948)	(0.115)
Δ migration: above occupation	0.00444	0.00543	−0.249	−0.136
	(0.143)	(0.151)	(0.176)	(0.171)
Observations	1001	1001	1001	1001
F-stat			37.69	24.99
Underidentification (*p*-value)			0.0690	0.0658
Panel B: High-Paid Occupations				
Δ migration own occupation	0.442*	0.381	−0.0343	0.155
	(0.210)	(0.212)	(0.491)	(0.472)
Δ migration below occupation	0.153	0.236	0.187	0.179
	(0.112)	(0.125)	(0.311)	(0.354)
Δ migration above occupation	−0.0831	−0.203	−0.237	−0.479
	(0.235)	(0.281)	(0.698)	(0.993)
Observations	572	572	572	572
F-stat			2.637	1.472
Underidentification (*p*-value)			0.123	0.131
Panel C: Low-Paid Occupations				
Δ migration own occupation	−0.0365	−0.0641	0.105	−0.0957
	(0.0956)	(0.0733)	(0.134)	(0.279)
Δ migration below occupation	0.143*	0.133	0.289*	0.316
	(0.0595)	(0.0781)	(0.114)	(0.192)
Δ migration above occupation	0.0555	0.0676	−0.239	0.00614
	(0.187)	(0.158)	(0.170)	(0.206)
Observations	429	429	429	429
F-stat			19.06	21.68
Underidentification (*p*-value)			0.0877	0.0699
Year dummies	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes

Additional covariates are controls for migrants and natives separately and include average age, the proportion with higher, high, intermediate and low education, and year-fixed effects. *F*-stat is the first -stage Kleibergen-Paap *F*-stat testing for weak instruments. Clustered SEs are reported in parentheses.
***p < 0.001,**p < 0.01,*p < 0.05.

[4]Low- and high -paid occupations are defined on whether they are above or below the median wage. Low-paid occupations include: Caring, Leisure and Other Services; Sales and Customer Service Occupations; Process, Plant and Machine Operatives; Elementary Occupations, and High-paid occupations includes: Managers, Directors and Senior Officials; Professionals; Associate Professional and Technical; Administrative and Secretarial; Skilled Trades.

Panel C shows that the positive effect of the migrant-native ratio for occupations below is concentrated in low-paid occupations, producing a similar coefficient to Panel A, but due to lower sample sizes we cannot detect a significant result. While in Panel B, high -paid occupation results are not as reliable as low paid, as it does not pass the weak instrument test and has much higher SEs. Nevertheless, it shows a positive correlation in below occupations at a much lower magnitude compared to low paid occupations.

Panel B and C may identify different local average treatment effects. In our sample period, Non-EU migrants faced higher restrictions than EU migrants to working in low -paid occupations relative to high -paid occupations where they had easier access through skilled worker routes.

Our results suggest that the overall impact on native wages is positive, where only migration into below occupations is significant. Furthermore, even if we consider the negative impact from above occupations we would expect the overall impact to remain positive. To show this, we further calculate the average yearly percentage point change in the migrant-native ratio in below and above occupations shown in Table 2. By multiplying this with our coefficient, we find that the average yearly effect of migration into the same occupation for below occupations it is 0.329% and for above occupations it is −0.109%.

IV. Discussion

Our results suggest that the wages of natives working in an occupation and a region are increased by immigration into lower paying occupations into the same region. This effect is strongest for low paying occupations, which tallies with results presented by Dustmann, Frattini, and Preston (2013) showing that migrants to the UK downgrade upon arrival, although due to reduced sample size the results should be interpreted with caution. Our results could be explained by migration into *below* occupations depressing wages relative to natives in *own* occupations. This is unlikely to be the main driver of our results, as we do not also see a significant negative impact from *own* occupation migration, and a significant positive impact from adjacent *above* occupation migration.

One pathway is through peer effects, which may impact productivity and therefore native wages as a result of social pressure to work harder and/or through knowledge spillovers (Cornelissen, Dustmann, and Schönberg 2017). Due to the positive selection of migration on productivity (Clemens 2022), and migrant downgrading (Dustmann, Frattini, and Preston 2013) then migrants in *below* occupations are on average more educated than natives in the same occupation. Migrants can therefore have positive spillovers on native productivity if we assume natives interact with migrants in adjacent occupations, or if native productivity benefits from more productive workers in adjacent occupations.

An alternative pathway is through task specialization, where migrants that have a comparative advantage in manual tasks push natives to specialize in occupations with communicative, interactive and better remunerated tasks (Peri and Sparber 2009). This could also occur from the change in skill intensity within occupations overtime, which is more likely for the broad occupation groups we have chosen. This effect may be

Table 2. Average yearly migrant inflows from 2007–2017.

	Average Yearly Percentage Point Change in Migrant Native Ratio 2007–2017					
	All Occ		Low-Paid Occ		High-Paid Occ	
	Mean	SD	Mean	SD	Mean	SD
Own Occ	0.93	0.58	1.38	1.13	0.57	0.28
Below Occ	0.99	0.64	1.55	1.43	0.66	0.25
Above Occ	0.80	0.48	1.15	0.83	0.46	0.25

Entries are for the working age (16–64) average percentage point change in migrant native ratio in occupation-region-time cells from 2007–2017 and it's Standard Deviation (SD), estimated by finding the mean change in migrant native ratio over the period and multiplying it by 100. Occupations are defined as the five highest paid occupations and are below the median average across the nine occupations and low paid occupations are defined as the four lowest paid that are below the median.

reduced by occupations with more restrictive requirements to enter, or the time it takes for occupational task content to evolve in response to migration in adjacent occupations.

V. Conclusion

Much of the policy debate surrounding migration focuses on how to attract high -skilled migrants for high -skilled jobs. Our results suggest policy-makers should consider the wider work environment and the complementarities that can occur across occupations. If countries stop migration into low -skilled occupations then this could reduce productivity spillovers to natives in higher paid occupations and thus harm real wage growth for natives, which in the UK has remained noticeably low since the financial crisis. Future studies would benefit from a more in-depth and causal exploration of potential mechanisms to better understand where these spillovers arise from, and should consider a task-based approach to ranking occupations.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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