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ASSESSING THE IMPACT OF A8 IMMIGRANTS ON UK WAGES

Abstract: *The aim of this report is to analyse the effect of immigration from A8 countries on wages of UK residents using the UK Labour Force Survey data. The analysis finds no significant overall impact of A8 immigration on the wages of those already resident in the UK. Our findings suggest that it is not necessary for policy makers to impose additional restrictions on immigrants from the European Union. Furthermore, any potential negative effects on unskilled resident workers can be mitigated by policies such as a robust minimum wage.*

Keywords and Description: *immigration, wages, EU, impact;*
EEA – *European Economic Area – comprises of the EU Member States and Iceland, Liechtenstein and Norway*
EU – *European Union*
EU15 – *[Was] the number of member countries in the European Union prior to the accession of ten candidate countries on 1 May 2004.*
(Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom)
EU8/A8 – *Central and Eastern European countries that entered the EU on May 1, 2004. (The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia)*
WRS – *Workers Registration Scheme*

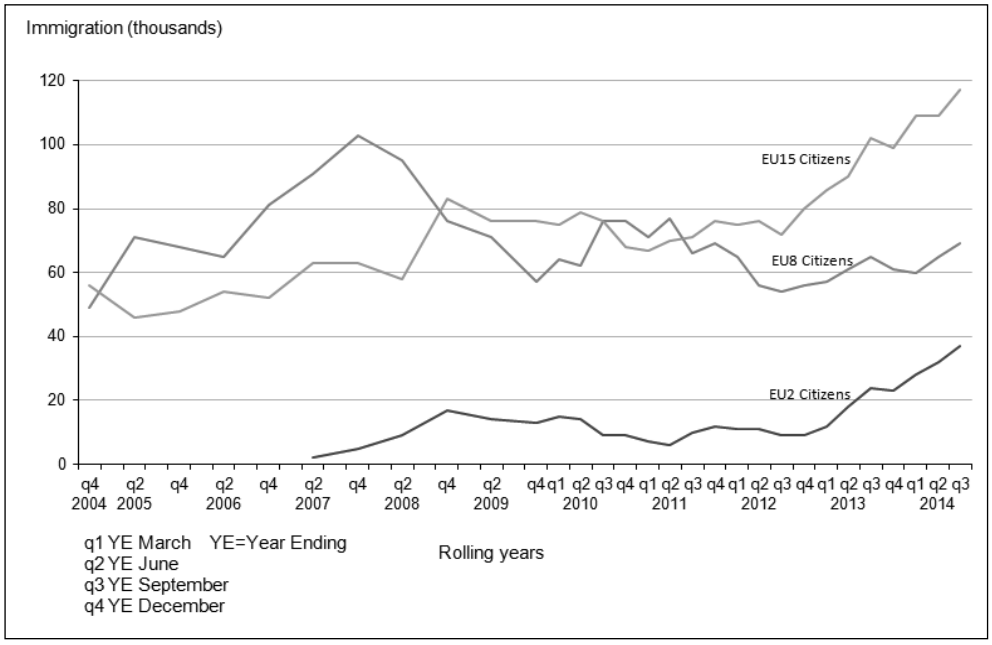
JEL: J 61, J 68

1 Introduction

Immigration can be defined as the way in which individuals move from their native country to another country in order to settle either as permanent residents, or future citizens. Immigration has become a widely debated issue in the European Union (EU), especially in the United Kingdom in the last 15 years.

The EU experienced its largest expansion in 2004 since its inception in 1957. The EU15 member states were allowed to put restrictions in place for up to seven years on the employment of migrants from the new member states should they fear that inflow of immigrants would distort natives' labour market opportunities. Citizens of newly joined Cyprus and Malta were excluded from these restrictions and therefore, the remaining eight countries came to be known as the A8 (Accession 8). The United Kingdom was among only three countries of the EU15 member states that allowed less restricted access to its labour market following the EU enlargement in May 2004. However, all A8 workers were required to register with the Worker Registration Scheme (WRS) that the UK introduced for monitoring purposes. A8 migrants were restricted from immediate access to income-related benefits and became eligible only after 12 months of continuous employment.

Figure 1



Source: International Passenger Survey (IPS) – Office for National Statistics.

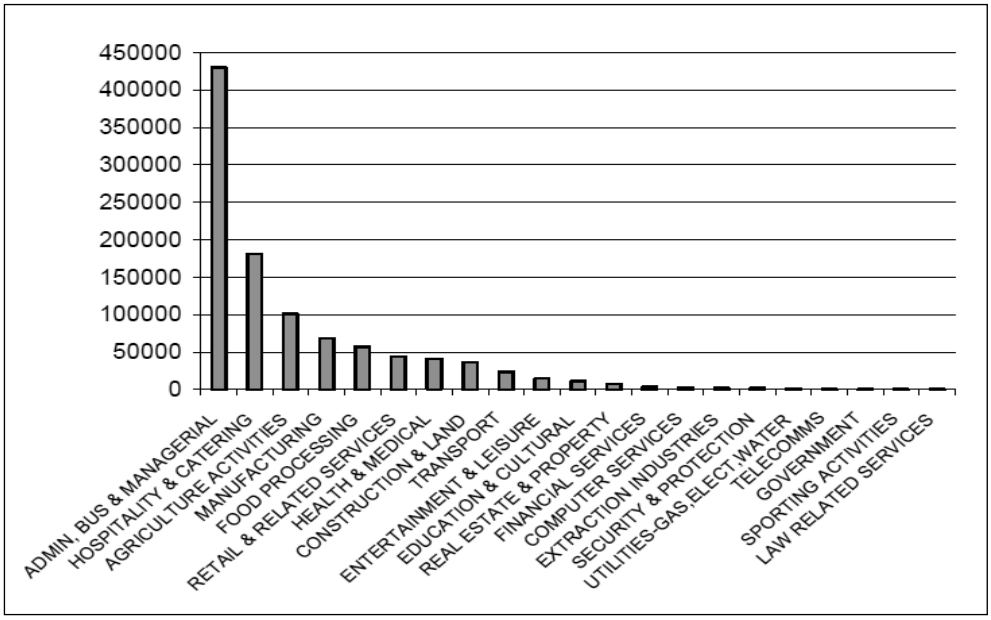
The above chart is a diagrammatic representation of the immigration levels into the United Kingdom in thousands from EU nations. These are EU 15, EU 8 or the A8 and EU 2(Malta and Cyprus).It is clear to see that the numbers coming in from the A8 countries were drastically rising from 2004 to the 4th quarter of 2007. This is a result of UK being one the few countries to allow more or less free access to its labour market. Immigration from A8 countries peaked in the fourth quarter of 2007 and then gradually declined as the financial crisis brought about a reduction in job

opportunities and increased cost of migration. The inflow of A8 immigrants picked up again in 2010 and has fluctuated since with inflows reducing because of the end of the seven-year restriction on other A8 migration by earlier EU members.

When analysing the impact of the A8 immigrants on UK wages, it is important to consider in what sectors the immigrants are most represented. We have used data from the WRS to deduce the chart below.

Figure 2

WRS registrations by sector 2004-2010



Source: WRS data [14].

A large proportion of A8 immigrants work in administration, business and management (42 % of registrations). The next dominating sectors are hospitality and catering (18 %) followed by agriculture (10 %), manufacturing (7 %) and food processing (6 %) with sporting and Law as the least indulged sectors. Generally, the A8 migration comprise of those both skilled and unskilled individuals. The above statistics underlines the fact that there is more benefit to the UK economy from the A8 migrants. Dustmann et al. [7] estimates that since 2004, net fiscal contribution of A8 immigrants was £5 billion.

Despite strengthening UK's fiscal position, immigration remains one of the most discussed issues in the country. Studies conducted by German research firm Marshall Show that 52% of the UK nationals believe immigrants take their jobs away with 34% of the whole Europe agreeing the same. This heated debate will no doubt be a key factor in the upcoming elections in 2015.

1.1 Policy briefs on immigration

Saggar and Somerville [16] highlight that the number of people coming into the UK indeed will not be reducing overnight. The existence of a multicultural United Kingdom offers the economy highly skilled individuals, although there is a need to control the ever-rising numbers. The best policy, therefore, is immigrant selection to reduce numbers as well as clear the political realm of immigration as a topic.

The UK immigration debate highlights that the UK has earned a name for strict immigration in that many international students have shunned the country to other European and the American schools for further studies. The report therefore explains the need to encourage international students into the country, remove them from net migration figures and to stay and work to contribute to the UK economy if they are offered the chance.

The UK Border Control report (2013) shows the dedication of the UK government to reducing the numbers on immigration. Policy reports presented indeed show a divergence of the UK government towards more strict rules towards non-EU immigrants as compared to those within the EU member states.

Section 2 of this paper describes what theory explains when we have immigration into any labour market. Section 3 looks at the past literature review on other author's findings. Sections 4 and 5 describe our data sets, methodology and results from which we deduce policy recommendations.

2 Economic Theory on the Impact of Immigration

The key concerns about immigration are the benefits and costs to the receiving economy. The main reason for more robust policies on immigration is due to fear of its potential to distort labour market opportunities of the resident working population, at least in the short run. In this section, we focus on the possible mechanisms by which wages and employment of native work force are affected by immigration, which may be positive or negative.

Economic theory suggests that immigration inflows alter the skill composition of the resident labour force if the skill composition of immigrants and native workers differ. This mismatch in skill composition promotes disequilibrium between supply of and cost-minimising demand for various types of labour at existing wages and output levels.

Immigration surplus, as a result of inflow of labour, is defined as the "gain in national income accruing to natives as a result of immigration" [1]. Economic theory predicts that national income will increase with alterations in the skill composition of the labour market due to influx of immigrants. This increase in national income will have to be distributed between immigrants and natives. However, immigration surplus does not necessarily imply that all persons within the host country are equally affected. Economic theory, however, suggests that natives maybe negatively affected if their skills are substitutable to that of the incoming immigrant population, at least

in the short run, while those natives with skills complimentary to immigrants may be positively affected.

To understand these mechanisms, the process needs to be modelled theoretically. Contemporary debates on immigration are based on the different skill groups of immigrants and how specific skill endowments affect the economic conditions of skill groups in the receiving labour market. It is, therefore, necessary to distinguish between different skills groups when modelling the impact of migration.

2.1 The impact of immigration on wages

Using a simple model framework, we consider an economy that produces a homogenous output (with a constant returns to scale technology) in a one-sector economy, which uses three factors of production (skilled workers, unskilled workers and capital). Skilled and unskilled workers may either be natives or immigrants. Our model further assumes that immigrants and native workers within the same skill group are perfect substitutes. We also assume that the supply of capital is perfectly elastic (fixed interest rate on capital which is set on the world market). Finally, we assume that labour supply is inelastic between both skill groups.

Suppose a given labour market experiences an influx of immigrants who might either be skilled, unskilled or both. In this case, immigration will only affect economic conditions of resident workers if it alters the skill composition of the labour market, implying a difference in the skill composition between immigrants and natives. For example, suppose before immigration the number of skilled and unskilled was equal. The influx of only unskilled immigrants will induce a shift of the composition of the total labour force in favour of the unskilled.

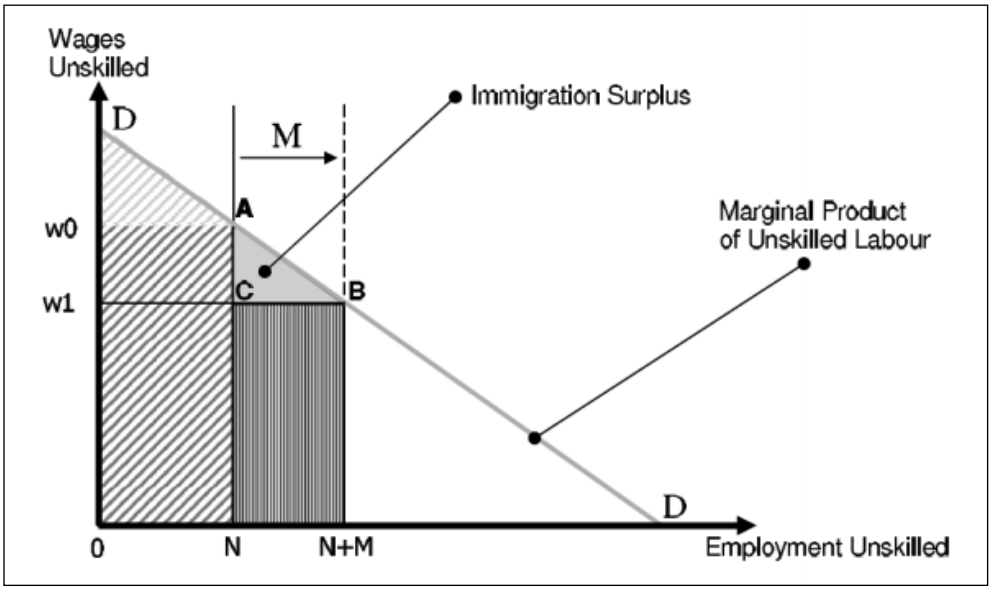
Suppose further that the labour market is in equilibrium before immigration, implying that all workers are fully employed at the equilibrium wage according to their respective skilled group. If immigration now occurs and there is a difference in the skill composition of immigrants and natives, any alterations in the skill composition due to immigration will promote disequilibrium between supply of and cost-minimizing demand for various types of labour at the existing wages and output levels. Assuming all immigrants are unskilled, this will result in excess supply of labour at the existing wage rate. With excess supply of unskilled labour, firms can now hire the required amount of labour at an even lower cost. This will lead to a decrease in the wage rate of unskilled workers, negatively affecting unskilled native workers as the economy moves down the marginal product of labour curve in favour of the unskilled. Thus, demand will increase to a point where all unskilled workers (both immigrants and natives) are employed, but at a lower wage compared to the pre-existing wage (before immigration).

This is illustrated in the Figure 3 below. The vertical axis represents wages and the horizontal axis represents employment. In the period before migration, all native workers (N) earned a wage of w0 and equilibrium is at point A. Immigration will shift the perfectly inelastic labour supply curve rightwards from point N to point

M. As the supply of skilled labour remains constant, this implies a relative excess supply of unskilled labour, thus pulling wages down the marginal product of labour curve. A new equilibrium is now formed at point B, with lower wages w1. Under this new setting, the total share of output in favour of unskilled labour has decreased by the area under the rectangle w0-w1-A-C. This output share is now redistributed in favour of skilled labour. As all unskilled labour of both natives and immigrant receive a wage equal to the marginal product of labour of the last immigrant, there is an additional surplus created by immigration in favour of skilled native workers, which is represented by the area under the triangle ABC.

Figure 3

Effects of Immigration on Wages



Source: [1].

Therefore, it can be noticed that native unskilled workers suffer as a consequence of immigration. A supply shock of unskilled workers will promote scarcity of skilled workers, shooting their wages up. Skilled workers then gain from immigration by accruing a surplus. As the wage rate of unskilled workers fall, wage rate of skilled workers rise. In this simple model, the benefits of immigration experienced by skilled workers will be greater than the loss to unskilled workers.

More generally, in an economy with differences in skill composition of immigrants and natives, native workers per capita income will increase as a result of immigration, but with unequal distribution. Therefore, due to immigration surplus, average wages will increase but wages will decrease for those natives that compete with immigrants. This outcome is based on the assumption that the supply of capital

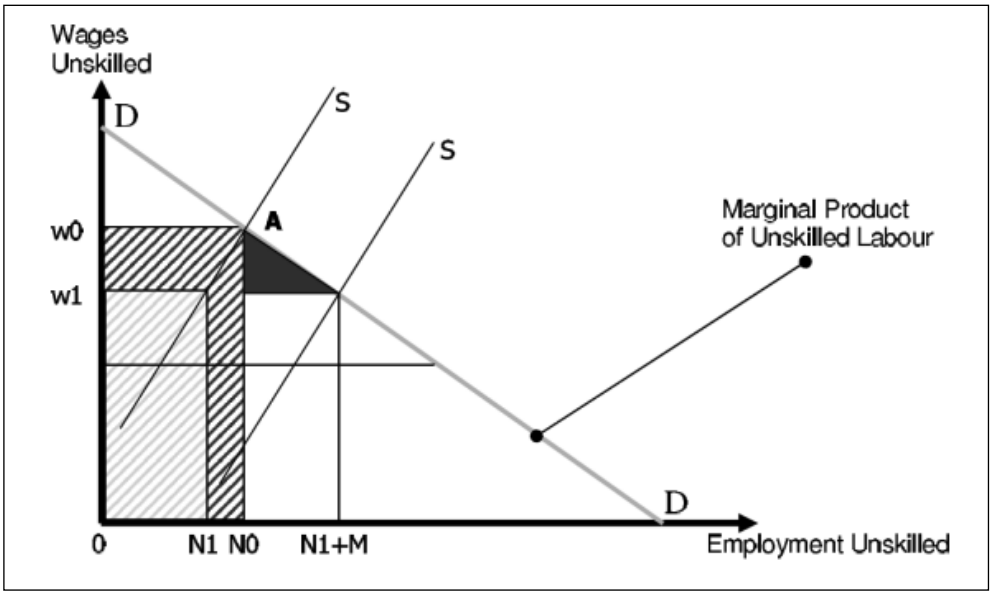
is perfectly elastic. Assuming the supply of capital is constant, the surplus will then be accrued to owners of capital, and immigration effects on average wage maybe negative. Under these settings, therefore, depending on the elasticity of capital supply, the average wage effects of immigration may be positive or negative.

2.2 The impact of immigration on employment

In the above model, one assumption we made was that labour supply is completely inelastic between both skilled groups. Suppose now that the supply of labour is elastic. Natives who see their wages decrease, as a result of immigration, would no longer want to participate in the supply of labour, creating voluntary unemployment. This is illustrated in Figure 4.

Figure 4

Effect of Immigration of Employment



Source: Borjas [1].

Figure 4 has an upward sloping labour supply curve. An increase in the supply of labour as a result of immigration leads to some natives (N0-N1) not being motivated to work at the new lower equilibrium wage, and remain voluntarily unemployed.

Our model was based on the assumption that all immigrants are unskilled which shifted the skill composition of the total work force towards the unskilled. If on the other extreme hand we were to assume that all immigrants are skilled, it will now be the case that skilled wages will fall and unskilled wages will rise, creating a surplus and redistribution in favour of the unskilled rather than the skilled. Generally, in this

simple model, the skill group who sees its relative supply of labour decrease as a result of immigration will always benefit the most. Finally, wage effects come about as a result of immigration altering the skill composition of the workforce, and no effects are to be anticipated if the skill composition of immigrants and natives are similar.

2.3 Multiple-sector economy

The model presented in the preceding discussion lacks flexibility. The production of homogenous traded goods in a one-sector economy with constant returns to scale technology, does not allow for sufficient degrees of freedom to accommodate alterations in the skill composition through changes in the output mix. Let us assume there is a multiple sector economy producing heterogeneous traded goods with output prices fixed on the world markets. This introduces flexibility in the output mix of traded goods. Such an economy can adjust to the skill composition of its workforce in an additional way by consequently adjusting the output mix of goods it is producing. Let us further assume that immigration is unskilled and the supply of labour is inelastic. If the output ratio is held fixed, as illustrated before, immigration would push down wages of unskilled workers (also increase wages of skilled workers) and the economy will be more involved in the production of unskilled-labour intensive goods. Consequently, the production of such goods will expand; driving up profits in that sector which intensively uses unskilled labour. The demand for unskilled labour will then increase followed by an increase in their wages. In the short run, the impact of immigration will lower the wages of unskilled workers, but eventually wages will increase in the long run. Wages are expected to return to the initial pre-immigration equilibrium, assuming the eventual equilibrium continues to involve positive production of all traded goods. This hypothesis is described by Leamer and Levinsohn [12] as "factor price insensitivity" which is also sometimes referred to as structural hypothesis, meaning that the industry structure rather than the wage structure is altered as a result of immigration.

In addition to the effects of immigration, the economy may further adjust through technological changes, resulting in the utilization and development of technology that intensifies the use of that type of labour that is relatively more abundant in supply. For example, an increase in unskilled labour will shift a capital-intensive economy to a more labour-intensive one. Furthermore, immigration (particularly that of skilled immigrants) may promote growth, technology and innovation through investment in additional knowledge and innovation, resulting in the increase of average wages in the long run.

3 Literature Review

Research into the impact of immigration on wages has produced contradicting results with most of the evidence from the United States. Borjas [1] examined the impact of immigration inflow in the United States and estimated that a 10 percent

increase in immigrants depresses wages by 3 to 4 percent. Conversely, Card [3] found that wages are not correlated with supply of low-skilled immigrant workers.

The majority of evidence from the UK is provided by Prof. Christian Dustmann and collaborators. It would be misleading to make assumptions about the impact of immigration on wages in the UK based on the evidence from the US as the immigrants to the UK are generally better educated than the natives.

The general idea that immigration has a negative impact on wages is based on a model, which assumes that capital is fixed. In a model where capital supply is elastic positive effects on average wages are possible. Drinkwater et al. [11] and later Manacorda et al. [12] estimate that immigration (including non-EU migrants and earlier EU15 migrants) has primarily had a negative impact on wages of immigrants and a negligible effect on the wages of the natives. It follows that with the increasing inflow of highly educated immigrants, their return to college education has rapidly decreased compared to that for natives.

Manacorda et al. [13] notes that prior to around 2000, immigrants experienced higher returns to their university education than natives. However, as the number of immigrants kept increasing while depressing their wages, the graduate premium started to rise among the natives and overtook that of immigrants.

The average age of EU migrant workers is 18-35, however, Manacorda et al. [13] consider only men aged 26-60. Using a larger age range in their study could potentially produce a more negative effect on immigrant wages than previously estimated. What is more, this study is based on a sample from the mid-1970s to the mid-2000s, which means that it does not capture the effect of the major inflow of migrant workers from the 10 countries that joined the EU in 2004.

Considering that immigrants are mainly represented in low-skilled jobs, Dustmann et al. [10]produced results consistent with Manacorda et al. [13]. Although, similarly to Manacorda et al. [13], Dustmann et al. [10] conducted their analysis over the period 1997-2005 and omitted the main impact of A8 countries. They estimated that immigration has a negative effect on wages below the 20th percentile, while it has a positive effect on wages above the 40th percentile. It was also found that the average effect on wages is positive - with a 1 percent increase in immigrant-native ratio resulting in 0.10 - 0.30 percent increase in average wages. A similar study conducted by Cohen-Goldner and Paserman [4] on Iran's labour market suggested that a 10 percent increase in immigrant-native ratio leads to 1.2-5.7 percent decline in native wages.

These diverse results only emphasize that it is important not to automatically assume that the impact of immigration is similar across different countries. It is vital to consider the characteristics of immigration before making assumptions about its impact on the economy.

3.1 Other characteristics of migrant workers in the UK

Dustmann et al. [9] found evidence that A8 immigrants who are eligible to claim benefits are almost 60 per cent less likely to receive state benefits and 57 per cent less likely to like in social housing compared to native residents. What is more, according to Dustman et al. [9], if A8 immigrants had the same demographic characteristics as native residents, they would still be less likely to claim benefits or live in social housing.

Dustmann et al. [9] then estimated the net fiscal contribution of A8 immigrants and natives and found that since 2004, A8 immigrants made a positive contribution to the public finances. This is a result of A8 immigrants having a higher labour participation rate and pay proportionately more in indirect taxes and make much less use of benefits. Thus if A8 immigrants have made a positive contribution to public finances, they have effectively strengthened UK's fiscal position.

Dustmann [9] provided a static, i.e. backward-looking, analysis of A8 immigrants' net fiscal impact. Static analyses do not possess any predictive power and therefore, do not allow us to estimate future fiscal impact of A8 immigrants and answer questions such as: 'What is the net present value of fiscal contribution of A8 immigrants in the UK over their life-cycle? '. On the other hand, a dynamic model would allow for such estimation, however, they require assumptions about immigrant fertility, propensity to return to the country of origin, labour market participation, and future government spending and tax polices. As Dustmann et al. [9] note, even a small deviation in the assumptions from the true values would have a significant impact on the final results and thus may lead to unreliable predictions. Nevertheless, it would be the aim of future study to make valid predictions about A8 immigrant behaviour and estimate their future fiscal impact once there is enough data available.

A later study conducted by Dustmann and Frattini [7] showed that EEA immigrants made a positive fiscal contribution, compared to Non-EEA immigrants who made a negative contribution between 1995 and 2011. Dustmann and Frattini [7] believe that because European immigrants bring their own qualifications whose cost are borne by other countries, they provide saving to the taxpayer worth £14 billion. The implicit saving estimated for non-European immigrants' education is £35 billion. The question arises as to what extent is this saving to the taxpayer relevant when, despite immigrants possess high qualifications, they tend to work in low-skilled jobs. They conclude their study by stating that EEA immigrants who arrived since 2000 have helped to reduce the fiscal burden for the natives.

4 Data and Methodology

A8 migration represents a natural experiment into the causal effects of immigration on native wages, as A8 immigration was triggered by policy change and not changes in labour market conditions. The next sections detail an empirical study that seeks to

answer what effect the arrival of A8 migrants into the UK had on the wages of those already resident in the country.

The data used in this study is obtained from the quarterly UK Labour Force Survey (LFS). Overseen by the Office of National Statistics, it is designed to be representative of the UK population. Around 53,000 households are selected from the Postal Address File compiled by the Royal Mail, according to them receiving less than 50 items of post per day. The survey is then conducted via face-to-face and telephone interview, with non-residential households discarded by interviewers. In line with Eurostat requirements, those living in communal housing are also not included.

Each household is interviewed for five successive quarters and answers are provided per respondent, i.e. per person resident at a sampled address. Responses from unavailable household members are collected by proxy. To avoid double counting when combining quarters, only respondents from wave 1 and wave 5 are included.

Information is gathered on a wide range of issues such as wages, economic activity, education and personal characteristics such as sex, age, ethnicity and health status. A particular strength of using the LFS to analyse the effects of immigration is that the nationality, country of birth and year of entry into the UK of respondents are also reported.

Post-accession A8 immigrants are defined as those who entered the UK post-May 2004. As shown in Table 1, the majority of A8 immigrants were Polish (59%), followed by Lithuanians (13%) and Slovaks (12%). The analysis that follows aims to ascertain the impact on those already resident in the UK. Hence 'natives' in this case are all those who are either not A8 nationals or who are nationals of these countries that came to the UK before May 2004.

Table 1

Number in sample of post-May 2004 A8 immigrants of each nationality for 2004 quarter 3 to 2005 quarter 4

Nationality of post-accession A8 Migrants	Frequency	Percent
Hungary	5	2.1
Poland	141	59.24
Czech Republic	17	7.14
Estonia	2	0.84
Lithuania	31	13.03
Latvia	12	5.04
Slovak Republic	28	11.76
Slovenia	2	0.84
Total	238	100

Source: UK Labour Force Survey.

A lower percentage of A8 immigrants were female compared to UK residents and they were either white or of an ethnicity not defined as Mixed, Asian, Black or Chinese. On entering the UK labour market, a higher percentage of working age A8 immigrants worked in service industries (including distribution, hotels and restaurants), agriculture and manufacturing than for working age UK residents. This suggests that higher proportions of A8 immigrants found work in sectors requiring lower skill levels even though the average years of schooling was higher for A8 immigrants than for UK residents (14.7 years and 12.5 years respectively).

Table 2

Characteristics of post-May 2004 A8 immigrants compared to those already resident in the UK for 2004 quarter 3 to 2005 quarter 4

	UK Resident	Post-Accession A8 Migrant
Number of working age in sample	175,524	238
Average years of schooling	12.5 (2.7)	14.7 (3.3)
% Female	49.8%	44.1%
% Ethnicities		
White	91.5%	91.2%
Mixed	0.7%	0.4%
Asian	4.3%	.
Black	1.9%	.
Chinese	0.5%	.
Other	1.2%	8.4%
% Industries		
Agriculture and fishing	1.0%	3.4%
Energy and water	0.8%	0.8%
Manufacturing	10.1%	15.1%
Construction	6.0%	4.6%
Distribution, hotels and restaurants	14.3%	21.8%
Transport	5.1%	4.2%
Banking, finance and insurance	11.2%	6.7%
Public admin, health and education	21.5%	7.6%
Other services	4.3%	6.3%

Source: UK Labour Force Survey.

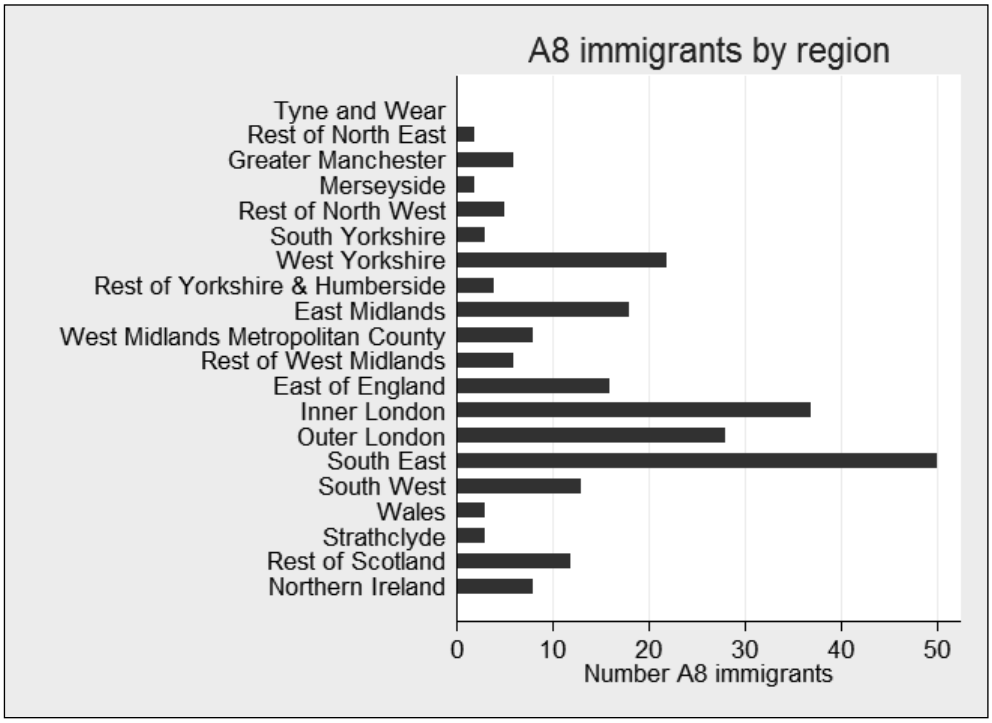
A difference in difference analysis similar to that detailed in Card [2] is conducted in order to understand the causal implications of A8 immigration. As a first look at the net effect on UK residents of all skill groups, the change in wages is examined for

a treatment group that experienced an inflow of A8 migrants compared to a control group that did not.

Figure 5 indicates that the initial wave of A8 immigrants primarily settled in London and the South East. Hence, London is considered as a treatment group. The treatment date is the date of accession, May 2004 and data from 2003 quarter 1 to 2004 quarter 1 is used for pre-treatment observations. Post-treatment observations are restricted to 2004 quarter 3 to 2005 quarter 4 in order to limit possible spillover effects and the possibility of immigrants moving out into the control regions.

Figure 5

Region of residence of post-May 2004 A8 immigrants for 2004 quarter 3 to 2005 quarter 4



Source: UK Labour Force Survey.

For a valid comparison, the only difference between the control group and London should be that the control group received no A8 immigrants. As London is major metropolitan areas, the control group is taken to be a combination of Greater Manchester, Merseyside and West Midlands Metropolitan County, which contain the three major cities of Manchester, Liverpool and Birmingham.

Whilst combining these three areas does improve the control group's similarity to London in terms of ethnicity and industry sector mix, there are still differences (see table A.1 in the Appendix). To control for these differences and other factors that

can potentially affect an individual's wages, the following model is estimated using Ordinary Least Squares:

$$\ln(wages)_i = \beta_0 + \beta_1 time_i + \beta_2 london_i + \beta_3 time * london_i + \beta_4 yosch_i + \beta_5 sex_i + \beta_6 ethnicity_i + \beta_7 age_i + \beta_8 (age)_i^2 + \beta_9 indsect_i + \beta_{10} disability_i + \beta_{11} hrlypay_i + \epsilon_i \quad (1)$$

The dependent variable $\ln(wages)_i$ is the log of gross hourly pay. The dependent variables are: $time_i$, a dummy variable that is 1 for quarters after 2004 q2 and 0 otherwise; $london_i$, a dummy taking value 1 if the respondent is a resident in London and 0 if they are resident in the control group; $yosch_i$, the years of schooling the respondent has undergone; sex_i, a categorical variable detailing the sex of the respondent; $ethnicity_i$, a categorical variable detailing the ethnicity; age_i and $(age)_i^2$, included as proxies for experience; $indsect_i$, the industry sector of the respondent's main job; $disability_i$, a categorical variable indicating disability; $hrlypay_i$, a categorical variable which shows if the respondent is paid a fixed hourly pay.

5 Results

Preliminary results of the difference-in-differences of log gross hourly pay for London and the control regions are reported in Table 3. Both London and the control group experienced an increase in gross wages after A8 accession. The difference in these changes suggests that A8 immigration had a small positive effect on the wages of those already resident in the UK.

Table 3

	Pre-May 2004	Post-May 2004	Difference over treatment time
Control group	2.0782	2.1503	0.0721
	0.5082	*0.5053*	*0.0084*
London	2.3888	2.4673	0.0785
	0.5961	*0.5896*	*0.0103*
		Difference in differences	0.0064
			0.0001

Results ofdifference in difference analysis of the effect on log gross hourly pay of A8 immigration in May 2004 for London compared to a controlgroup of Greater Manchester, Merseyside and West Midlands Metropolitan County.

Table 4

Results of OLS Estimation of Equation

Dependent variable: ln (gross hourly pay)			Observations	26842.000
			R-squared	0.435
	Estimate	Standard Err.	t-statistic	P-value
1. After May 2004	0.054	0.007	8.200	0.000
2. In London	0.203	0.008	26.100	0.000
3. Difference-in-difference dummy	-0.002	0.010	-0.180	0.856
4. Years of Schooling	0.163	0.007	22.380	0.000
(Years of Schooling)^2	-0.004	0.000	-15.710	0.000
5. Sex	-0.172	0.006	-30.560	0.000
6. Ethnicity				
Mixed	-0.065	0.025	-2.560	0.010
Asian or Asian British	-0.226	0.011	-20.980	0.000
Black or Black British	-0.223	0.013	-17.840	0.000
Chinese	-0.198	0.041	-4.860	0.000
Other ethnic group	-0.265	0.023	-11.760	0.000
7. Age	0.077	0.002	45.650	0.000
(Age)^2	-0.001	0.000	-40.010	0.000
8. Industry Sector				
Energy & water	0.434	0.089	4.900	0.000
Manufacturing	0.367	0.083	4.420	0.000
Construction	0.388	0.084	4.640	0.000
Distribution, hotels & restaurants	0.153	0.083	1.840	0.066
Transport & communication	0.310	0.083	3.720	0.000
Banking, finance & insurance etc	0.473	0.083	5.700	0.000
Public admin, educ & health	0.360	0.083	4.340	0.000
Other services	0.222	0.084	2.660	0.008
Workplace outside UK	-0.027	0.200	-0.140	0.892
9. Disability				
DDA disabled	0.110	0.017	6.400	0.000
Work-limiting disabled only	0.028	0.019	1.490	0.136
Not disabled	0.112	0.012	9.300	0.000
10. Fixed Hourly Pay	0.271	0.006	46.910	0.000
11. Constant (included for statistical purposes)	-1.391	0.104	-13.340	0.000

Results of OLS estimation of Equation (1.). Dependent variable is ln(gross hourly pay). Ethnicity coefficients with respect to 'white', industry sector with respect to 'agriculture and fishing', disability with respect to 'DDA disabled and working limited disabled'.

As discussed in the previous section, these results may be affected by factors that cause the wages of those in the treatment group and control group to evolve differently in time. The results of the estimation of equation (1.), which controls for these differences, are reported in Table 4. The coefficient of the difference-in-difference term now suggests that A8 immigration caused the wages of those already resident in the UK to decrease by 0.2%. This variable is, however, not significant and it is more accurate to conclude that A8 immigration had no significant effect on native wages.

6 Conclusions and Policy Recommendations

The aim of this report was to examine the effect of A8 immigrants on wages in the UK using data from the UK Labour Force Survey. The analysis finds no significant overall impact of A8 immigration on the wages of those already resident in the UK. Based on the theory discussed in section two, this suggests that any potential negative effects on residents with skills substitutable to those of A8 immigrants may have been balanced out by immigration surplus accruing to UK residents with skills complementary to those of A8 immigrants. Our findings are therefore consistent with Dustmann et al. [10], who find effects on wages that are negative below the 20th percentile and positive above the 40th percentile.

Further analysis, however, is necessary to determine which skill groups were affected positively and which were affected negatively. This could be done by splitting our sample into different skill groups and performing an estimation of equation (1.) for each sub sample. It is, however, likely that the number of A8 migrants in the considered sample is too small for this to be meaningful. This could be rectified by extending the time period covered by the analysis, but this may compromise the validity of the control groups. Therefore, a different analytical approach may be necessary to examine the impact on different skill groups.

Coupled with Dustmann and Frattinis'[7] findings that EEA immigrants have improved the UK's fiscal situation, our findings suggest that it is not necessary for policy makers to impose additional restrictions on immigrants from the European Union. Furthermore, any potential negative effects on unskilled resident workers can be mitigated by policies such as a robust minimum wage. Once additional data becomes available, it will be possible to examine whether this has indeed been the case for Romanians and Bulgarians, who had restrictions on their movement lifted in January 2014. Either way, immigration is likely to remain prominent in political debates surrounding the upcoming general election and beyond.

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Appendices

Table 1

A.1 Comparison of treatment and control regions before May 2004

	Inner London	Outer London	Greater Manchester	Merseyside	West Midlands Metropolitan County
Number of working age in sample	6,010	10,284	6,090	3,272	6,240
Average years of schooling	14.0 (3.5)	13.2 (3.1)	12.0 (2.4)	11.8 (2.2)	12.0 (2.5)
% Female	51.3%	51.1%	50.1%	50.0%	49.9%
% Ethnicities					
White	62.2%	71.5%	90.4%	97.8%	79.9%
Mixed	2.1%	1.3%	0.5%	0.4%	1.3%
Asian	13.3%	14.6%	6.1%	0.7%	13.3%
Black	14.4%	7.6%	1.6%	0.3%	4.1%
Chinese	1.7%	1.0%	0.3%	0.6%	0.1%
Other	6.1%	3.9%	1.1%	0.2%	1.2%
% Industries					
Agriculture and fishing	0.0%	0.2%	0.2%	0.2%	0.4%
Energy and water	0.2%	0.4%	0.6%	0.4%	0.7%
Manufacturing	4.4%	5.9%	10.6%	8.7%	14.4%
Construction	2.6%	5.3%	5.3%	4.8%	4.8%
Distribution, hotels and restau	10.3%	13.6%	14.4%	12.2%	13.2%
Transport	3.9%	6.3%	5.5%	5.4%	4.9%
Banking, finance and insurance	19.0%	15.8%	10.4%	8.7%	9.1%
Public admin, health and educ	15.2%	18.9%	19.9%	23.0%	18.6%
Other services	6.9%	4.9%	4.1%	4.0%	3.1%

Table A.1: Descriptive statistics for treatment groups Inner London and Outer London and control groups of Greater Manchester, Merseyside and West Midlands Metropolitan County for 2003 quarter 1 to 2004 quarter 1.

Source: Labour Force Survey).

A.2 STATA do-file

```
********** Labour Economics Immigration Project Analysis ************************
*** Sara Mahmoud: sara.is.mahmoud@gmail.com
*** Last mod: 20/03/15

*** useful commands:
* label list <variable>

cd "C:\Users\Sara\Documents\MSc\Sem 2\Labour Economics\Project - Immigration"
log using "C:\Users\Sara\Documents\MSc\Sem 2\Labour Economics\Project - Immigration\logFile", append
clear
use ".\Data\LFS_2003q1_2005q4_unsorted.dta"

* Generate A8 - variable if A8: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia
generate A8 = 0
replace A8 = 1 if (NATO == 118) | (NATO == 119) | (NATO == 78) | (NATO == 122) | (NATO == 121) | (NATO == 79) | (NATO == 125) | (NATO == 126)

*summarize A8
* sanity check variable A8
tabulate NATO if A8 == 1

*generate quarterly time series variable that stata understands, then format to display dates
gen date = quarterly(quarter, "YQ")
format date %tq


*Generate A8POSTnodouble - summing over quarters so this variable prevents double counting of same A8POST==1
generate A8POSTnodouble = 0
replace A8POSTnodouble = 1 if (A8 == 1) & (CAMEYR == 2004) & (filenum>2 | (filenum==2 &(THISWV == 1))) & ((WRKAGE != -8) & (WRKAGE != -9)) ///
& (THISWV==1 | THISWV ==5)
*get numbers
tabulate NATO if A8POSTnodouble==1
*sanity check waves
tabulate THISWV if A8POSTnodouble==1

*sum number of A8 migrants for each quarter and plot line graph of A8POST vs quarter
by date, sort: egen byquarterA8POSTnodouble = total(A8POSTnodouble)

*plot barchart of A8POST migration in regions
graph hbar (sum) A8POSTnodouble, over(GOVTOR) title("Post-accession A8 immigrants by region") /*xtitle("Number of post-accession A8 immigrants")*/
graph save A8POSTnodouble_regionCompareFiner, replace
graph export A8POSTnodouble_regionCompareFiner.png, replace

*Generate NOTA8POST - people not in A8 group after accession AND of WORKING AGE AND no double count (i.e. wave 1 or wave 5 in each quarter)
generate NOTA8POSTnodouble = 0
replace NOTA8POSTnodouble = 1 if ((A8 != 1) | (A8==1 & (filenum<2 | (filenum==2 &(THISWV != 1))))) & ((WRKAGE != -8) & (WRKAGE != -9)) ///
& (THISWV==1 | THISWV ==5)

*sanity check NOTA8POST
*tabulate THISWV if NOTA8POSTnodouble == 1
tabulate NATO if NOTA8POSTnodouble == 1
tabulate WRKAGE if NOTA8POSTnodouble == 1


************DIFFERENCE IN DIFFERENCE ANALYSIS*********************
*****Dependent variable: Native (non-A8POST) wages (and/or employment)
*****Time of treatment: May 2004
*****Treatment group: Inner and Outer London
*****Control group: Greater Manchester, Merseyside, West Midlands Metropolitan County

*Generate REGTREAT - regional treatment group, in Inner or Outer London AND of working age AND wave 1 or 5 to avoid double counting
gen REGTREAT = 0
replace REGTREAT = 1 if (GOVTOR==13 | GOVTOR==14) & ((WRKAGE != -8) & (WRKAGE != -9)) & (THISWV==1 | THISWV ==5)
*sanity check REGTREAT
*tabulate GOVTOR if REGTREAT==1
*tabulate WRKAGE if REGTREAT==1
*tabulate THISWV if REGTREAT==1

*Generate REGCONT - regional control group, in Greater Manchester, Merseyside, West Midlands Metropolitan AND of working age AND wave 1 or 5
*to avoid double counting
gen REGCONT = 0
replace REGCONT = 1 if (GOVTOR==3 | GOVTOR==4 | GOVTOR==10) & ((WRKAGE != -8) & (WRKAGE != -9)) & (THISWV==1 | THISWV ==5)
*sanity check REGTREAT
*tabulate GOVTOR if REGCONT==1
*tabulate WRKAGE if REGCONT==1
*tabulate THISWV if REGCONT==1

*Define treatment time periods = 1 if after May 2004
gen TIME = .
replace TIME = 1 if (date > q(2004-2))
replace TIME = 0 if (date < q(2004-2))
*tabulate date if TIME==1



**********Descriptive stats for London and other regions before treatment
*Size of working age sample
*recode WRKAGE variable
recode WRKAGE -8 -9 = .
*count WRKAGE for each region BEFORE TREATMENT
by GOVTOR, sort: egen WRKAGEbyregion = count(WRKAGE) if (REGTREAT==1 | REGCONT==1) & (TIME==0)
tabulate GOVTOR WRKAGE if (REGCONT==1 | REGTREAT==1) & (TIME==0)
*tabulate GOVTOR WRKAGEbyregion if (REGCONT==1 | REGTREAT==1) & (TIME==0)

*Average years of schooling by region
gen YOSCHbyregion = EDAGE - 5 if ((EDAGE > 0 & EDAGE < 50) & (REGCONT==1 | REGTREAT==1) & (TIME==0))
tabulate GOVTOR, su(YOSCHbyregion)
*% WRKAGE 16-24 by region
by GOVTOR, sort: egen YOUNGbyregion = count(AGE) if ((16 <= AGE <= 24) & (REGTREAT==1 | REGCONT==1) & (TIME==0))
gen PYOUNGbyregion = YOUNGbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PYOUNGbyregion)

*% female
*number female in each region
by GOVTOR, sort: egen FEMALEbyregion = count(WRKAGE) if (WRKAGE==2) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
*% of working age female
gen PFEMALEbyregion = FEMALEbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PFEMALEbyregion)

*%different ethnicities
*number each ethnicity in each region
*by GOVTOR, sort: tabulate ETH01 if (REGTREAT==1 | REGCONT==1) & (TIME==0)
by GOVTOR, sort: egen WHITEbyregion = count(ETH01) if (ETH01==1) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PWHITEbyregion = WHITEbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PWHITEbyregion)

by GOVTOR, sort: egen MIXEDbyregion = count(ETH01) if (ETH01==2) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PMIXEDbyregion = MIXEDbyregion/WRKAGEbyregion
```

```
tabulate GOVTOR, su(PMIXEDbyregion)

by GOVTOR, sort: egen ASIANbyregion = count(ETH01) if (ETH01==3) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PASIANbyregion = ASIANbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PASIANbyregion)

by GOVTOR, sort: egen BLACKbyregion = count(ETH01) if (ETH01==4) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PBLACKbyregion = BLACKbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PBLACKbyregion)

by GOVTOR, sort: egen CHINESEbyregion = count(ETH01) if (ETH01==5) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PCHINESEbyregion = CHINESEbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PCHINESEbyregion)

by GOVTOR, sort: egen OTHERbyregion = count(ETH01) if (ETH01==6) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen POTHERbyregion = OTHERbyregion/WRKAGEbyregion
tabulate GOVTOR, su(POTHERbyregion)

*%different sectors
by GOVTOR, sort: egen AGRbyregion = count(INDSECT) if (INDSECT==1) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PAGRbyregion = AGRbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PAGRbyregion)

by GOVTOR, sort: egen ENERGYbyregion = count(INDSECT) if (INDSECT==2) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PENERGYbyregion = ENERGYbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PENERGYbyregion)

by GOVTOR, sort: egen MANUFbyregion = count(INDSECT) if (INDSECT==3) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PMANUFbyregion = MANUFbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PMANUFbyregion)

by GOVTOR, sort: egen CONSTRbyregion = count(INDSECT) if (INDSECT==4) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PCONSTRbyregion = CONSTRbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PCONSTRbyregion)

by GOVTOR, sort: egen DISTRbyregion = count(INDSECT) if (INDSECT==5) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PDISTRbyregion = DISTRbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PDISTRbyregion)

by GOVTOR, sort: egen TRANSAbyregion = count(INDSECT) if (INDSECT==6) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PTRANSAbyregion = TRANSAbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PTRANSAbyregion)

by GOVTOR, sort: egen BANKbyregion = count(INDSECT) if (INDSECT==7) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PBANKbyregion = BANKbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PBANKbyregion)

by GOVTOR, sort: egen PUBLICbyregion = count(INDSECT) if (INDSECT==8) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PPUBLICbyregion = PUBLICbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PPUBLICbyregion)

by GOVTOR, sort: egen SERVbyregion = count(INDSECT) if (INDSECT==9) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen PSERVbyregion = SERVbyregion/WRKAGEbyregion
tabulate GOVTOR, su(PSERVbyregion)

by GOVTOR, sort: egen OUTSIDEbyregion = count(INDSECT) if (INDSECT==10) & (REGTREAT==1 | REGCONT==1) & (TIME==0)
gen POUTSIDEbyregion = OUTSIDEbyregion/WRKAGEbyregion
tabulate GOVTOR, su(POUTSIDEbyregion)*/

**************Descriptive stats comparison for A8POST migrants and residents after treatment

*variable defining migrant or not
gen MIGRANT = .
replace MIGRANT = 1 if (A8POSTnodouble==1)
replace MIGRANT = 0 if (NOTA8POSTnodouble==1)

*tabulate MIGRANT if (REGTREAT==1) & (TIME==1)
tabulate MIGRANT if (TIME==1)

by MIGRANT, sort: egen WRKAGEbymigrant = count(WRKAGE) if (TIME==1)
tabulate MIGRANT WRKAGE if (TIME==1)
*tabulate MIGRANT WRKAGEbymigrant if (REGCONT==1 | REGTREAT==1) & (TIME==1)

*Average years of schooling by migrant
gen YOSCHbymigrant = EDAGE - 5 if ((EDAGE > 0 & EDAGE < 50) & (TIME==1))
tabulate MIGRANT, su(YOSCHbymigrant)

*% female
*number female in each region
by MIGRANT, sort: egen FEMALEbymigrant = count(WRKAGE) if (WRKAGE==2) & (TIME==1)
*% of working age female
gen PFEMALEbymigrant = FEMALEbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PFEMALEbymigrant) /*if (REGCONT==1 | REGTREAT==1) & (TIME==1)*/

*%different ethnicities
*number each ethnicity in each region
*by MIGRANT, sort: tabulate ETH01 if (TIME==1)
by MIGRANT, sort: egen WHITEbymigrant = count(ETH01) if (ETH01==1) & (TIME==1)
gen PWHITEbymigrant = WHITEbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PWHITEbymigrant)

by MIGRANT, sort: egen MIXEDbymigrant = count(ETH01) if (ETH01==2) & (TIME==1)
gen PMIXEDbymigrant = MIXEDbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PMIXEDbymigrant)

by MIGRANT, sort: egen ASIANbymigrant = count(ETH01) if (ETH01==3) & (TIME==1)
gen PASIANbymigrant = ASIANbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PASIANbymigrant)

by MIGRANT, sort: egen BLACKbymigrant = count(ETH01) if (ETH01==4) & (TIME==1)
gen PBLACKbymigrant = BLACKbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PBLACKbymigrant)

by MIGRANT, sort: egen CHINESEbymigrant = count(ETH01) if (ETH01==5) & (TIME==1)
gen PCHINESEbymigrant = CHINESEbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PCHINESEbymigrant)

by MIGRANT, sort: egen OTHERbymigrant = count(ETH01) if (ETH01==6) & (TIME==1)
gen POTHERbymigrant = OTHERbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(POTHERbymigrant)

*%different sectors
by MIGRANT, sort: egen AGRbymigrant = count(INDSECT) if (INDSECT==1) & (TIME==1)
gen PAGRbymigrant = AGRbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PAGRbymigrant)

by MIGRANT, sort: egen ENERGYbymigrant = count(INDSECT) if (INDSECT==2) & (TIME==1)
gen PENERGYbymigrant = ENERGYbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PENERGYbymigrant)

by MIGRANT, sort: egen MANUFbymigrant = count(INDSECT) if (INDSECT==3) & (TIME==1)
gen PMANUFbymigrant = MANUFbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PMANUFbymigrant)

by MIGRANT, sort: egen CONSTRbymigrant = count(INDSECT) if (INDSECT==4) & (TIME==1)
gen PCONSTRbymigrant = CONSTRbymigrant/WRKAGEbymigrant
tabulate MIGRANT, su(PCONSTRbymigrant)
```

```
245
246   by MIGRANT, sort: egen DISTRbymigrant = count(INDSECT) if (INDSECT==5) & (TIME==1)
247   gen PDISTRbymigrant = DISTRbymigrant/WRKAGEbymigrant
248   tabulate MIGRANT, su(PDISTRbymigrant)
249
250   by MIGRANT, sort: egen TRANSAbymigrant = count(INDSECT) if (INDSECT==6) & (TIME==1)
251   gen PTRANSAbymigrant = TRANSAbymigrant/WRKAGEbymigrant
252   tabulate MIGRANT, su(PTRANSAbymigrant)
253
254   by MIGRANT, sort: egen BANKbymigrant = count(INDSECT) if (INDSECT==7) & (TIME==1)
255   gen PBANKbymigrant = BANKbymigrant/WRKAGEbymigrant
256   tabulate MIGRANT, su(PBANKbymigrant)
257
258   by MIGRANT, sort: egen PUBLICbymigrant = count(INDSECT) if (INDSECT==8) & (TIME==1)
259   gen PPUBLICbymigrant = PUBLICbymigrant/WRKAGEbymigrant
260   tabulate MIGRANT, su(PPUBLICbymigrant)
261
262   by MIGRANT, sort: egen SERVbymigrant = count(INDSECT) if (INDSECT==9) & (TIME==1)
263   gen PSERVbymigrant = SERVbymigrant/WRKAGEbymigrant
264   tabulate MIGRANT, su(PSERVbymigrant)
265
266   by MIGRANT, sort: egen OUTSIDEbymigrant = count(INDSECT) if (INDSECT==10) & (TIME==1)
267   gen POUTSIDEbymigrant = OUTSIDEbymigrant/WRKAGEbymigrant
268   tabulate MIGRANT, su(POUTSIDEbymigrant)
269
270   ****************************Difference-in-difference regression***********
271   *Variable defining sample containing only those residents and from wave 1 or 5 to avoid double counting (NOTA8POSTnodouble)
272   gen DIFFSAMPLE = .
273   replace DIFFSAMPLE = 1 if (NOTA8POSTnodouble==1)
274   *check numbers
275   tabulate GOVTOR if DIFFSAMPLE==1
276   tabulate date if DIFFSAMPLE==1
277
278   *Define treatment group dummy variable for difference in difference regression
279   gen LONDON = .
280   replace LONDON = 0 if (DIFFSAMPLE==1 & REGCONT==1)
281   replace LONDON = 1 if (DIFFSAMPLE==1 & REGTREAT==1)
282   *sanity check dummy
283   tabulate LONDON
284
285   *Define treatment time dummy variable for difference in difference regression
286   gen POSTA = .
287   replace POSTA = 0 if (DIFFSAMPLE==1 & TIME==0)
288   replace POSTA = 1 if (DIFFSAMPLE==1 & TIME==1)
289   *sanity check dummy
290   tabulate POSTA
291
292   ****Dependent variable log wage
293
294   *Generate log(wage) variable
295   gen LOGWAGE = .
296   replace LOGWAGE = log(HOURPAY) if (HOURPAY >= 1) /*>=1 to avoid -ve log values*/
297   summarize(LOGWAGE) if DIFFSAMPLE == 1
298
299   ****Mean diff-in-diff
300   *Basic diff-in-diff table
301   tab POSTA LONDON
302   tab LONDON POSTA, su(LOGWAGE)
303
304
305   *****Run baseline diff-in-diff regression
306
307   *Add control variables for sex, age and ears of schooling
308   *recode variables - NB for DIFFSAMPLE==1, 16 < AGE < 64 due to condition on WRKAGE
309   recode SEX -8 -9 = .
310   recode INDSECT -8 -9 = .
311   *generate years of schooling variable
312   gen YOSCH = EDAGE - 5 if EDAGE > 0 & EDAGE < 50
313   gen ETHNIC = ETH01 if ETH01 > 0
314   gen NAGE = .
315   replace NAGE = AGE if (AGE >= 16 & AGE <=64)
316
317
318   *fixed hourly pay
319   recode HOURLY -8 -9 = .
320   *disabled
321   recode DISCURR -8 -9 = .
322
323
324   reg LOGWAGE i.POSTA##i.LONDON c.YOSCH##c.YOSCH i.SEX i.ETHNIC c.NAGE##c.NAGE i.INDSECT i.DISCURR i.HOURLY if DIFFSAMPLE==1, robust
325
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