

# Immigration, Trade and Productivity in Services: Evidence from UK Firms

Gianmarco Ottaviano, Giovanni Peri, Greg Wright

LSE & CEP, UC Davis, UC Merced

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- ▶ For instance, the *content* of services may interact with immigrant knowledge about their origin country, above and beyond “network effects”.
  - ▶ Knowledge of origin legal system (legal services), business culture (business services), consumer habits (marketing services)
  - ▶ May play a role with trade in goods as well, but much more peripherally



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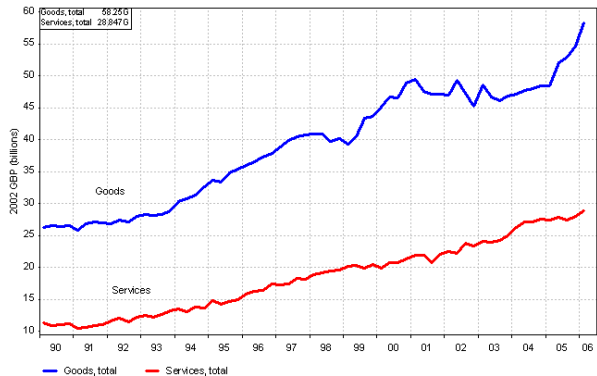
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  - ▶ Which may promote trade by making it easier for firms to overcome fixed trade barriers

▶ Service Types



## UK Exports of Goods and Services

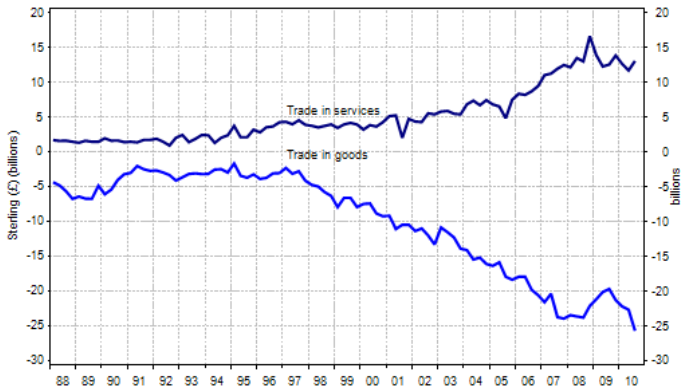
Quarterly figures, Constant Prices, seasonally adjusted £ billion



Source: Reuters EcoWin

## UK Balance of Trade in Goods and Services

Seasonally adjusted, quarterly trade balance, £ billion



Source: Reuters EcoWin

- 1 Model
- 2 Data
- 3 Specification & Identification
- 4 Results

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- ▶ and delivered to foreign customers located in countries  $x = 1, \dots, X$

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- ▶  $p/\varphi$  is the **marginal production cost** incurred in terms of a bundle of services not specific to  $x$  with price index  $p$

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- ▶ and of cultural content in terms of linguistic and institutional **intensity**

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- ▶ where  $\delta > 1$  is the top-tier elasticity across final services

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- ▶ A reduction in  $\mu_x$  reflects a positive  $x$ -specific immigration shock in the local labor market

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- ▶ Note that general equilibrium is a Rybczynski Effect



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- ▶ The relative importance of the General vs Bilateral Effect is decreasing in cultural distance and content

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- ▶ *Import Substitution Effect*
- ▶ Variation in  $\mu_x$  affects the margin between immigrants and imports
- ▶ The share of foreign services offshored is  $s_{o,x}^f = 1 - s_{m,x}^f = \left(p_{f,x}/p_{o,x}\right)^{\theta-1}$
- ▶ Differentiating (and noting  $\theta > 1, \sigma > 1$ ):

$$\frac{d \ln s_{o,x}^f}{d \ln \mu_x} = (\theta - 1) s_{m,x}^f \varepsilon_{p_{m,x}, \mu_x} > 0$$

- ▶ and

$$\frac{d \ln s_{f,x}^f}{d \ln \mu_x} = -(\sigma - 1) \left(1 - s_{f,x}^f\right) s_{m,x}^f \varepsilon_{p_{m,x}, \mu_x} < 0$$

- ▶ Immigration from  $x$  reduces offshoring, and disproportionately offshoring to  $x$

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- ▶ These effects should be stronger when there is a larger linguistic, cultural or institutional difference between countries

- ▶ Three UK datasets: ARD (firm survey, universe of large firms, agg. services trade), ITIS (services trade survey), QLFS (worker survey)

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- ▶ Maximum variation we exploit: workers from top 20 origin countries located across 243 TTWAs, working within 6 one-digit industries and trading 3 aggregate service types over 7 years

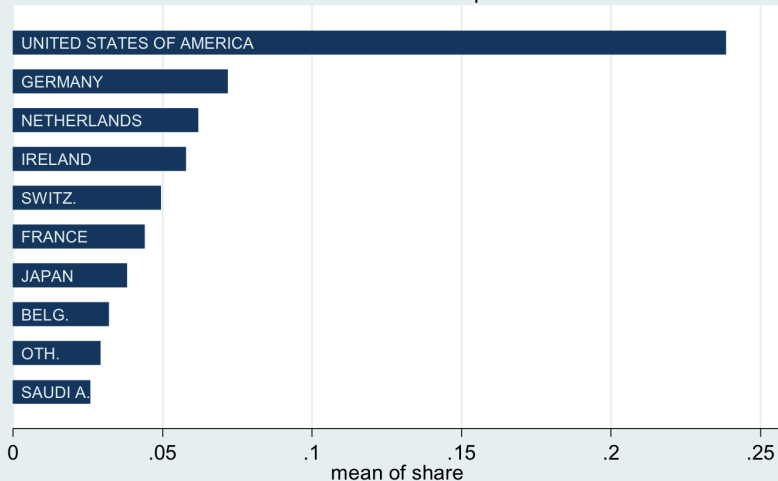
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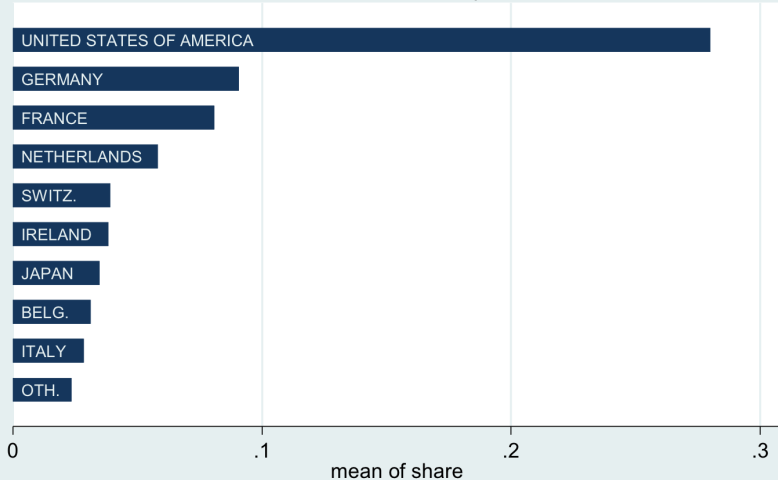
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- ▶ Diversity Index:  $ImmDiv_{kt} = 1 - \sum_{n=1}^N (ImmSh_{kt}^n)^2$

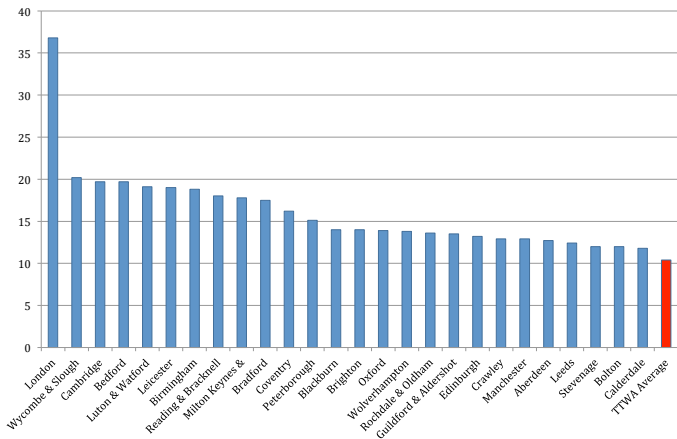
## Top Export Destinations As Share of Total Exports



## Top Import Source Countries As Share of Total Imports



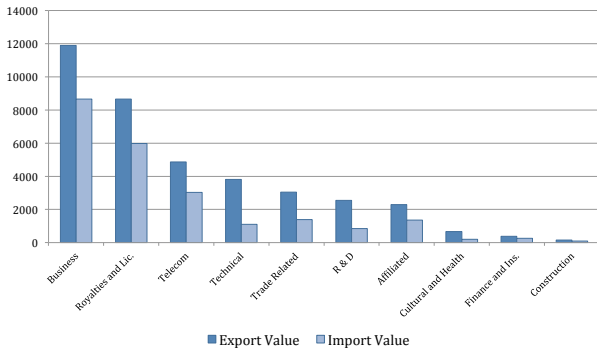
**Figure 1. Share of foreign-born workers; top (travel-to-work) Areas**





**Figure 2. U.K. Services Exports and Imports by Service Type, 1999-2005**

*Thousands of UK Pounds*



# Main Specification

$$\ln(y)_{iskt}^n = \phi_i + \theta_t + \zeta_{jt} + \zeta_{at} + \gamma_t^n + \beta_1 ImmShr_{kt} + \beta_2 ImmDiv_{kt} \\ + \beta_3 ImmShr_{kt}^n + \tau_s^n + \beta_x \ln X_{ikt} + \epsilon_{iskt}^n$$

- ▶ Unit of obs: service type  $s$  associated with firm  $i$  in TTWA ( $a$ )-Sector ( $j$ ) cell  $k$  in year  $t$
- ▶  $y_{iskt}^n$  is imports from or exports to country  $n$
- ▶  $ImmShr_{kt}$  is the share of immigrants in cell  $k$  (minus country  $n$ )
- ▶  $ImmDiv_{kt}$  is country-of-birth immigrant diversity (minus country  $n$ )
- ▶  $ImmShr_{kt}^n$  is employment share of immigrants from country  $n$
- ▶  $X_{ikt}$  is a set of firm-level control variables;  $\phi_i$  and  $\theta_t$  are firm and year fixed effects
- ▶  $\zeta_{jt}$  and  $\zeta_{at}$  are sector-by-year and TTWA-by-year fixed effects
- ▶  $\gamma_t^n$  is a destination-year fixed effect
- ▶  $\tau_s^n$  are service-type specific trade barriers
- ▶  $H_0$ :  $\beta_1 > 0$  and  $\beta_2 > 0$  (Productivity Effect - Prop. 1);  $\beta_3 < 0$  (Substitution Effect - Prop. 2)  
or  $\beta_3 > 0$  (Export Promotion Effect - Prop. 3)

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- ▶ Why PPML?
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- ▶ Allocate future aggregate growth of immigrants by country (relative to UK population growth) to cells according to this distribution
- ▶ Construct IV for diversity index using these values

# Productivity Regression

**Table 2. Immigrants and the Productivity of UK Firms**

Dependent Variable: Log of Gross Value Added per Worker	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	1.4** (0.6)	1.2** (0.5)	1.1* (0.5)	1.1** (0.4)	0.7** (0.3)	1.8* (1.0)
<b>Immigrant Diversity Index</b>	1.3** (0.6)	1.4* (0.8)	1.7** (0.8)	1.1 (0.7)	1.1 (1.0)	1.2 (0.9)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-Year and TTWA-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	6930	6930	6930	6930	6930	6930
F-Statistic of first stage	33	21	12	33	21	12

# General Productivity & Bilateral Export Effects

▶ Without London

**Table 7. Immigrants and the Services Exports (Total and Bilateral) of UK firms**

Dep. Variable: Log of Export Value	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	2.2*** (0.4)	2.1** (0.8)	2.5*** (0.8)	1.7*** (0.2)	3.6** (1.8)	1.5*** (0.2)
<b>Immigrant Share Bilateral</b>	8.1* (5.5)	10.1** (5.2)	10.4** (5.0)	6.2 (8.0)	8.9* (5.9)	9.3* (6.2)
<b>Immigrant Diversity</b>	-0.0 (0.1)	-0.0 (0.1)	0.0 (0.0)	-1.0* (0.5)	-0.7* (0.4)	-1.1* (0.6)
<b>Service Barrier Index</b>	-0.3* (0.2)	-0.6* (0.3)	-0.4* (0.2)	-0.5* (0.3)	-0.3 (0.3)	-0.5* (0.3)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23

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  - ▶ Mean: 1.5%

# Bilateral Export Effect: Extensive Margin

**Table 8. Immigrants and the Extensive Margin of Exports**

Dependent Variable: Export Status Indicator (0,1)	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	0.12*** (0.03)	0.14* (0.07)	0.11** (0.04)	0.10** (0.03)	0.10* (0.05)	0.11* (0.05)
<b>Immigrant Share Bilateral</b>	0.32 (0.41)	0.04 (0.04)	0.22* (0.12)	0.27 (0.47)	0.03 (0.11)	0.11 (0.29)
<b>Immigrant Diversity</b>	0.02 (0.15)	0.14** (0.05)	0.03 (0.03)	0.14 (0.17)	0.12* (0.06)	0.11 (0.10)
<b>Service Barrier Index</b>	-0.22** (0.10)	-0.18* (0.10)	-0.33** (0.15)	-0.21* (0.11)	-0.14 (0.13)	-0.27* (0.14)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23

# General Productivity & Bilateral Import Substitution

▶ Without London

**Table 5. Immigrants and Imports of Services (Offshoring) by UK firms**

Dep. Variable: Log of Import Value	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	12.2*** (3.4)	11.3*** (3.8)	9.8*** (2.5)	9.7** (5.9)	7.4** (3.7)	7.3** (3.4)
<b>Immigrant Share Bilateral</b>	-5.1* (3.3)	-4.0** (2.7)	-4.8** (2.6)	-8.2** (4.4)	-4.9* (3.4)	-7.9** (4.4)
<b>Immigrant Diversity</b>	3.0** (1.6)	2.1* (1.3)	2.8** (1.4)	1.0* (0.5)	0.7* (0.4)	1.0* (0.5)
<b>Service Barrier Index</b>	-0.5*** (0.2)	-0.6** (0.3)	-0.6*** (0.2)	-0.5* (0.3)	-0.6* (0.4)	-0.6* (0.4)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg. Bilat)	59, 40	43, 38	12, 23	59, 40	43, 38	12, 23

**Table 1: Tradable Service Sectors Divided by Category**

<b>Technical-Financial</b>	<b>Legal &amp; Related</b>	<b>Language-Human Resources</b>
Financial Services Insurance Architectural Engineering Surveying Agricultural Mining Other Technical Computer & Information Services Research & Development Other Business Services	Legal Services Accounting & Auditing Property Management	Recruitment & Training Procurement Management Consulting Public Relations Advertising TV and Radio Services Cultural & Recreational Services Publishing Services Health Services Market Research & Polling

# Bilateral Import Substitution by Service Type

**Table 6. Immigrants and Imports of Services (Offshoring), by Service Type**

Dep. Variable: Log of Import Value	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2SLS: Financial & Technical Services			2SLS: Legal & Related Services			2SLS: Language & HR Services		
<b>Immigrant Share Aggregate</b>	0.3*** (0.1)	0.3** (0.1)	0.3** (0.1)	7.3*** (2.7)	8.2* (3.2)	9.5*** (3.2)	11.2*** (3.7)	9.5*** (2.1)	10.8*** (2.2)
<b>Immigrant Share Bilateral</b>	-1.0 (1.0)	-0.8 (0.6)	-1.9 (1.2)	-10.8* (6.5)	-6.3** (3.2)	-14.2** (6.5)	-10.0** (5.1)	-6.0* (4.0)	-6.7** (3.3)
<b>Immigrant Diversity</b>	5.6** (2.9)	5.8** (3.1)	6.1* (3.9)	1.0** (0.4)	1.0* (0.6)	1.6* (0.8)	3.3* (1.7)	1.7** (0.7)	2.1* (1.0)
<b>Service Barrier Index</b>	-0.6** (0.3)	-0.6** (0.3)	-0.6** (0.3)	-1.0* (0.6)	-1.4* (0.8)	-1.1* (0.5)	-2.2*** (0.1)	-1.9*** (0.3)	-1.1** (0.4)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23

# Bilateral Export Effect by Service Type

**Table 9. Effect of Immigrants on Exports by Type of Service**

Dep. Variable: Log of Export Value	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	2SLS: Financial & Technical Services			2SLS: Legal & Related Services			2SLS: Language & HR Services		
<b>Immigrant Share Aggregate</b>	0.3*** (0.0)	0.2* (0.1)	0.3*** (0.0)	2.9*** (0.4)	2.0* (1.1)	2.0** (0.9)	1.9*** (0.7)	3.0* (2.1)	2.8*** (0.6)
<b>Immigrant Share Bilateral</b>	4.1* (2.9)	2.6 (2.8)	3.1* (1.8)	13.3* (7.6)	8.1*** (2.2)	12.1** (3.9)	4.2** (2.1)	5.0 (4.2)	2.9* (1.4)
<b>Immigrant Diversity</b>	-0.9 (0.7)	-1.0 (0.9)	-0.5 (0.6)	-1.1* (0.7)	1.1 (0.8)	2.0 (1.1)	-2.0 (1.8)	1.0 (0.9)	1.1 (1.0)
<b>Service Barrier Index</b>	-0.4 (0.3)	-0.7** (0.3)	-0.5* (0.3)	-1.5* (0.8)	-1.1** (0.5)	-1.5** (0.7)	-0.8*** (0.3)	-0.5* (0.3)	-0.7** (0.3)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg. Bilat)	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23

# Bilateral Export Effect: Cultural Distance

**Table 10. Immigrants and Exports of Legal & Related Services: Effect by Country Type**

Dep. Variable: Log of Export Value of Legal Services	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS: Trade and Immigration with Anglo-Saxon Countries			2SLS: Trade and Immigration with Non-Anglo-Saxon Countries		
<b>Immigrant Share Aggregate</b>	2.2* (1.4)	0.7* (0.5)	1.1* (0.6)	4.6** (2.4)	2.7** (1.4)	4.4*** (2.0)
<b>Immigrant Share Bilateral</b>	5.2* (3.2)	5.5 (5.7)	3.9* (1.9)	9.8*** (3.1)	8.3*** (2.0)	11.1** (5.8)
<b>Immigrant Diversity</b>	0.2 (0.2)	0.0 (0.1)	0.1 (0.1)	1.2 (0.9)	1.3 (0.9)	2.2 (1.7)
<b>Service Barrier Index</b>	-0.4** (0.2)	-0.5* (0.3)	-0.3* (0.2)	-1.2** (0.6)	-1.0* (0.6)	-1.1** (0.5)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	33, 49	21, 40	12, 23	33, 49	21, 40	12, 23

# Concluding Remarks

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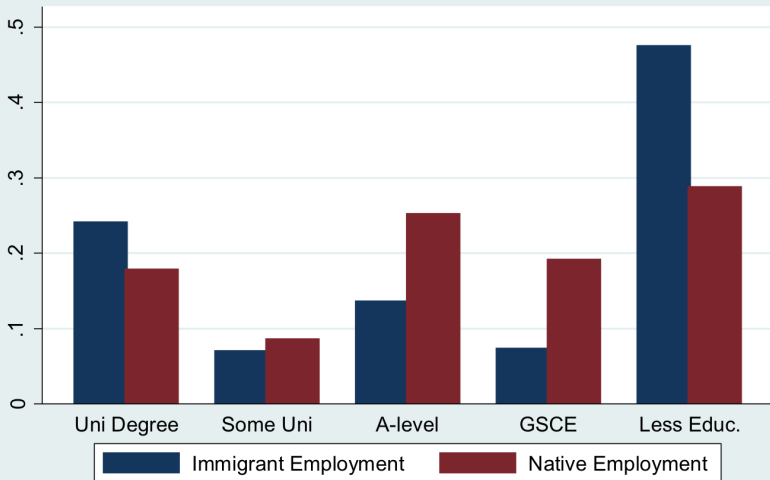
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- ▶ We find that the productivity effects of immigrants are important in explaining services trade
  - ▶ above and beyond bilateral network effects
- ▶ Furthermore, the bilateral effects operate differently in the case of services imports
  - ▶ Immigrants substitute for some bilateral services offshoring

## Share of Native & Immigrant Hours Worked, by Education 1997-2005



# Productivity & Bilateral Export Promotion Effect - Non-London TTWAs

▶ [Back to Main](#)

**Table 7b. Immigrants and the Services Exports (Total and Bilateral) of UK firms Non-London TTWAs**

Dep. Variable: Log of Export Value	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	3.1*** (0.7)	4.4** (2.1)	2.9** (1.5)	2.4** (1.2)	3.7* (1.9)	2.6** (1.3)
<b>Immigrant Share Bilateral</b>	13.1* (6.6)	13.6* (7.4)	9.5** (4.0)	8.3* (4.1)	11.0* (6.7)	8.5* (4.3)
<b>Immigrant Diversity</b>	-0.2* (0.1)	-0.1 (0.1)	0.0 (0.0)	-1.5 (1.5)	-0.6 (0.4)	-1.0* (0.5)
<b>Service Barrier Index</b>	-0.8** (0.3)	-0.5* (0.3)	-0.6** (0.3)	-0.6* (0.3)	-0.3 (0.4)	-0.4 (0.3)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	35, 40	15, 33	14, 21	25, 42	18, 34	15, 25

# Productivity & Bilateral Import Substitution Effect - Non-London TTWAs

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**Table 5b. Immigrants and Imports of Services (Offshoring) by UK firms  
Non-London TTWAs**

Dep. Variable: Log of Import Value	(1)	(2)	(3)	(4)	(5)	(6)
	OLS			2SLS		
<b>Immigrant Share Aggregate</b>	11.2** (4.5)	8.3* (4.9)	14.8 (9.7)	8.6* (4.0)	6.4* (3.1)	11.3 (10.1)
<b>Immigrant Share Bilateral</b>	-3.2** (1.3)	-3.8** (1.7)	-5.6* (3.3)	-3.2* (1.7)	-3.5* (1.7)	-4.9* (2.8)
<b>Immigrant Diversity</b>	1.1* (0.6)	0.6* (0.3)	3.3* (1.6)	0.8 (0.5)	0.6 (0.4)	2.2* (0.9)
<b>Service Barrier Index</b>	-0.3** (0.1)	-0.7* (0.3)	-0.2*** (0.0)	-0.3* (0.2)	-0.6* (0.3)	-0.2* (0.1)
<b>Firm and Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sec-Year and TTWA-Year FE</b>	No	Yes	No	No	Yes	No
<b>Sec-, TTWA-, Dest-Year FE</b>	No	No	Yes	No	No	Yes
Number of Observations	138,600	138,600	138,600	138,600	138,600	138,600
TTWA-Sec F-Stat (Agg, Bilat)	35, 40	15, 33	14, 21	25, 42	18, 34	15, 25