

Online appendix for "Immigrants, Occupations and Firm Export Performance" by Léa Marchal and Clément Nedoncelle

Not intended for publication.

A Data and empirical strategy: The classification of occupations

Table A.1: French classification of occupations

CS code	Occupation (French)	Occupation (English)	(1)
1	Agriculteurs exploitants	Farmers	
11	Agriculteurs sur petite exploitation	Farmers on small farms	-
12	Agriculteurs sur moyenne exploitation	Farmers on medium-sized farms	-
13	Agriculteurs sur grande exploitation	Farmers on large farms	-
2	Artisans, commerçants et chefs d'entreprise	Craftsmen, traders and business leaders	
21	Artisans	Craftsmen	-
22	Commerçants et assimilés	Traders and similar persons	-
23	Chefs d'entreprise de 10 salariés ou plus	Entrepreneurs with 10 or more employees	-
3	Cadres et professions intellectuelles supérieures	Executives and Higher Intellectual Professions	
31	Professions libérales	Liberal professions	H
33	Cadres de la fonction publique	Public Service executives	H
34	Professeurs, professions scientifiques	Professors, scientific professions	H
35	Professions de l'information, des arts et des spectacles	Information, arts and entertainment occupations	H
37	Cadres administratifs et commerciaux d'entreprise	Corporate administrative and commercial executives	H
38	Ingénieurs et cadres techniques d'entreprise	Engineers and business technical executives	H
4	Professions Intermédiaires	Intermediate Occupations	
42	Professeurs des écoles, instituteurs et assimilés	Teachers of schools, teachers and assimilated	H
43	Professions intermédiaires de la santé et du travail social	Intermediate health and social work occupations	H
44	Clergé, religieux	Clergy, religious	H
45	Professions intermédiaires administratives de la fonction publique	Intermediate administrative professions in the public service	H
46	Professions intermédiaires administratives et commerciales des entreprises	Intermediate administrative and commercial professions in companies	H
47	Techniciens	Technicians	H
48	Contremaîtres, agents de maîtrise	Foremen, supervisors	H
5	Employés	Clericals	
52	Employés civils et agents de service de la fonction publique	Civilian employees and public service employees	L
53	Policiers et militaires	Police and military	L
54	Employés administratifs d'entreprise	Corporate Administrative Employees	L
55	Employés de commerce	Commercial employees	L
56	Personnels des services directs aux particuliers	Direct service personnel to individuals	L
6	Ouvriers	Labourers	
62	Ouvriers qualifiés de type industriel	Industrial high-skilled Workers	L
63	Ouvriers qualifiés de type artisanal	Skilled craft workers	L
64	Chauffeurs	Drivers	L
65	Ouvriers qualifiés de la manutention, du magasinage et du transport	Skilled workers in handling, storage and transport	L
67	Ouvriers non qualifiés de type industriel	low-skilled industrial workers	L
68	Ouvriers non qualifiés de type artisanal	low-skilled craft workers	L
69	Ouvriers agricoles	Agricultural workers	L

Column (1) classifies occupations into low- and high-skilled (respectively denoted L and H).

B The pro-trade effect of immigrant workers: Additional results

Table A.2: Share of immigrant workers (first-stage)

	(1)	(2)
Sample	Intensive	Extensive
Dep. Var.	Mig_sh _{it-1}	
(log) Mig_stock _{rt-1}	0.008*** (0.001)	0.007*** (0.001)
Observations	226,065	624,061
R-squared	0.590	0.606
Firm FE	yes	yes
Firm-year controls	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Kleibergen-Paap F-Stat.	159.234	328.566

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.3: Share of immigrant workers (second-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive			Extensive
Dep. var.	(log) Exports	(log) Nr. of destinations	(log) Nr. of products	Participation
(log) Mig_sh _{it-1}	3.162*** (0.890)	2.341*** (0.425)	1.929*** (0.439)	0.627*** (0.137)
Observations	226,065	226,065	226,065	624,061
R-squared	0.878	0.882	0.840	0.786
Firm FE	yes	yes	yes	yes
Firm-controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.4: Two-year lagged number of immigrant workers (first-stage)

	(1)	(2)
Sample	Intensive	Extensive
Dep. Var.	(log) Mig _{it-2}	
(log) Mig_stock _{rt-2}	0.053*** (0.004)	0.043*** (0.004)
Observations	183,978	495,584
R-squared	0.835	0.804
Firm FE	yes	yes
Firm-year controls	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Kleibergen-Paap F-Stat.	199.896	449.565

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.5: Two-year lagged number of immigrant workers (second-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive			Extensive
Dep. var.	(log) Exports	(log) Nr. of destinations	(log) Nr. of products	Participation
(log) Mig _{it-2}	0.333*** (0.107)	0.288*** (0.053)	0.188*** (0.054)	0.070*** (0.019)
Observations	183,978	183,978	183,978	495,584
R-squared	0.879	0.893	0.844	0.804
Firm FE	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.6: Growth in immigrant employment (first-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive	Extensive	Intensive	Extensive
Dep. Var.	$Mig_{it-1} > Mig_{it-2}; Mig_{it-2} \neq 0$		$Mig_{it-1} > Mig_{it-2}; Mig_{it-2} = 0$	
(log) Mig_stock _{rt-1}	0.013*** (0.002)	0.010*** (0.001)	-0.007*** (0.002)	-0.005*** (0.001)
Observations	185,999	502,264	185,999	502,264
R-squared	0.301	0.311	0.182	0.166
Firm FE	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	OLS	OLS	OLS	OLS
Kleibergen-Paap F-Stat.	38.827	71.265	24.531	24.165

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.7: Growth in immigrant employment (second-stage)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	Intensive				Extensive			
Dep. var.	(log) Exports	(log) Nr. of destinations		(log) Nr. of products		Participation		
$d(Mig_{it-1} > Mig_{it-1}; Mig_{it-2} \neq 0)$	1.737*** (0.568)	1.466*** (0.328)		1.181*** (0.321)		0.504*** (0.129)		
$d(Mig_{it-1} > Mig_{it-2}; Mig_{it-2} = 0)$		-3.277** (1.273)		-2.766*** (0.824)		-2.227** (0.754)		-1.048*** (0.348)
Observations	185,999	185,999	185,999	185,999	185,999	185,999	502,264	502,264
R-squared	0.867	0.831	0.809	0.690	0.793	0.708	0.755	0.599
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.8: Alternative definitions of immigrants (first-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive	Extensive	Intensive	Extensive
Dep. Var.	(log) Mig _{it-1} [rob]		(log) Mig _{it-1} [for]	
(log) Mig_stock _{rt-1}	0.046*** (0.003)	0.040*** (0.003)	0.026*** (0.003)	0.023*** (0.002)
Observations	226,065	624,061	226,065	624,061
R-squared	0.827	0.811	0.905	0.892
Firm FE	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	OLS	OLS	OLS	OLS
Kleibergen-Paap F-Stat.	164.382	342.873	79.037	141.800

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations. Mig_{it-1}[rob] denotes the firm-year number of immigrant workers defined as either foreign citizens or foreign-born French citizens. Mig_{it-1}[for] denotes the firm-year number of immigrant workers defined as foreign-born individuals, independently of their citizenship.

Table A.9: Alternative definitions of immigrants (second-stage)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	Intensive				Extensive			
Dep. var.	(log) Exports		(log) Nr. of destinations		(log) Nr. of products		Participation	
(log) Mig _{it-1} [rob]	0.333** (0.131)		0.280*** (0.060)		0.225*** (0.065)		0.088*** (0.023)	
(log) Mig _{it-1} [for]		0.375 (0.235)		0.338*** (0.106)		0.305*** (0.112)		0.101** (0.042)
Observations	226,065	226,065	226,065	226,065	226,065	226,065	624,061	624,061
R-squared	0.886	0.888	0.900	0.903	0.854	0.855	0.793	0.793
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations. Mig_{it-1}[rob] denotes the firm-year number of immigrant workers defined as either foreign citizens or foreign-born French citizens. Mig_{it-1}[for] denotes the firm-year number of immigrant workers defined as foreign-born individuals, independently of their citizenship.

Table A.10: Sample of continuous exporters (first-stage)

(1)	
Sample	Intensive
Dep. Var.	(log) Mig _{it-1}
(log) Mig_stock _{rt-1}	0.061*** (0.005)
Observations	151,639
R-squared	0.828
Firm FE	yes
Firm-year controls	yes
Sector-year FE	yes
Method	OLS
Kleibergen-Paap F-Stat.	177.008

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.11: Sample of continuous exporters (second-stage)

(1) (2) (3)			
Sample	Intensive		
Dep. var.	(log) Exports	(log) Nr. of destinations	(log) Nr. of products
(log) Mig _{it-1}	0.323*** (0.101)	0.280*** (0.055)	0.194*** (0.057)
Observations	151,639	151,639	151,639
R-squared	0.900	0.889	0.855
Firm FE	yes	yes	yes
Firm-year controls	yes	yes	yes
Sector-year FE	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.12: Consistent sample of export flows across the EU the non-EU zones (first-stage)

	(1)	(2)
Sample	Intensive	Extensive
Dep. Var.	(log) Mig _{it-1}	
(log) Mig_stock _{rt-1}	0.064*** (0.006)	0.048*** (0.003)
Observations	127,370	636,840
R-squared	0.828	0.810
Firm FE	yes	yes
Firm-year controls	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Kleibergen-Paap F-Stat.	141.309	549.857

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.13: Consistent sample of export flows across the EU the non-EU zones (second-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive			Extensive
Dep. var.	(log) Exports	(log) Nr. of destinations	(log) Nr. of products	Participation
(log) Mig _{it-1}	0.157** (0.067)	0.212*** (0.044)	0.142*** (0.051)	0.071*** (0.015)
Observations	127,370	127,370	127,370	636,840
R-squared	0.921	0.914	0.875	0.846
Firm FE	yes	yes	yes	yes
Firm-controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations. The sample includes only export flows that are above 150,000 euros for both the EU and the non-EU zones.

Table A.14: Alternative estimation strategies (first-stage)

	(1)	(2)
Sample	(log) Exports	(log) Exports +1
Dep. var.	(log) Mig _{it-1}	
(log) Mig_stock _{rt-1}	0.059*** (0.004)	0.049*** (0.003)
Observations	226,065	624,061
R-squared	0.827	0.811
Firms	yes	yes
Firm-controls FE	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Kleibergen-Paap F-Stat.	239.255	542.856

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.15: Alternative estimation strategies (second-stage)

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	Intensive					
Dep. var.	(log) Exports	(log) Exports	(log) Exports +1	(log) Exports	Exports (with zeros)	Exports (with zeros)
(log) Mig _{it-1}	0.064*** (0.004)	0.429*** (0.086)	0.109*** (0.007)	1.025*** (0.162)	0.001 (0.039)	0.008*** (0.003)
Observations	226,070	226,070	624,061	624,061	637,991	637,991
R-squared	0.888	0.884	0.877	0.873	-	-
Firm FE	yes	yes	yes	yes	no	no
Variables demeaned and centred	no	no	no	no	yes	yes
Firm-year controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes
Method	OLS	IV-2SLS	OLS	IV-2SLS	Poisson	IV-Poisson

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations. Variables are demeaned and centred in columns (5) and (6) to overcome the fact that it is computationally too intensive to include firm fixed effects in a Poisson model.

C The pro-trade effect of immigrants across occupation groups: Additional results

Table A.16: Interaction with the share of high-skilled jobs (first-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive	Extensive	Intensive	Extensive
Dep. Var.	(log) Mig _{it-1}	(log) Mig _{it-1}	(log) Mig _{it-1} × Sh _{hs_{it-1}}	(log) Mig _{it-1} × Sh _{hs_{it-1}}
(log) Mig _{stock_{rt-1}}	0.061*** (0.004)	0.049*** (0.003)	-0.006*** (0.001)	-0.007*** (0.001)
(log) Mig _{stock_{rt-1}} × Sh _{hs_{it-1}}	-0.010*** (0.004)	-0.004** (0.002)	0.040*** (0.003)	0.030*** (0.002)
Observations	226,065	624,061	226,065	624,061
R-squared	0.827	0.811	0.803	0.780
Firm FE	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	OLS	OLS	OLS	OLS
Joint Kleibergen-Paap F-Stat.	78.292	174.000	78.292	174.000

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.17: Interaction with the share of high-skilled jobs (second-stage)

	(1)	(2)	(3)	(4)
Sample	Intensive		Extensive	
Dep. var.	(log) Exports	(log) Nr. of destinations	(log) Nr. of products	Participation
(log) Mig _{it-1}	0.435*** (0.118)	0.322*** (0.056)	0.266*** (0.060)	0.084*** (0.020)
(log) Mig _{it} × Sh _{hs_{it-1}}	-0.705*** (0.165)	-0.553*** (0.083)	-0.459*** (0.092)	-0.073*** (0.027)
Observations	226,065	226,065	226,065	624,061
R-squared	0.886	0.901	0.854	0.794
Firm FE	yes	yes	yes	yes
Firm-year controls	yes	yes	yes	yes
Sector-year FE	yes	yes	yes	yes
Method	IV-2SLS	IV-2SLS	IV-2SLS	IV-2SLS

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

D The pro-trade effect of immigrants across destinations: Additional results

Table A.18: Average effect across destinations (first-stage)

	(1)	(2)
Sample	Exp. concentration	$\hat{\gamma}_{it}$
Dep. var.	(log) Mig _{it-1}	
(log) Mig_stock _{rt-1}	0.059*** (0.004)	0.062*** (0.005)
Observations	226,065	158,970
R-squared	0.827	0.829
Firms	yes	yes
Firm-controls FE	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Kleibergen-Paap F-Stat.	239.255	542.856

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.

Table A.19: Average effect across destinations by occupation groups (robustness test)

	(1)	(2)
Dep. var.	Exp. concentration	$\hat{\gamma}_{it}$
ATE(Mig _{it-1} ^{hs})	-0.204*** (0.015) [236,992]	0.364*** (0.018) [162,011]
ATE(Mig _{it-1} ^{ls})	-0.424*** (0.090) [237,025]	2.231*** (0.676) [162,039]
Method	IV-2SLS/DRE	IV-2SLS/DRE

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. The number of observations are reported in brackets.

Table A.20: Exposure to immigrants from country j (first-stage)

	(1)	(2)
Sample	Intensive	
Dep. Var.	(log) Mig _{it-1}	
(log) Mig_stock _{rt-1}	0.061*** (0.006)	0.061*** (0.006)
Mig_sh _{jrt-1}		-0.057 (0.117)
Observations	370,232	370,232
R-squared	0.842	0.842
Firm FE	yes	yes
Firm-year controls	yes	yes
Sector-year FE	yes	yes
Method	OLS	OLS
Joint Kleibergen-Paap F-Stat.	97.919	97.904

***, **, * respectively denote significance at the 1%, 5% and 10% levels. Robust standard errors clustered at the 2-digit sector-year level are reported in parentheses. Firm-year controls include size dummies, the share of high-skilled occupations and the concentration of occupations.