MIGRATION AND LOCAL PRODUCTIVITY IN AUSTRALIA

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Relevance of migration for regional economies

- Many regions in the OECD face significant demographic change and a declining supply of labour as their populations age.
- The integration of migrants can help alleviate these challenges.
- Regions that manage migration well, can reap its benefits of migration for regional development such as through higher trade, patenting or productivity (OECD, 2022).

How are migration and productivity linked across space?

Local productivity is a consequence of many factors (Combes et al., 2008):

- The skill level of the local workforce, the sectoral composition of the local economy (Moretti, 2004; Combes et al. 2008).
- Local interactions between workers or firms lead to productivity gains, i.e., agglomeration economies (Marshall, 1890).
- Local productive or non-productive endowments (e.g., airports, roads, access to sea) (Roback, 1982: Albouy et al., 2013).

Migrants can *boost local productivity* through several channels:

- Migrants can fill shortages in critical positions while bringing new skills and ideas (Alesina et al. , 2016).
- Migration allows workers to become more specialized which can improve labour productivity (Peri, 2012).
- Migration can also contribute to productivity through firm creation, boosting innovation and trade in their host economies (OECD, 2022).

Migration can also *lower local productivity*:

- Additional cheap labour supply => desincentivize firms to invest in technology => lower productivity (Ortega and Peri, 2014).
- Higher transaction and cooperation costs due to cultural differences => lower productivity (Parrotta, Pozzoli and Pytlikova, 2014).
- If migrants have low average human capital → lower productivity.

The analysis in a nutshell

Context:
- Australian local labour markets 2010-2018 (89 SA4 regions).

Data:
- Administrative data sourced from different Australian agencies and department.
- The final data covers more than 7 million individuals per year (2011-2018).

Empirical Approach:
- Two-step estimation strategy à la Combes et al. (2008).

Endogeneity concerns:
- Sorting by ability: Individual fixed-effects.
- Reverse causality between local productivity, employment density and migrant share: (FUTURE work)
    - Predict migrants' presence using network instrument (e.g., shift-share) for causality.
    - Lagged values as instrument for local characteristics.

Examine the following:
- Agglomeration economies in Australia.
- Migrants' effect on local productivity.
- Heterogeneous effects on natives' with different education levels.

Contribution to the literature

Migration productivity

- Evidence from a country with selective migration policies and high-skilled migration.
- Limited evidence at the labour market level (Kemeny and Cooke, 2017).

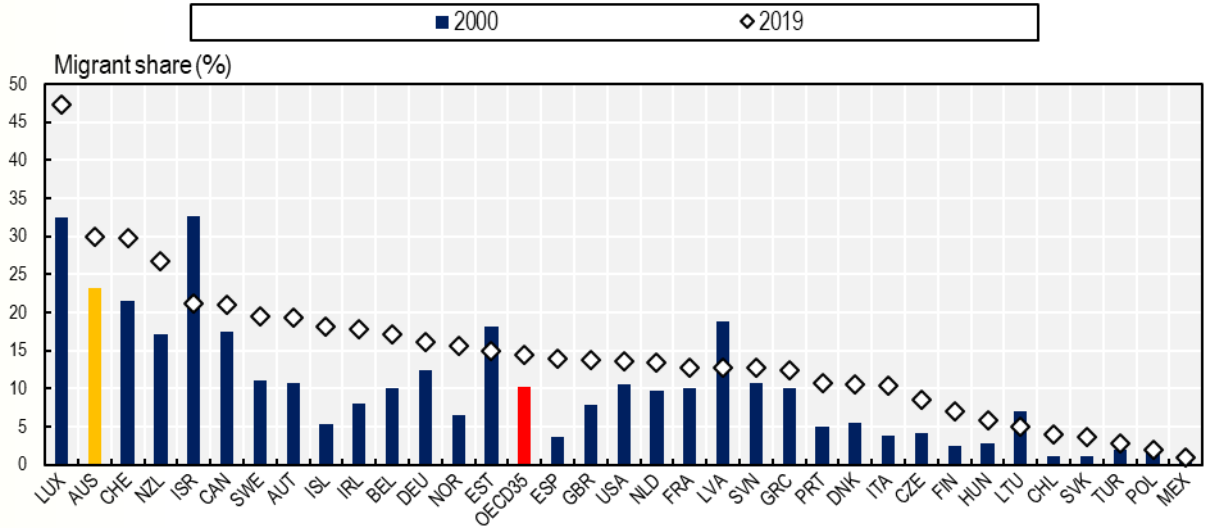
Agglomeration economies (Combes et al. 2008)

- Provide the first estimates for Australia.

The migrant share in Australia is one of the highest among OECD countries

- Australia has the highest migrant population share in the OECD, after Luxembourg.
- Migrants make up 30% of the population in Australia, more than twice the OECD average (14%).

Share of foreign-born population by country, 2000 and 2019 or closest available year

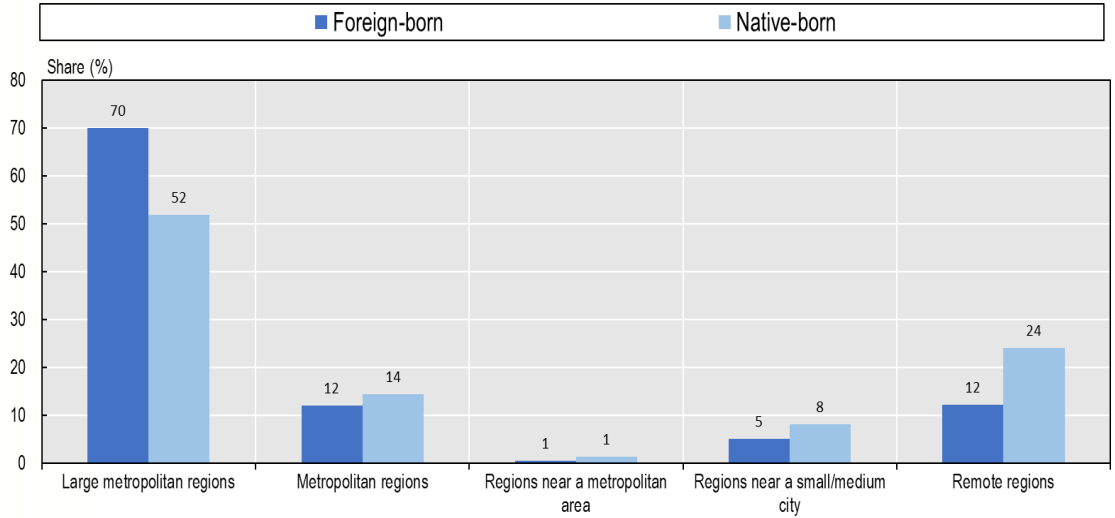


Note: The figure presents the foreign-born share among the total population. Data are for 2000 and 2019 or the closest available year.
Source: OECD Statistics, https://data.oecd.org/chart/6Lz5.

Most migrants in Australia live in metropolitan regions

- Similar to most OECD countries, migrants are more likely to live in metropolitan areas than their native-born counterparts.
- In Australia, eight out of ten foreign-born live in metropolitan regions compared to seven out of ten native-born.

Distribution of migrants and native-born by type of region, 2022 or latest available year

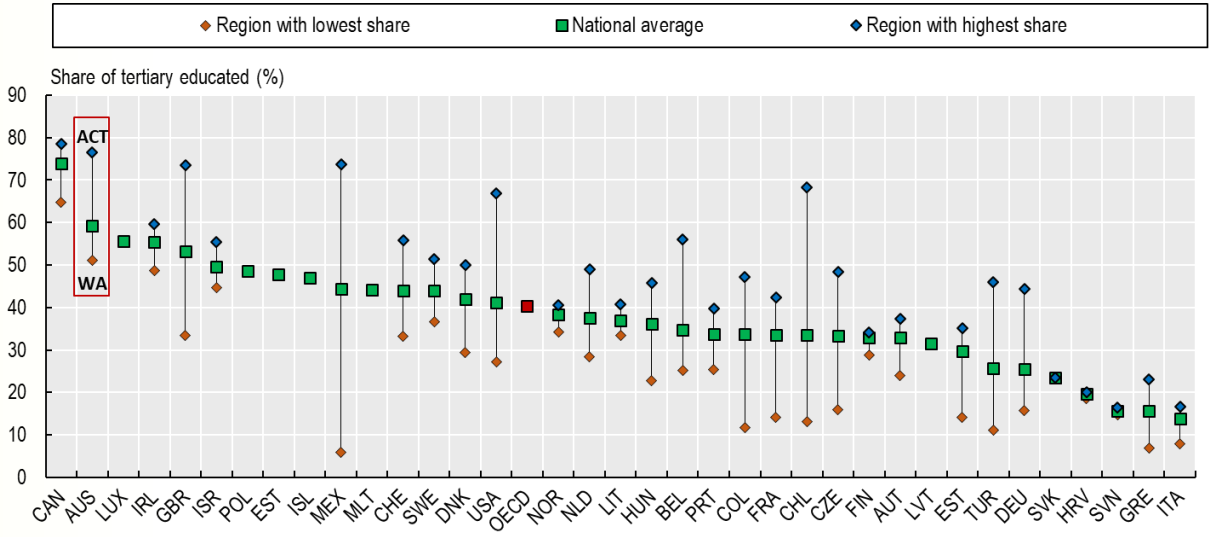


Note: The figure presents the distribution of foreign-born and native-born across TL3 regions classified according to their access to metropolitan areas. Data are for 2022 or the latest available year. Data for Australia are for 2016. Data for the UK are limited to England and Wales. The underlying sample covers the entire local resident population.
Source: OECD calculations based on data described in Box 1.

Migrants in Australia are among the most educated

- Australia has one of the highest educated migrant population among OECD countries. Almost 60% of the migrant population in Australia has attained tertiary education, compared to around 40% of the native population, and around 40% of migrants in other OECD countries.

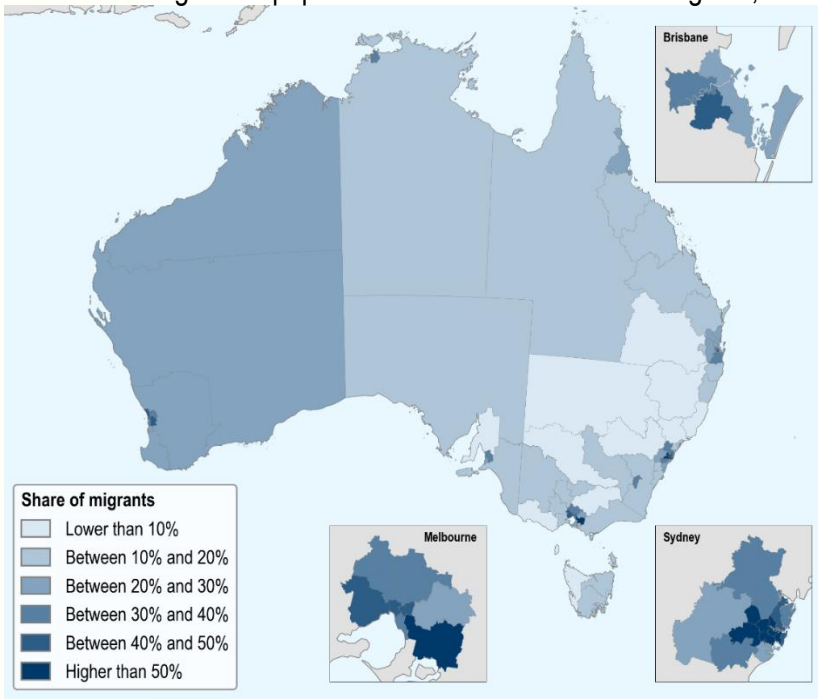
Share of tertiary-educated foreign-born population in TL2 regions, 2019 or latest available year



Note: The figure presents the share of tertiary-educated foreign-born among the foreign-born population (25-64). Data are for 2019 or latest available year.
Source: OECD calculations based on data from OECD Regional Statistics (database) (accessed March 2022).

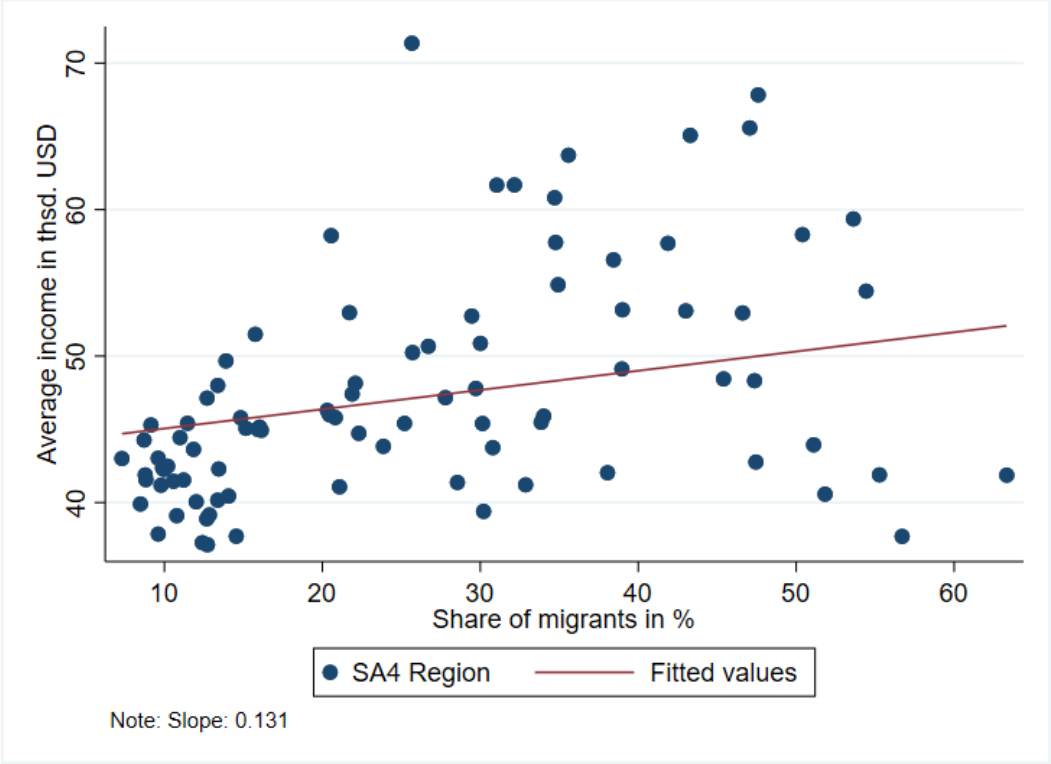
Geographic detail matters

Share of the foreign-born population across Australian SA4 regions, 2016



Note: The figure presents the share of foreign-born among the working-age population (15-64 years) in Australia disaggregated by SA4 regions (local labour markets). Data are for 2016.
Source: Australian Census of Population and Housing 2016 accessed via ABS Census TableBuilder (accessed May 2022).

Income and migrant share are highly correlated



Income and population density are highly correlated

Data and sample

- **Demographic information**: Multi-Agency Data Integration Project (MADIP).
  - Combination of various Australian agencies and departments and the Census.
  - 2008-2020
- **Income data:** Australian Tax Office (ATO) linked to MADIP.
  - Covering every Australian individual with a tax record.
  - 2010/11-2018/19
- **Migration data**: Department of Home Affairs linked to MADIP.
  - Covering every foreign- or native born who crossed the border.
  - 2000-2018
- **Census data**: Census of Population and Households 2016 linked to MADIP.
  - Covering around 25 million residence.
- **Local characteristics**: Australian Bureau of Statistics.
  - Area Size data.

Empirical strategy: Two-step estimation à la Combes et al. (2008)

Step 1: isolate local area effects:

$$\alpha y_{irst} = \alpha + \beta Spe_{rst} + \Phi X_{it} + \gamma_s + \gamma_{rt} + \gamma_i + \varepsilon_{irst} \quad (1)$$

where:

- y_{irst}: the natural logarithm of wages for individual i in SA4 r employed in sector s at time t.
- Spe_{rst}: the effect of specialisation in a given sector on productivity.
- X: a vector of individual observable characteristics (e.g., education, sex, age, occupation, and more) and employment characteristics (e.g., full-time, collective bargaining, or public sector).
- γ_{rt}: city-time fixed effects.
- γ_s: sector fixed effect.
- γ_i: is individual fixed effect.
- ε_{irst}: error term.

Empirical strategy: Two-step estimation à la Combes et al. (2008)

Step 2: local characteristics that affect productivity at local level:

$$\widehat{\gamma_{rt}} = \beta density_{rt} + \delta migrant\ share_{rt} + \theta X_{rt} + \gamma_t + \varepsilon_{rt} \quad (2)$$

where:

$\widehat{\gamma_{rt}}$: area-year fixed effect net of skill and industry composition.
$density_{rt}$: employment over land area.
$migrant\ share_{rt}$: XX add definition.
X_{rt}: share of high-skilled population, market potential, sectoral diversity, land area.
γ_t: time fixed effects.
ε_{rt}: error term.

Two main identification concerns

1. **Sorting by ability:** Possible positive correlation between worker characteristic and density.
   - *Observable characteristics*: e.g., diplomas, experience => Mincerian controls.
   - *Non-observable characteristics*: e.g., grit, intelligence => individual fixed effects.

2. **Reverse causality**
   - *Productivity and density*: historical instruments on the past settlement patterns of the overall population.
   - *Productivity and migrant share*: shift-share instrument based on past settlement patterns of migrants.

First step results

	1	2	3
Male		0.359***	
		(0.000)	
Age		0.125***	0.251***
		(0.000)	(0.006)
Age^2		-0.001***	-0.002***
		(0.000)	(0.000)
Occ. Level 1		0.447***	0.161***
		(0.001)	(0.001)
Occ. Level 2		0.440***	0.261***
		(0.001)	(0.001)
Occ. Level 3		0.242***	0.118***
		(0.001)	(0.001)
Occ. Level 4		-0.023***	-0.003***
		(0.001)	(0.001)
Occ. Level 5		0.119***	0.084***
		(0.001)	(0.001)
Occ. Level 6		-0.084***	-0.098***
		(0.000)	(0.001)
Emp. Spec.	0.055***	0.041***	0.045***
	(0.000)	(0.000)	(0.000)
Time x SA4 FE	Time x SA4, Sector	Time x SA4, Sector	Time x SA4, Sector
Individual FE	No	No	Yes
N	>35 Mio	>35 Mio	>35 Mio
R^2	0.090	0.259	0.741

Second step results: Agglomeration and migrants are positively correlated with productivity

	1	2	3	4
Density		0.0010*** (0.000)	0.00005*** (0.000)	0.00006*** (0.000)
Migrant Share	0.08883*** (0.009)		0.06805*** (0.011)	0.09357*** (0.016)
Land area				0.01004*** (0.004)
Diversity				-0.09410 (0.084)
Time FE	Yes	Yes	Yes	Yes
Pop. Weights	Yes	Yes	Yes	Yes
N	712	712	712	712
R^2	0.469	0.356	0.517	0.557

Weak agglomeration yet strong sorting effects

	No Mincerian	No Mincerian	Mincerian	Mincerian	Mincerian + Individual FE	Mincerian + Individual FE
Density	0.00017*** (0.000)	0.00009*** (0.000)	0.00008*** (0.000)	0.00004 (0.000)	0.00010*** (0.000)	0.00006*** (0.000)
Migrant Share		0.07074** (0.029)		0.08909*** (0.027)		0.09357*** (0.016)
Land area		-0.00002 (0.007)		0.00578 (0.006)		0.01004*** (0.004)
Diversity		-0.27344** (0.112)		-0.08439 (0.135)		-0.09410 (0.084)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Pop. Weights	Yes	Yes	Yes	Yes	Yes	Yes
N	712	712	712	712	712	712
R^2	0.656	0.722	0.610	0.610	0.356	0.557

Heterogeneity and robustness

	Above Median	Below Median	w/o 5% (top/bottom)	w/o 10% (bottom)	Pop. Dens > 1	w/o WA
Density	0.00002 (0.000)	0.00444*** (0.001)	0.00007*** (0.000)	0.00006** (0.000)	0.00002 (0.000)	0.00007*** (0.000)
Migrant Share	0.08358*** (0.016)	0.08378*** (0.024)	0.08168*** (0.015)	0.08156*** (0.016)	0.08247*** (0.016)	0.07684*** (0.016)
Land area	-0.00786 (0.008)	0.02918*** (0.006)	0.00601 (0.004)	0.00460 (0.005)	-0.00427 (0.004)	0.00735* (0.004)
Diversity	-0.13900* (0.078)	0.25648** (0.113)	-0.09730 (0.089)	-0.09356 (0.091)	-0.10883 (0.084)	-0.10815 (0.088)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Pop. Weights	Yes	Yes	Yes	Yes	Yes	Yes
N	712	712	712	712	712	712
R^2	0.568	0.534	0.521	0.527	0.634	0.579

Results are robust to alternative measures

	1	2	3	4	5
Density	0.00006***			0.00004**	0.00006***
	(0.000)			(0.000)	(0.000)
Nat. Density		0.00010***			
		(0.000)			
Log(Density)			-0.03398***		
			(0.011)		
Migrant Share	0.09357***	0.09780***	0.12069***		0.09357***
	(0.016)	(0.016)	(0.016)		(0.016)
$\frac{1}{(1-\text{Mig. Share})}$				0.21973***	
				(0.041)	
Land area	0.01004***	0.01019***	-0.03092**	0.00624*	0.01004***
	(0.004)	(0.004)	(0.012)	(0.003)	(0.004)
Diversity	-0.09410	-0.08966	-0.12260*	-0.12003	
	(0.084)	(0.086)	(0.068)	(0.083)	
Inv. Diversity					0.09410
					(0.084)
Time FE	Yes	Yes	Yes	Yes	Yes
Pop. Weights	Yes	Yes	Yes	Yes	Yes
N	712	712	712	712	712
R^2	0.557	0.547	0.532	0.543	0.557

Conclusion

- Very weak agglomeration economies.
- Accounting for unobservable skills increases the importance of density – a puzzle unique to Australia.
- An increase in the local migrant share improves productivity of other natives.

Next steps

- Combine SA4 areas by functional urban area.
- Instrument the local variables including the share of migrants and density.
- Examine the heterogeneous effects of agglomeration by education level of natives or migrants.

Thank you

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