

Office of the Chief Economist

The geography of trade and innovation in Australia

Warwick Jones and Shane Aves Sectoral and Regional Analysis Economic Advice Service Branch

Office of the Chief Economist 26 September 2017

Industry&Innovation Workshop 2017 26 September

The problem



- We know both theoretically and empirically that innovative firms are productive firms. We also know from firm level studies that that innovation is strongly linked to trade.
- What we don't know is *where* trade occurs and where innovation occurs. This is a major challenge in formulating effective trade and innovation policies.

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The approach to the question



- Where does trade happen in Australia?
- Where does innovation happen in Australia?
- How can we use this knowledge to develop better policy?



Small, open economy?

Time for some myth busting

International trade as a proportion of GDP



Source: World Trade Organisation (2017) *Merchandise trade (%GDP)* <u>https://data.worldbank.org/indicator/TG.VAL.TOTL.GD.ZS</u>

- Australia is a medium sized economy.
- We are currently ranked 14th largest in the world.
- Same size as Russia and larger than most European countries.
- Although our the real value of international trade has grown six fold since the seventies, we have lowest trade exposure of any medium sized economy country in the world.
- We are a first world country with a developing country's trade profile

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How has Globalisation Mark 2 played out in Australia?



Australia's two way trade as a proportion of GDP 1901 to 2015–16

Source: Department of Foreign Affairs and Trade (2017) *Australia's trade and economic indicators* <u>http://dfat.gov.au/trade/resources/trade-statistics/Pages/trade-time-series-data.aspx</u> Australian Bureau of Statistics (2017) *International Trade in Goods and Services* cat.no. 5368.0, <u>http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5368.0Jul%202017?OpenDocument</u> Note : data changed from calendar years to financial years in 1913

- Until the GFC Australia was slowly tracking back to where it was before the First World War.
- The upticks after the Wars showed the export potential of the economy.

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Changes in the geography of value flows in schema



The characteristics of international trade gateways



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Where do Australian cities rank?



AT Kearney global city index score

- Sydney is ranked 13th and Melbourne is ranked 14th on the Global City Index scores.
- This is similar to most city rankings.
- Perth is sometimes ranked around 70th.
- No other Australian cities are in the top 100.

Source: AT Kearney (2016) Global Cities 2016

https://www.atkearney.com/documents/10192/8178456/Global+Cities+2016.pdf/8139cd44-c760-4a93-ad7d-11c5d347451a

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Where is the critical mass of Advanced Producer Services necessary for multinational firms

Location of publically listed companies by shareholder value in 2009

- Nearly 90 per cent of public firms by value are located in Sydney and Melbourne.
- Three quarters of international business travel passes through their airports



Source: Tonts T and Taylor M (2013) The shifting geography of corporate headquarters in Australia: A longitudinal analysis *Regional Studies* 47(9):1507–1522



International trade is concentrating in Sydney and Melbourne

Value of international trade flowing through selected Australian ports



Source: ABS International cargo statistics (unpublished data)

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Income per taxpayer is sensitive to trade flows

- In the lead up to the GFC trade intensified in the Australian economy and incomes in inner Sydney and Melbourne grew faster than the rest of Australia
- Since the GFC, trade intensity has moved sideways and so has the income ratio

Ratio of income per taxpayer inside internationally exposed areas of Sydney and Melbourne to rest of Australia



Source: Department of Industry, Innovation and Science analysis of customised ATO data



Gross regional product is slowly concentrating in CBDs



- A third of NSW's Gross Regional Product is in the global arc stretching from Kingsford Smith Airport to north Sydney.
- This is slowly increasing.

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House (land) prices are telling a story

More than 90 per cent of house price change is due to changes in the underlying value of the land.

The value of land in the trade exposed areas of the Sydney is increasing faster than the rest of the state. This is a global phenomenon (BITRE 2015 I 65).

The house price/income ratio is higher in the CBD than elsewhere.

Real NSW house prices 1994–2016



Source: Australian Property Monitors custom data

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Where innovation is occurring

- Cities dominate even after scaling by employment.
- Natural resources also attract innovation, but:
 - Less opportunity for spillovers -66 per cent of industrial projects, (77 per cent by value) are engineering related. Often these are one-off site specific solutions, i.e. disposing of mine waste or ramping up production.
 - Industrial collaboration often involves employing Research Service Providers (RSP) - no value at risk.
 - Considering these factors, novel innovation with broad societal benefits is even more concentrated in cities.



Source: OCE analysis of innovation variables, details in Australian Innovation Systems Report (forthcoming)

Innovation in Sydney occurs in the global arc, Macquarie and Norwest Business Parks



Source: Department of Industry, Innovation and Science analysis of innovation variables, details in *Australian Innovation Systems Report (forthcoming)*

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While the marginal cost of transmitting information across geographical space has fallen significantly, the marginal cost of transmitting knowledge still rises with distance Therefore, the knowledge spillover benefits of clustering in cities can be large for high-value, knowledge intensive sectors

UK Office of Deputy Prime Minister

Devolving decision making/ Meeting the regional challenge/ The importance of cities for regional growth

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The effect of population density on innovation

- Population density has been linked with diffusion of knowledge. Empirical evidence suggests that interactions and information exchange on social networks are often the driving force for idea-creation, productivity and individual prosperity. These increase with population density.
- Adam Smith was one of the first to point to urban centres as exceptional aggregators, whether of innovations or depravities.
- The innovation score supports these claims.

Regional innovation per employee vs population density (SA3)



The relationship between innovation variables (regional level)

Correlation between innovation variables



- Innovation score is most highly correlated with Masters degrees and business collaboration, and least correlated with industrial R&D
- Educated workforce and innovation are closely related
- If knowledge spillovers occur through physical interactions between staff, customers, B2B, etc. then industrial projects may be less likely to result in knowledge spillovers between industries

Source: Department of Industry, Innovation and Science (2017) Australian Innovation System Report (forthcoming)

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Observations

Trade and innovation are strongly linked geographically



- We knew from firm level studies that innovation and trade are strongly linked. Geographic analysis presented here shows that they happen in the same place and that the trade profile of an area affects the type of innovation.
- This would suggest that innovation policy is indissolubly linked to trade policy.
- It also suggests that if we are to increase our currently low levels of innovation, we need to increase both the size and complexity of our trade.

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Final observations and some suggestions

Increasing trade (and innovation) as a proportion of GDP faces strong headwinds. Because so little of the economy is trade exposed we face:

The highest trade costs in the developed world. The United States and Canada are showing the way in reducing cross border trade frictions using very cost effective techniques.



No reduction in transport costs on any mode for the last 20 years.

North American data indicates that 10 per cent of the trade network links are carrying 90 per cent of the value. We need to identify and increase capacity in these areas. No reduction in trade protection for 20 years. We were one of the only countries in the world to have higher trade protection in the 1990s than we did in the 1970s and old habits can die hard. Pressure needs to be kept on to increase industrial flexibility as the global trade network continually changes.



Slow growth in services trade outside tourism and education.

Ireland and Singapore have specialised in the service trade and their GDP growth is far outstripping merchandise goods exporters such as Australia. We have the workforce and the institutional structures to do much better in services exports.

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Further information



Warwick Jones

Manager Economic Advice Service Branch Office of the Chief Economist

Phone: (02) 6276 1494

Email: <u>warwick.jones@industry.gov.au</u>



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