# Regional Economies and Automation
## The Economic Society of Australia
### 22 November 2018

Dr. Riccardo Welters

Associate Professor - Economics
College of Business, Law and Governance
James Cook University

# Predicted effects of automation

Technological development (and its employment threat) is nothing new.

Keynes alluded to it in his 1933 'Essays in persuasion':

> "*This means unemployment due to our discovery of means of economising the use of labour outrunning the pace at which we can find new uses for labour.*"

Whilst previous technological breakthroughs have certainly disrupted labour markets in the short term, they have not done so in the long term.

# Predicted effects of automation

So, is the 21st century gulf of automation something to worry about?

Historically, technological process has displaced manual, routine jobs.

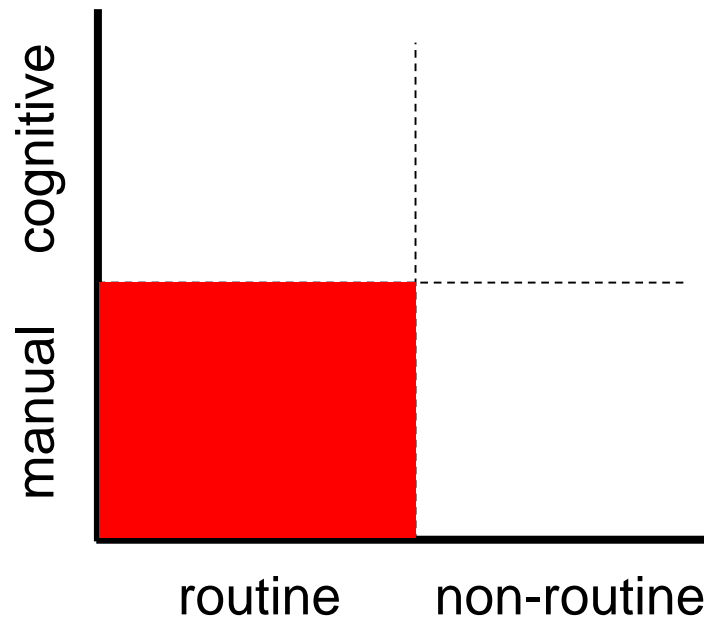Largely confining job losses to manufacturing.
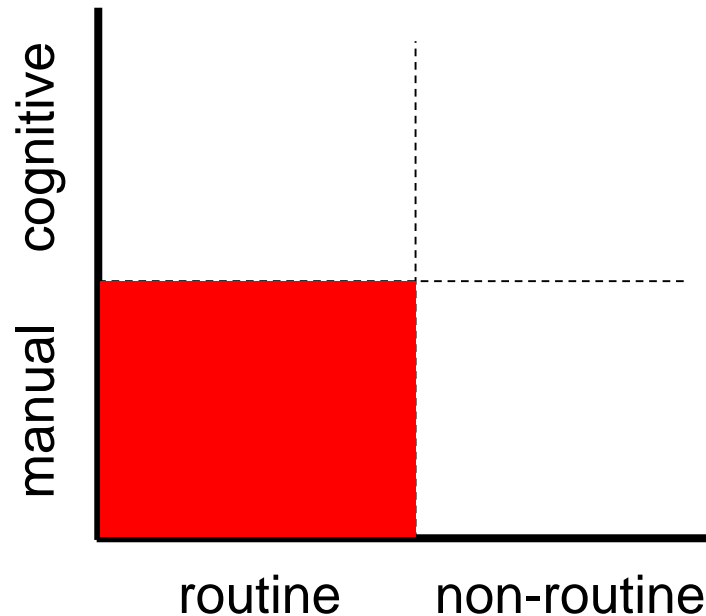


Autor et al. (2003)

# Predicted effects of automation

Recent developments in Machine Learning and Mobile Robotics suggest a broader array of jobs are 'at risk'.

Job losses no longer confined to manufacturing, but also spreading to service sector.

# Predicted effects of automation

Using this framework, Frey and Osborne (2017) build an index of so-called 'automation proof' occupations.

- Perception and manipulation skills

- Creative intelligence tasks

- Social intelligence tasks

The estimate that 47% of total US employment may be automated in the next 20 years. Using the same methodology, Durrant-Whyte et al. (2015) estimate it is 40% for Australia.

# Predicted effects of automation

Arntz et al. (2017) contest the Frey and Osborne (2017) findings. As opposed to exploring occupational-level data, they look at job-level data, which lowers the number of jobs 'at risk' to about 9% for the US.

They conclude that '*workers specialise in non-automatable niches within their occupation*'.

# Predicted effects of automation
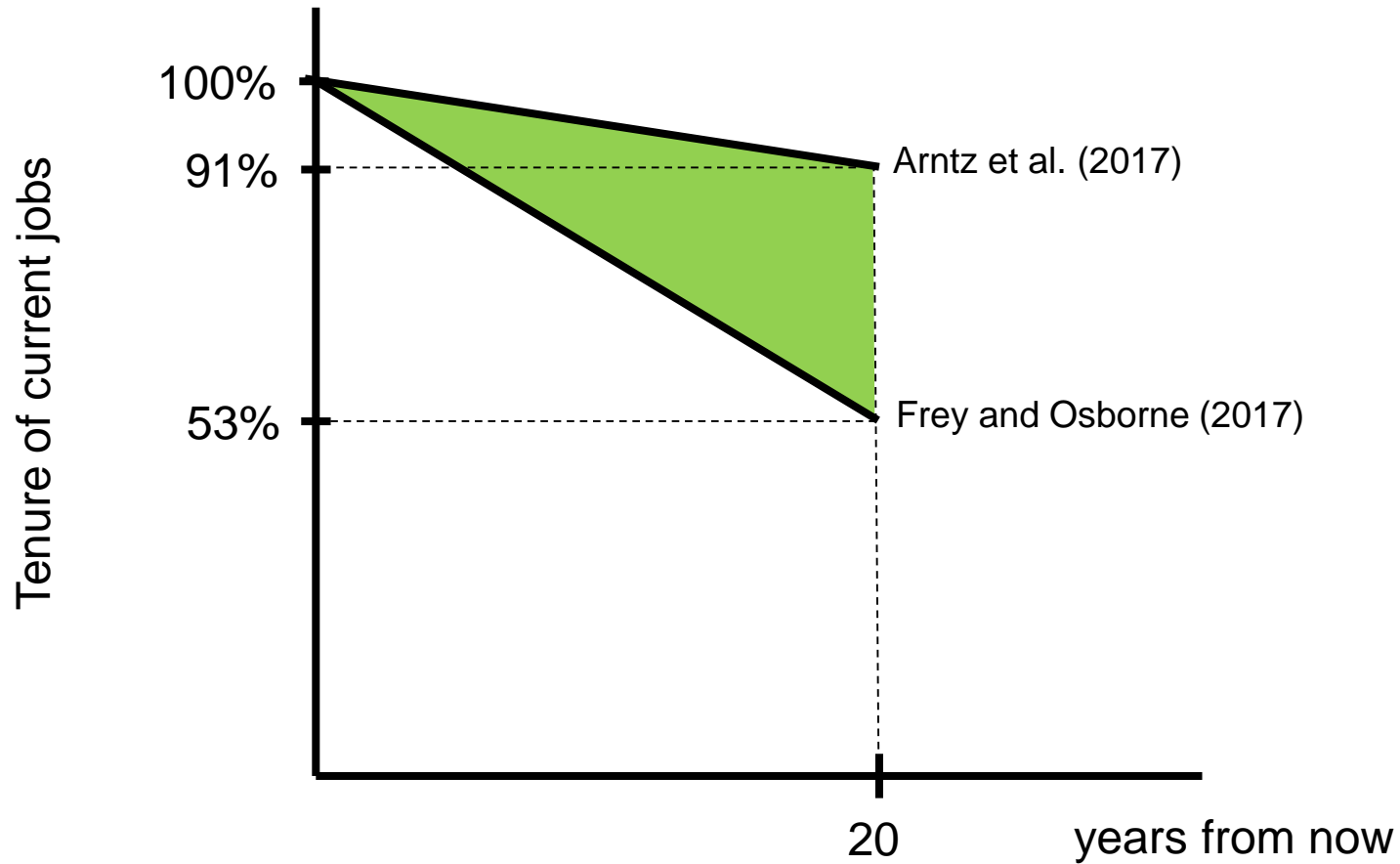
# Predicted effects of automation

Some qualifications to this analysis

- Schumpeter's (1942) creative destruction
    - Jobs created will be predominantly high skilled jobs
    - Where do the 'returns on automation' go?

- Job losses certainly not random across the educational distribution
    - Low educated workforces will be hit hardest

- Automation process does not stop after 20 years
    - Machine Learning and Mobile Robotics is expected to continue to make inroads.

# Predicted effects of automation

So for a country—or region for that matter—to weather the storm, you better have or develop a highly educated workforce, so you can focus on non-routine, cognitive jobs, which are least likely to be affected by automation.

So, how does Townsville compare?

# Townsville employment structure

| Education level (workforce) | Townsville | Queensland | Australia |
|---|---|---|---|
| Bachelor degree and above | 22.9% | 26.5% | 32.0% |
| (Advanced) Diploma | 10.3% | 11.4% | 11.7% |
| Certificate III, IV | 27.0% | 24.3% | 21.1% |
| Year 10-12 | 36.8% | 34.6% | 31.8% |
| Certificate I, II | 0.1% | 0.1% | 0.1% |
| Less than year 10 | 2.9% | 3.1% | 3.3% |

Source: ABS Census 2016

# Townsville employment structure

| Occupational level | Townsville | Queensland | Australia |
|---|---|---|---|
| Managers | 9.8% | 12.3% | 13.2% |
| Professionals | 19.1% | 20.2% | 22.6% |
| Technicians and Trades Workers | 15.4% | 14.5% | 13.8% |
| Community and Personal Service Workers | 14.9% | 11.5% | 11.0% |
| Clerical and Administrative Workers | 13.7% | 13.9% | 13.8% |
| Sales Workers | 9.8% | 9.9% | 9.5% |
| Machinery Operators and Drivers | 7.6% | 7.0% | 6.4% |
| Labourers | 9.7% | 10.7% | 9.6% |

Source: ABS Census 2016

# Townsville employment structure



Share of managers/professionals in industry employment

Source: ABS Census 2016
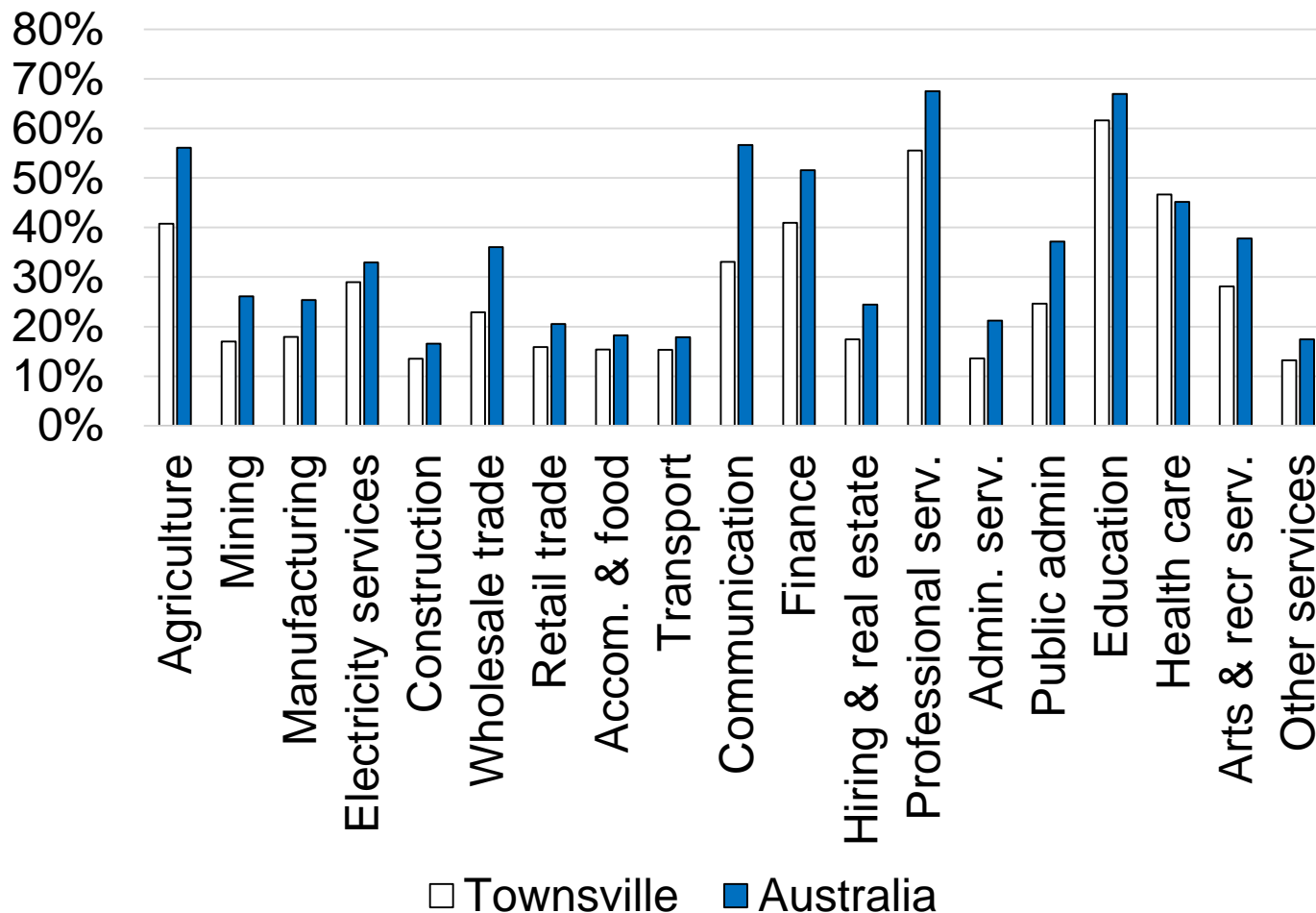
# Townsville employment structure

Consequently, Townsville seems badly positioned for the effects that automation may have on employment.

- Above average job destruction in the region

- Below average job creation in the region
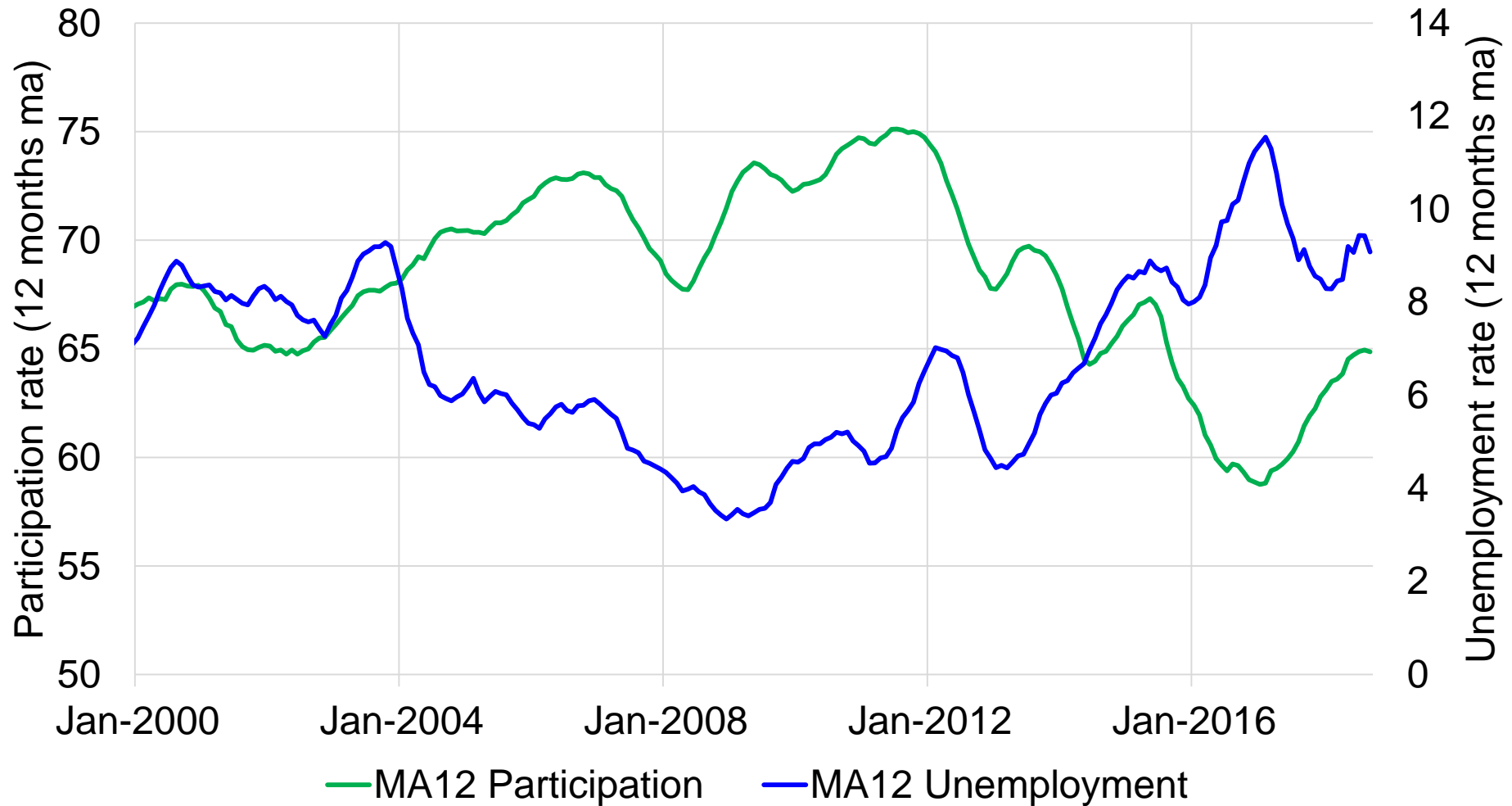
This is the 'labour market' discussion—I think—we should be having.

Unfortunately, this longer-term labour market concern does not get as much attention as it deserves, because….

13

# Townsville labour market
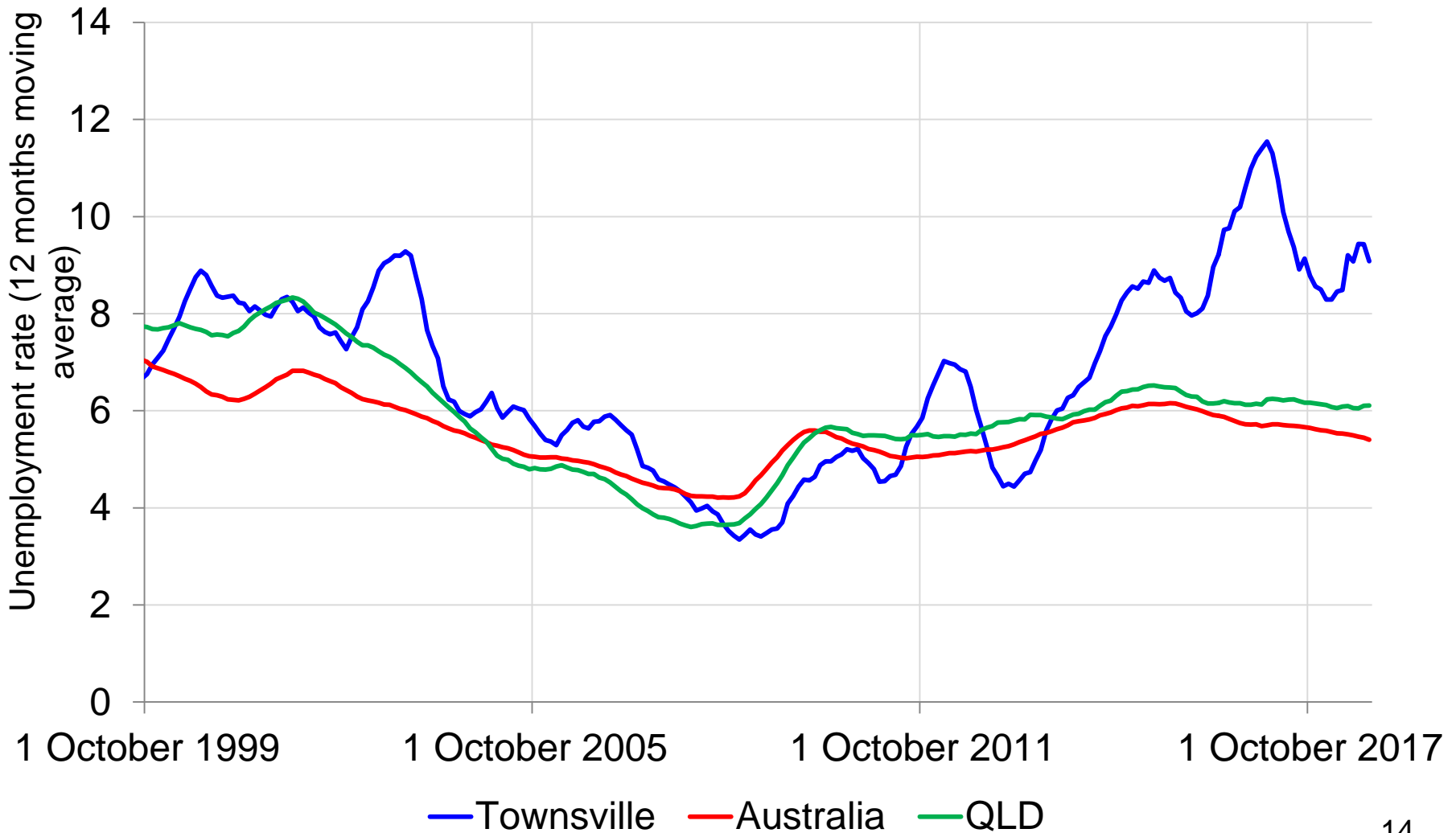
# Townsville labour market

# Townsville labour market

Underutilisation

The unemployment rate does not include underemployed workers and discouraged workers. Add them to the unemployment rate and you get the underutilisation rate, which is typically 2.5 times the unemployment rate. Applied to Townsville, that would be around 22%.

Youth unemployment

Youth unemployment is about twice as high as overall unemployment in Australia. Applied to Townsville, one in five young people is out of a job (2014 – 2018). Worrying, given youth unemployment's scarring effects on future employment outcomes (Schmillen and Umkehrer, 2017).

# Townsville labour market

So even though the labour market is improving, there are still major concern about its current (short-term) state.

Not surprising therefore, that that gets most attention in the (local) media. However, I think that is where the discussion should start; not stop.

# Thriving regional economies

At present the focus (at least in the media) seems to be on attracting projects to the region that:

- create as much employment as possible.

I think we should add to that, projects that:

- help workers / businesses upgrade their skills on the project

- set the region up for attracting / retaining high skilled workers / industries

Attracting / retaining high skilled workers / industries to a non-metropolitan region is notoriously difficult.

High skilled workers go where high skilled industries are; high skilled industries go where high skilled workers are.

# Thriving regional economies

Bottom up approach: industry clustering

Bring closely related (high-skilled) firms co-located in the region together, to achieve knowledge-spillovers and innovation which will spur growth of the cluster and give the region a competitive edge.

Once the cluster surpasses a critical threshold, agglomeration effects may spur endogenous growth (see Delgado *et al.* 2014).

# Thriving regional economies

Top down approach: create / attract a game changer

Create / Attract an environment / facility that high skilled firms / workers consider indispensable for their location decision.

For example, in Europe there's discussion about building the 'Einstein telescope' (a second CERN –the largest particle physics laboratory in the world).

Three non-metropolitan regions in Europe are in the running. Attract that and you change the game for your region.

20

# Thriving regional economies

Having said that, attracting / retaining skilled workers is more than just creating the right employment opportunities. It is also about (social) infrastructure.

- Child care

- Schools

- Health care

- Housing

- Congestion

- Natural environment

- The Arts

# Conclusions

Automation will have an impact on employment, sooner rather than later. The magnitude, however, is still subject to debate.

Townsville will not be immune to this impact; on the contrary, the impact in Townsville will likely be above average.

The key to a sustainable workforce is upskilling; the route towards achieving that in a non-metropolitan region difficult.

Industry clusters (or indeed some game-changing project) can be a way forward—combined with competitive (social) infrastructure.

# Bibliography

- Autor, D., Levy, F. and Murnane, R. (2003) The skill content of recent technological change: an empirical exploration. *Quarterly Journal of Economics*, 118, 1279–1333.

- Delgado, M., Porter, M. and Stern, S. (2014) Clusters, convergence, and economic performance. *Research policy*, 43, 1785-1799.

- Durrant-Whyte, H., McCalman, L., O'Callaghan, S., Reid, A. and Steinberg, D. (2015) *The Impact of computerization and automation on future employment*. CEDA.

- Frey, C. and Osborne, M. (2017) The future of employment: how susceptible are jobs to computerisation?. *Technological forecasting and social change*, 114, 254-280.

- Keynes, J. (1933) Economic possibilities for our grandchildren (1930). *Essays in persuasion*, 358–373.

- Schmillen, A. and Umkehrer, M. (2017) The scars of youth: Effects of early-career unemployment on future unemployment experience. *International Labour Review*, 156, 465-494.

- Schumpeter, J. (1942). Creative destruction. *Capitalism, socialism and democracy*, 825, 82–85.

Thank you!