Impact of Policy, Market Income Volatility and Demography on Income Inequality in Australia Between 2002 and 2016

Jinjing Li[1] Hai Anh La[1] Denisa M Sologon[2]

National Centre for Social and Economic Modelling (NATSEM), University of Canberra[1]
Luxembourg Institute of Socio-economic Research[2]

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Background

- Income inequality discussions in Australia
- ABS suggests the inequality has increased from 2001 but remained stable since 2007-08 (around 0.32~0.33)
- World Wealth and Income Database (WID World) shows that the share of income going to the top 1% rose from 7.5% in 2001 to 9.1% in 2015.

Background

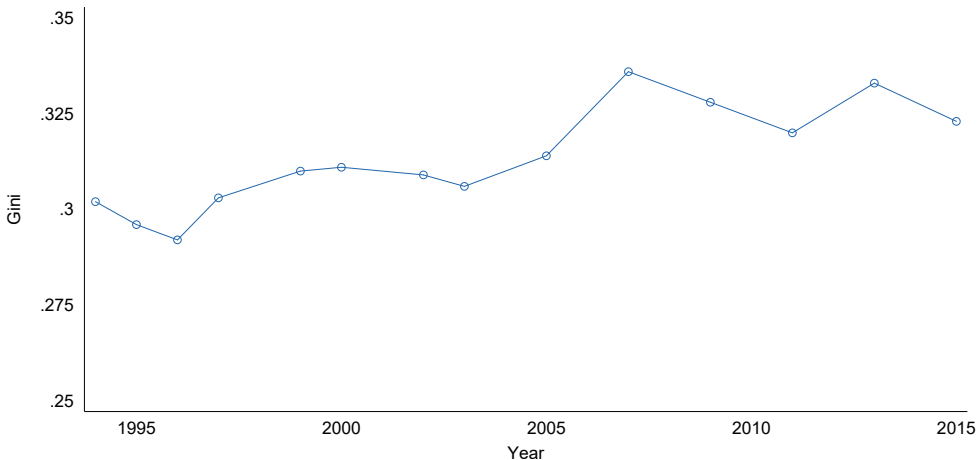


Figure 1: Disposable Income Gini (ABS Estimates)

Background

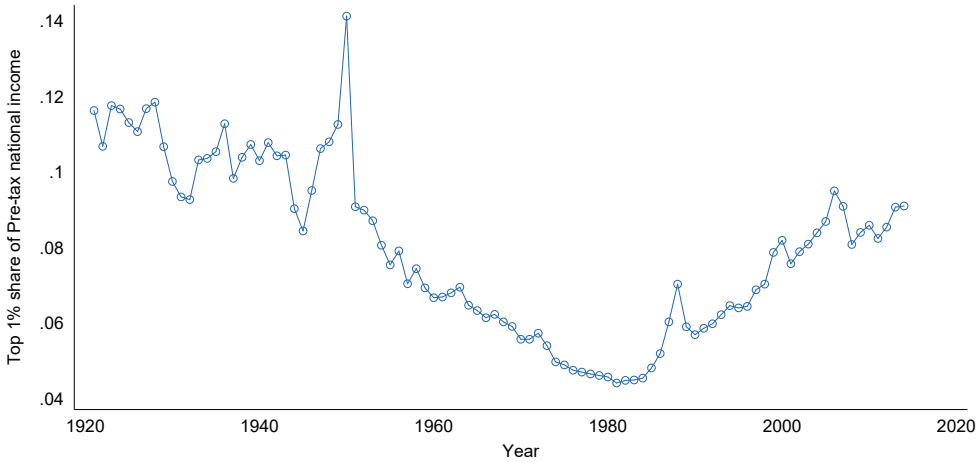


Figure 2: Top 1% share of Pre-tax national income

Background

- Many different measures
- The observed inequality is the result of a mixture of economic fluctuations, population change, and policy reforms
- Many factors are driving the changes (or the lack of)

Background

- Demography
  - Population has become older
  - People stay single longer
  - Smaller family/tax unit
- Economy
  - Financial Crisis
  - Workforce casualisation
  - Industry and occupation shift
- Policies
  - Numerous tax and transfer policy changes, from "Australians Working Together package" (2003) to "Welfare to Work Reform"(2006) to "Building Australia's Future Workforce Reform" (2011) to "Carbon Tax" (2012)

Summary

- We use a micro-econometric micro-simulation based decomposition model to examine the driving factors of income inequality in Australia between 2002 and 2016
- Among the four factors we decomposed (Demography, Market income, Policy, and Others), market income fluctuation is the largest source of inequality
- Demographic change seem to reduce income inequality during the period
- Policy reforms had a relatively minor impact on income inequality overall but its effect is heterogeneous across the income spectrum

Decomposition Framework

We decompose changes in the inequality measures (I) into four components

- Changes in the tax and welfare policies (p)
- Changes in the demographic structure of the population (d)
- Changes in the market income distribution (y)
- Other changes in the data (a)

Decomposition Framework

We can describe the difference in inequality measure I between t and $t-1$ as

$$
\begin{aligned}
\Delta I_{t,t-1}(p,d,y,a) =& I(p_t,d_t,y_t,a_t) - I(p_{t-1},d_{t-1},y_{t-1},a_{t-1}) \\
=& \underbrace{I(p_t,d_t,y_t,a_t) - I(p_{t-1},d_t,y_t,a_t)}_{\text{Policy Effect}} \\
&+ \underbrace{I(p_{t-1},d_t,y_t,a_t) - I(p_{t-1},d_{t-1},y_t,a_t)}_{\text{Demographic Effect}} \\
&+ \underbrace{I(p_{t-1},d_{t-1},y_t,a_t) - I(p_{t-1},d_{t-1},y_{t-1},a_t)}_{\text{Market Income Effect}} \\
&+ \underbrace{I(p_{t-1},d_{t-1},y_{t-1},a_t) - I(p_{t-1},d_{t-1},y_{t-1},a_{t-1})}_{\text{Other Effect}}
\end{aligned}
$$

Decomposition Framework

- Compared with common Gini decomposition or Oxaca-Blinder decomposition, we examine the entire distribution rather than a single (mean) value
- The result is dependent on the order in which variables are introduced. We use Shapley's approach in averaging the result
- To get a complete picture of these factors' impacts on the income distribution, we not only decompose Gini, but also other measures such as P95/P75, P25/P5 etc.

Demographic Model

We use a semi-parametric technique from DiNardo, Fortin, and Lemieux (1996) to simulate the effect of demographic shift on the population. Specifically, the weight of an observation from data t can be updated to mimic the population demographic structure of $t+1$ by

$$w_{t \to t+1} = w_t \frac{Pr(X|t+1)}{Pr(X|t)} = \frac{Pr(t+1|X)}{Pr(t|X)} \frac{Pr(t)}{Pr(t+1)}$$

where X covers gender, age, marital status, household size and their interactions

Market Income Model (Industry and Occupation)

Similar to the semi-parametric approach used for demographic simulation, we capture the shifts of industry, occupation and working hours (by gender).

Market Income Model (Income)

Market income is modelled nonparametrically as a function of the individual relative rank (r) in income source (k), where

$$y_{i,k,t} = \Lambda_{k,t}(r_{i,k})$$

We simulate the counterfactual income of rank r based on the changes in weight (w) and simulate the income based on the income-rank function $\Lambda(\cdot)$.

Tax and Transfer Policy Model

We use STINMOD+ model to map out detailed tax and benefit policy rules in order to estimate the household disposable income.

- Covers all major taxation and welfare schemes as legislated in Australia
- Consistent policy parameters between 2001 and 2025*
- Strong focus on validation and highly consistent with both survey and administrative data
- Connects to all statistical packages such as Stata, R, and its online interface
- More info https://stinmod.canbera.edu.au/

Tax and Transfer Policy Simulation

- Reported vs simulated in HILDA

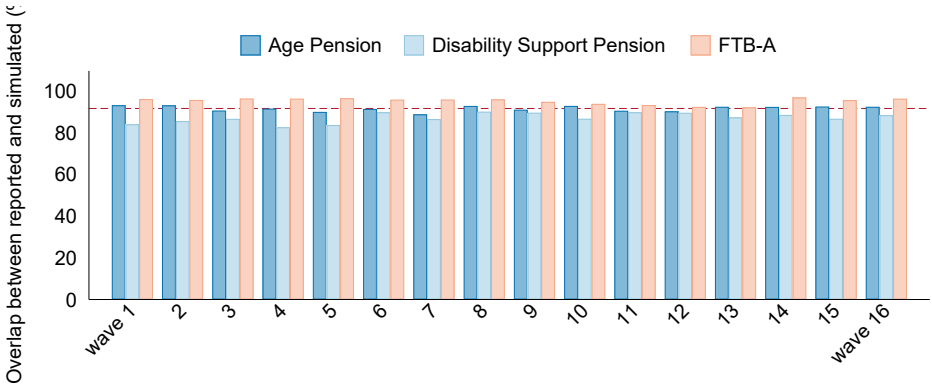


Figure 3: STINMOD+ benefit replication in HILDA

HILDA

- Household, Income and Labour Dynamics in Australia (HILDA) Survey
- Wave 2 to wave 16 (2002-2016), with 8000~12000 income units in each wave

What has changed in Australia (Policy)

- 2003: Australians Working Together package
  - Expand childcare, employment, training and education assistance
  - Out-of-school hours care available to more parents with school-aged children
- 2006 – Welfare to Work Reform
  - Personal income tax cuts
  - Changes in the tapering of various allowances including unemployment benefit (New Start Allowance, Youth Allowance (non-students), Widow Allowance, Partner Allowance, Mature Age Allowance, Sickness Allowance)

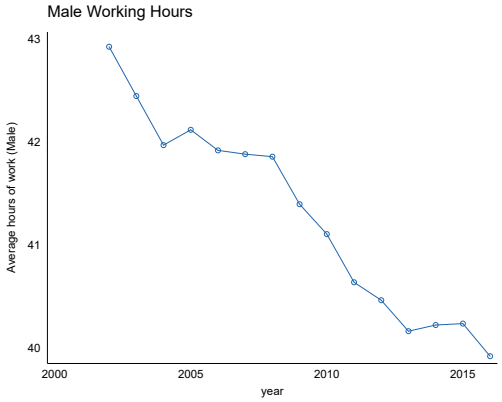
What has changed in Australia (Policy)

- 2009 - Nation building for recovery
  - Benefit increase for single and couple pensioners and carers
- 2011 – Building Australia's Future Workforce
  - Increasing rate of child benefit (FTB Part A) for 16 to 19 year olds in full-time secondary study.

What has changed in Australia (Demography)

Year	Average age	Partnered (%)	Average age of singles	IU size	Number of kids
2002	35.93	47.81	40.47	2.77	1.08
2003	36.07	47.95	40.20	2.78	1.09
2004	36.28	47.73	40.25	2.75	1.07
2005	36.47	48.31	40.36	2.75	1.07
2006	36.57	48.27	40.71	2.76	1.07
2007	36.68	48.01	41.06	2.74	1.06
2008	36.76	48.58	40.99	2.73	1.04
2009	36.82	48.15	40.78	2.74	1.05
2010	36.92	48.26	41.15	2.73	1.04
2011	37.10	47.94	41.13	2.74	1.06
2012	37.17	48.17	41.35	2.74	1.05
2013	37.22	48.02	41.47	2.75	1.06
2014	37.35	48.35	41.51	2.77	1.08
2015	37.47	47.51	41.68	2.74	1.06
2016	37.59	48.02	41.48	2.74	1.05

What has changed in Australia (Economy)



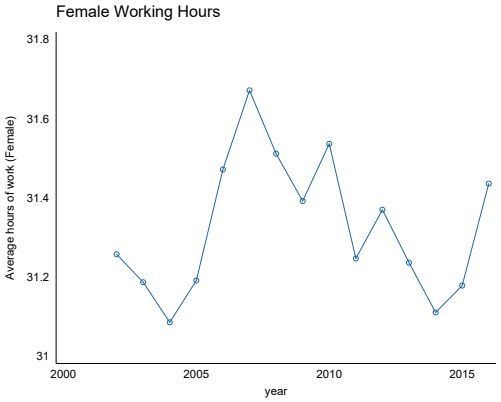


Figure 4: Number of hours worked

What has changed in Australia (Economy)

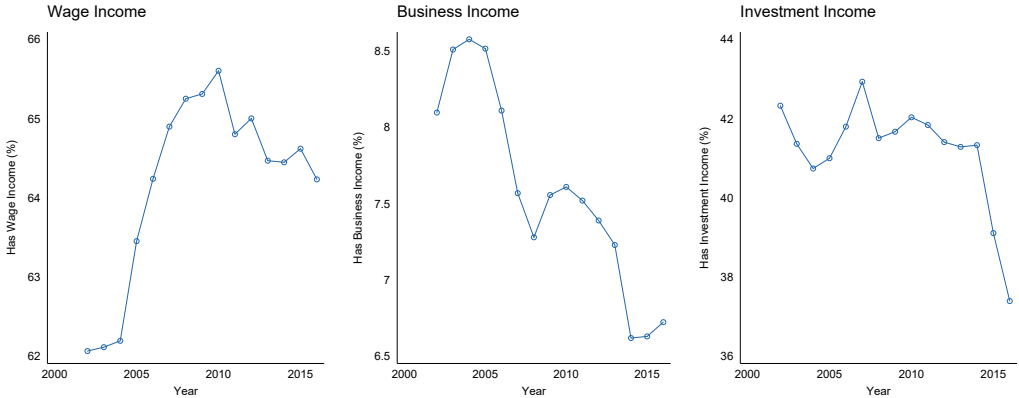


Figure 5: Proportion of Adults with the income source

What has changed in Australia (Economy)

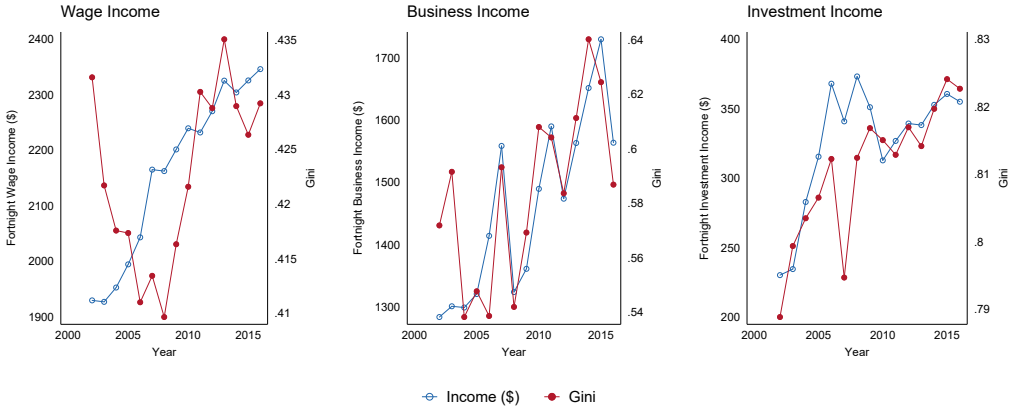


Figure 6: Average Income (2016 dollar) and Gini

Contribution to Inequality

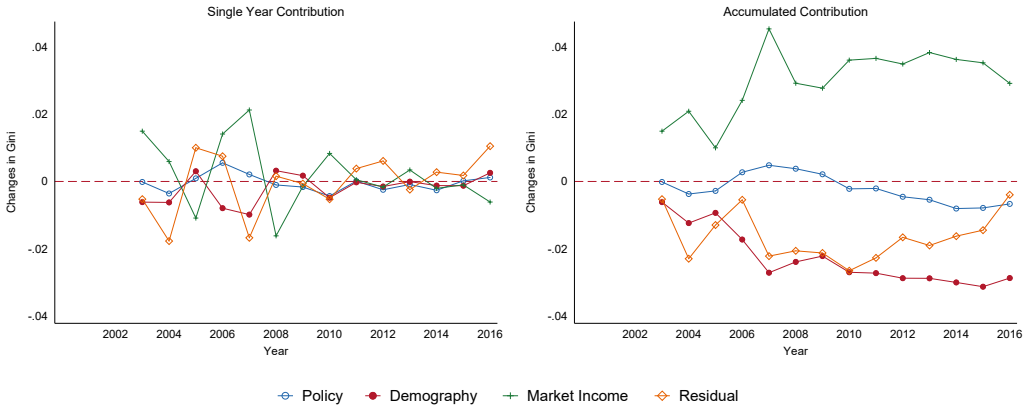


Figure 7: Decomposition of Gini Changes between 2002 and 2016 in Australia

Contribution to Inequality

- The largest contributor to inequality in Australia between 2002 and 2016 is the change in market income and labour market conditions, with the biggest change occurs just before the GFC
- Demographic aging is the most important equalising factor
- Policy seems to have a moderate impact

Does this pattern hold for all parts of the population?

For higher income earners

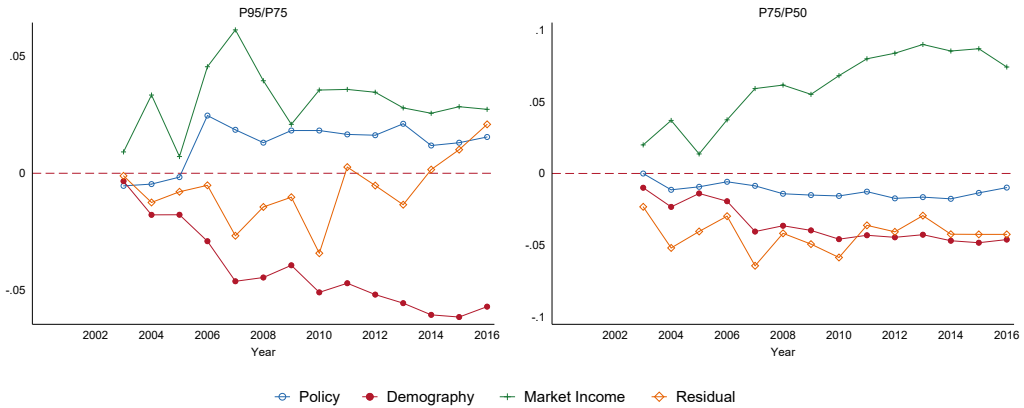


Figure 8: Decomposition of P95/P75/P50 between 2002 and 2016 (Accumulated)

For lower income earners

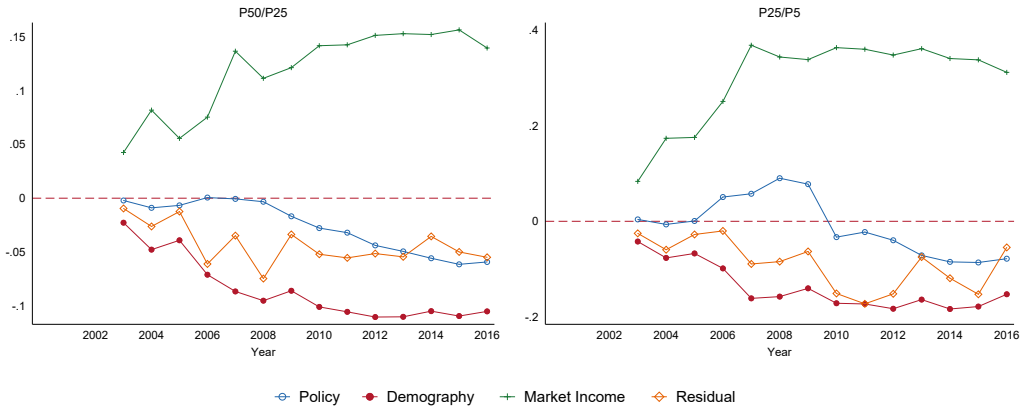


Figure 9: Decomposition of P50/P25/P5 between 2002 and 2016 (Accumulated)

Conclusion

- We use a comprehensive simulation-based decomposition model to examine the driving factors of income inequality in Australia between 2002 and 2016
- New insights on what's driving the income inequality in Australia
- Results are robust with varying simulation assumptions

Thank you

Thank you and Questions

Inequality in Australia

Year	Gini (Gross)	Gini (Disp.)	P95/P75	P75/P50	P50/P25	P25/P5
2002	0.475	0.333	1.697	1.447	1.497	1.536
2003	0.477	0.336	1.696	1.433	1.505	1.556
2004	0.458	0.315	1.695	1.397	1.496	1.567
2005	0.455	0.318	1.677	1.397	1.494	1.617
2006	0.462	0.337	1.733	1.429	1.441	1.718
2007	0.459	0.334	1.704	1.393	1.511	1.711
2008	0.448	0.321	1.691	1.416	1.435	1.727
2009	0.448	0.319	1.687	1.398	1.482	1.748
2010	0.451	0.313	1.666	1.395	1.458	1.543
2011	0.454	0.318	1.705	1.435	1.446	1.528
2012	0.452	0.318	1.691	1.428	1.442	1.509
2013	0.456	0.318	1.677	1.448	1.436	1.587
2014	0.458	0.315	1.676	1.425	1.453	1.489
2015	0.454	0.315	1.687	1.429	1.432	1.456
2016	0.456	0.323	1.704	1.423	1.417	1.562

Reference

DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach." *Econometrica* 64 (5):1001. https://doi.org/10.2307/2171954.