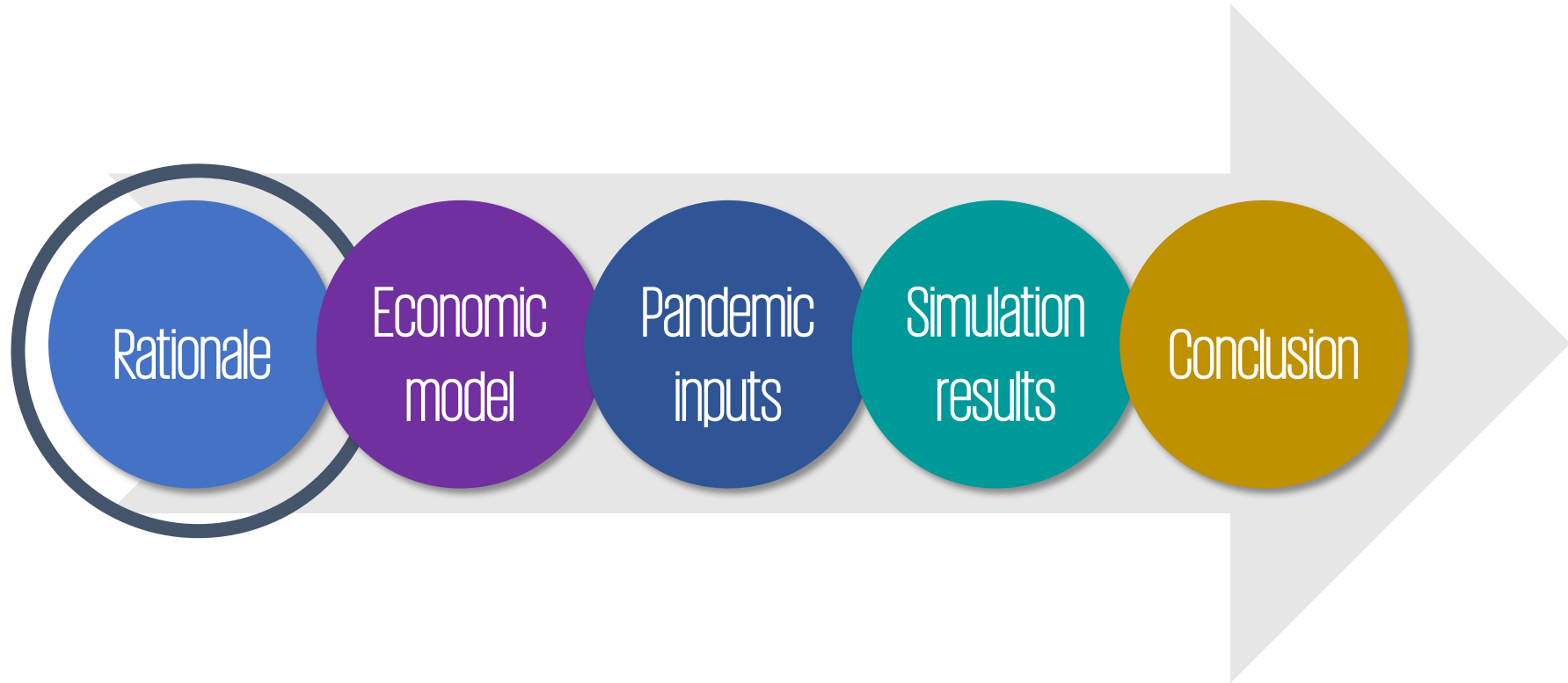


Distributional impacts of Coronavirus: a CGE-microsimulation analysis

Marc Jim Mariano
KPMG Economics

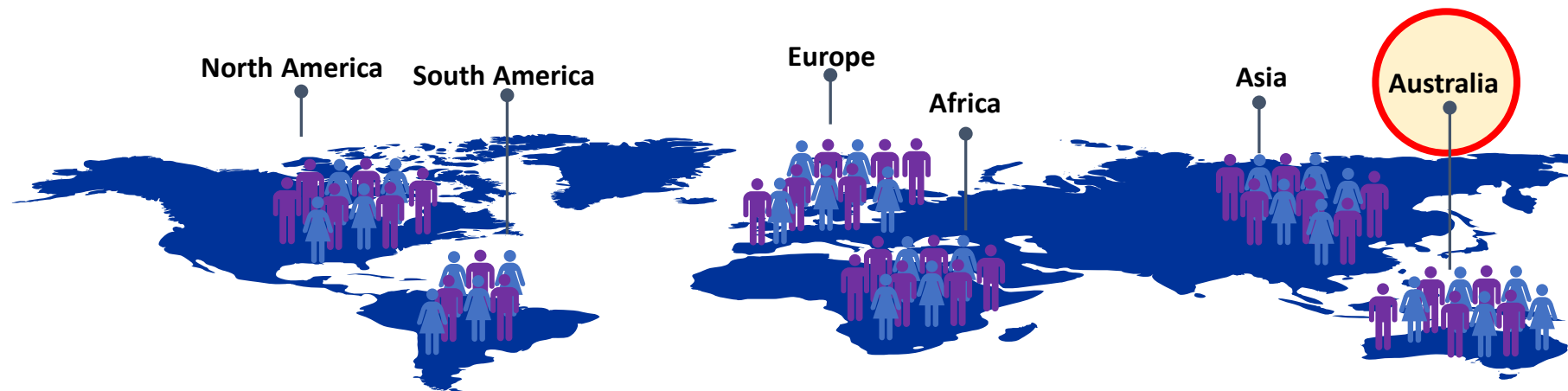
George Verikios
KPMG Economics and Griffith University

Overview



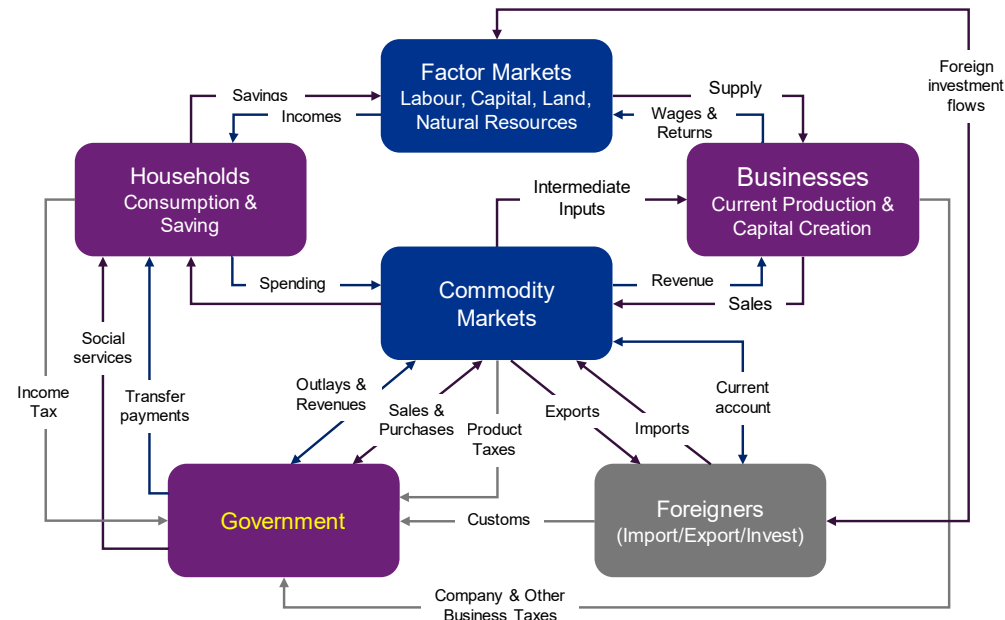
Rationale

- The COVID-19 pandemic caused economic recession that affected everyone globally.
- One **global** pandemic but the impact is **asymmetric** across nations, businesses, and households.
- We examine the distributional effects of COVID-19 across socioeconomic groups in Australia:
 - (1) by income group (poor and rich households)
 - (2) by age cohort (young and old)
 - (3) by geographical areas (capital cities & other areas).



Macro model

- Computable General Equilibrium (CGE)
- Recursive dynamic
- 117 sectors
- 43 occupations
- Consumers, producers, government, foreigners, capital creators



Features of a CGE model

Computable

- produces *computable* results, where coefficients and parameters in equations are calibrated using economic data

General

- takes into account the different interactions among economic agents making decentralized decisions

Equilibrium

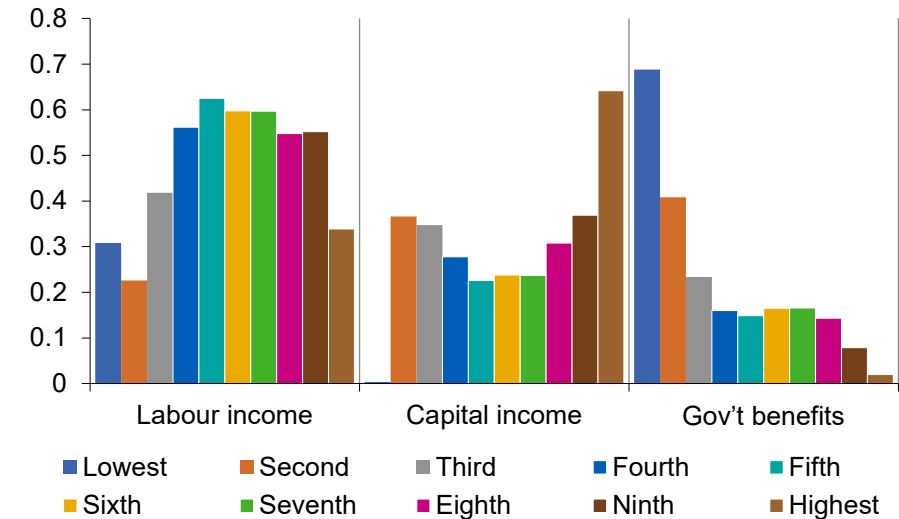
- implements principles of general equilibrium theories:
 - ✓ optimised solution to producer and consumer problems
 - ✓ market-clearing conditions for commodities and primary factors (demand = supply)
 - ✓ macroeconomic balance (costs = revenues)



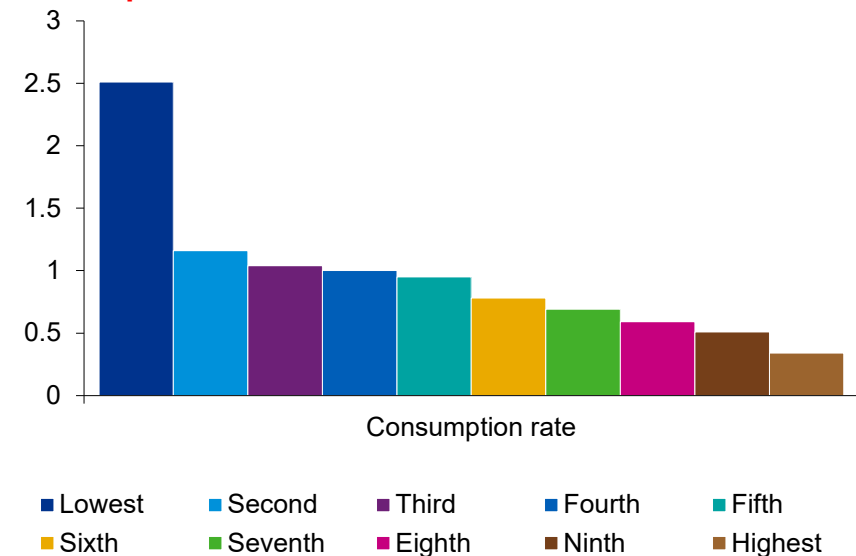
Micro model

- 2015-16
 - Household Expenditure Survey
 - Survey of Income and Housing
- 10,046 households
 - Income by source (64) – aggregated to wage, non-wage, government benefits
 - Expenditure by commodity (117)

Share of income source in total household income



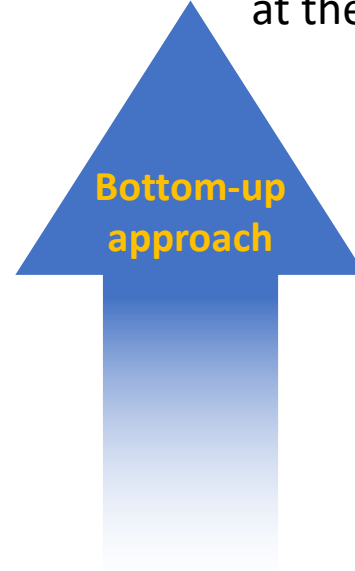
Consumption rate



Macro-micro linkage



Household-specific changes in consumption and labour are aggregated at the macro level



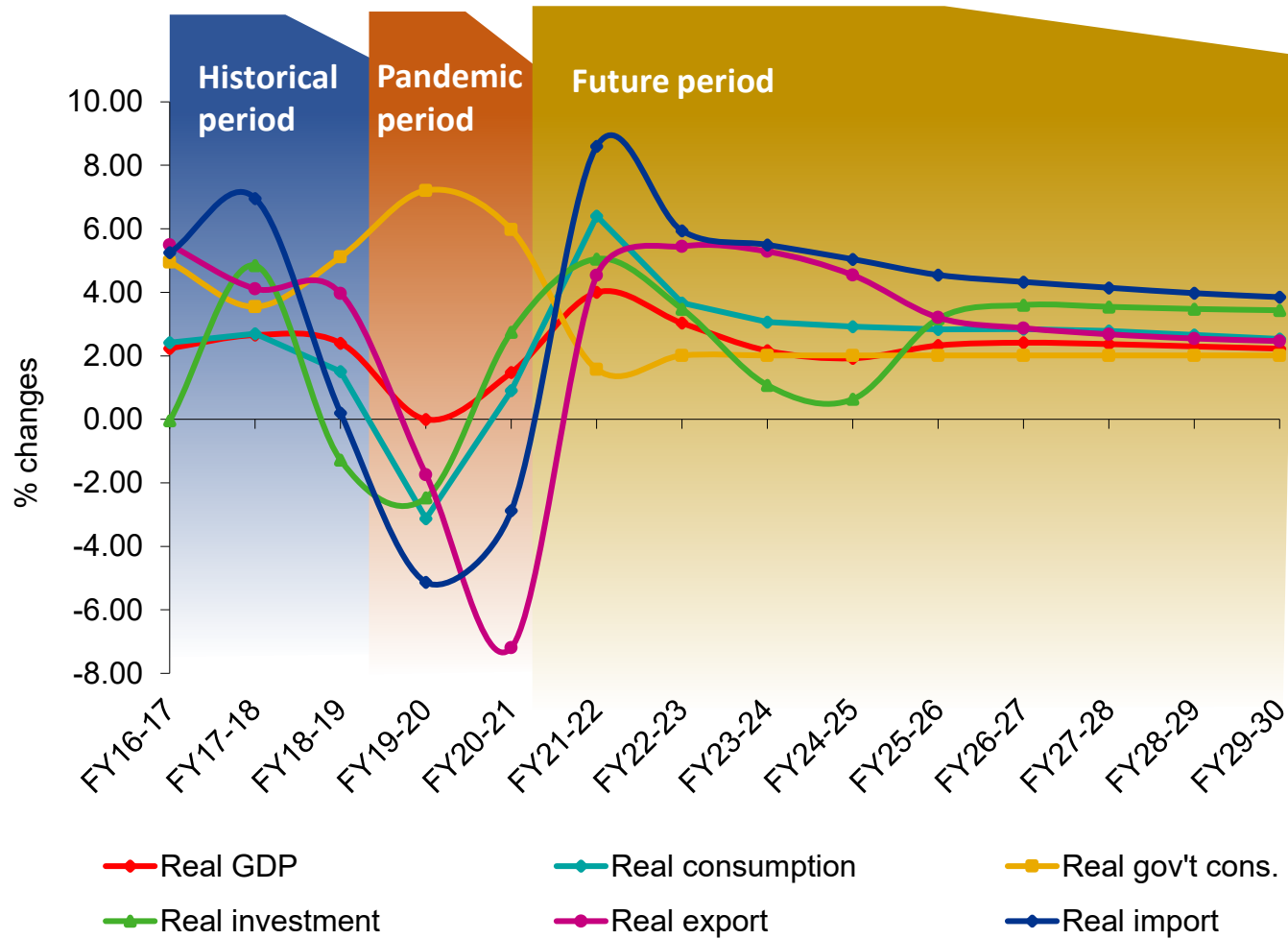
Labour supply and commodity demand are determined at the individual household level.

Simulation

- The Coronavirus pandemic is modelled by running a recursive dynamic CGE simulation that runs over 14 years covering the following:
 - historical period (2017-2019)
 - pandemic period (2020-2021)
 - future (or forecast) period (2022-2030)
- Historical and pandemic periods incorporate historical data from the Australian national accounts.
- Forecast period incorporates available projections from a global macroeconomic forecasting model (based on NiGEM).

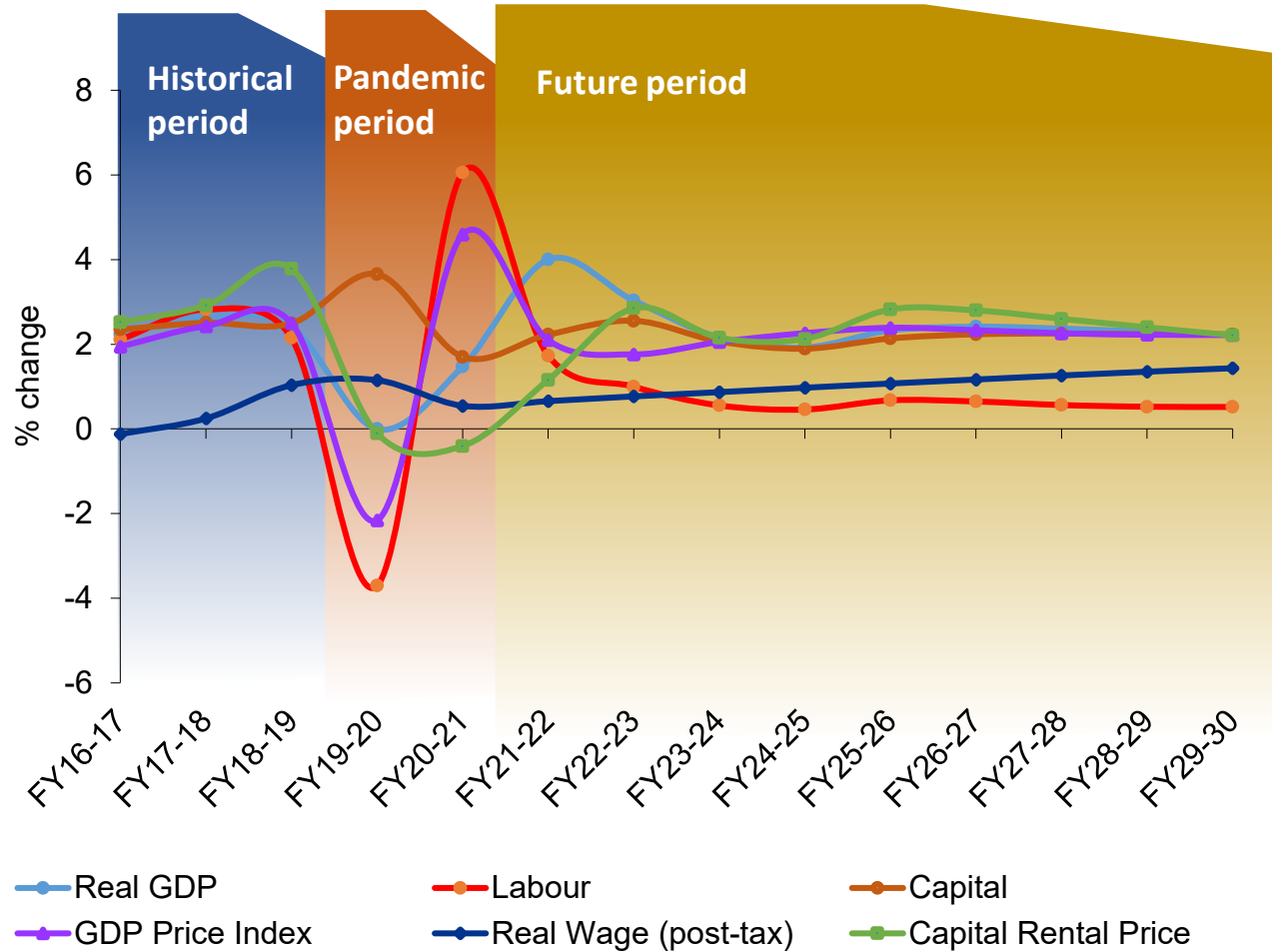
Shocked variables	Historical period 2017-2019	Pandemic period 2020-2021	Future period 2022-2030
Expenditure- and income-side components of GDP			
Price deflators (consumer goods and wages)			
Real consumption across 13 broad sectors			

Macro results



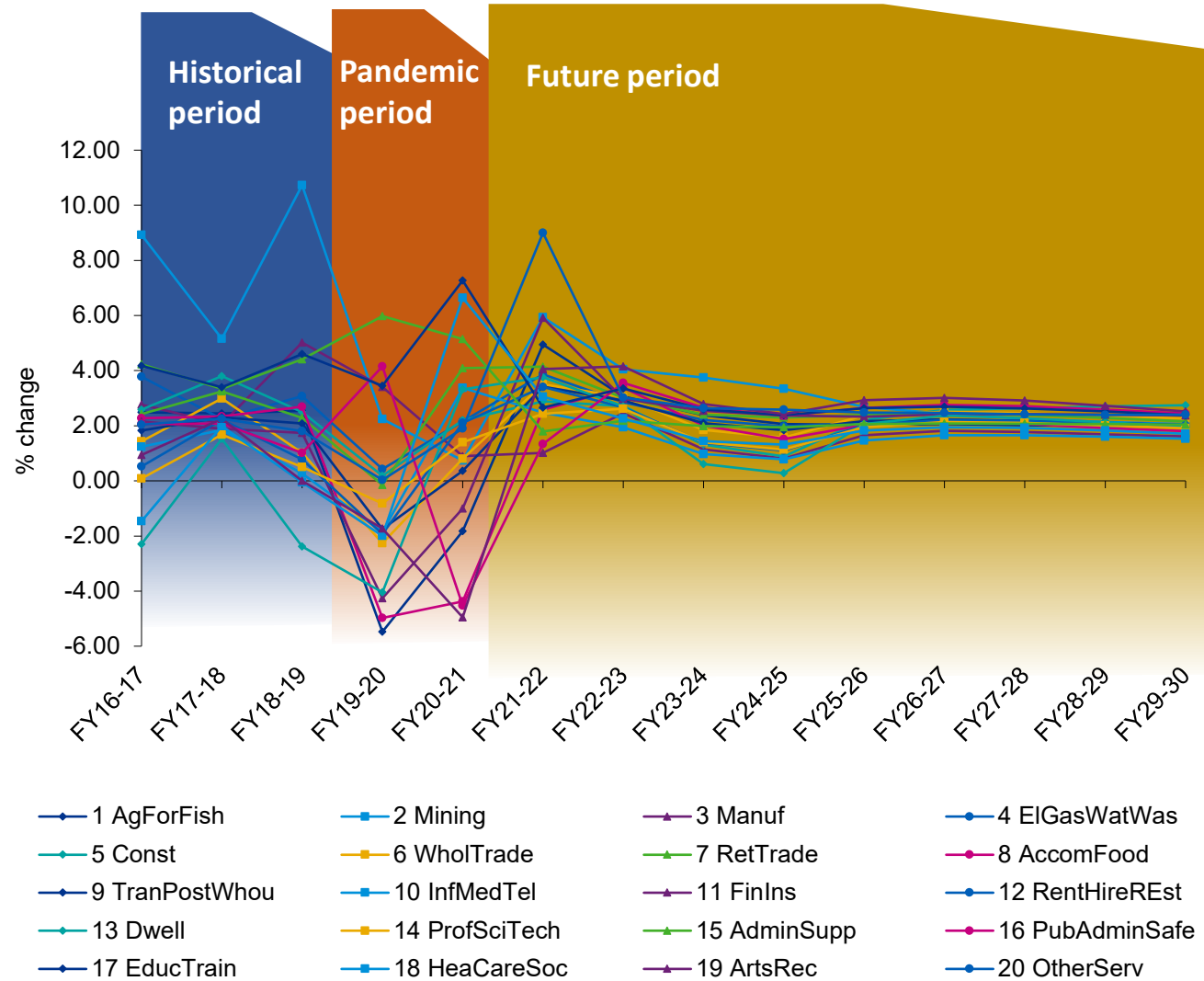
Annual growths (%)	Historical period	Pandemic period		Future period
	2017-2019	2020	2021	2022-2030
Real GDP	2.43	-0.004	1.48	2.53
Household Consumption	2.21	-3.13	0.91	3.30
Government Consumption	4.54	7.21	5.97	1.97
Investment	1.17	-2.47	2.75	3.05
Exports	4.53	-1.74	-7.19	3.73
Imports	4.14	-5.13	-2.88	5.10

Macro results

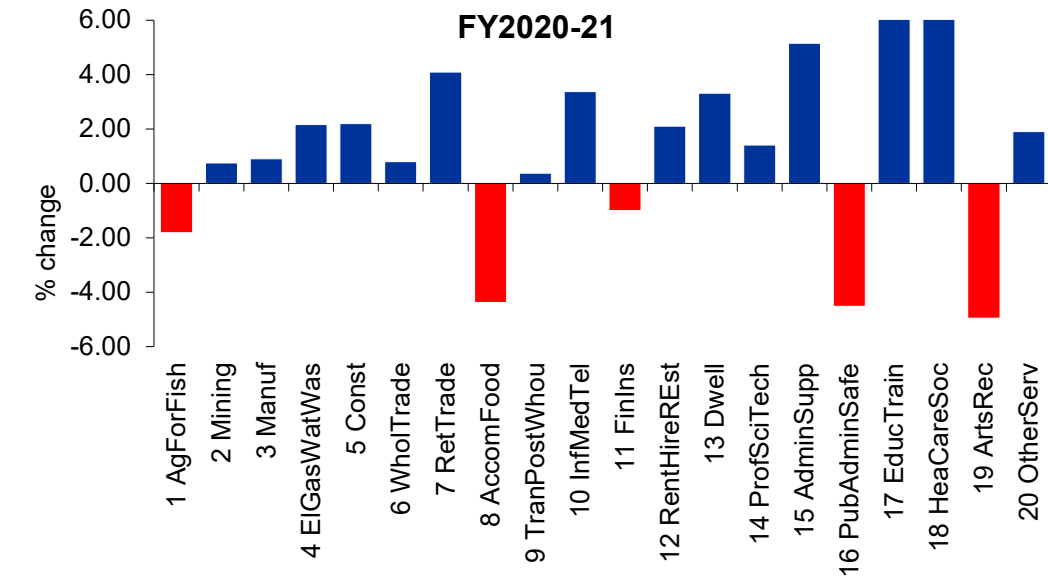
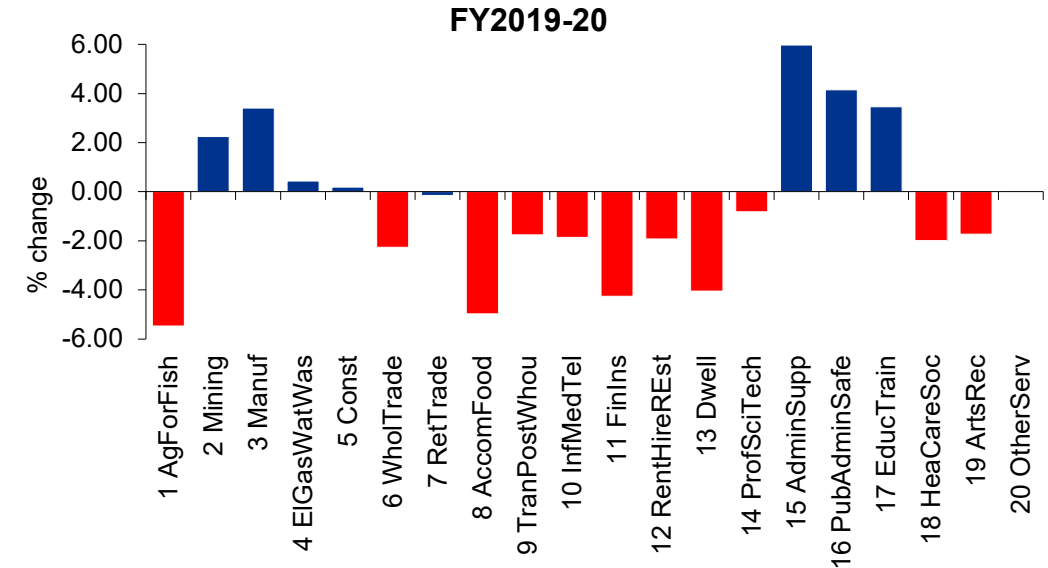


Annual growths (%)	Historical period	Pandemic period		Future period
	2017-2019	2020	2021	2022-2030
Real GDP	2.43	-0.004	1.48	2.53
Labour	2.36	-3.70	6.05	0.74
Capital	2.45	3.66	1.70	2.20
GDP Price Index	2.29	-2.16	4.59	2.18
Real Wage (post-tax)	0.39	1.15	0.55	1.06
Capital Rental Price	3.07	-0.11	-0.41	2.35
CPI	1.91	1.04	1.50	2.34

Sectoral output

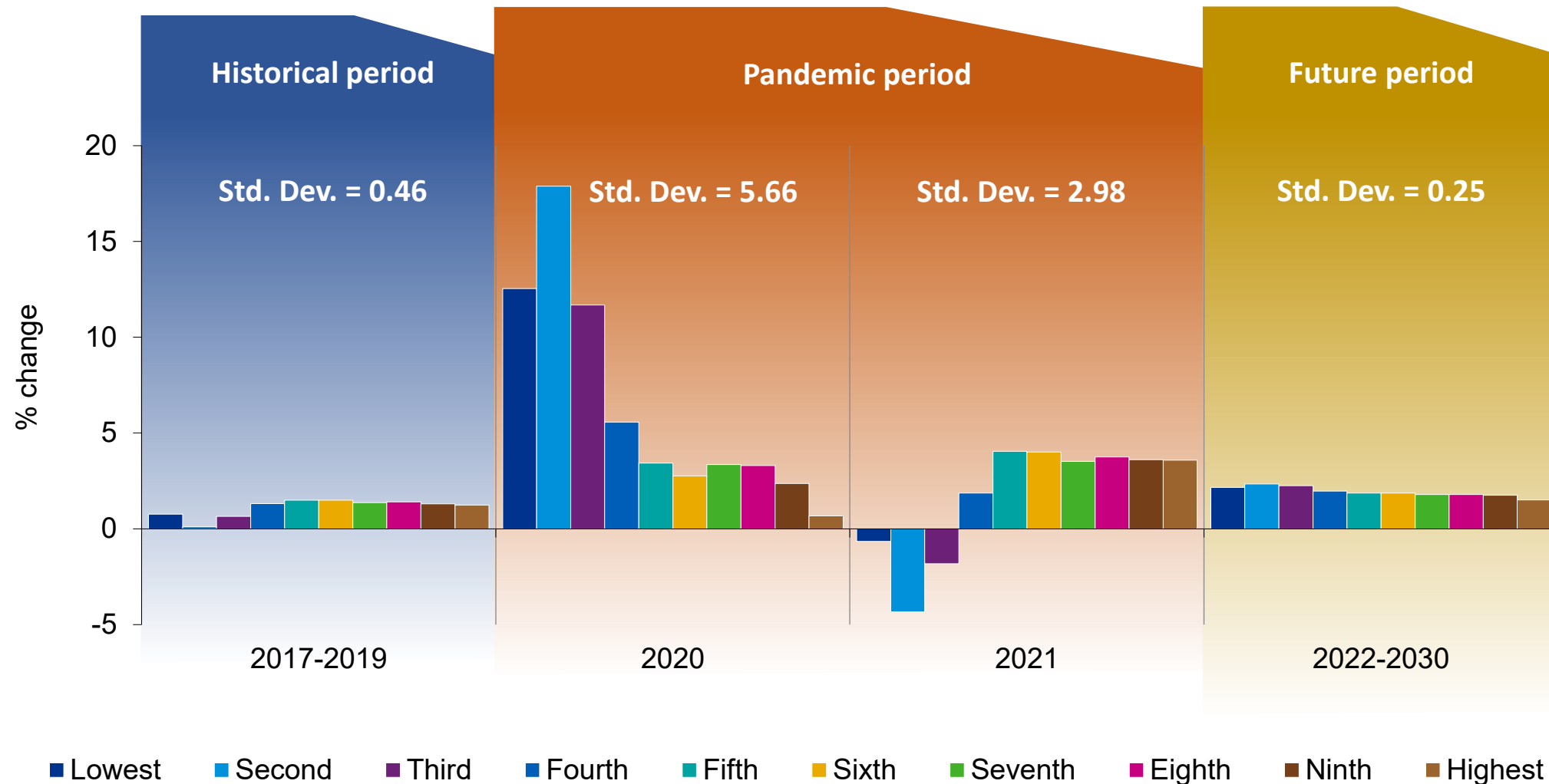


Pandemic period



Micro results - deciles

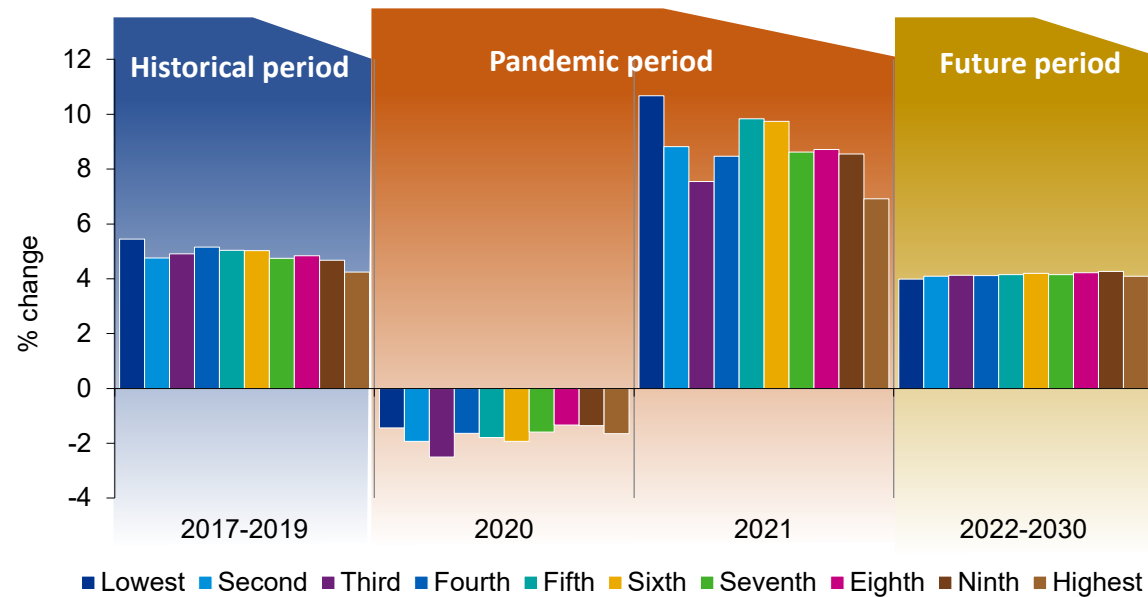
Real disposable income



Micro results - deciles

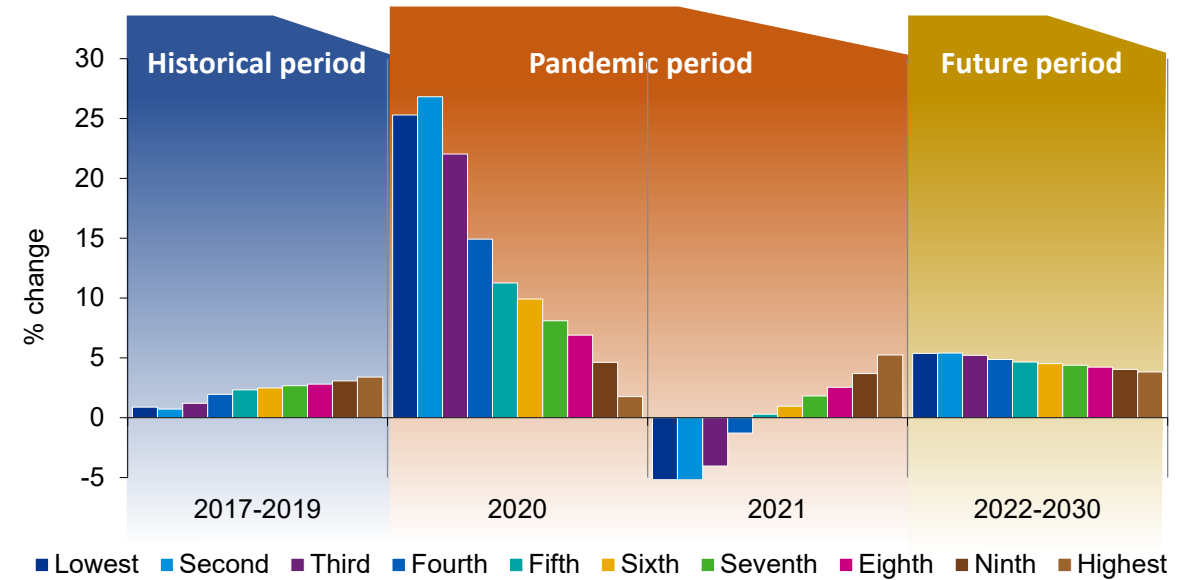
Income by source: Wage, non-wage, other income

Wage income

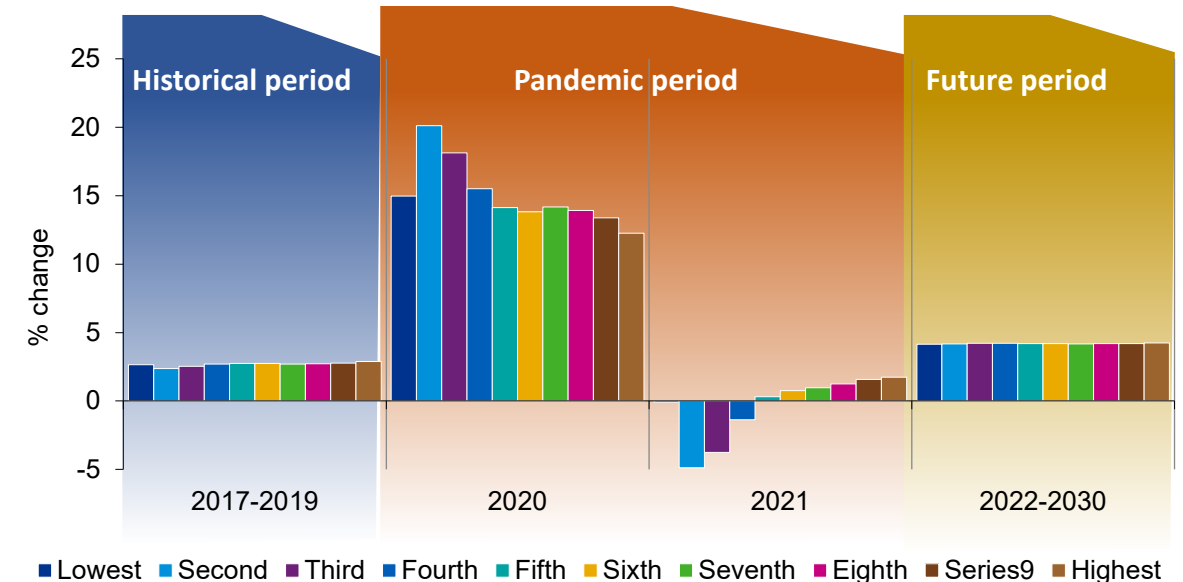


Standard deviation of % changes	Historical period	Pandemic period		Future period
	2017-2019	2020	2021	2022-2030
Wage income	0.32	0.35	1.10	0.08
Non-wage income	0.93	8.81	3.79	0.56
Other income	0.14	2.36	2.29	0.02

Non-wage market income

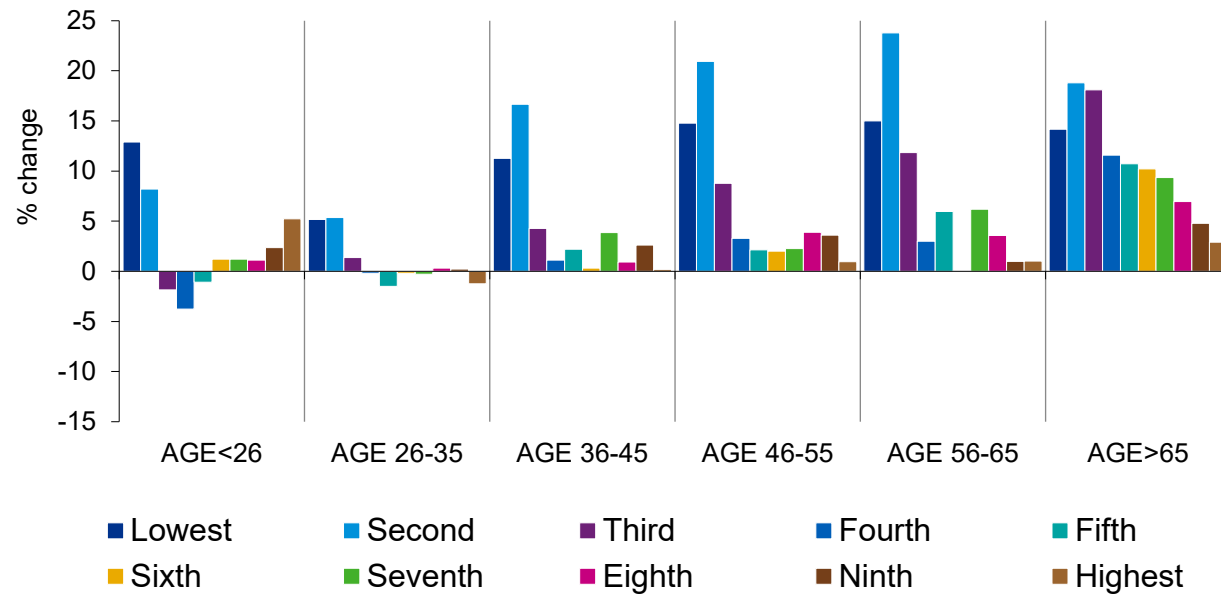


Other income

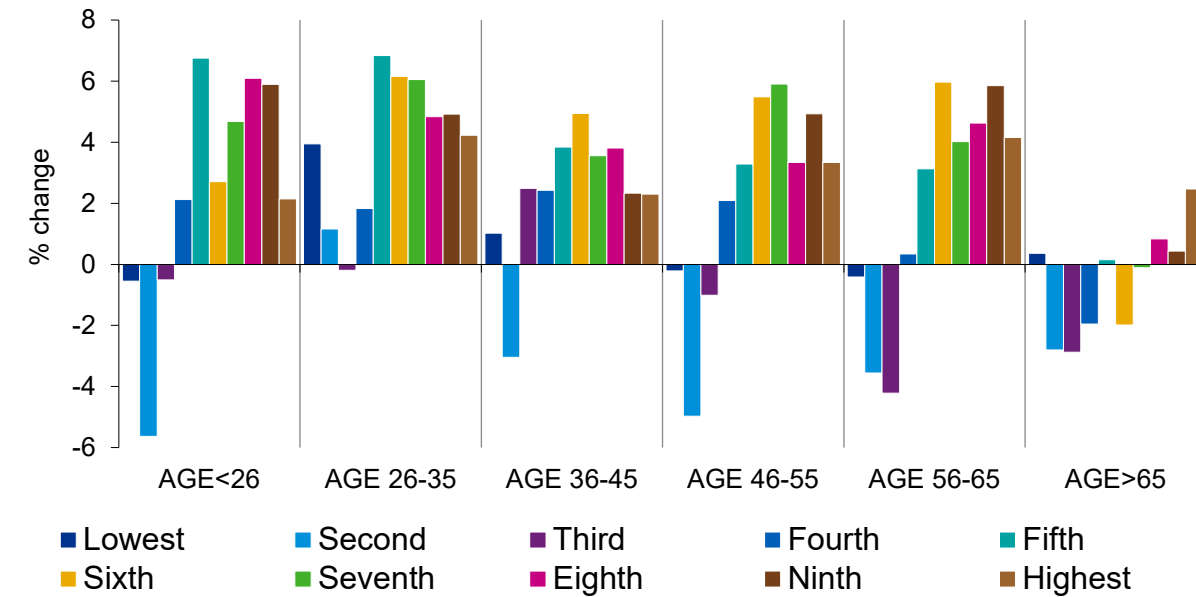


Income results by age cohort

FY2019-20



FY2020-21

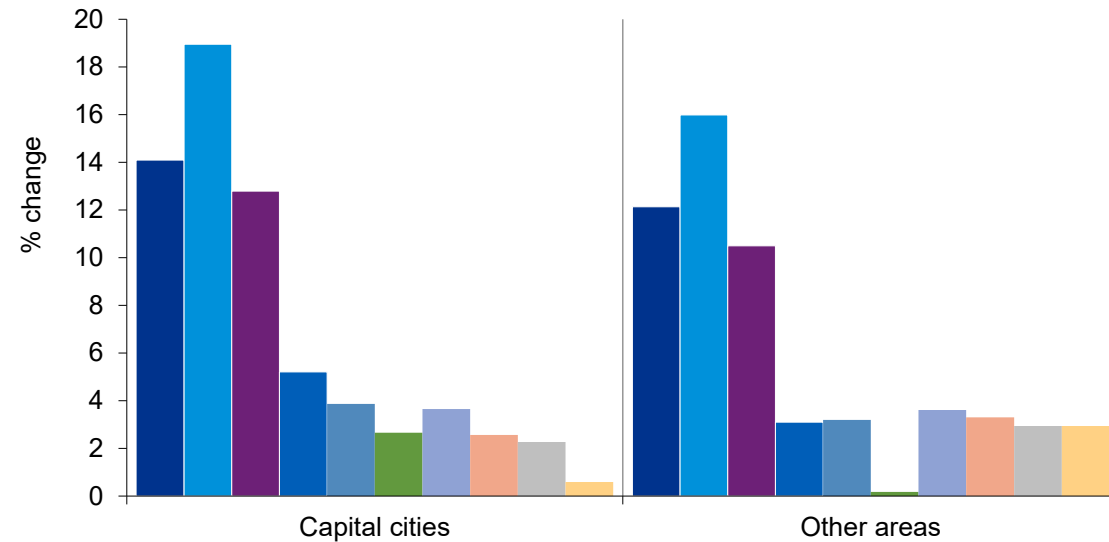


Variation of income changes across age cohorts

Std. Dev.	AGE<26	AGE 26-35	AGE 36-45	AGE 46-55	AGE 56-65	AGE>65
FY2019-20	4.99	2.44	5.41	6.63	7.60	5.22
FY2020-21	3.83	2.33	2.20	3.39	3.74	1.76

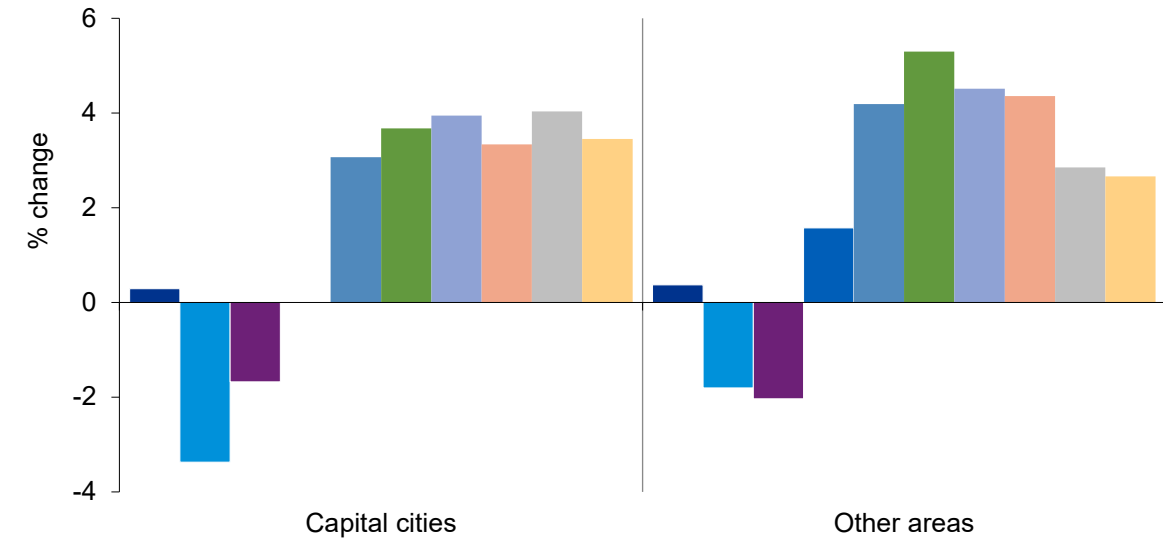
Income results by geographical area

FY2019-20



■ Lowest ■ Second ■ Third ■ Fourth ■ Fifth
■ Sixth ■ Seventh ■ Eighth ■ Ninth ■ Highest

FY2020-21

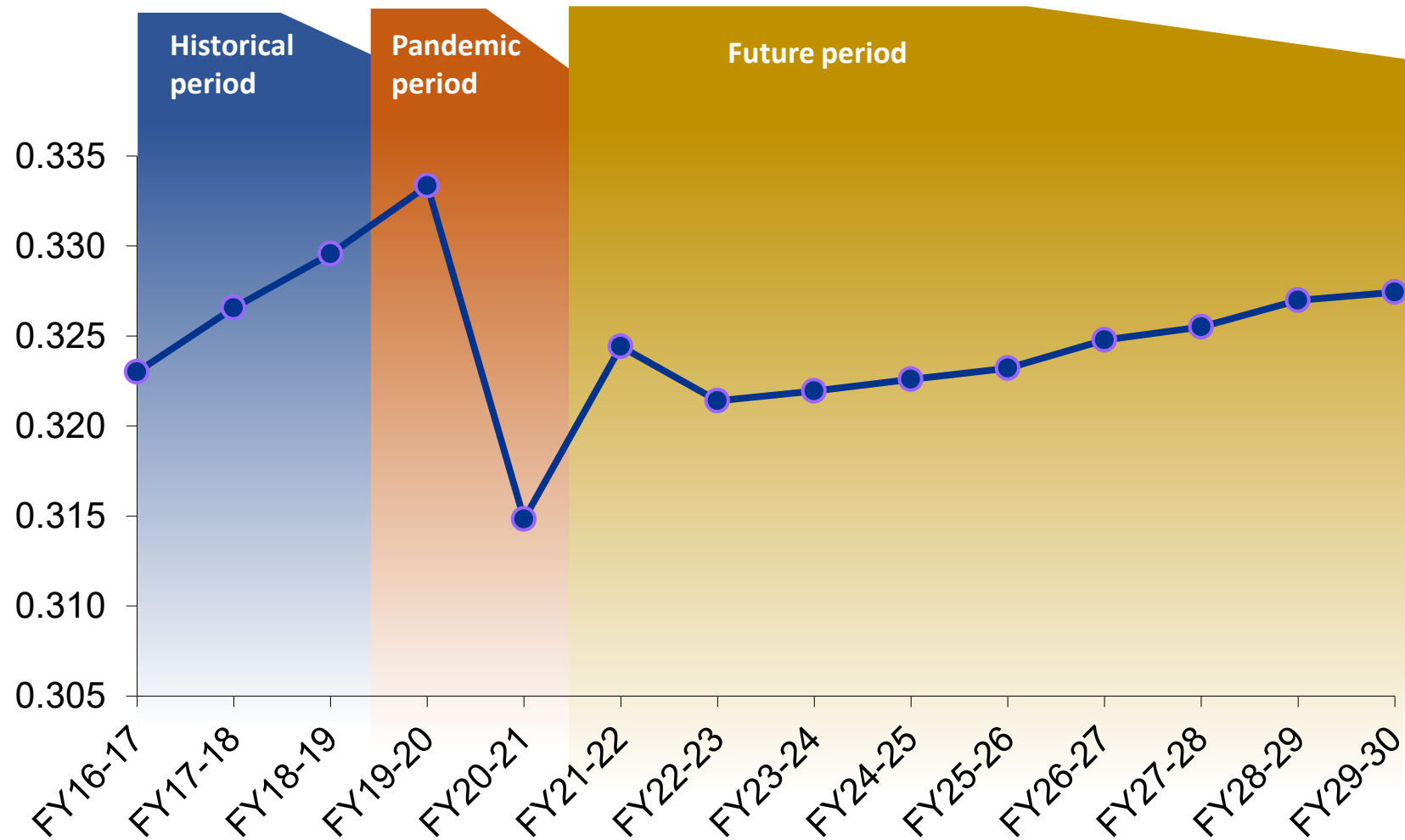


■ Lowest ■ Second ■ Third ■ Fourth ■ Fifth
■ Sixth ■ Seventh ■ Eighth ■ Ninth ■ Highest

Variation of income changes across areas

Std. Dev.	Capital cities	Other areas
FY2019-20	6.25	5.15
FY2020-21	2.67	2.62

Gini coefficient



Conclusion

- The Australian economy contracts during the pandemic as consumption, investment and trade activity fall.
- Recreation and tourism sectors had the largest fall in output.
- Covid19 support from the government provided a temporary safety net for low income households during the pandemic.

- The income effects of the pandemic is asymmetric at the household level.

Std. Dev. of the % changes in income across deciles by household type

