

National Population Growth Rate, its Components, and Subnational Contributions

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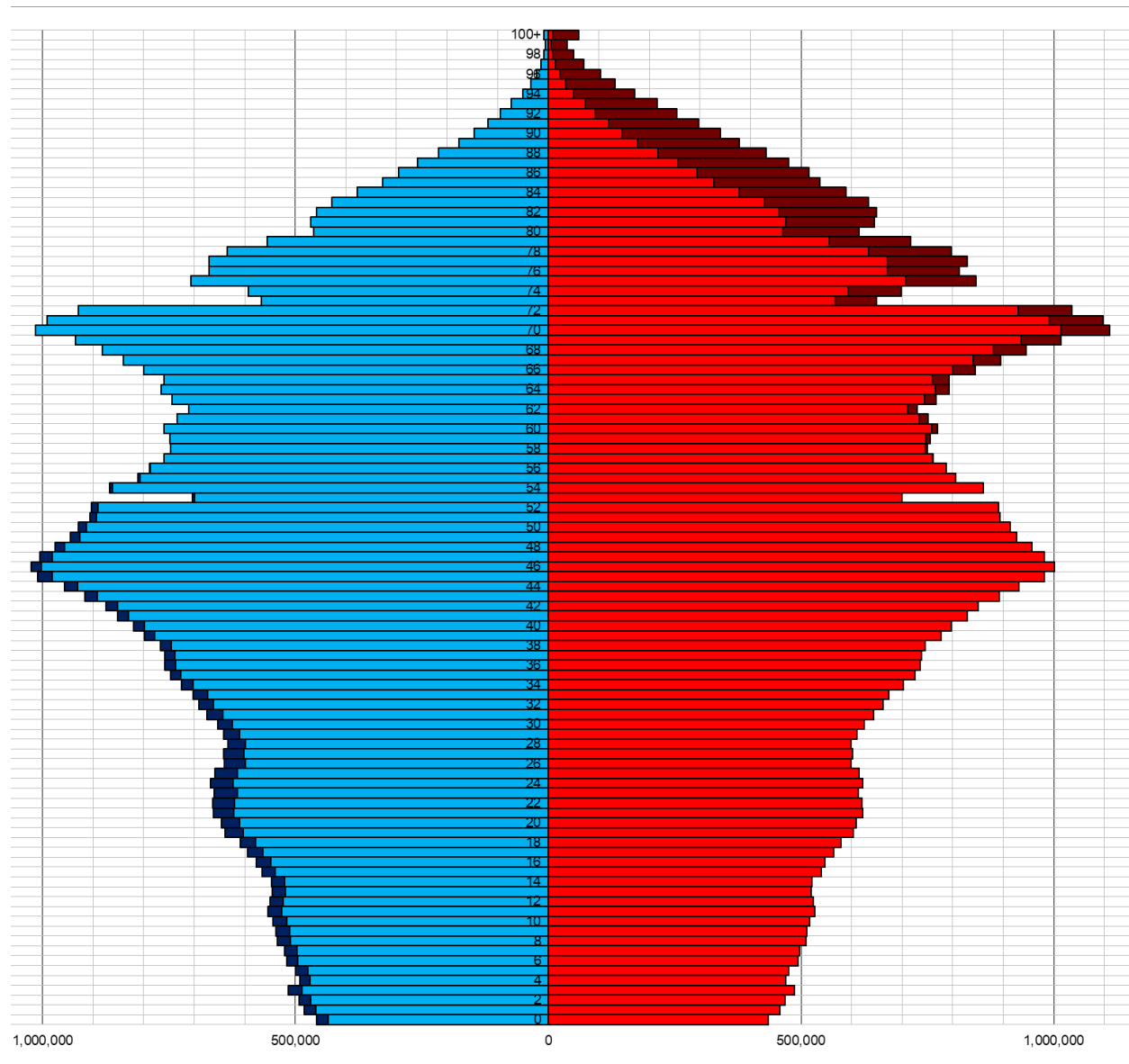
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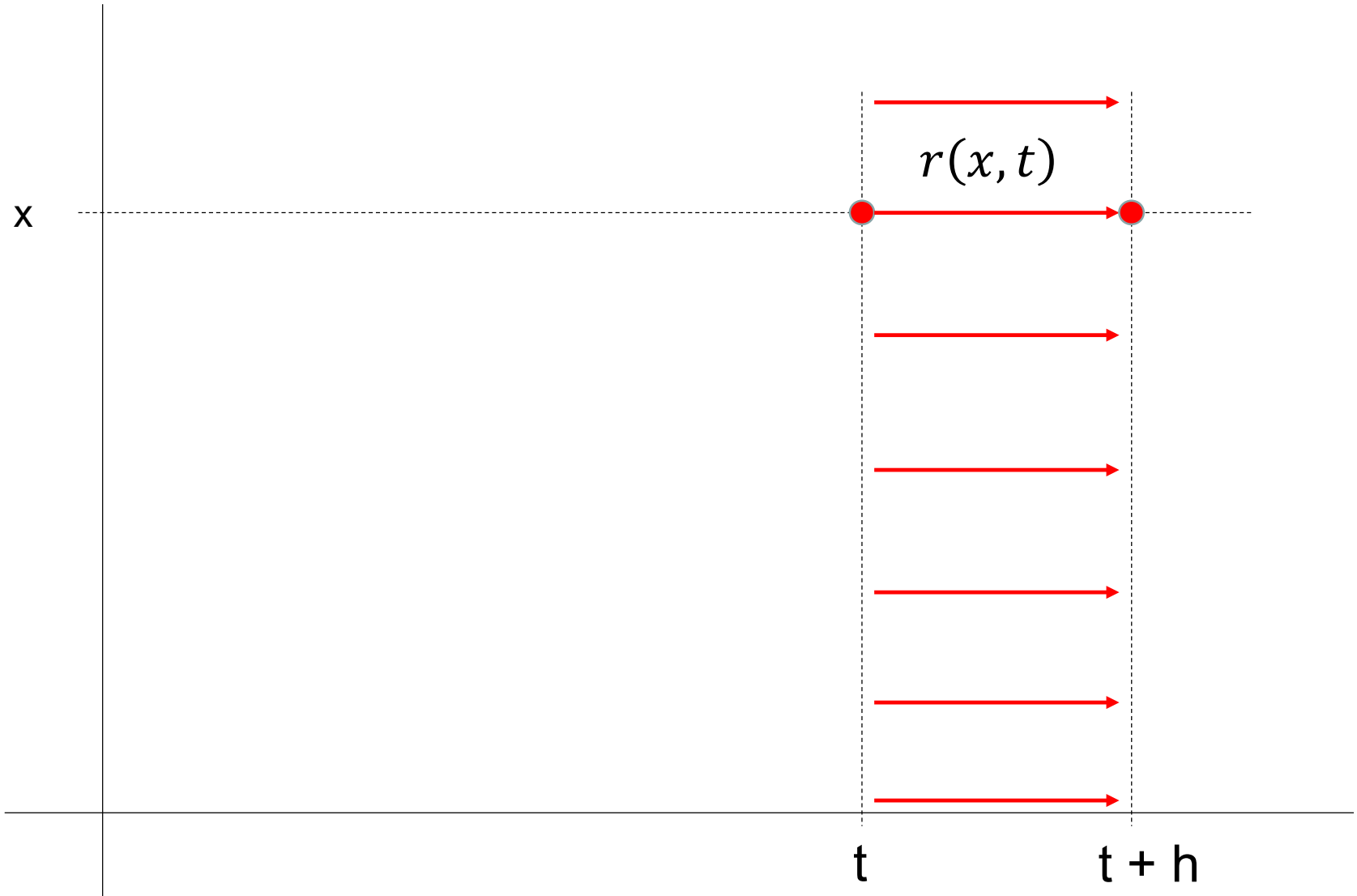


Japan 2019



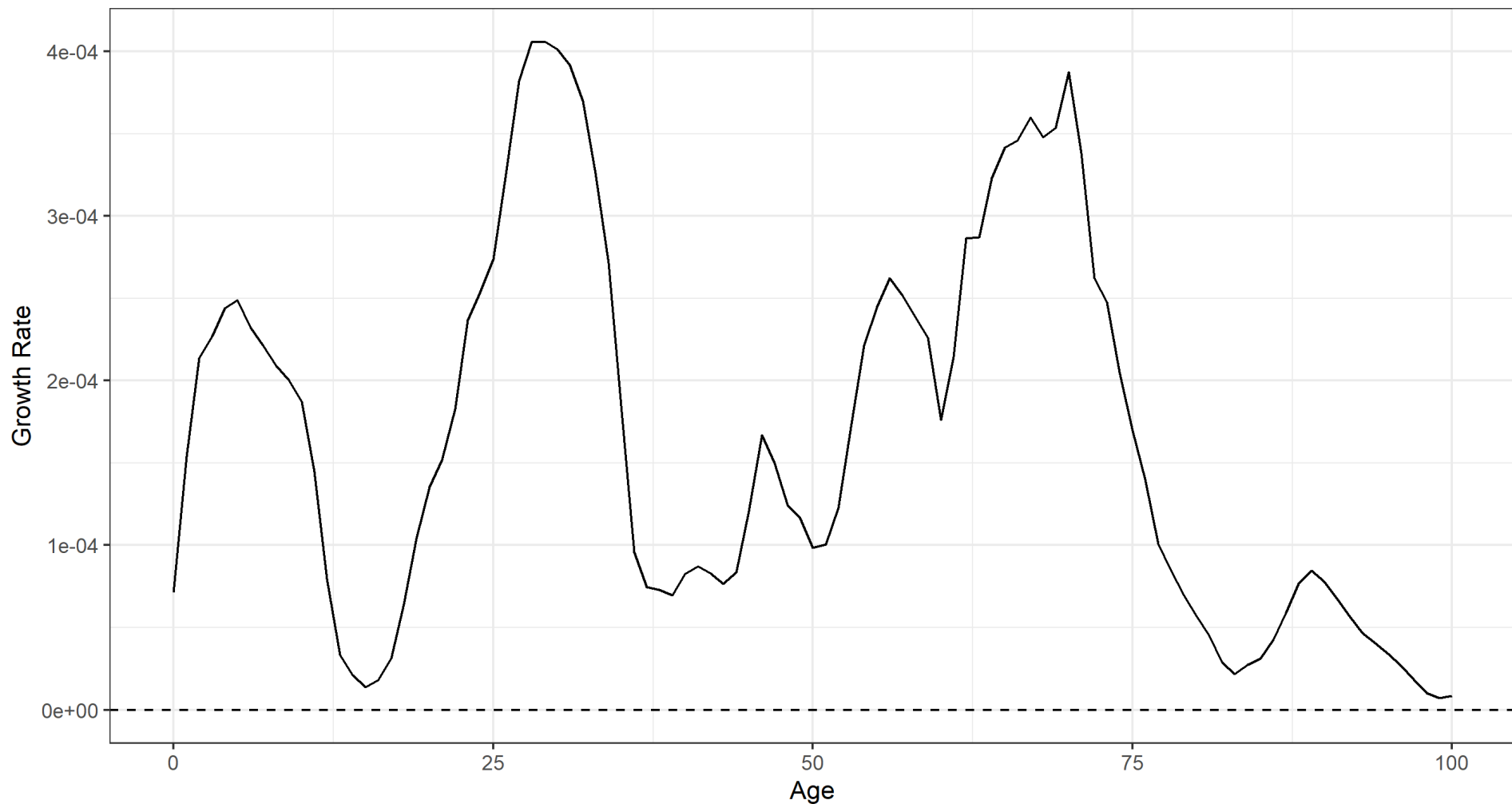
$$\bar{r}(t) = \int_0^{\omega} r(x, t) c(x, t) dx$$

Growth rate = average



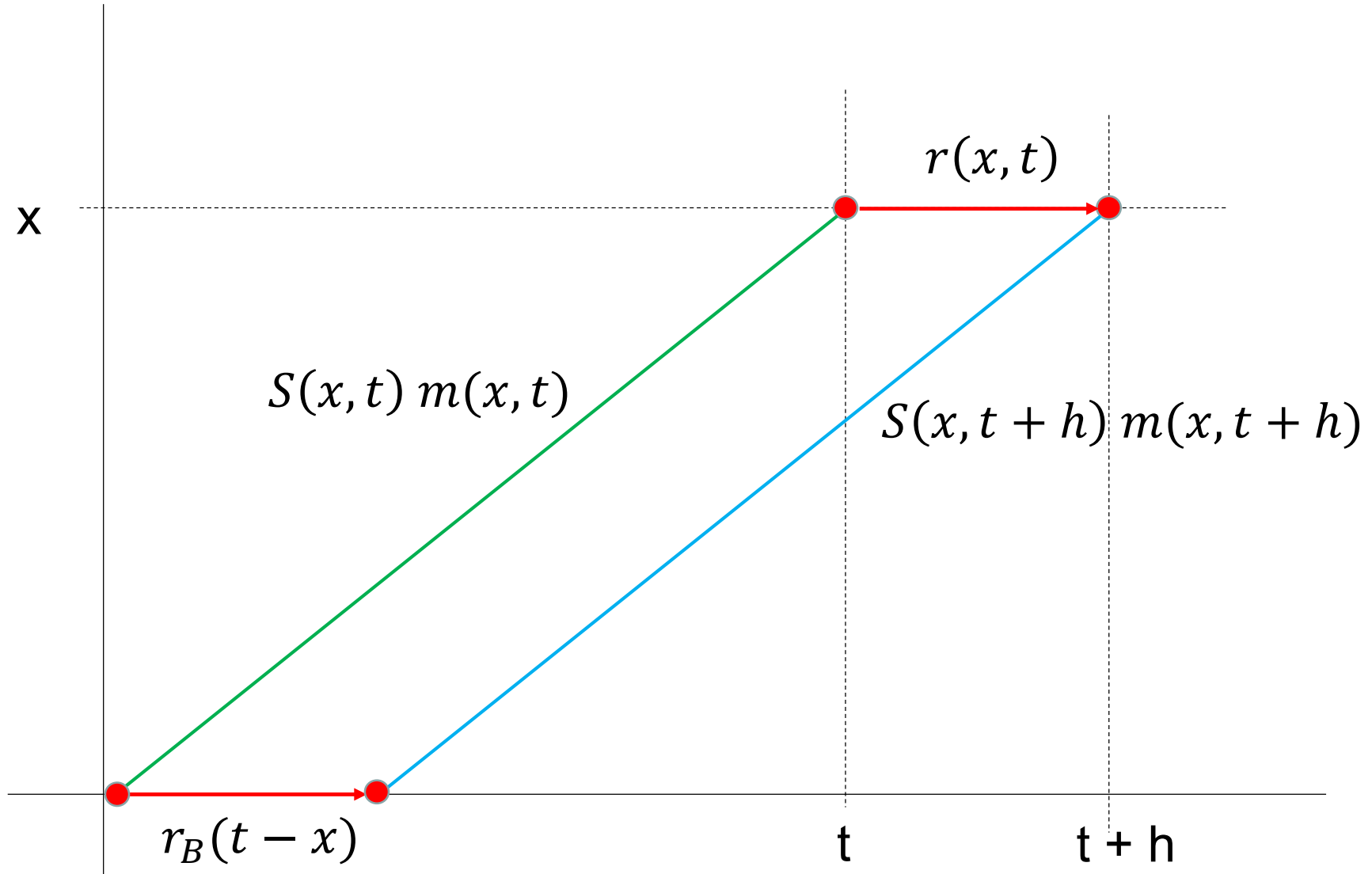


Australian females, 2008-18





Growth rate & its components

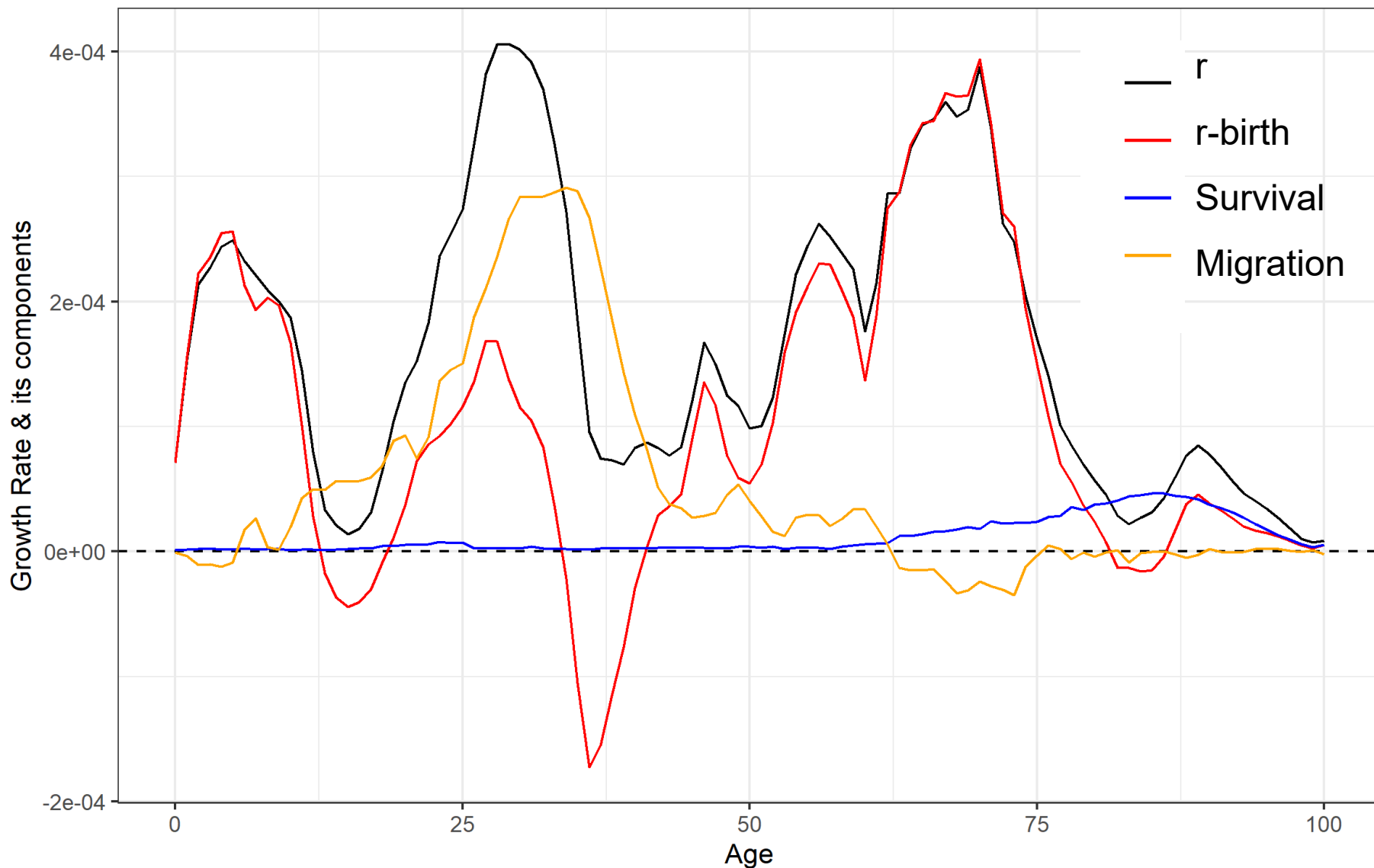


$$r(x, t) = \Delta S_x + \Delta m_x + r_B$$

Horiuchi & Preston (1988)



Australian females, 2008-18





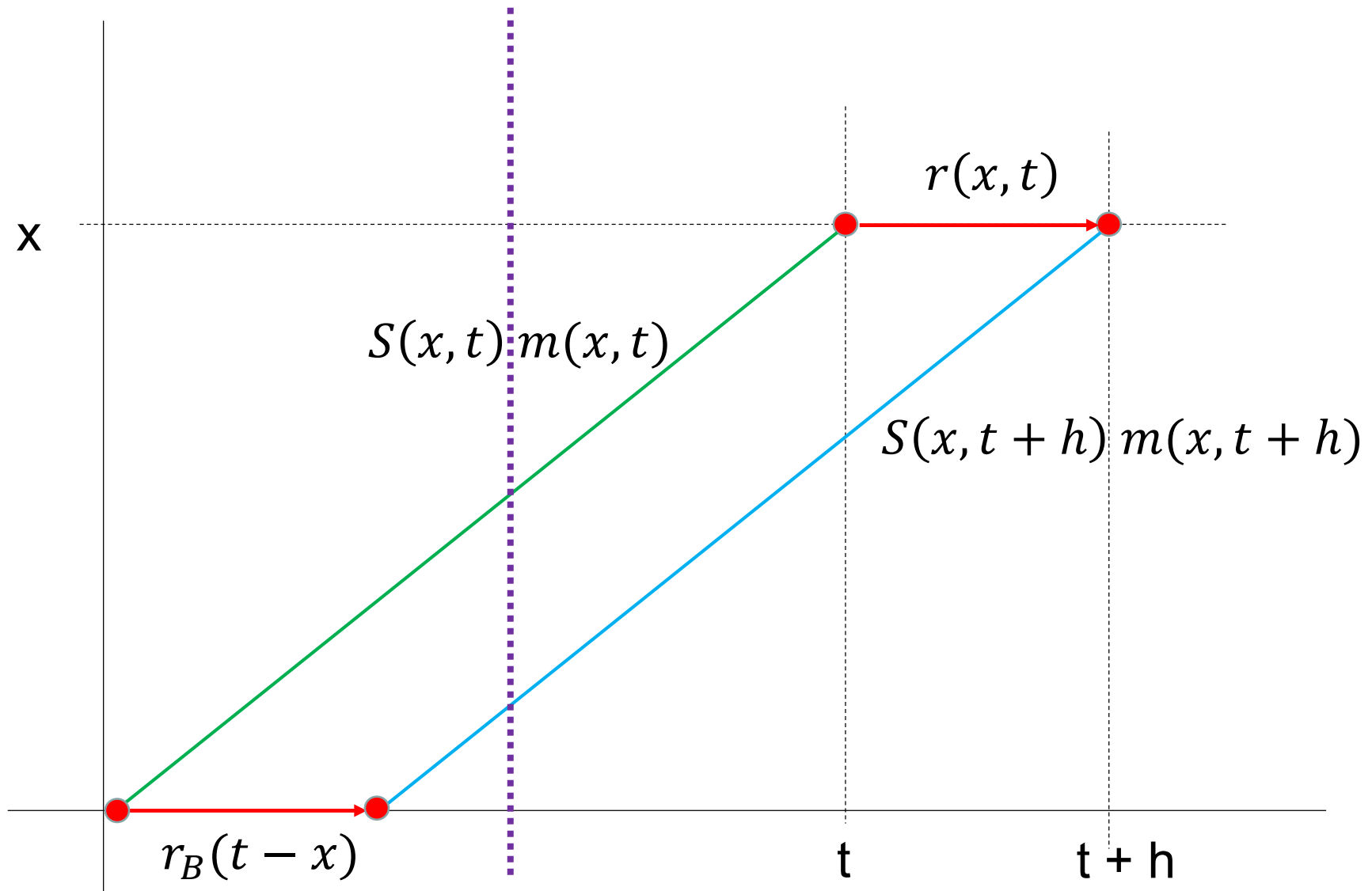
States and territories



- Integrate the demographic history even if only partial information is available
- Integrate the growth rate of states/ t in the nation growth rate

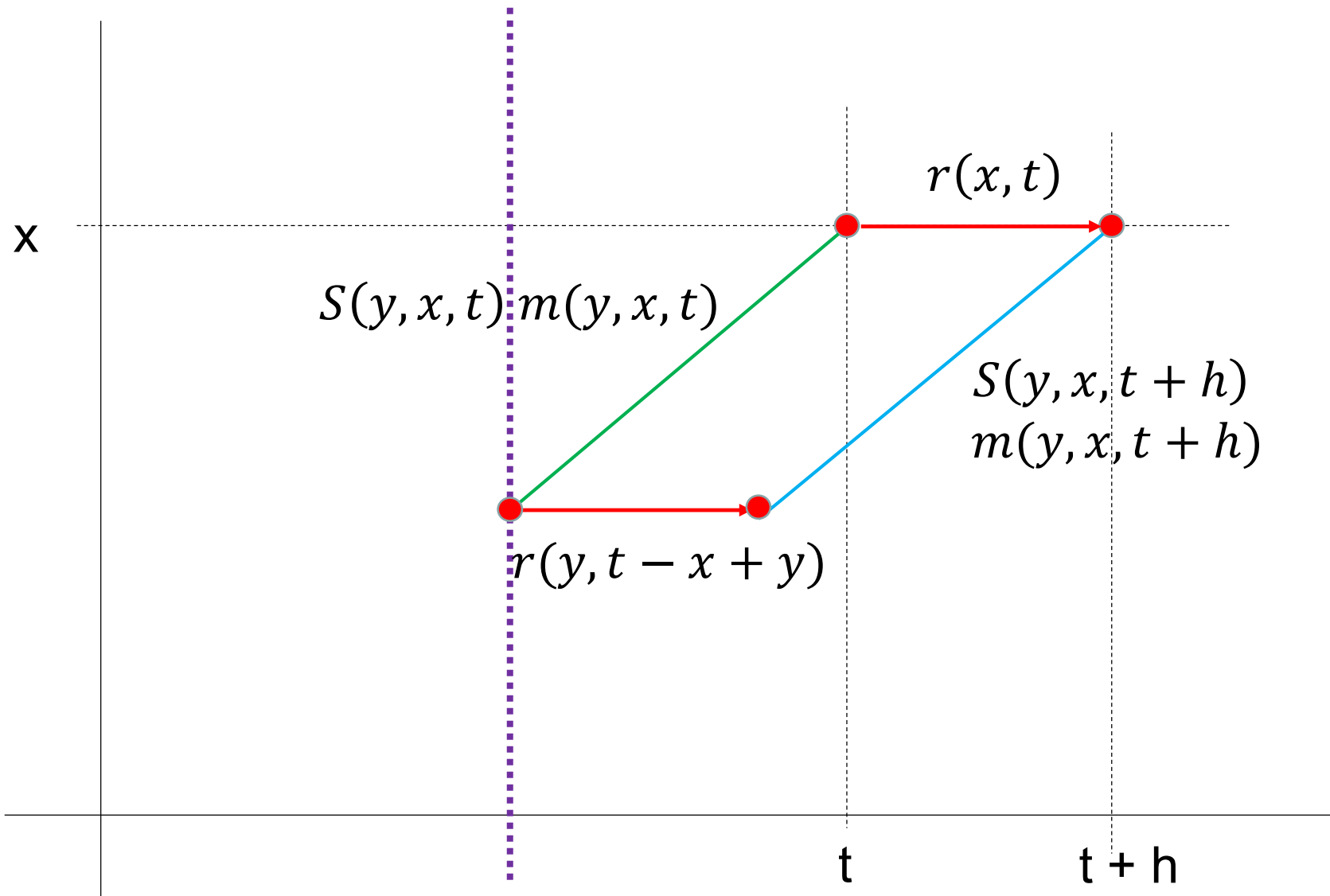


Growth rate & its components





Growth rate & its components

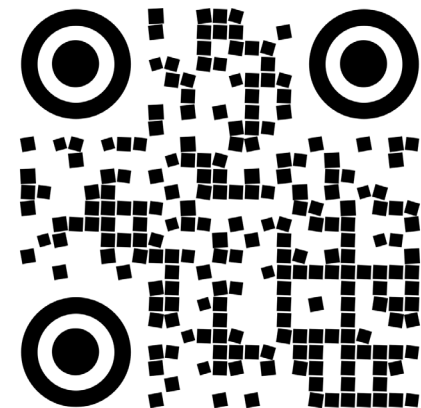


$$\bar{r}(t) = \sum_i \int_0^{\omega} r_i(x, t) c_i(x, t) c_i(t) dx$$



Australian Human Mortality Database

The Australian Human Mortality Database (AHMD) was created to provide detailed mortality and population data for Australian states and territories: Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria, and Western Australia. The AHMD's underlying methodology corresponds to the one used for the Human Mortality Database (HMD).



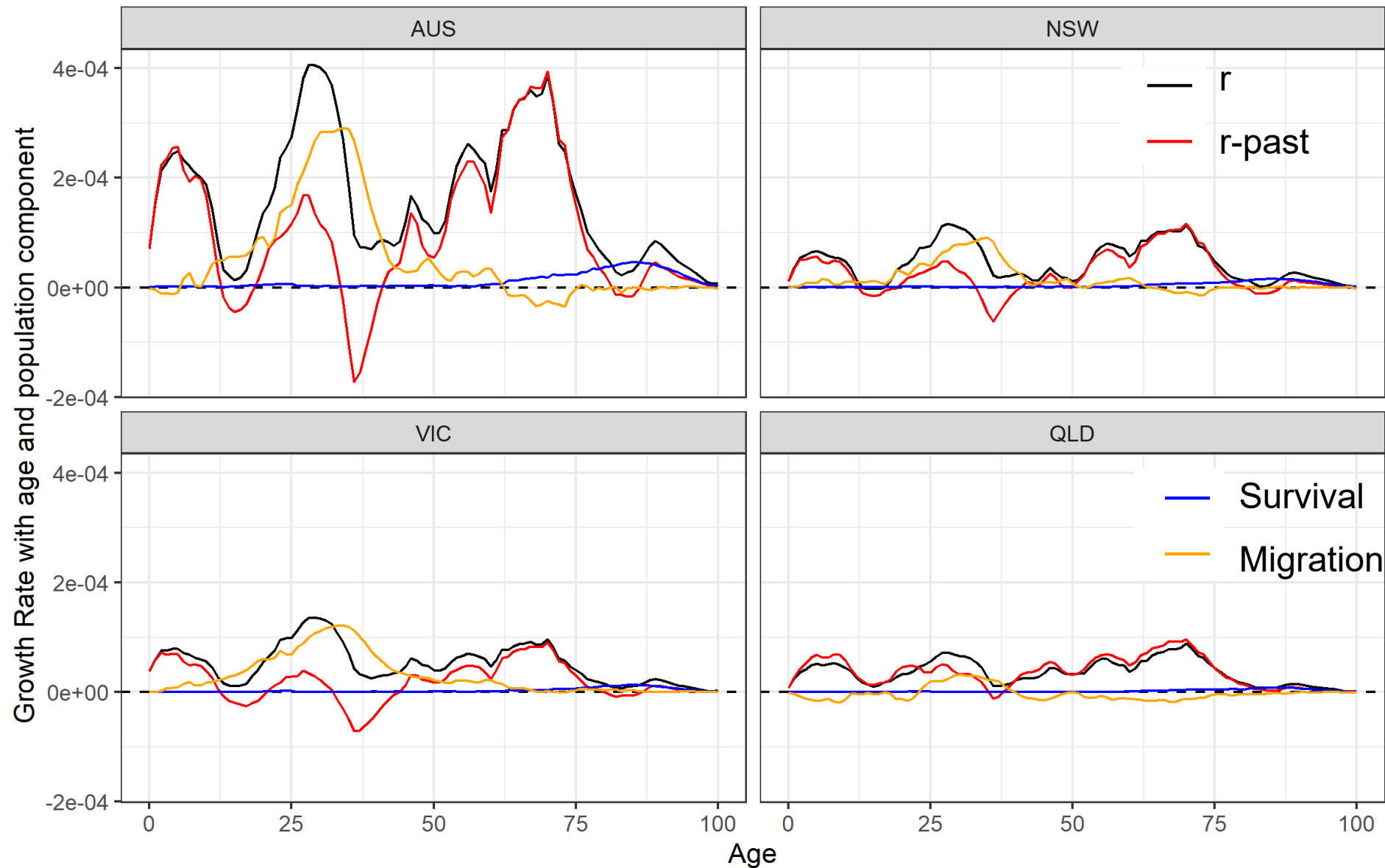


Data

Country	National (HMD)	Subnational population
Australia (AHMD)	1921-2019	1972-2021
Canada (CHMD)	1921-2019	1950-2019
France (FHMD)	1816 - 2020	1946-2018
Japan (JMD)	1947-2020	1975-2020
UK (HMD)	1922-2020	1922-2020
USA (USMDB)	1933-2019	1980-2018



Australian females, 2008-18





Country/State	Growth	Population %
Australia	16.67	100
New South Wales	4.53	32
Victoria	5.23	25
Queensland	3.67	20
Sum	13.43	78



Country/State	Growth	r-past	Survival	Net migration	Population %
Australia	16.67	10.27	1.19	5.20	100
New South Wales	4.53	2.54	0.43	1.56	32
Victoria	5.23	1.92	0.32	3.00	25
Queensland	3.67	3.72	0.22	-0.26	20
Sum	13.43	8.18	0.97	4.30	78



Country/State	Growth	r-past	Survival	Net migration	Population %
Australia	16.67	10.27	1.19	5.20	100
New South Wales	4.53	2.54	0.43	1.56	32
Victoria	5.23	1.92	0.32	3.00	25
Queensland	3.67	3.72	0.22	-0.26	20
Sum	13.43	8.18	0.97	4.30	78

Japan	-1.20
Tokyo	0.67
Osaka Prefecture	0.04
Kanagawa Prefecture	0.24
Sum	0.95



Country/State	Growth	r-past	Survival	Net migration	Population %
Australia	16.67	10.27	1.19	5.20	100
New South Wales	4.53	2.54	0.43	1.56	32
Victoria	5.23	1.92	0.32	3.00	25
Queensland	3.67	3.72	0.22	-0.26	20
Sum	13.43	8.18	0.97	4.30	78
Japan	-1.20	-3.18	1.55	0.44	100
Tokyo	0.67	-0.79	0.15	1.32	10
Osaka Prefecture	0.04	-0.36	0.11	0.29	7
Kanagawa Prefecture	0.24	0.25	0.09	-0.11	7
Sum	0.95	-0.90	0.35	1.50	24

- Age-specific growth rates experienced today are an accumulation of a long history of the fertility, mortality, and migration of past generations.
- To understand population growth today, it is vital to assess those historical changes from the past.



Country/State	Growth	r-past	Survival	Net migration	Population %
United Kingdom	6.64	1.58	1.75	3.31	100
England and Wales	6.16	1.81	1.56	2.80	89
Scotland	0.33	-0.27	0.16	0.44	8
Northern Ireland	0.15	0.07	0.04	0.04	3
Sum	6.64	1.61	1.76	3.28	100
United States	7.27	6.16	1.03	0.08	100
California	0.94	1.56	0.16	-0.78	12
Texas	1.37	0.97	0.06	0.34	8
Florida	0.89	1.30	0.08	-0.49	6
Sum	3.20	3.83	0.30	-0.93	27



Country/State	Growth	r-past	Survival	Net migration	Population %
Canada	10.57	6.19	1.10	3.29	100
Ontario	3.93	3.88	0.48	-0.44	39
Quebec	1.65	0.54	0.29	0.83	23
British Columbia	1.91	1.63	0.15	0.14	13
Sum	7.49	6.05	0.92	0.53	75
France	4.33	2.46	1.39	0.48	100
Île-de-France	0.94	0.93	0.23	-0.22	19
Auvergne-Rhône-Alpes	0.82	0.49	0.16	0.17	12
Nouvelle-Aquitaine	0.48	0.20	0.12	0.16	9
Sum	2.24	1.62	0.51	0.11	40