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Demographic Components of Future Potential Old-Age Support Ratios

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Background

- By 2050 more than 80% of all countries in the world are projected to be older than today (United Nations, 2019)
- Unprecedented stresses on systems of health care, financial and social support
- Policy options commonly discussed for mitigating population aging: a) raising fertility b) increasing skilled labor immigration c) increasing labor force participation of working age population d) raising the age at retirement e) reducing public pension benefits

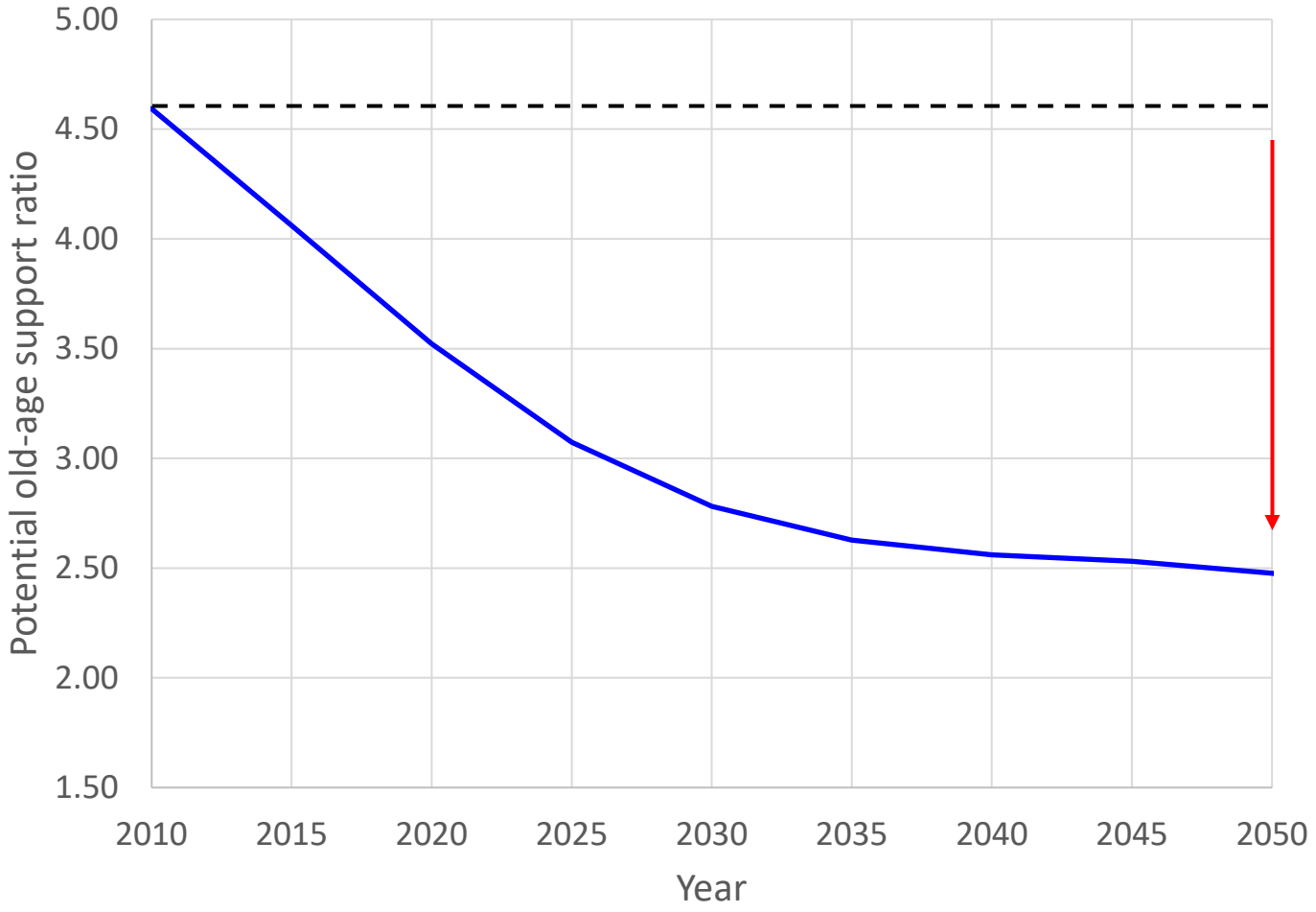
United Nations (2017); WDA Global Longevity Council (2022)

Objective

To quantify effects of demographic trends on future potential old-age support ratios (POASRs) to improve understanding how demography-related policy options, encouraging higher fertility and increasing immigration, may help to mitigate population aging

Potential old-age support ratio (POASR), P(20-64)/P(65+), the ratio of the population aged 20–64, P(20-64), to the population aged 65 years and older, P(65+)

Trend in the U.S. Potential Old-Age Support Ratio (POASR)
P(20-64) / P(65+)



What part of this decline in POASR could be attributed to aging of the current population, and anticipated trends in fertility, mortality, and net international migration?

Data

- Ten countries with advanced population aging in 2010: Australia, Canada, France, Germany, Italy, Japan, New Zealand, Spain, United Kingdom, and the United States of America

- Estimates and projections: the 2019 Revision of the World Population Prospects (WPP), United Nations

Summary of Population Projections, 2010-2050

(the 2019 WPP Medium Variant)

	Potential Old-Age Support Ratio			Total fertility rate			Life expectancy at birth			Net migration
Country	2010	2050	Change	2010-15	2045-50	Change	2010-15	2045-50	Change	2010-2050
Australia	4.55	2.40	-2.15	1.89	1.72	-0.17	82.4	86.9	4.6	151,917
Canada	4.44	2.22	-2.21	1.60	1.59	-0.01	81.8	86.8	5.0	247,453
France	3.48	1.86	-1.62	1.98	1.83	-0.15	81.9	86.2	4.3	65,283
Germany	2.95	1.76	-1.20	1.43	1.70	0.27	80.5	85.9	5.4	231,004
Italy	2.97	1.36	-1.61	1.42	1.49	0.07	82.4	87.0	4.7	127,229
Japan	2.64	1.24	-1.40	1.41	1.70	0.29	83.3	87.9	4.6	56,133
New Zealand	4.53	2.29	-2.24	2.04	1.74	-0.30	81.3	86.6	5.3	13,432
Spain	3.71	1.27	-2.44	1.33	1.57	0.25	82.5	87.0	4.5	21,591
United Kingdom	3.60	2.12	-1.47	1.87	1.77	-0.09	80.9	85.3	4.4	186,824
United States	4.59	2.48	-2.12	1.88	1.81	-0.07	78.9	83.1	4.2	1,014,546

POASRs decline for all countries, by about 50%

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Fertility is below replacement for the entire period

For some countries fertility is expected to decline, for some to increase

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Life expectancy at birth is high, about 80 years, and expected to further increase, by about 5 years

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Net migration is positive for all countries

Method

Comparative population projections

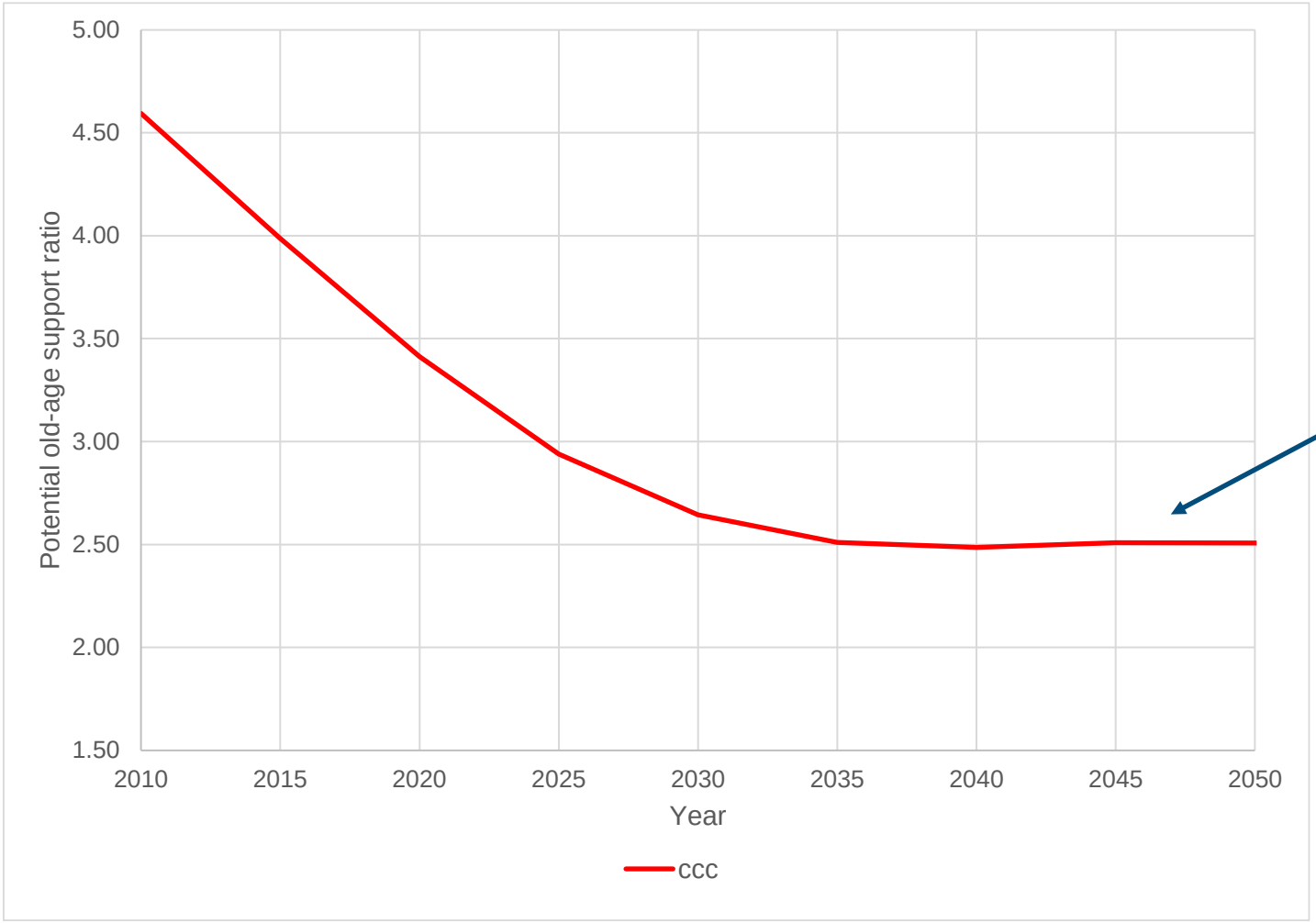
By comparing outcomes of custom population projections based on different assumptions regarding changes in fertility, mortality and migration, contribution of each demographic factor together with that of the initial demographic conditions on the change in population composition could be assessed

References

Hermalin (1966), United Nations (1956), United Nations (1988), Grigsby (1991), Andreev, Kantorová, and Bongaarts (2013)

Population projection variant: ccc

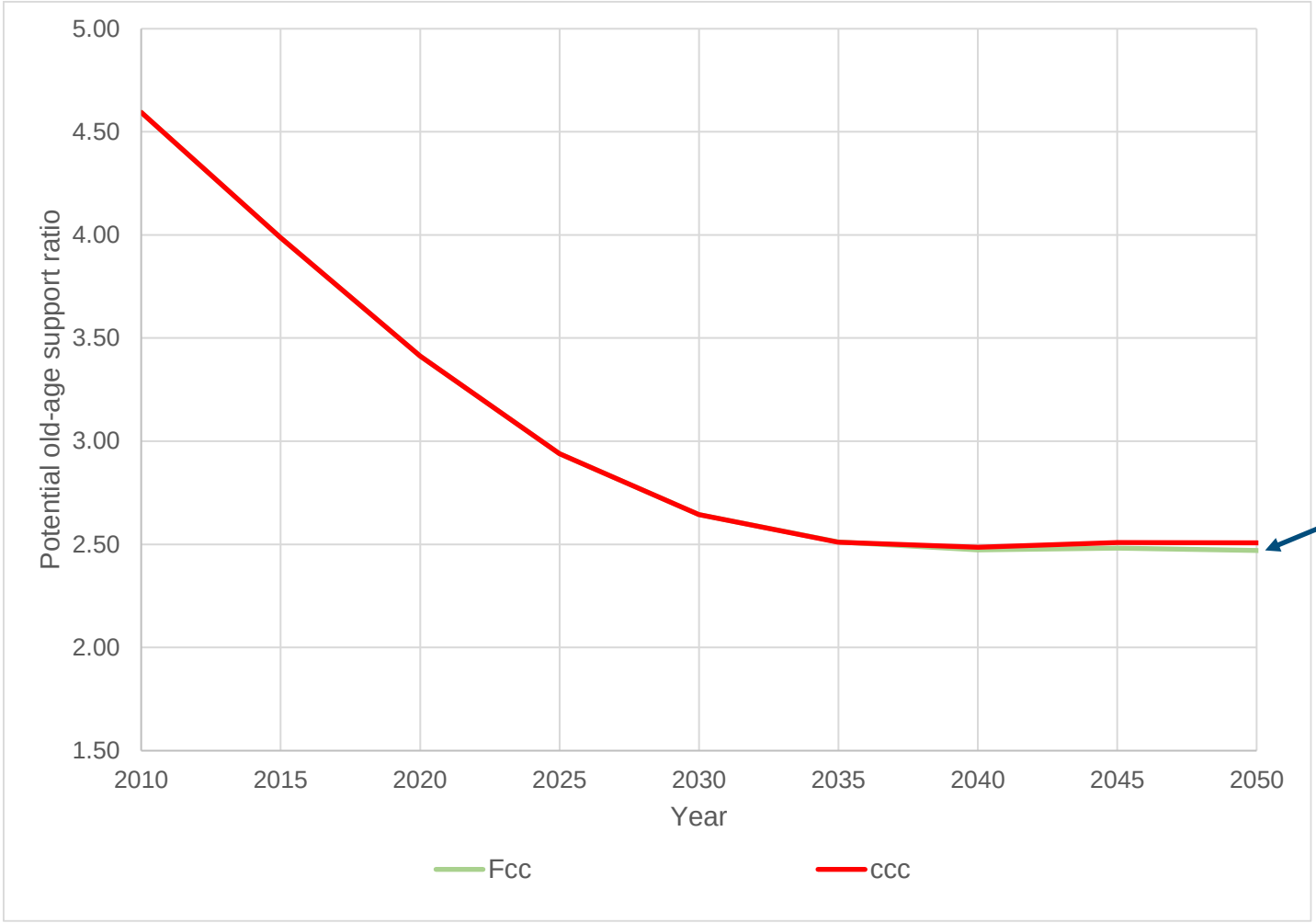
Momentum of population aging (effect of the current age structure)



- Constant fertility
- Constant mortality
- Zero migration

Convergence to stable population structure (Lotka, 1922)

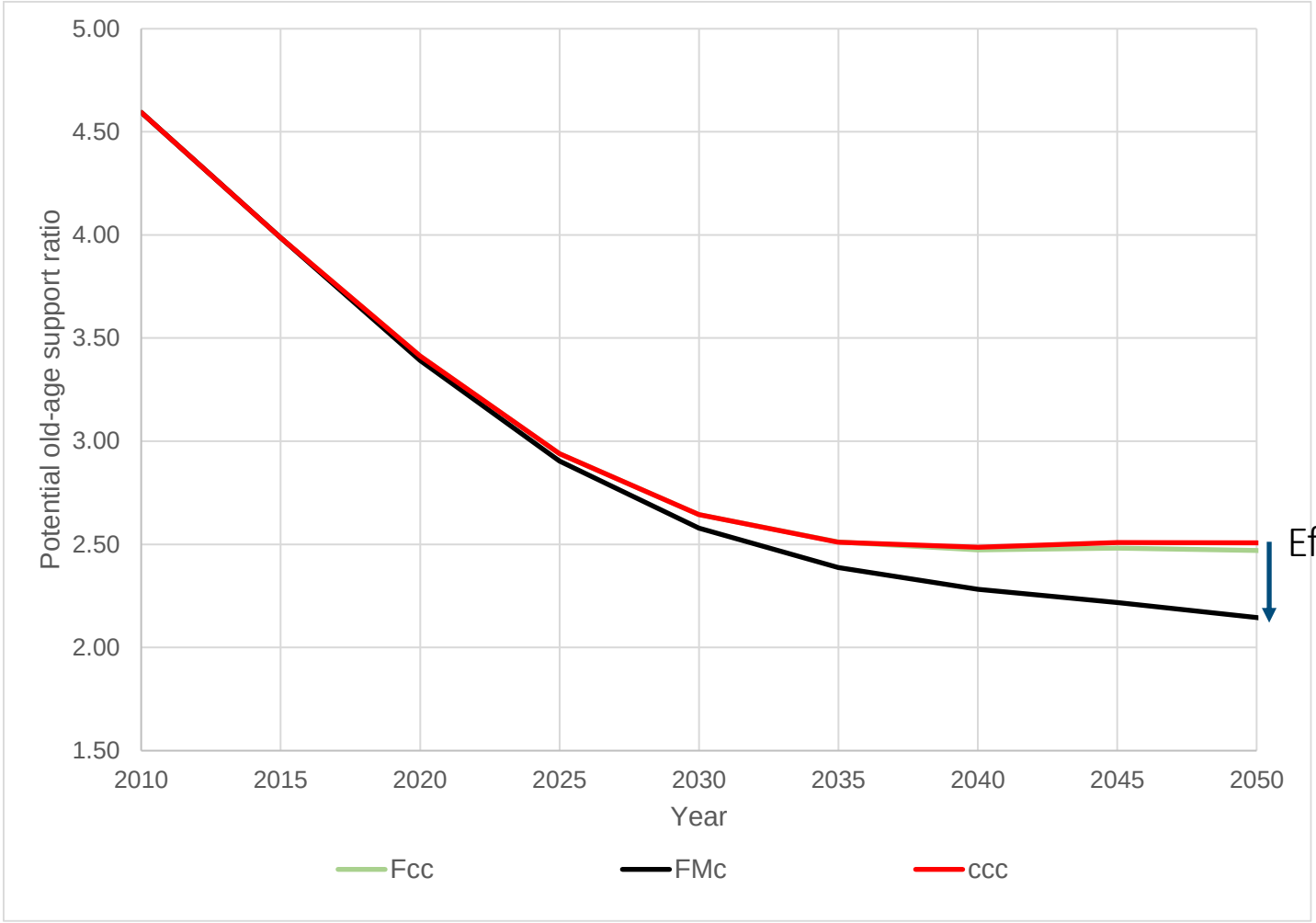
Population projection variant: Fcc



- Changing fertility
- Constant mortality
- Zero migration

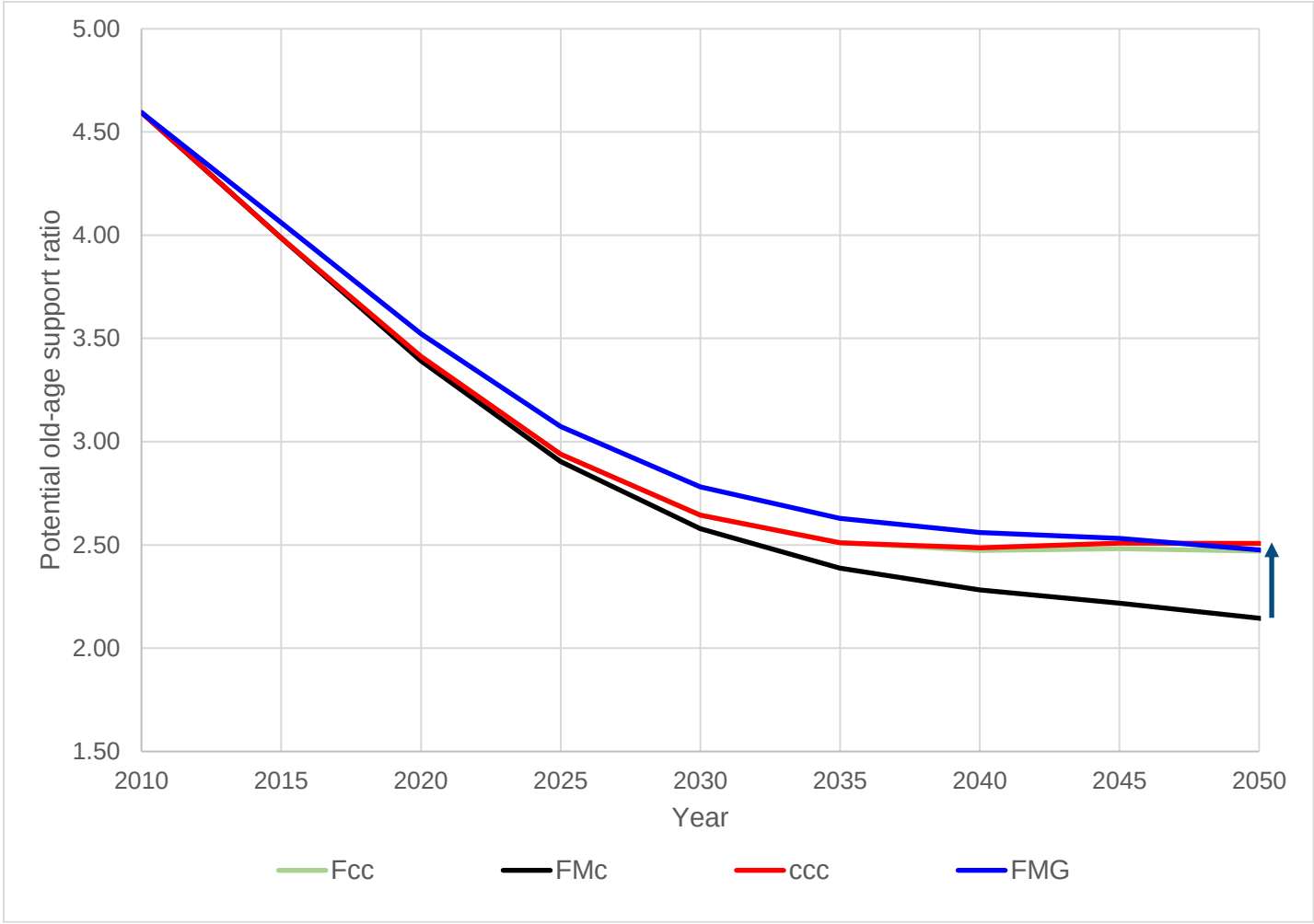
Effect of changing fertility

Population projection variant: FMc



- Changing fertility
- Declining mortality
- Zero migration

Population projection variant: FMG



- Changing fertility
- Declining mortality
- Positive net migration

The medium variant of the 2019 WPP

Effect of positive net migration

Demographic components of change in potential old-age support ratio from 2010 to 2050, United States

	2010 a)	A	F	M	G	2050 b)	Total change
Change	4.59	-2.09	-0.03	-0.35	0.35	2.48	-2.12
Percentage		99%	2%	16%	-17%		100%

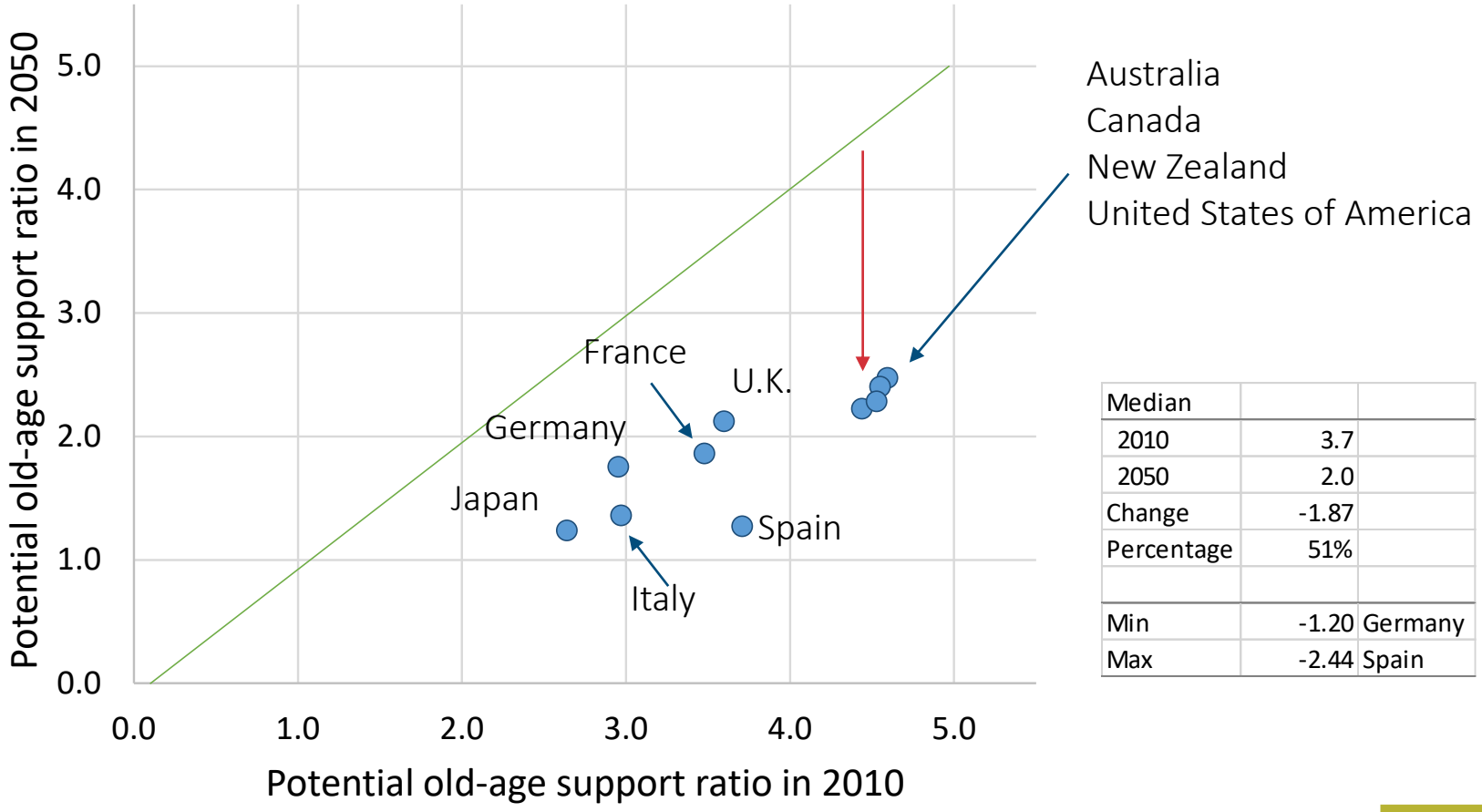
a) POASR level in 2010

b) POASR level in 2050, variant FMG

A – momentum of population aging, F – fertility, M – mortality, G – migration.

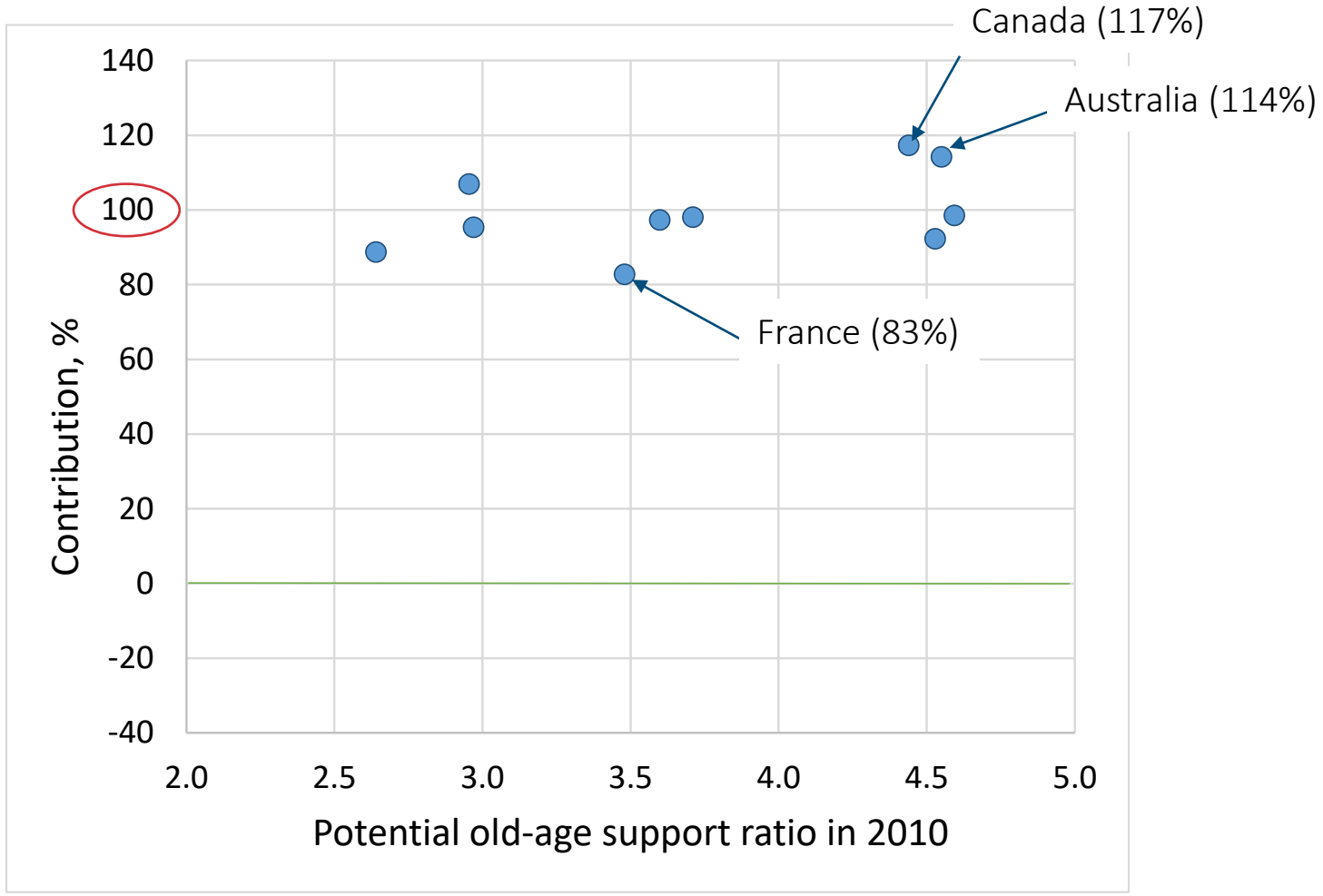
Average over six different transitions to compute decomposition

Changes in potential old-age support ratios between 2010 and 2050, ten countries with advanced population aging in 2010

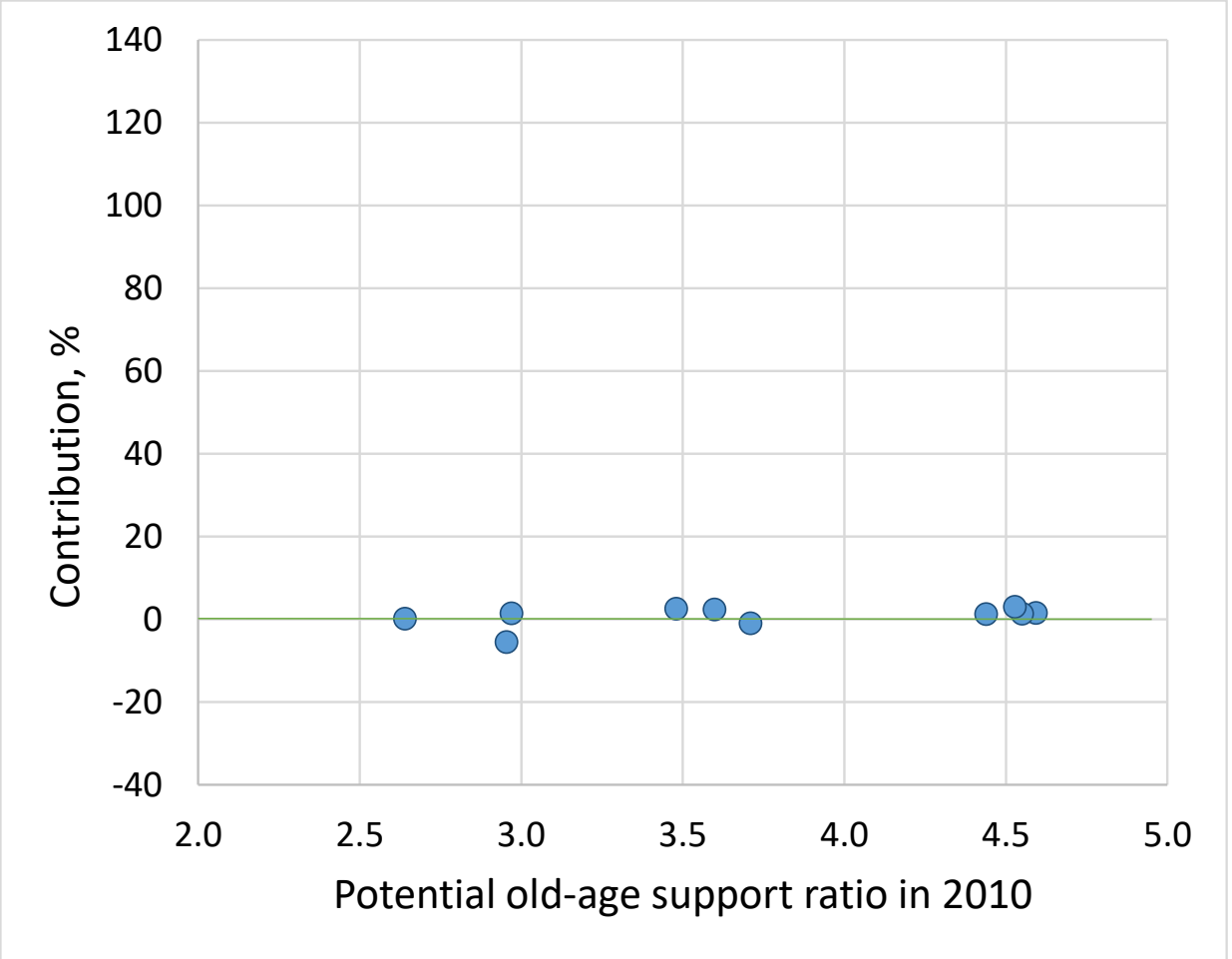


Median		
2010	3.7	
2050	2.0	
Change	-1.87	
Percentage	51%	
Min	-1.20	Germany
Max	-2.44	Spain

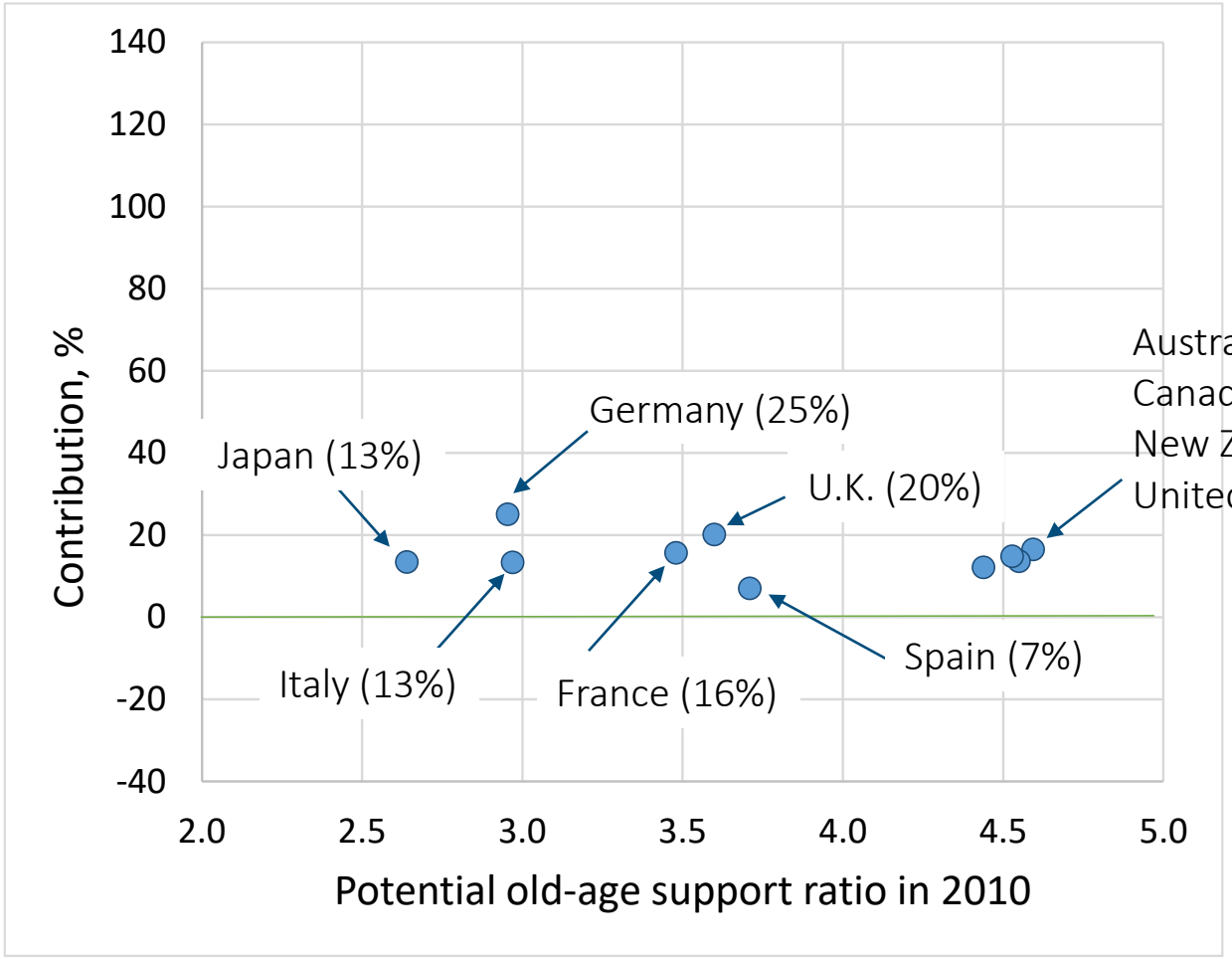
Contribution of momentum of population aging



Contribution of fertility change

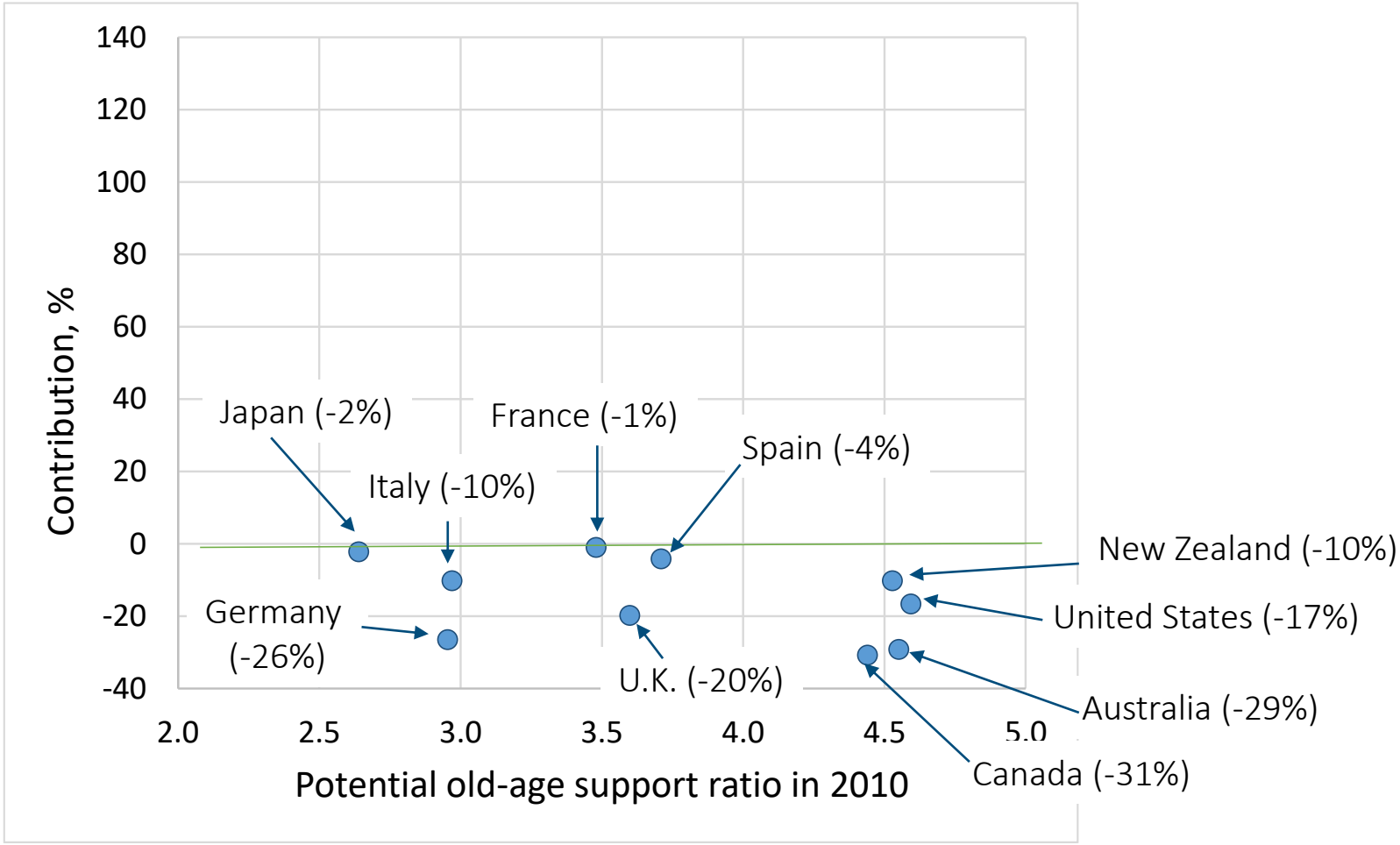


Contribution of mortality decline

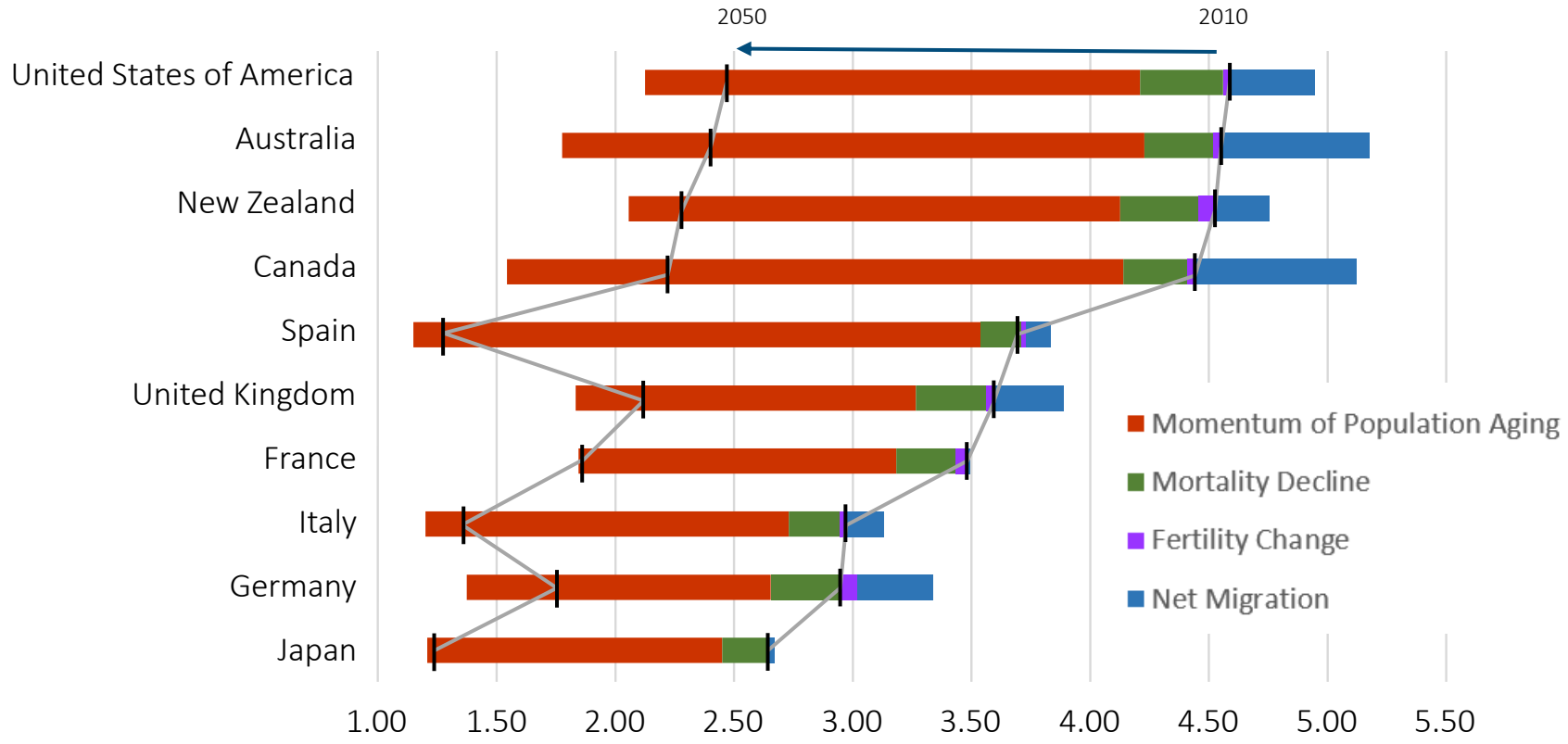


Median	14%	
Min	7%	Spain
Max	25%	Germany

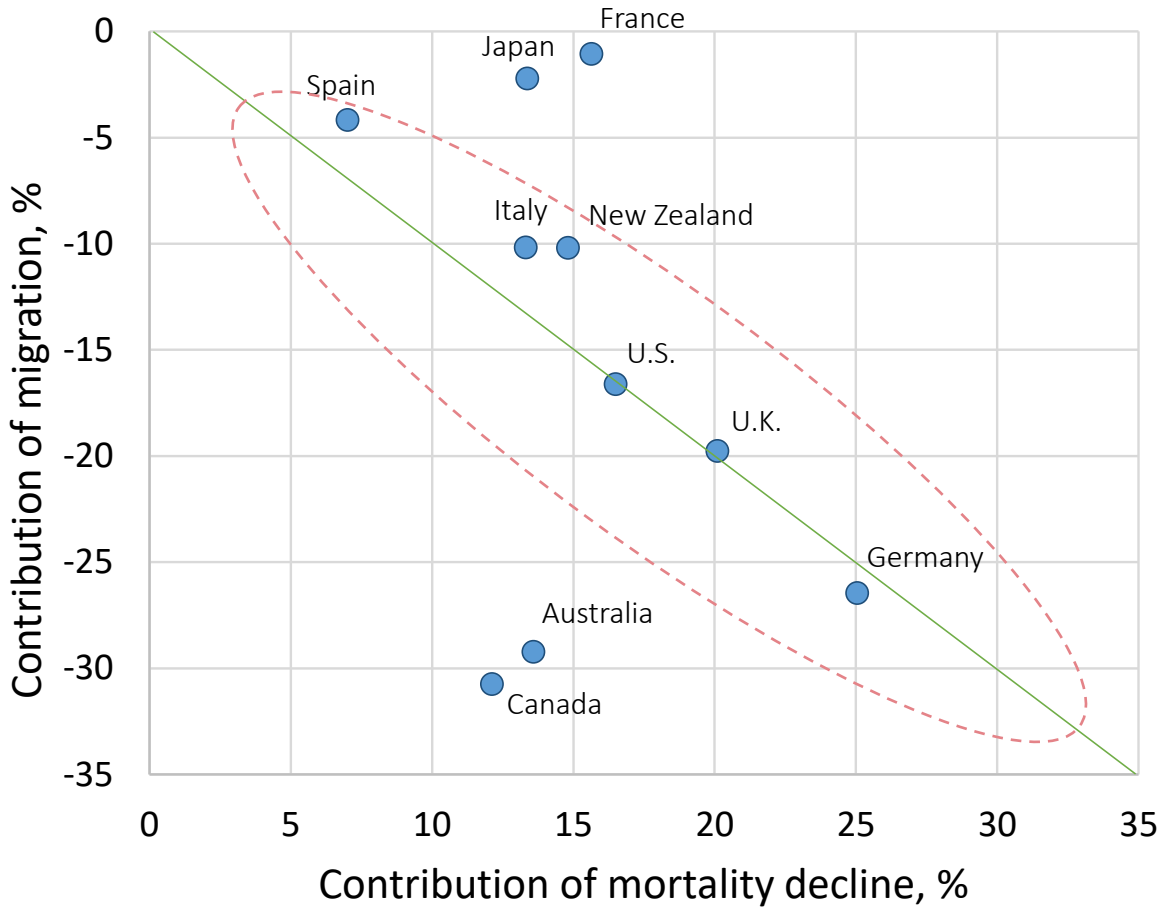
Contribution of positive net migration



Changes in POASRs over 2010-2050 together with components of change



Compensating effect of migration on mortality decline



Findings

- Potential old-age support ratios will be further **halved** over the period from 2010 to 2050.
- **Momentum of population aging** is the most influential factor contributing to the decline in POASRs. On average, close to 100% of the total decline is attributed to this factor.
- Expected **mortality decline** also contributes to the decline in POASRs. The contribution, however, is much smaller, about 15% on average.
- Positive net international **migration** on average offsets the effect of mortality decline but there is a high variation between countries.
- Anticipated changes in **fertility** do not have any significant effect on POASRs.
- International **migration** appears the only option in the short to medium term to reduce the declines in the POASR, to a limited extent.

Extras

- R scripts and data: https://github.com/kirillfandreev/dcmppoasr5

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