Overview of Demographic Dividend

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First Demographic Dividend

At an early stage of [demographic] transition, fertility rates fall, leading to fewer young mouths to feed. During this period, the labor force temporarily grows more rapidly than the population dependent on it, freeing up resources for investment in economic development and family welfare.

-- Lee and Mason (2006)

Second Demographic Dividend

A *second dividend* is also possible. A population concentrated at older working ages and facing an extended period of retirement has a powerful incentive to accumulate assets—unless it is confident that its needs will be provided for by families or governments.

-- Lee and Mason (2006)

Consumption Identity

$$\frac{C}{N} = (1-s)\frac{Y}{L}\frac{L}{N}$$

$C -$ aggregate consumption

$Y -$ aggregate income

$s -$ saving rate (S/Y)

$L -$ effective number of workers

$N -$ effective number of consumers

Effective producers and consumers

$$L = \sum_0^{\omega} \frac{y_l(x)}{\overline{y}_l(30-49)} P(x)$$

$$N = \sum_0^{\omega} \frac{c(x)}{\overline{c}(30-49)} P(x)$$

$P(x) -$ population age x

$y_l(x) -$ per capita labor income age x

$\overline{y}_l(30-49) -$ per capita labor income age 30-49

$c(x) -$ per capita consumption age x

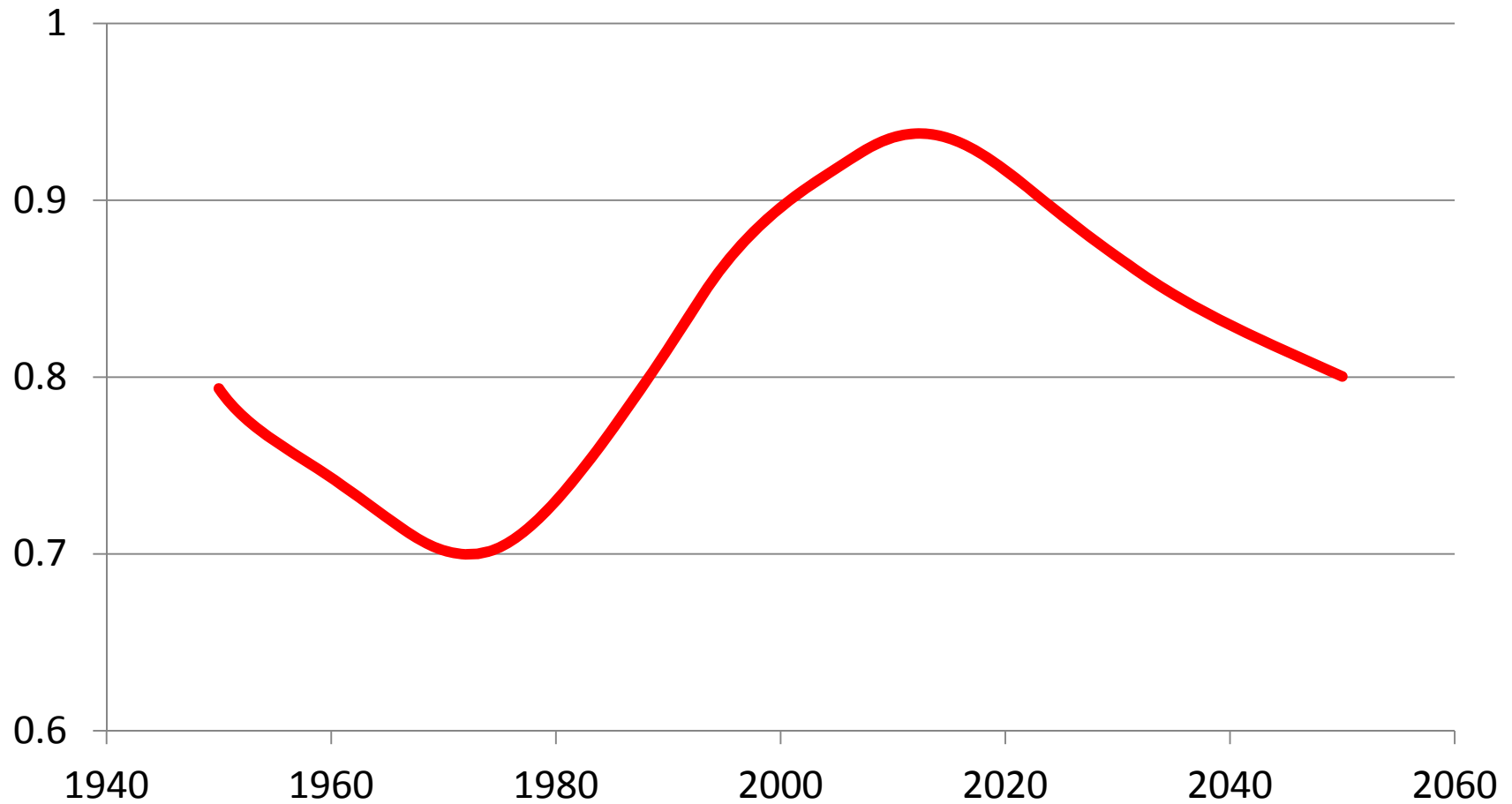$\overline{c}(30-49) -$ per capita consumption age 30-49

Two Dividends

Channel for first dividend:
Increase in the support ratio (L/N) holding other factors, saving and income per effective worker, constant.
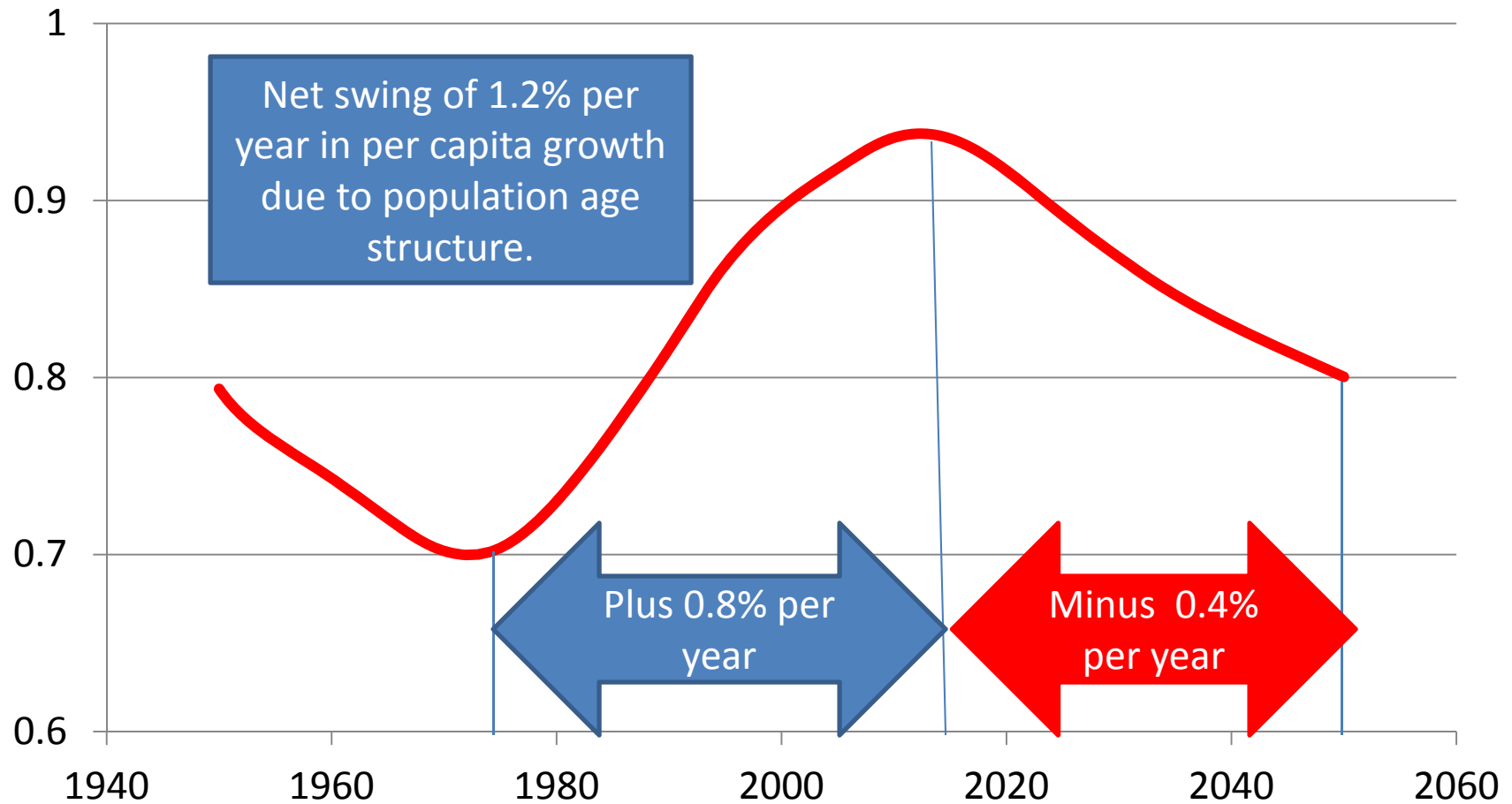
$$\frac{C}{N} = (1-s)\frac{Y}{L}\frac{L}{N}$$

Channel for second dividend:
Changes in saving and capital per effective worker influence income, from labor and assets, per effective worker.
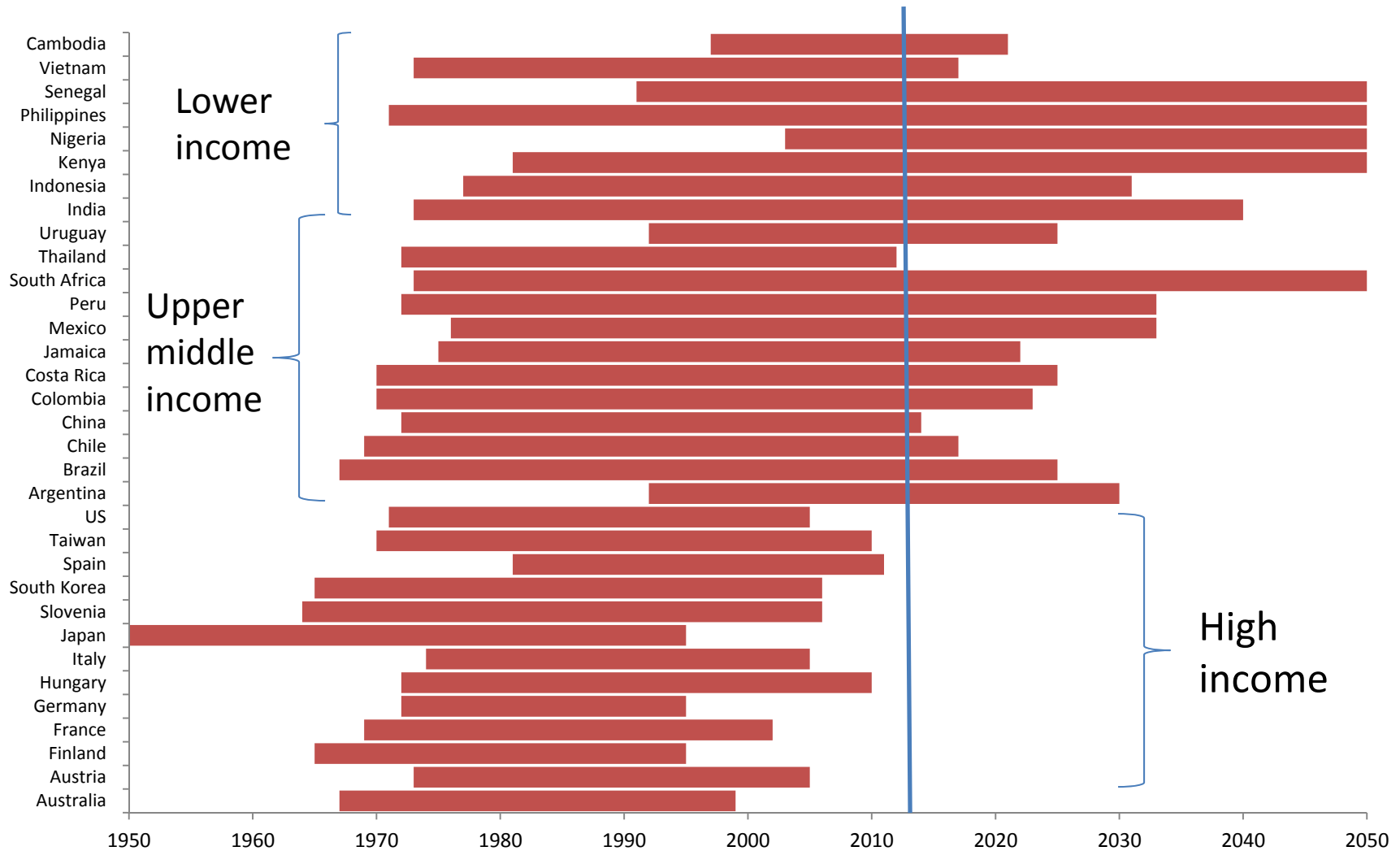
Support Ratio, China
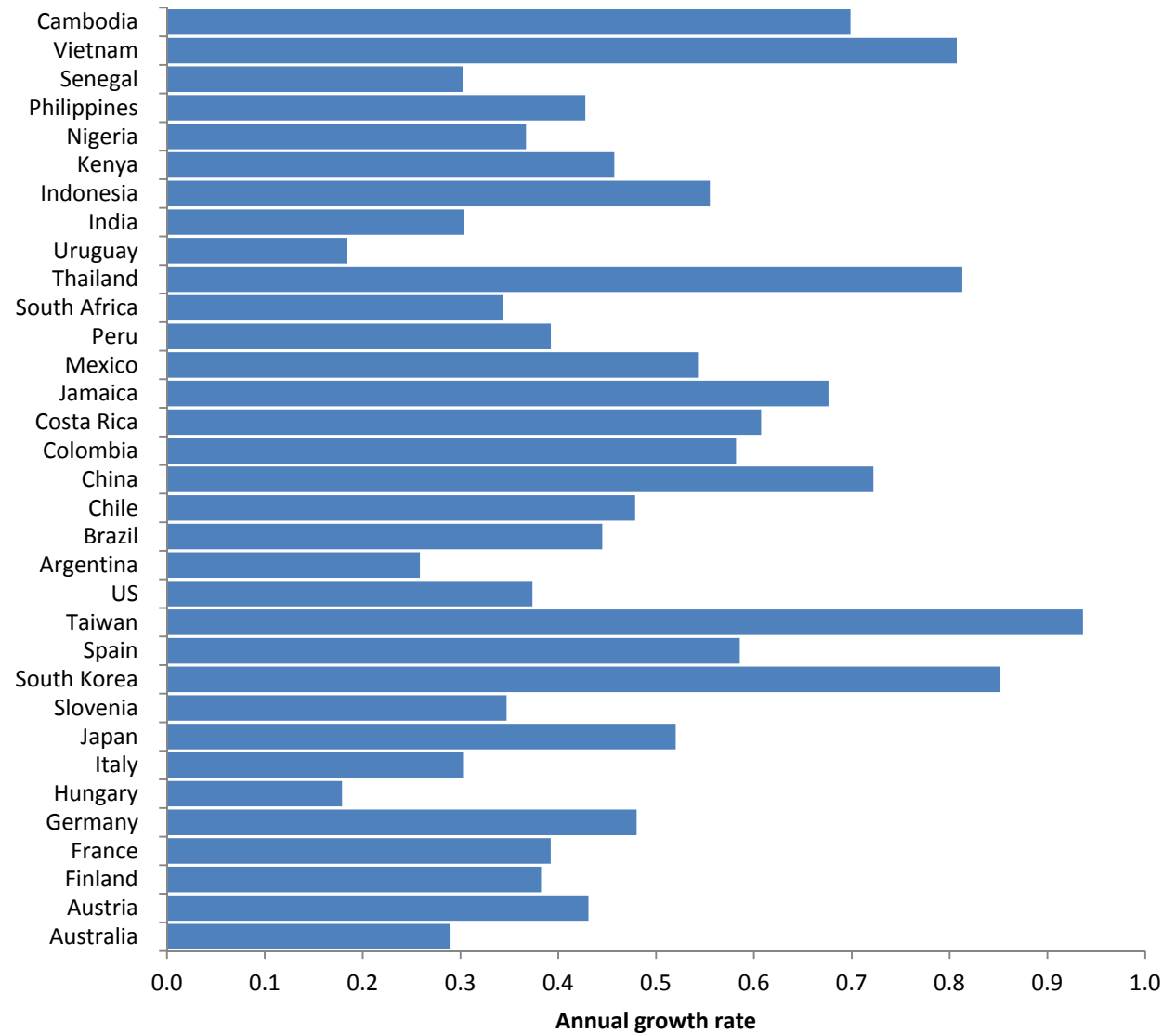
Support Ratio, China

Net swing of 1.2% per year in per capita growth due to population age structure.

Plus 0.8% per year

Minus 0.4% per year

Timing: First Dividend Phase

First Dividend – Annual growth per year in percent

- Boost to economic growth varies from 0.2 to 0.9% per annum.

- Biggest gains in E and SE Asia.

- Small gains in countries with slow fertility decline.

First Dividend – Total gain in consumption per equivalent adult

- Total gain ranges from under 5% to over 45%.

- Small gains in West and some LAC countries.

- Large gains in parts of Africa, LAC, and Asia.
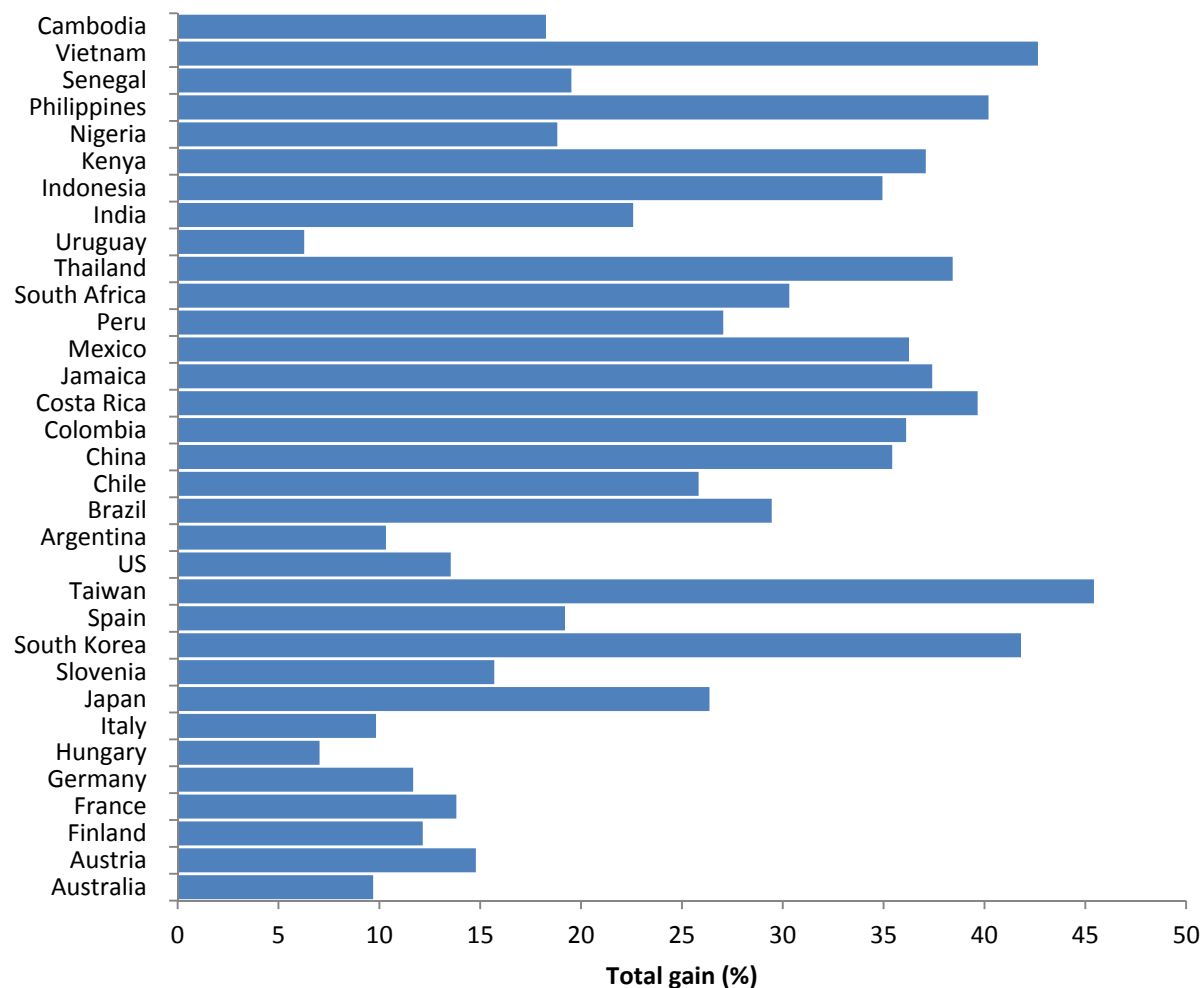
# Important issues about the first dividend

- Annual gain versus total gain.
- Timing – sooner better than later.
- Largest gains may occur in countries which started from a particularly disadvantaged position, i.e., very high fertility and high child dependency.
- Influence of policy on the dividend
  - Reproductive health and fertility decline
  - Lifecycle polices (labor income and consumption)

Second Demographic Dividend

- Aging leads to an increase in the demand for lifecycle wealth, i.e., the aggregate resources required to meet lifecycle needs.

- Impact on assets depends on extent to which elderly depend on transfers vs assets to support their old-age consumption.

- Quantifying the second demographic dividend requires a macroeconomic model including
  - Impact of population on saving (s) and capital (K)
  - Effect of capital on productivity (Y/L)

Lifecycle wealth, high-income profiles
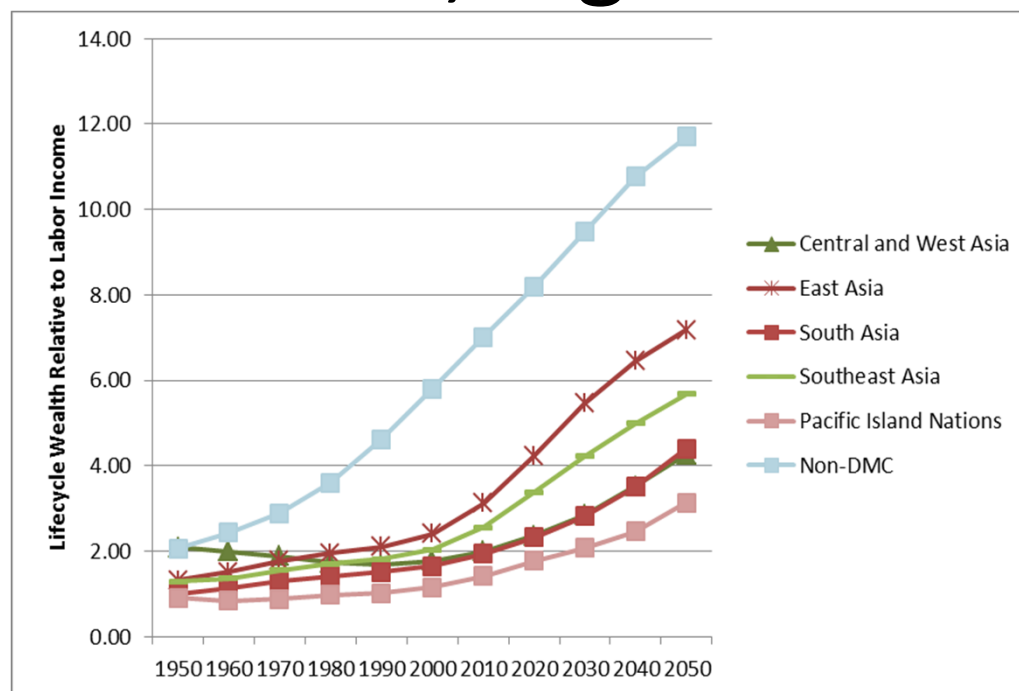
- Modest increase in DMC W before 2000 – about 1.5% faster than labor income.
- W grows most rapidly in DMCs from 2010-20 at 2.8% faster than labor income.
- Growth becomes more moderate in later decades, but always faster than labor income.

Mason and Lee 2011

Extending second dividend to human capital

- Tradeoff between fertility and human capital spending per child.

- Aging societies will have fewer workers but they will be more productive due to their enhanced human capital.

- Quantification requires model with
  - Tradeoff between fertility and human capital
  - Impact of human capital on productivity

How big are the dividends?
The second has typically been even larger than the first.

	Demographic Dividends: contribution to growth in GDP/N[1]			Actual growth in GDP/N[1]
	First	Second	Total	
Industrial economies	0.34	0.69	**1.03**	2.25
East and Southeast Asia	0.59	1.31	**1.90**	4.32
South Asia	0.10	0.69	**0.79**	1.88
Latin America	0.62	1.08	**1.70**	0.94
Sub-Saharan Africa	-0.09	0.17	**0.08**	0.06
Middle East and North Africa	0.51	0.70	**1.21**	1.10
Transition economies[2]	0.24	0.57	**0.81**	0.61
Pacific Islands	0.58	1.15	**1.73**	0.93

Source: Andrew Mason, 2005, "Demographic Transition and Demographic Dividends in Developed and Developing Countries," United Nations Expert Group Meeting on Social and Economic Implications of Changing Population Age Structures (Mexico City).

[1] Actual growth in GDP per effective consumer (GDP/N), 1970–2000, in percent a year. The effective number of consumers is the number of consumers weighted for age variation in consumption needs.

[2] Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, FYR Macedonia, Moldova, Mongolia, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

Source: Lee and Mason 2006 based on Mason 2005.

Bottom Line

- The first and second demographic dividends can make an important contribution to economic growth.
- The economic lifecycle influence both demographic dividends
  - Amounts consumed and produced at each age
  - Material needs in old age
- Quantifying reallocation system essential to understanding how aging will influence the demand for assets to meet old-age needs.

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