



Australian
National
University

CRAWFORD
SCHOOL



Crawford School Dialogue

Asia's Economic Transformation:

Implications for Australia

Presented by the Arndt-Corden Department of Economics and the Crawford School

Tuesday, 12 March, 2011

Weston Theatre, J G Crawford Building 132, Lennox Crossing, ANU



Demographic Transition in Asia

Creina Day

Arndt-Corden Department of Economics

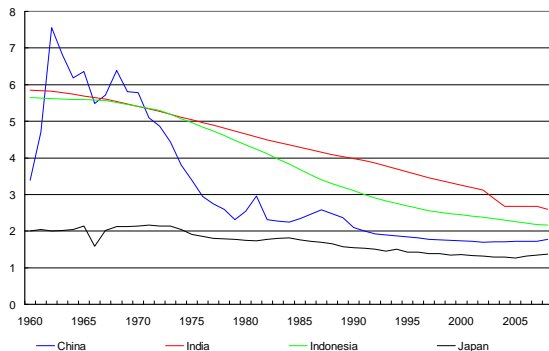
Demographic Transition and Economic Growth in Asia

Creina Day

The Australian National University

12 March 2011

Figure 1: Total Fertility Rate (births per woman), 1960-2008



Fertility Decline in Asia and Sho-shi-ka in Japan

Evidence of fundamental change in the fertility - economic growth relationship

Myrskylä et al (2009) (cross-sectional, longitudinal data, >100 countries) find relationship between fertility and Human Development Index (HDI)

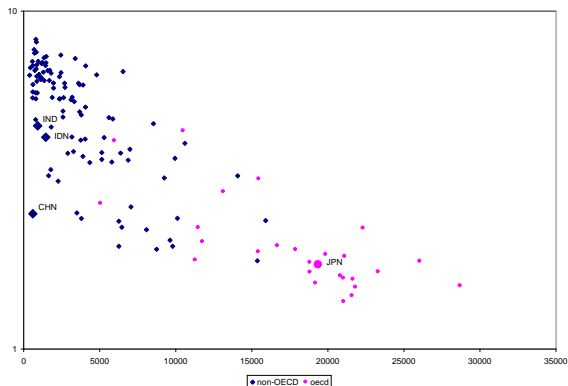
- negative in 1975
- hook (or reverse-J) shaped in 2005, such that it becomes positive for countries with $HDI > 0.9$.
- HDI of 0.9 \Rightarrow 75 years life expectancy, per capita GDP US\$25,000 in year 2000 PPP and 0.95 education index (literacy and enrolment ratios).

For 30 OECD countries,

- convex impact of per capita GDP on fertility in 2007, after controlling for birth postponement and country specific effects.

Cross-Sectional Relationship between Fertility and per capita GDP in 1980

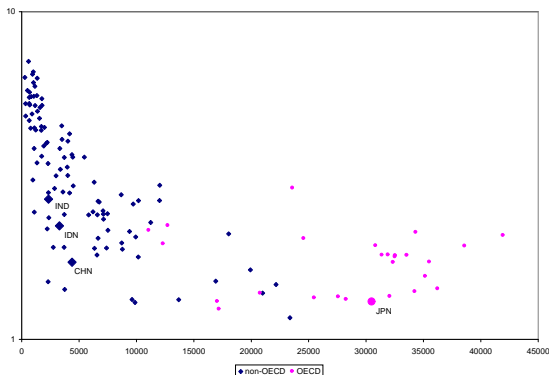
Figure 2: Total Fertility Rate (log scale vertical) versus Real GDP per capita (PPP\$) (1980, 5 year avge)



Source: Day and Dowrick, 2011 "Economic Growth, Skill Composition and J-shaped Fertility"

Cross-Sectional Relationship between Fertility and per capita GDP in 2007

Figure 3: Total Fertility Rate (log scale vertical) versus Real GDP per capita (PPP\$) (2007, 5 year avge)



Source: Day and Dowrick, 2011 "Economic Growth, Skill Composition and J-shaped Fertility"

Dynamic interplay: growth in per capita GDP \Leftrightarrow declining fertility

1. Why does economic growth imply fertility decline in these Asian economies?
2. Is further fertility decline inevitable? Will Asian economies drag the bottom of the J-shaped relationship between fertility and per capita GDP, as has Japan?
3. What are the implications of fertility decline for growth prospects in each of these Asian economies?

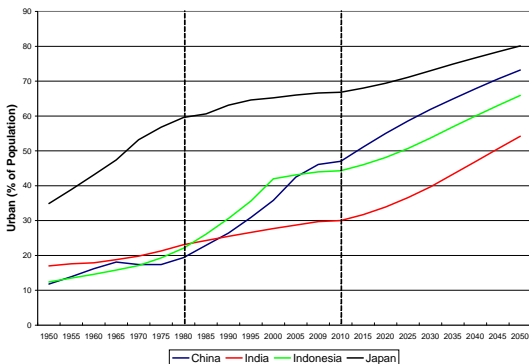
How does Economic Growth cause Fertility Decline?

Endogenous Fertility Models predict that growth in per capita income induces fertility decline by raising either

- the fraction of skilled workers, who have fewer children than their unskilled counterparts;
- female relative wages, which in turn, raise the opportunity cost of maternal time spent rearing children; or
- the relative return to investing in education per child (technological progress induces a child quality-quantity trade-off).

Shift to non-agricultural employment in China, India and Indonesia

Figure 4: Past and Projected Urbanisation



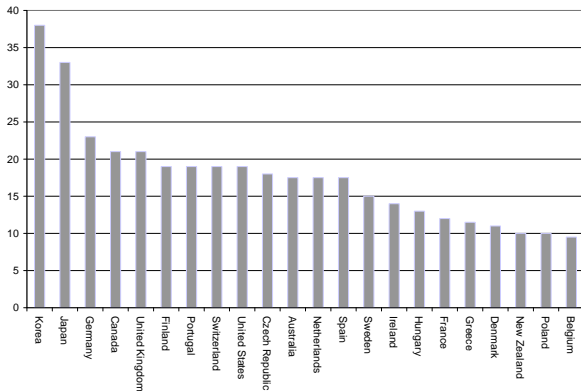
In transition from developing to developed economies, skill composition of workforce shifts.

Why Lowest of Low Fertility in Japan is not inevitable

- Rising female relative wages \Rightarrow competing income and substitution effect on demand for children: fertility may rise if income effect dominates.
- Once female relative wage sufficiently high, households mitigate rising cost of child rearing \Leftrightarrow institutional change: child-care sector develops, family friendly work and gender equity.

Japan's Gender Wage Gap has fallen, but could fall further

Figure 5: The Gender Wage Gap for 22 OECD economies in 2006



OECD average = 17.6 percent

How does Fertility Decline affect Economic Growth?

It is useful to decompose GDP per capita:

$$\frac{Y}{Pop} = \frac{Y}{L} \times \frac{L}{Popw} \times \frac{Popw}{Pop} \quad (1)$$

where Y denotes GDP, Pop total population, L labour force and $Popw$ working age population.

Growth in per capita GDP

$$\begin{aligned} g\left(\frac{Y}{Pop}\right) &= g\left(\frac{Y}{L}\right) \text{ Labour Productivity Growth} & (2) \\ &+ g\left(\frac{L}{Popw}\right) \text{ Labour Force Participation Growth} \\ &+ g\left(\frac{Popw}{Pop}\right) \text{ Growth in Working Age Ratio} \end{aligned}$$

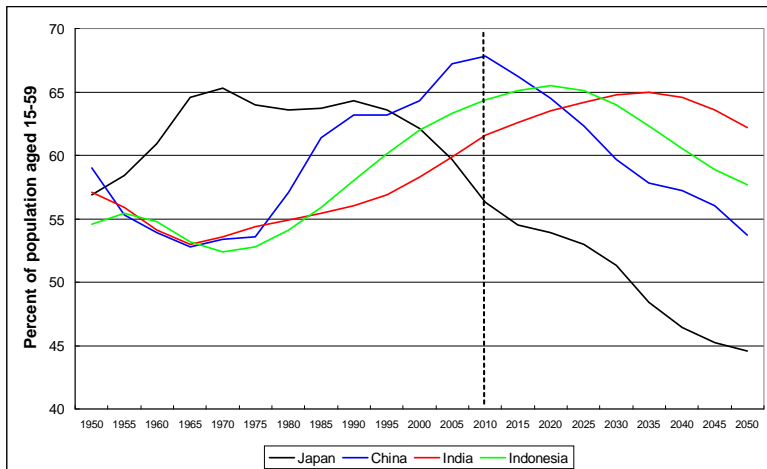
Demographic Dividend

As fall in child dependency ratio (0-14/pop) outstrips rise in age dependency ratio (65+/pop), the working age ratio (15-64/pop) rises.

This provides an *opportunity* to reap a "Demographic Dividend" through brute force of additional potential workers.

Growth in Working Age Ratio in 1980's and 1990's accounted for 1/4 and 1/3 of growth in GDP per capita in China and India, respectively.

Figure 6: Past and Projected Working Age Ratio



Demographic Dividend (Drag) of Fertility Decline Leaders (Latecomers)

India's Demographic Dividend is projected to peak over next two decades, adding 2 percentage points to annual per capita GDP growth.

China's working age ratio is currently peaking and so faces Demographic Drag. Nonetheless, even in 2020, $\frac{Popw}{Pop}$ is higher in China than in India.

Labour Productivity Growth is increasing in $\frac{Popw}{Pop}$.

While $g_{\frac{Popw}{Pop}}$ favours India, level of $\frac{Popw}{Pop}$ also matters, favouring China in the coming decade.

Need Demographic Drag imply Growth Slowdown?

Factors underpinning fertility decline also act to mitigate negative effect of demographic drag by raising:

- Growth in Labour Productivity through
 - investment in physical and human capital
 - labour migration from low productivity agriculture to high productivity manufacturing and services

- Growth in Female Labour Force Participation
 - For 97 countries, 1960-2000: fertility decline increased female LFP by 18 percentage points
 - Scope for future growth in Asia: in 2006, 69% and 34% of women in China and India, respectively, participate in formal economy

Some Policy Considerations

1. Growth in Working Age Ratio: Opportunity for Demographic Dividend. Is an increasing workforce also productive?
2. Growth in Labour Productivity: China's Investment-led growth to remain high 2010-2015. China has higher rates than India of enrolment in education at all levels.
3. Growth in Female LFP: Fertility decline frees women's time, but women constrained by care for elderly.
4. Possibility of fertility upturn in Japan? Lifetime employment and seniority wage systems disadvantage Japanese women, impeding further fall in gender wage gap.

Growth prospects in Australia have become increasingly linked to those in Asia.

Had growth in export volumes to China been commensurate with pre-global fiscal stimulus rates, Australia would have experienced 3 quarters of negative real GDP growth.

(forthcoming in *Agenda*)