

# Population, Intergenerational Transfers and Macroeconomy: “Demographic Dividends”

Amonthep Chawla

Thailand Development Research Institute (TDRI)

NUPRI-TDRI

National Transfer Account Training Workshop

Marriott Hua Hin, Thailand

December 16-25, 2010

## Macroeconomic Effects of Demographic Changes

- Declining fertility leads to a larger share of working-age adults
  - *More production and higher economic growth*
- Continual decline in fertility and mortality rates leads to population aging
  - *Smaller share of labor force, lower production, slower economic growth*
- Population aging may not adversely affect economic growth
  - *Need prudent policy to prepare for this coming demographic change*

## Demographic Dividends

- Changes in population age structure interact with the economic lifecycle, affecting economic growth
- Two demographic dividends
  - Changes in the economic support ratio
  - Changes in lifecycle wealth

## Simple Growth Model with Age Structure

$$\frac{Y}{N} = \frac{Y}{L} \frac{L}{N}$$

$$gr \left[ \frac{Y}{N} \right] = gr \left[ \frac{Y}{L} \right] + gr \left[ \frac{L}{N} \right]$$

- Per capita income depends on
  - Income per working-age member.
  - Proportion of the population in the working ages (the support ratio).
- Economic growth depends on the growth of productivity and growth of the support ratio.
- Demographic transition leads to large swings in the support ratio.

## The First Demographic Dividend

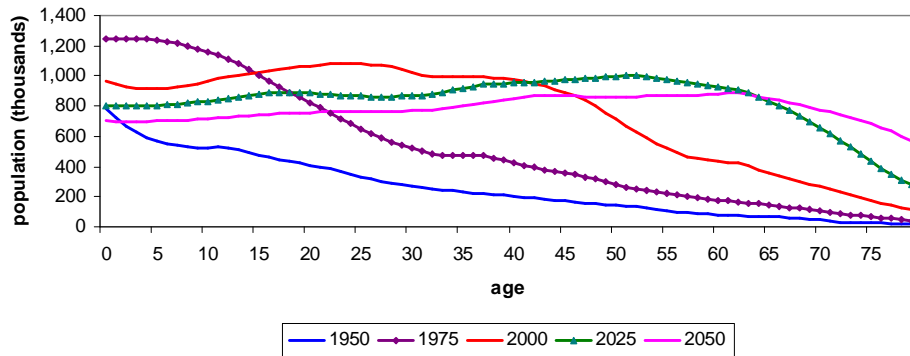
- Change in the economic support ratio or the first demographic dividend is influenced by the economic lifecycle
- The economic lifecycle begins and ends with the dependency periods when consumption exceeds earnings (lifecycle deficit), requiring economic flows from working-age adults (the lifecycle surplus ages) to close the gap.

## Calculating Support Ratio

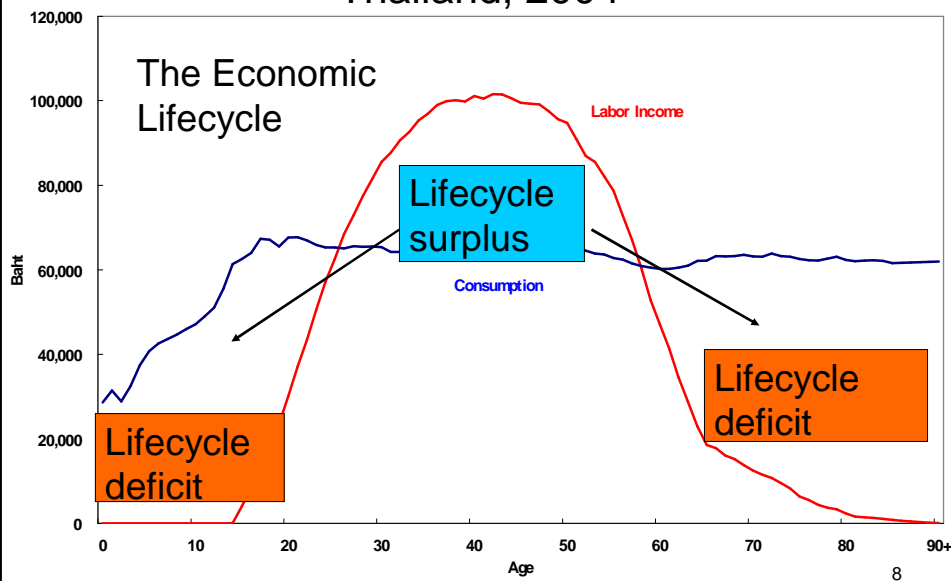
### Data Requirement

1. Population by age
2. Age profiles of production and consumption

# Population Change: Thailand



# Per capita consumption and labor income, Thailand, 2004



## Modeling the First Dividend

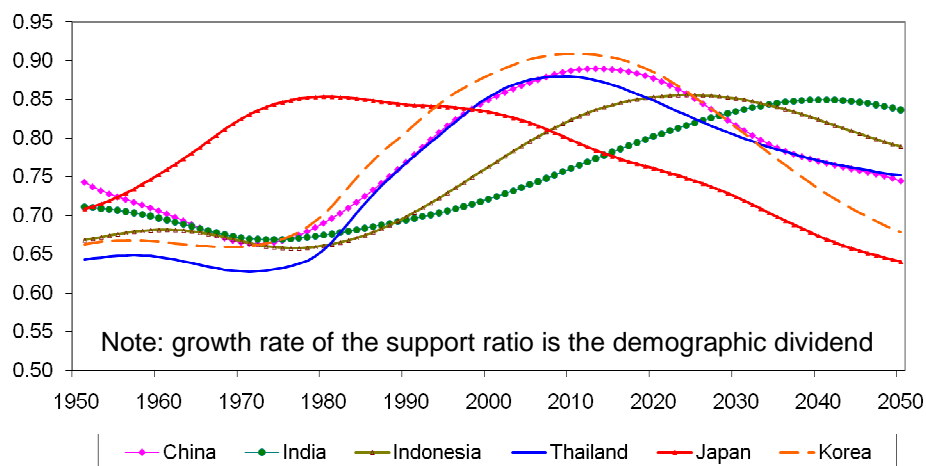
- Given constant productivity, changes in population age structure affects the economic support ratio

$$N(t) = \sum_a \alpha(a)P(a,t)$$

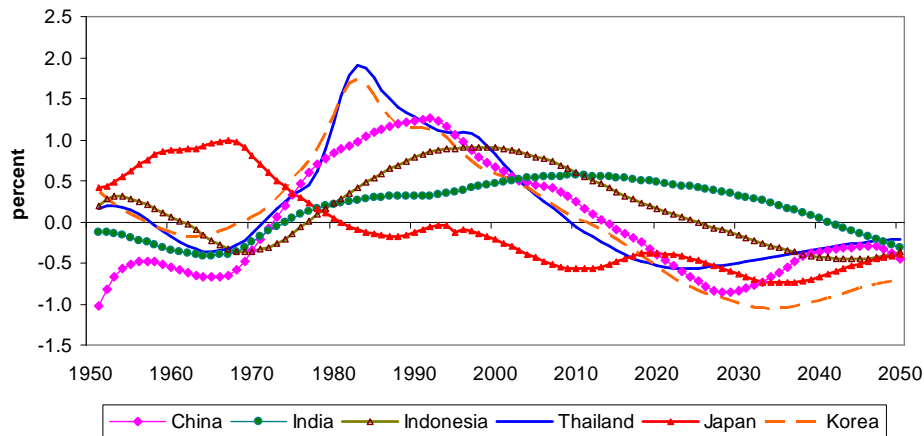
$$L(t) = \sum_a \gamma(a)P(a,t)$$

where  $\alpha(a)$  and  $\gamma(a)$  are the age profiles of consumption and labor income, and  $P(a,t)$  is the population

## Economic Support Ratio



## First Demographic Dividend



Note: Growth rate of the economic support ratio is the first demographic dividend

## Summary of the First Dividend

- Declining fertility leads to a larger share of effective producers, allowing the economy to grow
- However, the first dividend is transitory; continual decline in fertility leads to population aging
- The first dividend in Thailand is expected to deplete in 2010, whereas some countries could enjoy the first dividend for several more decades
- Will population aging unfavorably affect economic growth in the future?

## Preparation for Population Aging

- In order to avoid the adverse effect of population aging on economic growth, two approaches can be applied:
  - Physical capital accumulation (the second demographic Dividend)
  - Human capital accumulation (Raising productivity of the future labor force)

13

## The Second Demographic Dividend

- Definition: The growth in productivity induced by an increase in the demand for lifecycle wealth.
- Compositional effect: population is concentrated at older, high wealth ages
- Behavioral effect: increase in duration of life and retirement lead to greater accumulation of wealth

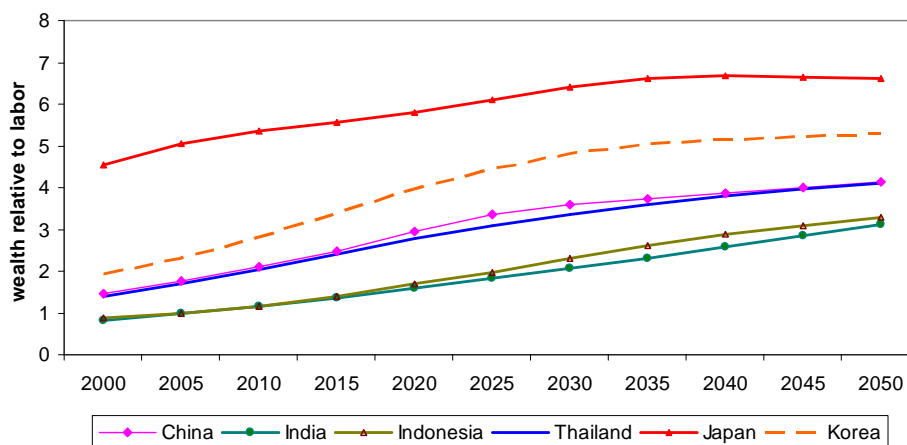
14

## Modeling the Second Demographic Dividend

- **Demand for capital** is proportional to lifecycle wealth of those 50+
- Lifecycle wealth of those 50+
  - $W(50+) = PV[C(50+)] - PV[YI(50+)]$
  - Cross-sectional age profiles of consumption and production shift proportionately over time
  - Productivity growth is constant
  - Assumptions: interest rate: 3%; productivity growth: 1.5%; elasticity of output wrt capital: 0.33

15

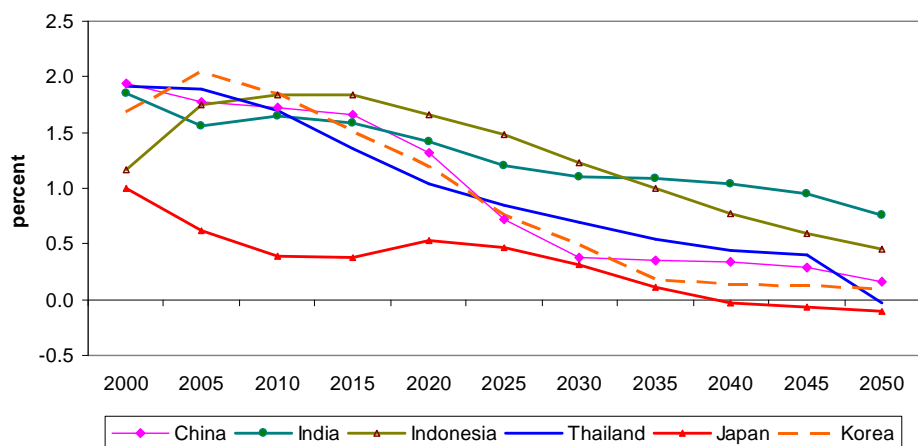
## Wealth Ratio



16



## Second Demographic Dividend



Note: growth rate of lifecycle wealth influences the second demographic dividend 17

## Summary of the Second Demographic Dividend

- The second demographic dividend is larger and more important to the economic growth than the first dividend in several countries
- The second dividend is not automatic; it requires policy that encourages capital accumulation rather than relies on pension wealth to finance consumption during retirement ages
- Population aging could benefit economic growth if capital accumulation is encouraged rather than PAYGO pension program

## Effects of demographic changes on economic growth (1970-2000)

	Demographic Dividends			Actual growth in GDP/N	Actual Dividend
	First	Second	Total		
China	0.78	0.70	1.49	7.14	5.65
India	0.27	0.85	1.12	2.66	1.54
Indonesia	0.50	0.72	1.22	4.26	3.04
Iran	0.42	0.34	0.76	-0.36	-1.12
Japan	0.21	1.51	1.72	2.61	0.89
Korea	0.98	1.25	2.22	6.03	3.81
Mongolia	0.48	0.09	0.56	1.72	1.15
Philippine	0.48	0.43	0.91	1.11	0.20
Singapore	1.15	1.08	2.23	5.66	3.43
<b>Thailand</b>	<b>0.99</b>	<b>0.35</b>	<b>1.34</b>	<b>4.61</b>	<b>3.27</b>
Vietnam	0.40	0.09	0.49	4.45	3.96

Notes: based on method by Mason (2005)

19

## Lessons Learned and Policy Responses

- Demographic changes that brought to economic growth in Thailand and several countries in Asia are approaching the end of the first dividend period
- However, the role of demographic transition on economic growth remains important
- Declining fertility and population aging could lead to higher economic growth if there are policies that
  - Encourage capital accumulation during working ages to support retirement consumption
  - Stimulate human capital investment so as to raise productivity of the future labor force