Aging and the Changing Nature of Intergenerational Flows: Policy Challenges and Response

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- National Institute on Aging, Project on Formal and Informal Support Systems for the Elderly in 50 Countries, R24AG045055
- Robert Gal, Kevin Hsieh, Sang-Hyop Lee, Bernardo Lanza Queiroz, An-Chi Tung, Cassio Turra, and Lili Vargha

Using NTA to Anticipate the Future

- Changes in population age structure lead to imbalances in the economy that must be reconciled by changes in the age profiles that compose National Transfer Accounts
- Reestablishing balanced (feasible) NTAs over time requires that many accounting identities or constraints be satisfied
  - Public: Tax + YAG = TGI + SG
  - Private: Inflows(x) = Outflows(x), x = 0,90+
  - Private: TGI(y,x) = TGO(x,y), x,y = 0,90+
- Model presented here simulates feasible NTAs
- Behavioral assumptions are simple
  - Public policy is exogenous
  - Private allocation governed by homothetic preferences and altruism
  - Refining understanding of behavioral patterns should be possible as more NTA data becomes available

Model Highlights

- Demography is exogenous, based on UN medium fertility scenario
- Macroeconomics
  - Nominal growth in GDP determined by exogenous changes in productivity and prices and growth in the effective labor force
  - Factor shares (labor and asset income) are constant
- Public sector
  - Core: NTA-based age profiles (0, 1, 2, . . . , 90+) of taxes and public spending on cash and in-kind transfers
  - Reform options based on policy scenarios
    - Status quo: Age pattern of taxes and spending normalized on labor income fixed at current levels
    - Parametric reform: rescaling of taxes and spending
    - Targeted reform: Gradual shift to age profiles typical of social welfare states or capitalist countries
    - Life cycle (LC) or survival indexed reform: Work, taxes, and public transfers received adjust to delayed aging
    - Constraints may be imposed on size of government and public debt

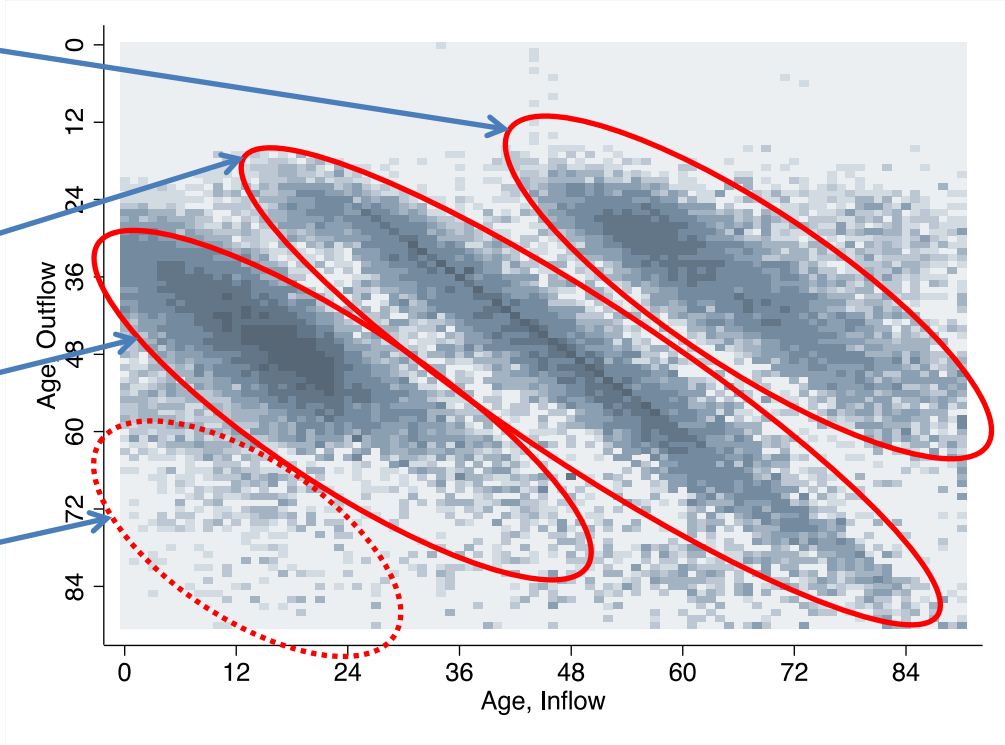
Within-household transfers, Taiwan, 2010

Children to parents

Within generation

Parents to children

Grandparents to children



Private transfer outflows: Three components

$$\frac{tfo\_d(y,x,t)}{cf(x,t)} = \frac{tfi\_d(y,t)}{cf(x,t)} w(y,x,t)\, N(y,t)/N(x,t)$$

Private transfer outflows to age group y from age group x relative to private consumption by age group x

Cost of age y recipients relative to private consumption of age group x

Share of age y recipients cost born by providers age x

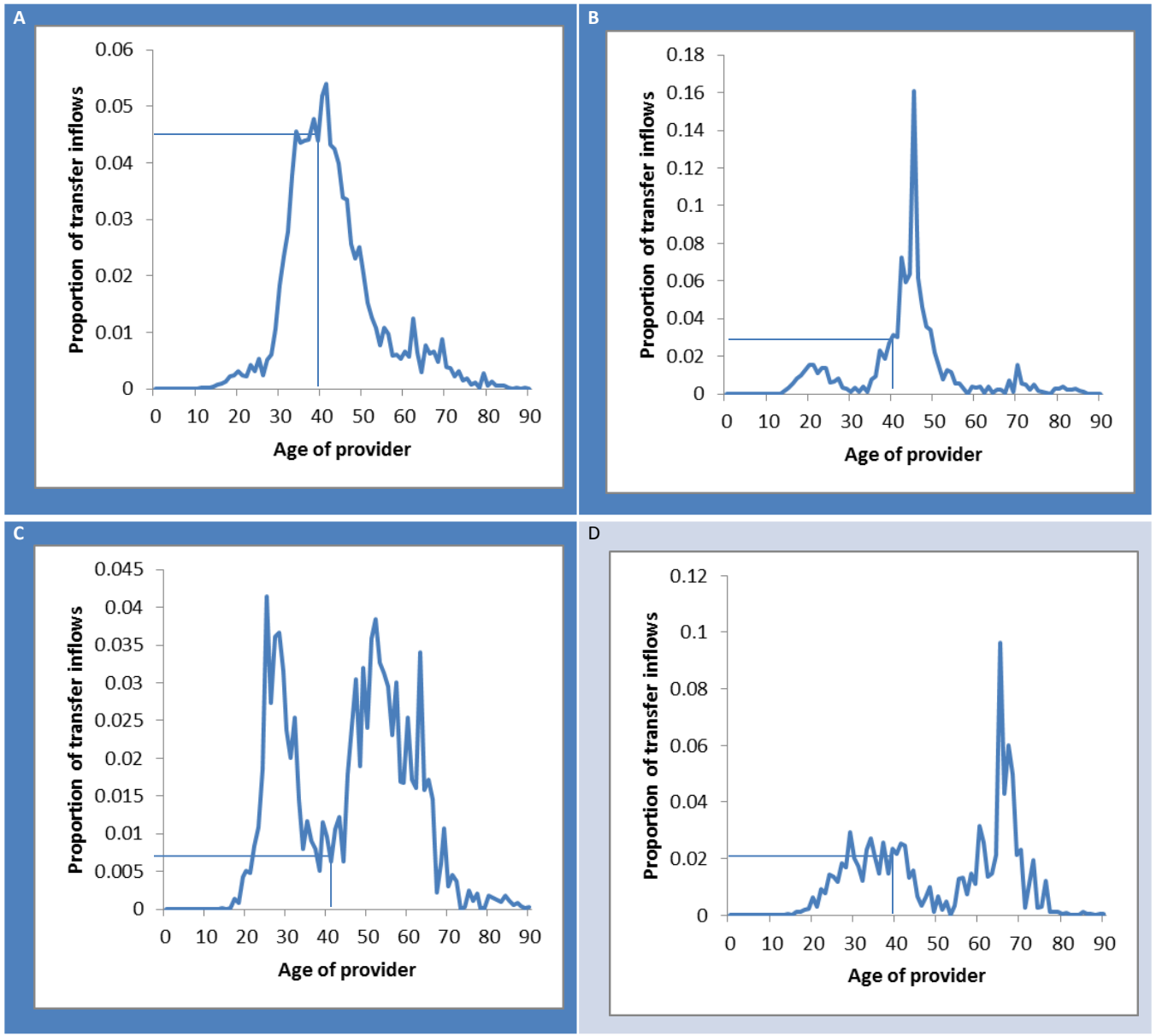
Age structure

Relative cost of age y for persons age 40

Relative cost: Private transfer inflows by age of recipient relative to private consumption at age 40, India, 2005.

Age distribution of dependence

Age of recip-ient	Share from 40-year-olds
10	4.5%
25	3%
45	<1%
65	2%



B

D

Private transfer inflows by age of provider as a proportion of total private transfer inflows to 10-year-olds (A), 25-year-olds (B), 45-year-olds (C) and 65-year-olds. India, 2005

Private Sector Model Highlights

- Each age group (0, 1, . . ., 90+) allocates after-tax resources among consumption, saving, and private transfers to persons age 0, 1, . . . , 90+ and the rest of the world
- Each age group is subject to a resource constraint that depends on its income from labor, assets, public cash transfers less taxes paid, and private transfer inflows from persons age 0, 1, . . . , 90+ and rest of world
- Non-market mechanism used to achieve equilibrium outcome
- Consumption, saving, and private transfers respond to:
  - Changes in income from labor and assets
  - Changes in taxes and public cash and in-kind transfers
  - Changes in age structure or dependency
  - Resources and needs of age groups with which they are connected through family relationships

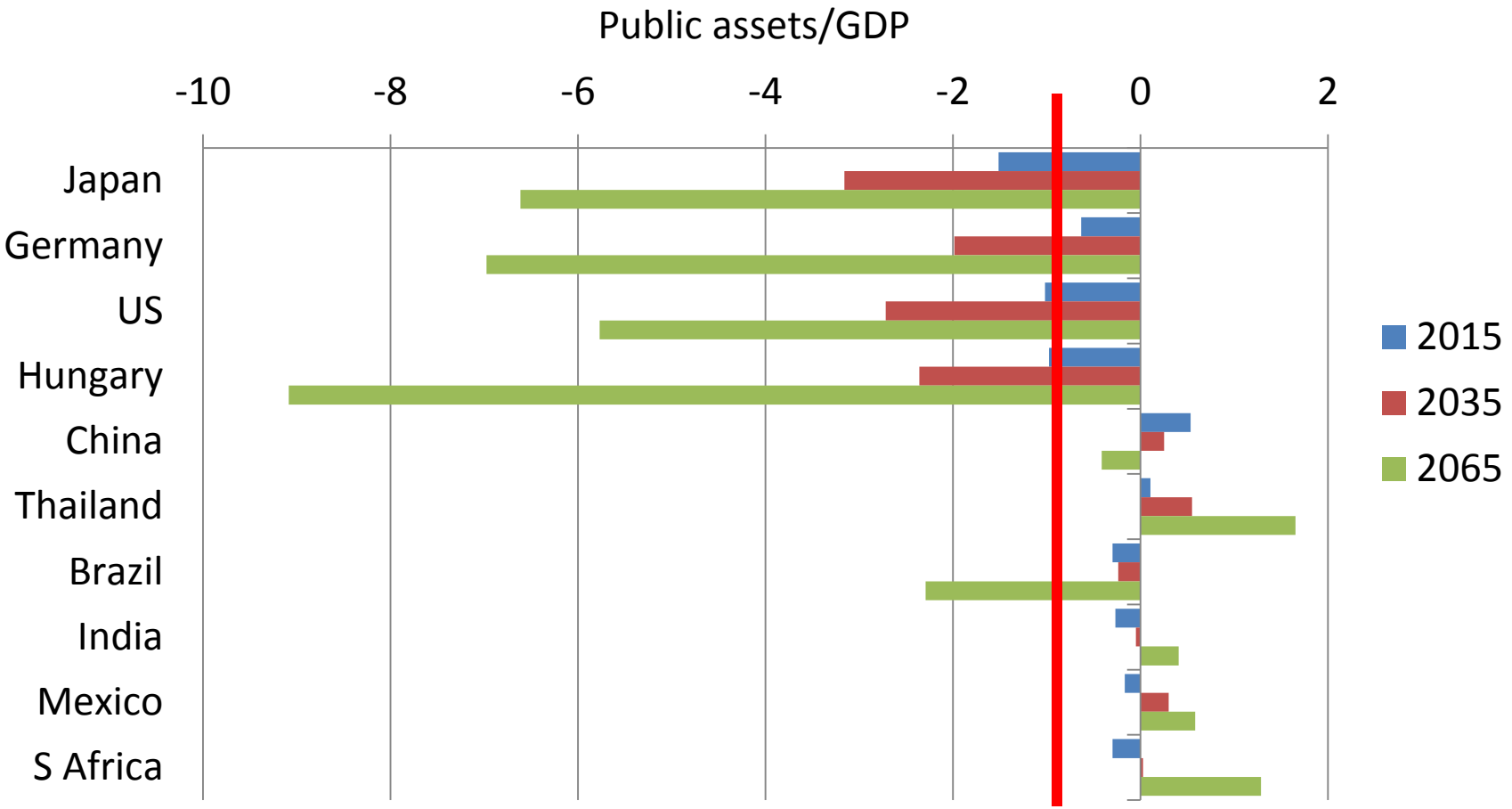
Application to 10 Countries

Demographic indicators, 2015					
	Demographic dividend stage	Total fertility rate	Life expectancy at birth	Age structure (%)	
				Under 20	60 and above
South Africa	Early-dividend	2.4	57	38.9	7.7
India	Early-dividend	2.5	67	38.2	8.9
Mexico	Early-dividend	2.3	76	37.0	9.6
Brazil	Late-dividend	1.8	74	31.4	11.7
China	Late-dividend	1.6	75	23.0	15.2
Thailand	Late-dividend	1.5	74	24.2	15.8
United States	Post-dividend	1.9	78	25.4	20.7
Hungary	Post-dividend	1.3	75	19.6	24.9
Germany	Post-dividend	1.4	81	17.9	27.6
Japan	Post-dividend	1.4	83	17.6	33.1
Source: World Bank (2015), United Nations (2015)					

Is the Status Quo an Option?

- Status quo leads to unsustainable levels of debt in the four post-DD countries and Brazil
- Status quo does not lead to public debt problems in dividend countries, other than Brazil
  - Age structure changes yield a fiscal dividend in DD countries, except China
  - China's public assets/GDP decline substantially, but China's initial wealth position is favorable
- Status quo provides limited support for the elderly in many dividend countries as compared with Brazil or Europe

Public Finances: Status Quo Scenario



Disagreement about the level of public debt that is sustainable, but Reinhart and Rogoff conclude that public debt in excess of 90% of GDP is likely to lead to financial crisis

DD Countries and Reform

- Trend in per capita consumption relative to productivity
- Consumption: simple average of age-specific consumption at ages 0 to 85
- Productivity: Average labor income of persons 30–49

Impact of aging on consumption: Dividend countries, status quo scenario

	Average consumption			Annual growth rate (%)	
	~2010	2035	2065	2010-35	2035-65
China	0.43	0.42	0.41	-0.11	-0.05
Thailand	0.73	0.68	0.57	-0.31	-0.58
India	0.79	0.81	0.72	0.09	-0.39
Mexico	0.84	0.80	0.71	-0.16	-0.40
S Africa	0.61	0.61	0.50	-0.05	-0.64

Note: Average consumption is simple average of normalized consumption by single year of age for those 0 to 84 with each age equally weighted

- Little downward pressure on consumption in China
  - Consumption is very low to begin with
  - Reliance on deficit spending
- Other DD countries
  - Modest effects before 2035, except in Thailand
  - Substantial downward pressure after 2035
  - Will be offset by productivity growth

Consumption and Reform

	Annual growth, 2010-2035			Annual growth, 2035-2065		
	Status quo	Capitalist reform	Social welfare reform	Status quo	Capitalist reform	Social welfare reform
China	-0.11	-0.09	0.14	-0.05	-0.01	-0.02
Thailand	-0.31	-0.28	-0.17	-0.58	-0.35	-0.27
India	0.09	0.10	0.17	-0.39	-0.40	-0.21
Mexico	-0.16	-0.18	-0.11	-0.40	-0.53	-0.32
South Africa	-0.05	-0.08	0.00	-0.64	-0.75	-0.41
Note: Capitalist reform assumes 0.35/0.9 constraints; social welfare reform 0.45/0.9 constraints						

- Capitalist policy scenario: Little impact on consumption
- Social welfare scenario: Moderates the impact of aging on overall consumption (but reduces saving with potential productivity effects)
- Social welfare reform has substantial age effects
  - Children: Modestly lower normalized consumption
  - Prime-age adults: Substantial decline
  - Elderly: Substantial gains

Responding to Severe Aging: Results for Japan

Parametric Reform

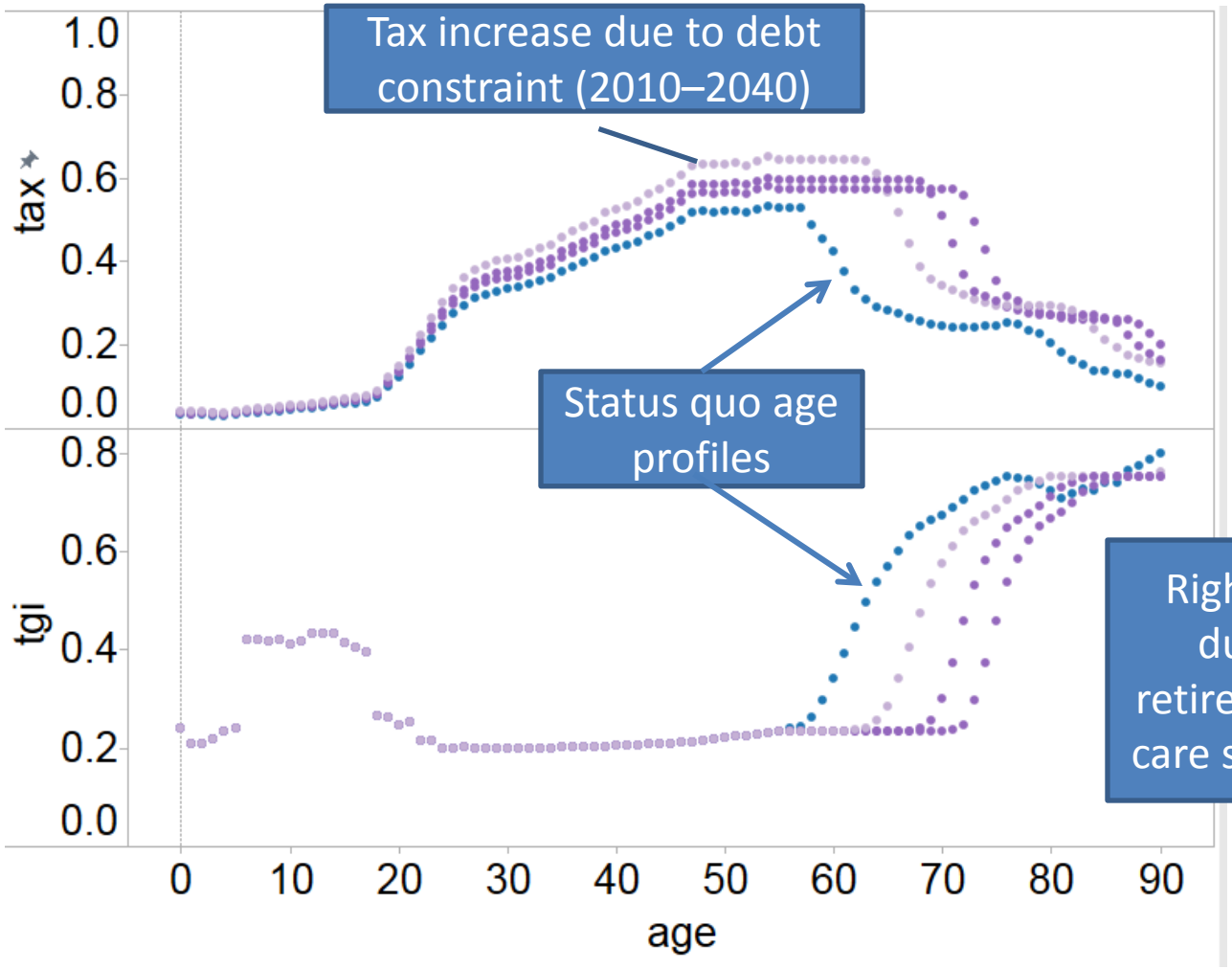
Policy: Rescale taxes and benefits to insure that government spending does not exceed 35% of GDP and public debt is reduced to 90% of GDP within 40 years

Percentage decline in consumption (relative to labor productivity) compared with 2010

	2040	2070
	SQ reform	SQ reform
Age 20	-21.1	-25.9
Age 45	-17.5	-21.3
Age 70	-28.6	-34.5

Note: In both scenarios size of government is constrained to 35% of GDP and public debt to 90% of GDP

Life cycle reform with constraints: Japan, 2010, 2040, 2070, and 2100



Lifecycle reform in Japan

Percentage decline in consumption (YoLYs) compared with 2010				
	2040		2070	
	SQ reform	LC reform	SQ reform	LC reform
Age 20	-21.1	-9.1	-25.9	-5.7
Age 45	-17.5	-12.0	-21.3	-8.0
Age 70	-28.6	-11.0	-34.5	-0.5

Note: In both scenarios size of government is constrained to 35% of GDP and public debt to 90% of GDP

- Moderates decline in consumption for all and especially the elderly
- Retirement is postponed by about 1 year per decade

Conclusions

- For post-dividend countries
  - Aging will require major public sector reform
  - Parametric reform will lead to
    - Downward pressure on standards of living
    - Unless productivity growth drops substantially, standards of living should continue to increase
  - Life cycle reform has great potential
- For dividend countries
  - No immediate fiscal problems except for Brazil
  - Prompt and well-conceived public sector reform must:
    - Be fiscally sustainable in the longer term
    - Balance the needs of children, working-age adults, and the elderly
  - Experience of post-dividend countries is instructive, but not a complete roadmap