

China's Growth to 2030: The Roles of Demographic Change and Investment Premia

Rod Tyers and Jane Golley
Australian National University

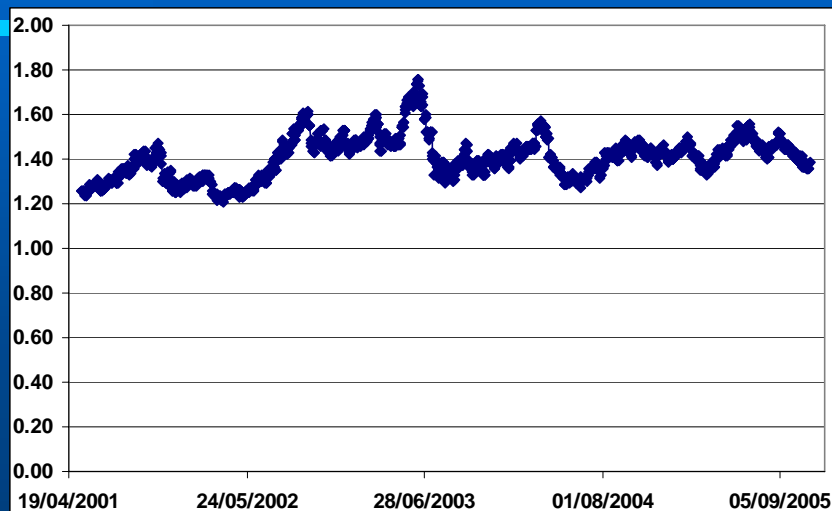
Introduction

- China's demographic change is a concern because:
 - fertility continues to decline
 - population growth has slowed
 - labour force growth has slowed
 - population and labour force are likely to begin declining in the next decade.
- Financial reforms are a key to growth
 - they reduce the gaps between private, public and offshore financing costs, leading to larger and more efficiently distributed investment
- We show that
 - Both financial reform and higher fertility will raise future GDP
 - Financial reform will *also* raise real GNP per capita
 - Higher fertility will *reduce* real GNP per capita
- We ask
 - How much *additional* financial reform would deliver the same GDP performance as higher fertility

Chinese financial reform

- SOE privatisation has led to a substantial increase in China's private saving rate
- Weak financial system has caused much of this saving to be channeled into property or, at least prior to 2001, (illegally) abroad
- Stock market has been either unavailable or unpalatable to small/medium enterprises and commercial banks have tended to show little interest in them - they resort to the informal credit sector and pay rates > 20%
- The interest premium has been substantial, due to
 - market segmentation and incompleteness – the absence of some financing channels
 - risk associated with weak defense of property rights, corruption, political risk

Ratio of Chinese to US 10 Yr bond yield

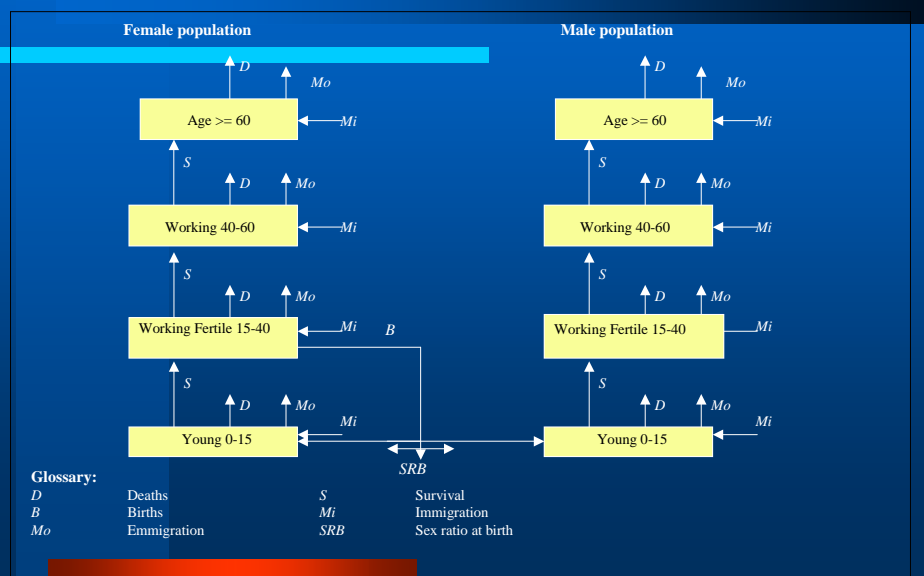


The analysis

- Global demographic module with migration flows
 - Quantifies the demographic effects of changes to fertility, life expectancies and migration rates
 - Distinguishes full and part-time labour force participation rates and skill levels by age-gender group
- GTAP-Dynamic model of the global economy
 - Endogenous capital accumulation with integrated global financial market
 - Region-specific investment premia
- Adaptation of the *GTAP Dynamic* model of the global economy
 - Incorporates 8 age-gender groups and integrates the demographic module
 - A base line projection is constructed for the global economy that incorporates anticipated demographic changes through 2030
 - Analyse shocks to Chinese fertility and interest premia

The demographic module

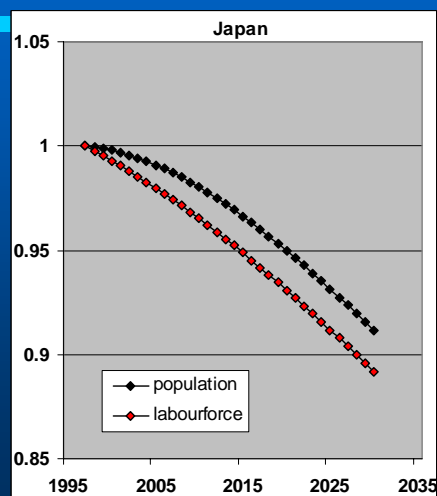
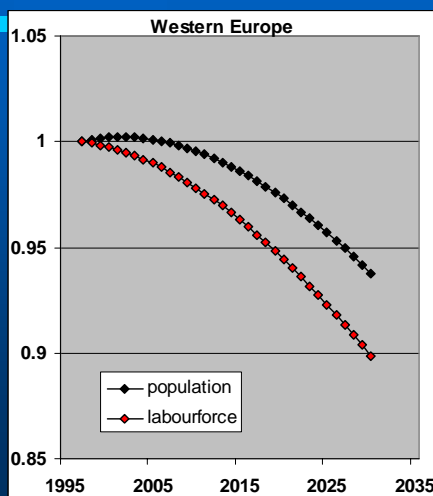
(14 regions, 4 age groups, 2 genders)



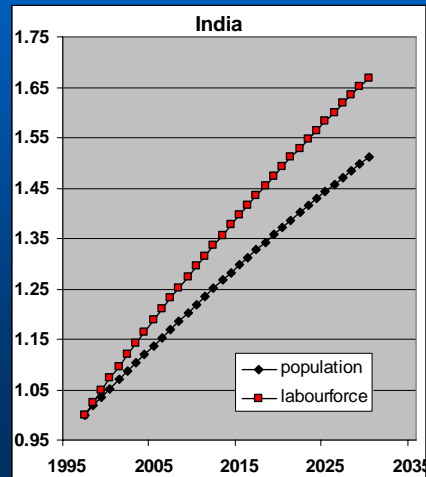
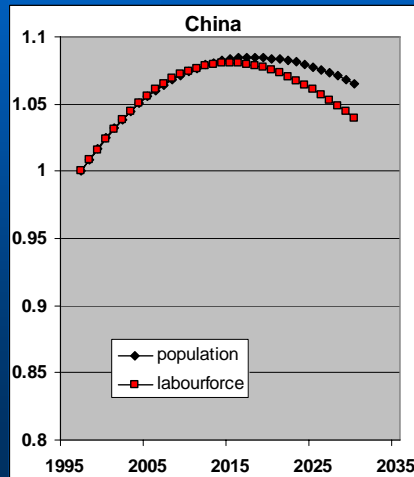
Scenarios to 2030

- **Base line:** best guess, albeit with Chinese fertility continuing to decline, from 1.9 to 1.5
- **Stable Chinese fertility:** Slight decline from 1.9 to 1.8
- **High Chinese fertility:** 2-child policy with fertility trending 1.9 to 2.3
- **Additional Financial reform:** same GDP growth as achieved by high fertility but this time with low fertility and (endogenously) reduced interest premia

Base line population and labour force trend



Base line population and labour force trend

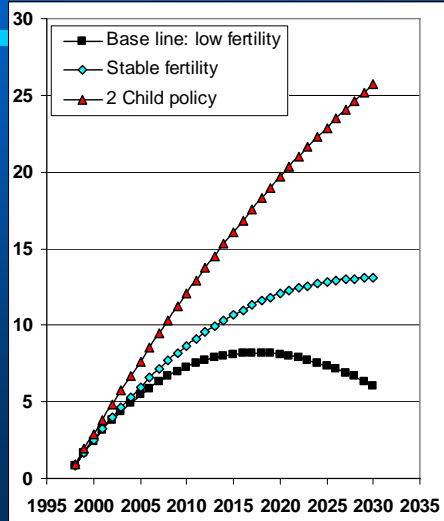


Introducing the demographic change scenarios

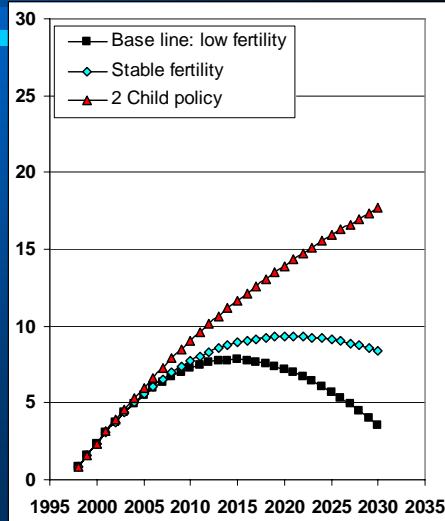
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China's population and labour force

Population

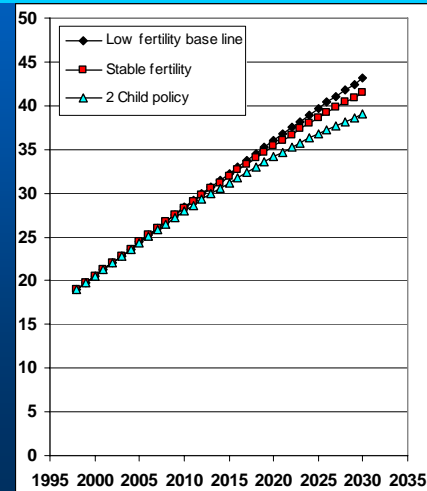


Labour force

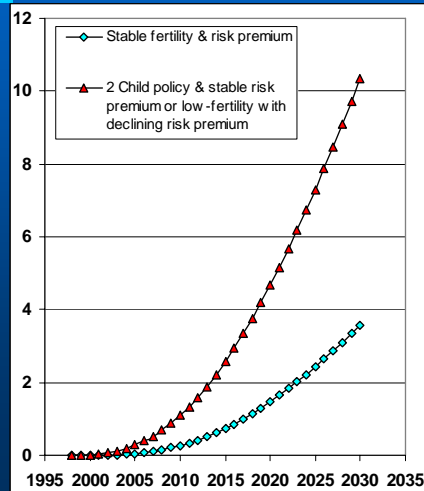


China's aged dependency and GDP

Non-working aged dependency ratio



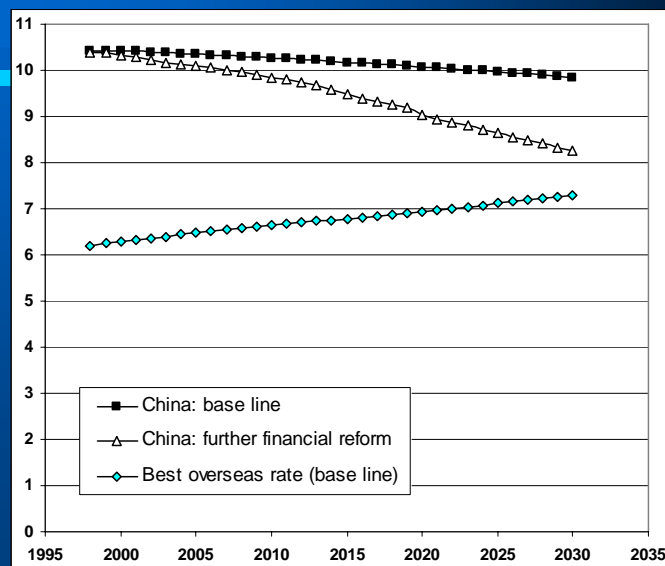
Real GDP, % departure from base line



Introducing the “additional financial reform” scenario

- **Base line:**
 - fertility continuing to decline, from 1.9 to 1.5
- **Additional financial reform:**
 - fertility continuing to decline, from 1.9 to 1.5
 - same GDP growth as achieved by high fertility
 - (endogenously) reduced interest premia

China's borrowing rate, %



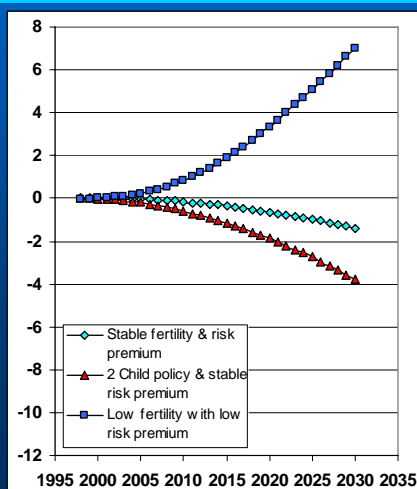
Comparing “higher fertility” and “additional financial reform”

- The “high fertility” (2 child policy) scenario and the “additional financial reform” scenario achieve the same GDP growth.
- The high fertility scenario does it (mainly) via labour supply growth
- The financial reform scenario does it via capital growth
- Although they have different effects on trade composition, both affect China’s overall terms of trade similarly
- Financial reform reduces the domestic interest rate, so it reduces saving slightly

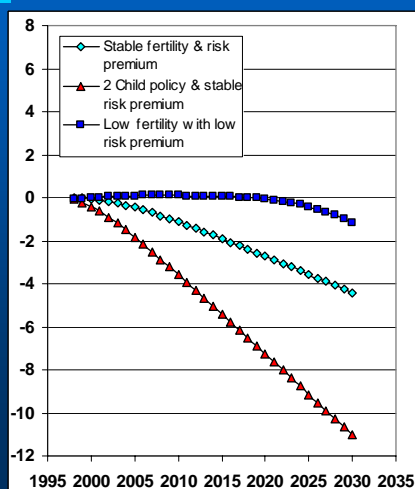
China’s real wage & per capita income

% departures from the base line

Real production wage



Real per capita income



Conclusions

- A successful policy to promote higher fertility would increase GDP growth but
 - labour force gains would not be significant for more than a decade and a half
 - it would reduce per capita real income growth
- Higher GDP growth can be achieved without impairing the rate of growth in real per capita income via continued (“additional”) financial reforms that reduce market segmentation and risk
- The scope for financial reforms is considerable, so that even a government concerned with size (GDP) irrespective of per capita income need not resort to fertility promotion

Caveats

- Slower population growth retards GDP growth in these simulations because aged labour force participation is set to remain low in the base line
 - Aged participation could increase with the relative expansion of the private sector, following Japan
- Saving rates by age group are difficult to distinguish because of intergenerational transfers
 - China’s saving rate could decline more than we project as it ages
- The “additional financial reform” simulation offers only that amount of reform needed to achieve the same growth as high fertility
 - On-going financial reforms will yield earlier and larger dividends than this simulation suggests

Additional slides for detail

GTAP-Dynamic: the standard model

- **Dynamic global general equilibrium model**
 - based on comparative static GTAP, by Rob McDougall and Elena Ianchovichina (Purdue University, World Bank)
- **Our aggregation:**
 - 14 regions
 - 5 primary factors
 - 3 sectors (full version, 27 sectors).
- **Solow-Swan-like dynamic structure: growth by physical capital accumulation with exogenous technical change**
 - So slower population growth *slows* GDP growth and *raises* per capita income.

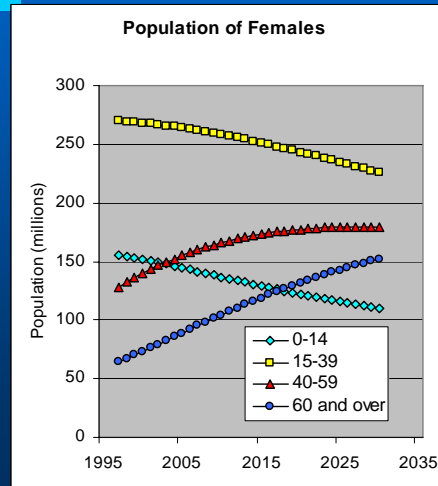
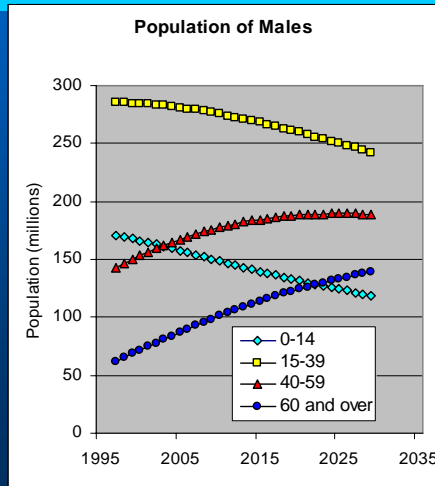
Standard *GTAP-Dynamic* Peculiarities

- Recursive multi-region dynamics
 - adaptive expectations about capital returns drive the regional distribution of investment
 - financial capital has perfect international mobility only in the long run
- Fixed saving rates in each region
- Offshore asset ownership pooled via a “global trust”
- No restrictions on ultimate steady states
 - current accounts can blow out
- Physical capital inter-sectorally mobile in the short run
 - short run sectoral supply elasticities are high

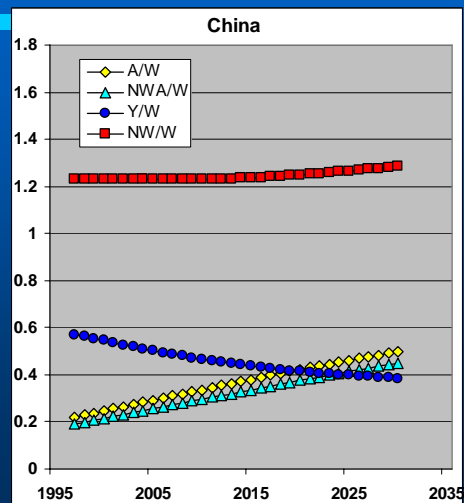
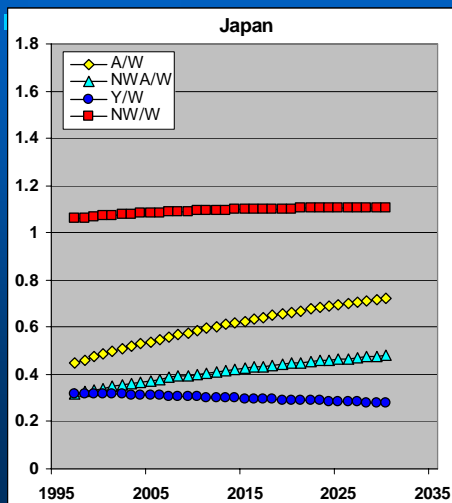
GTAP-Dynamic: our modifications

- Disaggregation of regional households into the 8 age-gender groups
- Consumption-savings decisions differ by group, based on reduced form consumption equations
 - So group and average regional saving rates now depend on real disposable incomes and domestic real interest rates
- Expenditure shares across commodities differ by group
- So the age-gender distribution affects
 - Labour force size and skill composition
 - Average saving rates – in advanced countries the aged deplete their assets, less so in China
 - Average consumption shares – the aged consume more basic foods and more (health) services
- Full integration of the demographic module

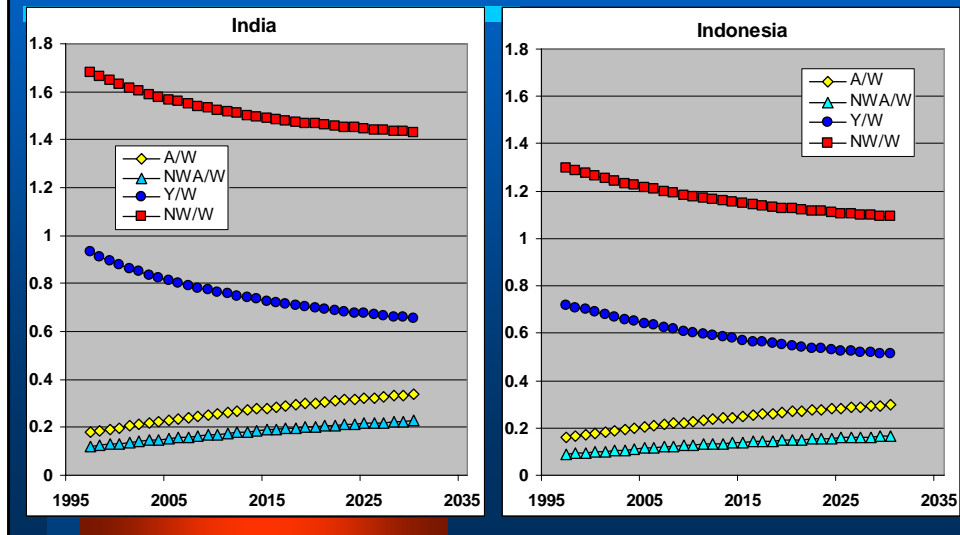
Base line population projections: China



Base line dependency ratios



Base line dependency ratios



Base line real GDP, per capita income

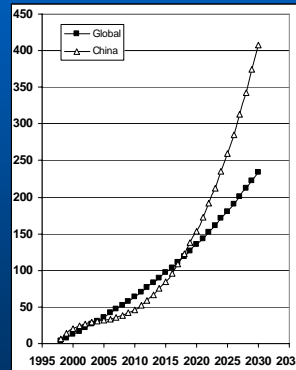
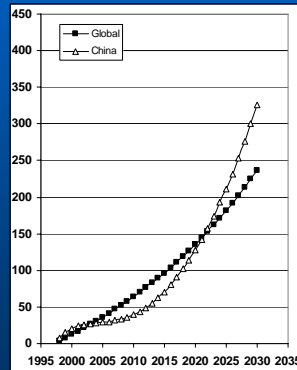
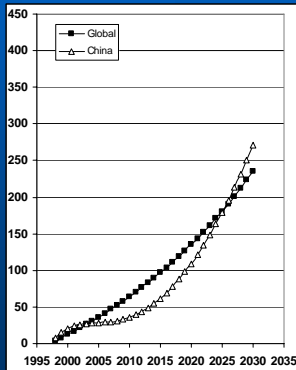
| | % change 2030 over 1997 | | Average annual growth rate, %/yr | |
|-----------------------|-------------------------|------------------------|----------------------------------|------------------------|
| | Real GDP | Real per capita income | Real GDP | Real per capita income |
| Australia | 262 | 178 | 4.0 | 3.1 |
| North America | 253 | 171 | 3.9 | 3.1 |
| Western Europe | 159 | 178 | 2.9 | 3.1 |
| Central Europe, FSU | 205 | 210 | 3.4 | 3.5 |
| Japan | 166 | 217 | 3.0 | 3.6 |
| China | 340 | 378 | 4.6 | 5.0 |
| Indonesia | 490 | 390 | 5.5 | 4.9 |
| Other East Asia | 529 | 373 | 5.7 | 4.8 |
| India | 565 | 291 | 5.9 | 4.2 |
| Other South Asia | 430 | 127 | 5.2 | 2.5 |
| South America | 293 | 149 | 4.2 | 2.8 |
| Mid East & Nth Africa | 280 | 104 | 4.1 | 2.2 |
| Sub-Saharan Africa | 360 | 114 | 4.7 | 2.3 |
| Rest of World | 336 | 159 | 4.6 | 2.9 |

Chinese and global investment

Base line (low fertility)

2 child policy

Financial reform, low fertility

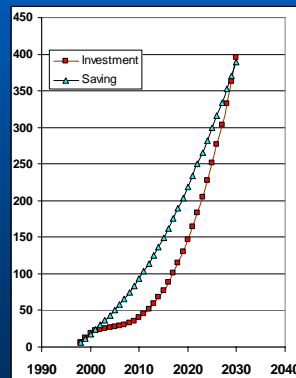
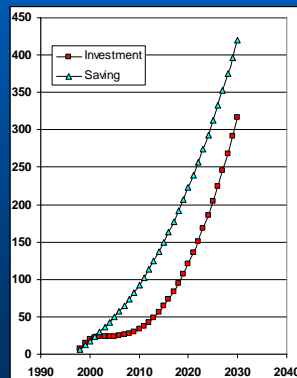
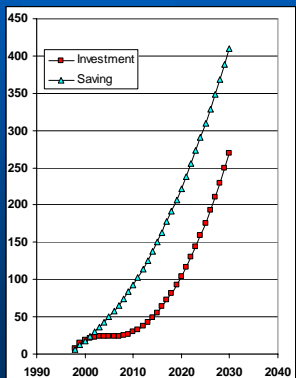


Chinese saving and investment trajectories

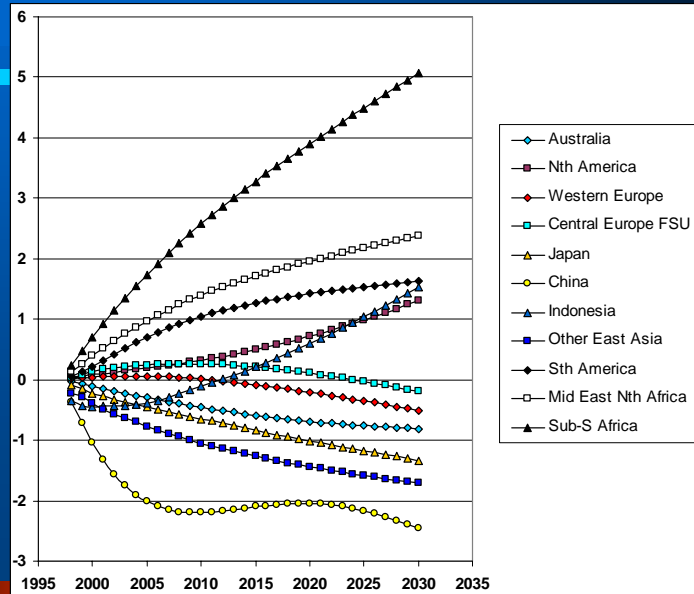
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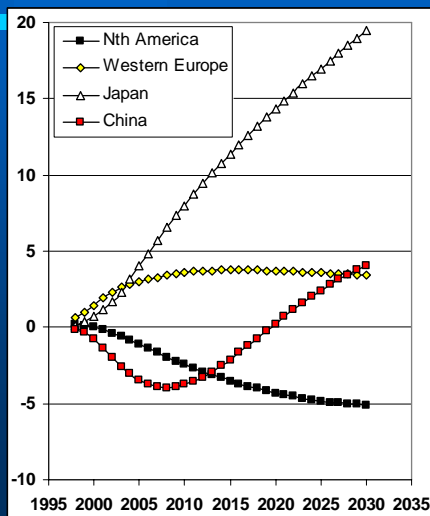


Base line investment premia



Real exchange rate projections

Base line



2 child policy

