On the Macroeconomic and Financial Implications of the Demographic Transition

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CEDES, Argentina

MOTIVATION

- ✓ **The main purpose of the paper is to explore the links between the demographic transition, the macroeconomy, and financial assets**

- ✓ **Why is it relevant to examine the demographic problems from this perspective?**

  1. ***Bonus Stage: financial deepening and financial stability are crucial for the second dividend to materialize***
  2. ***Aging Stage: social security and health expenditures can jeopardize the solvency of the public sector and macro stability***
  3. ***Global Demographic Asymmetries: capital flows are critical to profit from existing international demographic asymmetries***

- ✓ **The IDRC-CEDES Project addresses point three, but it was necessary to develop a methodological framework for the case studies**

METHODOLOGICAL FRAMEWORK: GOALS

- ✓ To integrate the NTA methodology with the concepts utilized in the study of macroeconomic fluctuations and aggregate financial analysis
- ✓ To identify the links and interactions between the SR, the FS, the cohort's deficits, and the aggregate representative agents' deficit
- ✓ To show that the LCD (and demographic-driven public transfers) create and destroy financial assets and impinge on asset accumulation
- ✓ To analyze the macroeconomic effects of the changes in the life cycle deficit and the demand for wealth during the bonus and aging stages
- ✓ To examine the implications for stocks (LCW, public debt, and the country's external financial position) and for stock-flow disequlibria
- ✓ To run simulations for a set of G-20 emerging countries using NTA database to show the empirical relevance of the framework

METHODOLOGICAL FRAMEWORK: RELATION WITH DIVIDENDS

$$(Y_t/N_t) = (Y_t/L_t)(L_t/N_t)$$

First Dividend

Second Dividend

- **NTA**: SR & FS; "Transitory" Effects
- **MACRO**: Savings/Income
- **FINANCE**: Structural & Scale effects

❑ ***Flows***

- **NTA**: LCD ➔ Asset-Based Reallocations
- **MACRO**: LCD ➔ S;I ➔ Current Account
- **FINANCE**: LCD ➔ ΔF & ΔB

❑ ***Stocks***

- **NTA**: LCW & TW ➔ Asset Accumulation (K/L)
- **MACRO**: Stock/Flow disequilibria: global imbalances; debt sustainability
- **FINANCE**: Financial deepening; external financial position

Support Ratios and Fiscal Support Ratios

Adjusted Support Ratio and Adjusted Fiscal Support Ratio

Adjusted Support Ratio is defined as follows:

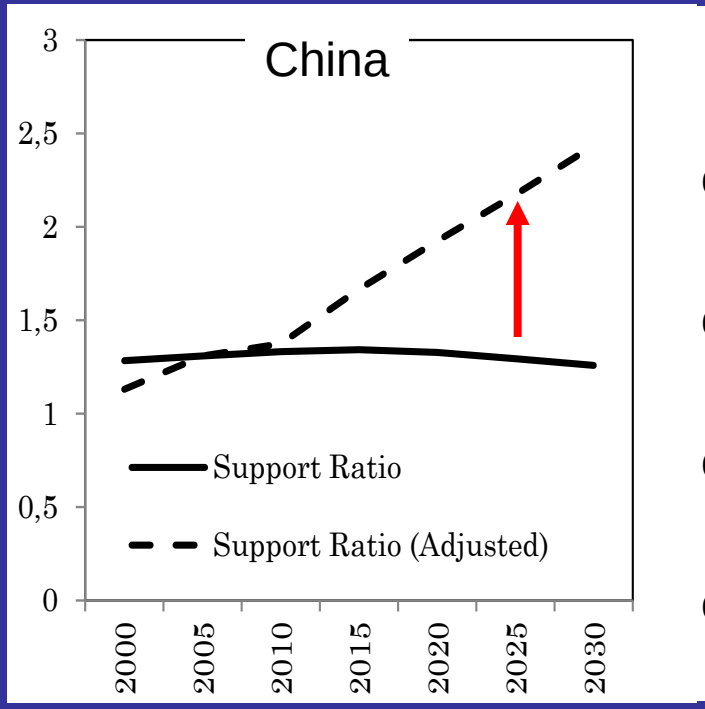
$$SRA_{t,z} = SR_{t,z} \left(HI_{t,z}/HC_{t,z}\right)$$

where $HI_{t,z}$ and $HC_{t,z}$ are the proportional increase in per capita labor income and the per capita consumption between period t and t + z.

The Adjusted Fiscal Support Ratio is

$$FSA_{t,z} = FS_{t,z} \left(HT_{t,z}/HG_{t,z}\right)$$

Where the growth in per capita taxes and per capita benefits are, respectively, $HT_{t,z}$, and $HG_{t,z}$.


China
3
2,5
2
1,5
1
0,5
0
Support Ratio
Support Ratio (Adjusted)
2000
2005
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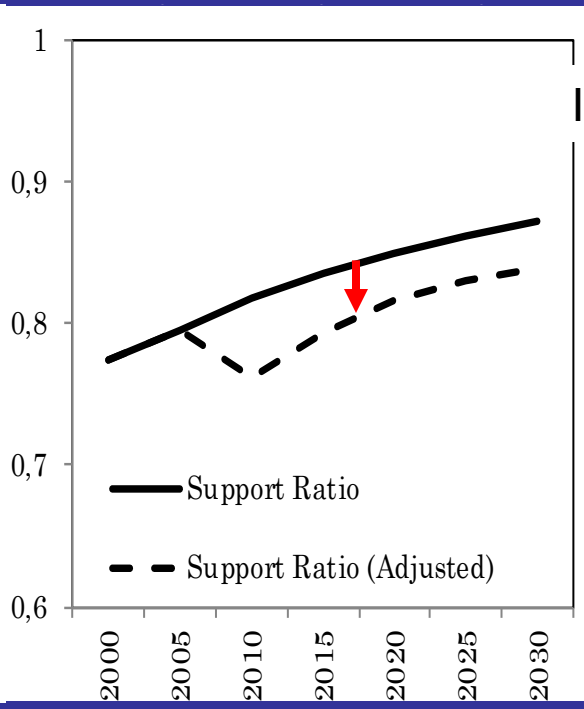
2025
2030


India
1
0,9
0,8
0,7
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Support Ratio
Support Ratio (Adjusted)
2000
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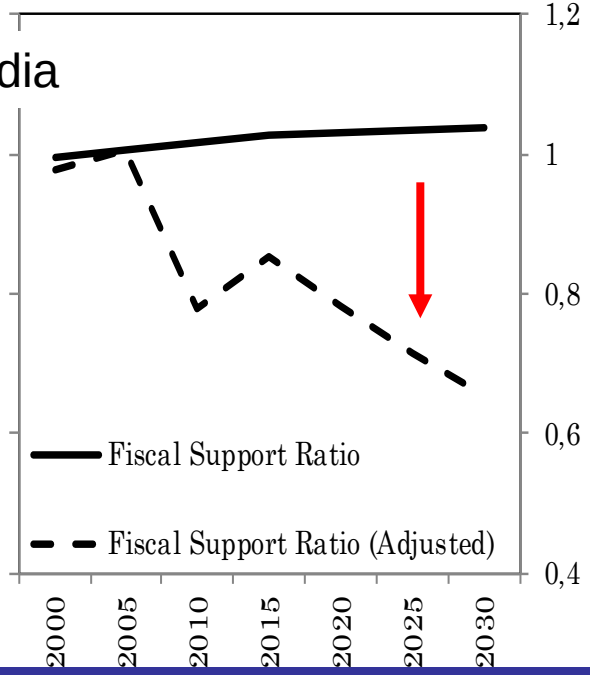
1,2
1
0,8
0,6
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Fiscal Support Ratio
Fiscal Support Ratio (Adjusted)
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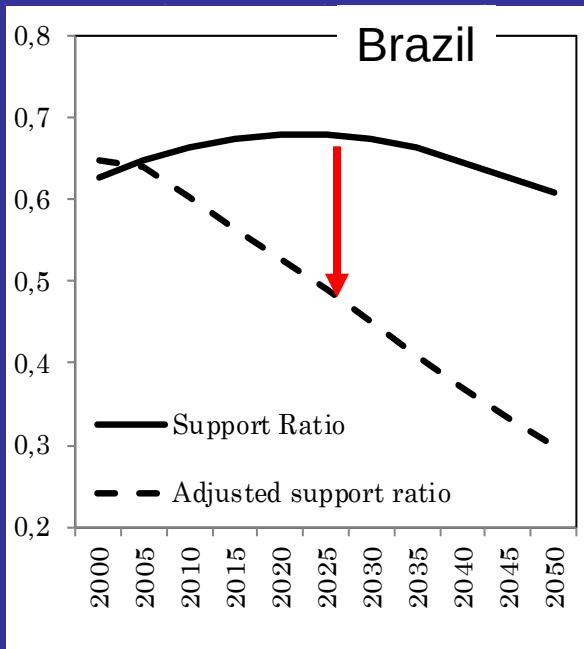
Brazil
0,8
0,7
0,6
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0,4
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Support Ratio
Adjusted support ratio
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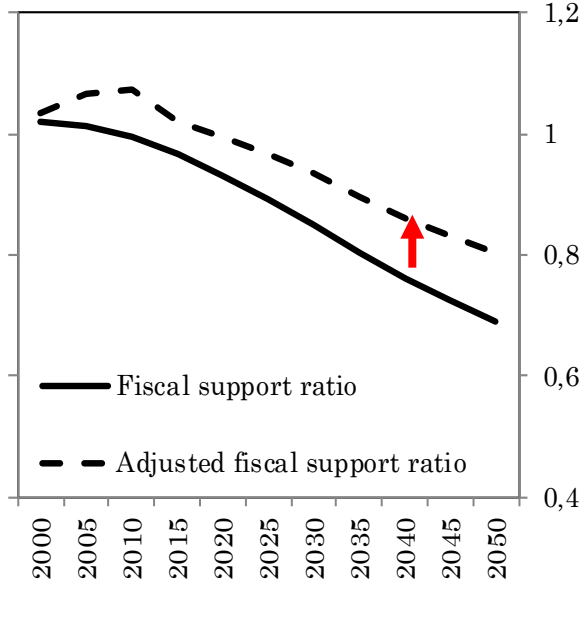
1,2
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0,8
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Fiscal support ratio
Adjusted fiscal support ratio
2000
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2045
2050

Flows:

Savings and the Life Cycle Deficit

From the Life Cycle Deficit to Savings

The trajectory of LCD is determined by the evolution of overall consumption and the changes in SRA:

$$LCD_{t,z} = C_{t,z}\,(1 - SRA_{t,z})$$

Government net transfers (τ) – which is the difference between transfers received (G) and taxes (T) from the private sector – can be expressed in terms of FSA and the evolution of public expenditures:

$$\tau_{t,z} = Gd_{t,z}\,(1 - FSAd_{t,z})$$

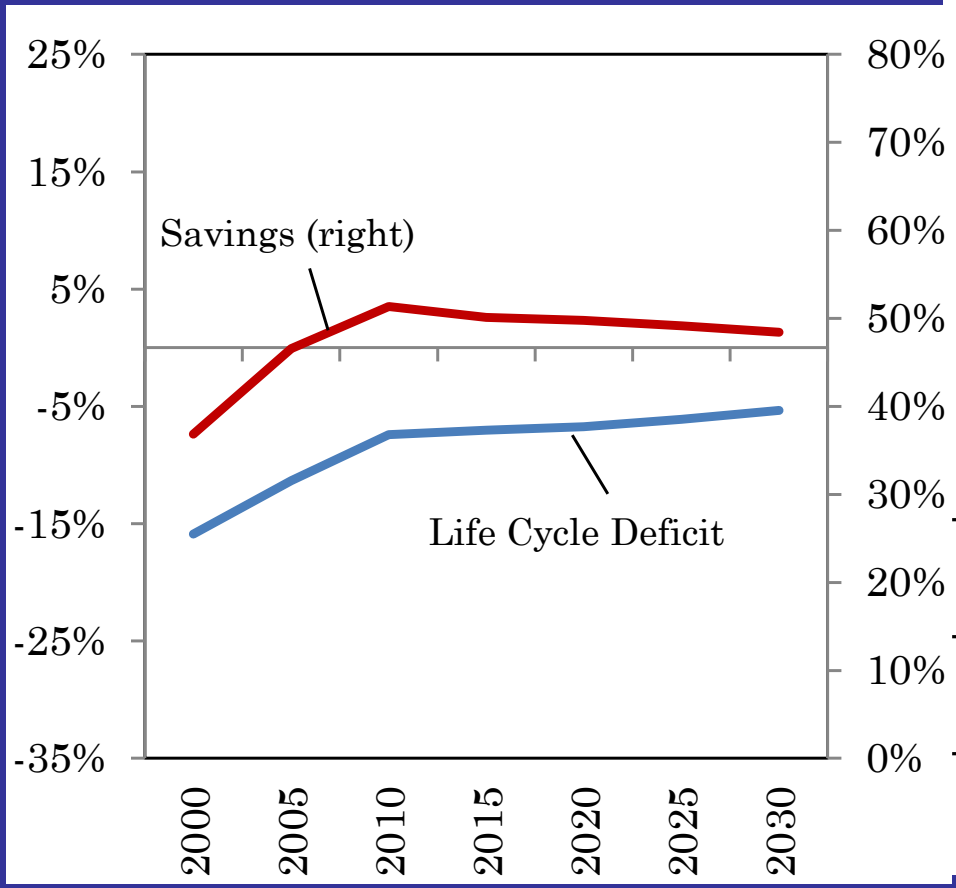
Sectoral savings can be defined as

$$Sp_{t,z} = Yp_{t,z} + G_{t,z}\,(1 - FSA_{t,z}) - C_{t,z}(1 - SR_{t,z}) = \Delta Fp_{t,z} + \Delta Bp_{t,z} + \Delta Kp_{t,z}$$

$$Sg_{t,z} = Yg_{t,z} - G_{t,z}\,(1 - FSA_{t,z}) = \Delta Kp_{t,z} + \Delta Fg_{t,z} - \Delta B_{t,z}$$

$$Sf_{t,z} = -CA_{t,z} = -\Delta F_{t,z}$$

CHINA


25%
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70%
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Savings (right)
Life Cycle Deficit
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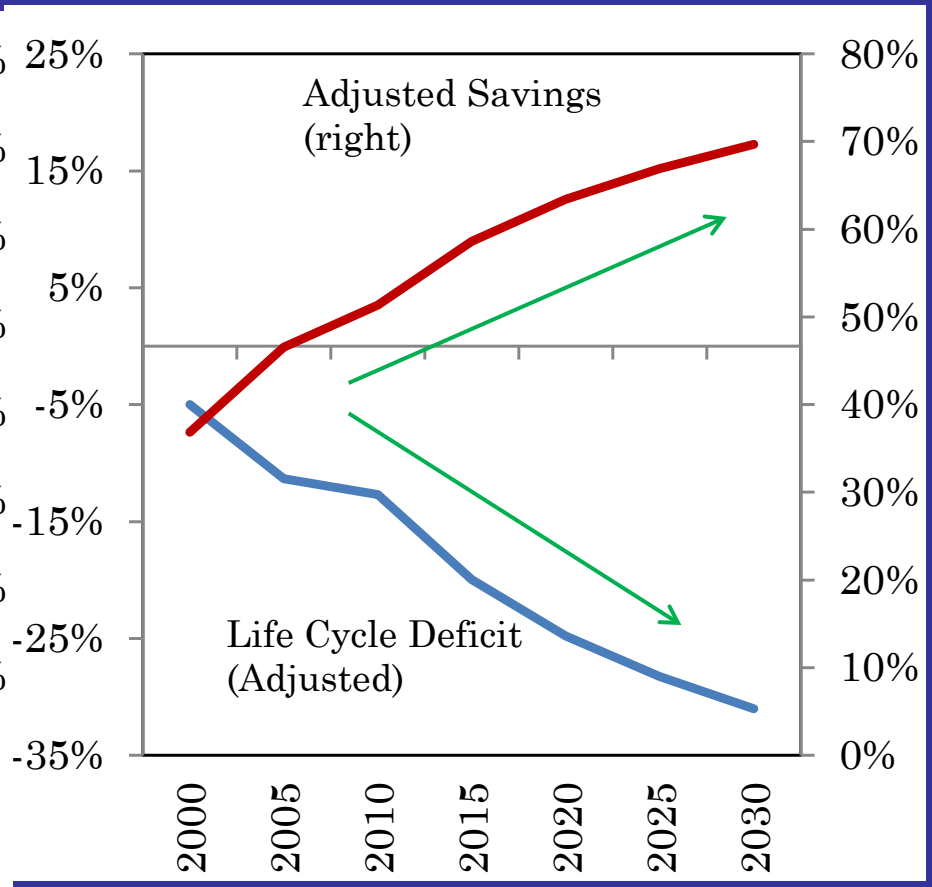
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Adjusted Savings
(right)
Life Cycle Deficit
(Adjusted)
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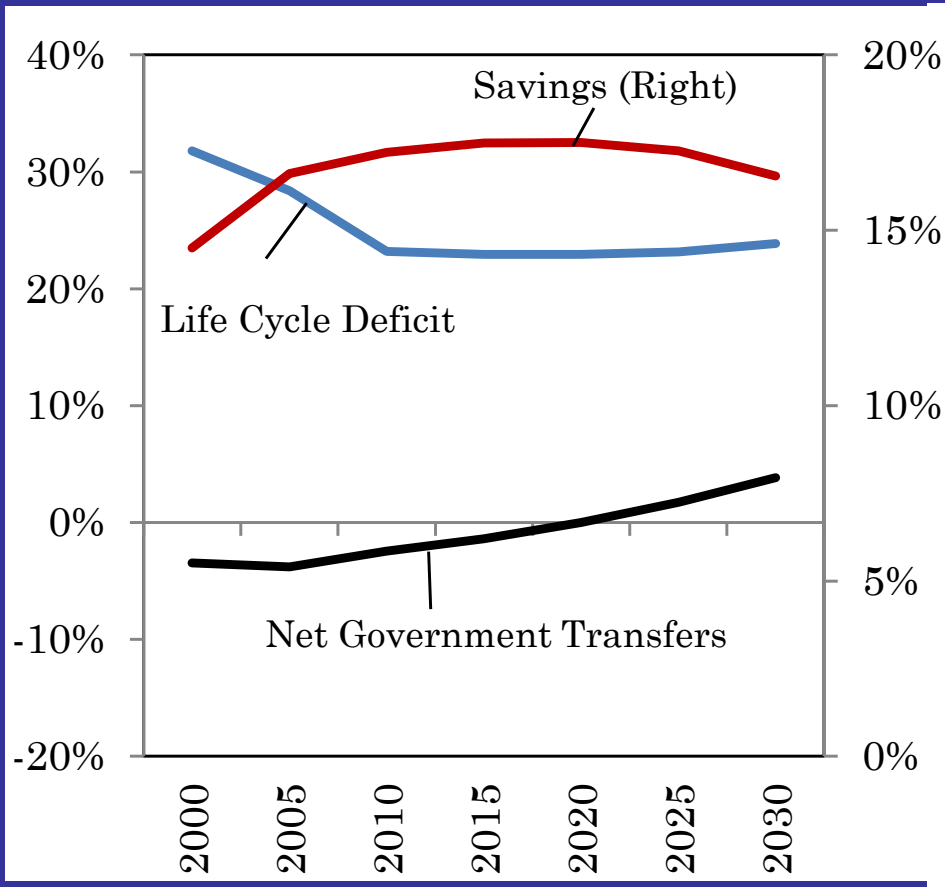
BRAZIL


40%
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Savings (Right)
Life Cycle Deficit
Net Government Transfers
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2020
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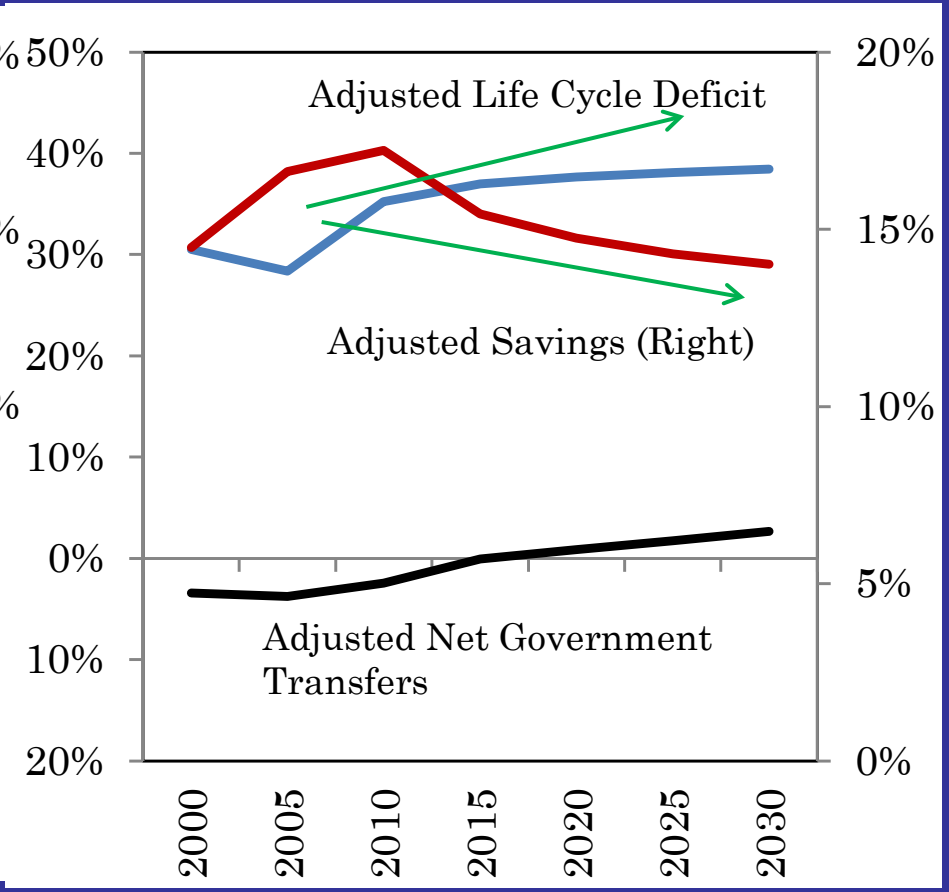
2030


50%
40%
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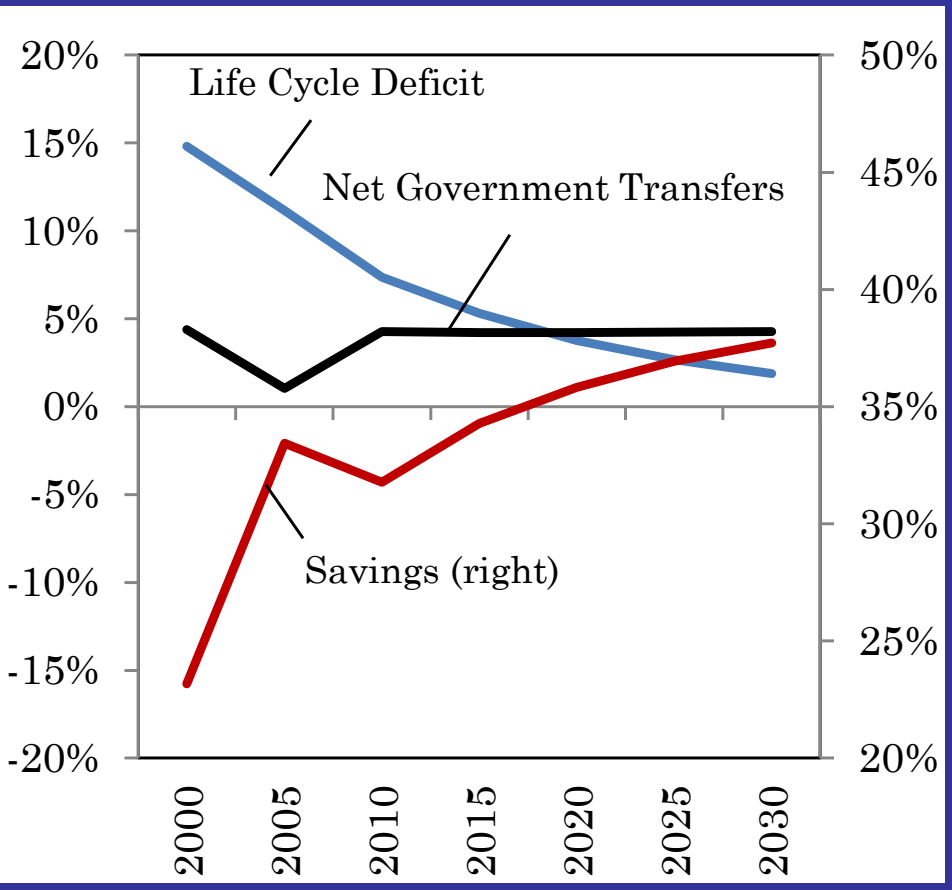
0%
10%
20%
20%
15%
10%
5%
0%
Adjusted Life Cycle Deficit
Adjusted Savings (Right)
Adjusted Net Government Transfers
2000
2005
2010
2015
2020
2025
2030

INDIA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Life Cycle Deficit
Net Government Transfers
Savings (right)
2000
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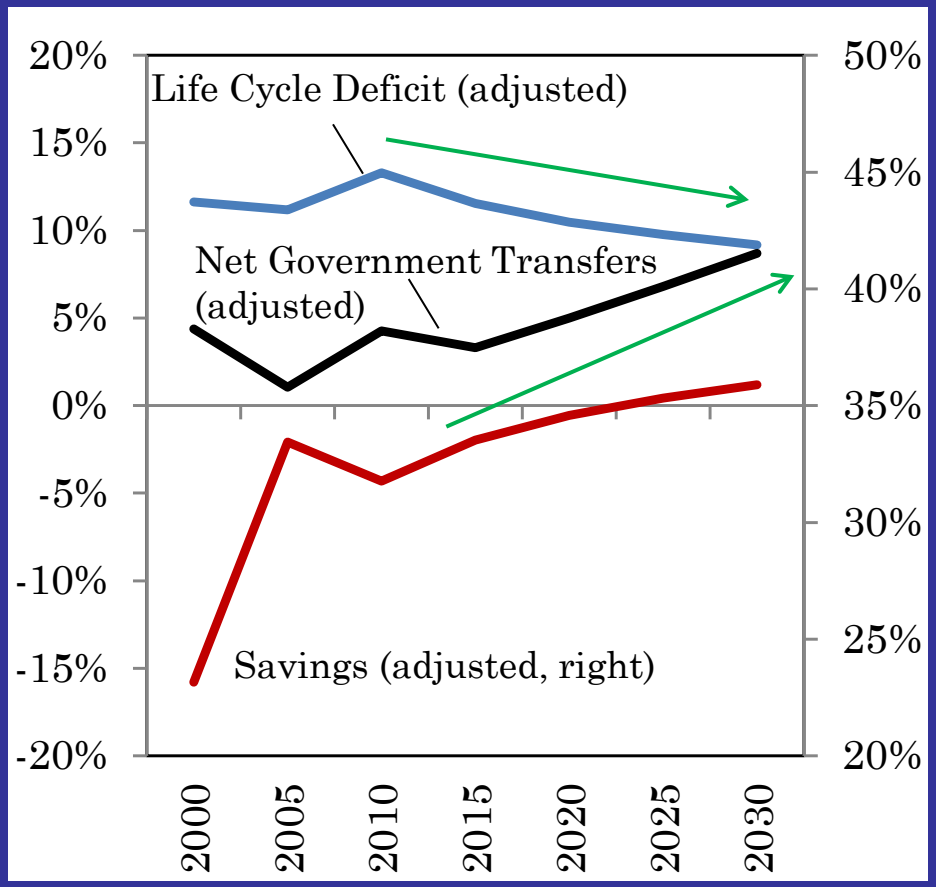
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-15%
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50%
45%
40%
35%
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25%
20%
Life Cycle Deficit (adjusted)
Net Government Transfers (adjusted)
Savings (adjusted, right)
2000
2005
2010
2015
2020
2025
2030

Stocks:

Assets' Dynamics

Assets' Dynamics

Using the national accounts terminology, we define

$$LCD_{t,z} = YA_{t,z} - (Sp_{t,z} + Sg_{t,z}) = YA_{t,z} - (I_{t,z} + CA_{t,z})$$

and

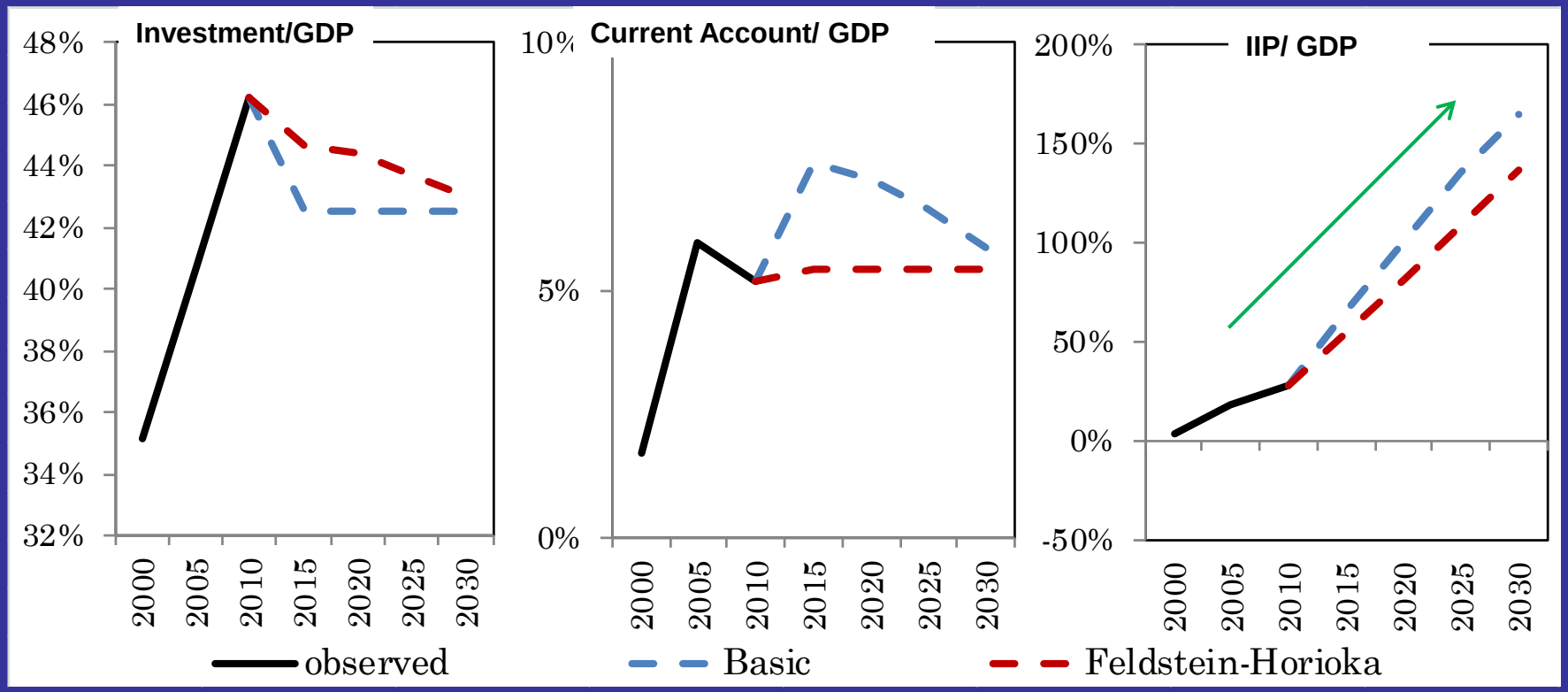
$$A_{t,Z} = Fp_{t,Z} + Fg_{t,Z} + Kp_{t,Z} + Kg_{t,Z}$$

Projections: Two scenarios

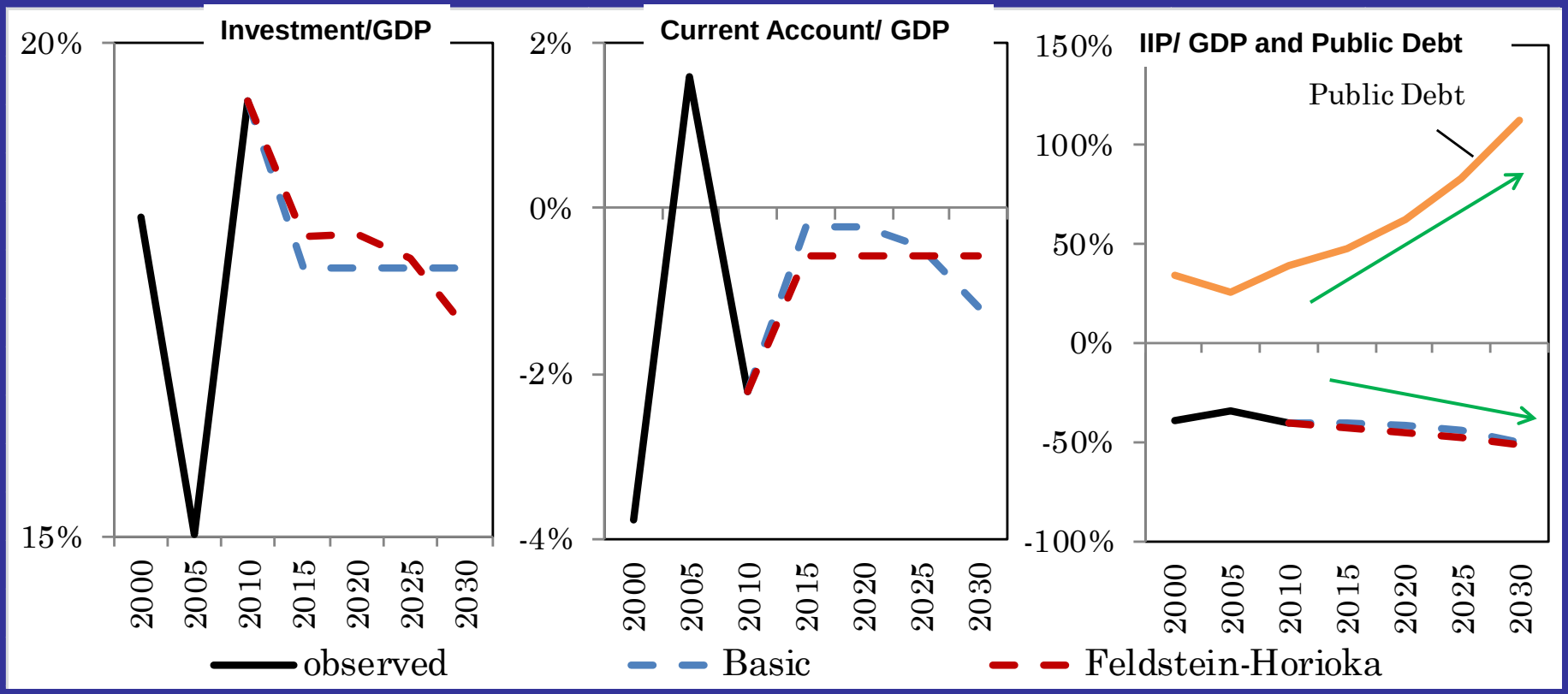
(a) Basic: unadjusted support ratios; constant investment rates

(a) Feldstein-Horioka: unadjusted support ratios; constant Current Account/GDP ratio

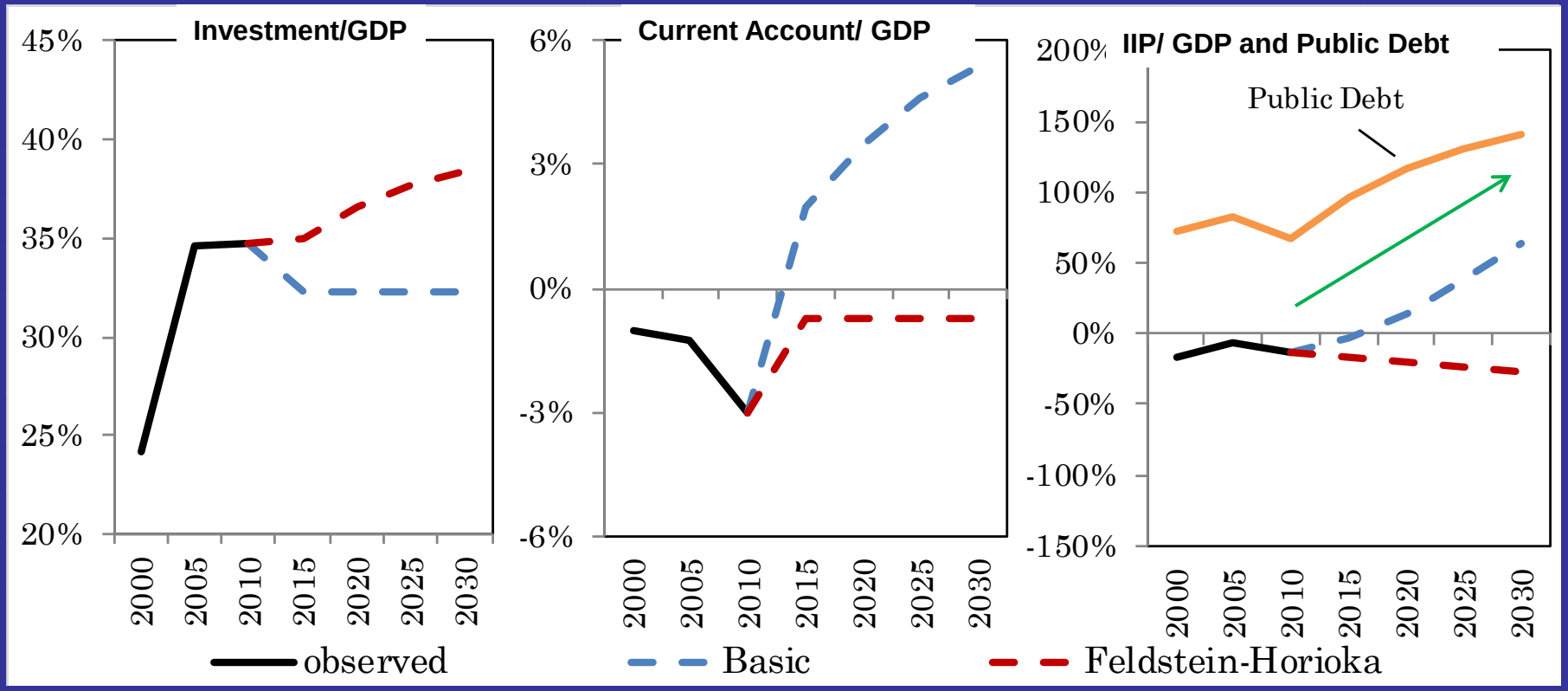
CHINA


Investment/GDP
48%
46%
44%
42%
40%
38%
36%
34%
32%
2000
2005
2010
2015
2020
2025
2030
observed
Current Account/ GDP
10%
5%
0%
Basic
IIP/ GDP
200%
150%
100%
50%
0%
-50%
Feldstein-Horioka

BRAZIL


Investment/GDP
20%
15%
2000
2005
2010
2015
2020
2025
2030
observed
Current Account/ GDP
2%
0%
-2%
-4%
2000
2005
2010
2015
2020
2025
2030
Basic
IIP/ GDP and Public Debt
Public Debt
150%
100%
50%
0%
-50%
-100%
2000
2005
2010
2015
2020
2025
2030
Feldstein-Horioka

INDIA


Investment/GDP
45%
40%
35%
30%
25%
20%
2000
2005
2010
2015
2020
2025
2030
observed
Current Account/ GDP
6%
3%
0%
-3%
-6%
2000
2005
2010
2015
2020
2025
2030
Basic
IIP/ GDP and Public Debt
200%
150%
100%
50%
0%
-50%
-100%
-150%
Public Debt
2000
2005
2010
2015
2020
2025
2030
Feldstein-Horioka

Stocks:

Life Cycle Wealth and Transfer Wealth

LCW and Transfer Wealth

We define the value of the life-cycle wealth that the afore-mentioned cohorts intend to demand for the planning period t / t+Z, as:

$$LCW_{t,Z} = \sum_{z=0}^{z=Z} C_{t,z} (1 - SRA_{t,z}) HD_{t,z} = \sum_{z=0}^{z=Z} LCD_{t,z} \; HD_{t,z}$$

and the “transfer wealth” (TW) that will contribute to financing LCW as:

$$TW_{t,Z} = \sum_{z=0}^{z=Z} G_{t,z} (1 - FSA_{t,z})] HD_{t,z}$$

it follows that:

$$A_{t,Z} = Ap_{t-1} + Ag_{t-1} + \sum_{z=0}^{z=Z} [YG_{t,z} + YP_{t,z}] HD_{t,z} - LCW_{t,Z}$$

Wealth Estimates

(% of 2030 GDP)

	Baseline	
	Life-cycle wealth	Transfer wealth
India	45%	55%
Brazil	565%	16%
China	-148%	n.d.

?

?

CONCLUSIONS

- ✓ **The literature on the macroeconomic effects of demography is focused on long-run growth when investment and savings are equal**

- ✓ **However, structural transformations associated with demography may give rise to macroeconomic disequilibria that can be long-lasting and difficult to manage**

- ✓ **This type of disequilibrium may preclude a country from taking advantage of the dividends or from preparing for the aging stage**

Our analysis of potential macroeconomic disequilibria indicates that the following issues should take center stage:

- ✓ **The consequences of demographic changes for fiscal flows (the fiscal deficit) and stocks (public debt)**
- ✓ **The adjusted versions of SR and FS to incorporate scale effects and macroeconomic imbalances in the analysis of the dividends**
- ✓ **The evolution of the current account and the international investment position of domestic residents**
- ✓ **The disequilibria between stocks and flows in the medium run originating in inconsistencies between the supply and demand for wealth.**

The evidence that we analyzed suggests that these types of effects are particularly difficult to manage

- ✓ **When there exist too few policy instruments to deal with the demographic transition; the availability of fiscal space is critical in this regard (Brazil and India debt stocks)**
- ✓ **When initial conditions are unfavorable (compare Brazil with China)**
- ✓ **When large countries experience sizable disequilibria because of the interaction between a low consumption rate and favorable demographics that impinge on global imbalances and capital flows (China)**

THANKS!!