Financing Infrastructure: Monetary Architecture Approach

Finance Task Team & partners

national planning commission
Department:
The Presidency
REPUBLIC OF SOUTH AFRICA

2030 NDP

Three recent papers from a research consortium: NT, DBSA, NPC, PCC & CST

- *Transformation of SA's Monetary Architecture, 1983-2024*
- *A from-whom-to-whom approach to understand the financial structure of South Africa*
- *Macro-financial implications of the energy transition: towards a non-equilibrium stock-flow consistent model*
- *Understanding the financing of sustainability transitions in a resource dependent world (global overview for IRP)*
- *Starting work on Senegal's Monetary Architecture*

Investment requirements

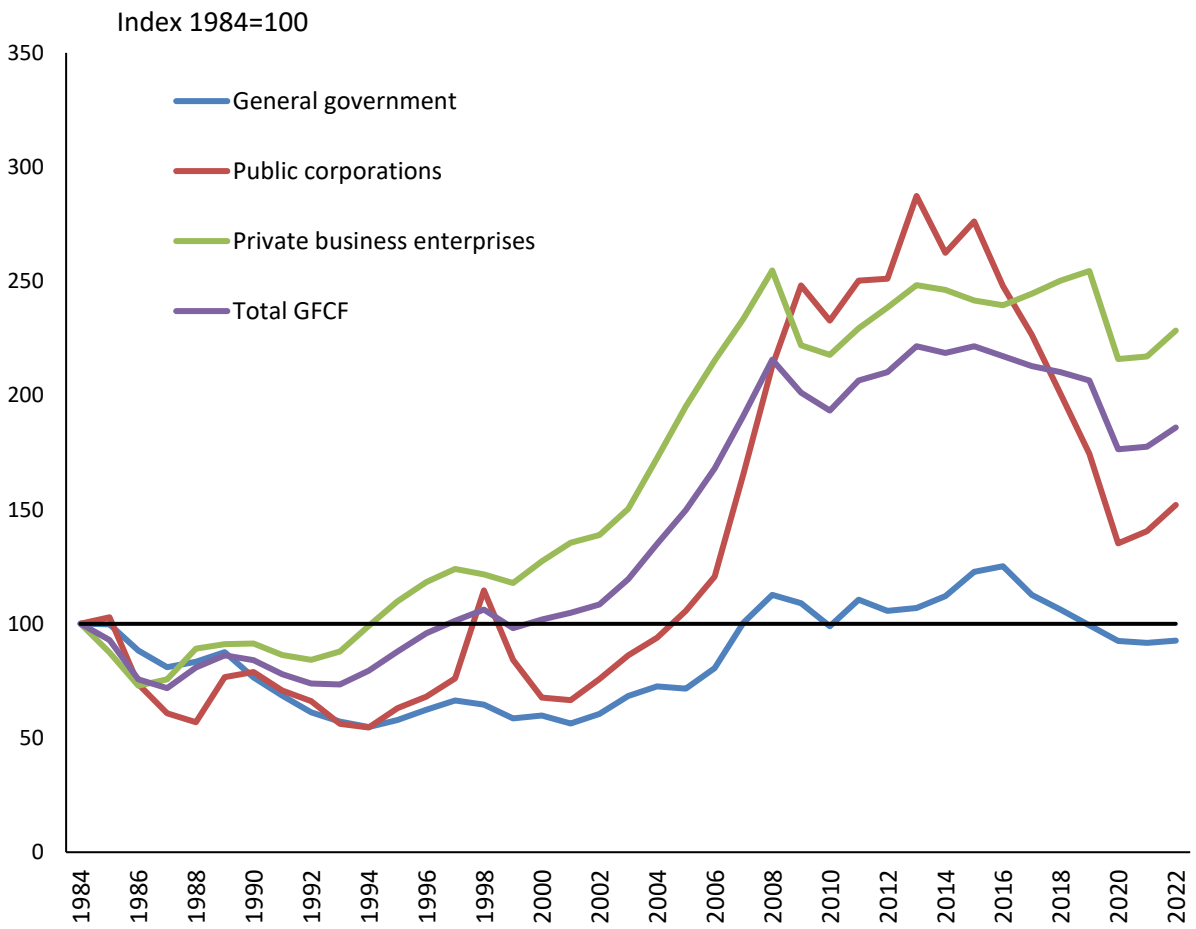
Based on joint research by NPC, NT, PCC and DBSA, the gap between current investments and the *investments required (both capex & opex)* to achieve NDP goals:

- Water: R214 billion pa is needed to fund the lowest cost and most sustainable option. This is R2.1 trillion through to 2035, which is R75 billion more than what is currently spent.
- Energy: R143 billion per annum through to 2050 (i.e. around R1.5 trillion to 2035), and based on a market sounding we can report that this is mostly available until 2030.
- Food security: R158 billion per annum is required through to 2050, of which R112 billion per annum is to ensure water supplies for agriculture – an amount that is included in the estimate of R214 billion per annum for water. Total requirement, therefore, is R46 billion per annum excluding water.
- Total requirement for energy, water and food: R403 billion pa

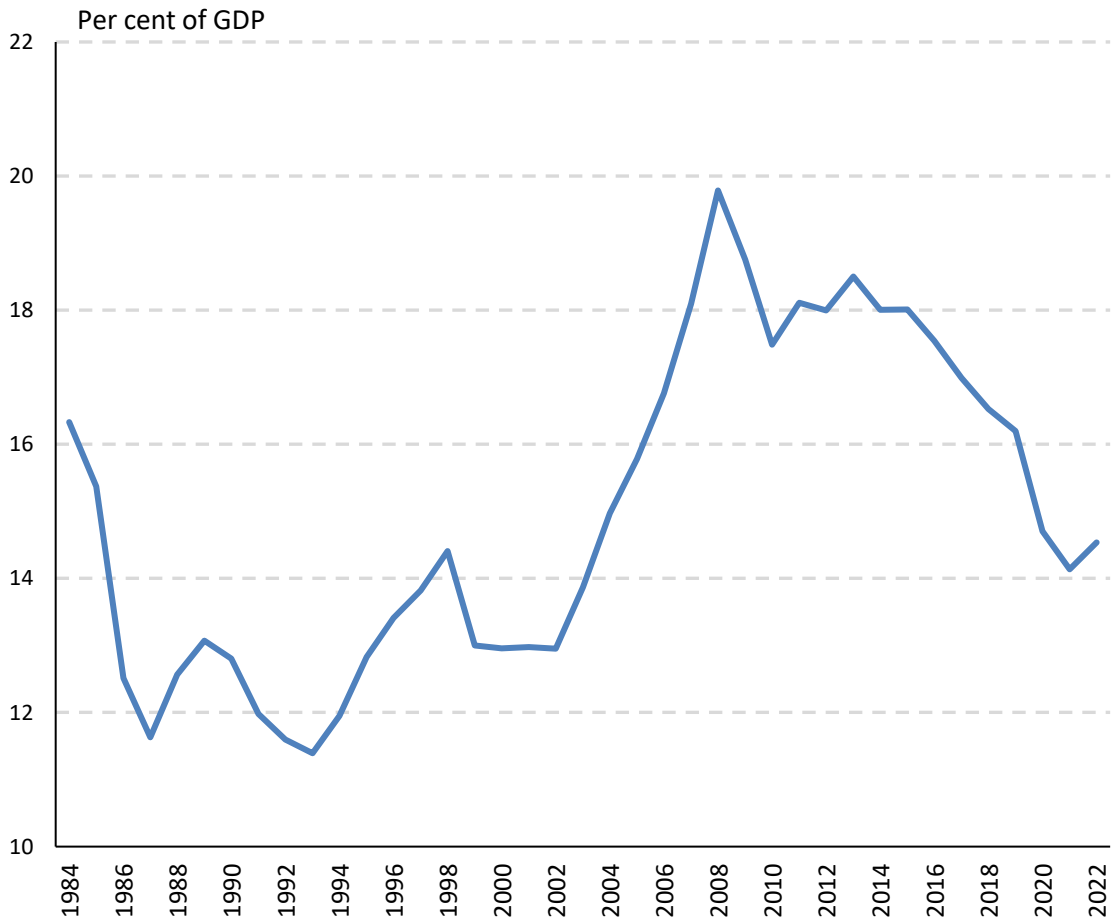
The gap between what needs to be spent on water and food supplies through to 2030 is approximately R90 billion per annum, with a gap for energy only emerging after 2030.

GFCF BY SECTOR

Fixed investment by sector



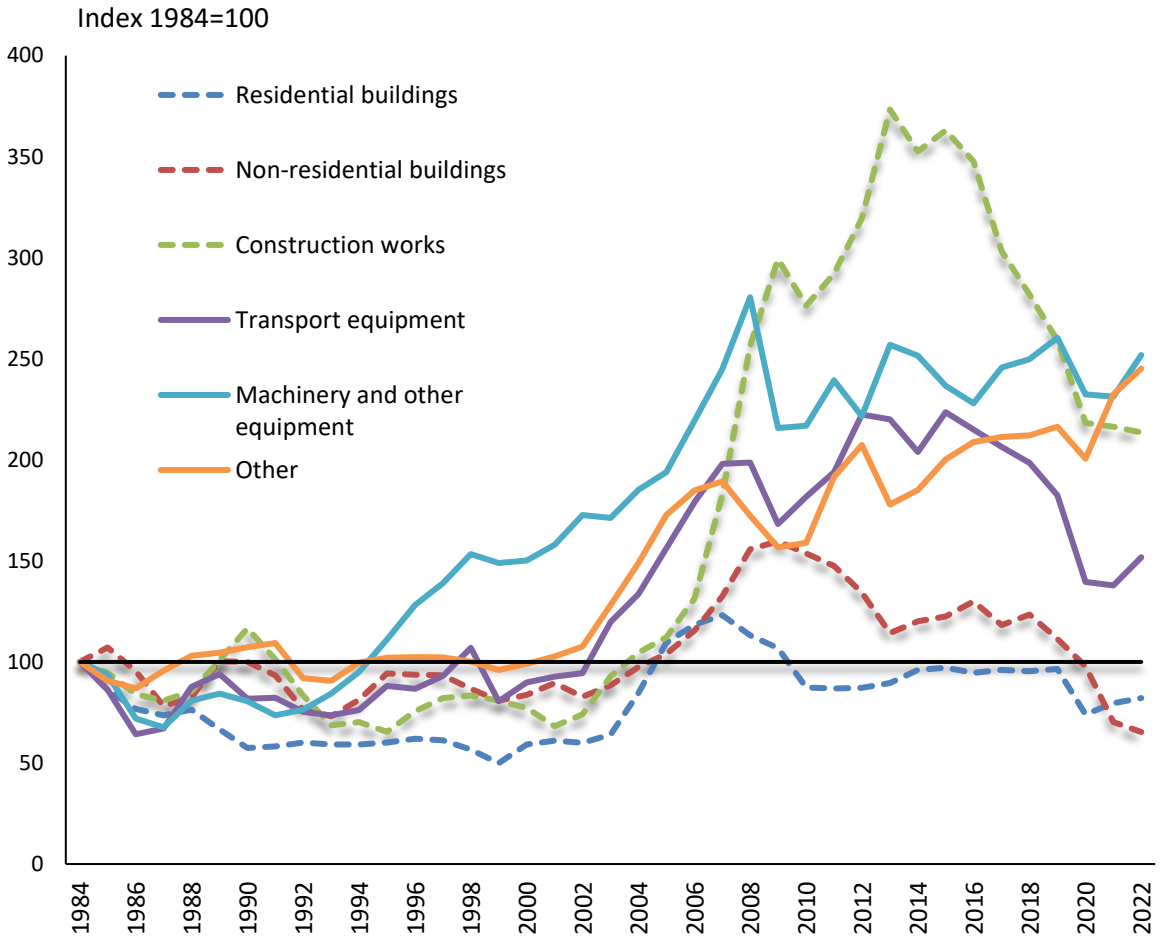
Fixed investment as per cent of GDP



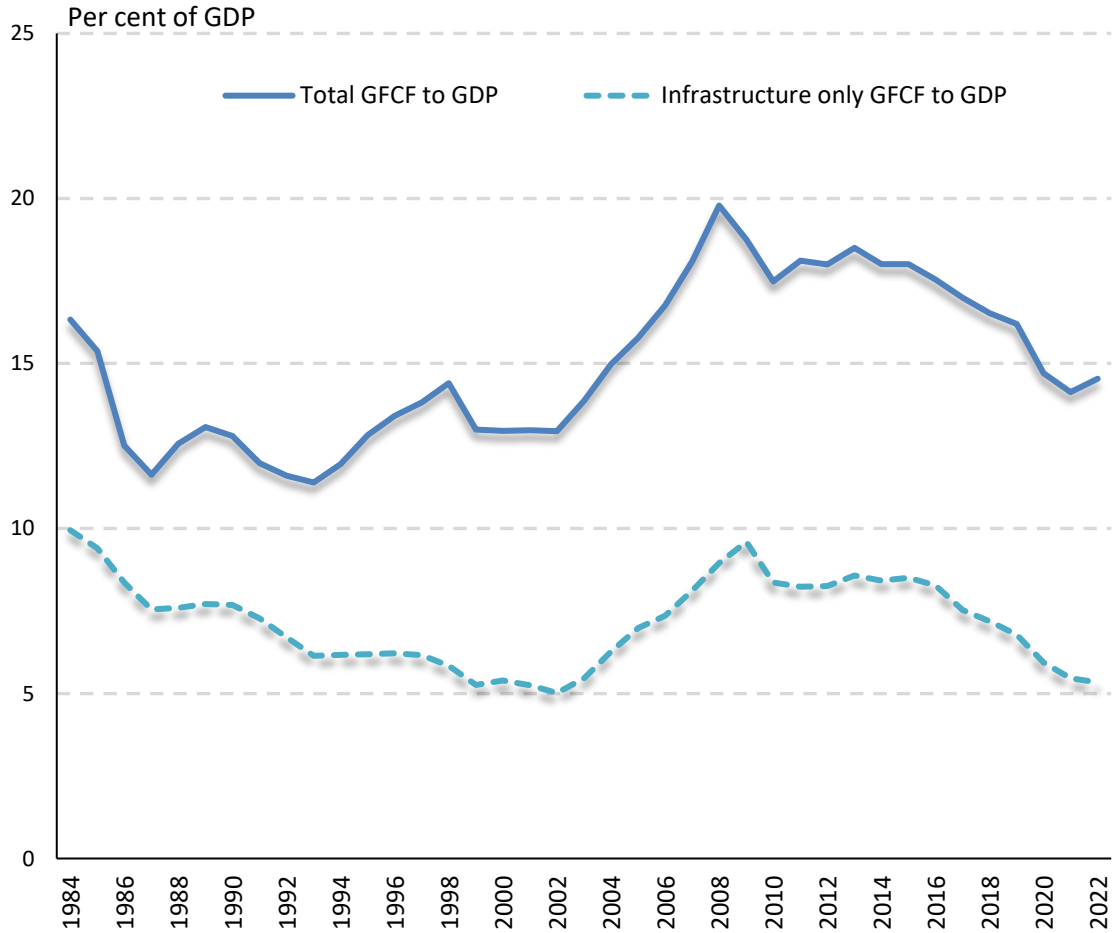
Source: Stats SA, SARB

GFCF FOR INFRASTRUCTURE

Fixed investment by sector

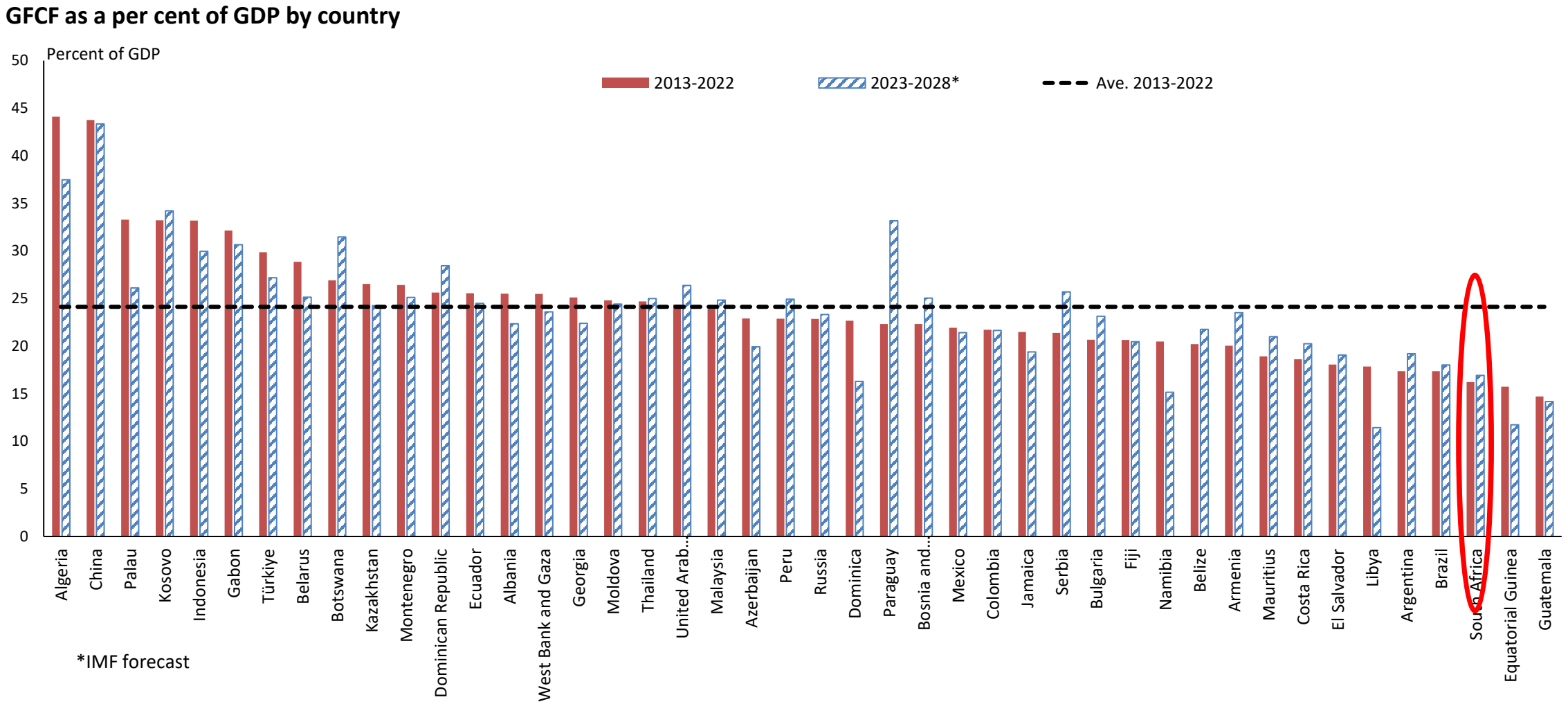


Fixed investment as per cent of GDP



Source: Stats SA, SARB

GFCF COMPARED TO UMIC



Source: IMF

Household Wealth, 2017n – is a JT possible if this remains the same?

Bottom 90% of all households hold 14.4% of the wealth, top 0.1% (35 400 adults) hold 29.8% of all wealth, i.e. the wealth of the top 0.1% is twice the value of the wealth of the bottom 90%.

South Africa's wealth lies in housing (28.8%), pensions/life insurance (32.5%) and bonds/stock (34.6%) – however, 62.7% of all bonds/stock are held by only 3500 adults (0.01%).

Table 9: The distribution of personal wealth in South Africa in 2017

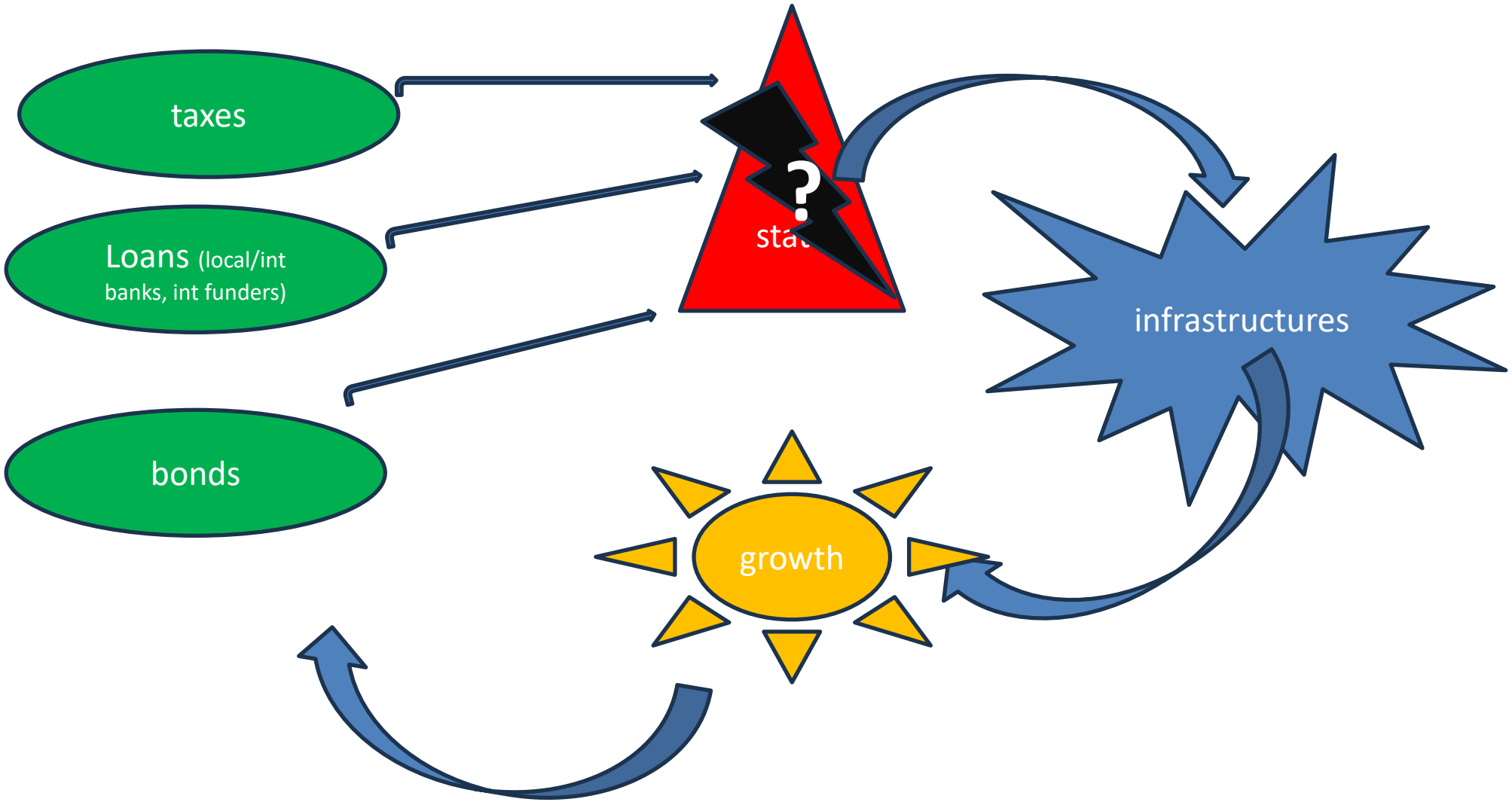
	Number of adults	Wealth threshold	Average (2018 rands)	Average (2018 PPP $)	Wealth share (%)
Full population	35,400,000		326,000	52,200	100
Bottom 90% (p0p90)	31,860,000		94,100	15,100	14.4
Bottom 50% (p0p50)	17,700,000		−16,000	−2,600	−2.5
Middle 40% (p50p90)	14,160,000	27,700	138,000	22,000	16.9
Top 10% (p90p100)	3,540,000	496,000	2,790,000	447,000	85.6
Top 1% (p99p100)	354,000	3,820,000	17,830,000	2,860,000	54.7
Top 0.1% (p99.9p100)	35,400	30,350,000	96,970,000	15,540,000	29.8
Top 0.01% (p99.99p100)	3,540	146,890,000	486,200,000	77,920,000	14.9

Table 10: Share of total assets held by wealth group by asset class, 2017 (%)

	Currency	Business assets	Housing	Pensions/life insurance	Bonds and stock
Bottom 90% (p0p90)	37.3	40.4	41.2	36.2	0.2
Bottom 50% (p0p50)	9.7	1.4	14.0	5.3	0.0
Middle 40% (p50p90)	27.7	39.1	27.2	30.9	0.2
Top 10% (p90p100)	62.7	59.6	58.8	63.8	99.8
Top 1% (p99p100)	10.6	41.9	27.8	14.1	95.2
Top 0.01% (p99.99p100)	1.5	13.4	8.5	2.1	62.7
% of total assets	0.6	3.6	28.8	32.5	34.6

(Source: Chatterjee et al 2021:20, UNUWIDER)

Traditional flow of funds



Why is this happening?

The financial sector grows faster than the real economy, but financial surpluses are not re-invested – they spin around the financial ponzi scheme at increasing velocities, and leave the country

Monetary architecture approach: key terms

- Architecture of a financial eco-system is a web of interlocking balance sheets (‘everyone’s asset is someone else’s liability, and vice versa’)
- existing financial flows are a function of path dependent balance sheet configurations
- it follows, balance sheet ***re***configurations can unlock new flows of capital
- ‘elasticity spaces’ – these are spaces within the financial ecosystem where potential balance sheet reconfigurations exist that could unlock new flows of capital
- banks are not just intermediaries between savers & borrowers, they are also creators of money

References for the Monetary Architecture approach: Murau, Steffen (2020) ‘A Macro-Financial Model of the Eurozone Architecture Embedded in the Global Offshore US-Dollar System’, Boston University, Global Development Policy Center, Global Economic Governance Initiative, GEGI Study July 2020, Boston, MA.; Murau, Steffen, Armin Haas, and Andrei Guter-Sandu (2024) ‘Monetary Architecture and the Green Transition’, Environment and Planning A. Economy and Space 56 (2), pp. 382-401; Murau, Steffen and Matteo Giordano (2024) ‘Forging Monetary Unification through Novation. The TARGET System and the Politics of Central Banking in Europe’, Socio-Economic Review, 22 (3), pp. 1283-1312. Murau, Steffen and Jens van ‘t Klooster (2023) ‘Rethinking Monetary Sovereignty. The Global Credit Money System and the State’, Perspectives on Politics 21 (4), 1319-1336.

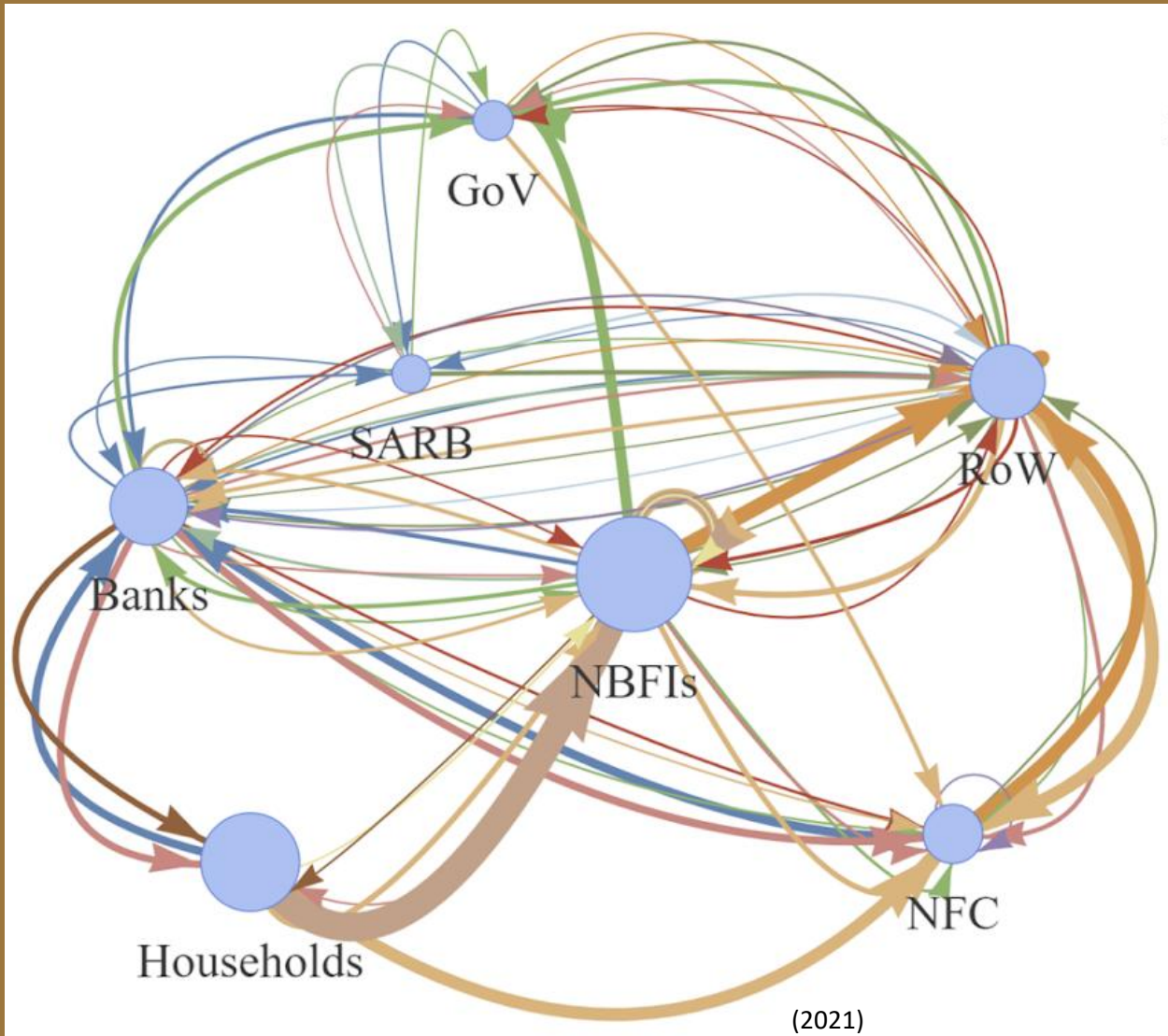
The assets on SA's balance sheets

The assets on South Africa's balance sheets are as follows:

- SARB: R1.2 trillion
- National Revenue Fund (managed by NT): R2.1 trillion in 2024
- Commercial Banks: R6.7 trillion
- Non-financial corporations (listed): R12,7 trillion
- Formal small businesses (unlisted): R2,5 trillion
- Shadow Banks: R3.2 trillion
- Pension funds: R6.7 trillion (including GEPF)
- GEPF: R1.6 trillion
- Stokvels: R50 billion (11 million members)
- SOEs: R1.3 trillion
- DFIs: R345 billion (14 largest out of 45 = 97% of assets)
- Households: R11 trillion, including offshore wealth (unequal – wealth of 0.1% is twice 90% of the pop)

Cannot be added up because there are significant overlaps - GEPF part of pension funds, NFCs includes formal small businesses, etc. However, the W2W paper based on SARB Quarterly Reports estimates total assets in 2021 were R49 trillion, up from R20 trillion in 2010.

SARB's Whom-to-Whom Data, 2010-2021 … **from R20 tn to R49 tn**



Financial instruments

- Gold and other foreign reserves
- Currency and deposits in domestic currency
- Currency and deposits in foreign currency
- Debt securities in domestic currency
- Debt securities in foreign currency
- Loans in domestic currency
- Mortgage in domestic currency
- Loans in foreign currency
- Equity and investment fund shares in domestic currency
- Equity and investment fund shares in foreign currency
- Insurance, pension and standardised guarantee schemes in domestic currency
- Financial derivatives and employee stock options in domestic currency
- Financial derivatives and employee stock options in foreign currency
- Other accounts receivable/payable in domestic currency

(2021)

Template balance sheet
(explains the categories of financial instruments)

Assets		Liabilities	
€	**Actual assets** Held on-balance-sheet over time; commitments for future cash inflows; typically financial claims but also physical assets can be seen as bonds as they generate future cash inflows	€	**Actual liabilities** Held on-balance-sheet over time commitments for future cash outflows ***Equity capital*** Residual category, difference of actual assets and actual liabilities
€	**Contingent assets** Potentiality for balance sheet expansion & cash inflow in a crisis; then they become actual assets; can be explicit or implicit; as counterfactual instruments it is often not clear if they exist or not	€	**Contingent liabilities** Potentiality for balance sheet expansion & cash outflows in a crisis; then they become actual assets; can be explicit or implicit; as counterfactual instruments it is often not clear if they exist or not

High net markups, low levels of re-investment of operating surplus in GFCF

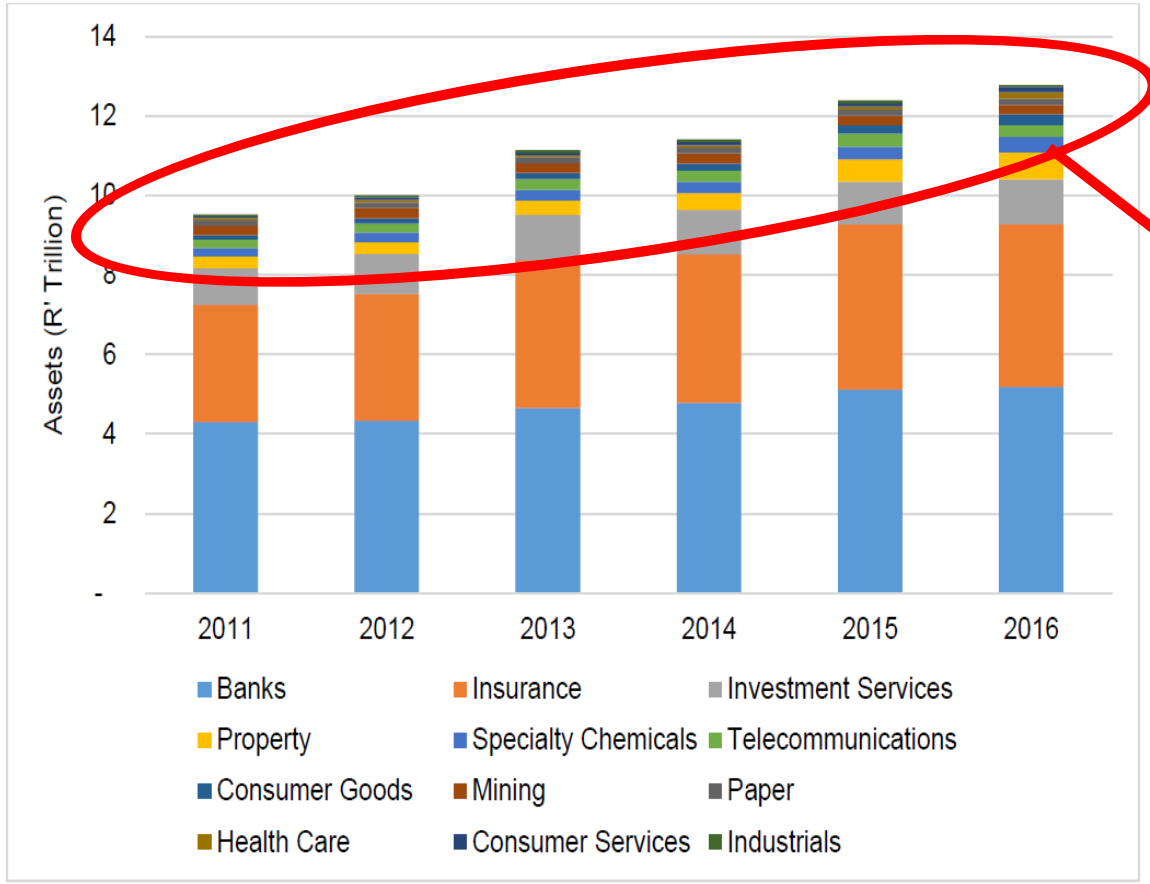
Sector	Ave growth of GFCF, 1994-2019	Average Net Markup, 1994-2019 (%)	Ave growth of employment, 1994-2019
Communication	11,5	42,6	-0,4
Construction	7	17,1	2
Transport & storage	6,7	31,7	4,5
Electricity & gas	6,1	23,7	1
Community, social, personal	5,9	21,2	1,2
Wholesale & retail	5,3	41,17	2,9
Mining & quarrying	4,7	28,8	-0,9
Finance & insurance	2,8	32,3	1
Heavy industry	2,6	8	-0,7
Business services	2,3	34,9	3,4
Catering & accommodation	2	15,5	1,4
Diversified manufacturing	1,9	7	-0,4
Agricutlure, forestry, fishing	0,6	33,3	-0,9

Net markup is an industry's net operating surplus as a percentage of the sum of its intermediate inputs, wages, and capital depreciation (Quantec, n.d.). It factors in capital intensity, to an extent, as more capital-intensive industries are likely to have higher levels depreciation.

Source: Zalk, 2021. Average growth of GFCF in USA, Europe & Asia over past 20 years has been 20-30% - Africa: 15-20%

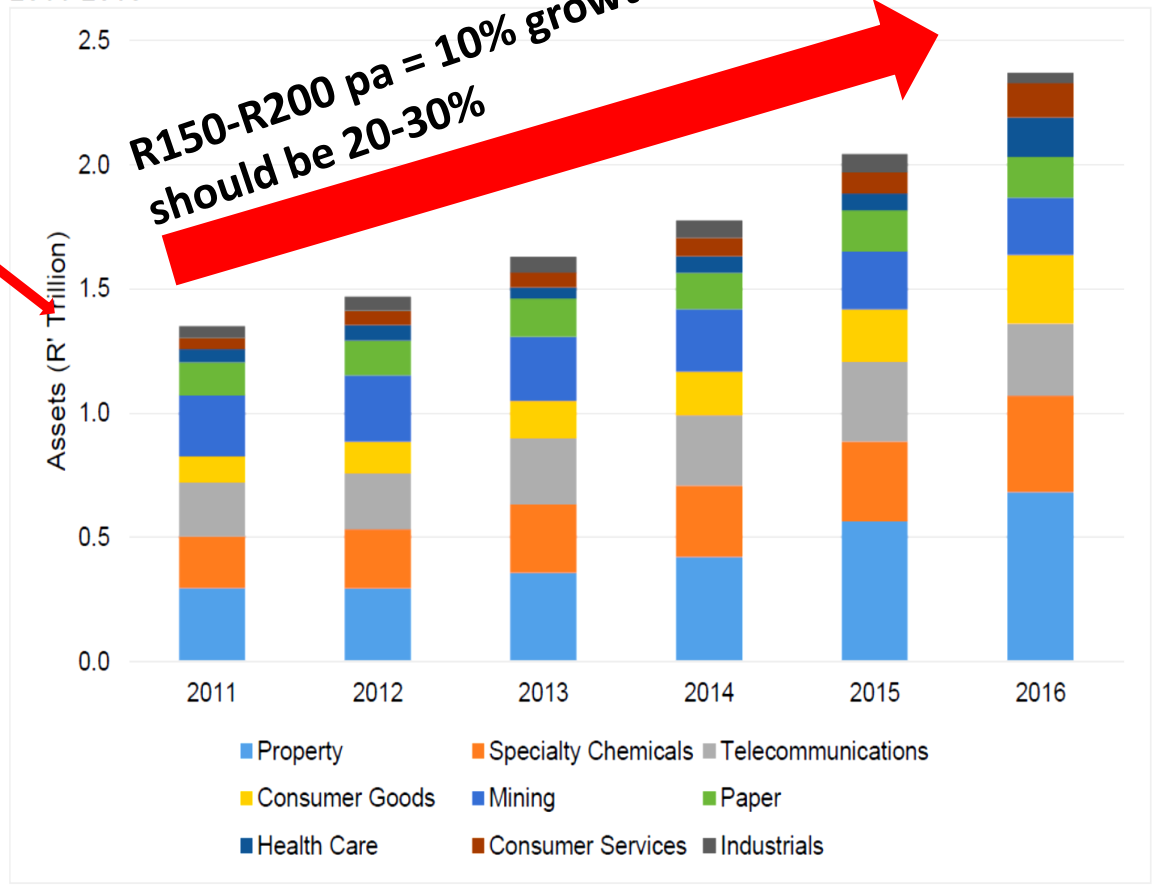
NFCs are not investing profits in expansion (GFCF), 2011-2016

Figure 9: JSE Top 50 total assets per sector 2011-2016 (2015 constant prices)



Source: InetBFA

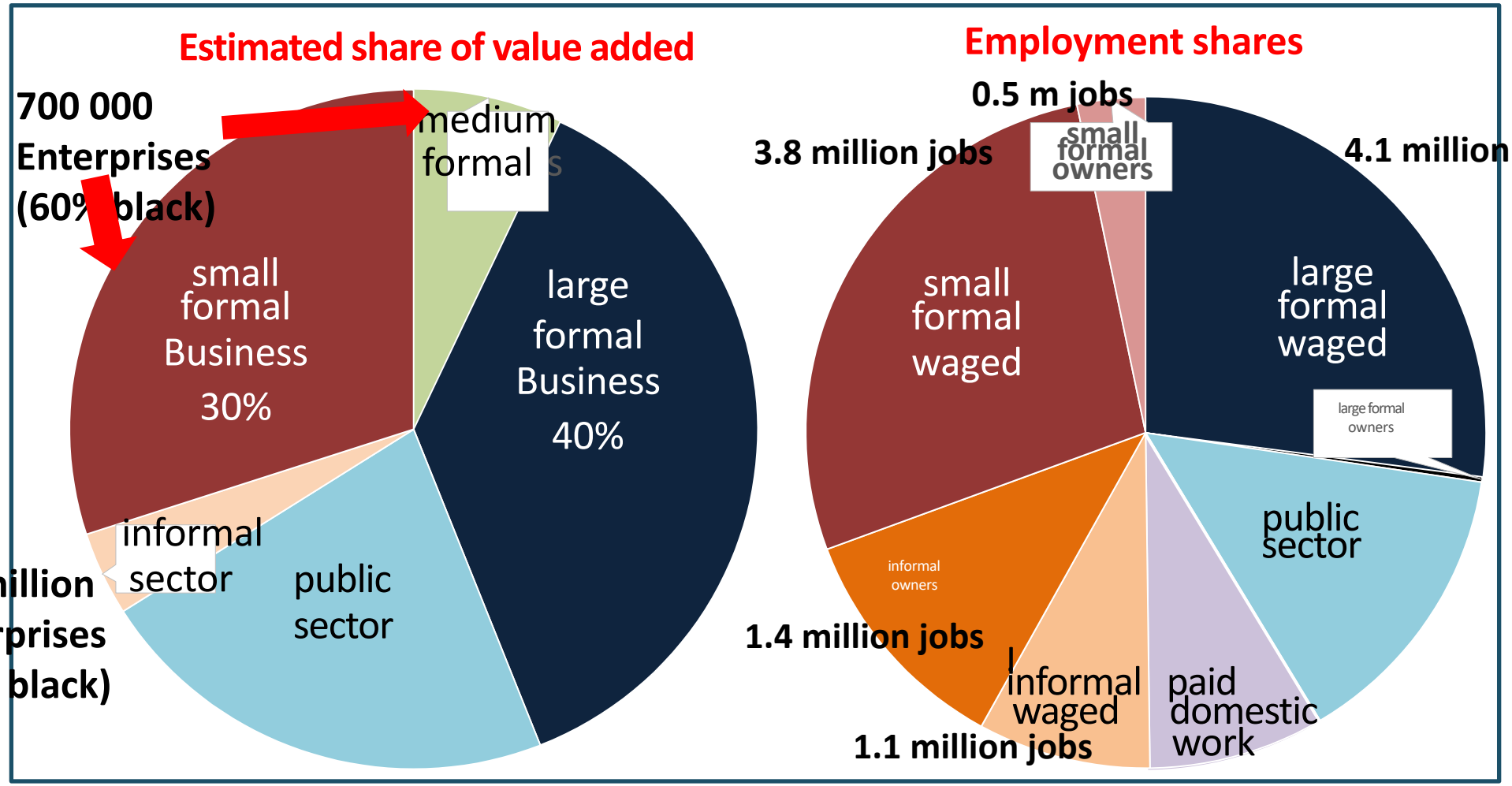
Figure 11: JSE Top 50 assets (excluding financial services) (constant 2015 prices) 2011-2016



Source: InetBFA

Capex is R150 bn to R200 bn pa, gradually rising – but mainly replacement, not expansion

Shares in national value added and in employment by size of business, sector and ownership



Only 10% of small businesses sourced funding from government or a formal financial institution

Large listed firms

By 2017

- Top 100: 95% of market cap on JSE; top 50: 86%; top 20: 71%; top 10: 58% - 2 companies accounted for 35% (SAB & BAT)

By 2024:

- Top 40: 80%; top 10: 35% (half of which was BAT and AB InBev after buying out SAB)

Outward financial flows:

- Large listed NFCs have invested more in foreign financial assets (R3 trn) over the period 2010-2021 than the amount that foreigners (RoW) invested in SA-based NFC assets (R2.8 trn)
- Increasing number of firms listed on the JSE who don't have significant local operations – NASPERS (3%), Richemont (8% from whole of Africa/ME); BAT (20% from Asia-Pacific/ME/Africa)' South 32 (10%); Anglo America (25%). Some PropCos have none.
- If the dual listed companies are excluded from the top 50, the remainder accounted for only 20% of the JSE in 2017 – by 2024, this percentage had slightly increased
- All non-internationalised JSE listed companies in 2024 did not make up more than 45% of the JSE's market cap. In 2024 – they are SA's *real companies*

High profits, low investment means money makes money from money not productive activity….

- Market capitalization of the JSE as a % of GDP has consistently been the 2nd highest in the world as a % of GDP (…… if you don't invest in the real economy - manufacturing, mining, agriculture, infrastructure, etc - invest in the JSE)

- SA banks have consistently been some of the most profitable in the world – they lend where the markup is high, e.g. mortgages, credit card debt, cellphones, finance, business services, etc

- 95% of all stocks & bonds held by 1% of the population

Financial Sector Assets (R'trillions)

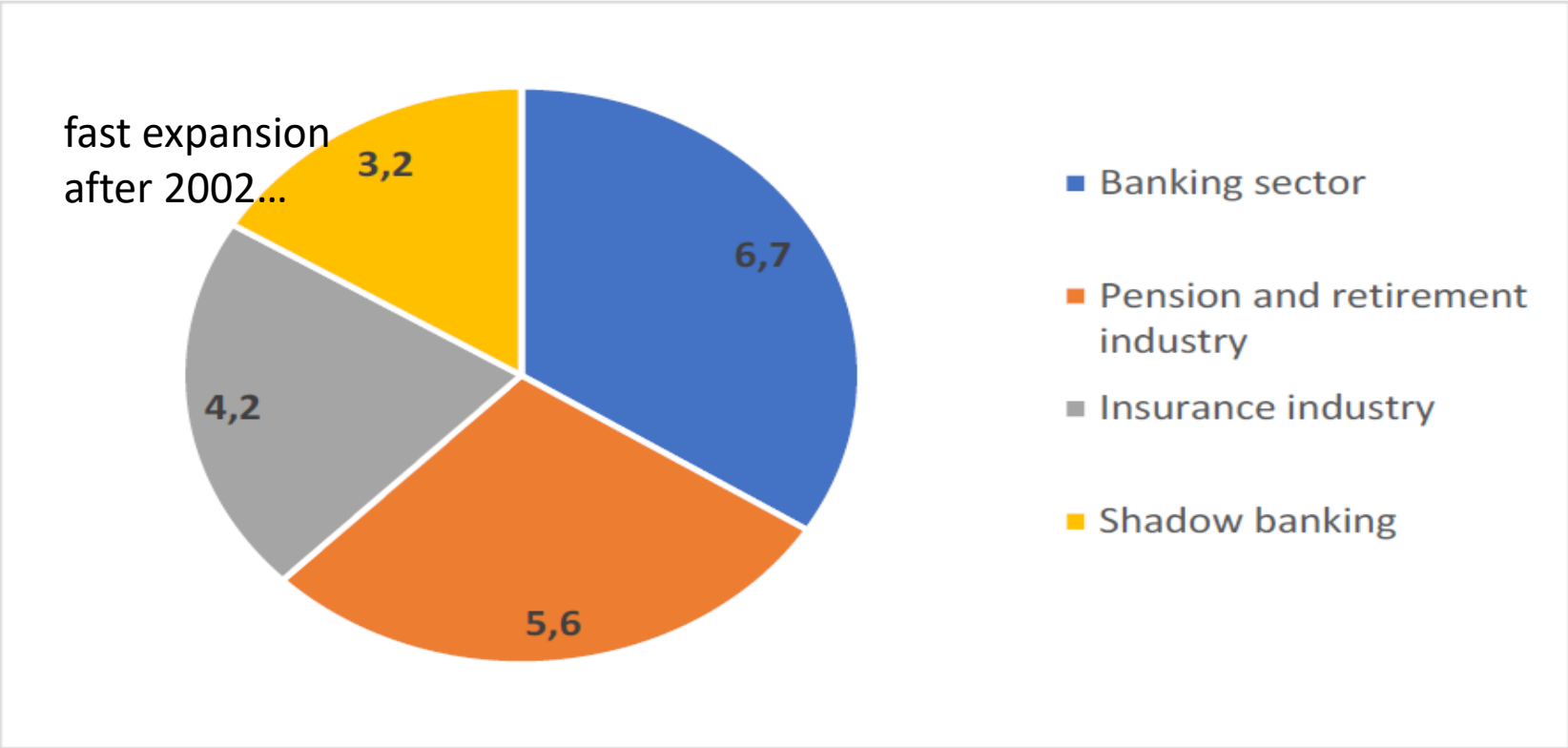


Figure 1.2: Financial sector assets (R' trillion)

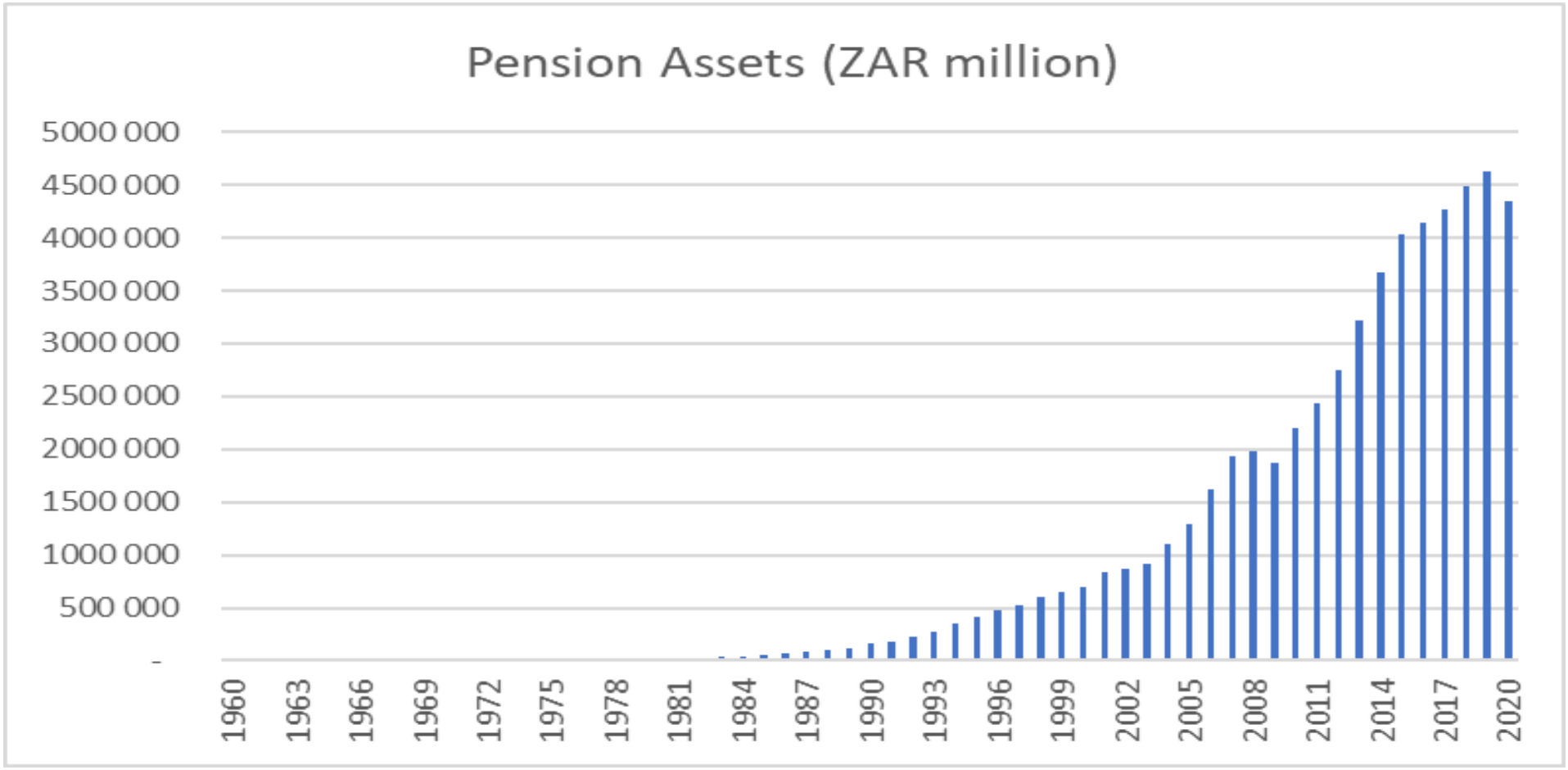
Source: Author's computation using data from ASISA and SARB

(Source: Mashinbye)

GDP in 2023: R6.9 trillion

- Banking sector = GDP
- NBFI sector (shadow banks, insurance, pension) bigger than the banking sector
- Pension industry alone is worth 81% of GDP
- Shadow banks are 50% of GDP
- NRF: R1.7 trillion
- Top 14 DFIs: R345 billion

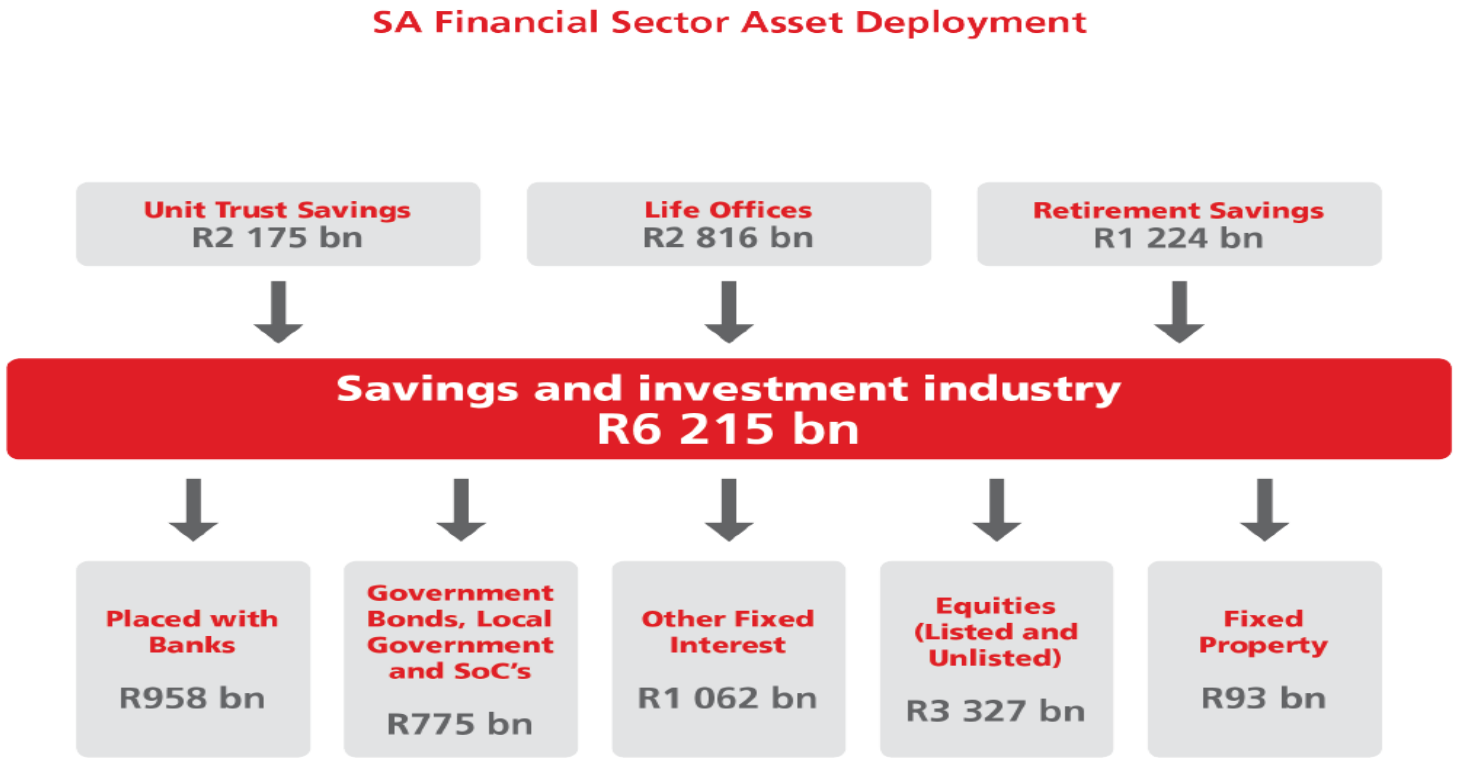
Pension assets, 1960-1980



(Source: FSB, 2020)

Note: 16th largest pension pool – larger than equivalent pools in India, Ireland, France, Spain and Chile in 2024

Savings & Investments (pension funds, life insurance, investment funds)



Source: ASISA, SARB Quarterly Reports, 21 December 2018

Shadow banking sector & counter-parties: Money Market Funds, Fixed-Income Funds, Multi-Asset Funds, Fund-of-Funds

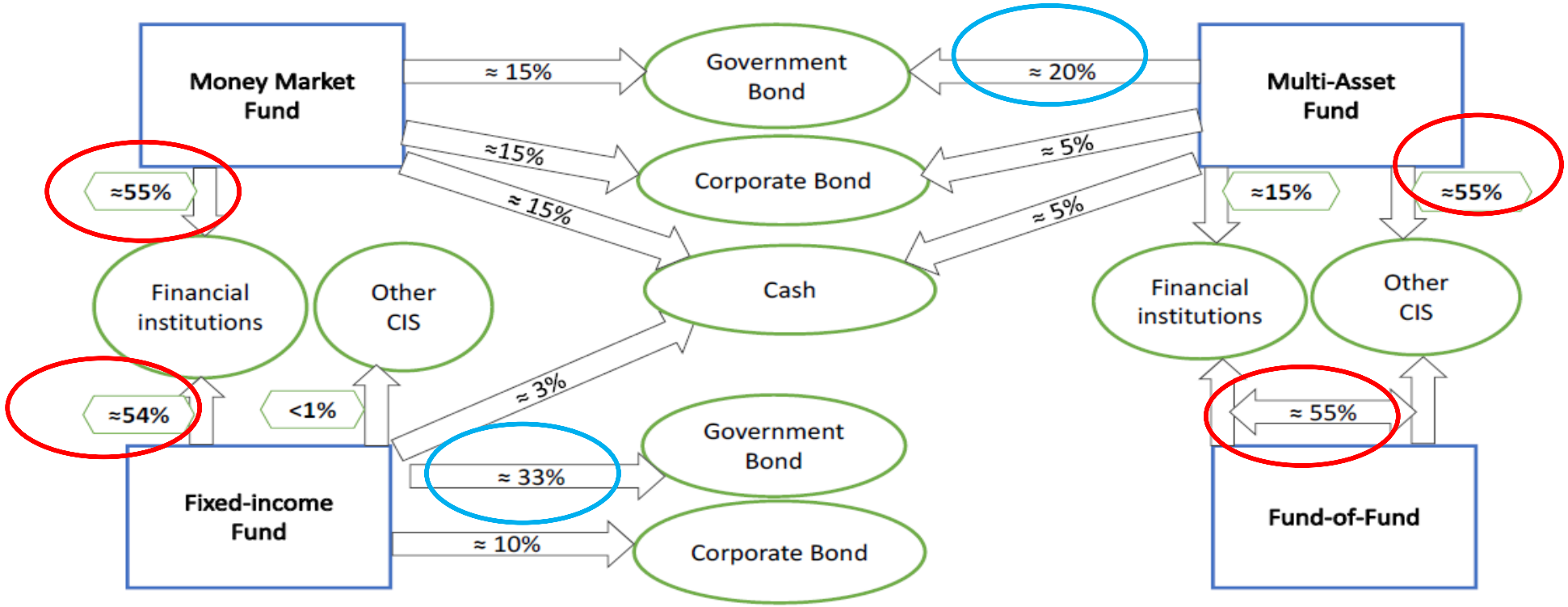


Figure 1.5: Shadow banking network in South Africa

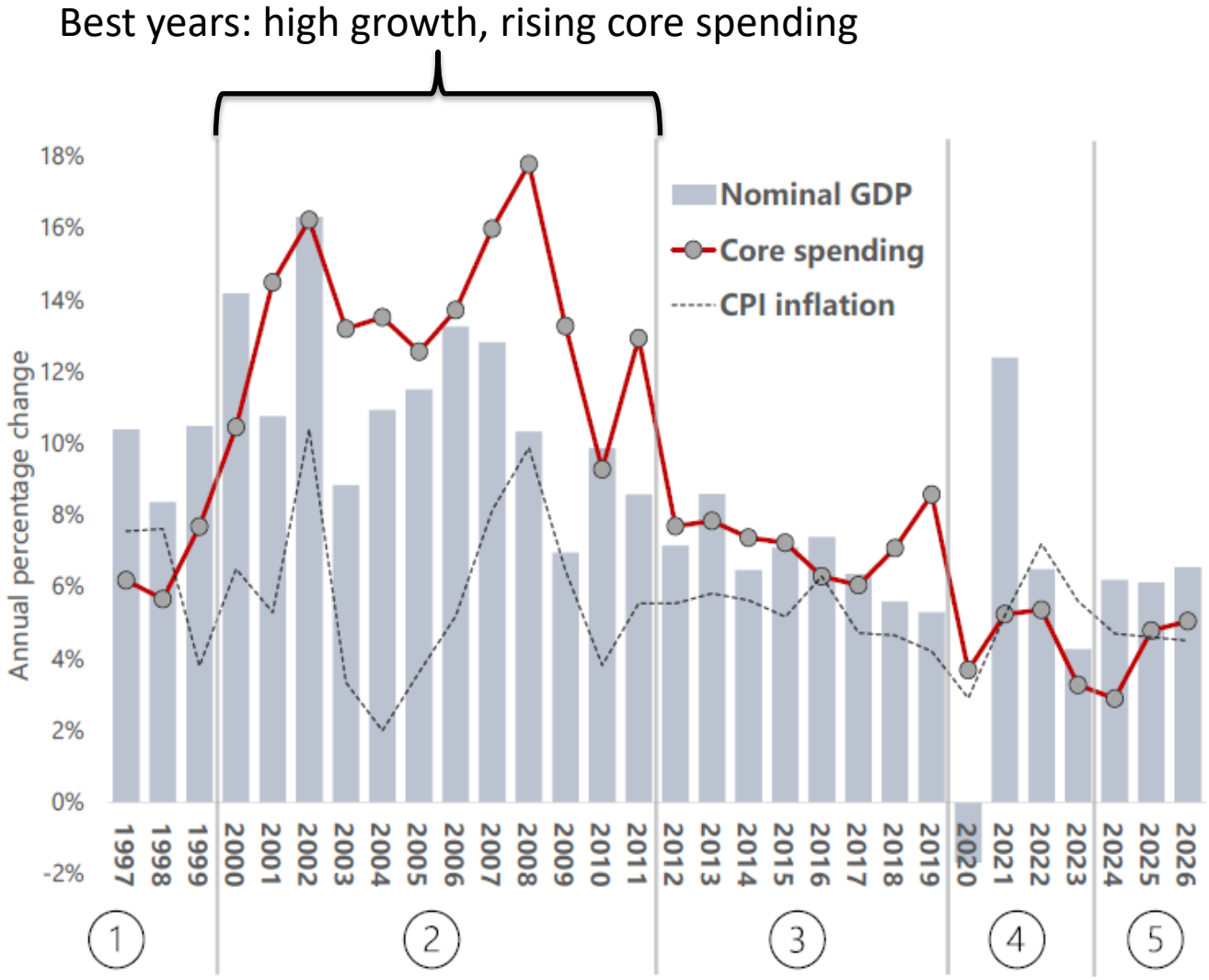
Source: Author's computation using data from ASISA

Source: Mashinbye. CIS = Collective Investment Schemes (unit trusts)

Redistributive fiscal policies

- 10% of the population pay 72% of the taxes
- **60% of state expenditure benefits the poor**

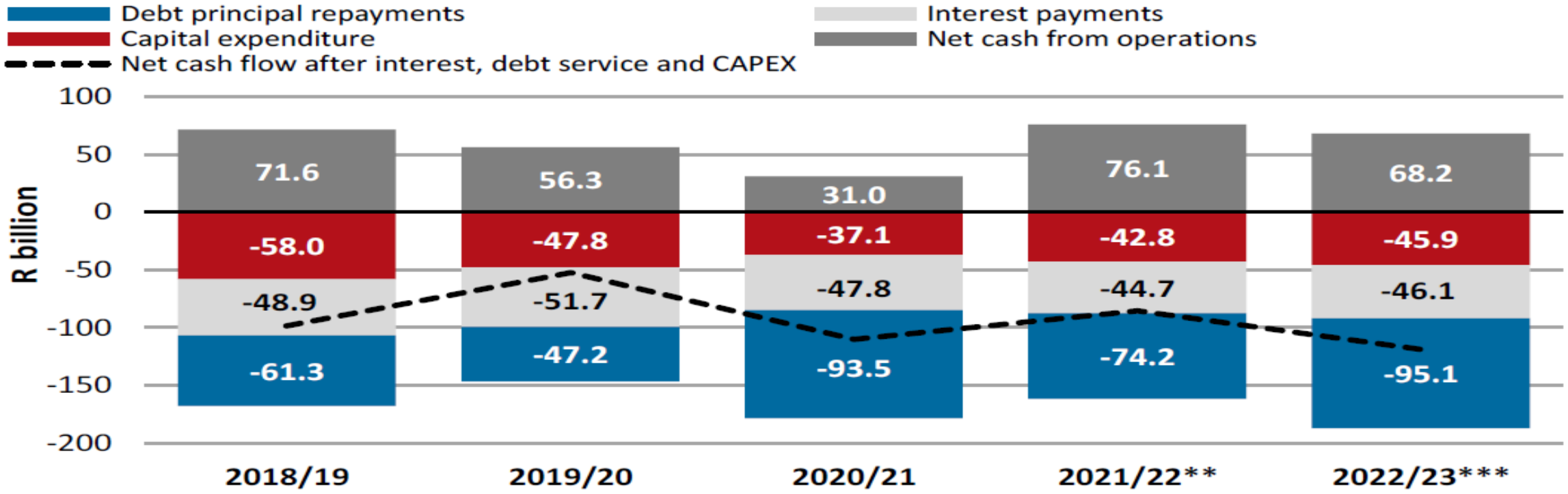
- 10% of the ‘chronic poor’ (50% of all households) transitioned out of poverty, 2008-2014 – social grants
- 40% of the transient poor (10% of all households) transitioned out of poverty, 2008-2014 – social grants, subsidies, micro-credit
- middle class deracialised, maintained its living standards through massive increases ir consumer debt levels
- Elite wealth increased the most, mainly pensions & bonds



(Source: Sachs, 2021)

SOEs could have driven GFCF, but failed – cash flow for 2018-2023

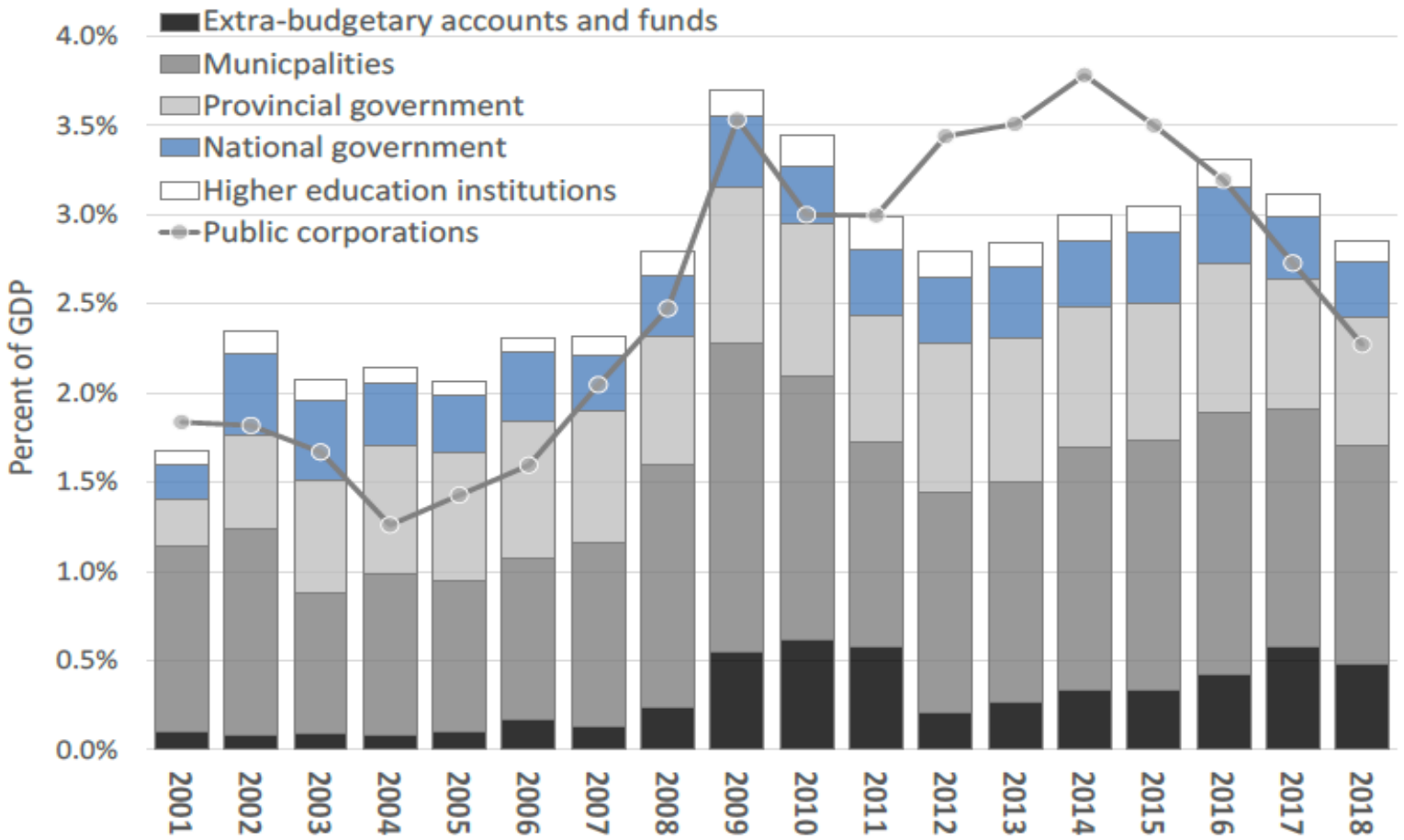
Figure 8.1 Consolidated cash flows at state-owned companies*



*State-owned companies listed in the PFMA schedule, excluding development finance institutions
**Please note that numbers may differ from earlier publications due to restatement or error
***Due to reporting delays, unaudited financial results or quarter 4 reports for 2022/23 were used
Source: National Treasury

Source: National Treasury, 2024. Budget Review. p.83

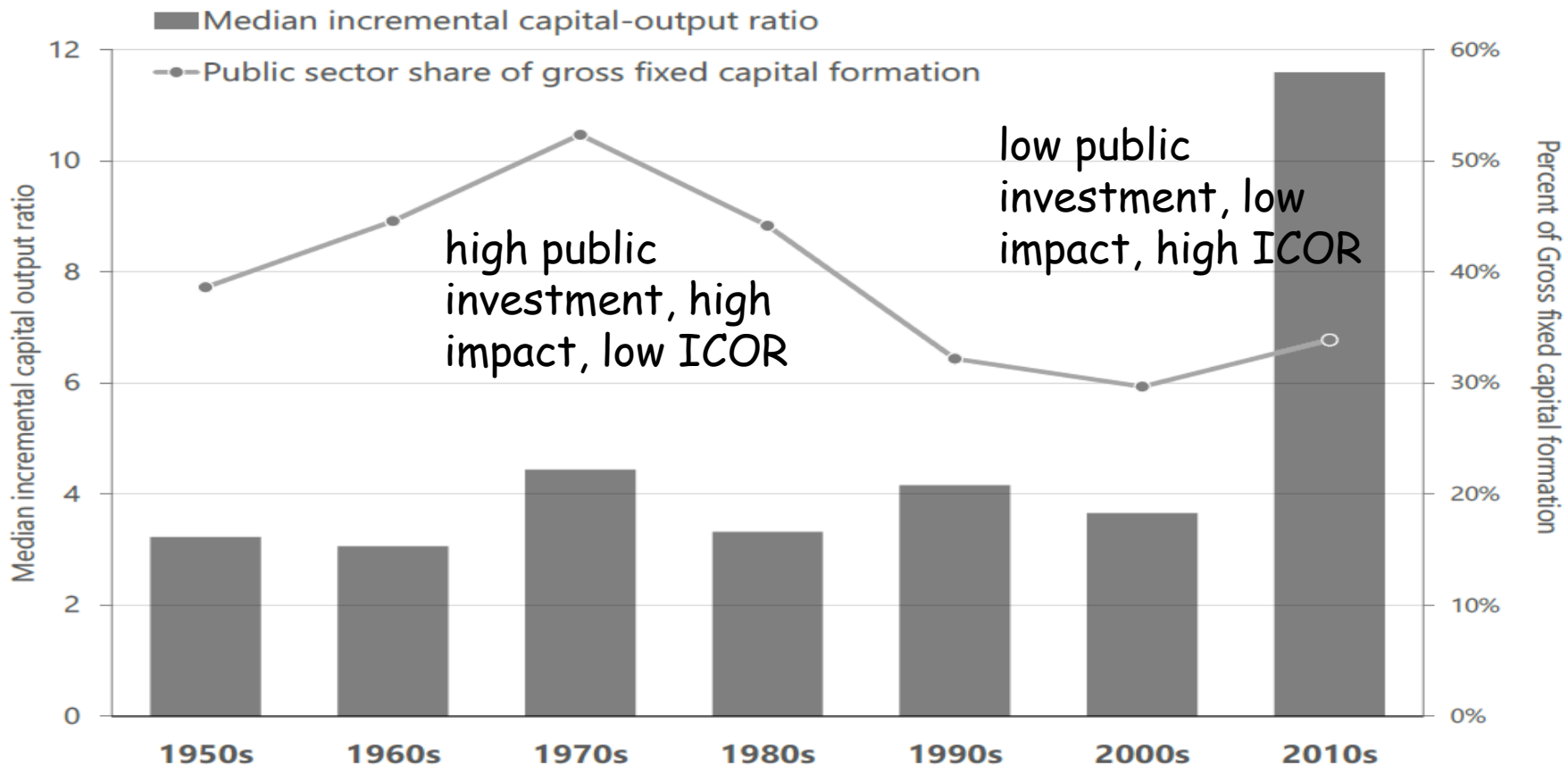
Capital Spending by Public Sector Institutions (2001-2018)



(Source: Sachs, 2021)

Public Investment and the Incremental Capital-Output Ratio (ICOR)

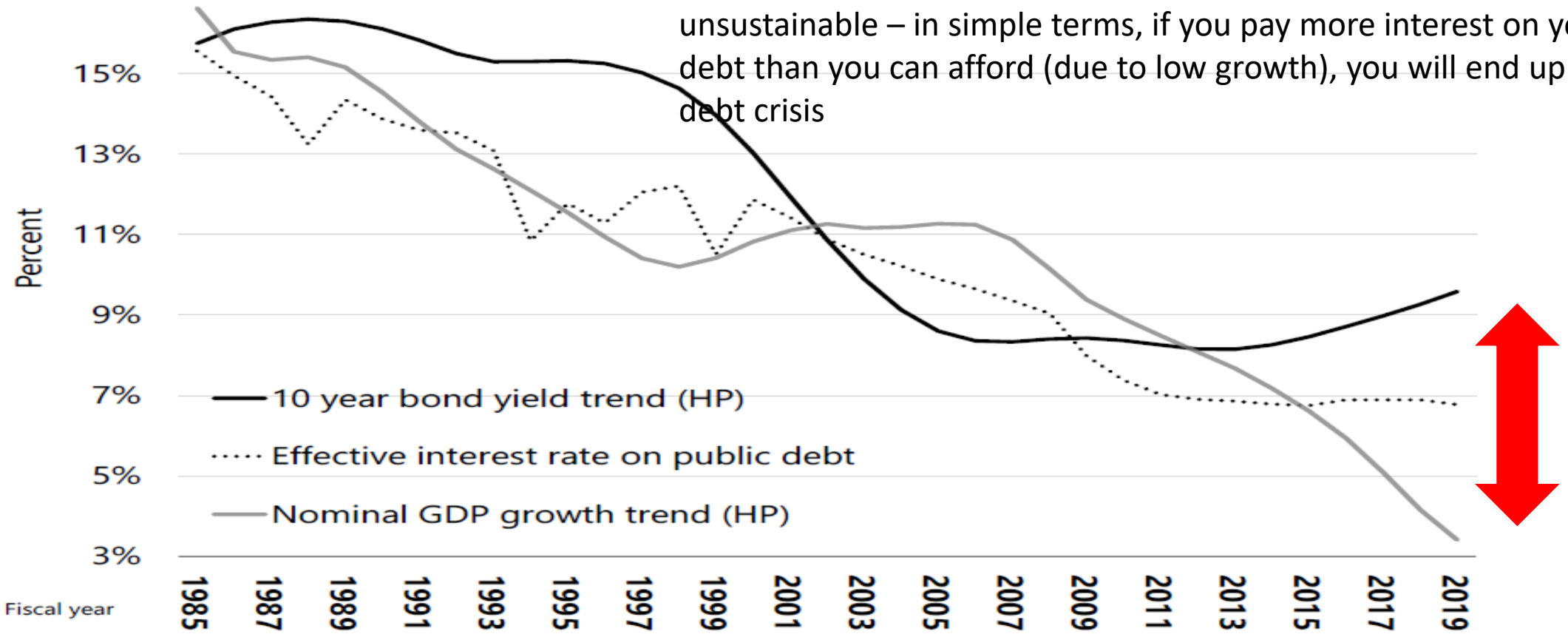
ICOR: how much you need to invest for a given output – if you spend more & get less, ICOR rises



(Source: Sachs, 2021)

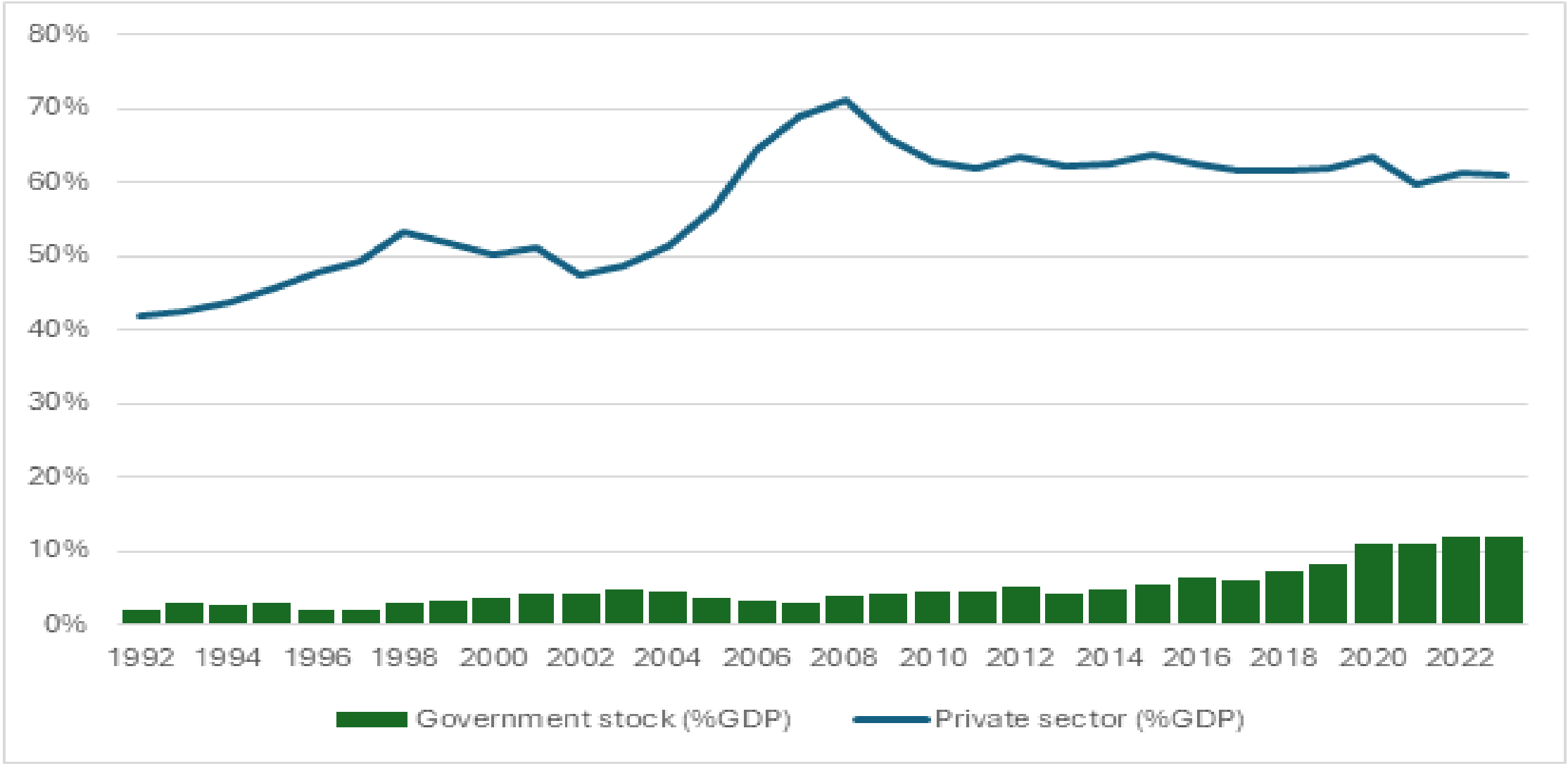
Government's interest on debt and the trend in nominal GDP growth

Note: when the effective interest rate on public debt and the bond yield is consistently higher than the growth rate, then your debt is unsustainable – in simple terms, if you pay more interest on your debt than you can afford (due to low growth), you will end up in a debt crisis



(Source: Sachs, 2021)

Credit provided by banks, 1992-2022

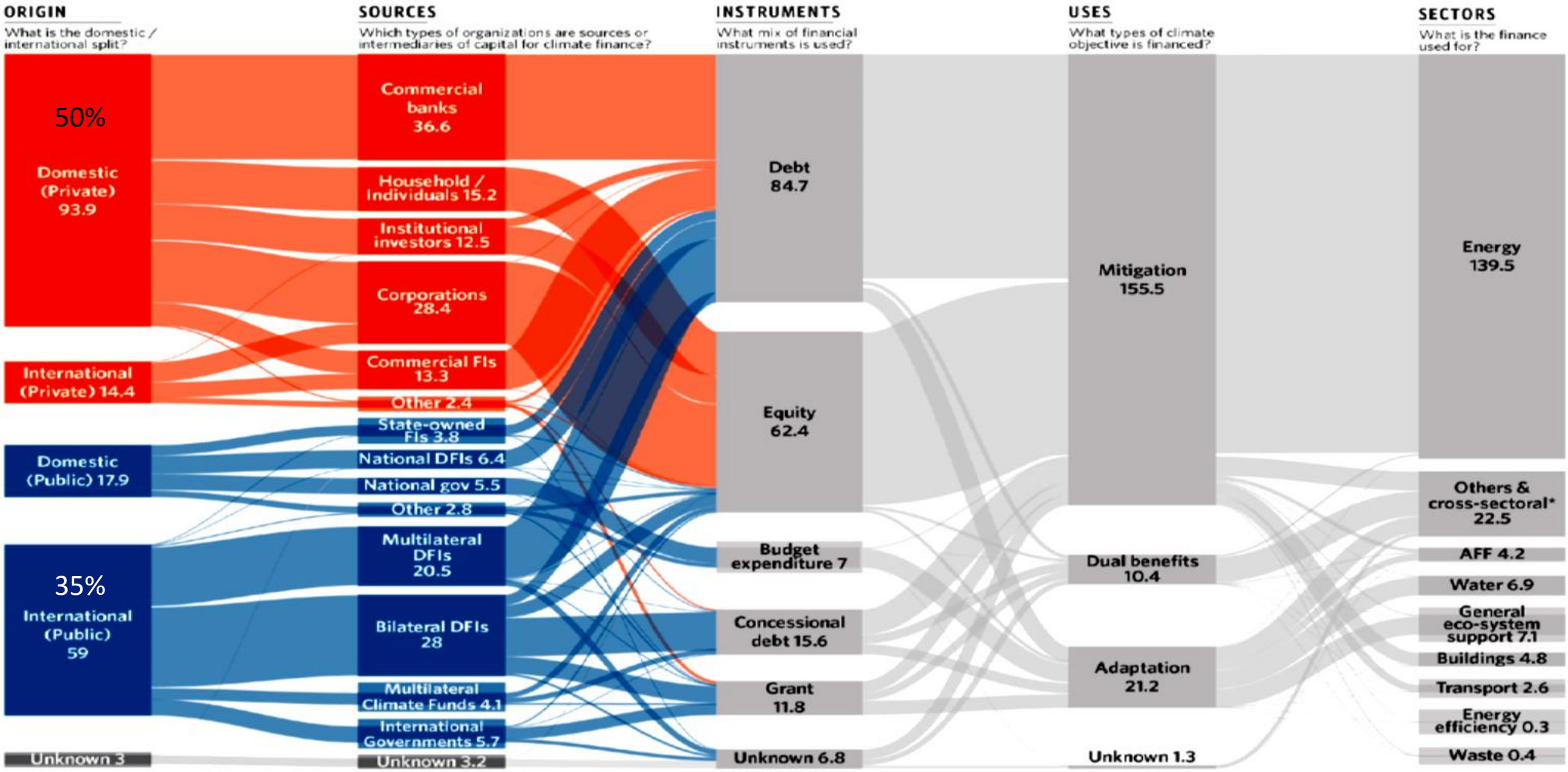


LANDSCAPE OF CLIMATE FINANCE IN SOUTH AFRICA, 2022-2023

ZAR billion

188.3 BILLION ZAR

CLIMATE POLICY INITIATIVE



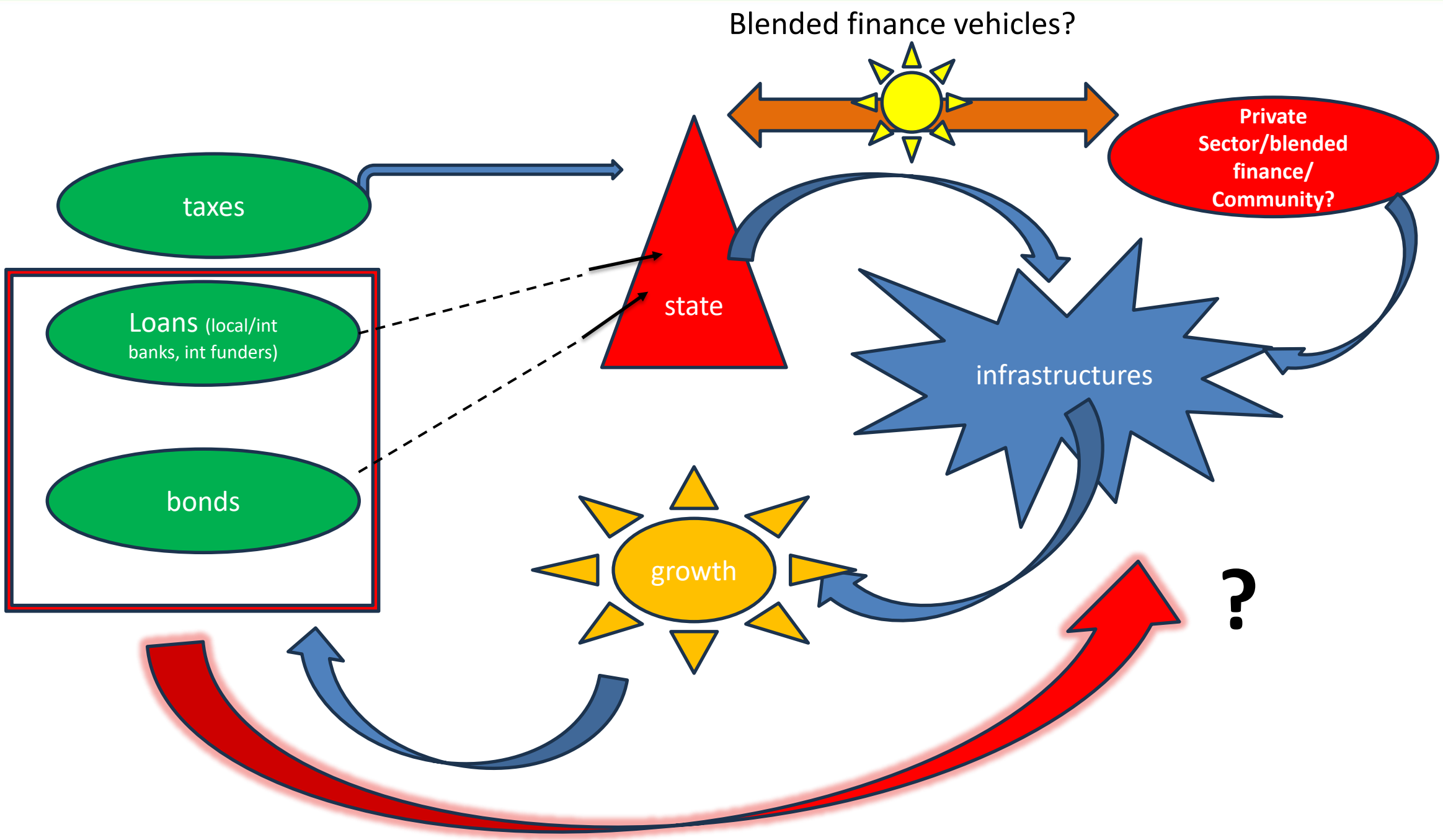
PRIVATE PUBLIC

"Other" private sources include Funds and Third Sector Organisation.
"Other" public sources include Public Funds, SOE and Provincial Government.

**Includes projects and investments that cannot be attributed to a single sector, such as multi-sector programmes, cross-cutting technical assistance, policy and regulatory support, capacity building, and enabling environment activities.*

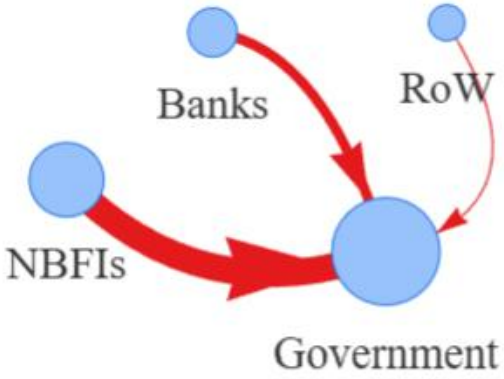
Summary

- No growth possible with declining levels of investment in GFCF
- Drivers of this decline: SOE weaknesses, NFCs not re-investing in productive capacity, SMEs starved of capital
- Yet, finance system grows faster than the real economy, resulting in increased quantities of cash making money from cash
- 45% leaves SA (Reg 28) – but now maxed out
- Growth of shadow banks caused by need to continuously increase the velocity of financial flows through the financial system
- Plenty of capital to invest in our infrastructures
- Building the pipeline of projects is the challenge

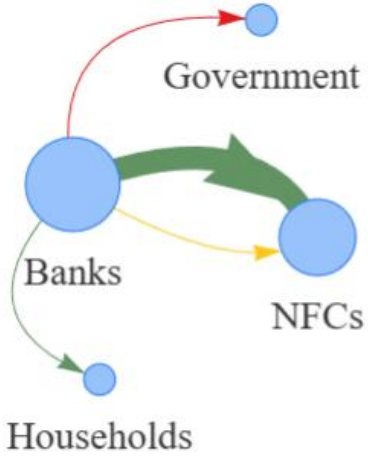

Blended finance vehicles?
taxes
Loans (local/int banks, int funders)
bonds
state
Private Sector/blended finance/ Community?
infrastructures
growth
?

Illustrative scenarios of financing schemes

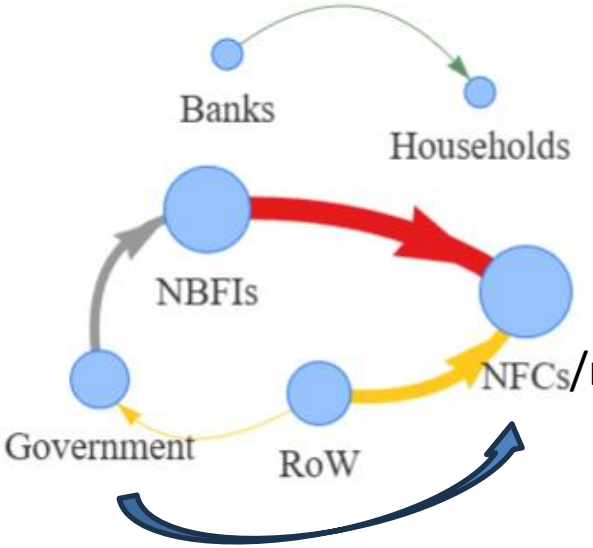
Public Debt Push



Bank Credit Expansion

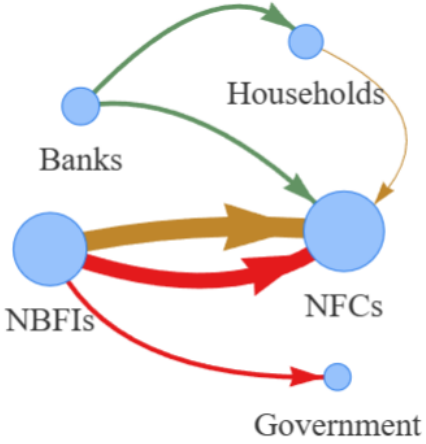


Blended Concessional Finance

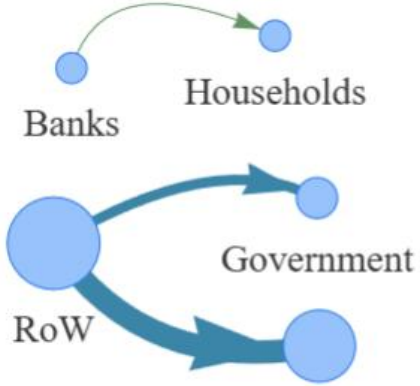


/new FIs (eg IF)

Inst. Savings Mobilization



Foreign Green Bonds



NFCs /new FIs (eg IF)

- Debt securities in domestic currency
- Debt securities in foreign currency
- Loans in domestic currency
- Mortgage in domestic currency
- Loans in foreign currency
- Equity in domestic currency
- Equity in foreign currency
- Guarantee (contingent)

Possible elasticity spaces – not recommendations, 'thought scenarios'

1. **DFIs**: make the SARB the prudential authority for all or some of the major DFIs (IDC, DBSA, LB), regularize their participation in the capital markets, double their asset base with support from the SARB balance sheet
2. **Pension funds**: create viable vehicles for redirecting at least 20% of pension fund assets into infrastructure (R1 trillion), including guarantee mechanisms, partnership structures (e.g. IF, WA) – key role for PIC/GEPF. Calibrated reduction of 45% cap on outward flows to growth of internal pipeline
3. **New guarantee mechanisms:** given limits to sovereign guarantees, new mechanisms needed, e.g. WB/MIGA proposal
4. **Strengthen the Infrastructure Fund (blended finance):** more effective leverage of private funding, possible role for unclaimed funds
5. **SOEs**: clear strategic goals and effective capabilities to restore the SOEs – HOLDCO solution has been dropped. Is there room for a major equity injection subject to conditions? (Worked with Eskom last year.) Shareholder diversification?
6. **Change the risk-reward profile of the banking sector**: prudential reforms that change the risk calculus, incentives to re-direct lending into GFCF and to support small businesses, and dismantle oligopolistic practices (Banking Enquiry)
7. **Incentivise re-investment of profits in fixed assets by NFCs:** role for JSE to limit use of dual listing for capital exports with limited local development impact, and reform that create tax incentives for re-investment (German model)

Elasticity spaces - continued

8. **Small formal business access to finance:** public sector support (e.g. R100 m Transformation Fund), prudential reforms and changes in banking strategy
9. **Role of shadow banks:** with pension funds, and DFIs, could be heavy lifters – skilled, agile, large asset base, but incentive structure is inappropriate
10. **New approach to project-level finance:** BOT and BOOT solutions as applied in the toll roads projects and now planned for ITPs, are going to be key for leveraging private sector funding (can REITS play a role)?
11. **Expanding the middle class:** this means strengthening existing middle class balance sheets, but also ensuring those below the poverty line and on the brink of poverty are strengthened and those aspiring to be middle class are supported with various mechanisms. This will include a specific focus on women-headed households – 42.3% of all households are headed up by women, higher amongst poorer households
12. **SARB's role in climate proofing**: climate-related prudential reforms, incorporation of DFIs under the SARB balance sheet to extend DFI role in climate financing, consideration of stranded assets
13. **Strategic re-alignment of GEPF to focus on the NDP target for GFCF (30% of GDP):** not just returning as an investor in Government bonds (which is NB), but also investing in the ITPs, and a hands-on approach to helping SOEs to reform to become more effective lenders and implementers
14. **Households**: instead of focussing on poverty, focus on wealth – how to grow the middle class and limit the way the bond market reinforces inequality, and find vehicles that combine liquidity & long-term investing

Non-equilibrium modelling

- CGE models exclude finance & climate damage factor
- assumes s = i, i.e. savings equals investment – but this is not true, but a necessary assumption if finance is excluded
- endogenising finance & a climate damage factor – becomes, by definition, a non-equilibrium model
- tendency towards equilibrium vs non-equilibrium
- if tendency towards non-equilibrium, then state intervention is necessary & justifiable
- building SA's first non-equilibrium model: NT, DBSA, AFD, PCC, CST
-

In a nutshell…..

- SA, like all African countries, has to massively increase investments in GFCF, infrastructure in particular
- With limited fiscal space, constrained monetary policies, declining ODA and FDI, where will be the money come from? (Government: ‘we don’t have enough money’)
- In a credit-based system (i.e. post-1971), the architecture of a financial eco-system can be understood as a web of interlocking balance sheets
- Capital flows are a function of these interlocking balance sheet configurations
- What then are the range of balance sheet reconfigurations that can unlock new and expand existing capital flows?
- In short, we need to better understand how our existing domestic financial eco-systems work, & the available elasticity spaces
- Key conclusion: there is more than enough capital in the SA financial *system* to fund our infrastructure programmes

Summary storyline:

Since 1994, profits made by private companies have in general been high relative to profit margins in other countries, but reinvestments in GFCF* (i.e. fixed assets like infrastructures, factories, buildings, farms, ports, etc) have been low. South Africa's total investments in GFCF have been declining – out of 44 upper middle-income countries, South Africa is third last - only Guatamala and Equitorial Guinea are lower. Instead of going into productive assets, profits went into consumption, debt, fancy financial instruments and the JSE. Consumption-led growth during the 2000-2012 period resulted in rising pro-poor spending. SOEs – comprising 30% of GDP – initially did well, but over time became inefficient and eventually corrupt, resulting in them producing less and less as they spent more and more (rising ICOR). Public investment in GFCF (i.e. infrastructure) declined. Over time, Government debt grew and the private sector took more and more money out the country. Result 1: worsening inequality - 0.1% of the population (35 000 individuals) have twice the wealth of 90% of the population. Result 2: declining levels of investment in public infrastructure and private fixed assets. Solution: a series of balance sheet reconfigurations to unlock and direct capital into productive investments (total GFCF) that create the preconditions for growth and effective redistribution, including incentivizing re-investment of profits in expansion. This is an alternative to a limited focus on fiscal restraint, tight monetary policies and hopeful statements about private sector-led growth.

(*GFCF = Gross Fixed Capital Formation)