Macroeconomic Diagnostics (MDSx)

Module 11

External Sustainability and External Vulnerability

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Course: MDSx

Module: 11

Section: 1

Video #: 1

Video Title: About Module 11

Video Type: Standard

Key Ideas

External financing tightening / “sudden stops” / currency crises

Output drop, high unemployment, import compression

Insolvent and illiquid countries are the most vulnerable

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Course: MDSx

Module: 11

Section: 2

Video #: 1

Video Title: Balance of Payments and Debt Creating Flows

Video Type: Standard

Balance of Payments and Debt Creating Flows

$$CA = NX + \text{Primary and Secondary Income}$$

Primary Income	**Cross-border compensation of employees** **Investment Income:** Receipts minus payments, including dividends, repatriated profits and interest paid on foreign debt
Secondary Income	**Transfers, including:** Government donations/aid Worker's remittances Taxes, social contributions, other items.

Balance of Payments and Debt Creating Flows

$$\text{Primary Income} = -i^f D^f + \textit{other primary income}$$

$i^f D^f$ = interest payments on debt

i^f = external (dollar) interest rate

D^f = (gross) outstanding debt

Balance of Payments and Debt Creating Flows

The primary current account (CAP):

$$CAP = NX + \text{"Other primary income"} + \text{secondary Income}$$

$$\text{Primary Income} = \underbrace{\text{ioa}_t}_{\substack{\text{Income on other} \\ \text{assets,labor}}} - id_t^f$$

$$\text{Secondary Income} = \underbrace{\text{tr}_t}_{\text{Transfers}}$$

Balance of Payments and Debt Creating Flows

Financial account:

Non-debt financing items (FDI, equity) and debt creating flows.

$$\text{Financial account} = \underbrace{oaf_t}_{\text{Other net asset flows}} - \Delta d_t^f$$

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Section: 2

Video #: 2

Video Title: Debt and the NFA

Video Type: Standard

Debt and the NFA

NFA

Net Foreign Assets (NFA) –

also called the “Net International Investment Position (NIIP)

Comprehensive measure –

ALL accumulated claims on ROW minus ALL ROW’s accumulated claims on us

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What the rest of the world owes us minus what we owe them.

Debt and the NFA

Let us recall:

$$NFA_t = NFA_{t-1} + CA_t + KG_t + EO_t$$

KG_t Capital gains from valuation changes

EO_t KA transfers, errors/omissions

Assume for simplicity: $KG_{i,t} = EO_{i,t} = 0$

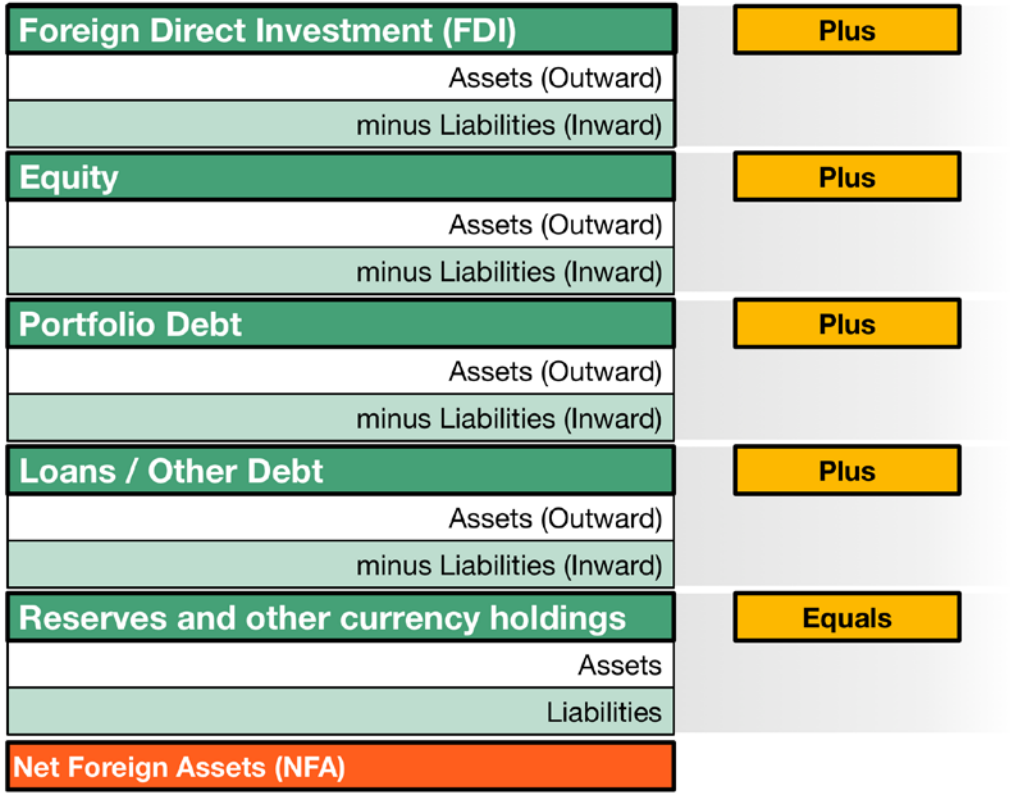
Debt and the NFA

$NFA < 0$ We owe rest of the world more than it owes us.

$NFA > 0$ Rest of the world owes us more than we owe it.

Debt and the NFA

Composition of NFA:



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Video #: 3

Video Title: External Debt Dynamics

Video Type: Standard

External Debt Dynamics

$$d_t^f = \frac{(1+r_t)}{(1+g_t)} d_{t-1}^f - cap_t + oaf_t$$

Today's foreign debt increases when:

Interest rate increase

Growth decreases

Primary current account increases

Other asset flows increase (borrowing to financing outward FDI")

External Debt Dynamics

Steps to get debt-GDP ratio dynamics:

1. Derive in dollar (or other currency) terms.

2. Scale by GDP.

External Debt Dynamics

$$CAB_t = FA_t = (\underbrace{\text{Non-debt creating inflows OAF}_t}_{Asset+}) - \underbrace{D_t^f - D_{t-1}^f}_{\text{Debt creating flows}}$$

$$D_t^f - D_{t-1}^f = -CAB_t + (\underbrace{Non\text{-}debt\ creating\ inflows\ OAF_t}_{Asset+})$$

Derive in dollar (or other currency) terms:

Split up FA – debt/non debt

Solve for change in debt

External Debt Dynamics

$$D_t^f - D_{t-1}^f = i_t^f D_{t-1}^f - CAP_t + OAF_t$$

$$D_t^f = (1 + i_t^f) D_{t-1}^f - (CAP_t - OAF_t)$$

Derive in dollar (or other currency) terms:

- Split up FA – debt/non debt
- Solve for change in debt
- Split out primary current account and interest payments

External Debt Dynamics

$$D_t^f = (1 + i_t^f) D_{t-1}^f - CAP_t + OAF_t$$

Today's foreign debt equals :

Yesterdays foreign debt capitalized

Minus primary current account balance

Plus other asset flows increase (borrowing to finance outward FDI)

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Course: MDSx

Module: 11

Section: 2

Video #: 4

Video Title: External Debt to GDP Ratio

Video Type: Standard

External Debt/GDP Ratio

Steps to get debt-GDP ratio dynamics:

1. Derive in dollar (or other currency) terms.

2. Scale by GDP.

External Debt/GDP Ratio

$$D_t^f = (1+i_t^f)D_{t-1}^f - (CAP_t - OAF_t)$$

$$\frac{E_t * D_t^f}{P_t\ Y_t} = (1+i_t^f)\frac{E_t D_{t-1}^f}{P_t\ Y_t} - \frac{E_t * (CAP_t - OAF_t)}{P_t\ Y_t}$$

External Debt/GDP Ratio

Today's exchange rate equals yesterday's times one plus growth rate.

$$E_t = E_{t-1}(1+\varepsilon_t)$$

Today's nominal output equals yesterday's times one plus growth rate.

$$P_t Y_t = P_{t-1} Y_{t-1}(1+g_t)*(1+\pi_t)$$

External Debt/GDP Ratio

$$\frac{(1+i_t^f)E_t D_{t-1}^f}{P_t\ Y_t} = \frac{(1+i_t^f)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)} \frac{E_{t-1} D_{t-1}^f}{P_{t-1} Y_{t-1}}$$

$$\frac{E_t * D_t^f}{P_t\ Y_t} = \frac{(1+i_t^f)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)} \frac{E_{t-1} D_{t-1}^f}{P_{t-1} Y_{t-1}} - \frac{E_t * (CAP_t - OAF_t)}{P_t\ Y_t}$$

Today

Yesterday

Today

External Debt/GDP Ratio

Effective NOMINAL interest factor = $(1+i_t^f)(1+\varepsilon_t)$

Effective REAL interest factor = $(1+r_t) = \dfrac{(1+i_t^f)(1+\varepsilon_t)}{(1+\pi_t)}$

Growth adjusted REAL interest factor = $\dfrac{(1+i_t^f)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)} = \dfrac{(1+r_t)}{(1+g_t)}$

External Debt/GDP Ratio

Final expression – debt dynamics in percent of GDP:

$$d_t^f = \frac{(1+r_t)}{(1+g_t)} d_{t-1}^f - cap_t + oaf_t$$

$$cap_t = nx_t + ioa_t + tr_t$$

External Debt/GDP Ratio

$$d_t = d_{t-1}\frac{(1+r)}{(1+g)} - pb_t$$

Fiscal

$$d_t^f = d_{t-1}^f\frac{(1+r)}{(1+g)} - cap_t + oaf_t$$

External

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Video #: 5

Video Title: Debt Dynamics and Stabilization in Excel, Part 1

Video Type: Excel

Debt Dynamics and Stabilization

$$d_t^f = \frac{(1+r_t)}{(1+g_t)} d_{t-1}^f - cap_t + oaf_t$$

EXCEL

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Module: 11

Section: 2

Video #: 6

Video Title: Debt Dynamics and Stabilization in Excel, Part 2

Video Type: Excel

EXCEL

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Course: MDSx

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Section: 2

Video #: 7

Video Title: External Debt Sustainability

Video Type: Standard

External Debt Sustainabilty

How we close the gap:

Exchange rate adjustment (“expenditure switching”) –

As discussed in previous module

Caution –

If RER depreciates, debt ratio by itself also rises (effective real interest rate).

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Module: 11

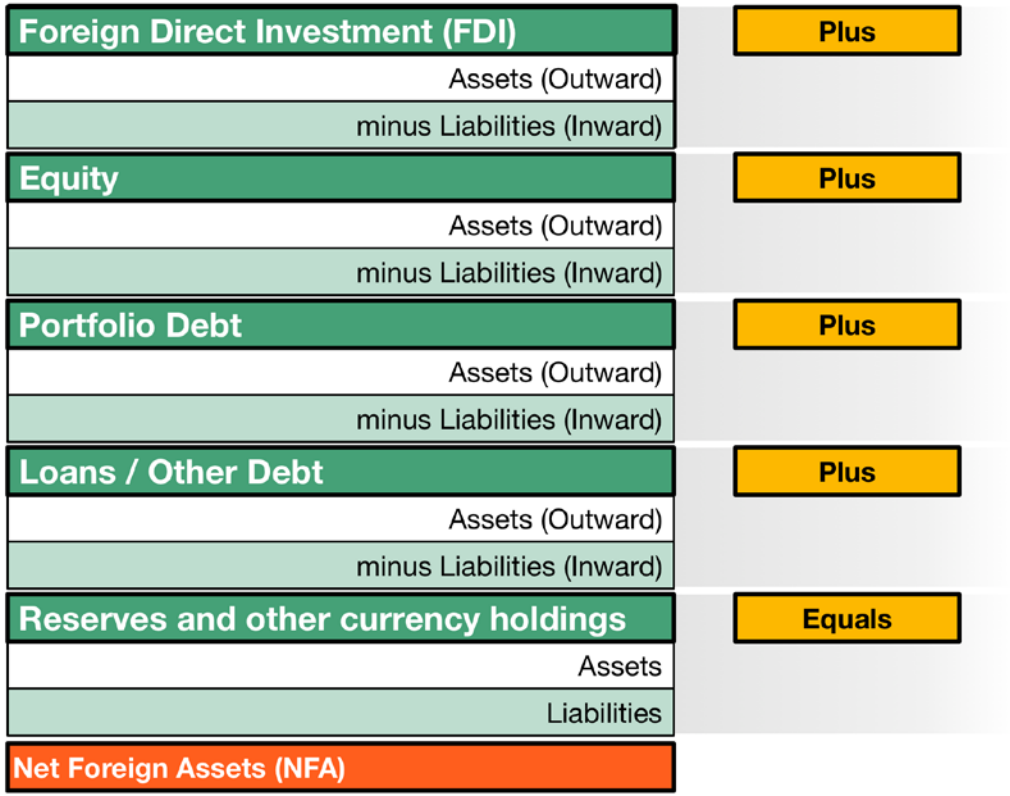
Section: 3

Video #: 1

Video Title: Benefits and Costs of International Reserves

Video Type: Standard

Benefits and Costs of International Reserves



Benefits and Costs of International Reserves

Benefits:

Insurance/buffer – as we will discuss

Higher reserves – more market confidence, less speculation

Costs:

Opportunity cost/alternative use: retire public debt, finance capital expenditure

Sterilized intervention – interest rate costs

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Section: 3

Video #: 2

Video Title: Reserves and Financial Shocks

Video Type: Standard

Reserves and Financial Shocks

External financial tightening:

Sterilized foreign exchange intervention

Prevent depreciation by selling reserves and purchasing domestic money

Stabilize liquidity and interest rates through “sterilization” which is offsetting increase in net domestic assets

Shield economy from disruptive short-term financial volatility

Reserves and Financial Shocks

The perils of foreign exchange intervention:

An risky but attractive option

Keeping interest rates low may encourage more financial outflows

Financial tightening may last longer than expected

Reserves loss can be worse than originally envisaged

Reserves and Financial Shocks

Speculation may hasten the depletion of reserves:

- Speculators would like to buy foreign exchange while cheap
  - Anticipating a devaluation they will purchase reserves even faster
  - Higher reserve holdings can help to buttress confidence
  - Even so sterilized intervention is only a short-run option

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Section: 3

Video #: 3

Video Title: Reserves and Trade Shocks

Video Type: Standard

Reserves and Trade Shocks

Decrease in Terms of Trade (ToT):

Similar logic to financial case

Shortfall originates in current account (not financial account).

Lower export prices without intervention lead to exchange depreciation

Sterilized intervention performs the same smoothing over function

Reserves and Trade Shocks

More perils of intervention:

Terms of trade decline temporary vs. permanent

Failure to adjust exchange rate may delay needed shifts in composition of production and spending

Once again sterilized intervention is not a long-run option

Speculative dangers lurk here as well

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Course: MDSx

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Section: 3

Video #: 4

Video Title: The Reserve Adequacy Metric

Video Type: Standard

Assessing Reserve Adequacy

Traditional Metrics:

Import cover for countries with relatively closed capital accounts

Short-term debt for countries with large short-term cross-border financial transactions

Broad money (M2) for countries with large banking sectors and very open capital accounts

Assessing Reserve Adequacy

IMF's Assessment Method:

	Percent (%)	Short-term debt	Other liabilities	Broad money	Exports
Revised	Fixed	30%	20%	10%	10%
	Float	30%	15%	5%	5%

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Module: 11

Section: 3

Video #: 5

Video Title: The Reserve Adequacy Metric in Excel

Video Type: Excel

EXCEL

Required to effectively communicate video segments.

Course: MDSx

Module: 11

Section: 4

Video #: 1

Video Title: Summarizing What We Have Learned

Video Type: Standard

Summarizing What We Have Learned

Different perspectives of External Vulnerabilities

Previous modules:

Composition of current and financial account.

External balance assessment of current account and real exchange rate.

This module:

- Debt sustainability
- Reserves adequacy

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Module: 11

Section: 4

Video #: 2

Video Title: [CONVERSATION]

Video Type: Standard

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Module: 11

Section: 5

Video #: 1

Video Title: Assessing Diagnostica

Video Type: Standard

Reserves and Financial Shocks

$$CA = FA(non\text{-}res) + \Delta Int'l\ Reserves$$

WE MAY NOT NEED THIS.

Stock / flow relationships – foreign exchange intervention.

Peg exchange rate more valuable than the market – spend reserves.

Peg exchange rate that is cheap relative to the market – accumulate reserves.

Reserves and Trade Shocks

Increase in Terms of Trade (ToT):

Intervention to keep RER from **appreciating**

Financial inflows remain constant

Central bank must sell international reserves

Central bank will eventually run out of reserves

Key Ideas

Assess capacity to:

Service external obligations – external debt sustainability

Smooth currency fluctuations and weather headwinds – reserve adequacy

Debt and the NFA

Fiscal sustainability:

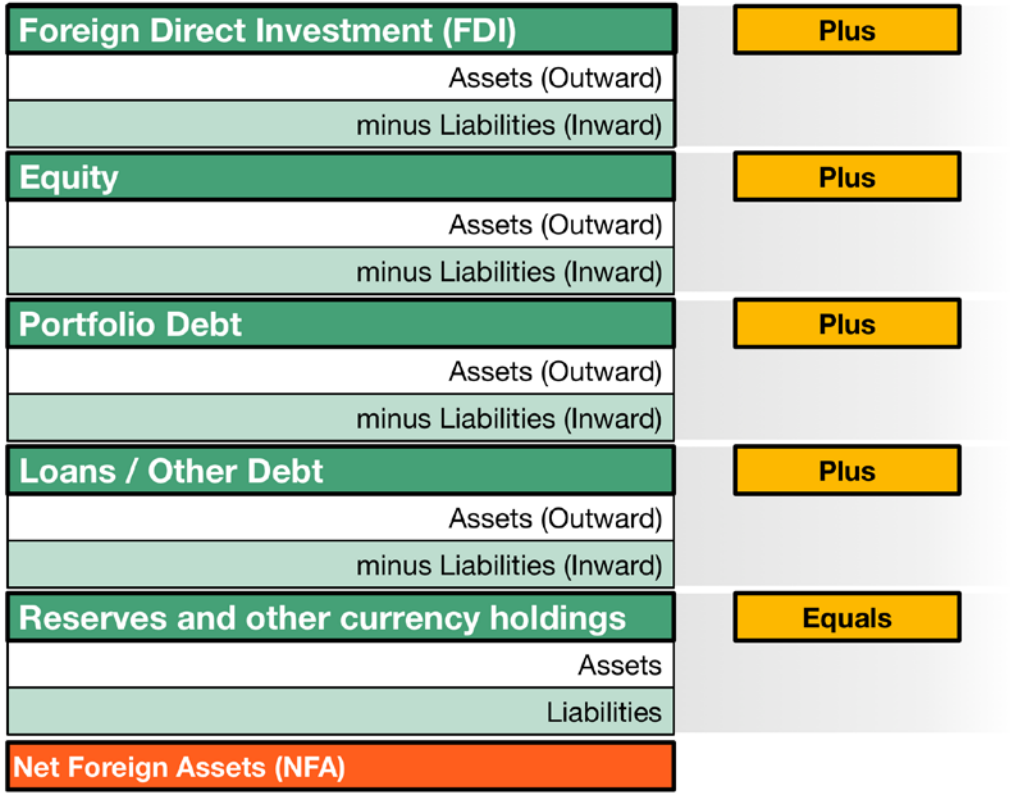
Will public sector be able to cover principle and interest on debt – no default, restructuring, or high inflation.

External debt sustainability:

Will country be able to cover principle and interest on debt – no default, restructuring, or high inflation.

Debt and the NFA

Contractural Debt Elements of NFA:



Debt and the NFA

Resources to service debt come from:

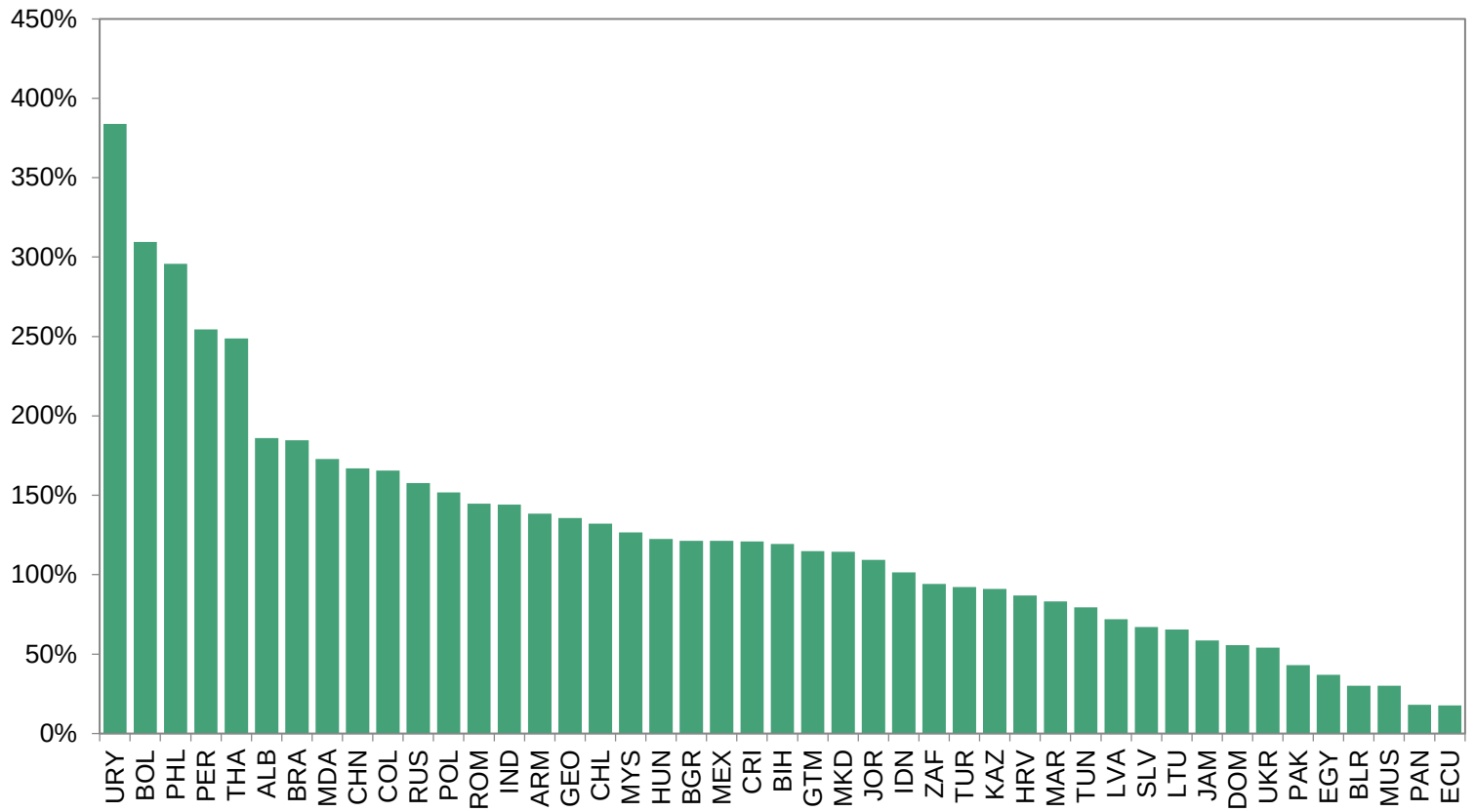
Net exports

Inward transfers

Other asset income

Elements of the ‘primary current account’.

Assessing Reserve Adequacy



Assessing Reserve Adequacy

IMF's Assessment Method:

	Percent (%)	Short-term debt	Other liabilities	Broad money	Exports
Revised	Fixed	30%	20%	10%	10%
	Float	30%	15%	5%	5%

Note: Existence of capital controls allows for judgment in reducing weights on "broad money" and "other liabilities".