Current Account

i. Goods and Services account

   Exports (credit)

   Imports (debit)

ii. Primary income account

   Investment income

iii. Secondary income account

   Personal transfers, international cooperation

Financial Account

i. Direct investment

ii. Portfolio investment

    Equity

    Debt securities

iii. Financial derivatives

iv. Other investment

    Banks loans, trade credit, etc.

Balance of Payments Analytic Presentation

1) Current Account CA
2) Capital Account +KA
3) Financial Account - FA
4) Errors and Omissions +ÈRO
5) Overall Balance = OB

Total Financing

Reserve Assets ✓
IMF Credit and Loans ✓
Exceptional Financing ✓

Exchange Rate: Definitions

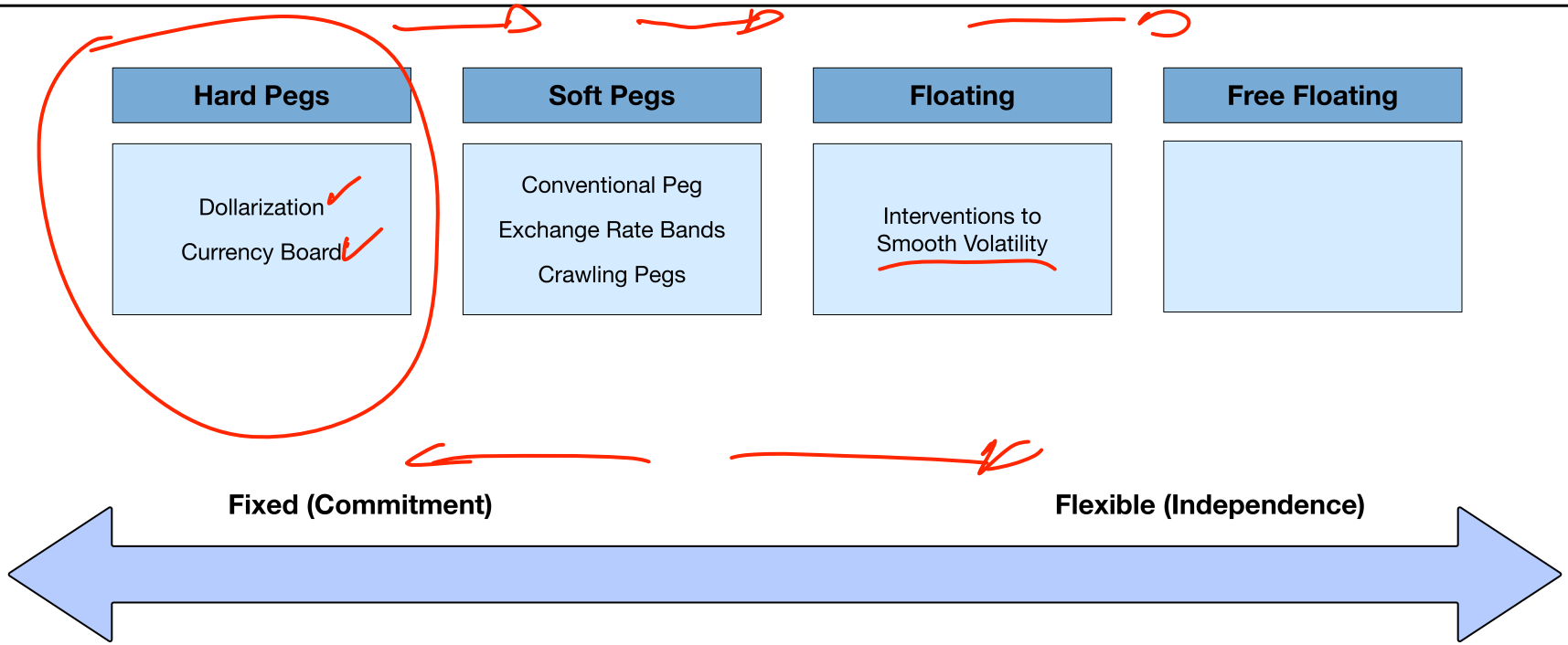
Nominal Exchange Rate (NER) – the price of one unit of a currency in terms of units of another currency

In this course… LCU/$ such that increase (decrease) in NER is a depreciation (appreciation)

Real exchange rate (relative prices):

$$\mathbf{RER = NER*(Pf/P)}$$

Range of Exchange Rate Regimes



Exchange Rate Determinants

Economic Fundamentals:

Inflation at home and abroad

External Financial Factors:

Foreign interest rates, uncertainty in international capital markets, etc.

Expectations:

Today's value of the exchange rate is linked to expectations about tomorrow's value (asset price)

Economic policy:

Fiscal, monetary, exchange rate regime (fixed, floating, intermediate)

Purchasing Power Parity and the Law of One Price

Arbitrage condition in goods markets.

Absolute PPP. For all 'i':

$$P_i = NER^*(Pf_i)$$

$$RER = NER^*(Pf/P) = 1$$

Relative PPP focuses on changes rather than levels:

$$\Delta RER \approx \Delta NER + (\pi \text{ abroad}) - (\pi \text{ home country})$$

Uncovered Interest Parity (UIP)

Arbitrage condition in financial markets and risk neutrality

$$(1+i_t) = (1+i_t^f)*[E(NER_{t+1})/(NER_t)]$$

Re-arranging yields:

$$NER_t = E(NER_{t+1})*[(1+i_t^f)/(1+i_t)]$$

Incorporating a country risk premium:

$$(1+i_t) = (1+i_t^f)*(1+rp_t)*[E(NER_{t+1})/(NER_t)]$$

UIP: Numerical Example

Assumptions: Investor has 100 pesos, $i_t = 5\%$, $i^f_t = 2\%$ and $NER_t = 4$ (P/$)

	Home Security (Pesos)	Foreign Security (Dollars)
t	100	100/4 = 25
t+1	100 · (1.05) = 105	25 · (1.02) = 25.5
$E(NER_{t+1})$ according to UIP		25.5 · $E_t NER_{t+1}$ = 105

$= 4.1$

UIP arbitrage dictates an expected depreciation of 2.9%

Another Useful Way to Look at the UIP

If NER_{t0} is the "correct" LR value, increase in domestic rates will lead to immediate NER appreciation…

	t0	t1	t2
i	2%	5%	2%
i^f	2%	2%	2%
NER (P/$)	4.1	$1000(1.05) = \frac{100}{NER_{t1}} \cdot (1.02) \cdot 4.1$ $= 4$	4.1

NER will appreciate by 2.9% in t1, before returning to equilibrium

Uncovered Interest Parity in Real Terms

Also useful to consider UIP in real terms, assume perfect foresight for simplicity:

$$(1+r_t) = (1+r_t^f)*(1+rp)*(RER_{t+1}/RER_t)$$

If we take logs, can approximate as:

$$r_t \approx r_t^f + rp_t + (rer_{t+1} - rer_t)$$

Traded and Non-Traded Goods (1 of 2)

RER = NER*(Pf/P), take logs:

$$rer = ner + p_f - p$$

Suppose price index is a geometric average of traded and non-traded prices:

$$p = \alpha p^N + (1 - \alpha)p^T$$

Similarly for foreign goods:

$$p_f = \alpha_f p_f^N + (1 - \alpha_f)p_f^T$$

Traded and Non-Traded Goods (2 of 2)

Substituting back in the RER equation:

$$rer = ner + p_f^T - p^T + \alpha_f(p_f^N - p_f^T) - \alpha(p^N - p^T)$$

Three components:

- The relative price of tradable goods across countries.
- The relative price of non-tradable goods abroad.
- The relative price of non-tradable goods at home.

The Balassa-Samuelson Effect

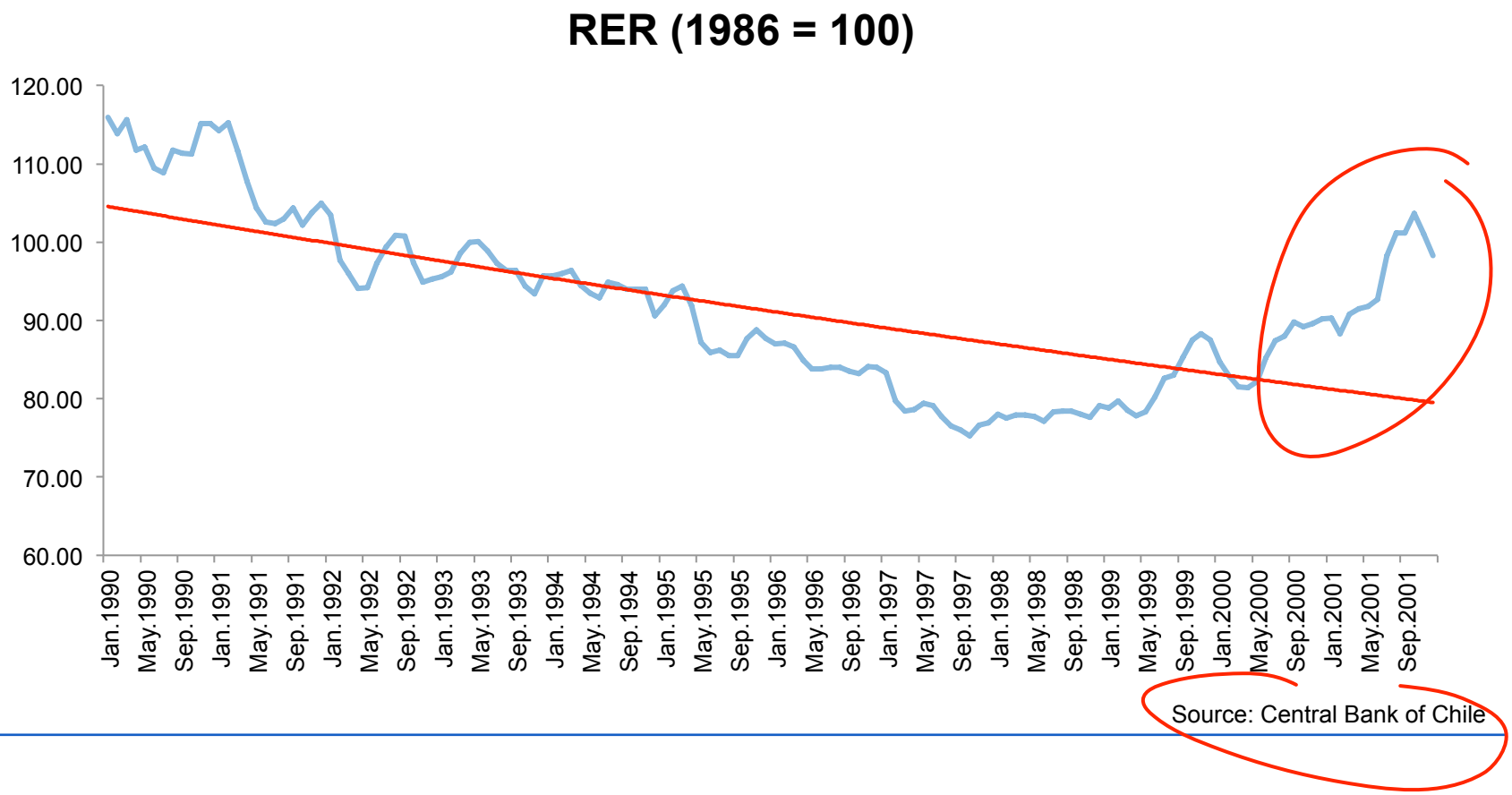
Typically in developing countries, productivity growth in tradable sector is faster.

Wages in the tradable sector will grow fast, but if labor is mobile across sectors, wages in the non-tradable sector will also increase.

Push-up the relative price of the non-traded good (lower productivity).

As a result, an appreciated RER.

Trend Appreciation - Chile in the 1990's



Source: Central Bank of Chile

Real Exchange Rate Gap

Deviation of the RER from its trend (in %)

$$[(RER - RER_{trend}) / RER_{trend}] * 100$$

Recall that the RERgap is an important determinant of inflation:

$$\pi_t = c + \rho * \pi_{t-1} + \beta * ygap_t + \Upsilon * RERgap_t + \varepsilon_t$$

Projecting the Exchange Rate Using Relative PPP

Using the definition of the RER:

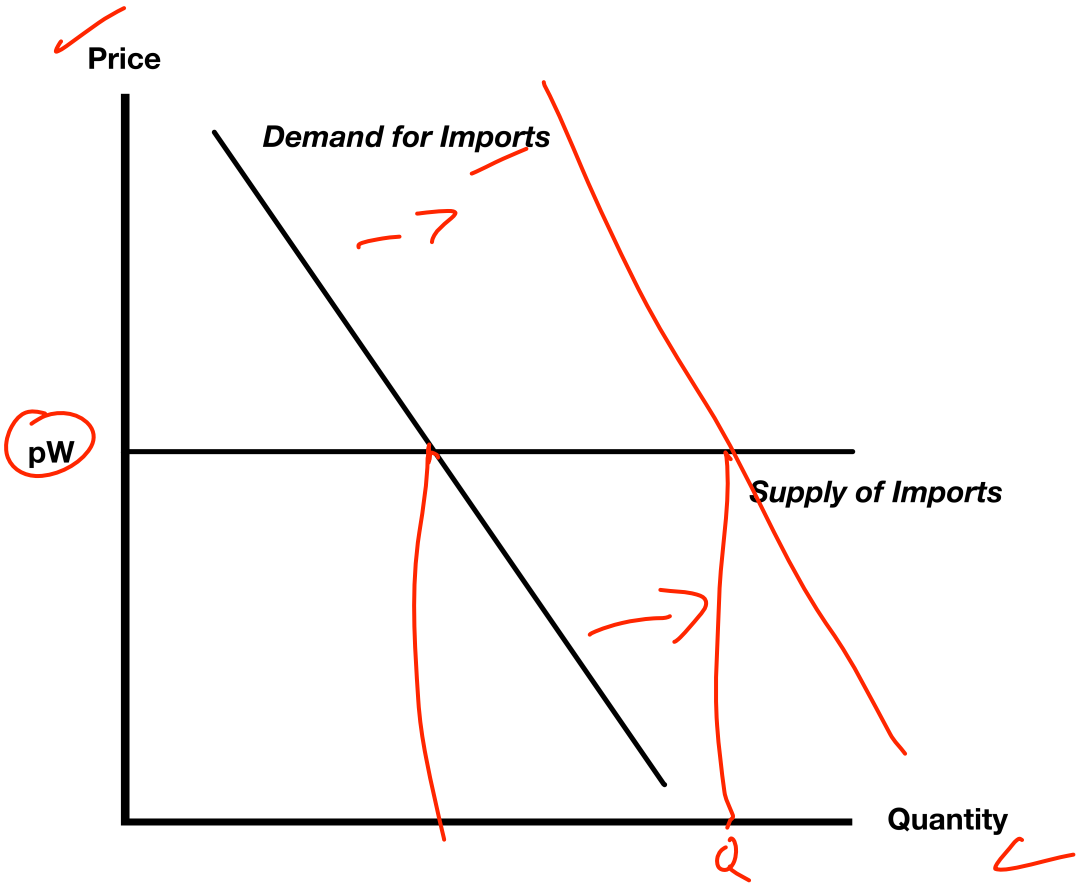
$$(1+\%\Delta RER_t/100) = (1+\%\Delta NER_t/100)*[(1+\%\Delta Pf_t/100)/(1+\%\Delta P_t/100)]$$

$$\frac{+/-\%\Delta NER_{2014}}{100} = \frac{NER_{2014}}{NER_{2013}} - 1$$

Re-arrange to forecast the NER in 2014:

$$NER_{2014}=NER_{2013}*(1+\%\Delta RER_{2014}/100)*[(1+\%\Delta P_{2014}/100)/(1+\%\Delta Pf_{2014}/100)]$$

Demand & Supply of Imports: Small Open Economy



Projecting the Demand for Imports

$$RMg = f(RY ; Prmf)$$

$$Prmf = Pmf * NER / P$$

RMg = volume of imports (real imports of goods)

Pmf = import prices in $

Prmf = relative price of imports of goods

Application to Macronia

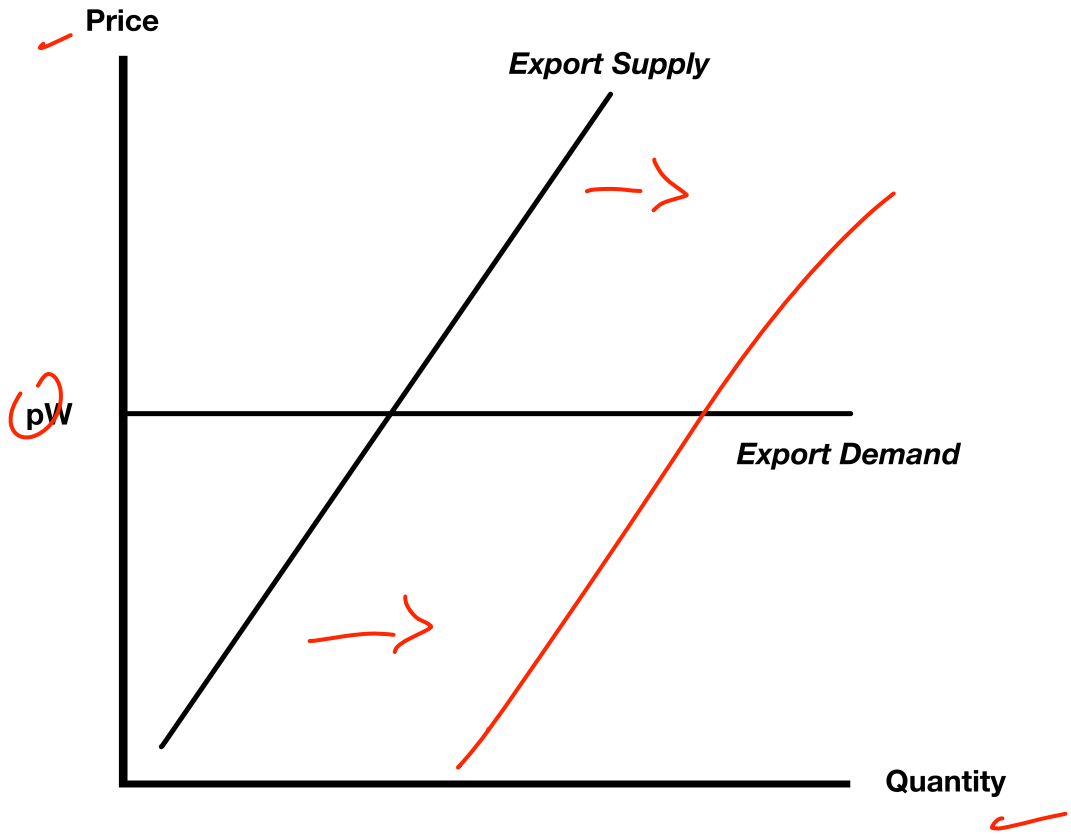
$$\%\Delta RMg = (\varepsilon_{RM,RY} * \%\Delta RY) + (\varepsilon_{RM,Prmf} * \%\Delta Prmf)$$

Use typical elasticities calculated for developing countries

$\varepsilon_{RM,Y} = 1.3$ 1 – 2

$\varepsilon_{RM,Prmf} = -0.6$ -0.1 – -0.7

Demand & Supply of Exports: Small Open Economy



Projecting the Supply of Exports

$$RXg = f(RY^p ; Prxf)$$

$$Prxf = Pxf * NER/P$$

RXg = volume of exports (real exports of goods)

RY^p = potential output as a proxy for export sector productive capacity

Pxf = export prices in $

Prxf = relative price of exports of goods

Application to Macronia

$$\%\Delta RXg = (\varepsilon_{RX,RYp} * \%\Delta RYp) + (\varepsilon_{RX,Prxf} * \%\Delta Prxf)$$

Use typical elasticities calculated for developing countries:

$\varepsilon_{RM,Y} = 1.0$ 1–2

$\varepsilon_{RM,Prmf} = 0.6$ 0.5–1

Projecting Import and Export Values

Compute value of imports of goods in US$

$$Mg_{2014} = Mg_{2013} \times (1+\%\Delta Pmf/100) \times (1+\%\Delta RMg/100)$$

Compute value of exports of goods in US$

$$Xg_{2014} = Xg_{2013} \times (1+\%\Delta Pxf/100) \times (1+\%\Delta RXg/100)$$

Projecting Services

Includes Transportation and Insurance:

- Credits linked to exports – earnings from services provided to non-residents.
- Debits linked to imports – expenditure on services provided by non-residents.

$$\mathbf{Credits_{2014} = (Credits_{2013}/Xg_{2013})^{*}(Xg_{2014})}$$

$$\mathbf{Debits_{2014} = (Debits_{2013}/Mg_{2013})^{*}(Mg_{2014})}$$

Projecting Primary Income: Credits

Primary income credit depends on stock of foreign assets and rate of return on these assets.

For Macronia, we use a simplified approach and assume primary income credits to be exogenous.

Projecting Primary Income: Debits

Interest payments:

$$\textbf{Interest Payments}_{2014} = (\textbf{implicit int. rate})_{2014} * (D_{2014} + D_{2013})/2$$

- Implicit interest rate forecast: LIBOR rate + a country spread.
- Debt stock for 2014: stock for 2013 + debt flows from the financial account.

Other payments:

$$(\textbf{Other Payments}_{2013} / \textbf{int. Payments}_{2013}) * \textbf{int. Payments}_{2014}$$

Projecting the Secondary Income Balance

Focus on net balance in US$:

$$\%\Delta transfers_{2014} = \varepsilon_{transfers,\ Yf} * \%\Delta Y^{f}_{2014}$$

$$SIB_{2014} = SIB_{2013} * (1 + \%\Delta transfers_{2014}/100)$$

Projecting Foreign Direct Investment

Factors to consider:

- past trends
- growth prospects of the domestic economy
- macroeconomic stability
- investment climate (institutions, rules, and regulations)

Assume a constant share of GDP (in millions of US$)

$$FDI_{2014} = (FDI_{2013} / GDP_{2013}) * GDP_{2014}$$

Projecting Portfolio Investment

Factors to consider:

- Return differentials
- Macroeconomic stability in receiving country
- Global risk aversion/ appetite
- Domestic financial development
- Financing needs of government

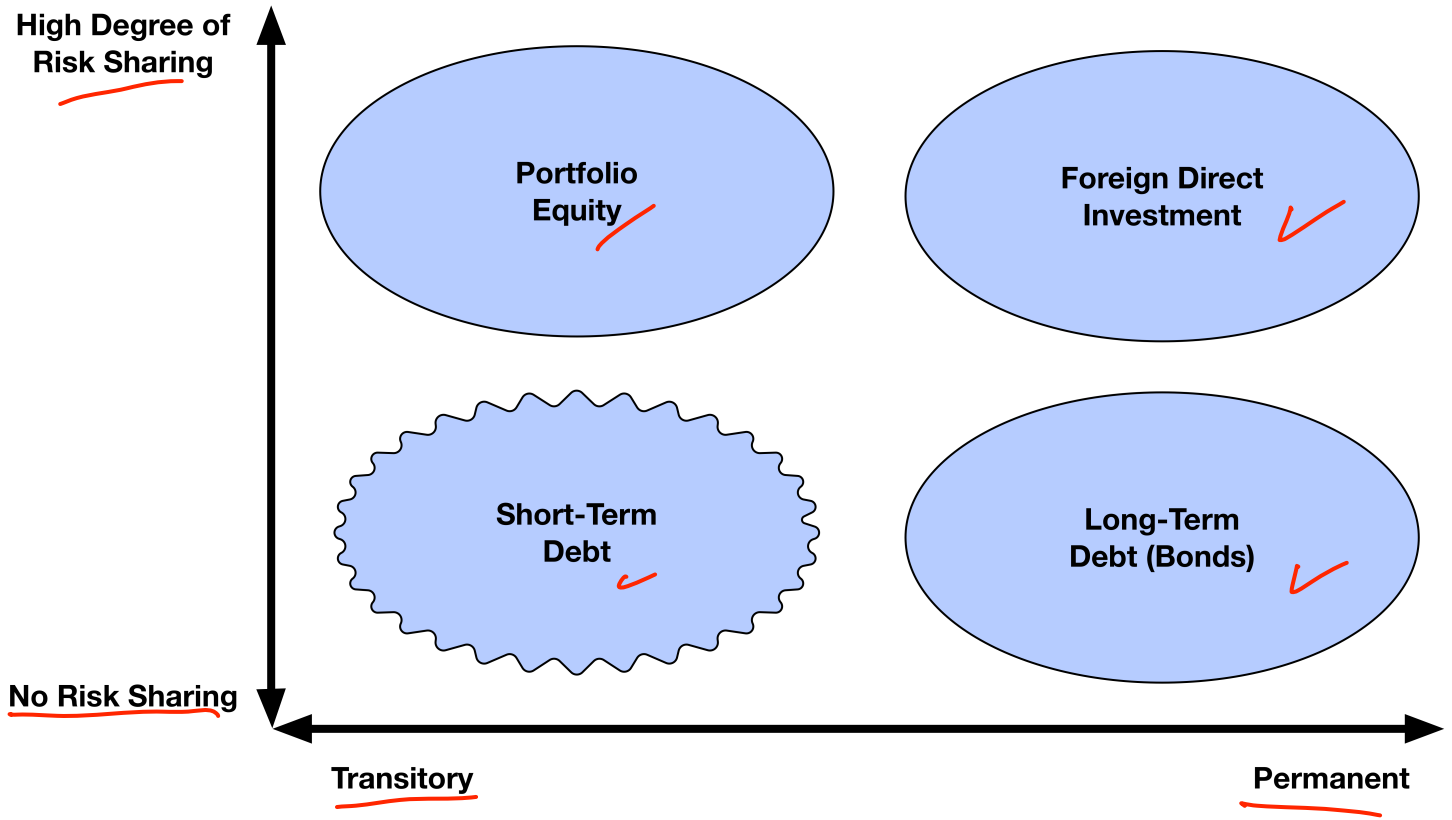
Projecting Other Investment Flows

Relatively more volatile component. Includes short-term borrowing.

Factors to consider:

- Linked to trade flows +
- Global risk appetite +
- Return differentials, etc. +

Some types of financial flows are riskier than others…



Errors and Omissions and Reserves

Errors and Omissions:

- Could forecast based on past trends
- For Macronia assumed to be zero in forecast

Reserves:

- Baseline: reserves are an outcome (diagnostic forecast)
- Financial program: reserves may be a target

External Debt

Gross external debt is the amount of outstanding liabilities to nonresidents:

$$\text{Debt}_t = \text{Debt}_{t-1} + \text{Disbursements} - \text{Repayments}$$

$$\text{Debt service} = \text{Interest payments} + \text{Amortization}$$

International Investment Position (IIP)

Net IIP:

Stock of External Assets - Stock of External Liabilities

Projections based on stocks for 2013 + projected flows from the BoP for 2014.

Ignores valuation changes and other volume changes.

Assessing the External Position

CAB = S – I

Country can increase current consumption or investment by reducing its net asset position (repay later)

Country can consume or invest less now, add to the country's net asset position (consume or invest more later)

The Role of International Reserves

- Financing (temporary) BOP deficits
- Supporting exchange rate pegs; moderating volatility in flexible arrangements
- Sustaining confidence in the domestic currency and the economy
- How can we assess whether a country has enough reserves?

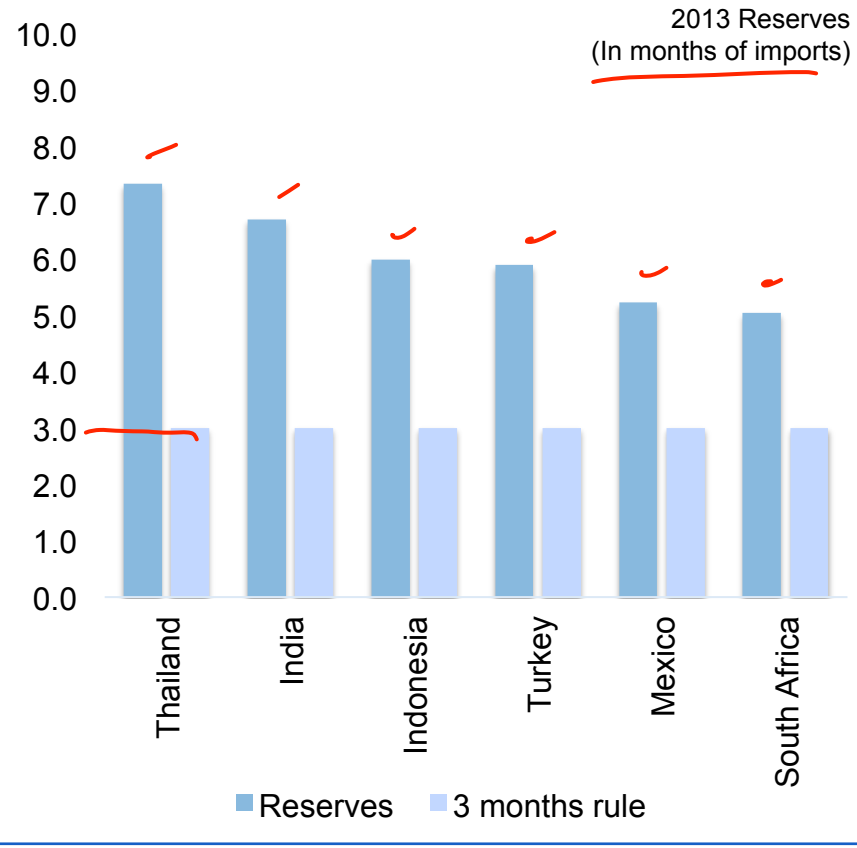
Reserve Adequacy

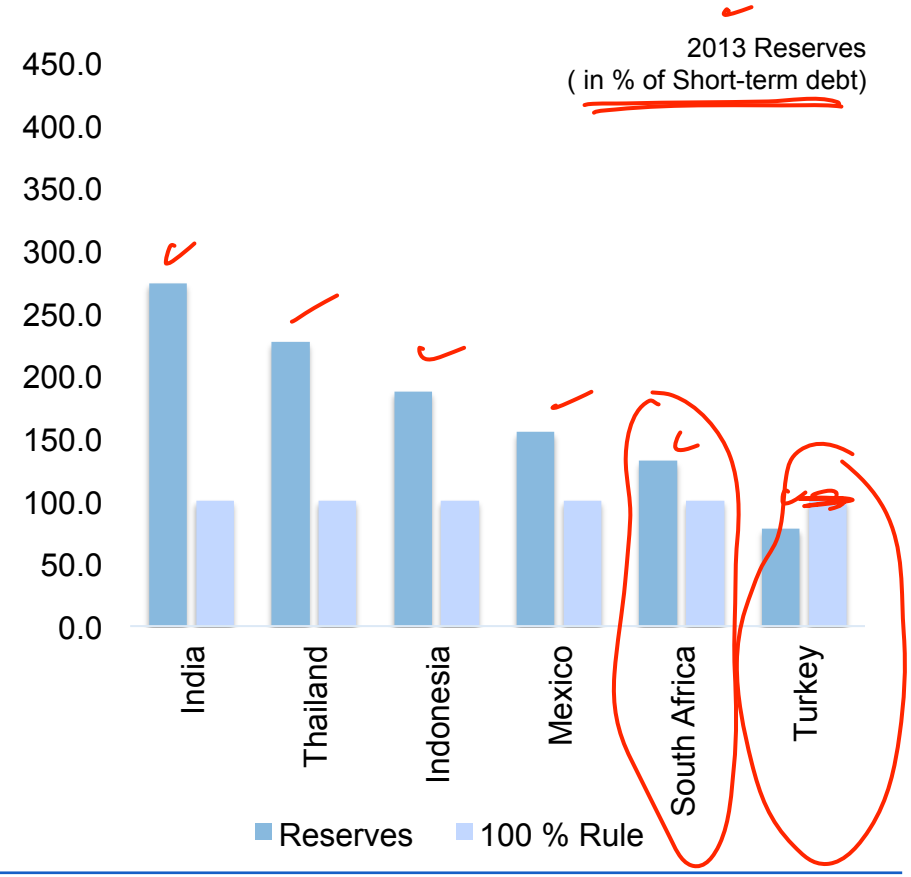
Traditional Benchmarks:

- Trade flows/import cover (≥ 3 months of imports)
- Money stock to counter risk of capital flight (≥ 10% of M2 floating ER and ≥ 20% for fixed ER)
- Short-term debt. Greenspan-Guidotti rule (≥ 100%)

More sophisticated measures. Ex: 2011 IMF paper proposed new metric that combined indicators.

Illustration: Reserve Adequacy Measures



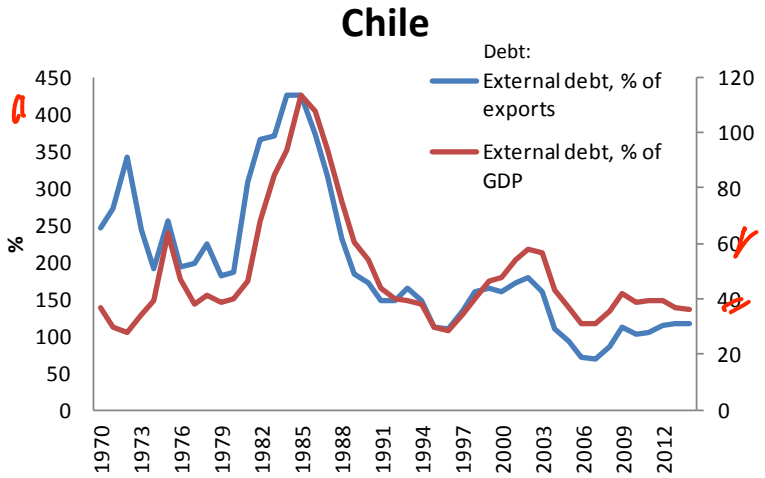


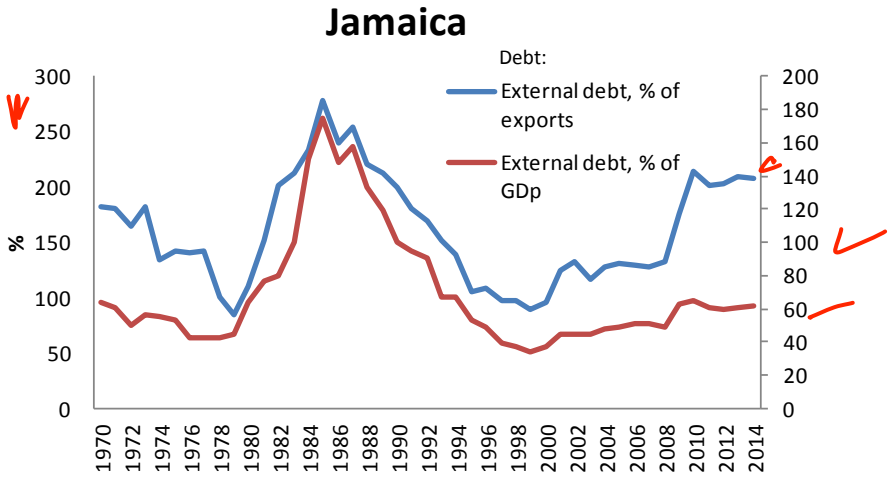
Stock Indicators

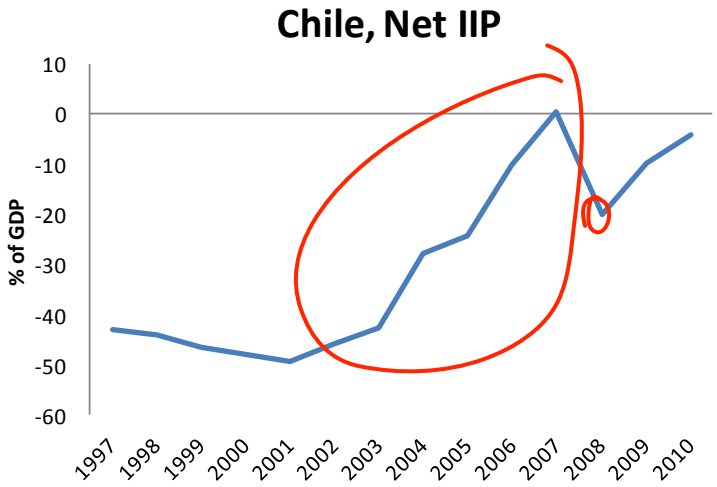
Measures of External debt burden:

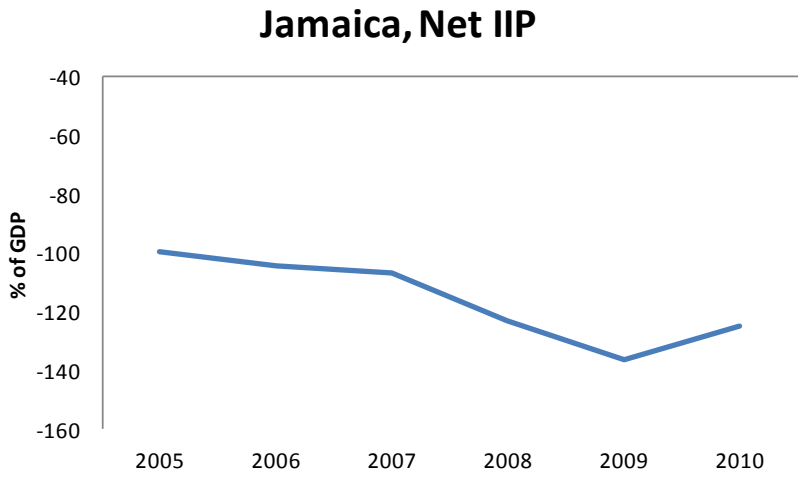
- Debt to GDP ratio; debt to exports ratio
- Debt service to exports; debt service to government revenue

Net IIP itself can help to assess sustainability of external position.


Chile
Debt:
External debt, % of exports
External debt, % of GDP
%
450
400
350
300
250
200
150
100
50
0
120
100
80
60
40
20
0
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012


Jamaica
Debt:
External debt, % of exports
External debt, % of GDp
%
300
250
200
150
100
50
0
200
180
160
140
120
100
80
60
40
20
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014


Chile, Net IIP
% of GDP
10
0
-10
-20
-30
-40
-50
-60
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


Jamaica, Net IIP
% of GDP
-40
-60
-80
-100
-120
-140
-160
2005
2006
2007
2008
2009
2010