



Workshop on Trade Policy and Trade Indicators

Module 2.2



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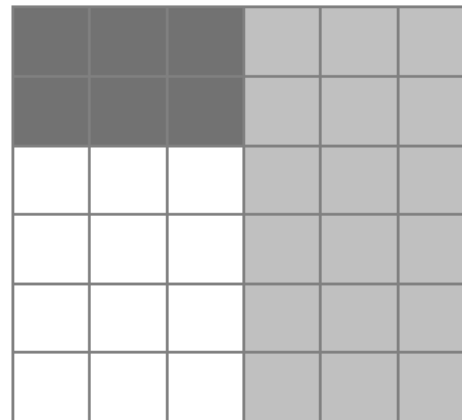
THE ANALYSIS OF INDICATORS

- Key for the performance and tracing of Trade Policy,
- Several possibilities from which to choose.
- The main goal within this module is to provide relevant indicators that can be use as tools for the analysis of the external sector. For example:
 - Information about trends,
 - Trade analysis by partners and sectors,
 - Use of composite (synthetic) indicators .
- A good report should not only present data but rather give causalities.
- The analysis is more than the mere description of the conjuncture.

Shares and proportions

A share is the part of a group of individuals that this group represents in the total population.

Derivation of a ratio



$$\text{Proportion dark grey boxes} = \frac{n_i}{N} = \frac{6}{36} = 0.167 * 100 = 16.7\%$$

$$\text{Proportion light grey boxes} = \frac{n_i}{N} = \frac{18}{36} = 0.5 * 100 = 50\%$$

Weightings

When calculating an average about values from different groups, we have to apply a weighting according to the relative size of the groups to avoid incorrect conclusions.

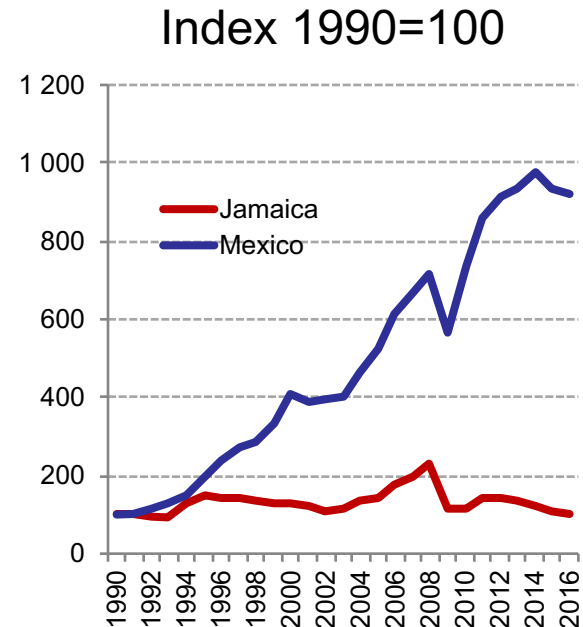
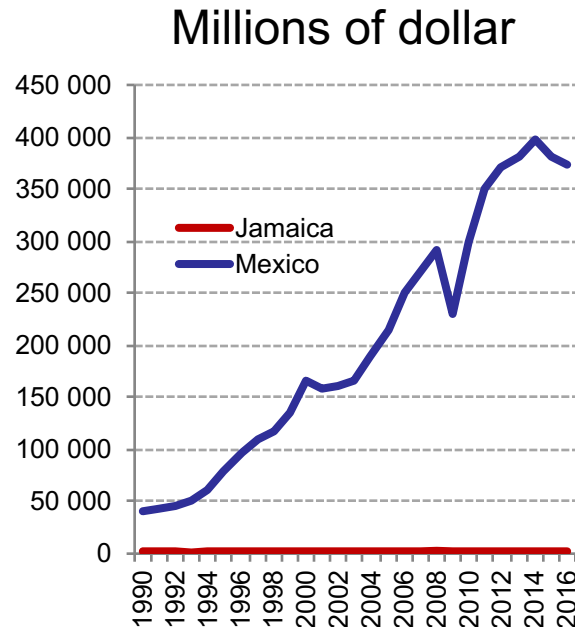
$$\text{Weighted average} = \sum_{i=1}^n \left(\frac{f_i}{\sum_{i=1}^n f_i} \right) * G_i$$

	Population (in thousand)	Exports per capita
Cuba	11 425	254
Dominican Rep.	10 652	926
Haiti	10 890	91
Jamaica	2 881	415
<i>Simple average</i>		421
Weighted Average (by exports)		699
Weighted Average (by inhabitants)		417

Number Index

This is an economic indicator that captures the central tendency of a data set. In general, it is expressed in percentages and centered around a base year, usually being equal to 100.

Jamaica and Mexico: total exports to the world





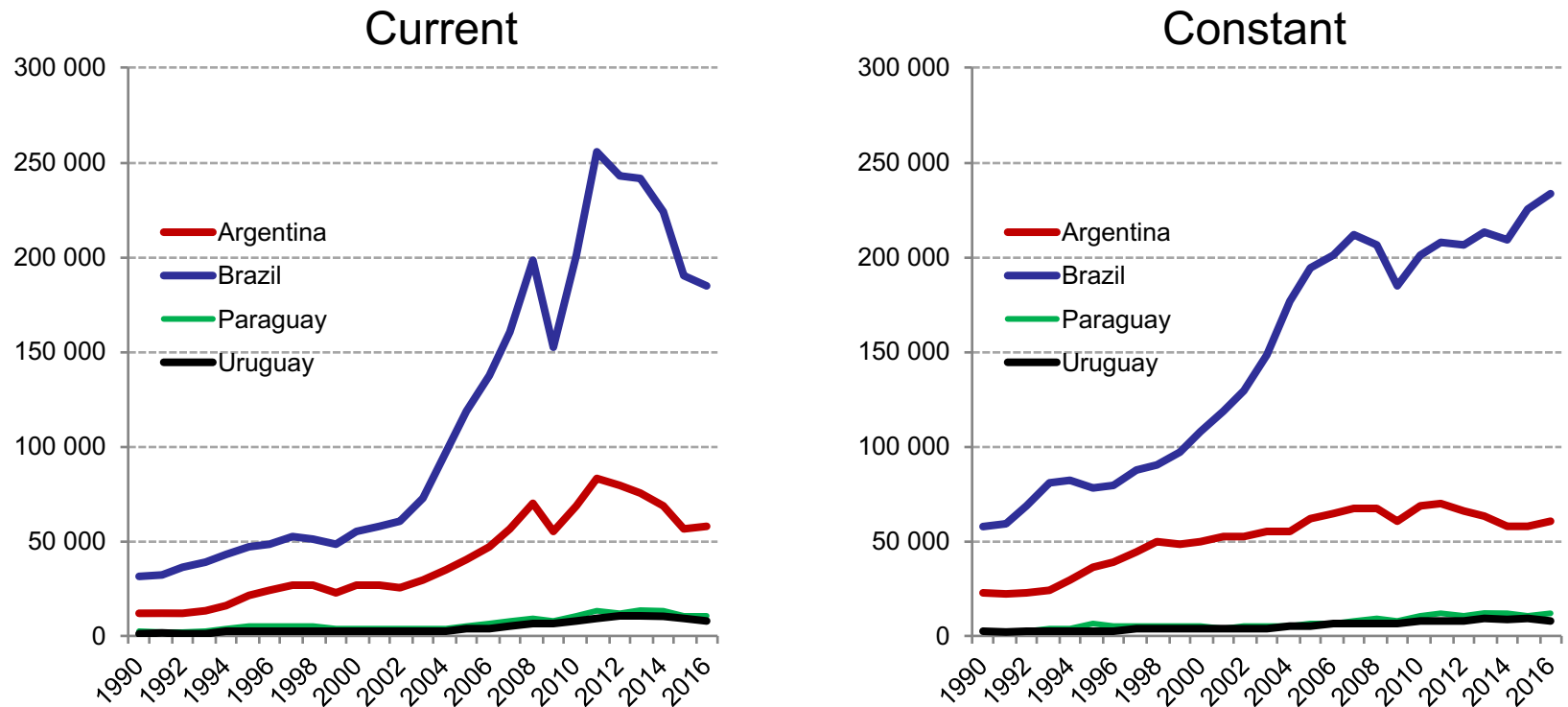
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Deflation

This procedure seeks to isolate the price effect (or the inflation) in a series. It is then possible to follow its real trend that is reflected in the change of volume.

MERCOSUR: exports to the world



Unit Value Indices

- They are calculated for exports as well as for imports.
- They should be interpreted as the level that the prices reach in a given year with respect to a base year that is assigned the value 100, i.e. it shows the development of prices over time.
- The most common indices are:

- Laspeyres
$$LPI = \frac{\sum \frac{p_n^k}{p_0^k} \cdot p_0^k q_0^k}{\sum p_0^k q_0^k} = \frac{\sum p_n^k q_0^k}{\sum p_0^k q_0^k}$$

- Paasche
$$PPI = \frac{\sum \frac{p_n^k}{p_0^k} \cdot p_n^k q_n^k}{\sum p_0^k q_n^k} = \frac{\sum p_n^k q_n^k}{\sum p_0^k q_n^k}$$

Volume Indices

- This indicator is used to measure the development of quantity. Its calculation follows the same logic and criterion of the unit value indices.
- ECLAC follows the method of factor reversal proposed by Fisher (1922), which is part of an analogy criterion: what holds for individual price and quantity ratios should also apply to the index numbers which aim to represent them.
- Hence, the multiplication of the indices results in a value index, from which it is possible to approximate the corresponding volume indices by using information about the current value of exports or imports, respectively.

$$VIX = \frac{IX_i}{UVIX_i} * 100 ,$$

$$VIM = \frac{IM_i}{UVIM_i} * 100 .$$



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Terms of Trade (ToT)

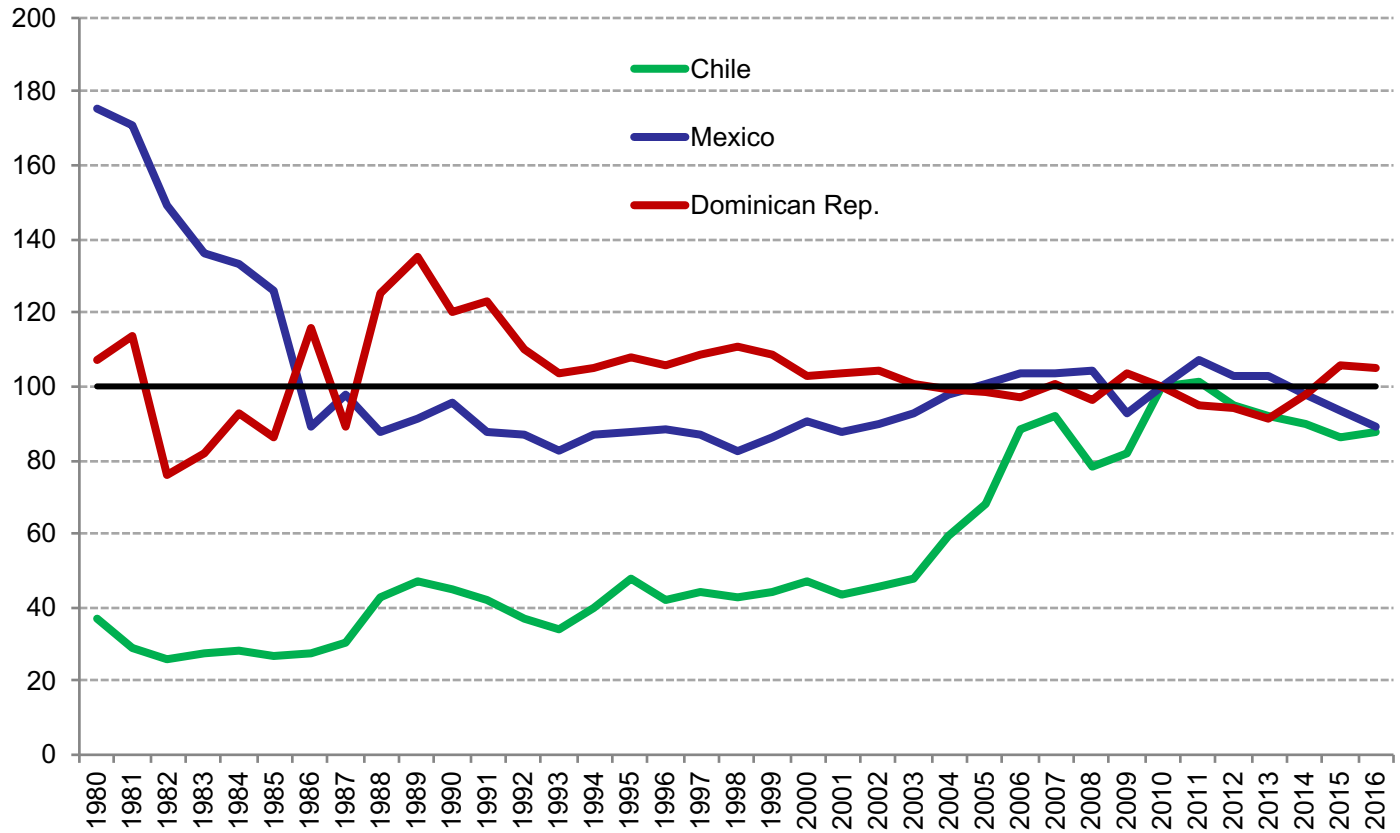
Measures the ratio of exchange between the basket of goods that a country exports and that of goods the same country imports, considering the price effect fixed at a base year. Thus, it represents the change in the purchasing power of a given export volume.

A decrease of the index is called deteriorating terms of trade, and a value below 100 is unfavorable as it indicates that the value of exported products is lower compared to that of the imported products. Correspondingly, an increase of the index is called improvement und ToT above 100 are favorable.

$$TOT_t = \frac{UVIX_t}{UVIM_t} * 100$$

Development of the ToT

Selected countries: Terms of Trade, prices based on 2010



Source: CEPALSTAT

Retropolation or reversed intrapolation

This procedure is used to calculate statistical series backwards, i.e. into the past. This helps connecting two series that otherwise could not be compared because only the growth rate is known but not the absolute values.

From the new series, we take the first value available and calculate the corresponding previous values backwards using the known annual growth rates of the past:

$$G_{t-1} = \frac{G_t}{1 + \frac{\alpha_t}{100}}; \dots G_{t-2} = \frac{G_{t-1}}{1 + \frac{\alpha_{t-1}}{100}}; \dots G_{t-n} = \frac{G_{t-n+1}}{1 + \frac{\alpha_{t-1+n}}{100}}$$

Index of the Relative Trade Balance

There is a large family of indicators that analyze the advantages and disadvantages of a country's trading with its partners or various country groups. Its most simple version is also known as Relative Trade Balance:

$$IRTB_{it}^k = \frac{X_{ijt}^k - M_{ijt}^k}{X_{iwt}^k + M_{iwt}^k}$$

The indicator can take positive and negative values that will indicate a surplus or a deficit in total trade and that express advantages or disadvantages in the exchanges.

An index greater than 0 indicates that the sector has advantages.

Analysis of the Relative Trade Balance

Jamaica: highest IRTB products in Dominican Rep., Mexico and the USA, 2016

SITC Rev. 3		Dominican Rep.	Mexico	USA
001	LIVE ANIMALS	1.00	0.00	-0.96
017	MEAT,OFFL.PRPD,PRSVD,NES	1.00	0.00	-1.00
034	FISH,FRESH,CHILLED,FROZN	1.00	0.00	-0.95
037	FISH ETC.PRPD,PRSVD.NES	1.00	0.00	-0.98
054	VEGETABLES	1.00	-1.00	0.62
081	ANIMAL FEED STUFF	1.00	-1.00	-1.00
111	NON-ALCOHOL.BEVERAGE,NES	1.00	0.00	-0.14
112	ALCOHOLIC BEVERAGES	-0.32	0.45	0.34
223	OILSEED(OTH.FIX.VEG.OIL)	1.00	0.00	-1.00
251	PULP AND WASTE PAPER	0.00	1.00	-0.47
269	WORN CLOTHING,TEXTL.ARTL	-1.00	0.99	-1.00
273	STONE, SAND AND GRAVEL	-1.00	-1.00	0.68
278	OTHER CRUDE MINERALS	1.00	-1.00	-1.00
282	FERROUS WASTE AND SCRAP	0.00	0.00	0.96
285	ALUMINIUM ORE,CONCTR.ETC	-1.00	0.00	1.00
288	NON-FERROUS WASTE,SCRAP	0.00	0.00	0.89
289	PREC.METAL ORES,CONCTRSTS	0.00	0.00	0.99
431	ANIMAL,VEG.FATS,OILS,NES	1.00	-1.00	-1.00
726	PRINTNG,BOOKBINDNG MACHS	1.00	-1.00	-0.99
744	MECHANICAL HANDLNG EQUIP	-1.00	0.34	-0.35
748	TRANSMISSIONS SHAFTS ETC	1.00	-1.00	-0.97
792	AIRCRAFT,ASSOCTD.EQUIPNT	0.00	1.00	0.33
843	MENS,BOYS CLOTHING,KNIT	1.00	-1.00	-0.99

Fuente: CEPAL, sobre la base de datos COMTRADE



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Growth Rates

- Changes experienced by a variable in a given period of time.

Between two
subsequent years

$$\begin{aligned}x_t &= \left(\frac{X_t - X_{t-1}}{X_{t-1}} \right) * 100 \\ &= \left(\frac{X_t}{X_{t-1}} - 1 \right) * 100\end{aligned}$$

Annualized rate
(for longer periods)

$$\begin{aligned}x_{n-N} &= \left(\sqrt[n-N]{\frac{X_n}{X_N}} - 1 \right) * 100 \\ &\equiv 100 * \left(\frac{X_n}{X_N} \right)^{\left(\frac{1}{n-N} \right)} - 100\end{aligned}$$

where
N initial period
n final period



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Nominal Exchange Rates

- The nominal exchange rate E (or NER) is defined as the number of units of the domestic currency that can purchase a unit of a given foreign currency.
- A decrease in this variable is termed nominal appreciation of the currency.

$$E_{ij} = \frac{R}{1}$$

E_{ij} = Bilateral Nominal Exchange Rate

R = Price of foreign currency in terms of home currency

Cross Rates

- Cross rates are nominal exchange rates calculated using a reference rate.
- Some NERs are not always quoted hence are not readily available.
- What is the JMD-CLP exchange rate?

$$E_{JMD/CLP} = E_{JMD/USD} * \frac{1}{E_{CLP/USD}}$$

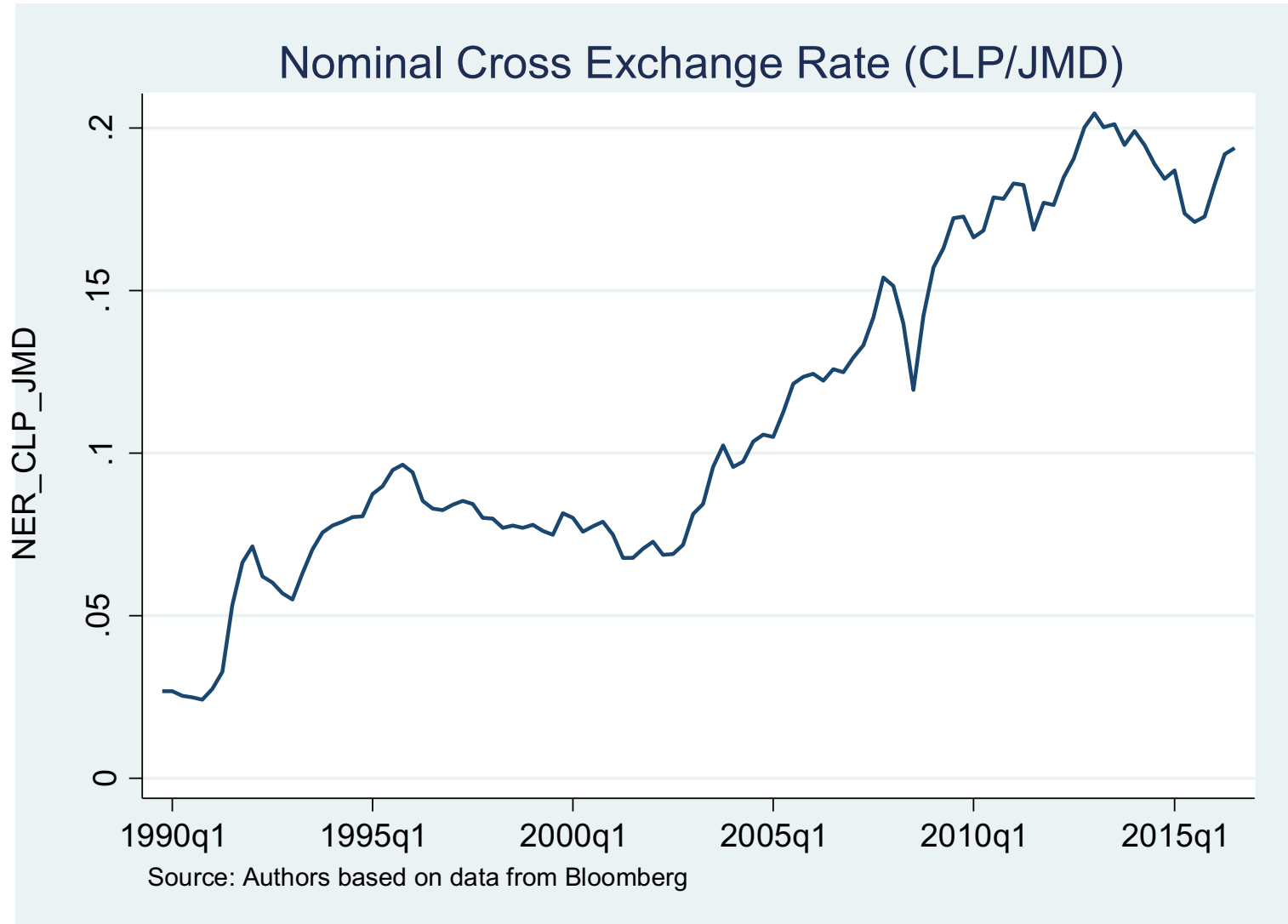
E_{ij} = Bilateral Nominal Exchange Rate between countries i and j



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Cross Rates





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Real Exchange Rates

- Measures the ratio of exchange between the goods basket of one country (Home) with respect to another country (Foreign). A decrease in the RER is termed appreciation of the real exchange rate, and an increase is termed depreciation.

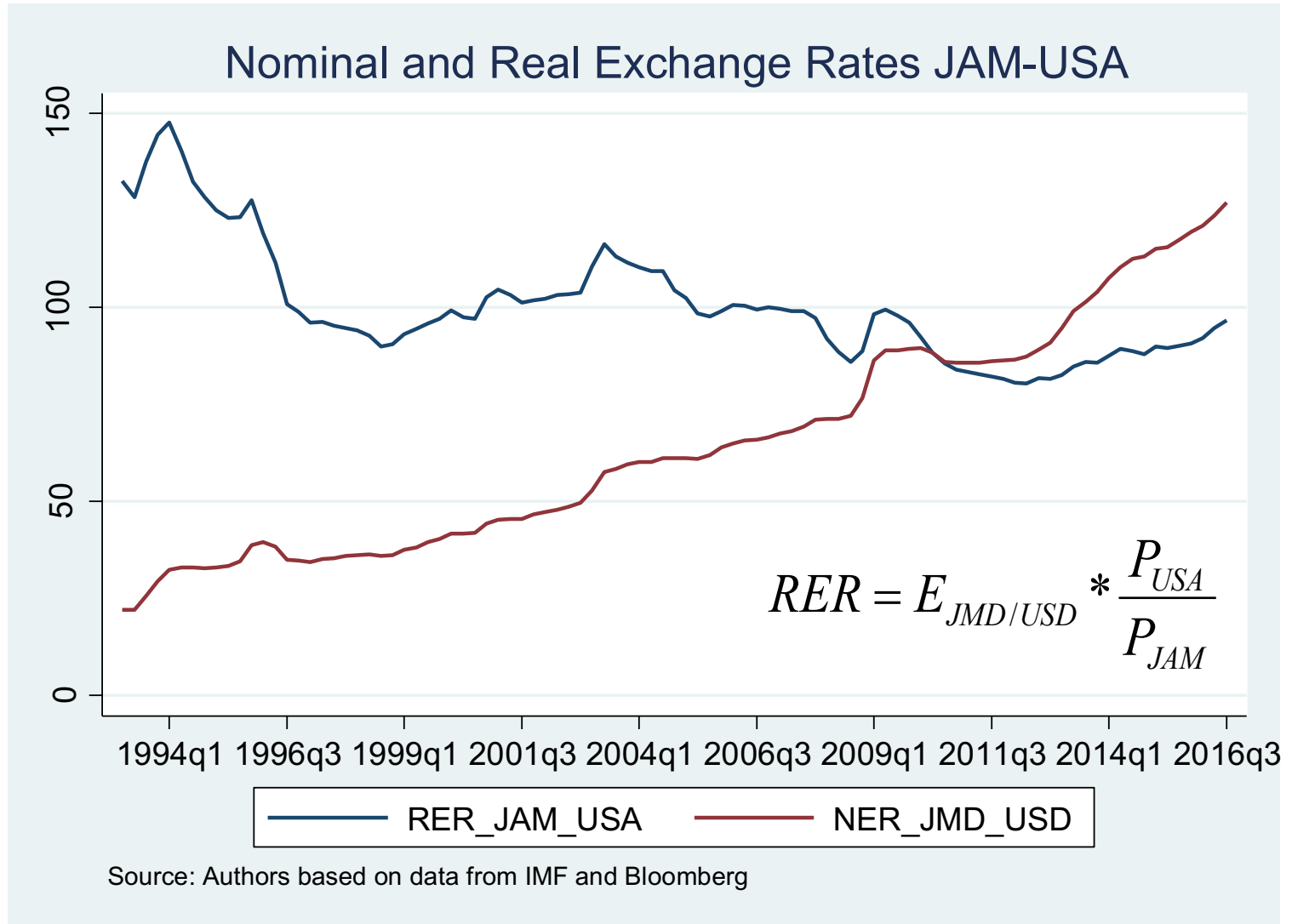
$$RER = E_{ij} * \frac{P_j}{P_i}$$

E_{ij} = Nominal Exchange Rate of Home Country in terms of Foreign Country's currency

P_i = Deflator (or CPI) of Home Country

P_j = Deflator (or CPI) of Foreign Country

Real Exchange Rates





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Nominal Effective Exchange Rate

- Multilateral index measuring the value of a currency against a weighted average of several foreign currencies
- Geometric weighted average

$$NEER_i = \prod_{j=1}^n \left(\frac{E_{ij}}{E_{ij}^*} \right)^{w_j} * 100$$

E_{ij} = Nominal Exchange Rate

E_{ij}^* = Nominal Exchange Rate in base period

n = number of countries (currencies) from the basket

w_j = country's weight (of the currency)



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Real Effective Exchange Rate

- Takes into account developments in relative prices and the NERs between different trading partners

$$REER_i = \frac{\prod_{j=1}^n P_j^{w_j}}{P_i} \prod_{j=1}^n \left(\frac{E_{ij}}{E_{ij}^*} \right)^{w_j} * 100$$

$$REER_i = \prod_{j=1}^n \left(\frac{E_{ij}}{E_{ij}^*} * \frac{P_j}{P_i} \right)^{w_j} * 100$$

E_{ij} = Nominal Exchange Rate

E_{ij}^* = Nominal Exchange Rate in base period

n = number of countries (currencies) from the basket

w_j = country's weight (of the currency)

P = Price indexes



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Comments on weights

- Which weights to use?
- Depends on the question the researcher wants to answer:
 - Effect of exchange rates on domestic prices of imported goods
 - Effect of exchange rates on competitiveness
- Potential weights:
 - Import, export and trade shares weights
 - GDP weights
 - Third Country export weights
- Should weights be fixed or time varying?



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Comments on price/cost indexes

- Which series should be used as the price/cost index?
 - Consumer price index
 - Wholesale or producer price index
 - Export unit values
 - GDP deflator
 - Unit labor costs



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Real Effective Exchange Rate

- Trade shares weights: Measures a country's international competitiveness according to the terms of trade of the countries with which it trades
- An increase in REER implies that exports become cheaper and imports become more expensive; therefore, an increase indicates a gain in trade competitiveness.
- Some important remarks:
 - Attention to how REER is constructed
 - Both NEER and REER are based on a specific base period. It *does not* indicate the absolute level of competitiveness of any country.

Real Effective Exchange Rate

- Steps to calculate a REER:
 1. Select partners that will enter the sample
 2. Calculate cross rates with all partners
 3. Create an index with same base period for each cross rate
 4. Compute weights for each partner
 5. Apply these inputs into the formula



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Exercises

- There is no data for Jamaica's REER in the most common databases (IMF, BIS, World Bank)
- Calculate Jamaica's REER
- Calculate the annualized growth rate for Jamaica's REER in the last 10 years

References

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