Exchange Rates: Application of Supply and Demand to Currencies

ECO 120: Global Macroeconomics



Unit Goals

- Interpret meaning of exchange rates
- Use exchange rates to convert prices and values from one currency to another
- Interpret changes in exchange rates in terms of currency's value against others
- Use a supply and demand model of currencies to predict changes in exchange rates.

Learning objectives

 LO3: Use the supply and demand model for currencies to predict changes in exchange rates.



Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.

Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.

Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.

- **Nominal Exchange Rate:** how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).



Exchange Rates

- Nominal Exchange Rate: how much of one currency can be traded for one unit of another currency.
- Example:
 - The Mexican Peso / U.S. Dollar exchange rate is 17.22 pesos / dollar (Feb 5, 2024).
 - One U.S. dollar can be exchanged for 17.22 pesos.
- There are two ways to express every exchange rate.
- Same example:
 - The Mexican Peso / U.S. Dollar exchange rate is 0.058 dollars / peso (Feb 5, 2024).
 - One Mexican Peso can be exchange for 0.058 dollars (or 5.8 U.S. cents).



- Appreciation: A currency appreciates against a second currency when one unit of the first currency can purchase more of the second currency.
- Depreciation: A domestic currency depreciates against a second currency when one unit of the first currency can purchase *less* of the second currency.
- Examples of an appreciation of the dollar:
 - Exchange rate increases from 17.22 pesos/dollar to 20.00 pesos/dollar.
 - Exchange rate decreases from 0.058 dollars/peso to 0.05 dollars/peso.

- Appreciation: A currency appreciates against a second currency when one unit of the first currency can purchase more of the second currency.
- Depreciation: A domestic currency depreciates against a second currency when one unit of the first currency can purchase *less* of the second currency.
- Examples of an appreciation of the dollar:
 - Exchange rate increases from 17.22 pesos/dollar to 20.00 pesos/dollar
 - Exchange rate decreases from 0.058 dollars/peso
 - to 0.05 dollars/peso.

- Appreciation: A currency appreciates against a second currency when one unit of the first currency can purchase more of the second currency.
- Depreciation: A domestic currency depreciates against a second currency when one unit of the first currency can purchase *less* of the second currency.
- Examples of an appreciation of the dollar:
 - Exchange rate increases from 17.22 pesos/dollar to 20.00 pesos/dollar.
 - Exchange rate decreases from 0.058 dollars/peso to 0.05 dollars/peso.



- Appreciation: A currency appreciates against a second currency when one unit of the first currency can purchase more of the second currency.
- Depreciation: A domestic currency depreciates against a second currency when one unit of the first currency can purchase *less* of the second currency.
- Examples of an appreciation of the dollar:
 - Exchange rate increases from 17.22 pesos/dollar to 20.00 pesos/dollar.
 - Exchange rate decreases from 0.058 dollars/peso to 0.05 dollars/peso.



- Appreciation: A currency appreciates against a second currency when one unit of the first currency can purchase more of the second currency.
- Depreciation: A domestic currency depreciates against a second currency when one unit of the first currency can purchase *less* of the second currency.
- Examples of an appreciation of the dollar:
 - Exchange rate increases from 17.22 pesos/dollar to 20.00 pesos/dollar.
 - Exchange rate decreases from 0.058 dollars/peso to 0.05 dollars/peso.

MXN to USD

$$8,440 \ MXN \times \left(\frac{1 \ USD}{17.22 \ MXN}\right)$$

$$9,500 \; USD \times \left(\frac{17.22 \; MXN}{1 \; USD}\right)$$

MXN to USD

Suppose the price of a bike in Mexico is 8.440 MXN.

How much does this cost in USD?

$$8,440~MXN \times \left(\frac{1~USD}{17.22~MXN}\right)$$

MXN to USD

Suppose the price of a bike in Mexico is 8.440 MXN.

How much does this cost in USD?

$$8,440 \ MXN \times \left(\frac{1 \ USD}{17.22 \ MXN}\right)$$

= 490.13 USD

MXN to USD

Suppose the price of a bike in Mexico is 8.440 MXN.

How much does this cost in USD?

$$8,440~MXN \times \left(\frac{1~USD}{17.22~MXN}\right)$$

= 490.13 USD

USD to MXN

$$9,500 \; USD \times \left(\frac{17.22 \; MXN}{1 \; USD}\right)$$

MXN to USD

Suppose the price of a bike in Mexico is 8.440 MXN.

How much does this cost in USD?

$$8,440~MXN \times \left(\frac{1~USD}{17.22~MXN}\right)$$

= 490.13 USD

USD to MXN

Suppose the price of a car in the U.S. 9.500 USD.

How much does this cost in MXN?

9,500
$$USD \times \left(\frac{17.22 \ MXN}{1 \ USD}\right)$$

MXN to USD

Suppose the price of a bike in Mexico is 8.440 MXN.

How much does this cost in USD?

$$8,440~MXN \times \left(\frac{1~USD}{17.22~MXN}\right)$$

= 490.13 USD

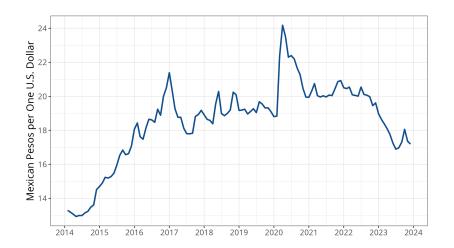
USD to MXN

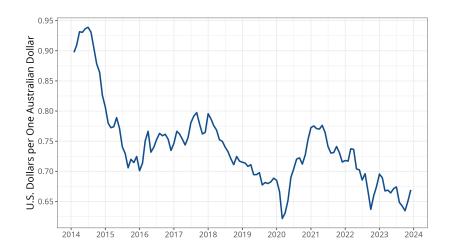
Suppose the price of a car in the U.S. 9.500 USD.

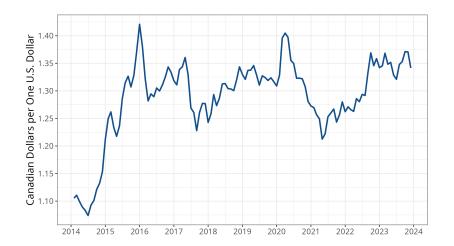
How much does this cost in MXN?

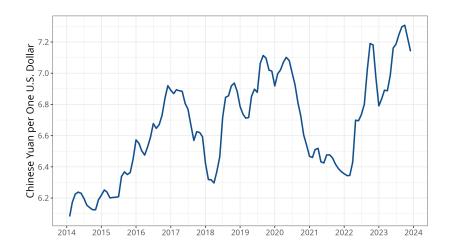
$$9,500~USD \times \left(\frac{17.22~MXN}{1~USD}\right)$$

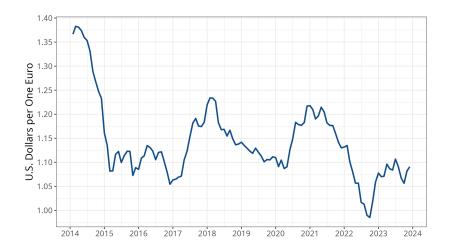
= 163,590 MXN

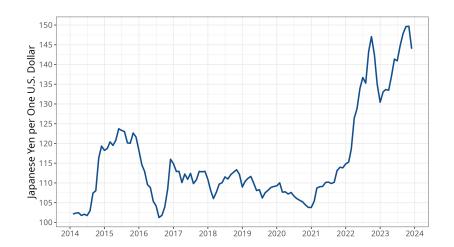


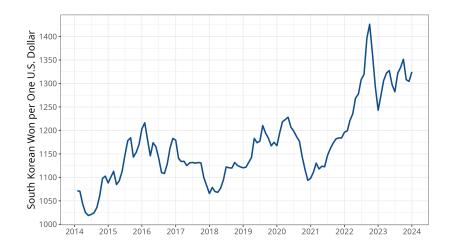














- Weighted average of many currencies, based on level of trade.
- Includes: Euro Area, Canada, Japan, United Kingdom, Switzerland, Australia, and Sweden.

Price of currency of interest (say U.S. Dollars):

- Exchange rate expressed as foreign currency per one unit of currency of interest.
- Example: price of dollars = Euros per U.S. dollar.
- An increase in this exchange rate means an appreciation of the dollar.

• Demand for currency is a derived demand. It depends on...

- foreign demand for the country's goods
- foreign demand for the country's assets
- Financial assets could include stocks and bonds for companies in a country, government bonds from a country
- Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.

- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a derived demand. It depends on...
 - foreign demand for the country's goods
 - foreign demand for the country's assets
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.

- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a derived demand. It depends on...
 - foreign demand for the country's goods
 - foreign demand for the country's assets
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.

- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a derived demand. It depends on...
 - foreign demand for the country's goods
 - foreign demand for the country's assets
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.

- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a *derived demand*. It depends on...
 - foreign demand for the country's goods.
 - foreign demand for the country's assets.
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.



- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a derived demand. It depends on...
 - foreign demand for the country's goods.
 - foreign demand for the country's assets.
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.



- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a *derived demand*. It depends on...
 - foreign demand for the country's goods.
 - foreign demand for the country's assets.
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.



- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a derived demand. It depends on...
 - foreign demand for the country's goods.
 - foreign demand for the country's assets.
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.



- Price of currency of interest (say U.S. Dollars):
 - Exchange rate expressed as foreign currency per one unit of currency of interest.
 - Example: price of dollars = Euros per U.S. dollar.
 - An increase in this exchange rate means an appreciation of the dollar.
- Demand for currency is a *derived demand*. It depends on...
 - foreign demand for the country's goods.
 - foreign demand for the country's assets.
 - Financial assets could include stocks and bonds for companies in a country, government bonds from a country
 - Assets may include foreign direct investment, when owners from a foreign country own significant portions of a company or a company's facilities located in a country.



- Law of demand for foreign exchange: as the value of the currency increases, the quantity of the currency demanded will fall.
- **Exports effect:** if the currency is more expensive, the country's goods are more expensive.

- Law of demand for foreign exchange: as the value of the currency increases, the quantity of the currency demanded will fall.
- **Exports effect:** if the currency is more expensive, the country's goods are more expensive.

Supply of Currency

Supply of Currency

- A currency is supplied when holders of the currency try to sell it.
- Supply of U.S. dollars happens when people in U.S. demand foreign currencies.
- Supply of a currency is nothing more than the holders' demands for foreign currency.

Supply of Currency

- A currency is supplied when holders of the currency try to sell it.
- Supply of U.S. dollars happens when people in U.S. demand foreign currencies.
- Supply of a currency is nothing more than the holders' demands for foreign currency.

Supply of Currency

- A currency is supplied when holders of the currency try to sell it.
- Supply of U.S. dollars happens when people in U.S. demand foreign currencies.
- Supply of a currency is nothing more than the holders' demands for foreign currency.

- When something *besides the exchange rate* influences the demand for a currency, then there is a *shift* in the demand.
- Determinants of demand for currency:
 - Changes in demand for country's products.
 - Changes in interest rate differential
 - Expectations of future exchange rate

Shifts in Demand

- When something besides the exchange rate influences the demand for a currency, then there is a shift in the demand.
- Determinants of demand for currency:
 - Changes in demand for country's products.
 - Changes in interest rate differential.
 - Expectations of future exchange rate.

- When something besides the exchange rate influences the demand for a currency, then there is a shift in the demand.
- Determinants of demand for currency:
 - Changes in demand for country's products.
 - Changes in interest rate differential.
 - Expectations of future exchange rate.

Shifts in Demand

- When something besides the exchange rate influences the demand for a currency, then there is a shift in the demand.
- Determinants of demand for currency:
 - Changes in demand for country's products.
 - Changes in interest rate differential.
 - Expectations of future exchange rate.

- When something besides the exchange rate influences the demand for a currency, then there is a shift in the demand.
- Determinants of demand for currency:
 - Changes in demand for country's products.
 - Changes in interest rate differential.
 - Expectations of future exchange rate.

Shifts in Supply

- Don't even think about it.
- The supply of a currency is the demand for the other country's currency
- Think about what currency demand shifts, then always shift the supply of the other currency in the same direction.

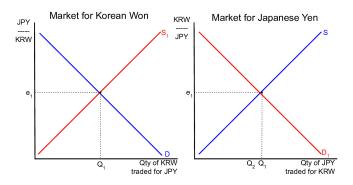
Shifts in Supply

- Don't even think about it.
- The supply of a currency is the demand for the other country's currency
- Think about what currency demand shifts, then always shift the supply of the other currency in the same direction.

- Don't even think about it.
- The supply of a currency is the demand for the other country's currency
- Think about what currency demand shifts, then always shift the supply of the other currency in the same direction.

Example 1: Decrease in Income in Korea

Japan and Korea are major trading partners. Suppose there is a decrease in incomes in Korea, leading to a decrease in demand for imported goods from Japan to Korea

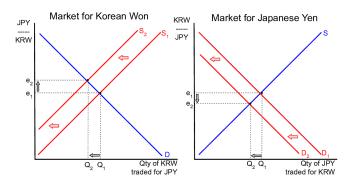


Two related markets. Market for Korean Won (Price=JPY/KRW) and Market for Japanese Yen (Price=KRW/JPY)



Example 1: Decrease in Income in Korea

Japan and Korea are major trading partners. Suppose there is a decrease in incomes in Korea, leading to a decrease in demand for imported goods from Japan to Korea

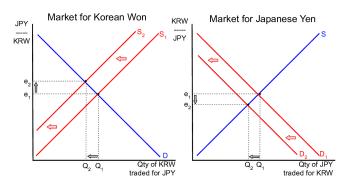


Decrease in Koreans' demand for Japanese Yen \rightarrow Decrease in Supply of Korean Won.



Example 1: Decrease in Income in Korea

Japan and Korea are major trading partners. Suppose there is a decrease in incomes in Korea, leading to a decrease in demand for imported goods from Japan to Korea

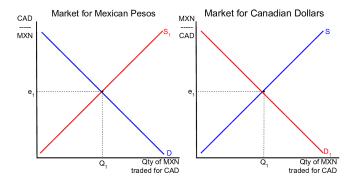


Korean Won appreciates against the Japanese Yen Equivalently, Japanese Yen depreciates against Korean Won



Example: Reduction in Trade Restrictions

Suppose a trade agreement between Mexico and Canada results in a significant reduction in legal restrictions in Mexico, allowing more imports from Canada.

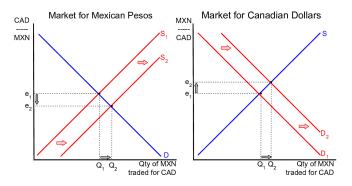


Two related markets. Market for Mexican Pesos (Price=CAD/MXN) and Market for Canadian Dollars (Price=MXN/CAD)



Example: Reduction in Trade Restrictions

Suppose a trade agreement between Mexico and Canada results in a significant reduction in legal restrictions in Mexico, allowing more imports from Canada.



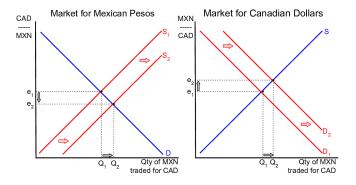
Increase in Mexican consumers' demand for Canadian Dollars

 \rightarrow Increase in Supply of Mexican Pesos.



Example: Reduction in Trade Restrictions

Suppose a trade agreement between Mexico and Canada results in a significant reduction in legal restrictions in Mexico, allowing more imports from Canada.

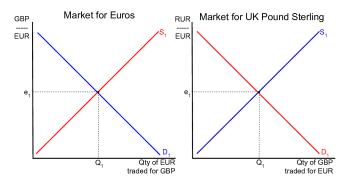


Mexican Peso depreciates against the Canadian Dollar

 \rightarrow Canadian Dollar appreciates against the Mexican Peso

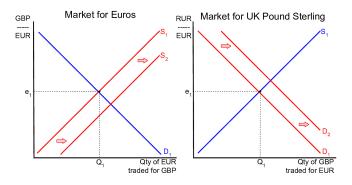


Suppose interest rates in the United Kingdom increase, but stay the same in the Euro area.



Two related markets. Market for Euro (Price=GBP/EUR) and Market for U.K. Pound Sterling (Price=EUR/GBP)

Suppose interest rates in the United Kingdom increase, but stay the same in the Euro area.

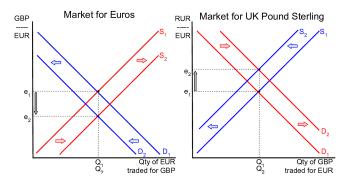


Increase in Euro-area investors' demand for U.K. Pounds

 \rightarrow Increase in Supply of Euros



Suppose interest rates in the United Kingdom increase, but stay the same in the Euro area.

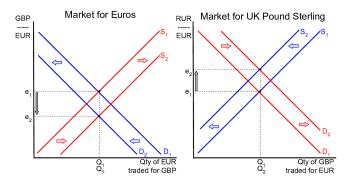


Decrease in British investor's demand for Euros

 \rightarrow Decrease in Supply of U.K. Pounds.



Suppose interest rates in the United Kingdom increase, but stay the same in the Euro area.



Euro depreciates against the U.K. Pound Sterling

 \rightarrow U.K. Pound Sterling appreciates against Euro



Spotlight: Oleg Itskhoki & Dmitry Mukhin

Sanctions and the Exchange Rate, NBER Working Paper, April 2022.

Impact of Sanctions Depends

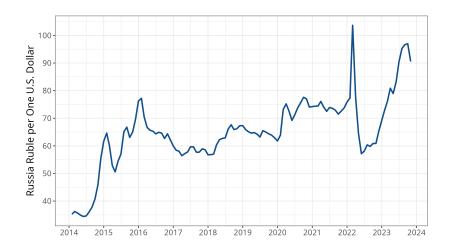
- Sanctions that prevent financial investment in the country cause the country's currency to depreciate
- Sanctions that limit availability of imports into a country cause the country's currency to appreciate
- Explains both upward and downward movements in USD / RUB exchange rate following Russia's February 2022 invasion of Ukraine





Dr. Oleg Itskhoki (left) Professor of Economics University of California-Los Angeles

Dr. Dmitry Mukhin (right) Asst Professor of Economics London School of Economics



Scholar Spotlight: Markéta Arltová

The Impact of Economic Sanctions on Russian Economy and RUB/USD Exchange Rate, Journal of International Studies, 2018. (with Ladislav Tyll and Karel Pernica)

Economic Sanctions, Exchange Rates, and Food Prices

- International price of oil positively affects USD/RUB exchange rate
- International sanctions following Crimea annexation decreased USD/RUB 2014-2016
- Depreciation of RUB increased imported food prices
- Russia counteracted exchange rate impact with import restrictions, including on food



Dr. Markéta Arltová Associate Professor Department of Statistics and Probability University of Economics Prague, Czech Republic

Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.

Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.

Reading and Exercises

- Textbook: Module 47
- Canvas Quiz due Wednesday 11:59 PM.
 Multiple-choice, 15 questions, unlimited attempts allowed, only best score counts
- Homework/In-class Exercise due Friday 11:59 PM. We will work together in class on Thursday.