CURRENCY FORECASTING TECHNIQUES

Michala Moravcová

Department of Finance, Masaryk University

International Finance

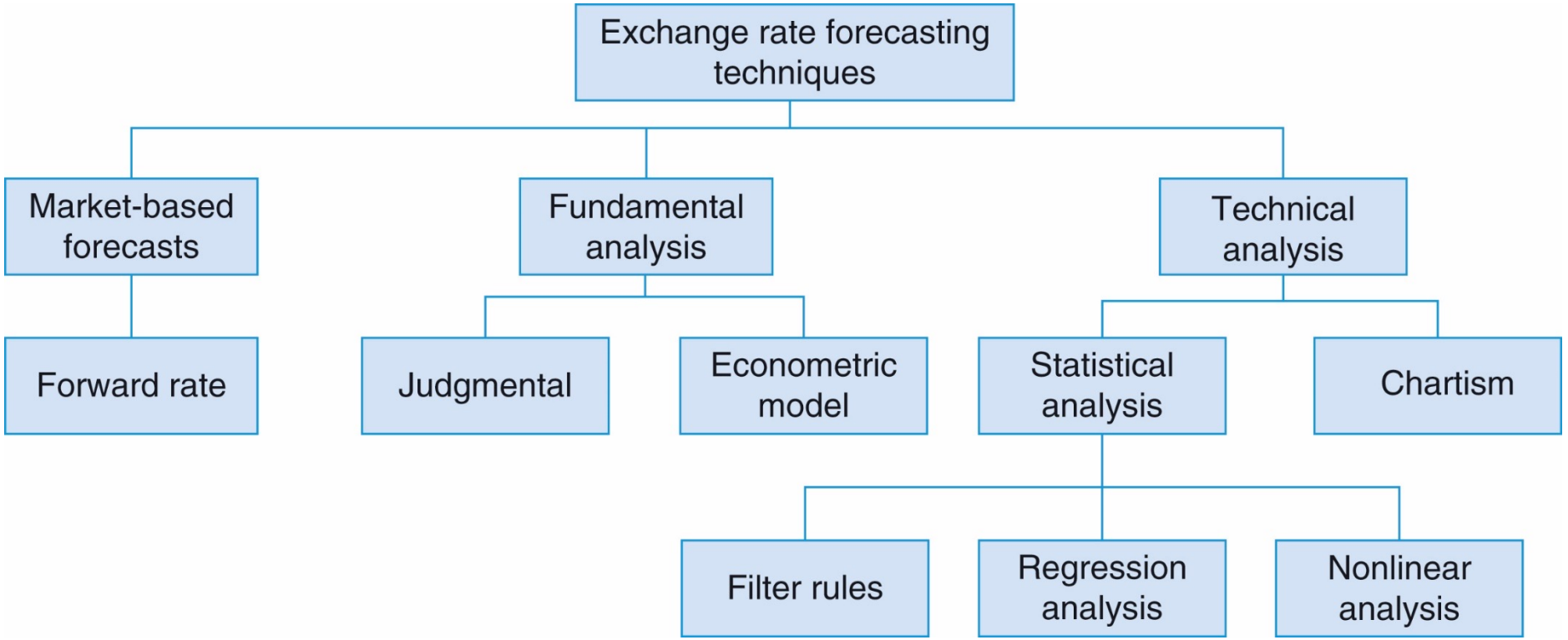
Content

1. Currency Forecasting Techniques
2. Fundamental Analysis
3. Technical Analysis

1. Currency Forecasting Techniques

- Fundamental exchange rate forecasting
  - Uses fundamentals in econometric models (e.g., money supply, inflation, productivity growth rates, current account)
- Technical analysis
  - Using historical data to find patterns
  - Academics criticize it, but a survey suggests this is used often by traders
    - This suggests that there might be something to it, especially since other models also have shortcomings
    - Fundamental analysis is flawed as well
    - Forward rate may not be an unbiased predictor of the future spot rate, even in an efficient market
    - If enough of the trading world uses it, it will matter through trade pressure

Categories of Exchange Rate Forecasting Techniques



Fundamental analysis

- Formal economic models of exchange rate determination, which link exchange rates to macroeconomic fundamentals such as money supplies, inflation rates, productivity growth rates, and the current account.
- The models involve parameters that govern the relationship between the exchange rate and the fundamentals. For example, if the current account deficit as a percentage of gross domestic product (GDP) increases by x %, the model predicts that the domestic currency will depreciate relative to the foreign currency by *b* multiplied by x %. (*b* is estimated by econometrics models, i.e. Regression analysis).

Currency Forecasting Techniques

- Evaluating forecasts
  - Accuracy
    - Mean absolute error (MAE)
    - Root mean squared error (RMSE)
  - Being on the right side of the forward rate
    - Making right decision as to whether to go long or short on currency could be sufficient
    - Percentage correct – beat probability and statistics, i.e., 50% chance of being right
  - Profitability
    - How often can be you be wrong if you lose small when you are wrong and win big when you are right?

Currency Forecasting Techniques

- Fancy Foods can seek the advice of two forecasting companies to help it predict future forex rates: Forexia and Trompe Le Monde. Which forecast is more accurate?

	Forexia	Trompe Le Monde
Forecast	\$1.65/£	\$1.51/£
Forecast relative to forward rate (forward rate: £1.53/\$)	Higher	Lower
Decision	Hedge	Do not hedge
Forecast error	–\$0.10/£	\$0.04/£
Ex post cost relative to forward rate	Zero	Positive

More inaccurate but suggests hedging, which proves to be less costly

Technically more accurate but suggests no hedging, which proves to be costly: $£1M \times (\$1.55 - \$1.53)/£ = \$20{,}000$

Fundamental Exchange Rate Forecasting

- The asset market approach to exchange rate determination
  - The exchange rate as an asset price – based on current fundamentals and expectations of future exchange rates
    - Just like stocks – linked to current / future fundamentals
    - There are two assets (currencies) in FX rate
    - The exchange rate as a weighted average of the current fundamental and its expected future value. The equity price of a stock the value of the current cash flow (the dividend) and the discounted expected value of the future equity price, the price at which you can sell the stock in the future.
    - Even a small change in current fundamentals can cause a large change in the forex rate if it also changes expectations
  - The monetary approach
    - Real money balances – people are only concerned with the real value of the nominal money they are holding
      - Depends on income, and on interest rates (money supply) (we compare 2 currencies)
      - Currency depreciates: ↑ MS (↓IR) =, ↑ inflation, ↓ real income
      - Reasonable in the long-term, questionable in short-term (prices can be sticky)

Fundamental Exchange Rate Forecasting

- Why the random walk works
  - Current exchange rates adequately reflect the expected value of future fundamental values
    - In order for this to be true exchange rate should also predict future fundamental values (Engel, Mark and West, 2007 show this to be true)

- Novel forecasting techniques that efficiently exploit the information across fundamentals in multiple countries predict exchange rates out of sample better than the random walk model. At longer horizons, such as 3 to 4 years in the future, fundamental models do have predictive power for exchange rates (see, for example, Mark, 1995).

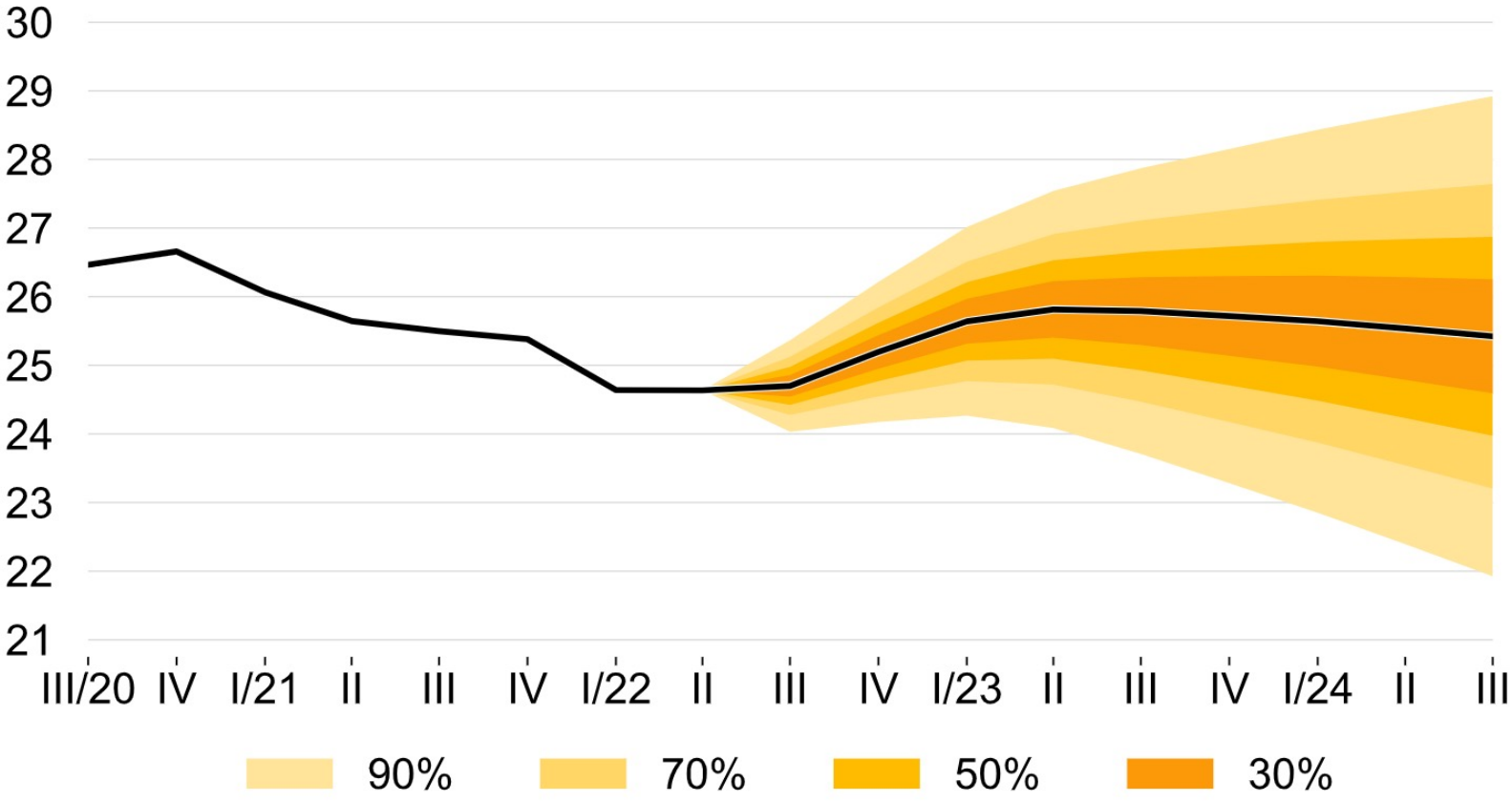
Fundamental Exchange Rate Forecasting

- News and exchange rates
  - The performance of the monetary exchange rate model is that exchange rate changes are unpredictable but they still reflect news about fundamentals
- If there is news about the money supply or real income, and it does not change the exchange rate in the required direction, this would be strong evidence against the fundamentals model. Several authors have used high-frequency data on exchange rates and macroeconomic announcements to investigate how exchange rates react to macroeconomic news (see Andersen et al., 2003, 2007; and Faust et al., 2007, Kočenda and Moravcová, 2019, Moravcová, 2018).
  - News is incorporated into exchange rates very quickly (typically less than 15 minutes) – market efficiency
    - Strange reaction to news about inflation/increases in money supply: the dollar appreciates whereas it should depreciate according to the MER model – one interpretation is that this reaction anticipates central bank responses of aggressive monetary policies (i.e., higher interest rates)
    - Leaking news

Fundamental Exchange Rate Forecasting

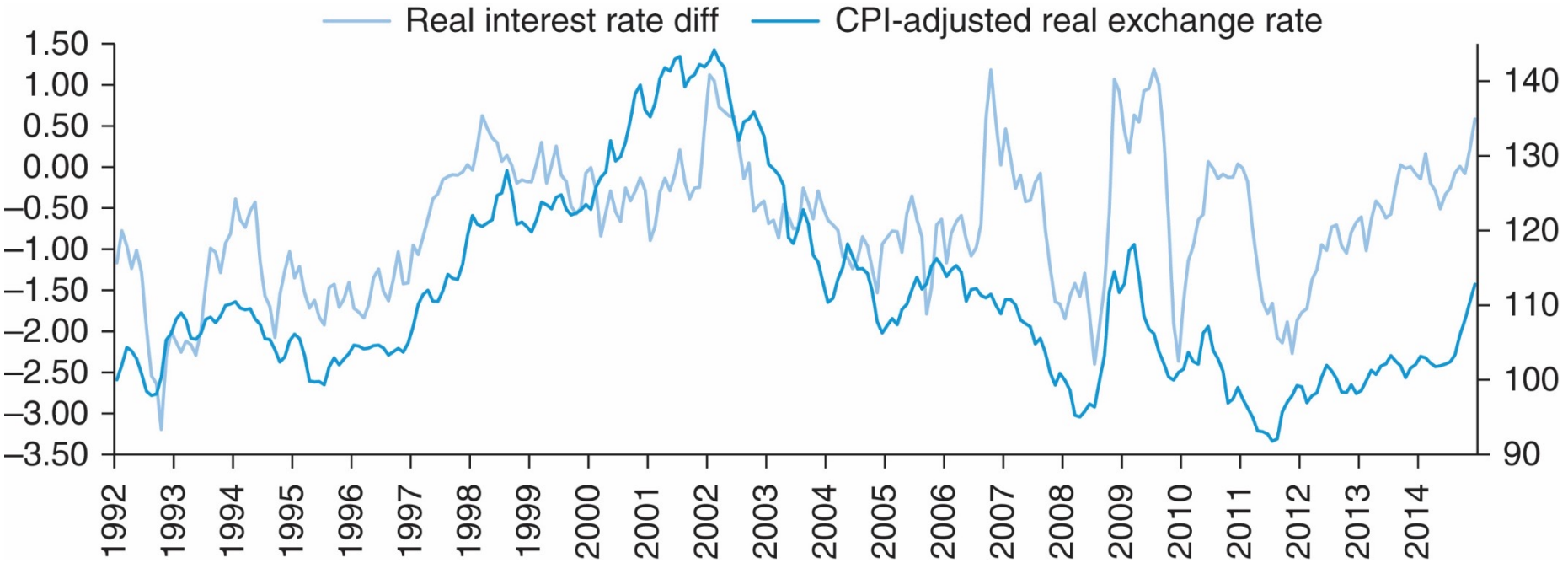
- The real exchange rate, the real interest rate differential, and the Current Account
  - Converting UIRP (International Fisher Effect) to real terms
    - Alter nominal interest rates using expectation about inflation
    - When the foreign interest rate is greater than the domestic interest rate, domestic currency is expected to appreciate in real terms (UIRP)
  - Mean reversion – should always go back to the mean
    - Whether the forex rate is unusually high or low in forecasting future forex rates – your best predictor remains the current forex rate
  - Empirical evidence is weak

EURCZK forecast



Source: cnb.cz

The Real Exchange Rate and the Real Interest Differential



Fundamental Exchange Rate Forecasting

- The real exchange rate and the BOP
  - The trade balance (part of the Current Account)
    - Strong domestic currencies make foreign goods cheaper
  - The Capital Account
    - Higher real interest rates (increases savings and decreases real investment) are associated with capital account deficits (losing net foreign investment)

Fundamental Exchange Rate Forecasting

- Equilibrium
  - Supply and demand force an equilibrium price and quantity of the real exchange rate on the current account through a "**goods" channel** and a "**savings and investment" channel**
  - Increase in government spending/decrease in taxes causing a budget deficit increases demand
    - → Real interest rates increase
    - → Currency appreciates
  - New information signals increases in future GDP
    - → Consumers spend more
    - → Currency appreciates (due to Current Account deficit / inflow of foreign capital)

Fundamental Exchange Rate Forecasting

- PPP-based forecasts
  - Most popular fundamental exchange rate models
  - “Fair value” exchange rate models used by most brokers / banks
    - They adjust PPP for various effects, such as productivity trends, which is particularly important for developing countries
    - They use the deviation between current value and fair value of the exchange rate to predict the direction of change
  - Academic studies suggest there is some predictive power, though it is limited to medium-to-long horizons
    - For example, the Big Mac index

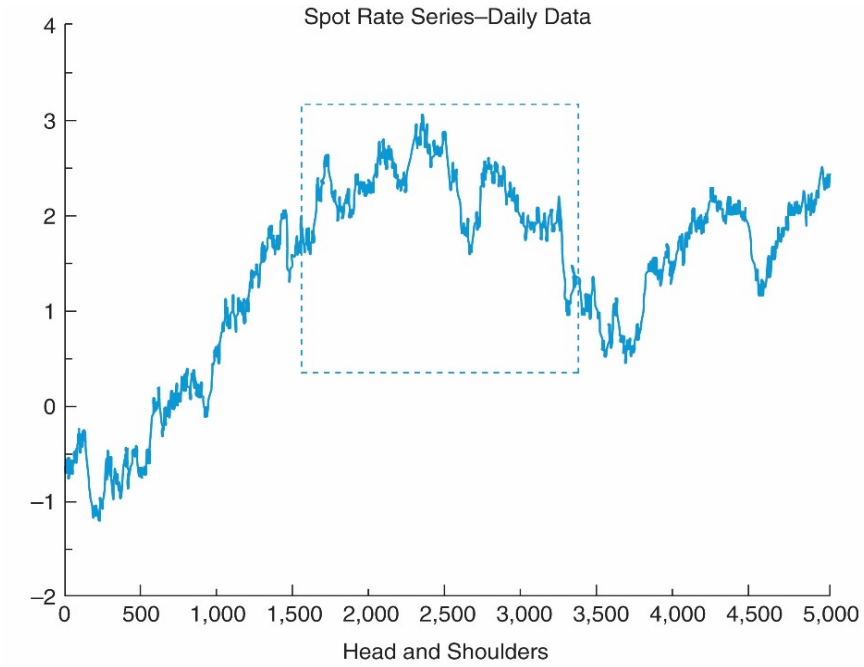
Technical analysis

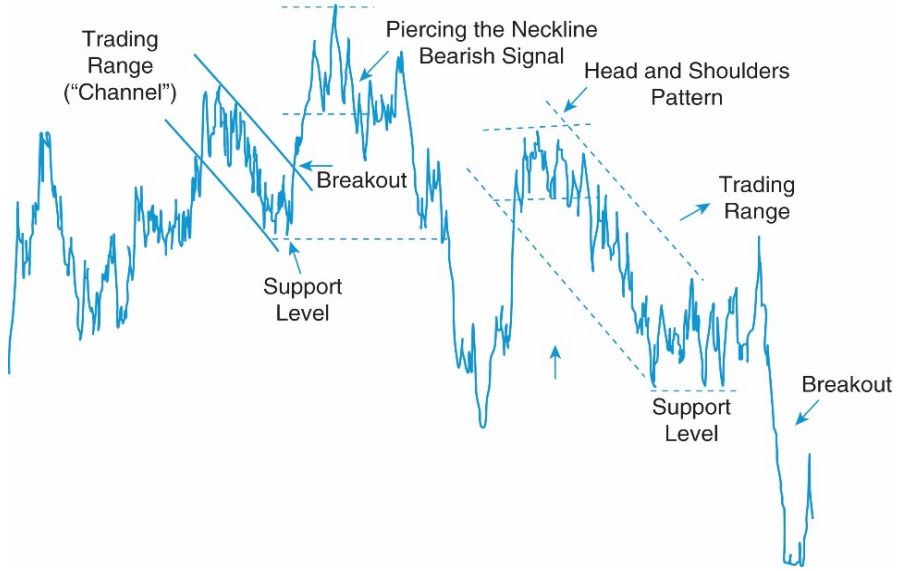
- Why to use it?
  - Forex dealers and currency fund managers make extensive use of technical analysis (see, for example, Gehrig and Menkhoff, 2006).
- Fundamental analysis has some inherent problems. (right exchange rate model, fundamental variables must be forecast, macroeconomic inputs to fundamental analysis are not all available at frequent intervals).
- Forward rate may not be an unbiased predictor even in efficient market.
- Large segment of the trading world is using technical analysis.

Technical Analysis

- “Pure” technical analysis: Chartism
  - Support level – level price has trouble falling below
  - Resistance level – level price has trouble rising above
  - Breakout – a sudden break of a trading range
  - Potentially spurious patterns
  - Does charting work?

Exchange Rate Patterns Described by Chartists

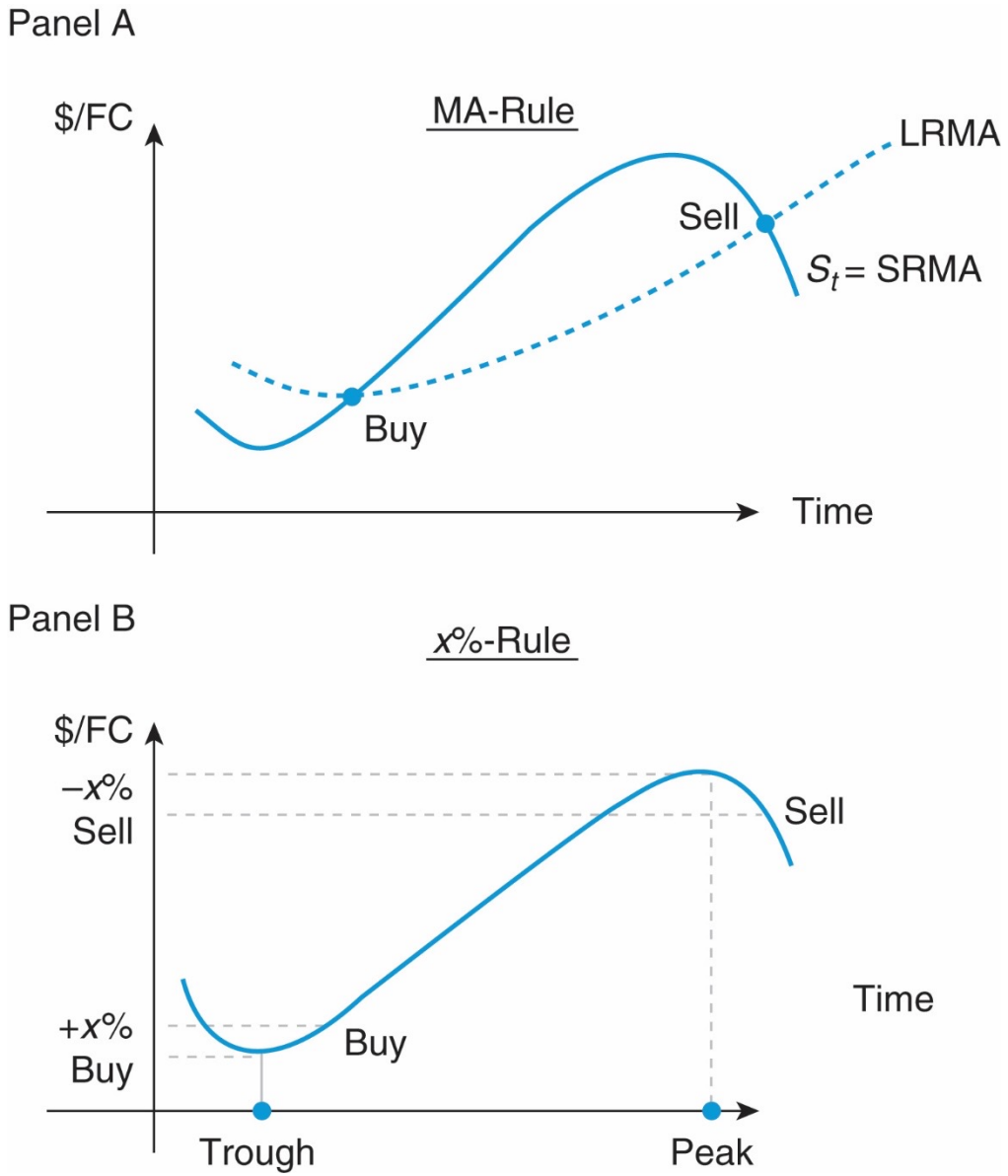




Technical Analysis

- Filter rules
  - x% rules
    - Buy (go “long”) the currency if it appreciates by x% above its most recent trough (or support level)
    - Sell (go “short”) the currency when it falls x% below its most recent peak (or resistance level)
  - Moving-average crossover rules
    - Go long (short) in the foreign currency when the short-term moving average crosses the long-term moving average from below (above)
    - 1 and 5 days; 1 and 20 days; 5 and 20 days

How Filter Rules Work



Technical Analysis

- Non-linear models
  - More sophisticated models which take non-linearity into consideration
    - Use computer techniques such as algorithms to search for optimal trading rules
    - Apply Darwinian-like, natural-selection process to filter rules on past data to breed the “best” trading rules

Predicting Devaluations (Pegged Regimes)

- What causes a currency crisis?
  - Macroeconomic conditions
    - Government follows policies inconsistent with its currency peg – speculative attack is unavoidable
      - Government will exhaust reserves defending peg
    - Events that should precede devaluations
      - Growing budget deficits
      - Fast money growth
      - Rising wages and prices
      - Currency overvaluation
      - Current account deficits (caused by budget deficits combined with currency overvaluation)

Predicting Devaluations

- Self-fulfilling expectations
  - Group of investors begin speculative attack
  - Other investors see this and think that the currency will collapse so they convert out of currency
- Contagion
  - If group successfully attacks one currency, they might as well try another
  - If one currency is attacked, other currencies will appreciate relative to that currency and their domestic firms suffer a loss of competitiveness
  - Other countries in similar position – obvious targets (e.g., Asian crisis)

Questions

- **How do fundamental analysis and technical analysis differ?**
- **Describe three statistics you should obtain from a currency-forecasting service in order to judge the quality of its currency forecasts.**
- **Does a large increase in the domestic money supply always lead to a depreciation of the currency?**
- **What is chartism?**
- **What is an x% filter rule?**
- **What is a moving-average crossover rule?**