

# PPP Charts

Based on Similar Baskets of Goods, As Compiled by the IMF

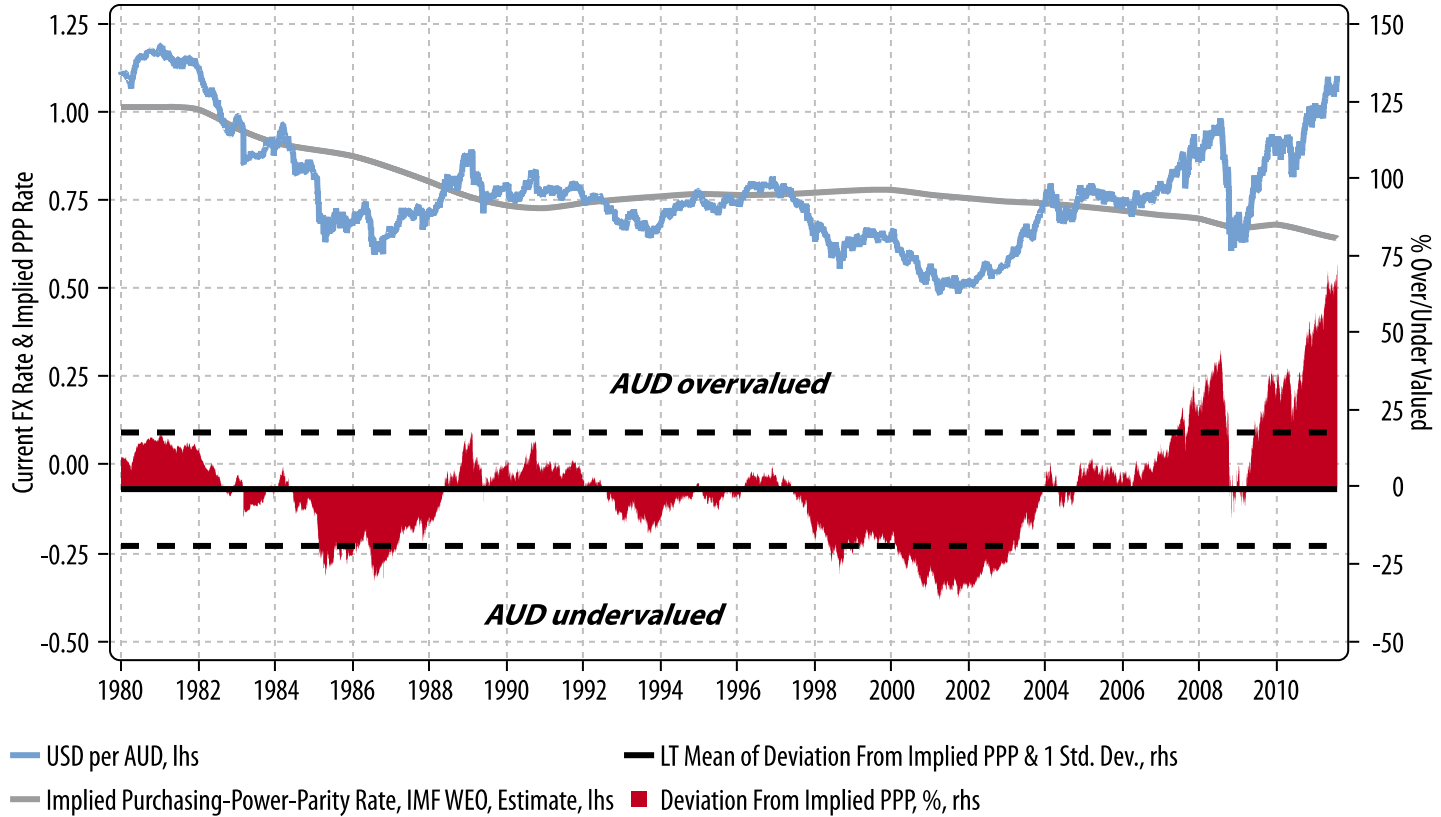
# Executive Summary

- **These PPP charts plot the spot exchange rate vs the IMF's WEO implied PPP rate.** We use the WEO PPP rate rather than CPI differentials because CPI's are often calculated differently for different countries whereas the implied rate compares similar (and similarly-weighted) baskets.
- **These charts are designed to facilitate two ways of reading PPP: you can put "fair value" at the level implied by the IMF's PPP rate (where the spread is 0); or you can put "fair value" at the LT mean.** Comments welcome on which is more appropriate, but we think it is useful that these charts facilitate both observations.
- Since there is no WEO series for the euro as a whole, we have created one using a GDP-weighted average of the euro countries.
- A note on scales: spot/PPP rate scales (left scales) have been flipped so that a stronger currency is shown as rising
- For more info, see the appendix
- **Comments/suggestions welcome.**

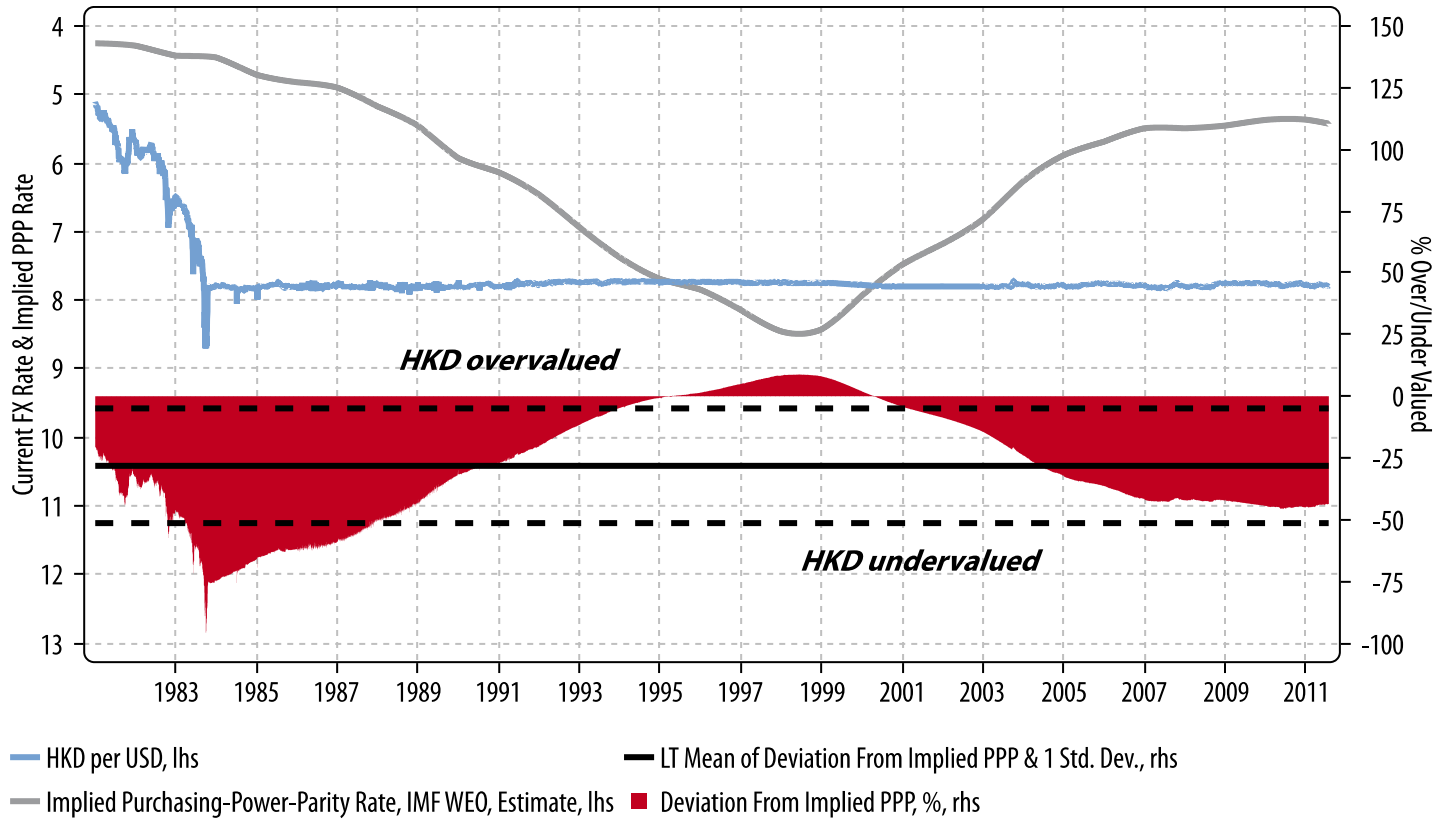
# PPPs vs USD

# Asia

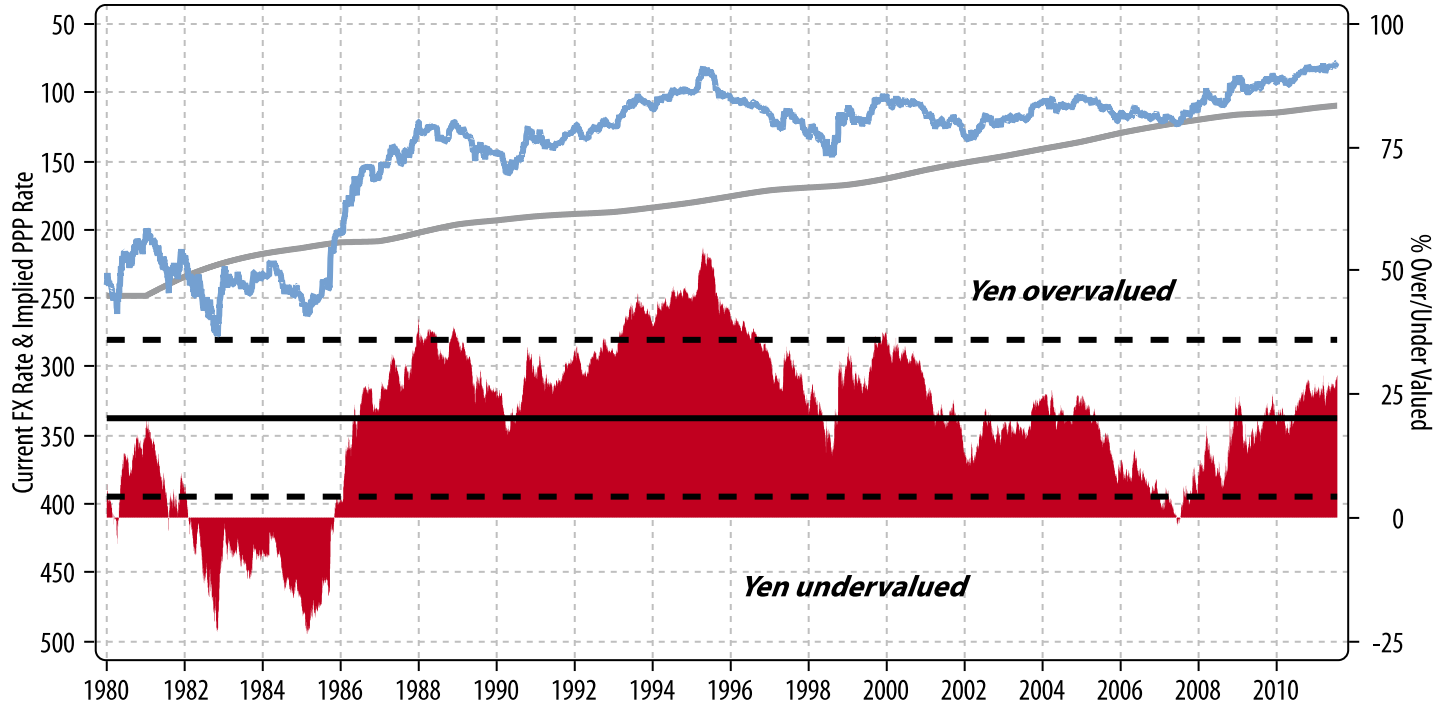
## AUD/USD vs Implied PPP



## HKD/USD vs Implied PPP

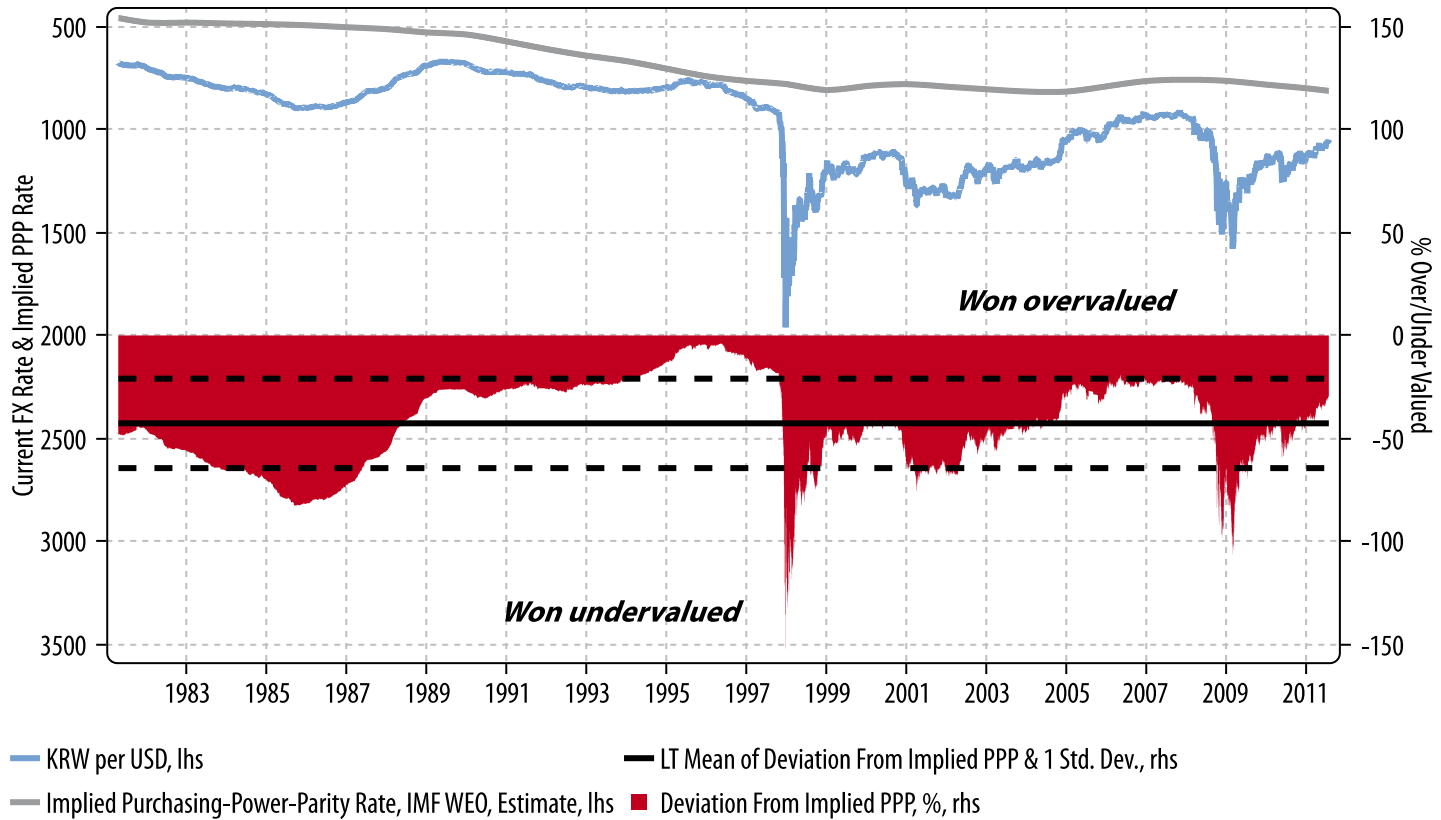


## Yen/USD vs Implied PPP

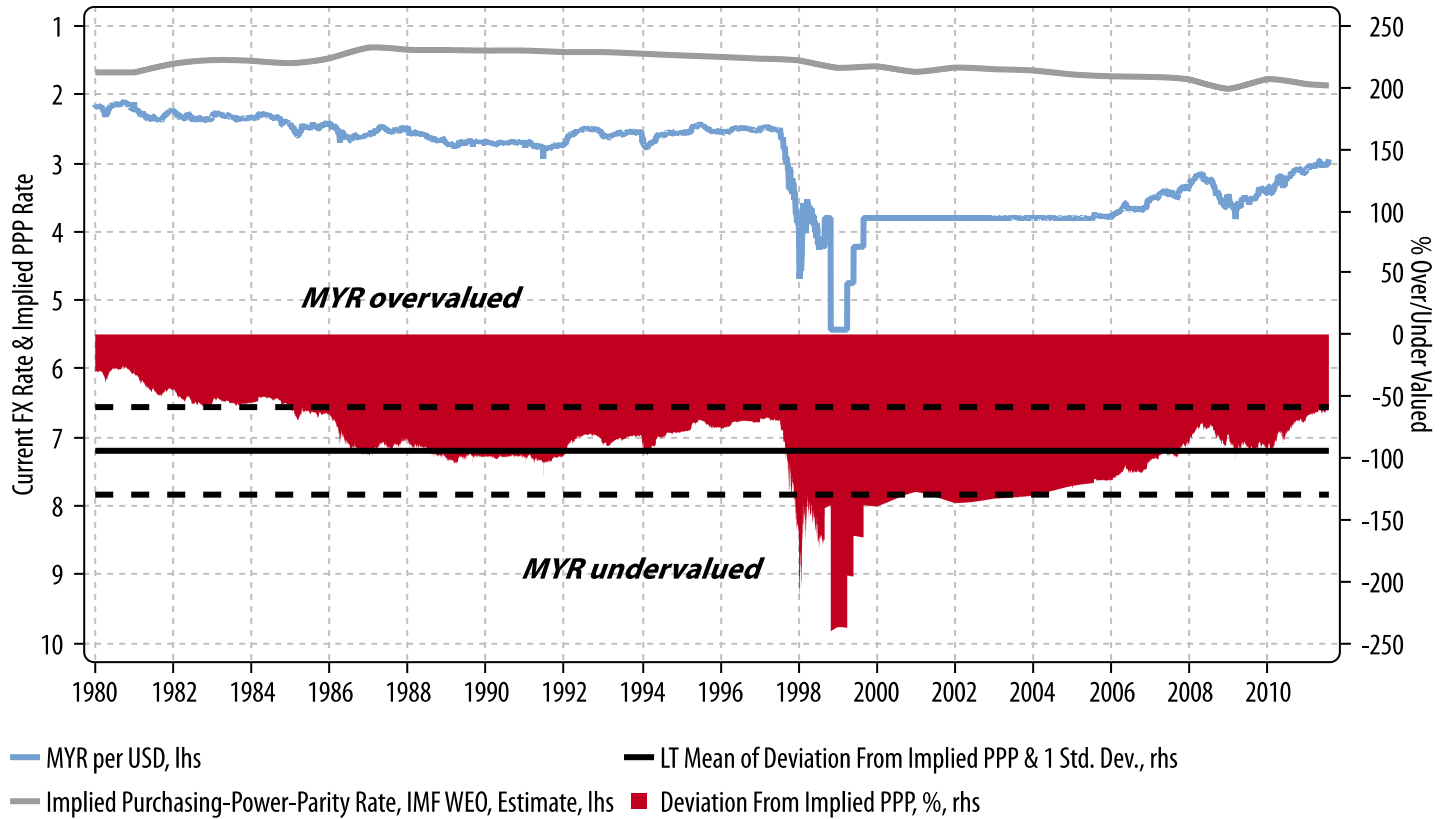


- JPY per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- Long-Term Mean Of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied Purchasing Power Parity, %, rhs

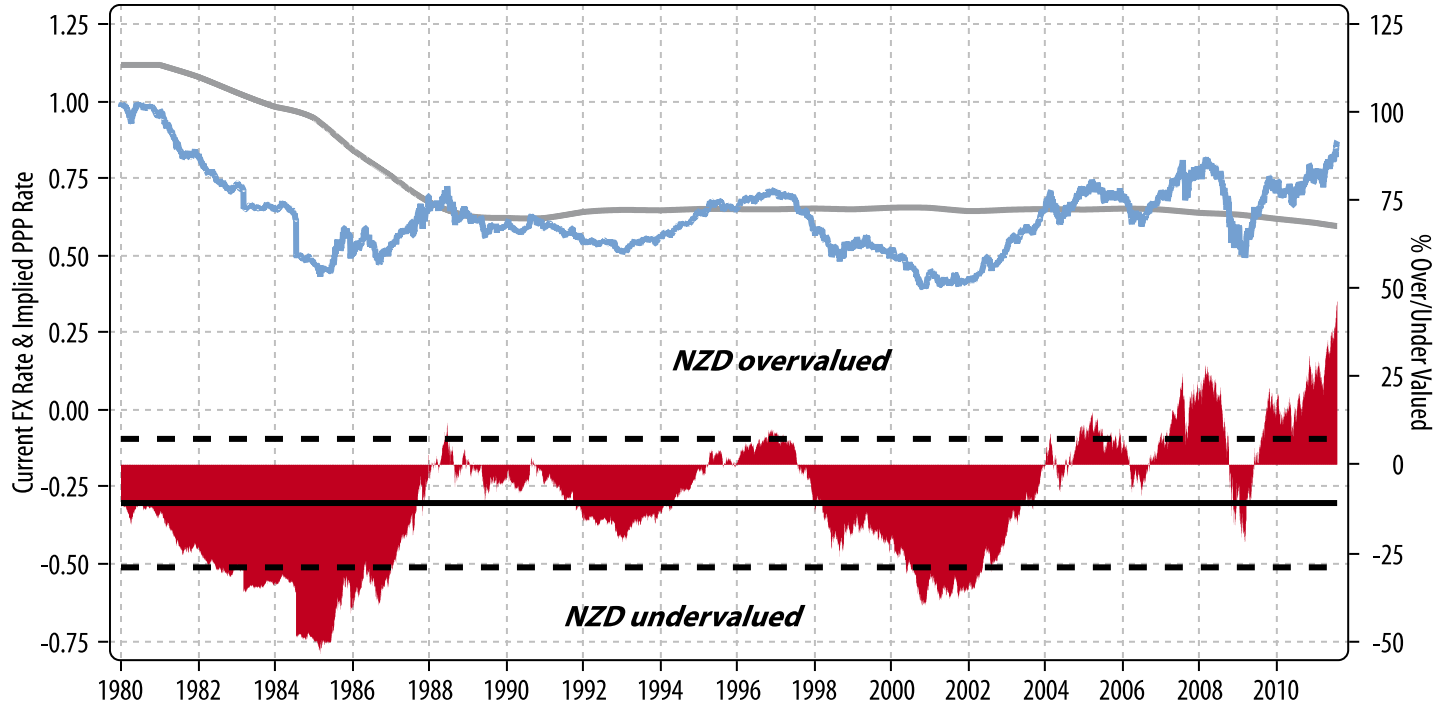
## KRW/USD vs Implied PPP



## MYR/USD vs Implied PPP

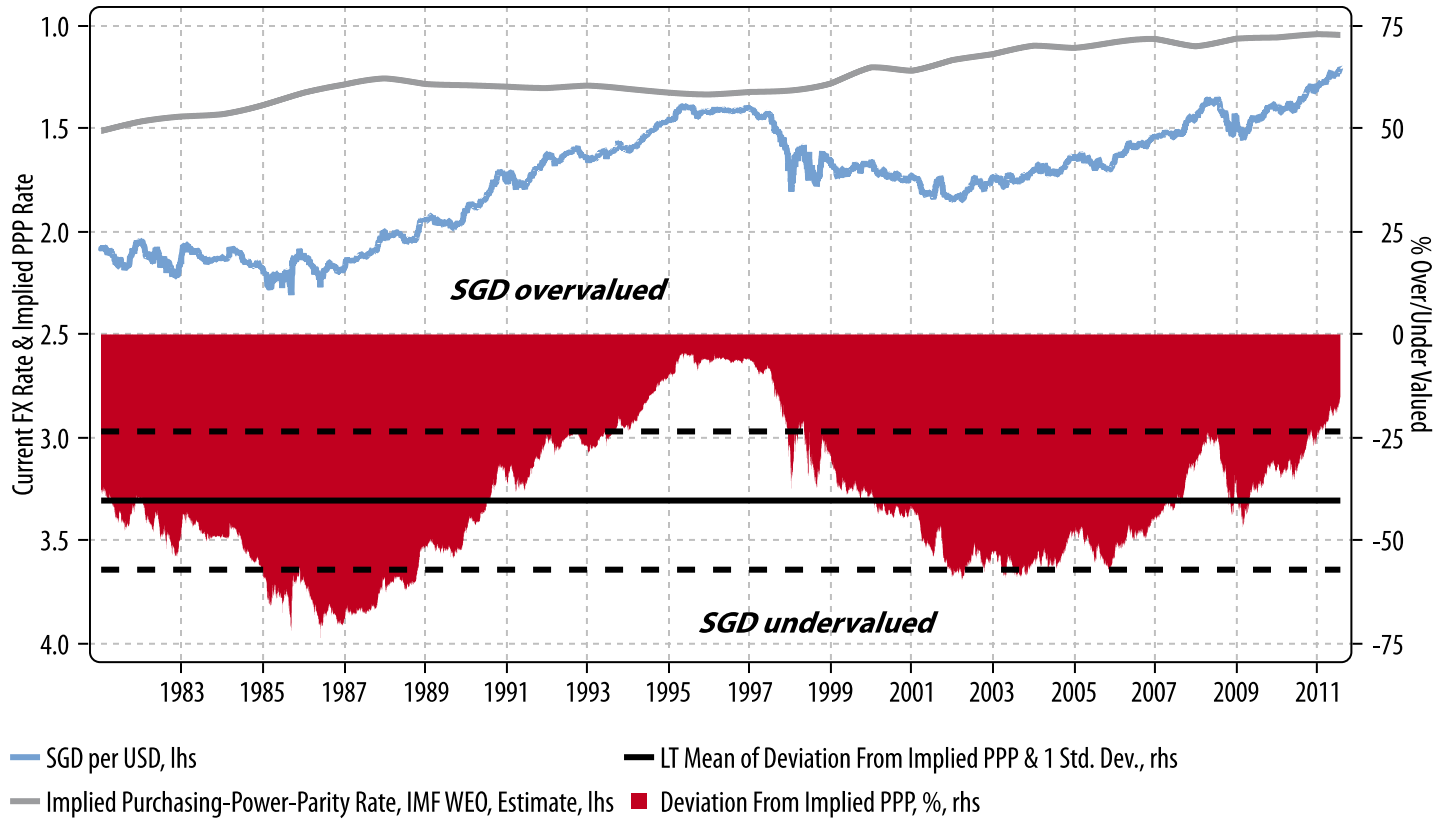


## NZD/USD vs Implied PPP

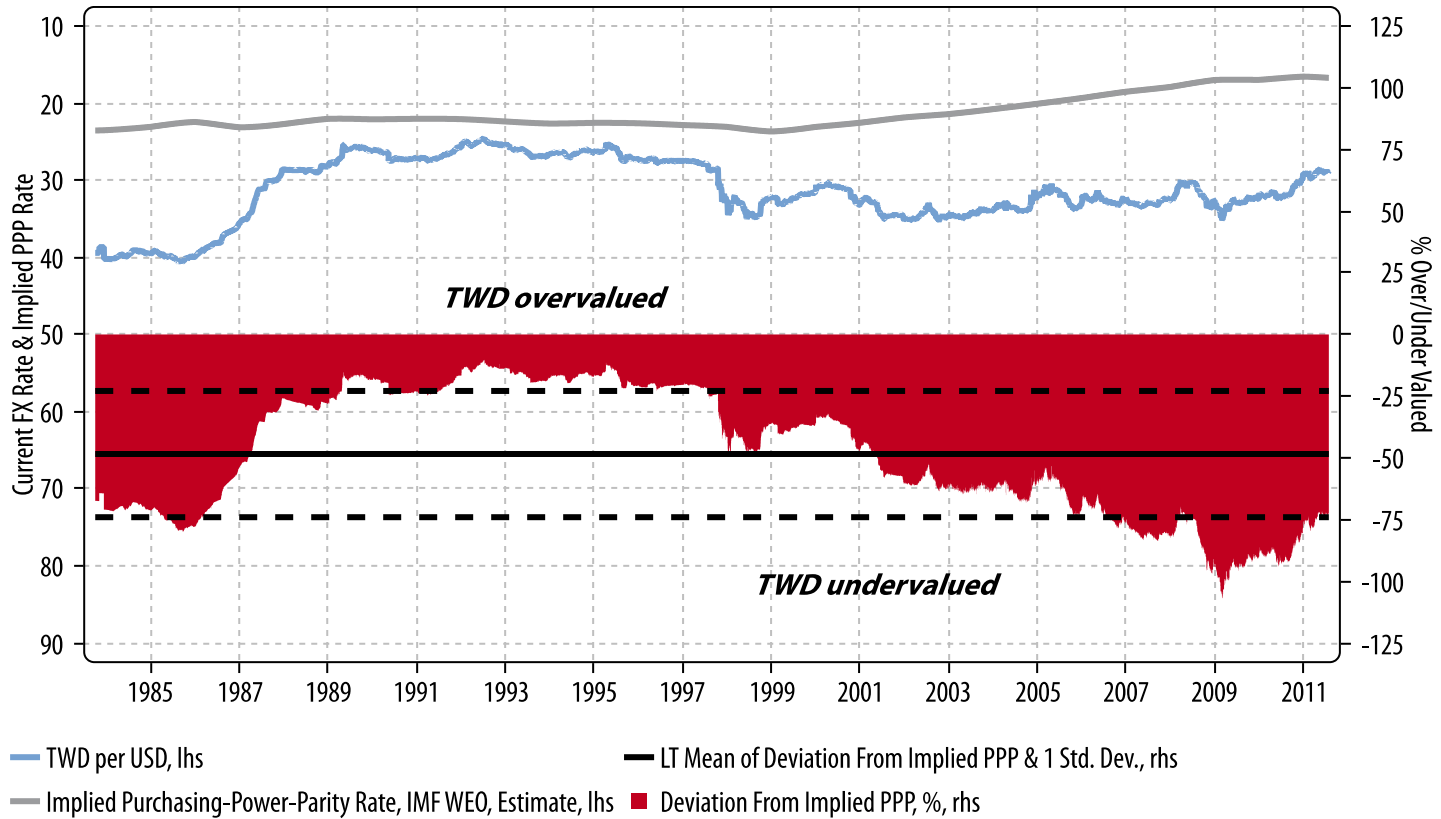


- USD per NZD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- Long-Term Mean Of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied Purchasing Power Parity, %, rhs

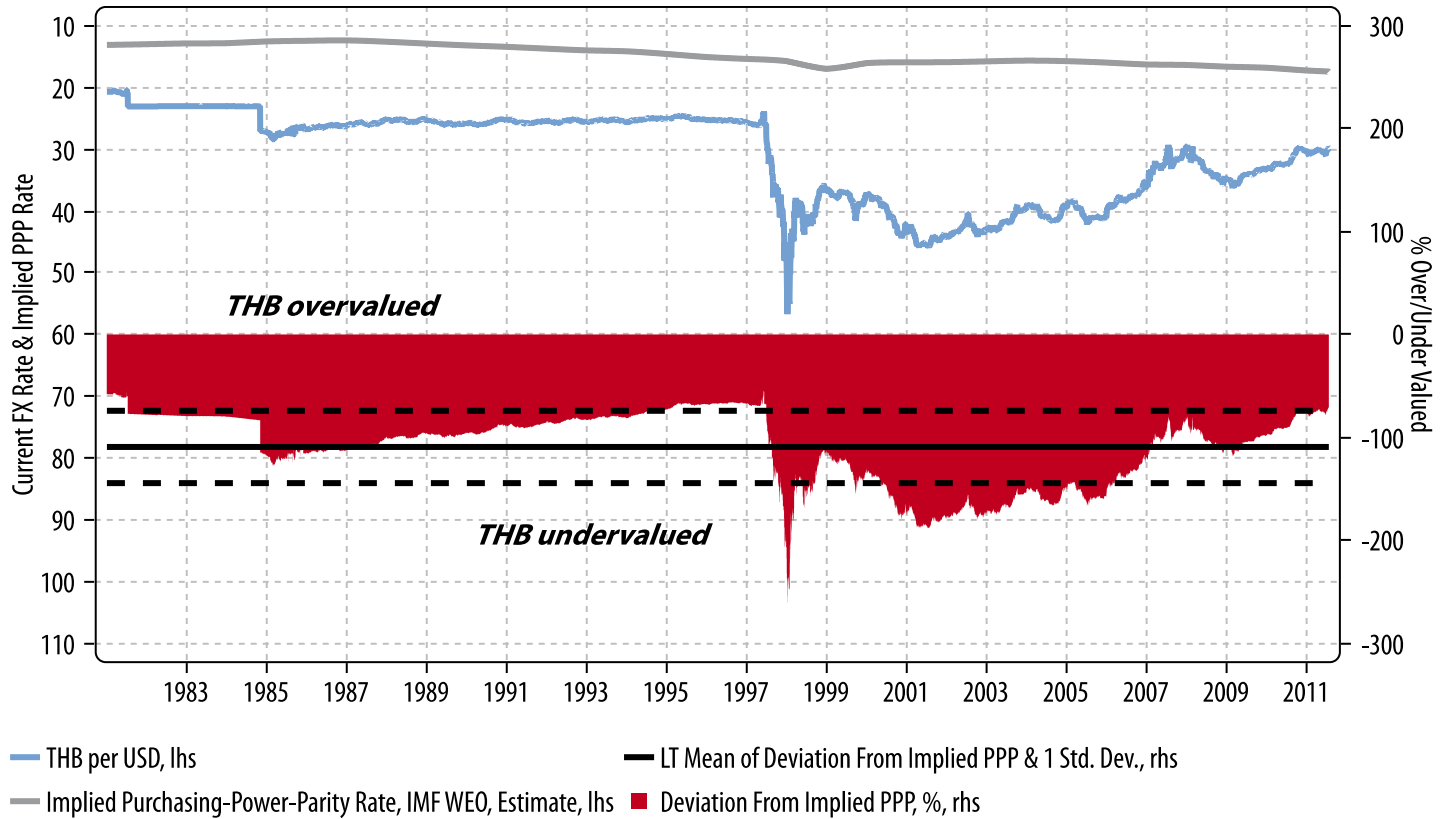
## SGD/USD vs Implied PPP



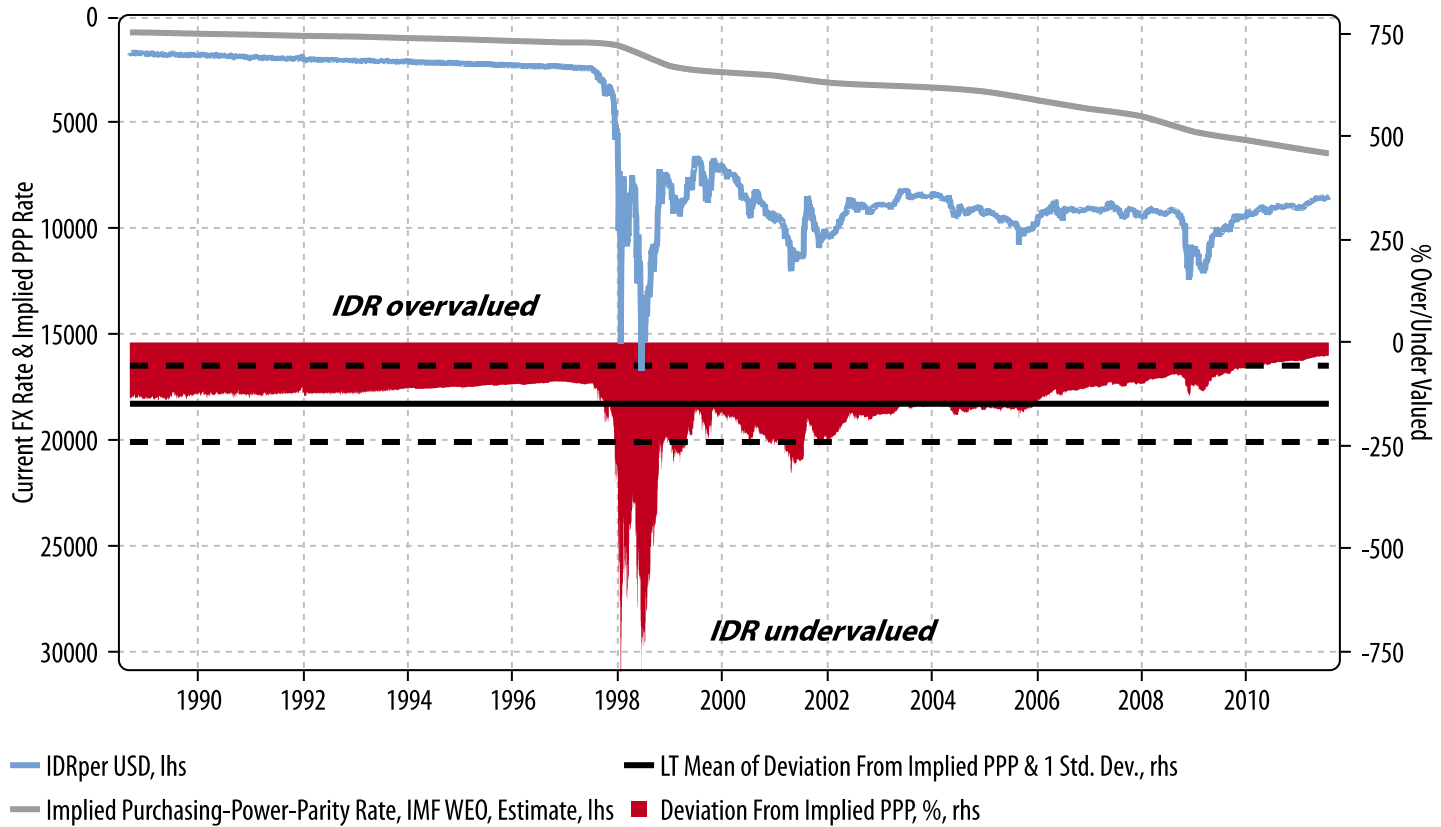
## TWD/USD vs Implied PPP



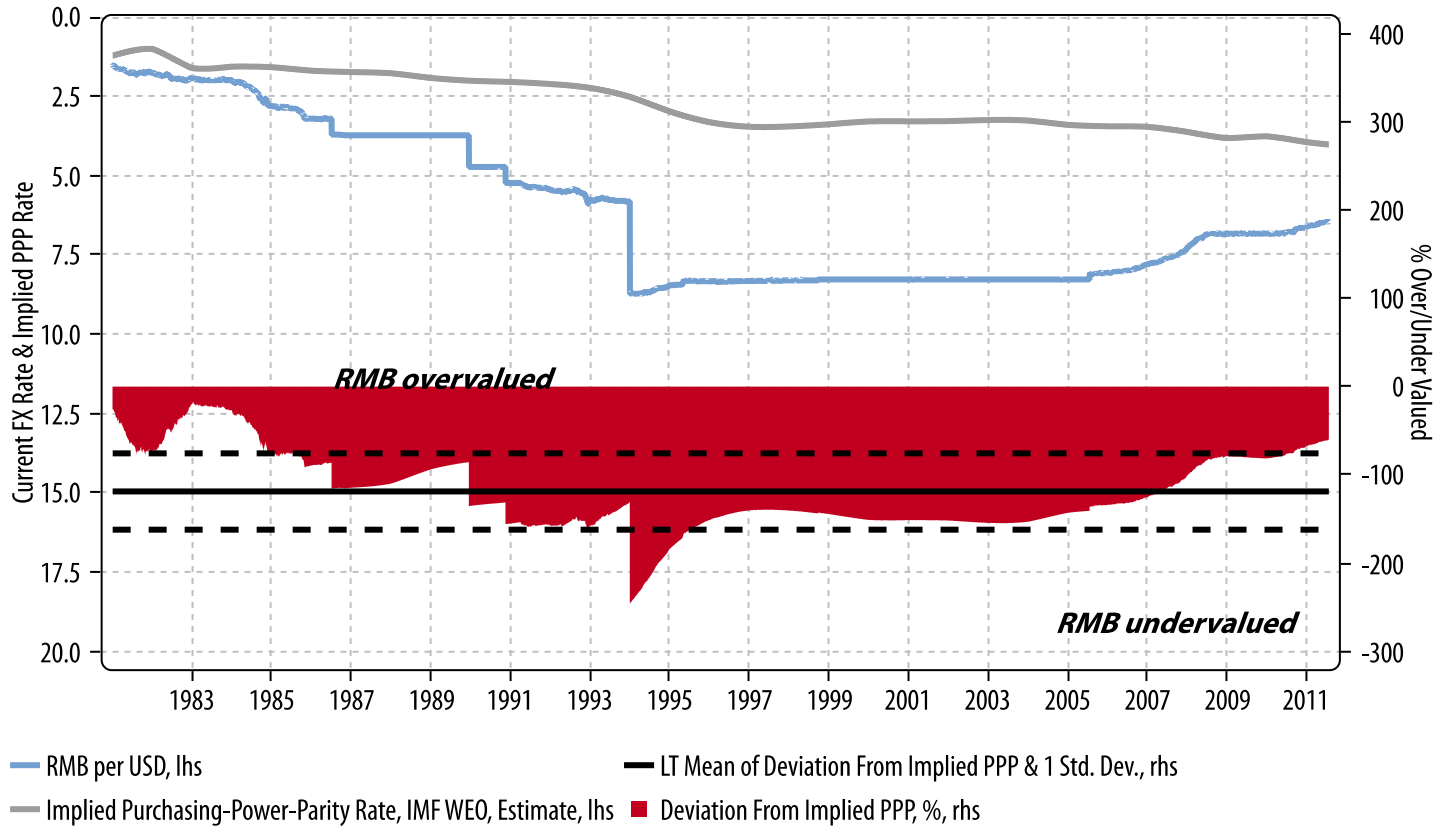
## THB/USD vs Implied PPP



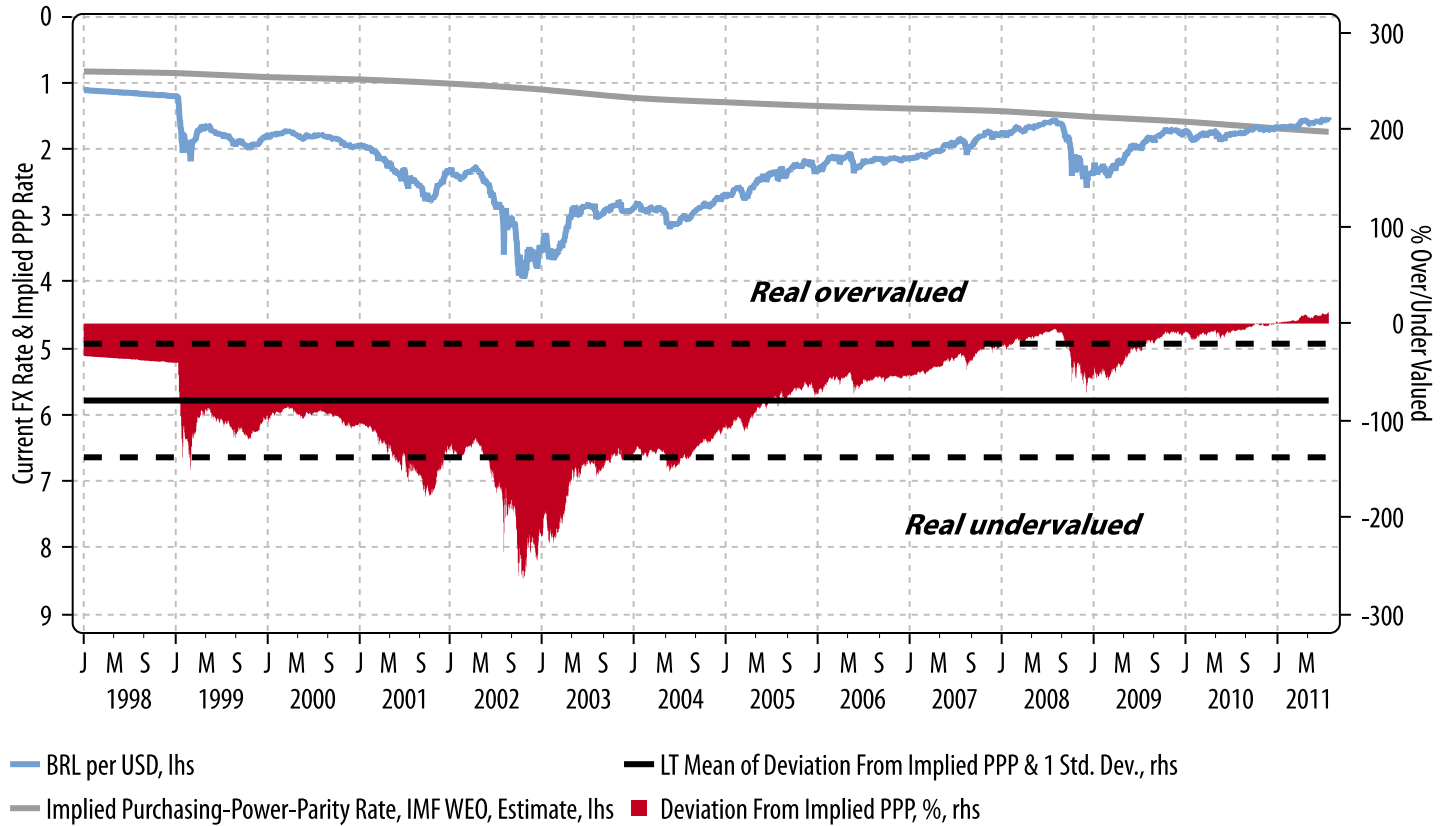
## IDR/USD vs Implied PPP



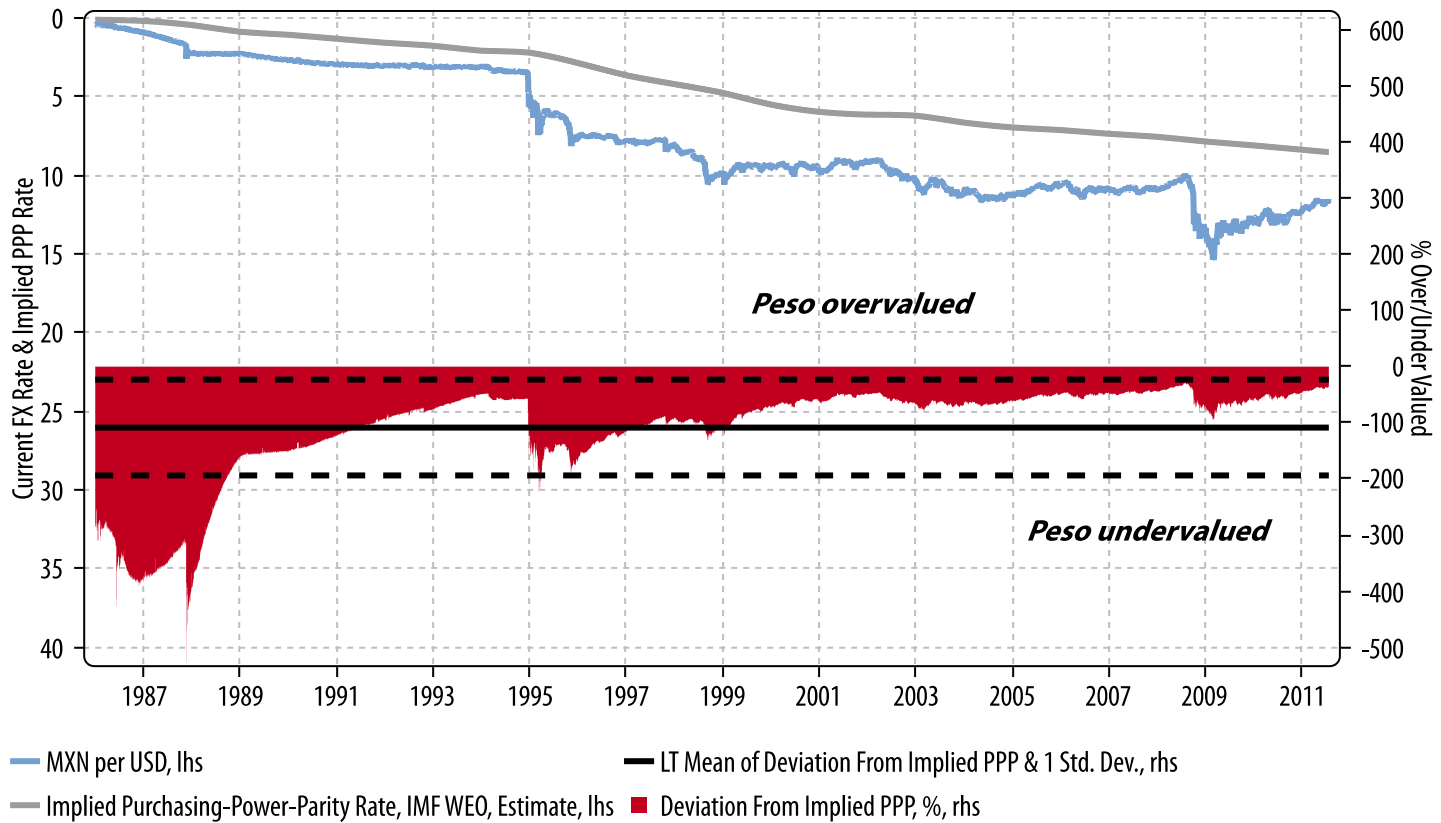
## RMB/USD vs Implied PPP



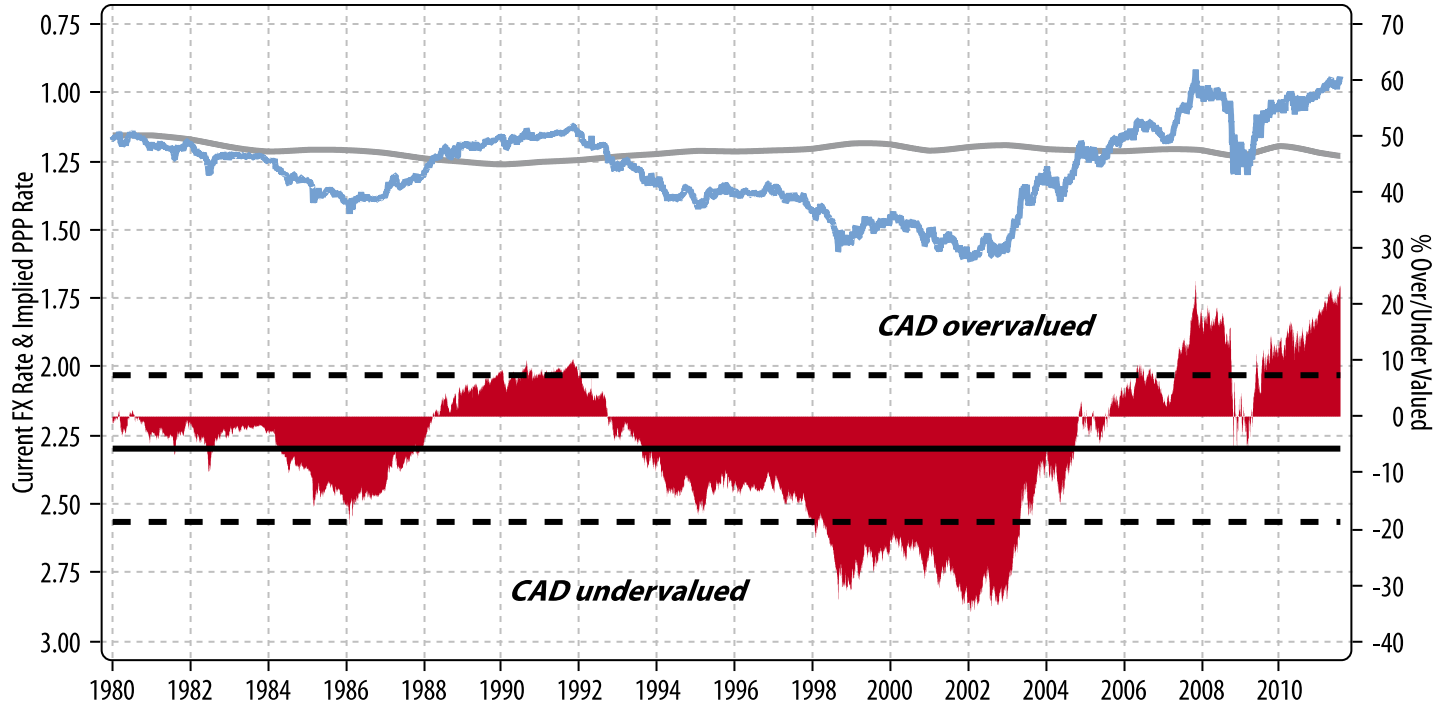
## BRL/USD vs Implied PPP



## MXN/USD vs Implied PPP

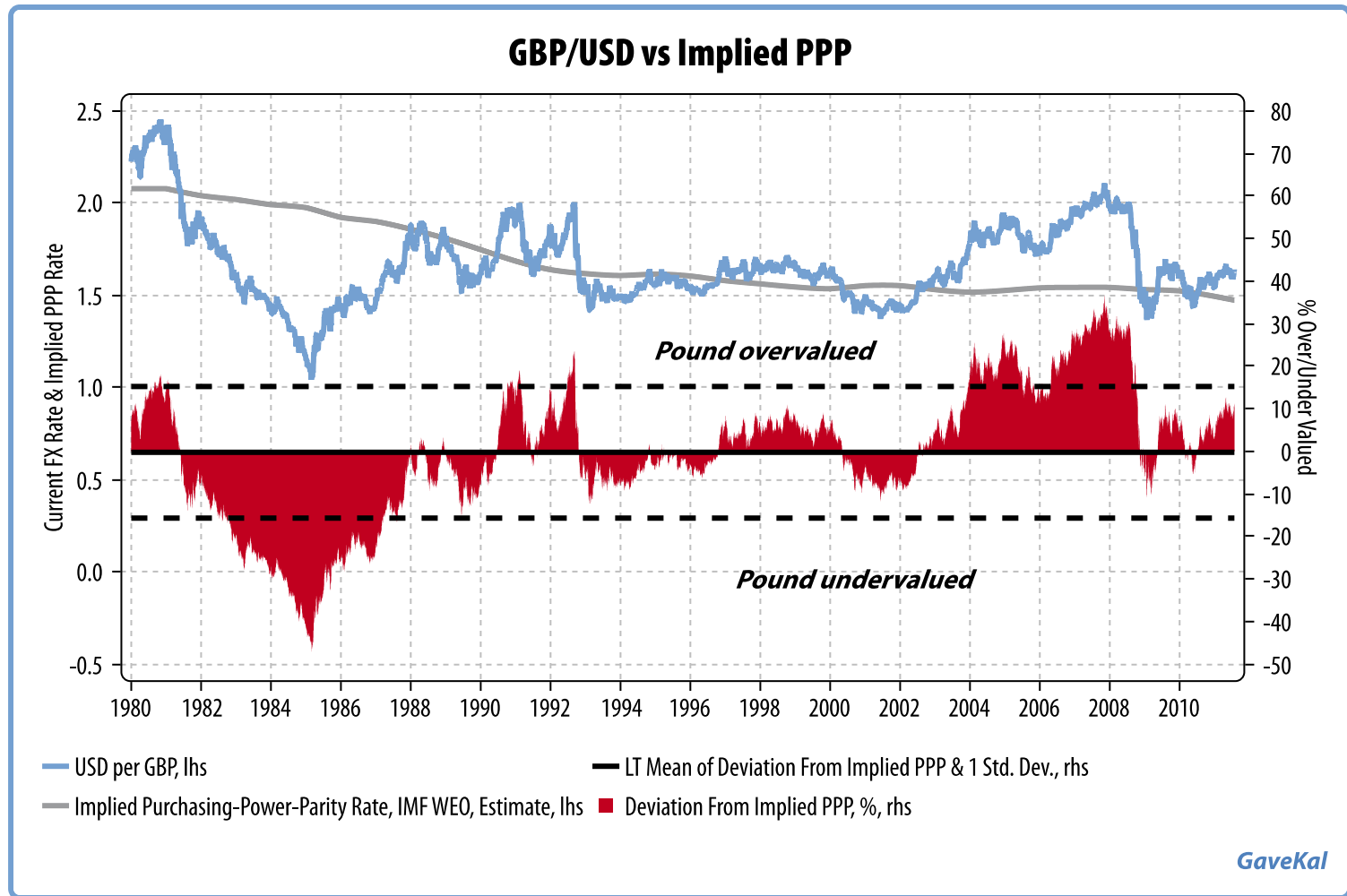


## CAD/USD vs Implied PPP

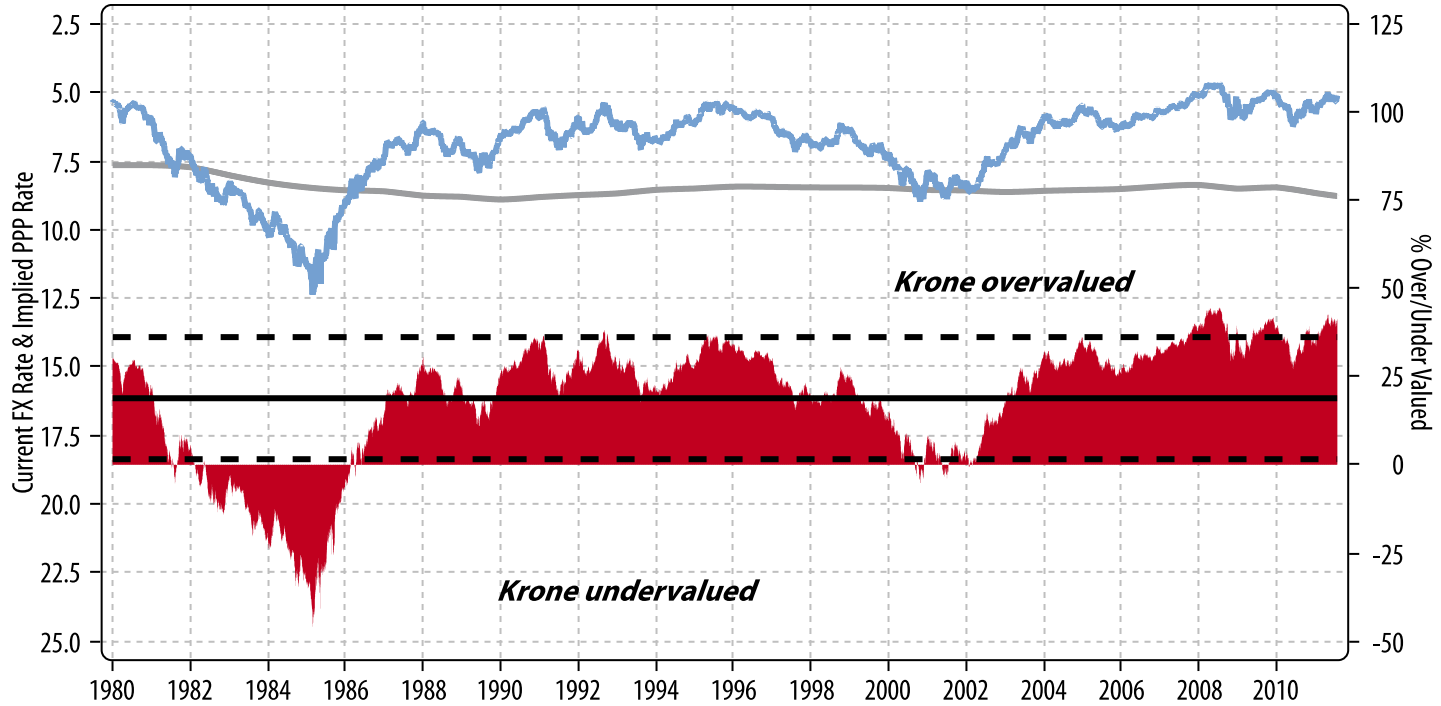


— CAD per USD, lhs  
— Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs  
— LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs  
■ Deviation From Implied PPP, %, rhs

# Europe non-euro

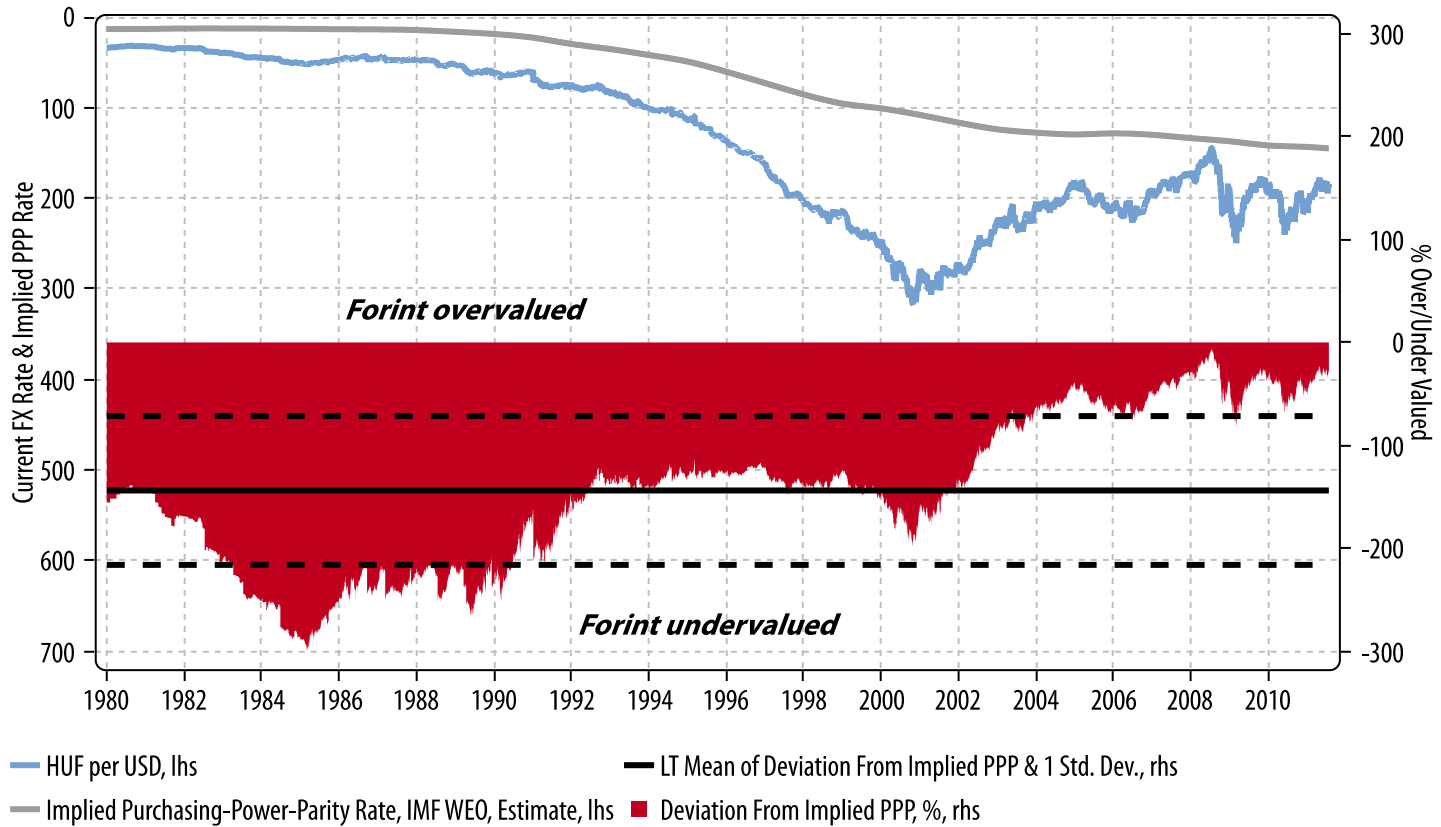


## DKK/USD vs Implied PPP

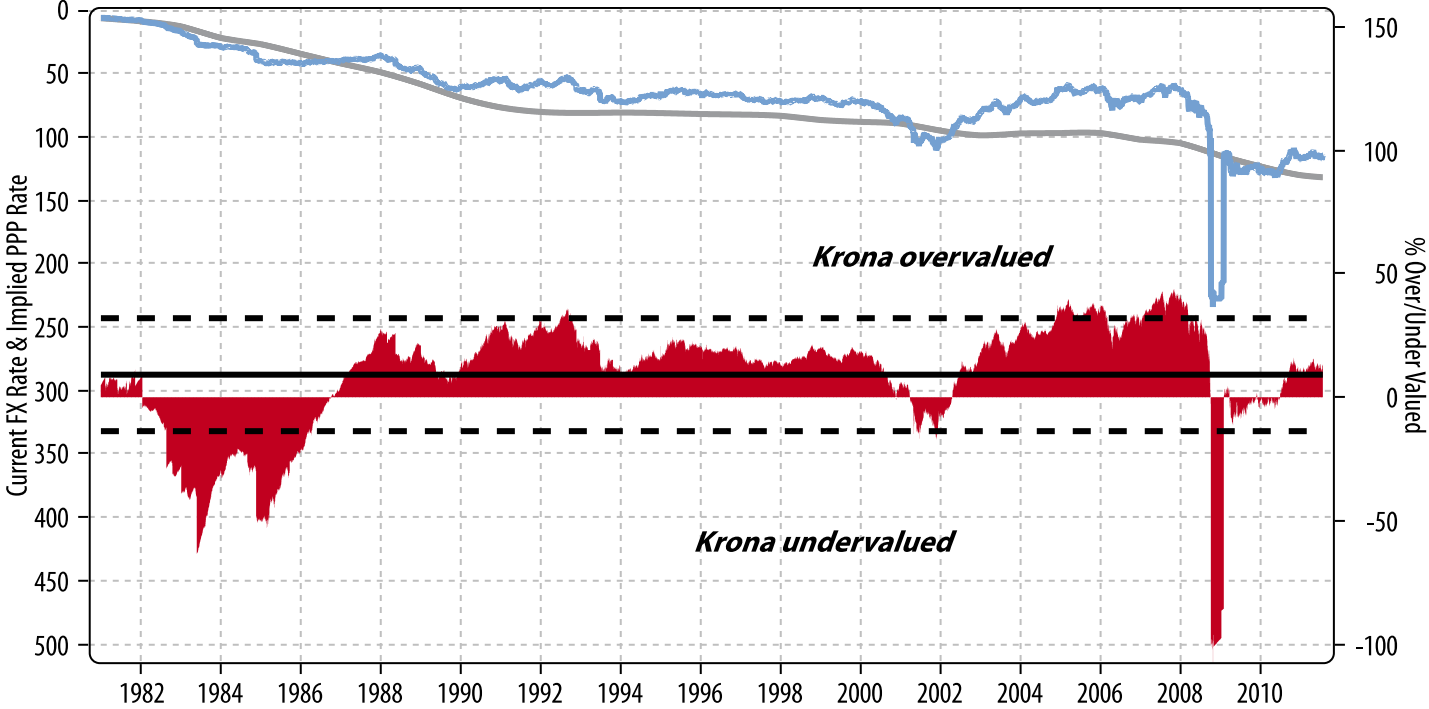


- DKK per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## HUF/USD vs Implied PPP

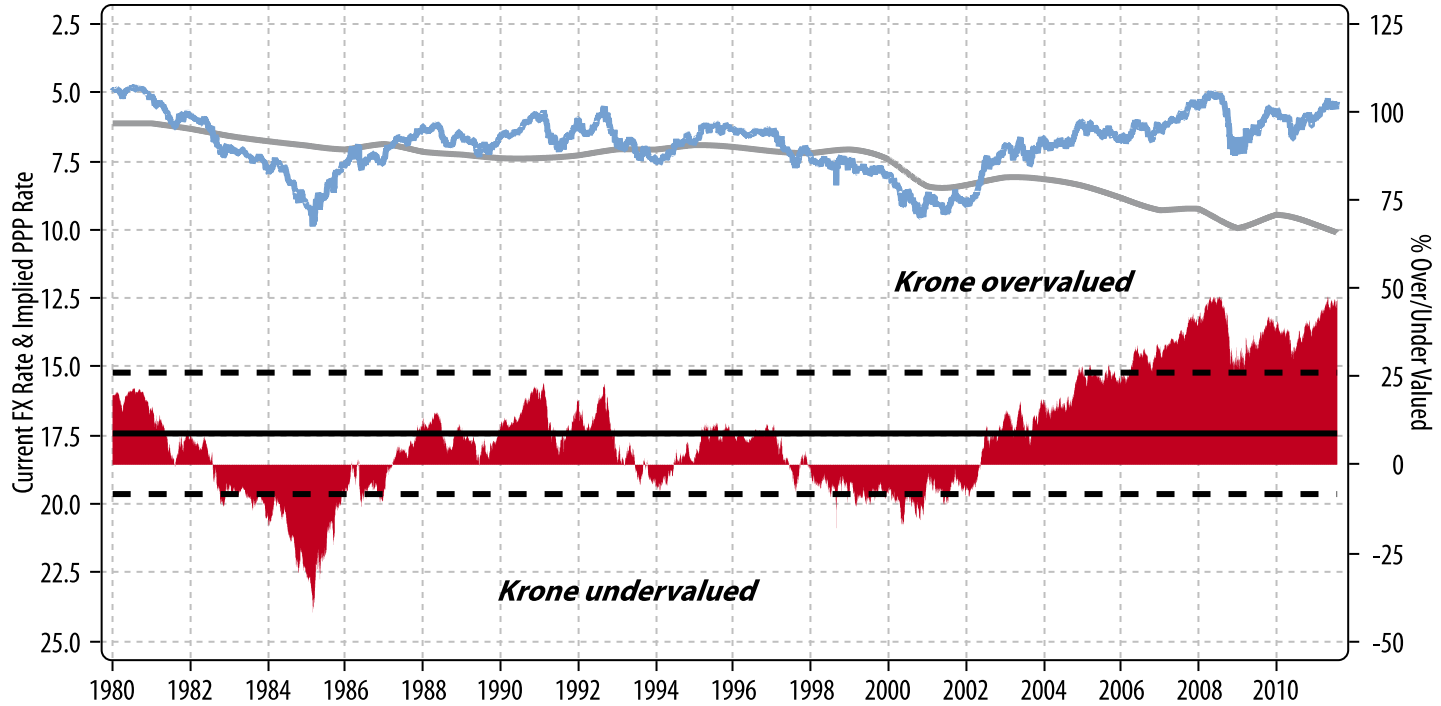


# ISK/USD vs Implied PPP



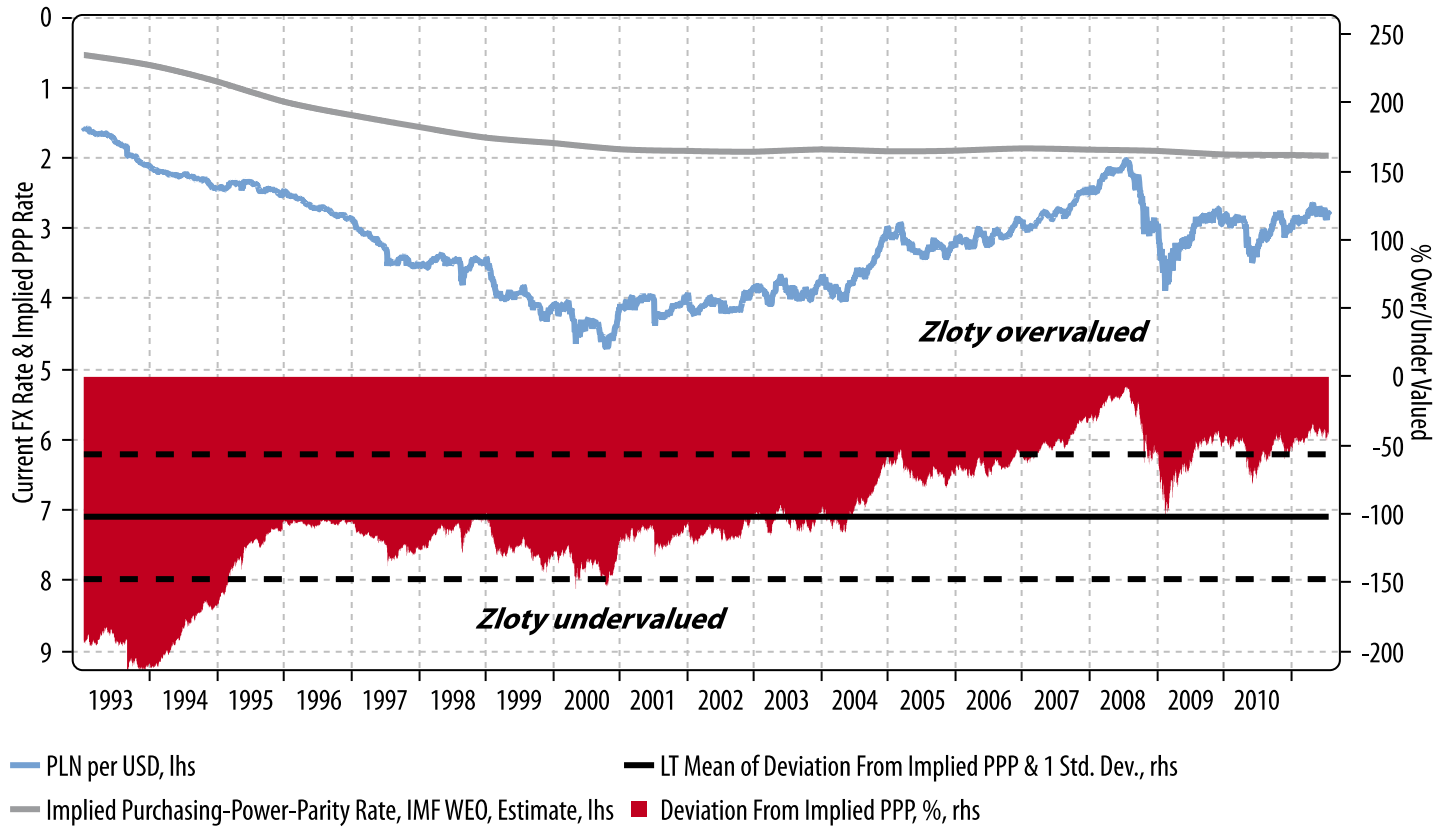
— ISK per USD, lhs  
— Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs  
— LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs  
■ Deviation From Implied PPP, %, rhs

## NOK/USD vs Implied PPP

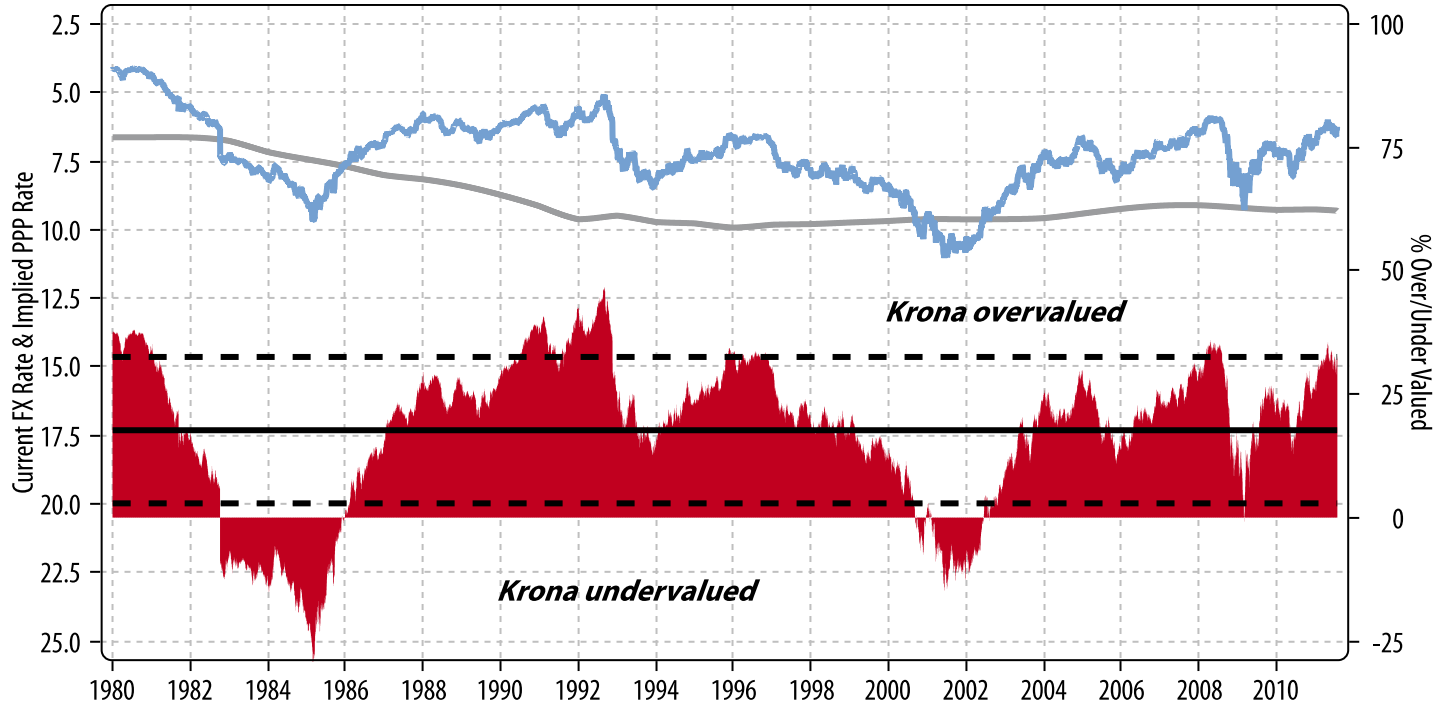


- NOK per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## PLN/USD vs Implied PPP

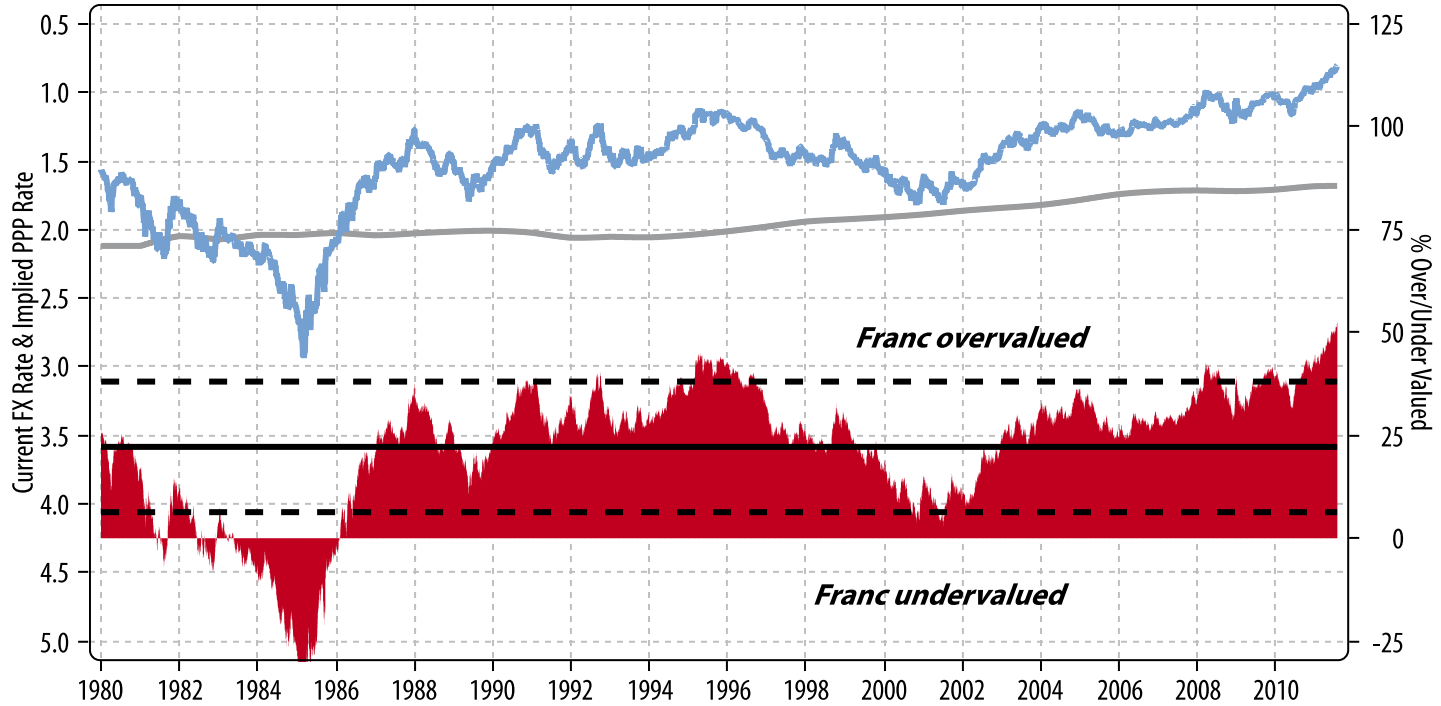


## SEK/USD vs Implied PPP



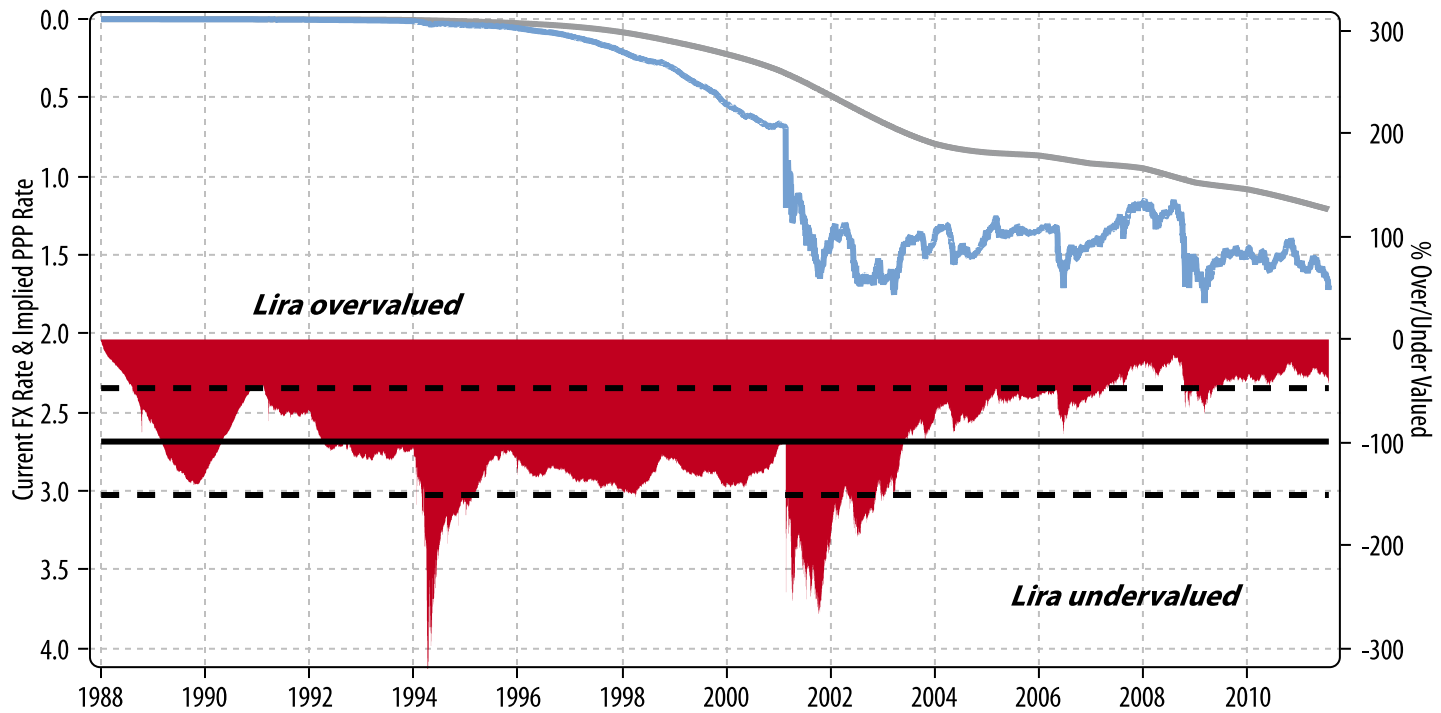
- SEK per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## CHF/USD vs Implied PPP



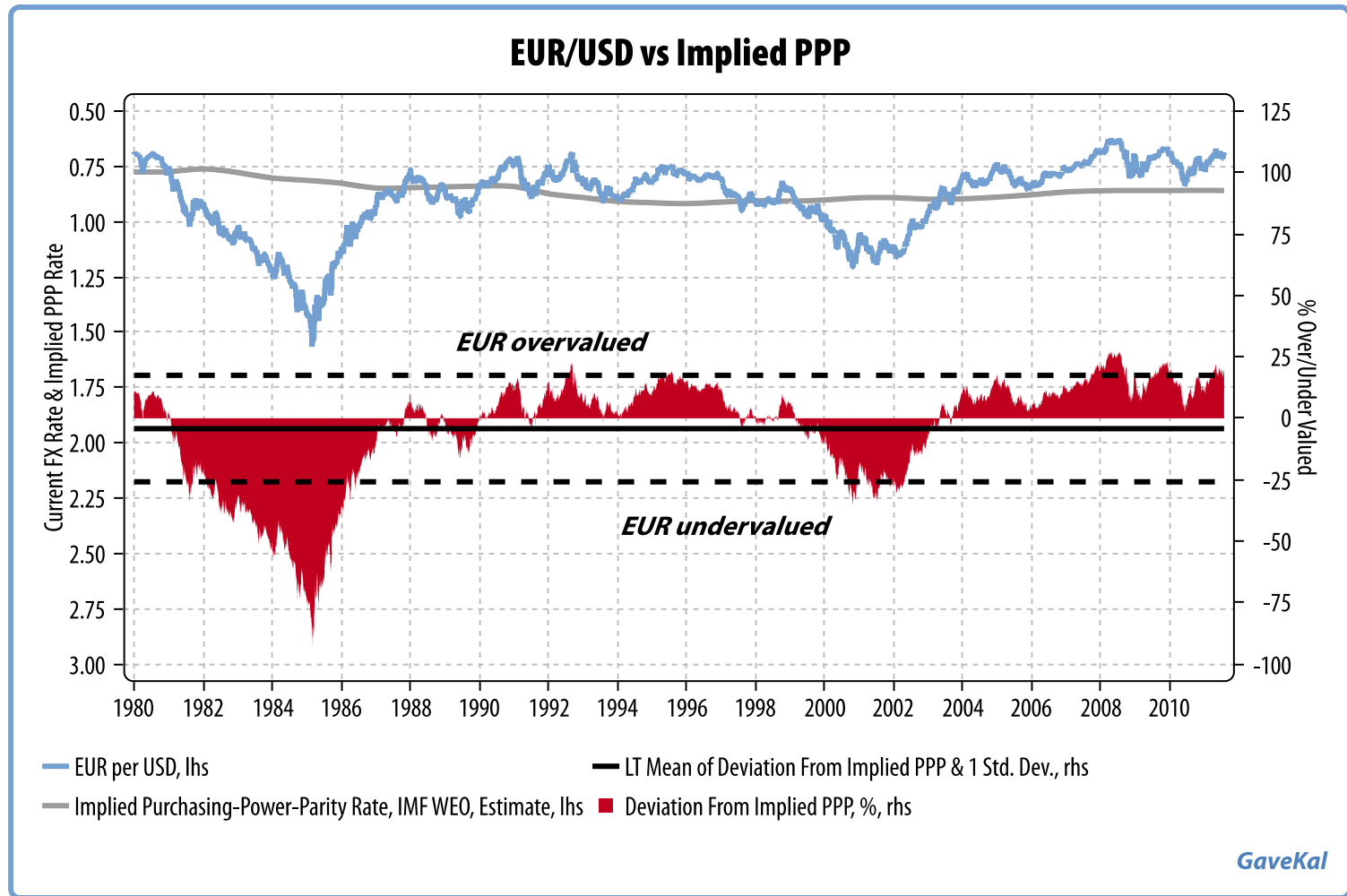
— CHF per USD, lhs  
— Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs  
— LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs  
■ Deviation From Implied PPP, %, rhs

## TRY/USD vs Implied PPP



- TRY per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

# Euro

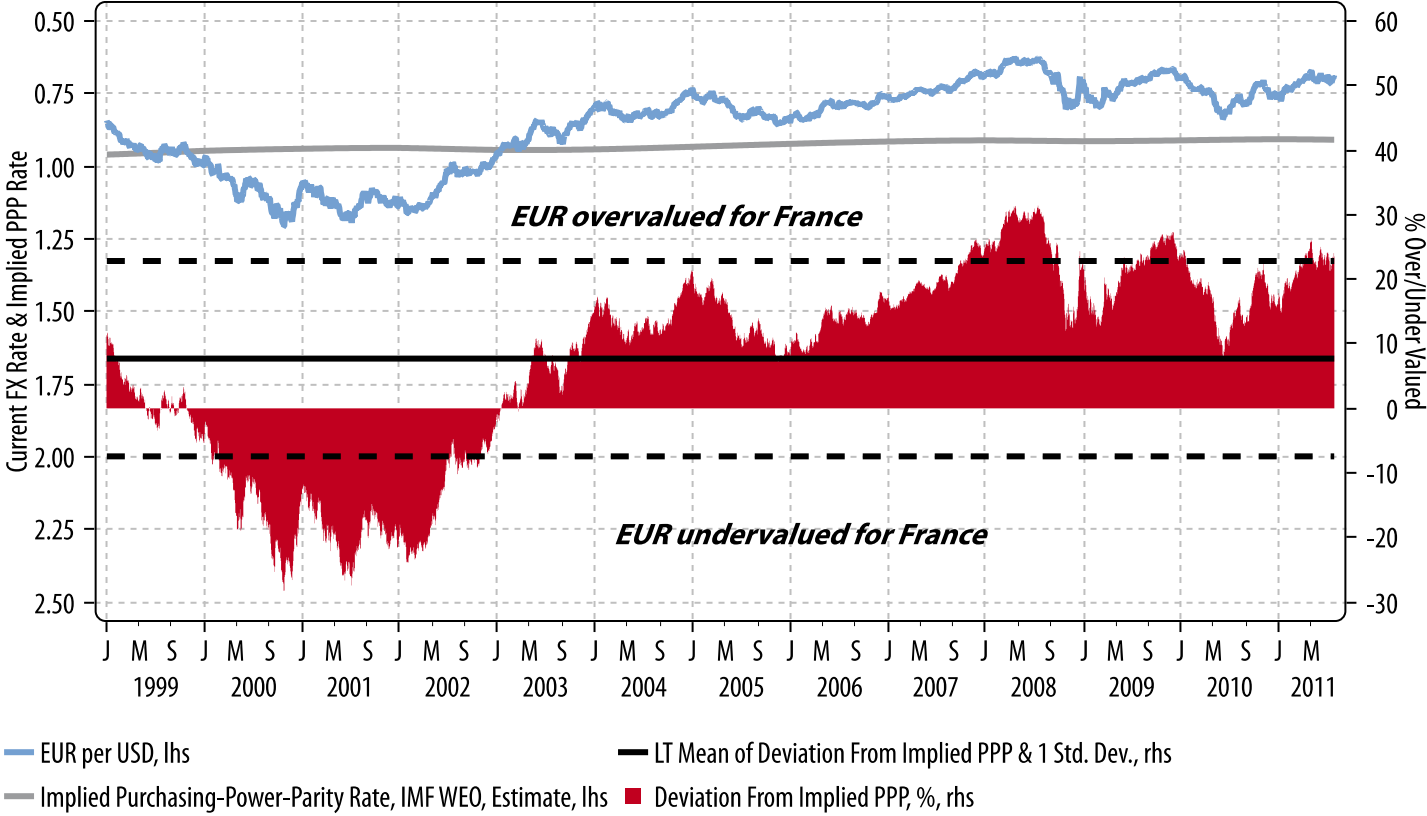


## Composite Implied PPP Exchange rate for 12 Euro Countries

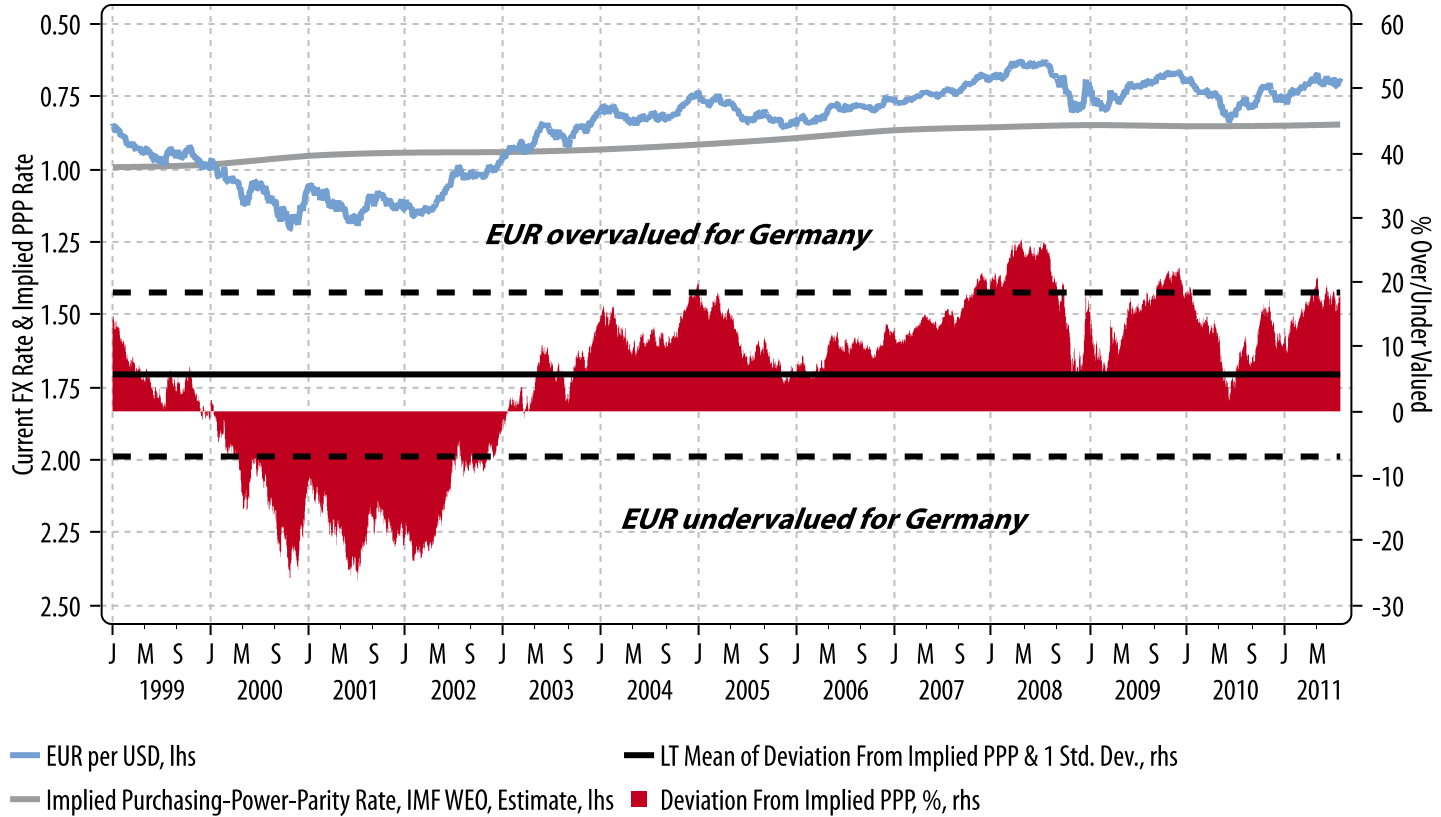


- Euro Area, FX Spot Rates, Macrobond, EUR per USD, lhs
- ("Austria, GDP, Current Prices, USD"\*"Austria, Implied Purchasing-Power-Parity Conversion Rate"+"Belgium, GDP, Current Prices, USD"\*"Belgium, Imp...

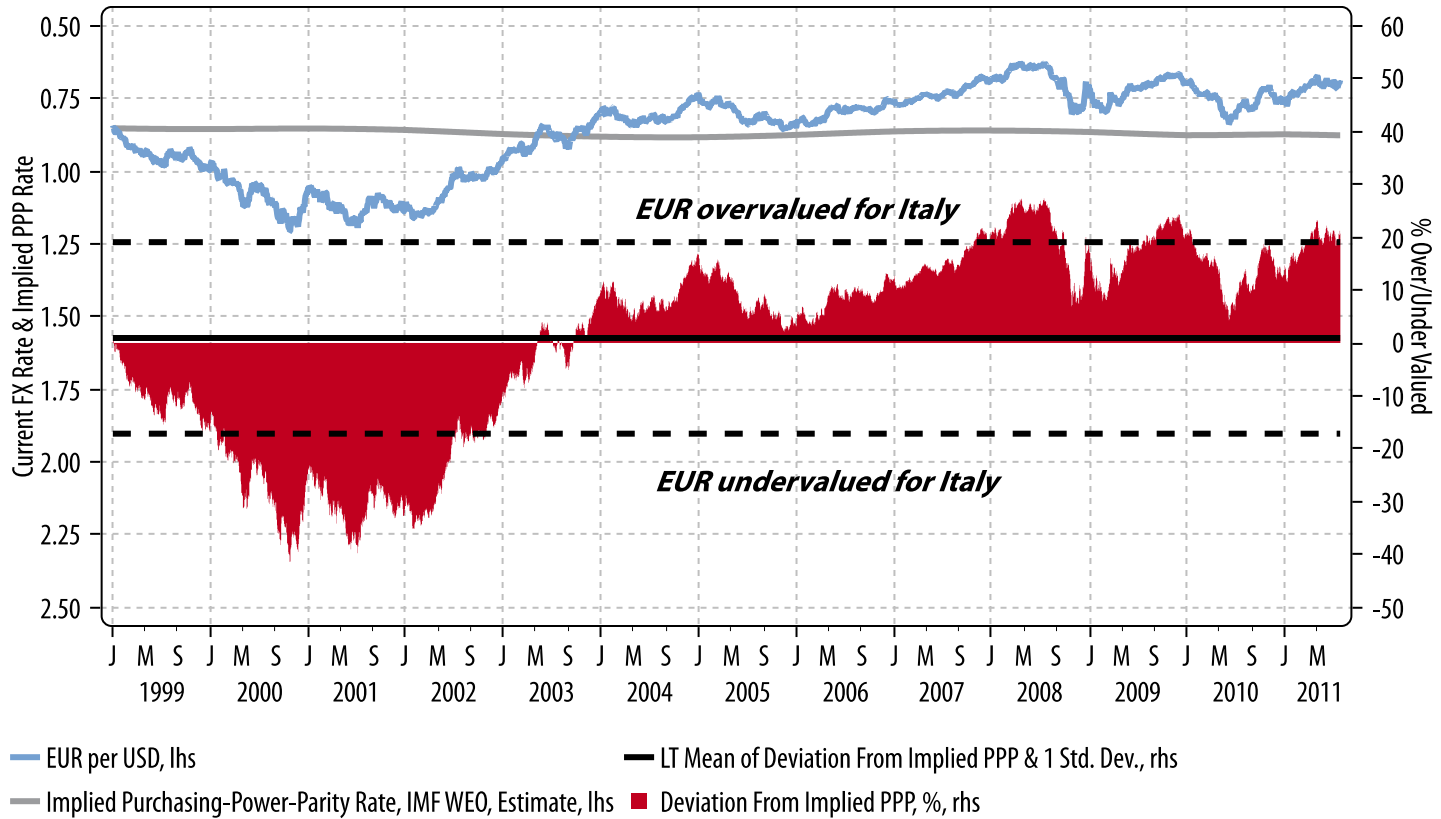
# EUR/USD vs Implied PPP for France/US



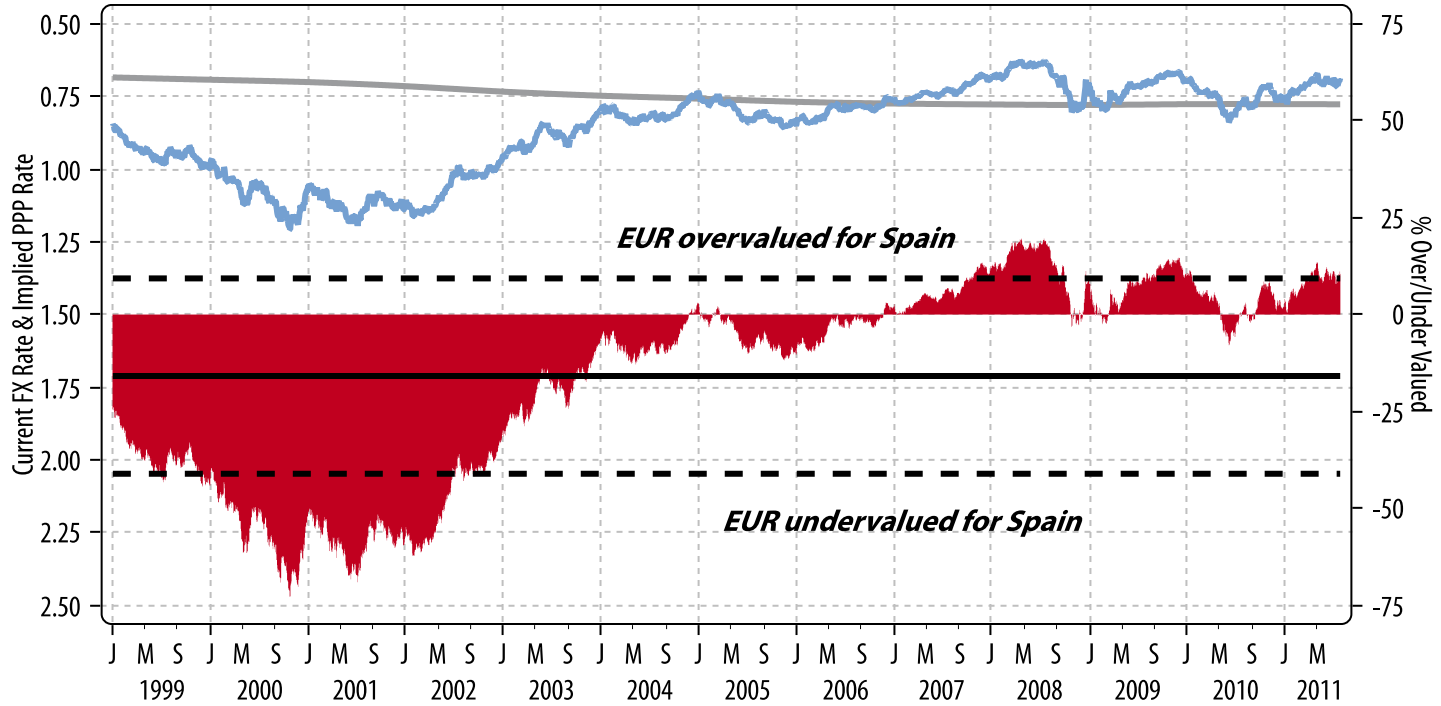
## EUR/USD vs Implied PPP for Germany/US



## EUR/USD vs Implied PPP for Italy/US

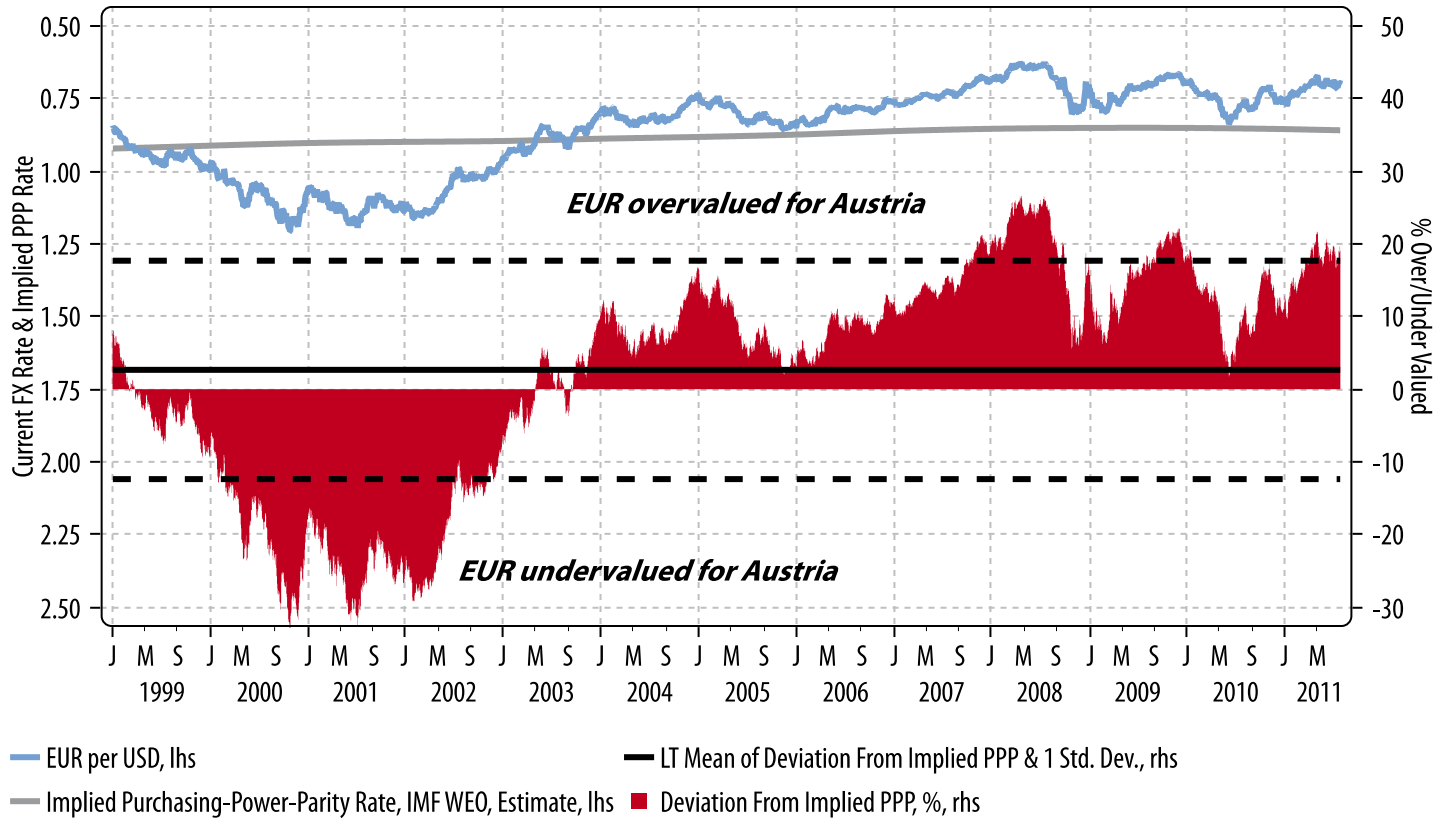


## EUR/USD vs Implied PPP for Spain/US

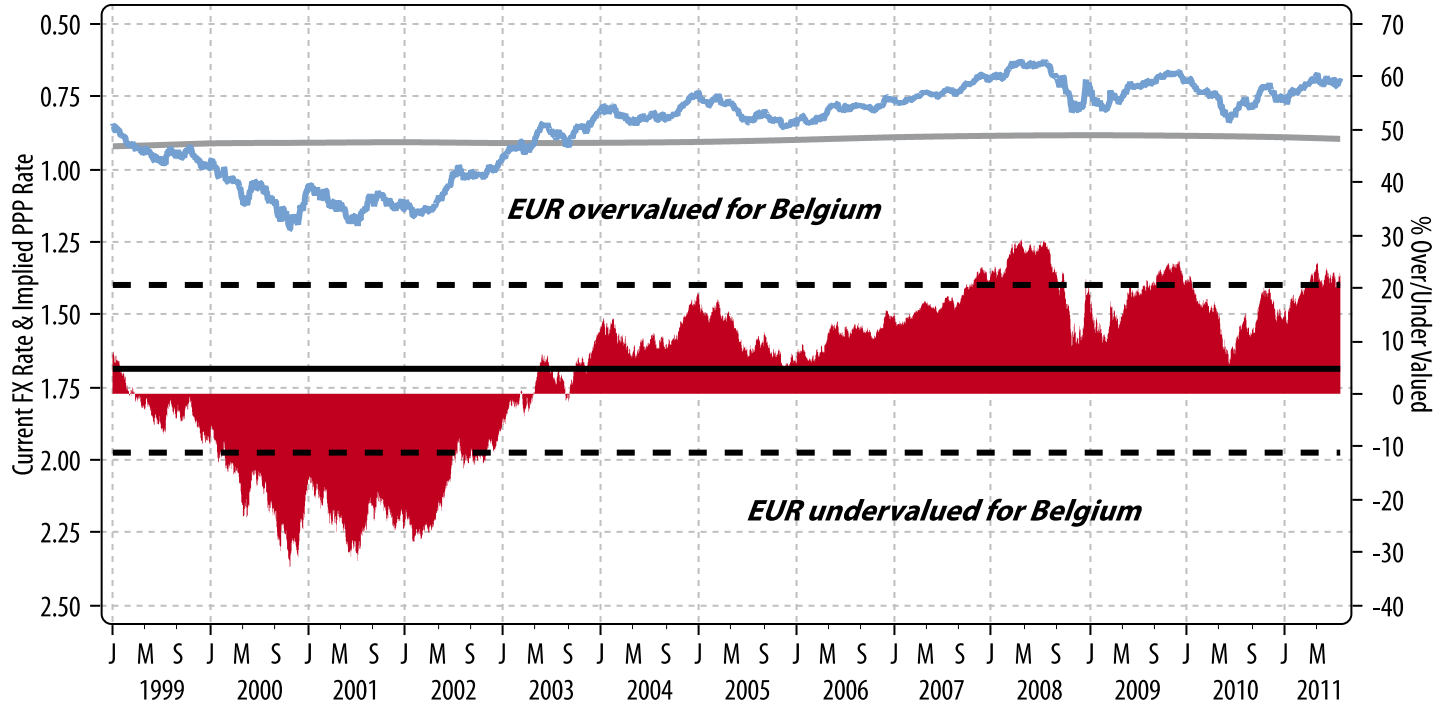


- EUR per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## EUR/USD vs Implied PPP for Austria/US



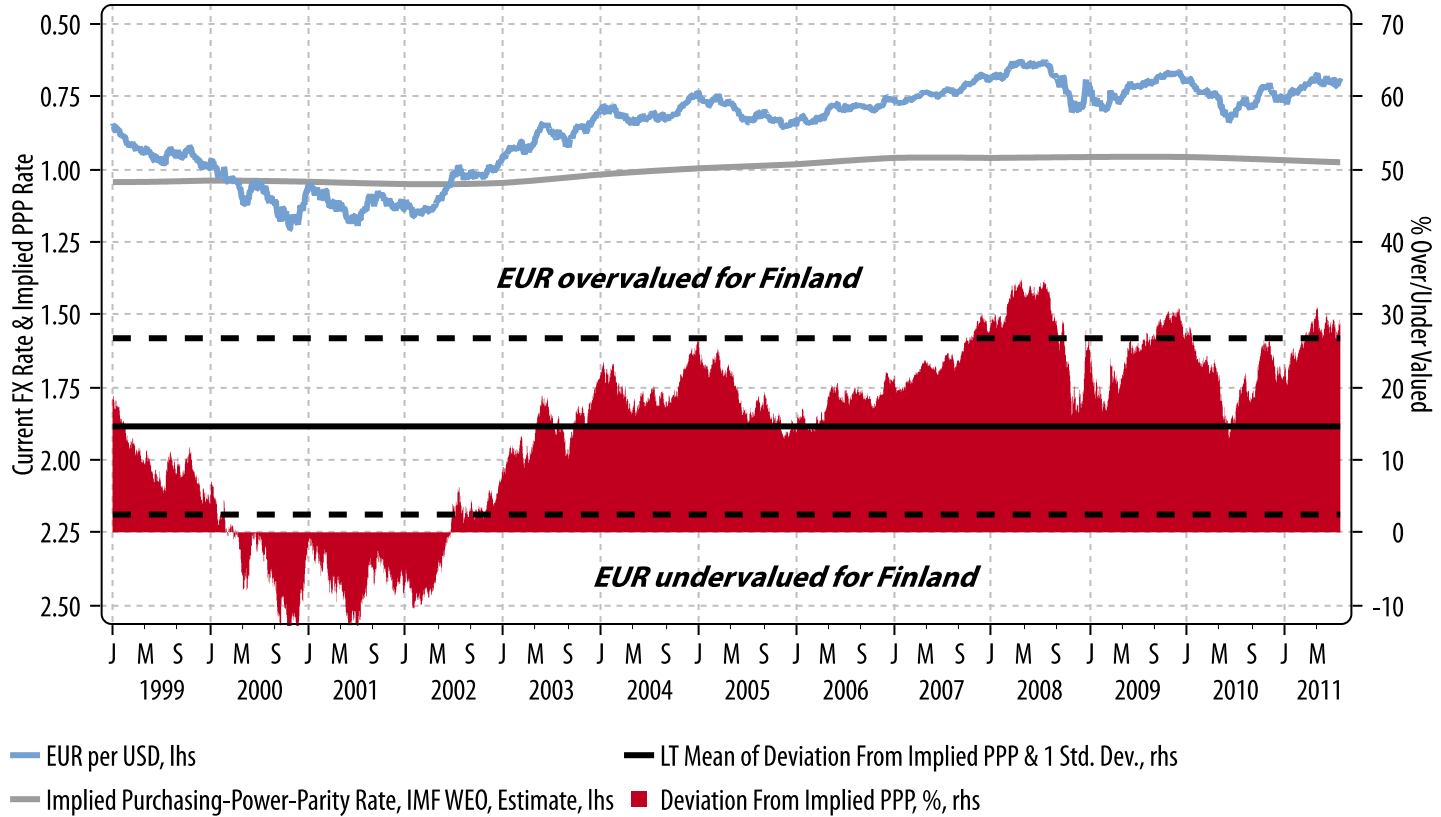
## EUR/USD vs Implied PPP for Belgium/US



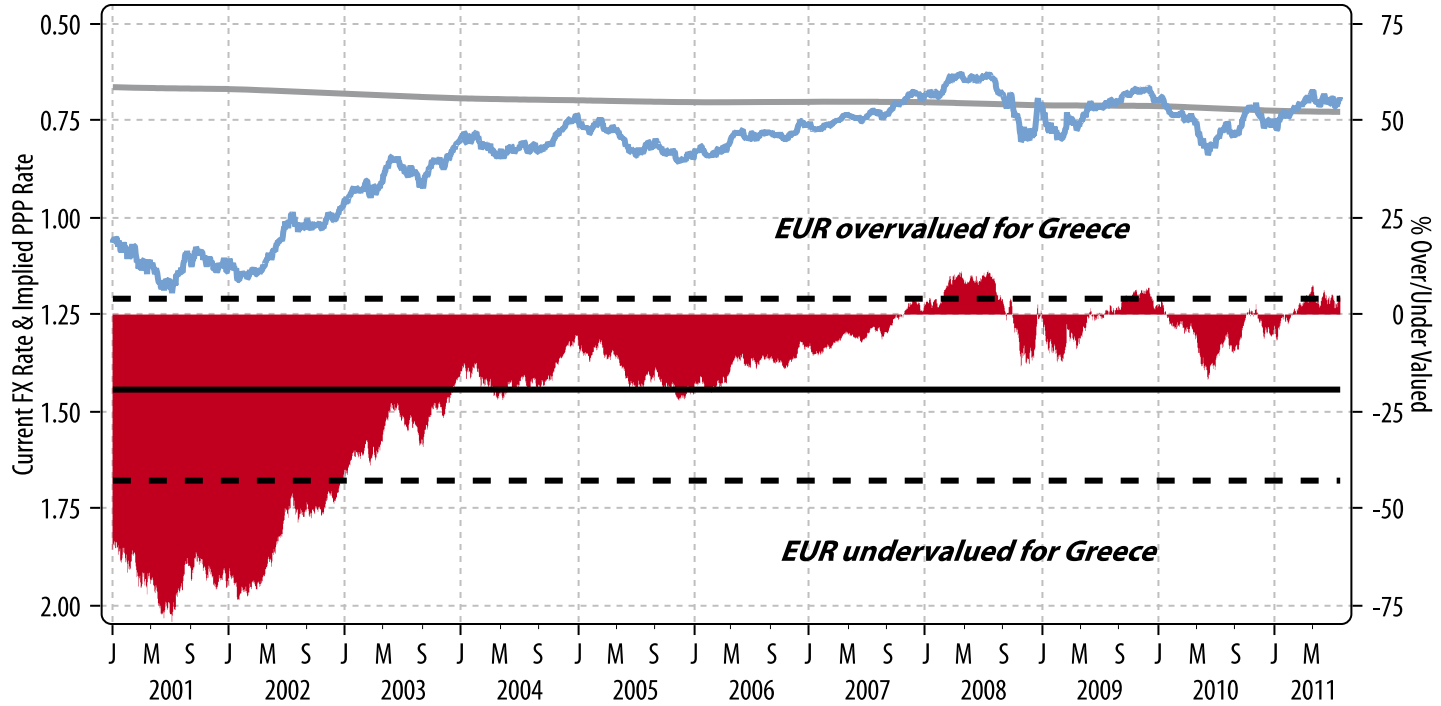
- EUR per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs



## EUR/USD vs Implied PPP for Finland/US

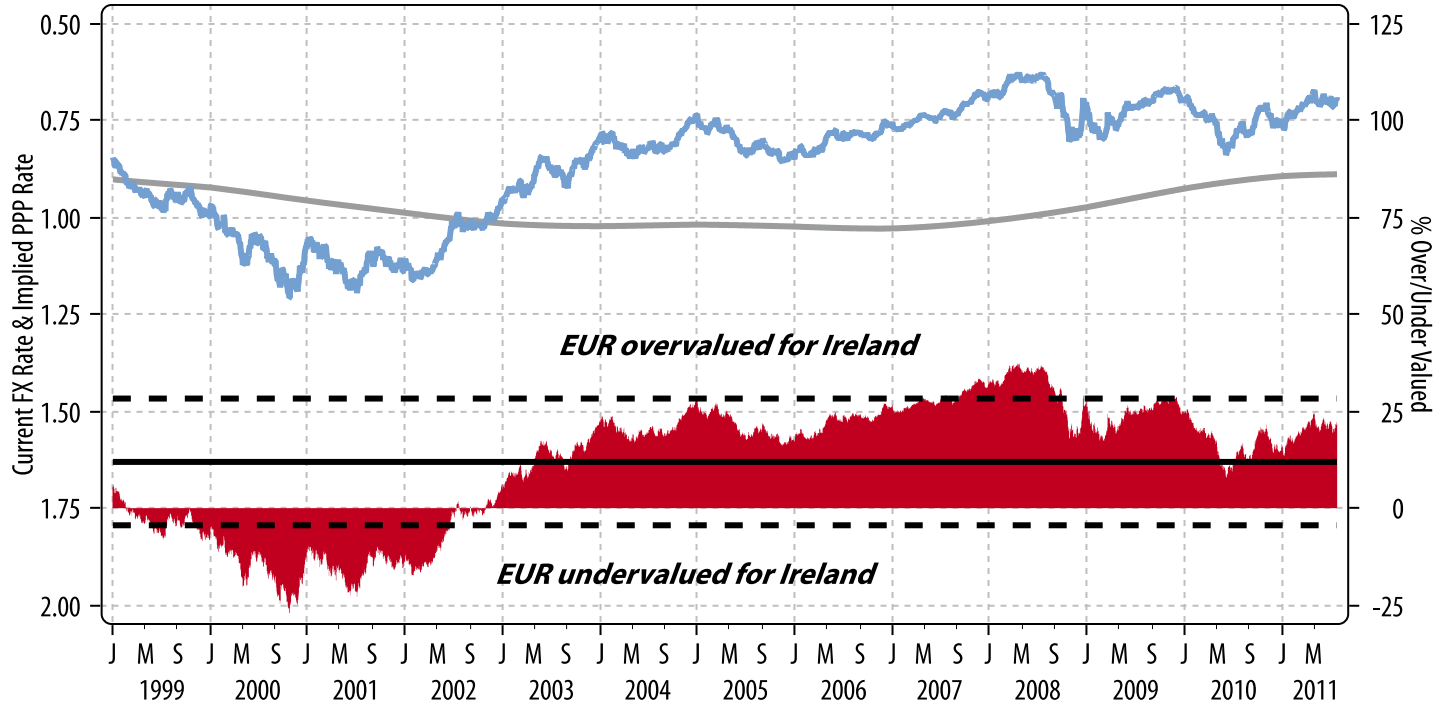


## EUR/USD vs Implied PPP for Greece/US



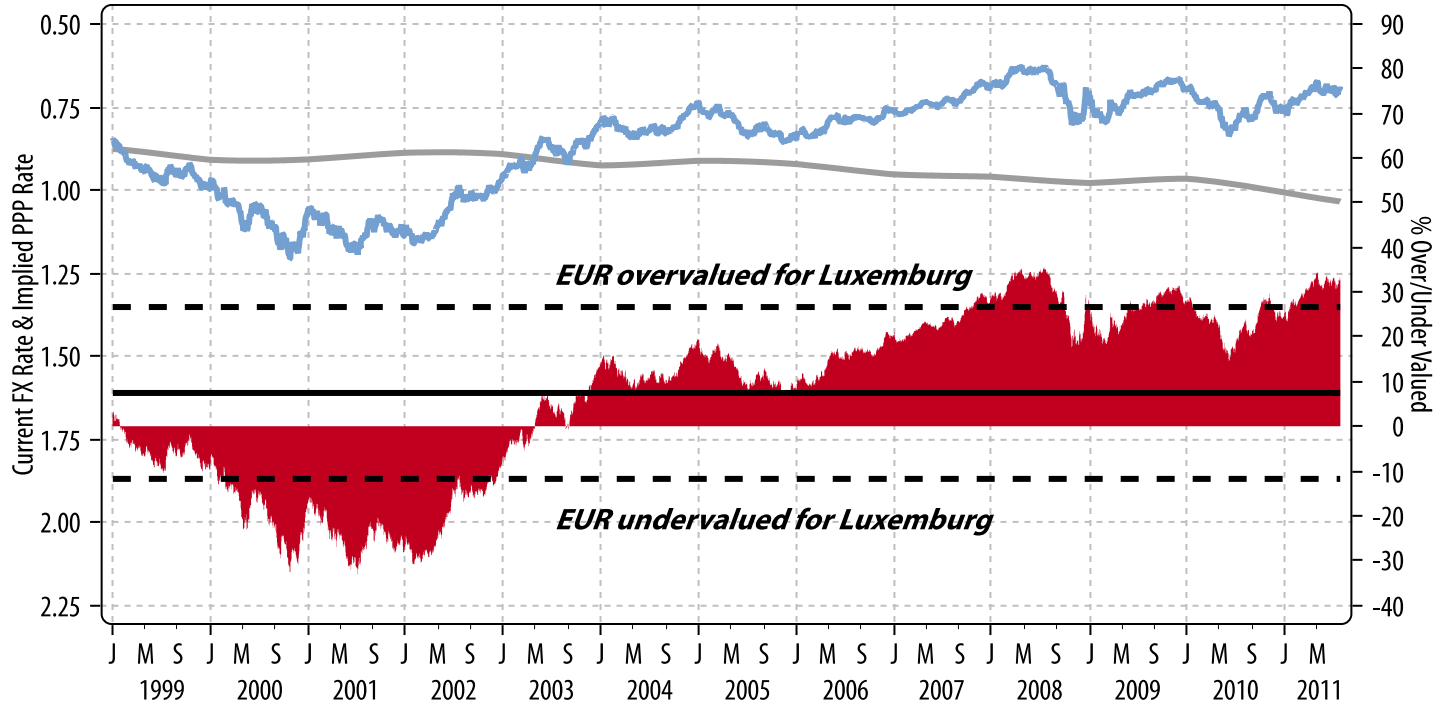
- EUR per USD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## EUR/USD vs Implied PPP for Ireland/US



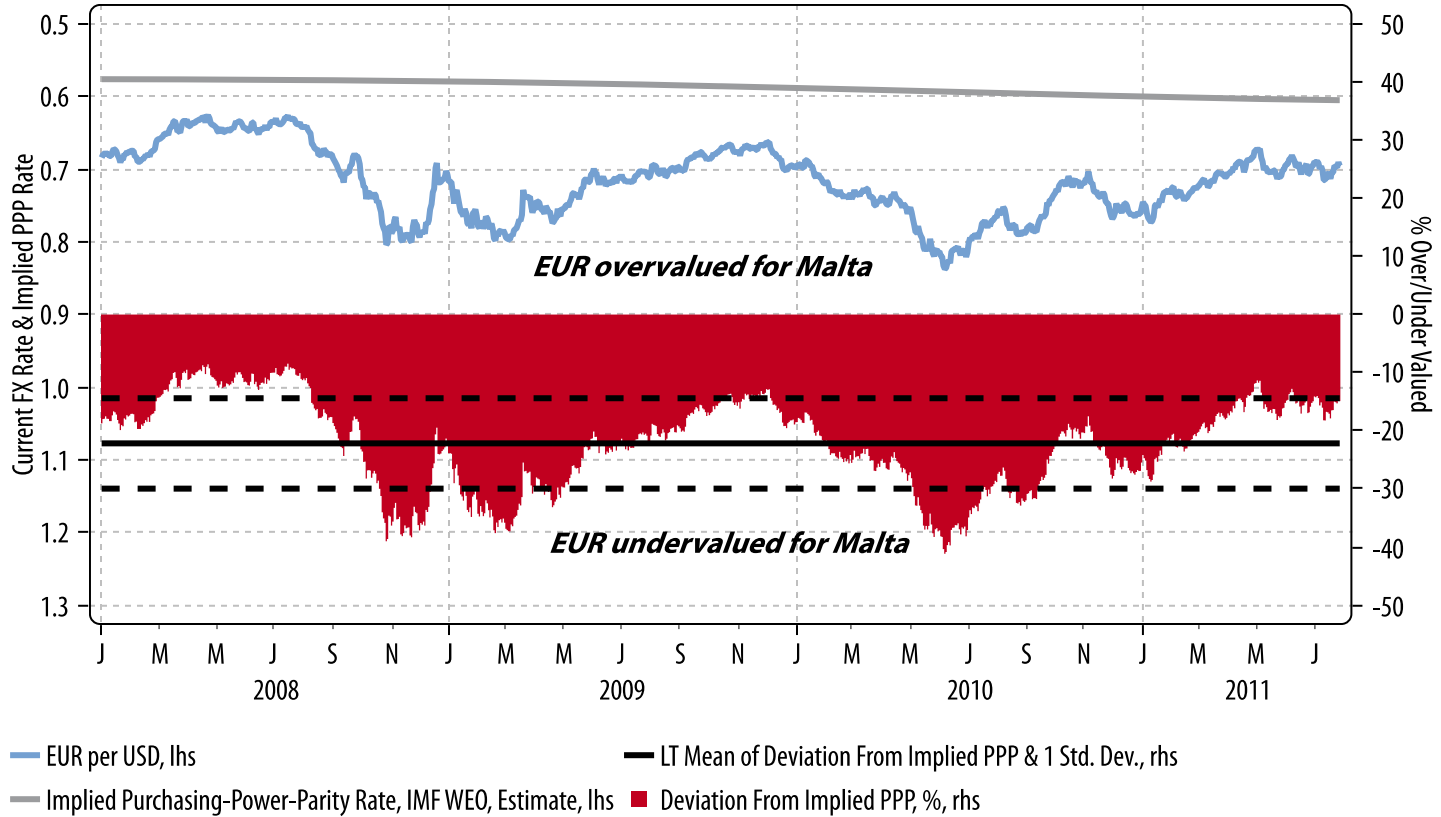
- EUR per USD, Ihs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, Ihs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## EUR/USD vs Implied PPP for Luxemburg/US

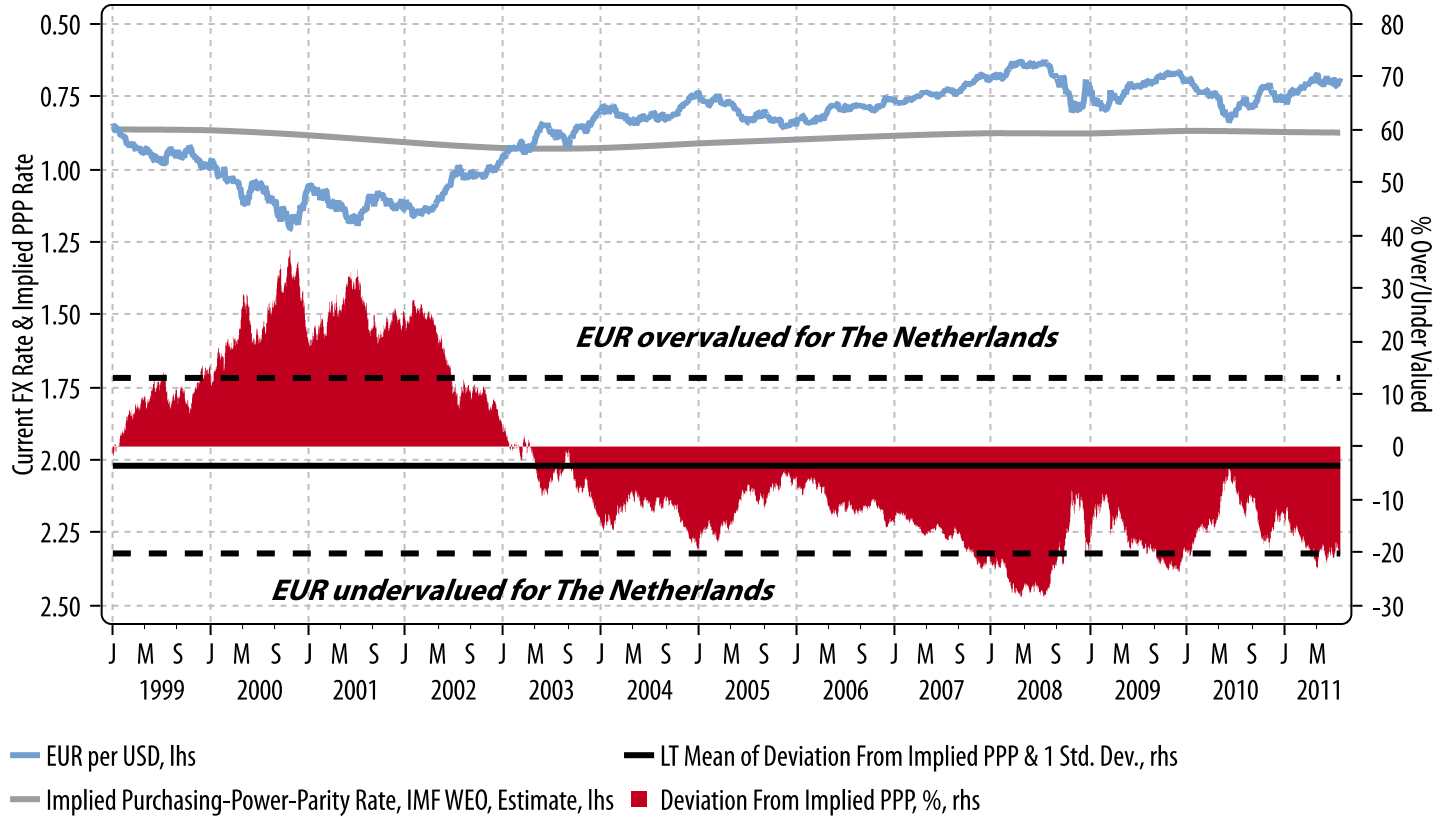


— EUR per USD, lhs  
— Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs  
— LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs  
■ Deviation From Implied PPP, %, rhs

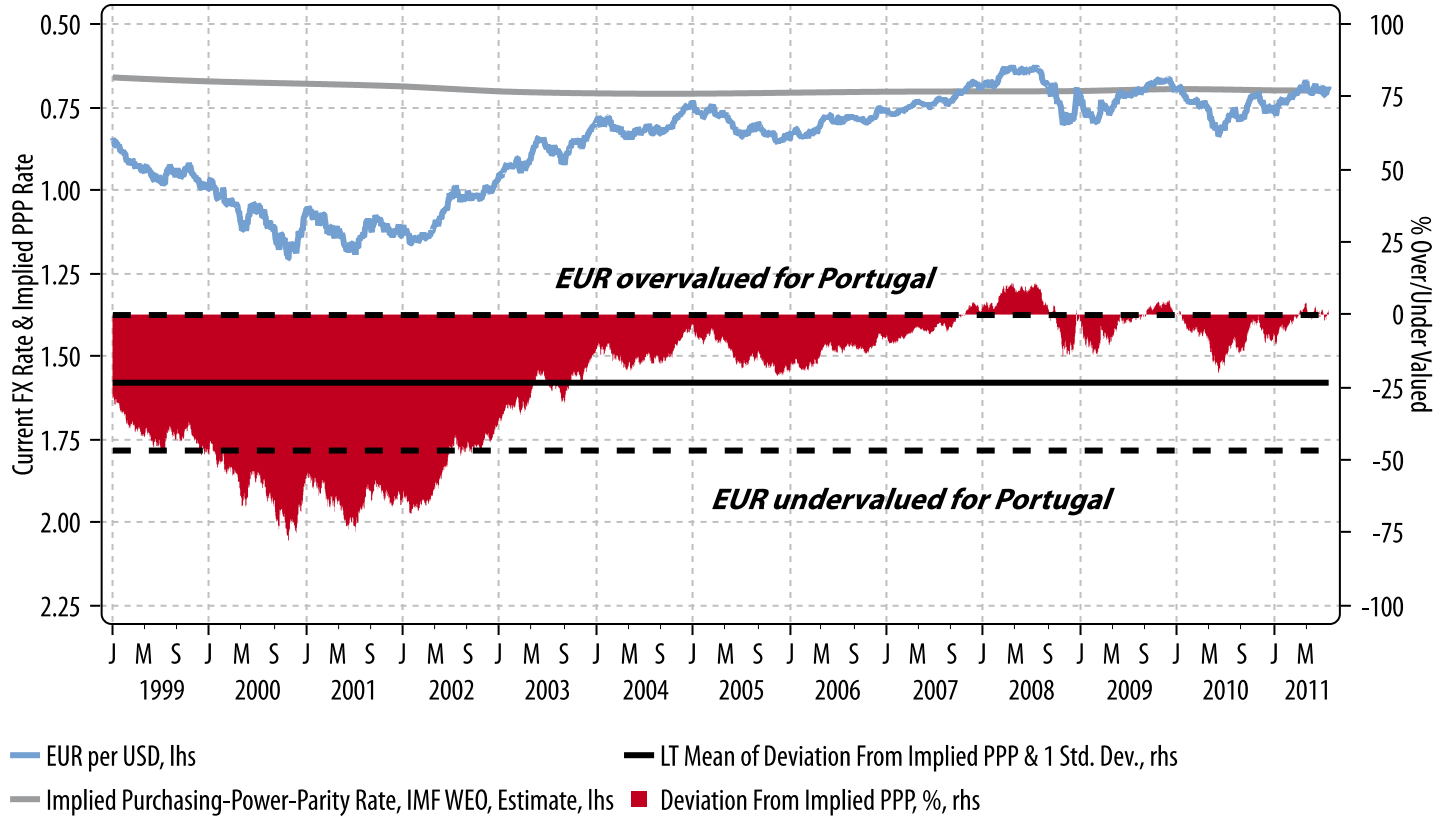
## EUR/USD vs Implied PPP for Malta/US



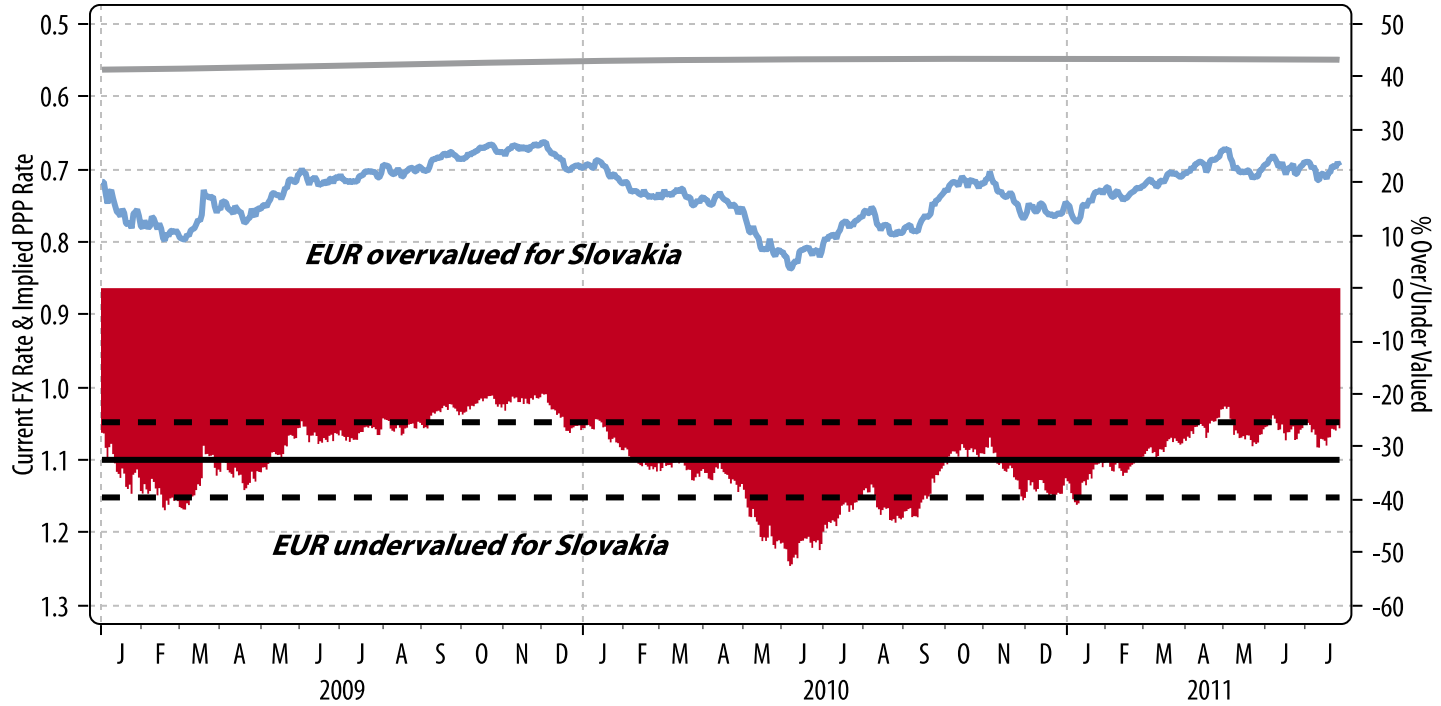
## EUR/USD vs Implied PPP for Netherlands/US



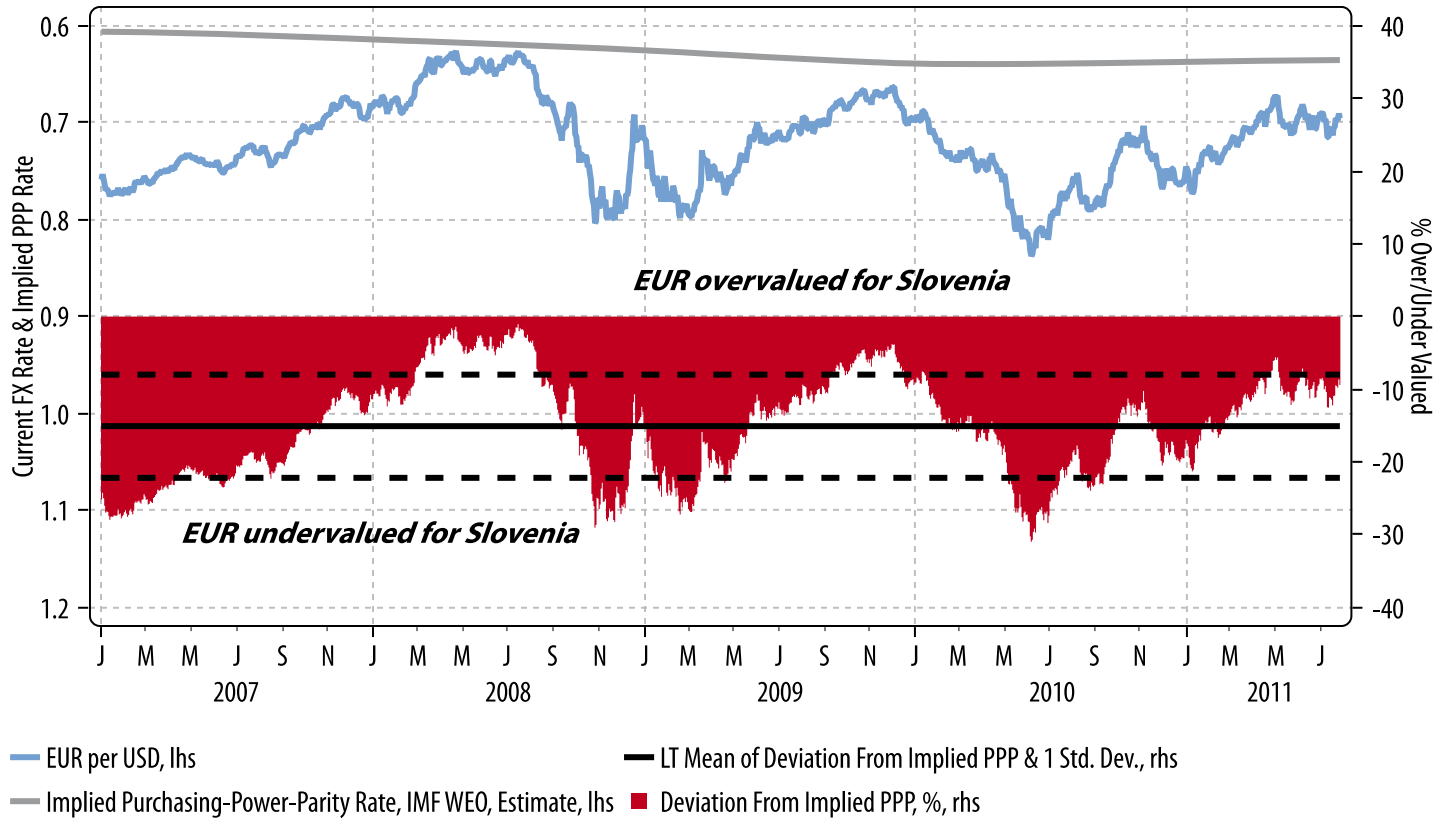
## EUR/USD vs Implied PPP for Portuguese/US



## EUR/USD vs Implied PPP for Slovakia/US

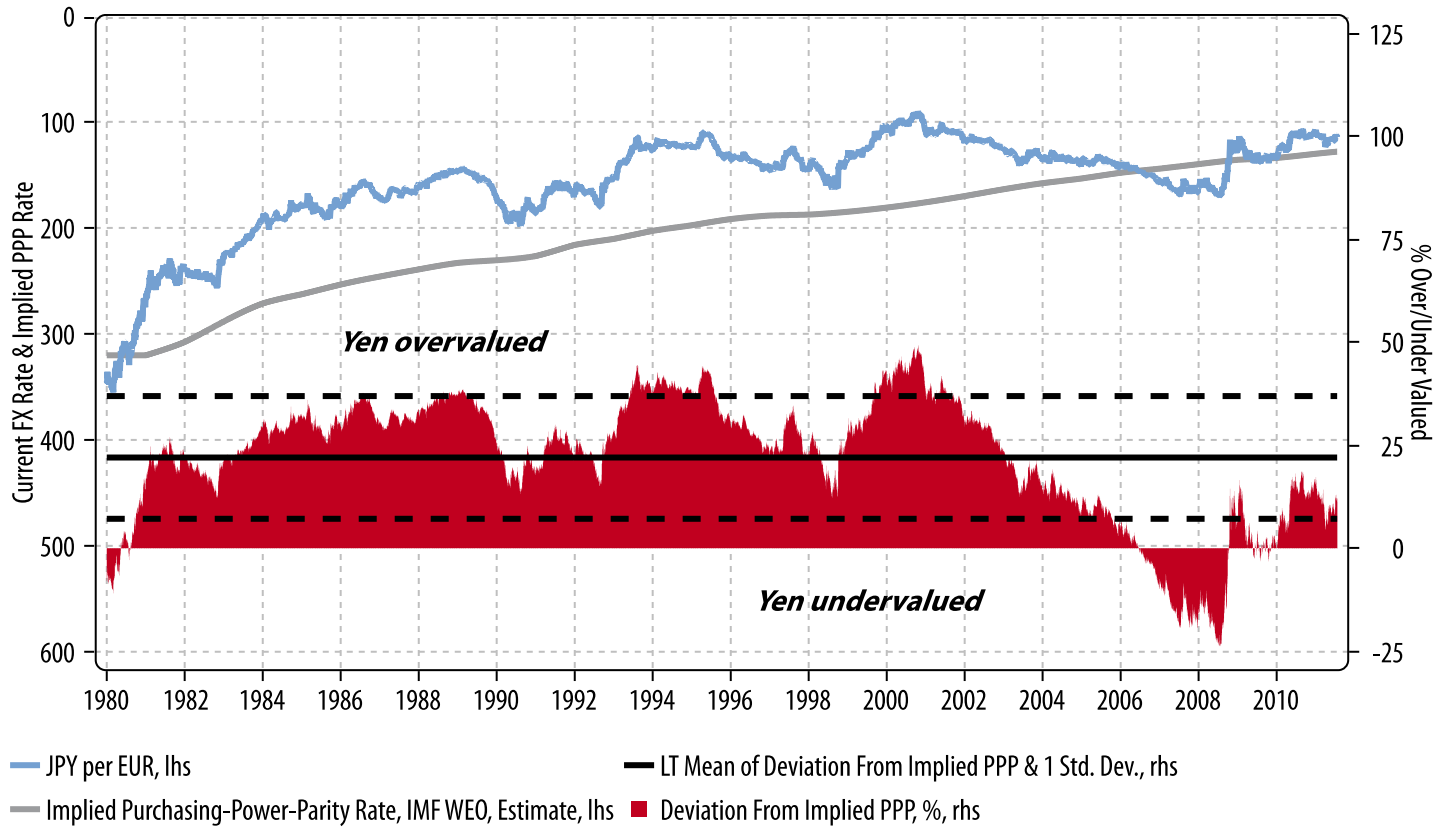


## EUR/USD vs Implied PPP for Slovenia/US

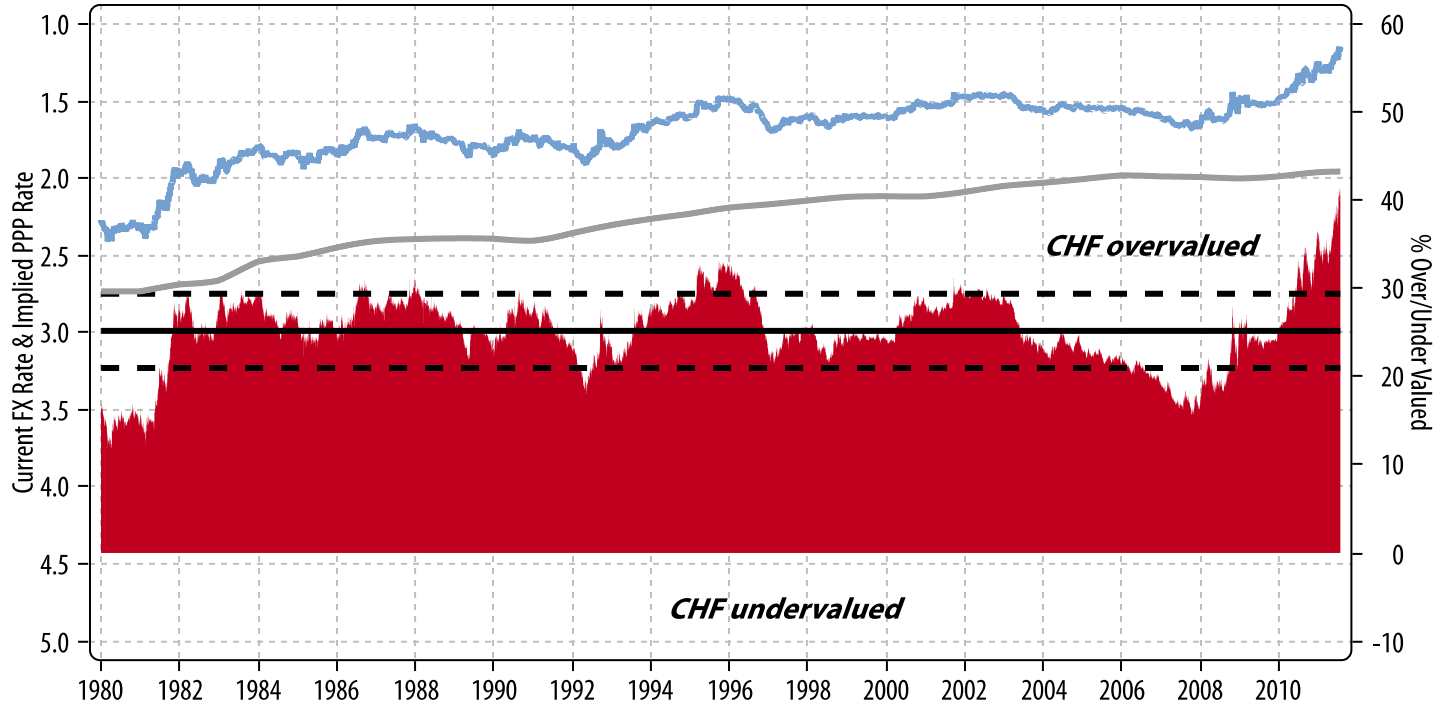


PPPs vs EUR

## JPY/EUR vs Implied PPP

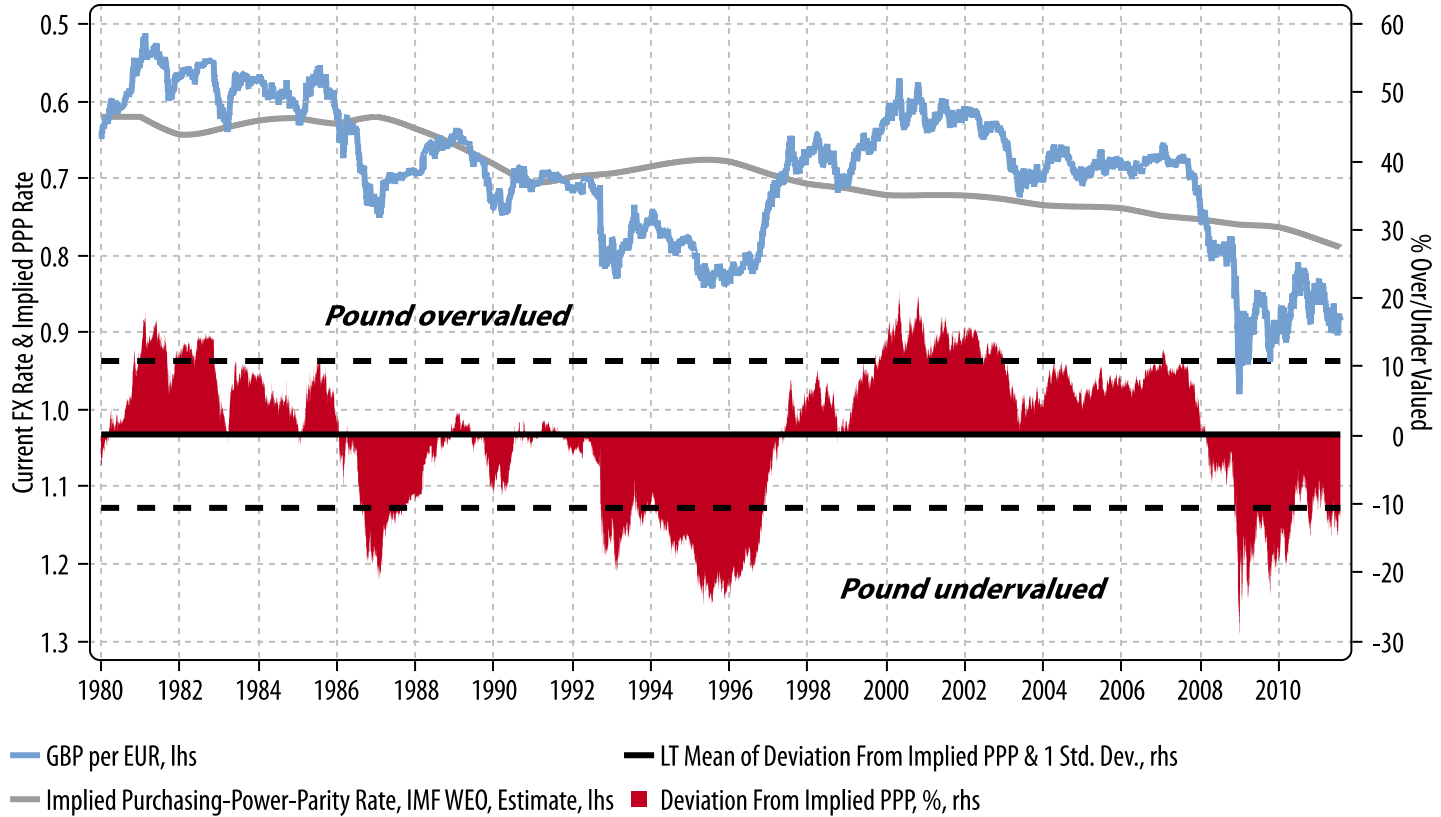


## CHF/EUR vs Implied PPP

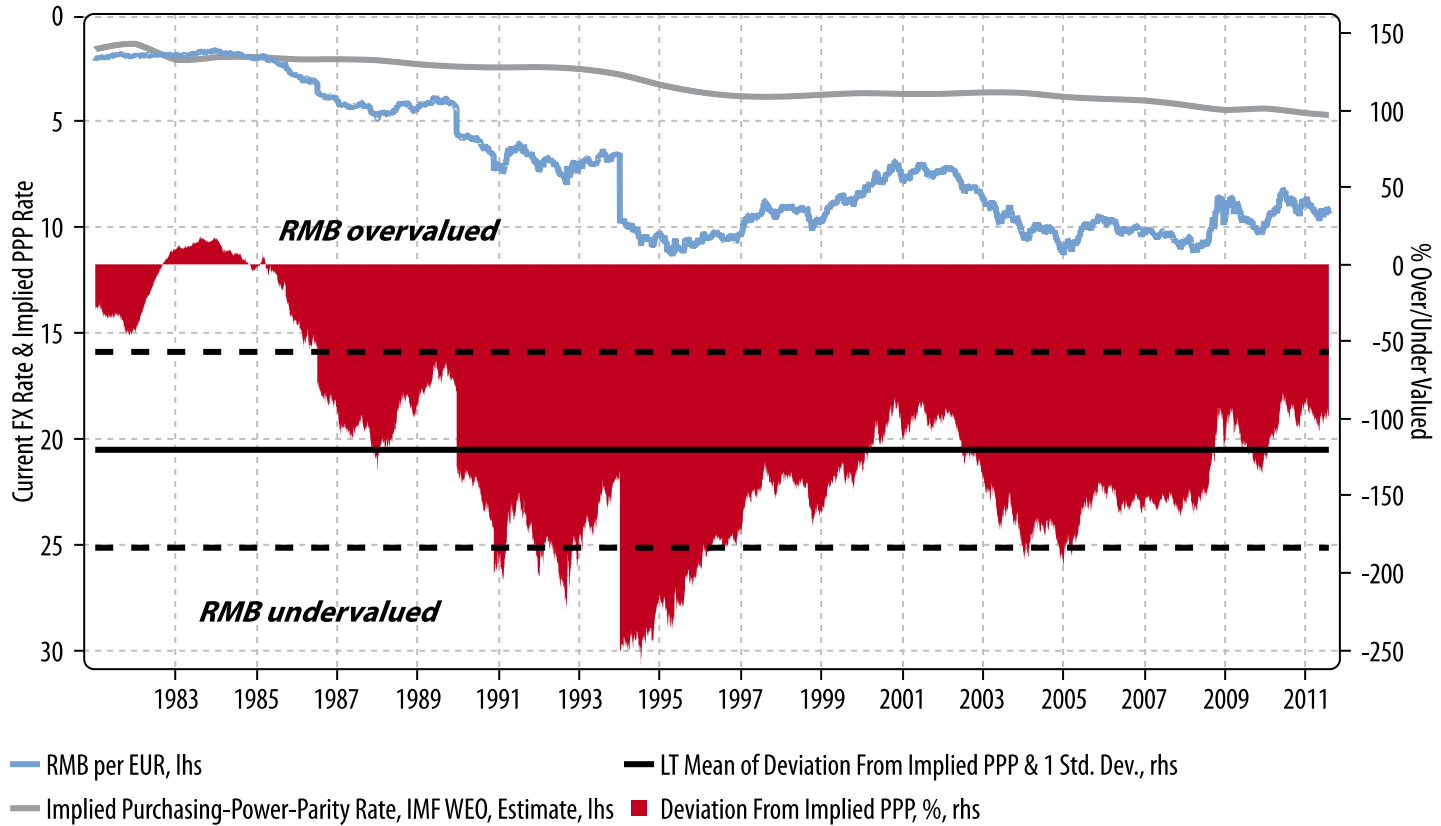


- CHF per EUR, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

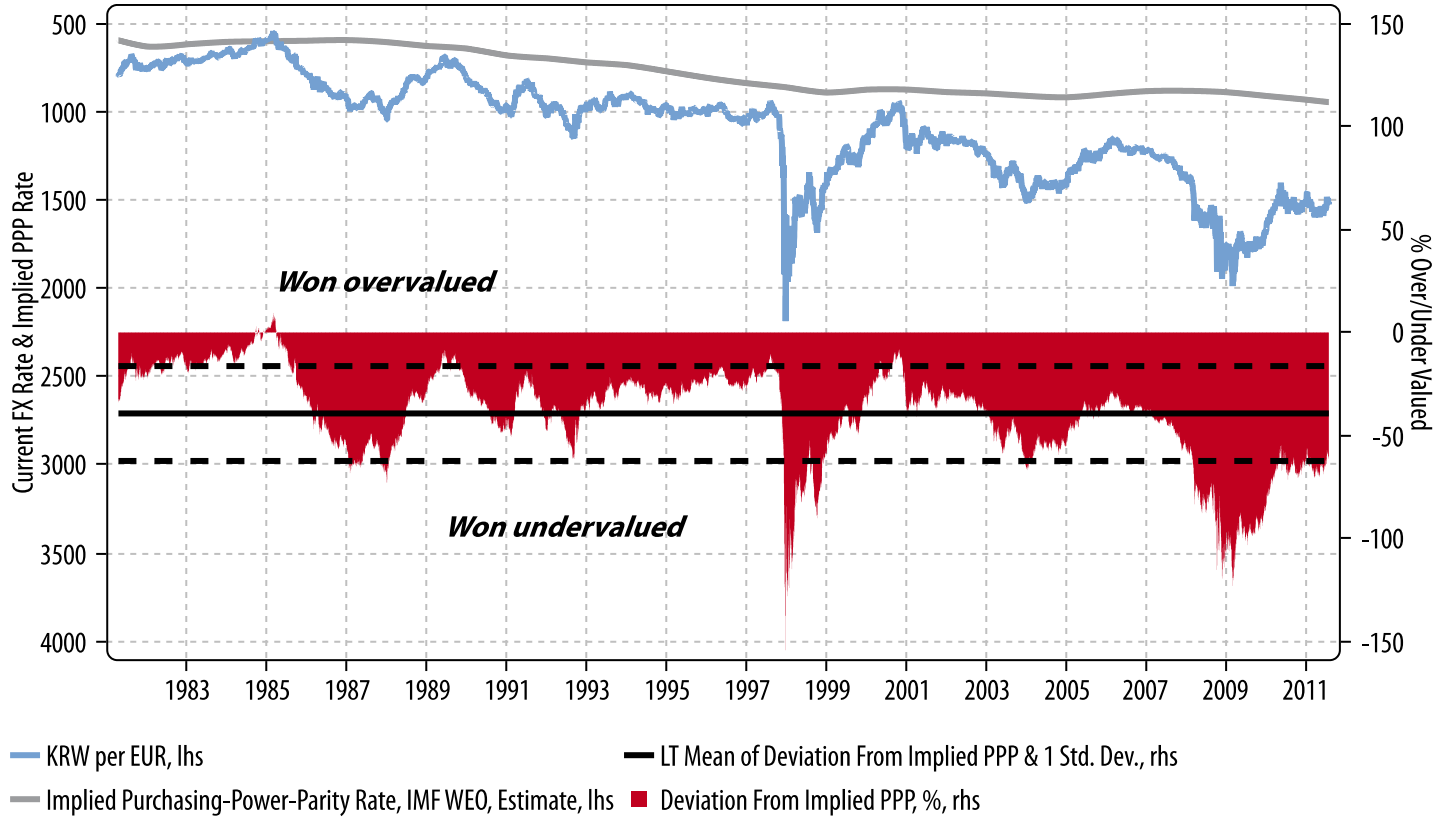
## GBP/EUR vs Implied PPP



## RMB/EUR vs Implied PPP



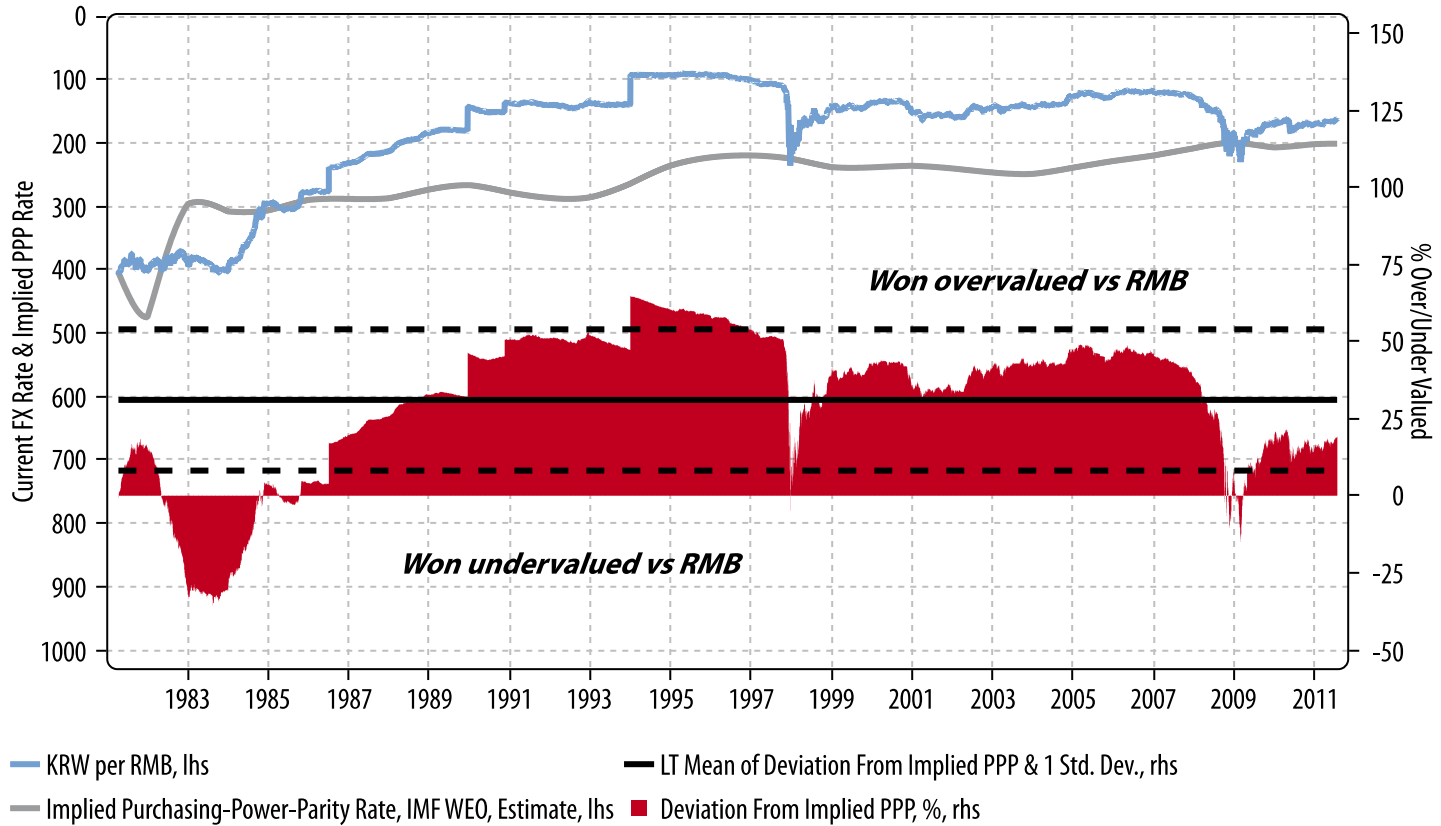
## KRW/EUR vs Implied PPP



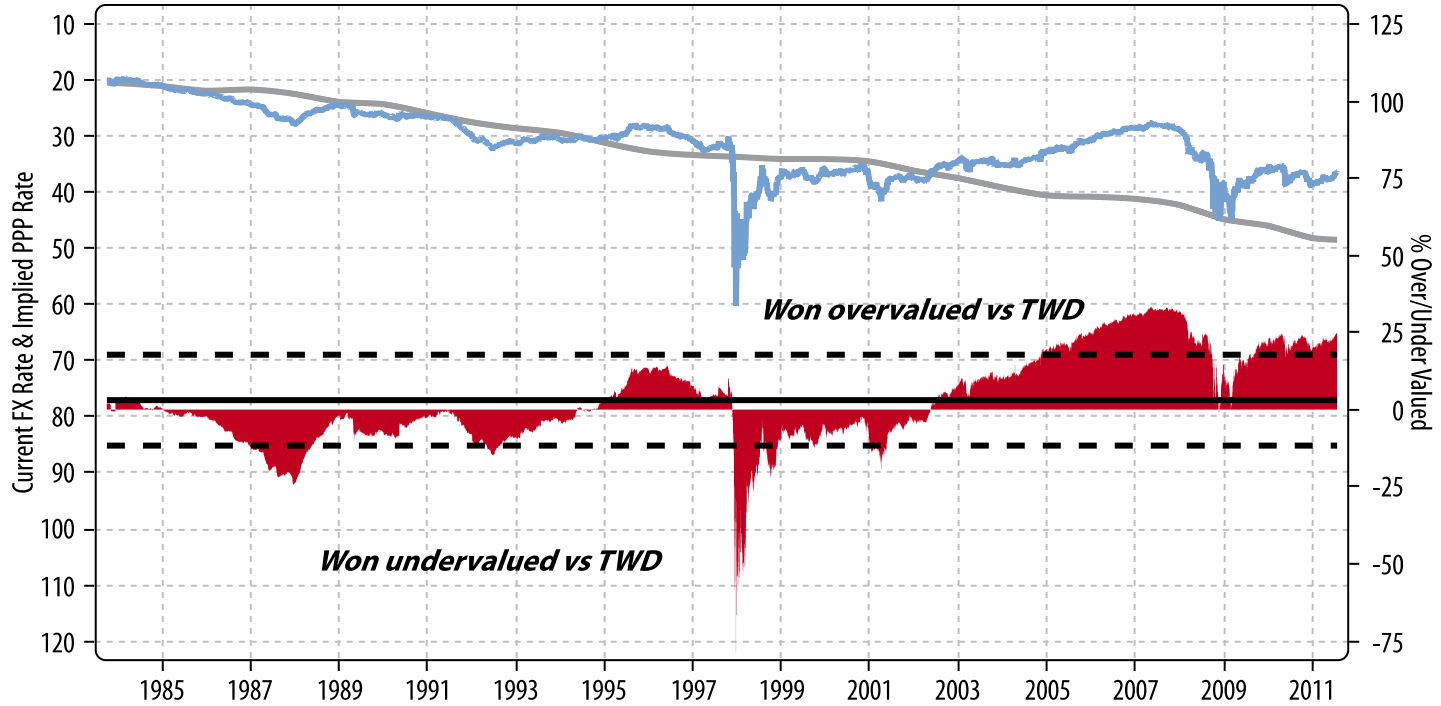
# PPPs vs Other



## KRW/RMBvs Implied PPP

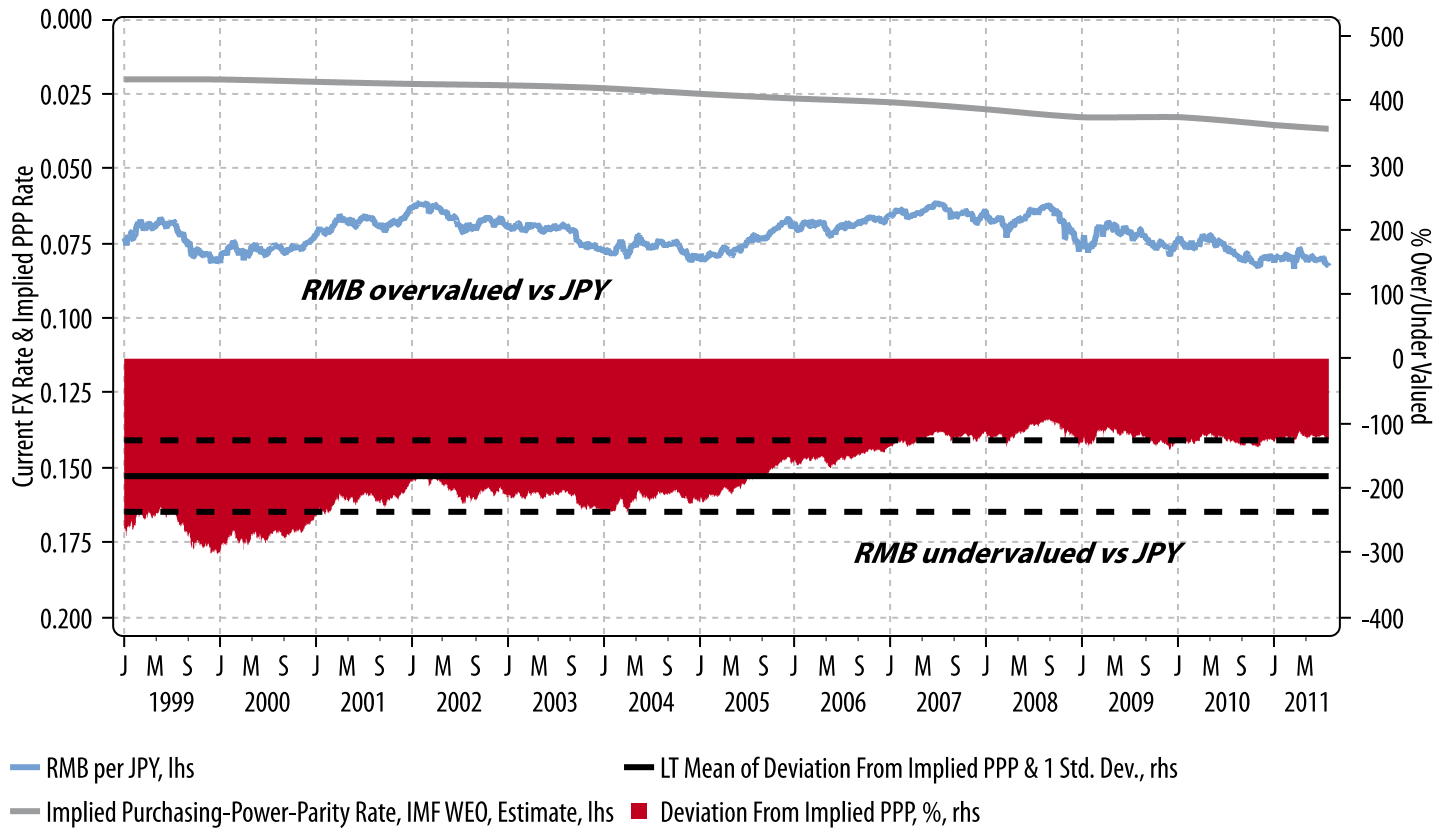


## KRW/TWDvs Implied PPP



- KRW per TWD, lhs
- Implied Purchasing-Power-Parity Rate, IMF WEO, Estimate, lhs
- LT Mean of Deviation From Implied PPP & 1 Std. Dev., rhs
- Deviation From Implied PPP, %, rhs

## RMB/JPY vs Implied PPP



# Appendix

- The following PPP charts are built as follow:
  - 1) Plot the spot exchange rate and the implied PPP exchange rate (more on this series later)
  - 2) Calculate the % difference  $((\text{Spot}-\text{PPP})/\text{PPP}) * 100$ , plot as a column
  - 3) Calculate mean and 1 standard deviation of the difference Spot-PPP
- **Scales:** On most of the charts the scale is inverted on both sides
  - Macrobond's standard definition of a currency, e.g. "EUR" is Euros per 1 US dollar. Since this series rises when the currency depreciates, flipping the (left) scale makes reading the graph more intuitive
  - To keep overvalued above and undervalued below, the right scale (% over/under-valued) must also be flipped
  - One quirk in these charts therefore: if a currency is 10% overvalued, it will show up as "-10%" since the scale is flipped

# The IMF WEO Implied PPP Conversion Rate

- Rather than use rebased CPI differentials we use the WEO implied conversion rate because CPI's from two different countries are often made of two very different baskets of goods with different weights, therefore it compares “apples to oranges”
- The IMF uses a methodology similar to that of the OECD (and uses their data prior to '05):
- “The calculation is undertaken in **three stages**. **The first stage is at the product level, where price relatives are calculated for individual goods and services. ... The second stage is at the product group level, where the price relatives calculated for the products in the group are averaged to obtain unweighted PPPs for the group.** Coca-cola is for example included in the product group “Softdrinks and Concentrates”. **And the third stage is at the aggregation levels, where the PPPs for the product groups covered by the aggregation level are weighted and averaged to obtain weighted PPPs for the aggregation level up to GDP** (in our example, aggregated levels are Non-alcoholic beverages, Food...). The weights used to aggregate the PPPs in the third stage are the **expenditures on the product groups as established in the national accounts”**
- For more info [see here](#) (world bank/ICP program)

# PPP Conversion Rate continued

- The conversion rate is defined as “national currency per international dollar” on the IMF website BUT THIS IS MISLEADING – apparently by international dollar they mean “US dollar”
- Therefore the difference between the spot exchange rate with the US and the PPP implied rate is the level of over/under valuation
- To compare two currencies ex-US dollar we divide one implied conversion rate by another, since e.g.  $(\text{CHF}/\text{USD}) / (\text{JPY}/\text{USD}) = \text{CHF}/\text{JPY}$

# Other methodology

- There are two broad ways to read the graphs:
  - Compare the level of over/undervaluation to the long term average
  - Compare the level of over/undervaluation to the implied PPP rate
- The Euro country graphs start at the date that the country adopts the euro