ESTIMATING JAMAICA'S FUNDAMENTAL EQUILIBRIUM EXCHANGE RATE (FEER)

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Motivation

- Jamaica's external accounts have suffered from chronic deficits with deterioration in the debt ratio (IIP) to -138.7 per cent of GDP as at June 2013

- Current IMF program has brought into focus the issue of exchange rate misalignment and the need for movement to equilibrium in an effort to improve the country's competitiveness and ultimately, external accounts

- The objective of the study is to estimate a medium-run equilibrium exchange rate to determine whether or not there is or has been exchange rate misalignment
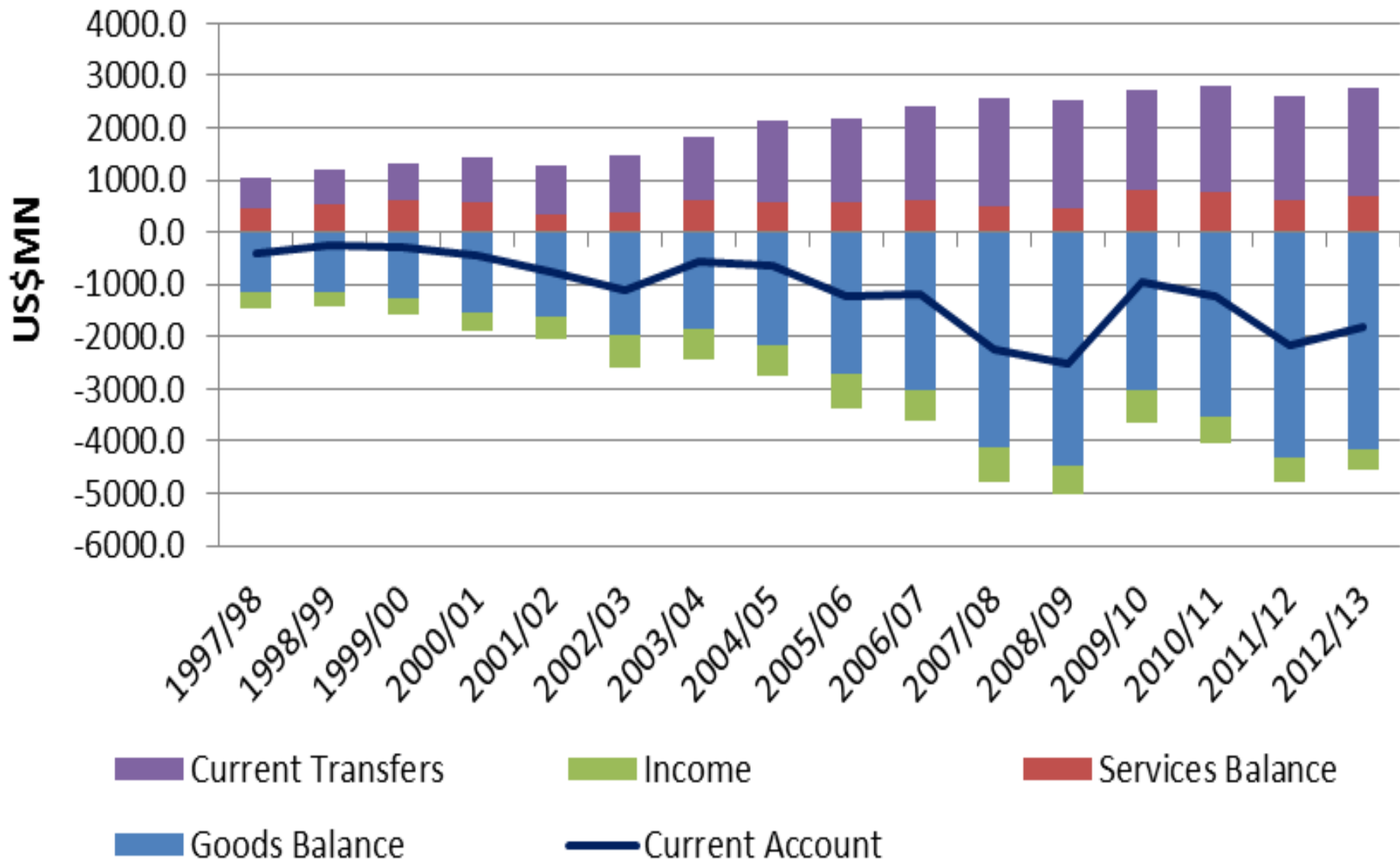
Outline

- Stylized Facts
- Definitions and Concepts
- Estimation Methodology
- Results
- Conclusion

Stylized Facts

Jamaica's Current Account Deficit

Jamaica's CAD/GDP (%)
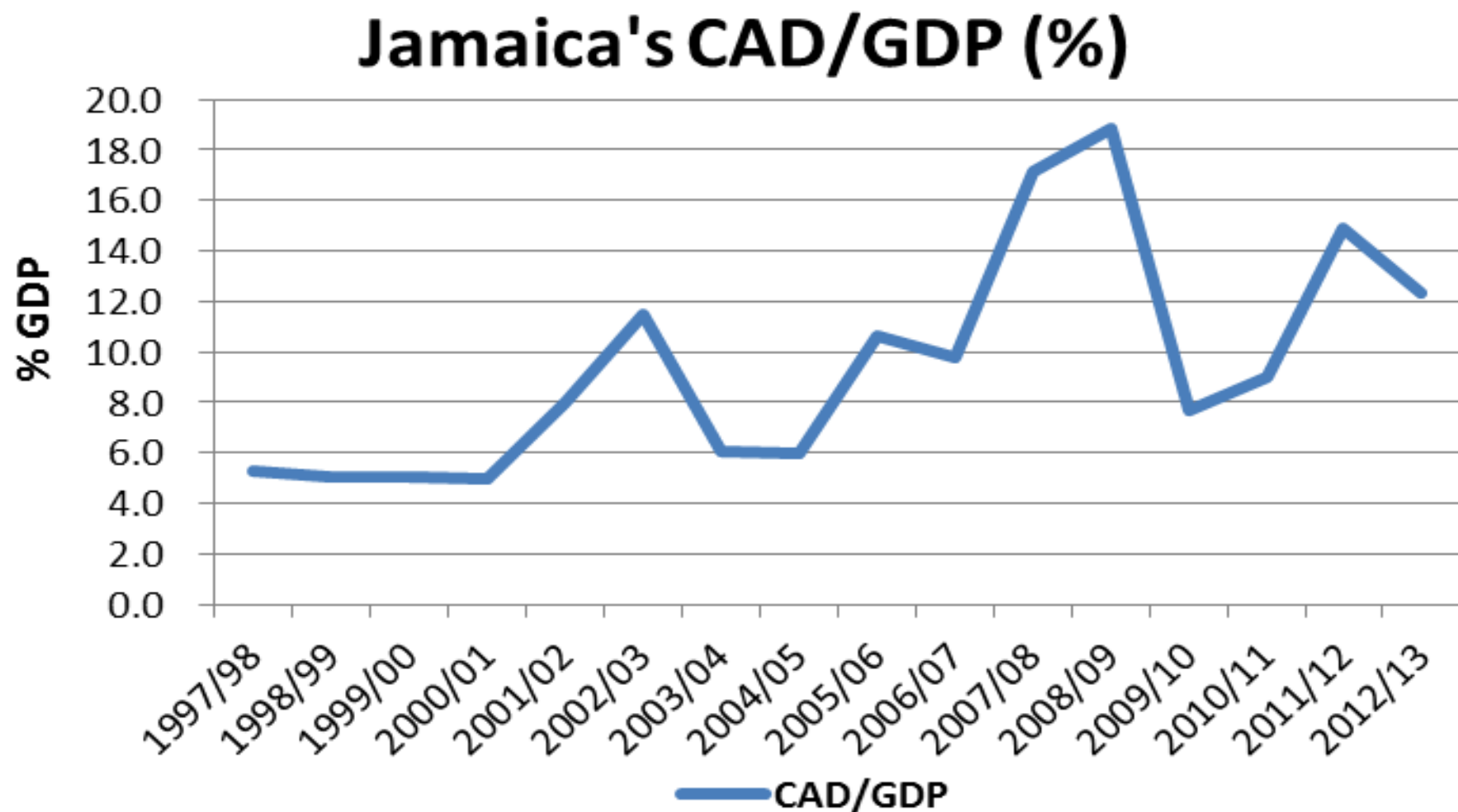
Structure of Jamaica's Current Account

Definitions and Concepts

Equilibrium Exchange Rates

- Williamson (1983) distinguishes the market equilibrium exchange rate as the one which balances demand and supply of the currency in the absence of official intervention.

  - **Short-term equilibrium** is defined as the exchange rate which will pertain if the market has full knowledge of the facts and reacts rationally.

  - **Medium-term equilibrium** which is defined when the economy is at internal and external balance.

  - **Long-term** equilibrium which is defined as the point when stock-flow equilibrium is achieved for all agents in the economy.

Some Measures of Equilibrium Exchange Rate

- Short-Run
  - Behavioural Equilibrium Exchange Rate (BEER)
  - Capital Enhanced Equilibrium Exchange Rate (CHEER)

- Medium-Run
  - Fundamental Equilibrium Exchange Rate (FEER)
  - Desired Equilibrium Exchange Rate (DEER)

- Long-Run
  - Permanent Equilibrium Exchange Rate (PEER)
  - Natural Real Exchange Rate (NATREX)

Equilibrium Real Effective Exchange Rates (EREERs)

- A real exchange rate (RER) can be expressed as the nominal exchange rate adjusted for any price differences between two or more countries.

  - $RER = S_{ijt}\left(\dfrac{P_{it}}{P_{jt}^*}\right)$

- The real effective exchange rate (REER) is derived from a composite weighting of the RER for a range of key trading partners.

  - $REER = \left[S_{ijt}P_{it}/P_{jt}^*\right]^{\omega ij}$

Fundamental Equilibrium Exchange Rate (FEER)

- FEER is the rate that results in simultaneous attainment of internal and external equilibrium

  - Internal Equilibrium: Market for non-tradable goods clears and there is full employment
  - External Equilibrium: Sustainable current account balance with convergence to steady-state

- The FEER is expected to generate a current account surplus or deficit that matches the country's medium-run fundamentals

- Similar to macroeconomic balance (MB) approach

Variables

- Medium-run determinants of the FEER are defined by select fundamentals:
  - Net Foreign Liabilities (-)
  - Trade Openness (-)
  - Productivity (+)
  - Terms of Trade (+)
  - Government Spending (ambig)
  - Foreign Direct Investment (ambig)

Methodology

Autoregressive Distributed Lag (ARDL) Approach (Pesaran and Shin)

- ARDL used because underlying regressors integrated of different orders
- 3 Step Procedure
  - **Step 1**
    - Bounds Testing
      - Tests the presence of a cointegrating relationship based on Unrestricted Error Correction Model (UECM)
        - Joint significance test of lagged regressors using F-statistic
        - The null hypothesis of no cointegration was rejected

Bounds Test

- *UECM*

  - $\Delta LogREER_t =$
  $\alpha + \sum_{i=0}^{m} B_i \, \Delta logP_{t-1} +$
  $\sum_{i=0}^{n} \gamma_i \Delta logY_{t-1} + \sum_{1=i}^{k} \emptyset_i \Delta logREER_{t-1} + \tau_1 logP_{t-1} +$
  $\tau_2 logY_{t-1} + \tau_3 logREER_{t-1} + \varepsilon_t$

- Cointegration equation is defined as:

  - $\tau_1 logP_{t-1} + \tau_2 logY_{t-1} + \tau_3 logREER_{t-1} = 0$

- Bounds test

  - $H_0 : \tau_1 = \tau_2 = \tau_3 = 0$
  - $H_1 : \tau_1 \neq \tau_2 \neq \tau_3 \neq 0$

Bounds Test Results

Unrestricted Error Correction Model		
Variable	**Coefficient**	**Significance**
C	3.71	***
@TREND	0.00	*
D(LNNFL)	-0.44	***
D(LNNFL(-2))	0.17	
D(LNNFL(-3))	0.19	
D(LNCGR(-1))	-0.05	
D(LNTOT)	-0.08	*
D(LNTOT(-3))	-0.08	*
D(LNPROD)	0.35	
D(LNOPEN)	-0.09	***
D(LNOPEN(-2))	0.07	*
D(LNFDI)	-0.02	**
D(LNFDI(-1))	-0.02	***
D(LNFDI(-2))	-0.01	
LNREER(-1)	-0.36	***
LNNFL(-1)	-0.22	***
LNCGR(-1)	0.10	**
LNTOT(-1)	-0.26	***
LNPROD(-1)	0.17	
LNOPEN(-1)	-0.09	**
LNFDI(-1)	0.00	
Level of significance: * = 10.0 per cent; ** = 5.0 per cent; *** = 1.0 per cent		

Wald Bounds Test			
		Critical Bounds (5 %)	
	F-Statistic	Lower	Upper
Group Regressors	5.31	1.82	2.99

ARDL Model (Contd.)

- **Step 2**
  - Estimation of short-run equation
    - ECM term was [negative and significant](#)
    - Based on Half-Life Derivation Formula, ECM term suggests a return to equilibrium in 1.3 quarters

- **Step 3**
  - Estimation of long-run equation
    - Coefficients used to construct EREER
    - A Hodrick-Prescott filter with a smoothing factor of 1600 was applied to eliminate short-run fluctuations and derive a proxy for the long-run equilibrium or sustainable levels of the variables.

Estimation Results

Error Correction Model

Variable	Coefficient	Significance
D(LNNFL(-1))	-0.36	***
D(LNNFL(-3))	-0.13	
D(LNNFL(-4))	0.07	
D(LNCGR(-2))	0.03	
D(LNTOT)	-0.08	**
D(LNTOT(-1))	-0.07	***
D(LNINV(-3))	-0.04	
D(LNPROD(-2))	-0.32	***
D(LNOPEN)	-0.03	
D(LNOPEN(-2))	0.05	***
D(LNFDI(-2))	0.01	
D(LNFDI(-3))	0.00	
ECM(-1)	-0.27	**

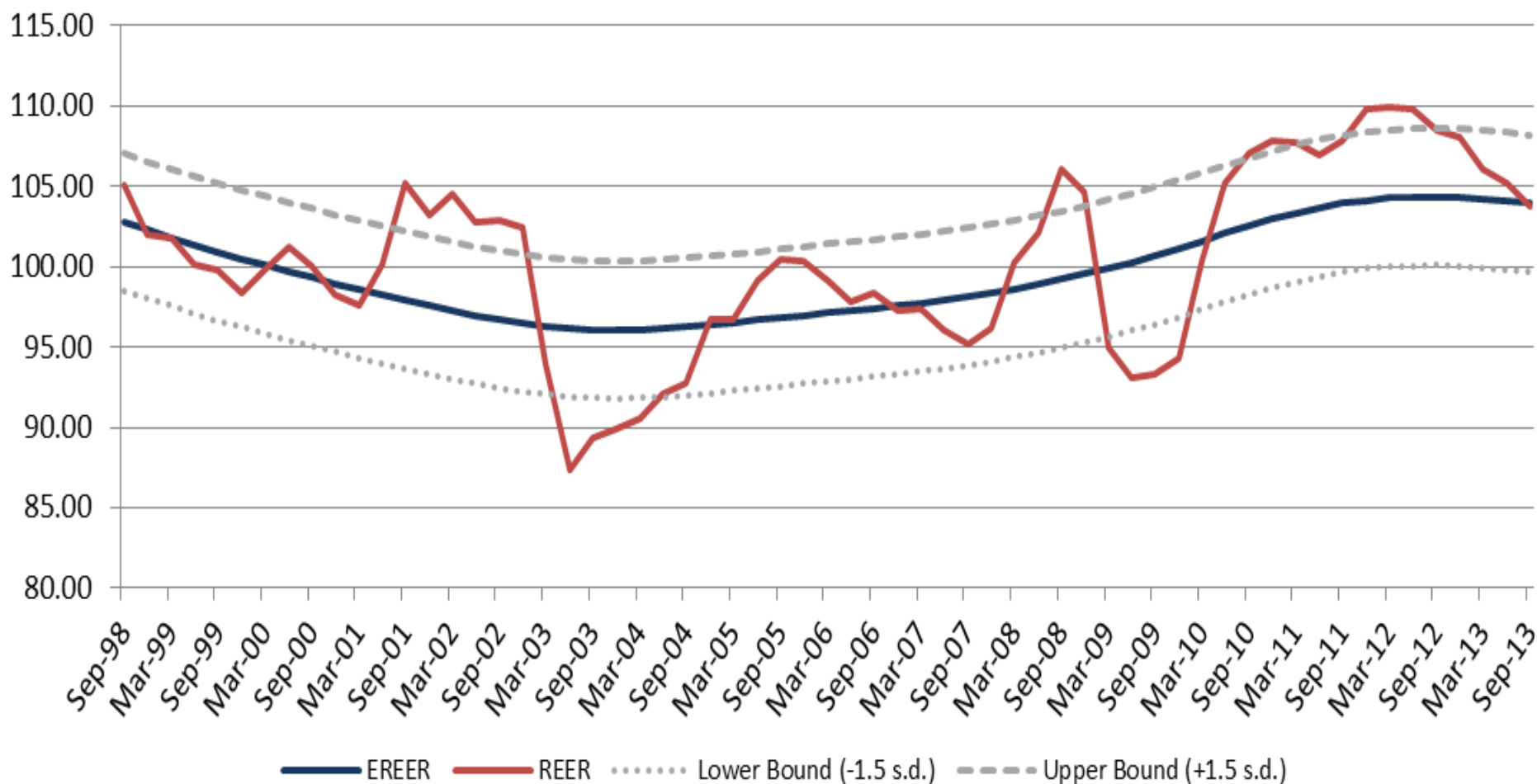Level of significance: * = 10.0 per cent; ** = 5.0 per cent; *** = 1.0 per cent

Long-Run Equation

Variable	Coefficient	Significance
C	8.14	***
LNNFL(-1)	-0.26	***
LNCGR(-2)	0.05	
LNTOT	-0.25	***
LNTOT(-1)	-0.09	
LNTOT(-2)	-0.24	***
LNPROD	0.11	*
LNOPEN	-0.08	***
LNFDI(-1)	-0.02	***

Level of significance: * = 10.0 per cent; ** = 5.0 per cent; *** = 1.0 per cent

Results

Actual and Equilibrium REER (Sep 98 - Sep 2013)

Conclusion

- There have been periods of undervaluation and overvaluation of the REER since 1998

- Depreciation since December 2011 has brought REER in line with equilibrium

- Continued depreciation could cause the REER to fall below the lower bound

- Highlights the need to focus on continuing to implement the structural forms under the Programme
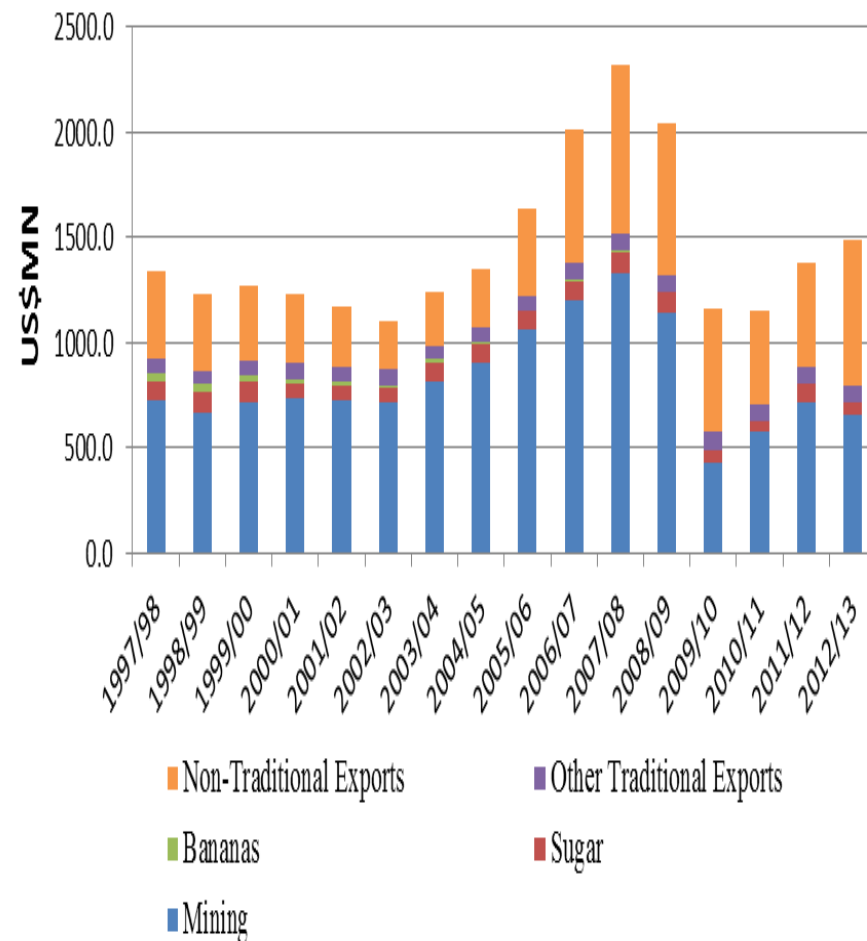
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Jamaica's Balance of Trade
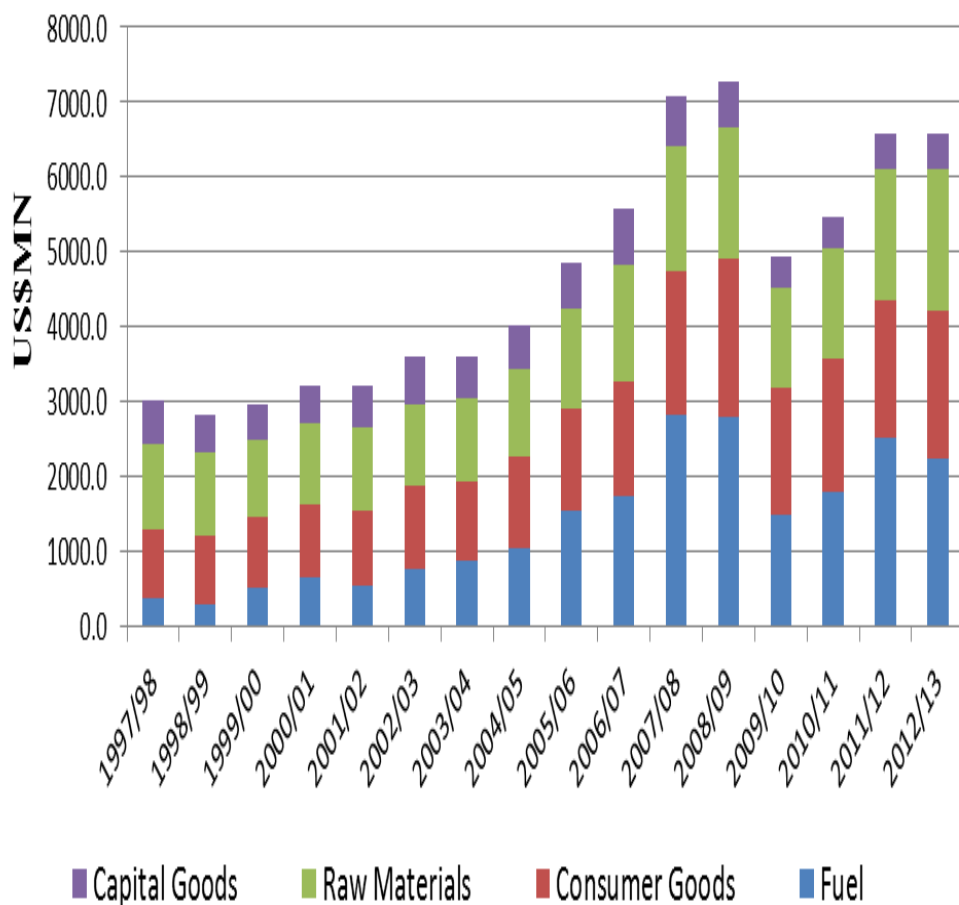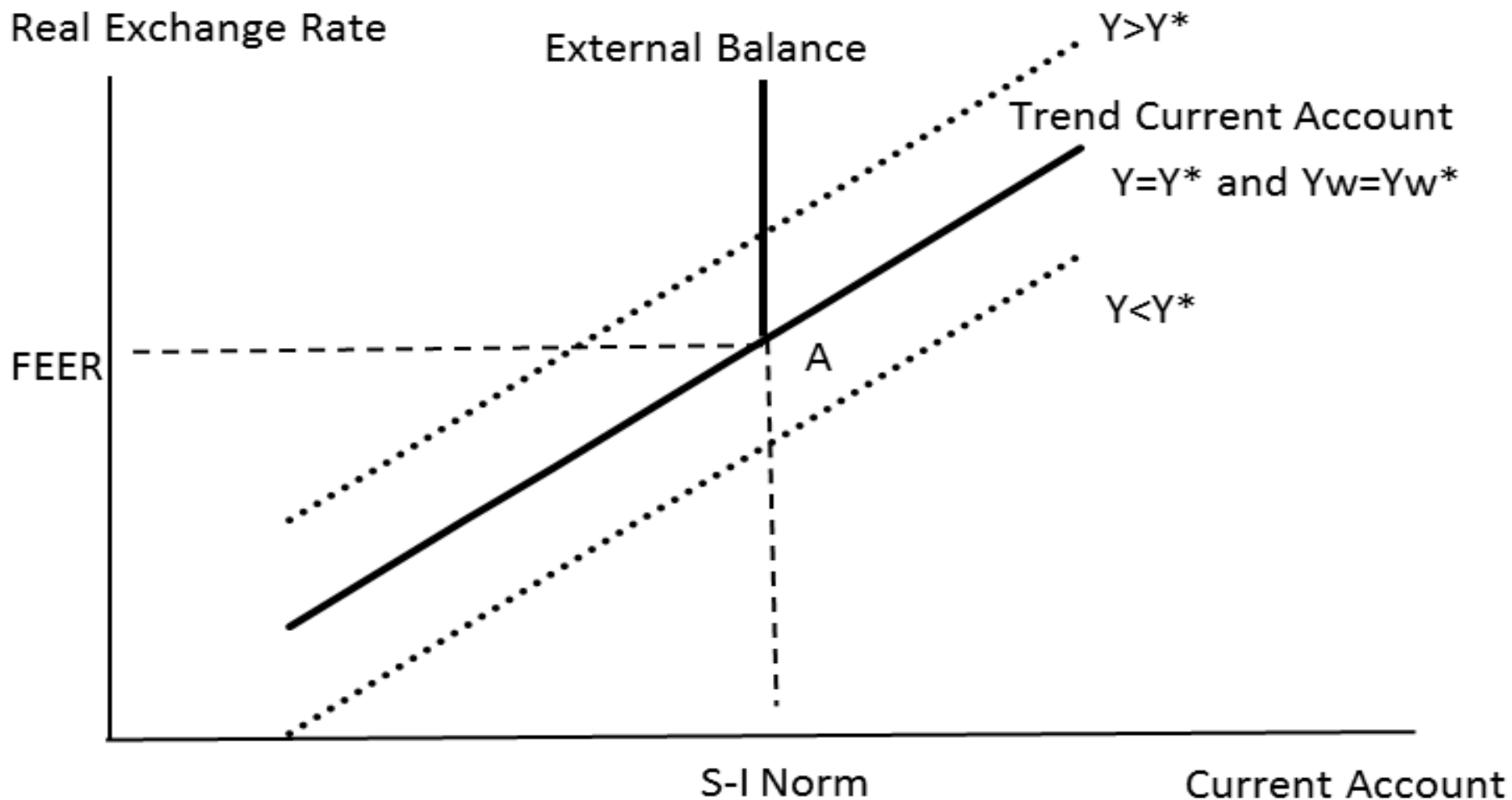
Uncovered Interest Parity (UIP) and Purchasing Power Parity (PPP) Conditions

- UIP condition holds when the exchange rate is such that the interest return on the domestic currency is indifferent to the interest return on foreign currency deposits

- The PPP condition holds when the exchange rate is such that the price of a local good is indifferent to the price of an identical foreign good

Stylized Model of the FEER

Graph of Variables