

New Estimates of Fundamental Equilibrium Exchange Rates

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The Search for Equilibrium Exchange Rates

- Some dismiss the search, but we don't
- But there are differing concepts of equilibrium and it matters which one is searching for
- “Fundamental equilibrium exchange rate” is defined as one consistent with medium-run macro equilibrium
- I.e. the rate consistent with achieving specific macro objectives, which must be sustainable (ambiguities are resolved by an appeal to utility maximization)
- Clearly a real rate, and an effective rate.

Determinants of FEERs

- Fall in two classes:
 - Assumptions about the future in the absence of policy changes
 - Assumptions about desirable outcomes
- Use of April 2008 WEO to specify likely outcomes on the basis of present policies
 - Initial assumption that we should use 2013 forecasts
 - But these are little different (except for Russia) from 2009 forecasts
 - So 2009 figures were used
 - Big change since April is rise in oil price (over 40%).

Desirable Outcomes: Current Balance Targets

- Critical policy determinant of equilibrium exchange rates, given that we are all accelerationists now and that trade policy is little used as a tool of macro policy
- 3% of GDP limit on prudent imbalances
- Capital should flow downhill
- Larger (6% of GDP) limit on deficits of Australia and New Zealand and a similar limit on the surpluses of Singapore and Switzerland
- Targets not estimated for oil exporters in the central case because these depend on changes in the oil price and savings strategies of the oil exporters.

Calculating Current Balance Targets

- Application of the preceding rules yields targets for 24 economies
- Who would have an aggregate deficit reduction of \$351b. (= \$429b. - \$78b.)
- 3% of GDP of the remaining high-surplus economies (China, Hong Kong, Japan, Malaysia, Taiwan, and Sweden) is \$430b.
- So if aggregate RoW imbalance is to remain the same, these economies need to cut surpluses by $351/430$ x (excess of their projected surplus over 3% of GDP).

Current Balance Targets

| Country | Current Account (percentage GDP) | | Country | Current Account (percentage GDP) | |
|----------------------------|----------------------------------|---------------|---------------------------|----------------------------------|---------------|
| | Forecast | Target change | | Forecast | Target change |
| <i>Pacific</i> | | | <i>Europe</i> | | |
| Australia | -5.3 | 0.0 | Czech Republic | -2.8 | 0.0 |
| New Zealand | -7.1 | 1.1 | Euro area | -0.9 | 0.9 |
| <i>Asia</i> | | | Hungary | -5.1 | 2.1 |
| China | 10.0 | -5.7 | Norway | 20.4 | 0.0 |
| Hong Kong SAR | 8.3 | -4.4 | Poland | -5.7 | 2.7 |
| India | -3.4 | 0.4 | Russia | 2.9 | 0.0 |
| Indonesia | 1.2 | -1.2 | Sweden | 6.7 | -3.0 |
| Japan | 3.9 | -0.8 | Switzerland | 13.8 | -7.8 |
| Korea | -0.9 | 0.9 | Turkey | -6.3 | 3.3 |
| Malaysia | 11.1 | -6.6 | United Kingdom | -4.4 | 1.4 |
| Philippines | 1.0 | -1.0 | <i>Western Hemisphere</i> | | |
| Singapore | 18.9 | -12.9 | Argentina | -0.5 | 0.5 |
| Taiwan | 8.1 | -4.1 | Brazil | -0.9 | 0.0 |
| Thailand | 1.3 | -1.3 | Canada | -1.2 | 1.2 |
| <i>Middle East -Africa</i> | | | Chile | -1.3 | 0.0 |
| Israel | 1.7 | -1.7 | Colombia | -4.3 | 1.4 |
| Saudi Arabia | 24.0 | 0.0 | Mexico | -1.6 | 0.0 |
| South Africa | -7.9 | 4.9 | United States | -4.2 | 1.2 |
| | | | Venezuela | 5.0 | 0.0 |
| | | | <i>Rest of World</i> | 3.9 | 0.0 |
| | | | <i>WORLD</i> | 0.3 | 0.0 |

- a. IMF forecast for 2009
b. Estimated NFA for 2009

Variant Simulations

- (1) Same CB targets but higher trade elasticities (to shrink the global c/a discrepancy)
- (2) Oil exporters (Saudi Arabia, Norway, Russia, Venezuela) were subject to the same rules as other countries (implies big cuts in surpluses by Saudi Arabia and Norway)
- (3) Stabilize NFA/GDP at 2009 level (IMF method 3), more demanding of adjustment by US, China, Australia...

Symmetric Matrix Inversion Method (SMIM) model Calculates:

- Desired changes in REERs
- Corresponding changes in exchange rates against the dollar

Current Account Change from Change in REER

$\Delta CA\%GDP =$

$\% \Delta REER \times \text{Impact Parameter}$

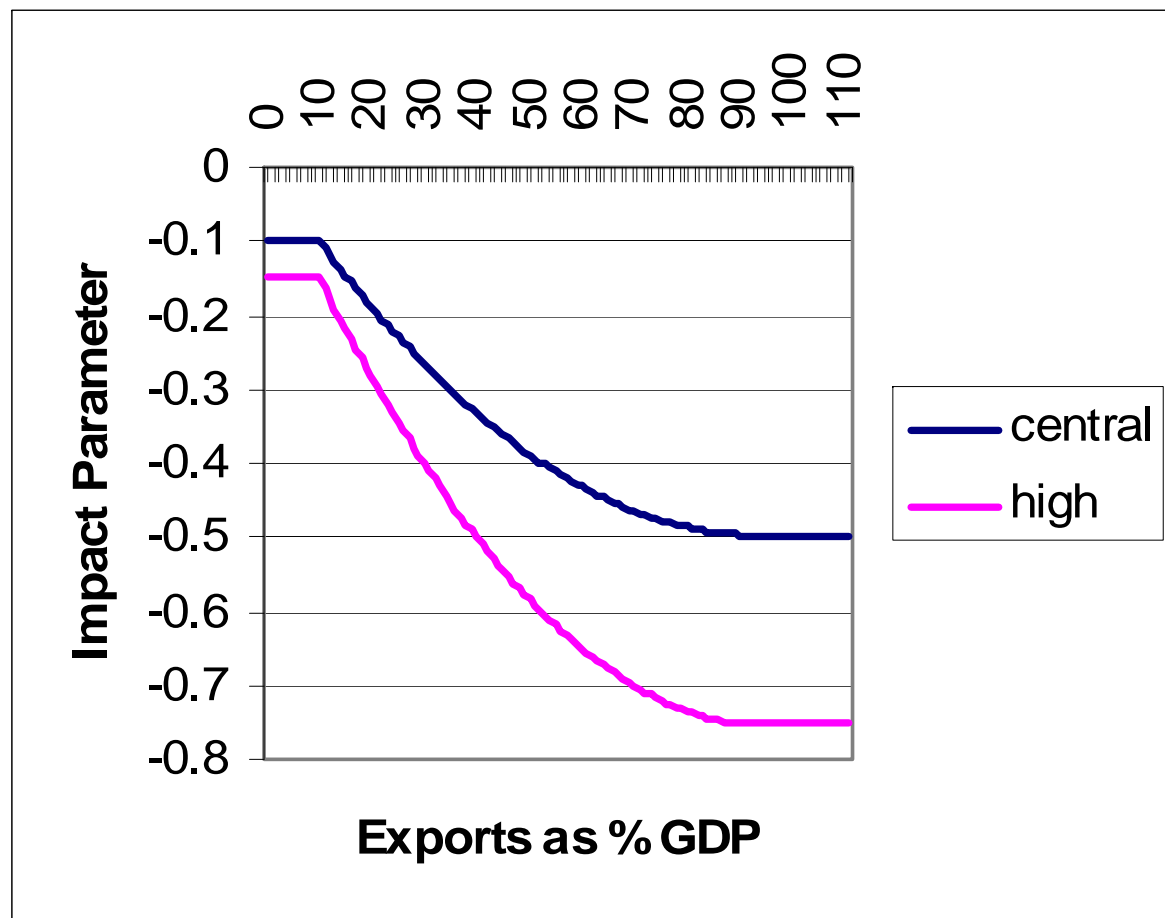
US: +1.2% GDP =

$(-7.4 \% \Delta REER) \times (-0.16)$

China: -5.7% GDP =

$(+19.2\% \Delta REER) \times (-0.30)$

Percent of GDP change in Current Account for 1% rise in REER



Desired Changes in REERs

$$\% \Delta r = \Delta CA \% GDP / \text{Impact}$$

parameter

| | | | |
|------------|------------------|---|-------|
| US: | -7.4% = +1.2%Y | / | -0.16 |
| Euro area: | -6.0% = +0.9%Y | / | -0.14 |
| Japan: | +6.6% = -0.8%Y | / | -0.12 |
| China: | +19.2% = -5.7%Y | / | -0.30 |
| Singapore: | +25.8% = -12.9%Y | / | -0.50 |

REER versus Bilateral Rate Against the Dollar

- %Rise in REER = %Rise against dollar
minus trade-weighted % increases of
partner exchange rates against dollar

For country k:

$$r_k = -z_1 a_{k1} - z_2 a_{k2} \dots + z_k - z_{k+1} a_{k k+1} \dots$$

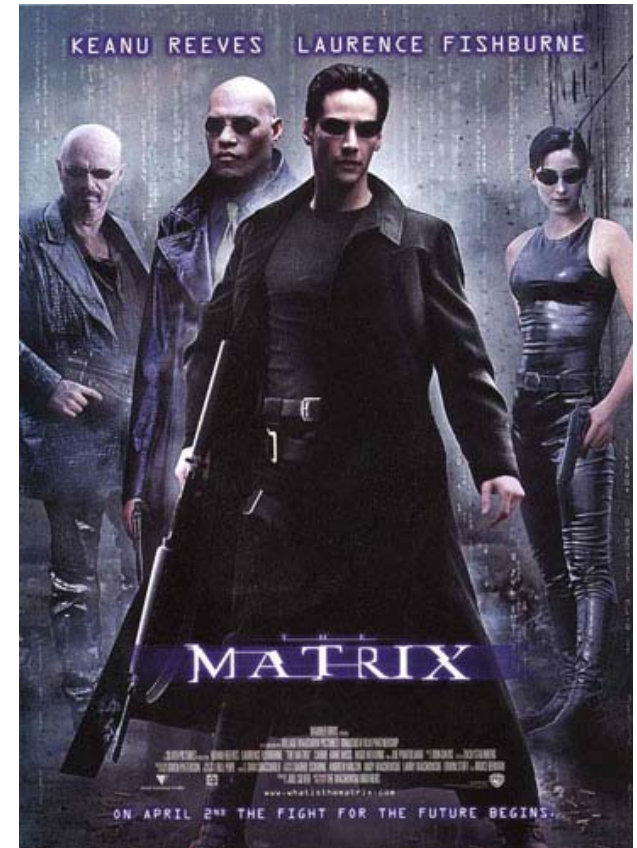
In matrix form:

$$R_{35 \times 1} = B_{35 \times 35} Z_{35 \times 1}$$

R = vector of % changes
in REER

Z = vector of % changes in bilateral
exchange rates against the dollar

$B = I - A$ where I = identity matrix and
 A = trade shares matrix



Solving for Realignment against the Dollar:

$$Z_{35 \times 1} = B_{35 \times 35}^{-1} R_{35 \times 1}$$

Averaging Results

- System Overdetermined
- # possible solutions = # countries
- Estimate = Average
- Not achieve targets exactly

Alternative Variants

- High elasticity
- Oil adjustment
- Stabilize Net Foreign Assets as % of GDP

The Central Simulation

- Figures of 2009 although adjustment takes longer than one year
- Estimate needed changes in effective rates by dividing target changes in CB by impact parameter
- Apply SMIM to get bilateral rates against dollar
- Positive numbers indicate undervaluations = need to appreciate, negative numbers indicate need to depreciate or overvaluation.

Currency Realignment Needed to Reach FEERs

| | Percent change from base (a): | | Currency level against the dollar: | | |
|-----------------------------|-------------------------------|--------------------------|------------------------------------|-----------------|-----------------|
| | Trade-weighted Average | Bilateral vs. the Dollar | FEER Equivalent | July 1-15, 2008 | % Change Needed |
| <i>Industrial Countries</i> | | | | | |
| Canada | -4.1 | -1.5 | 1.02 | 1.01 | -0.6 |
| Euro Area (b) | -7.2 | -0.2 | 1.47 | 1.58 | -7.0 |
| Japan | 5.7 | 19.0 | 90.1 | 106.5 | 18.2 |
| Switzerland | 21.4 | 23.9 | 0.88 | 1.02 | 16.3 |
| United Kingdom (b) | -6.6 | -2.5 | 1.91 | 1.98 | -3.7 |
| United States | -8.6 | 0.0 | 1.00 | 1.00 | 0.0 |
| <i>Developing Asia</i> | | | | | |
| China | 18.4 | 31.5 | 5.45 | 6.85 | 25.7 |
| Korea | -3.5 | 11.2 | 850 | 1024 | 20.5 |
| Malaysia | 12.3 | 30.7 | 2.47 | 3.25 | 31.8 |
| Singapore | 24.7 | 41.2 | 1.00 | 1.36 | 36.2 |
| Taiwan | 9.0 | 26.0 | 25.1 | 30.4 | 21.2 |
| <i>Other Developing</i> | | | | | |
| Mexico | -0.4 | 2.0 | 10.6 | 10.3 | -2.5 |
| Poland | -8.6 | -6.1 | 2.59 | 2.10 | -19.1 |
| South Africa | -14.6 | -6.7 | 8.21 | 7.73 | -5.9 |
| Turkey | -13.0 | -8.5 | 1.32 | 1.23 | -7.0 |

a. February 2008

b. Dollars per currency unit

Comments on Results

- Dollar is still overvalued, but solely w.r.t. most Asian currencies plus Switzerland, Sweden
- Euro has overshot, but not greatly
- Largest undervaluations are Singapore and Switzerland, even giving them larger CB targets
- Largest overvaluations are South Africa and Turkey
- US neighbors Canada and Mexico appear roughly correct
- Canada and Australia are close to parity with the US dollar, the Swiss franc is over parity
- The effective changes of the Asian countries are markedly smaller than their changes against the dollar.

Concluding Remarks

- Similar picture to PB07-4, except that euro etc have appreciated further against dollar in last year
- That is, RMB and other East Asian currencies are still seriously undervalued
- Need for bilateral appreciations against dollar by some currencies that are overvalued on effective basis.