Economics International Inc

Estimates of Fundamental Equilibrium Exchange Rates, May 2024

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This study updates estimates of Fundamental Equilibrium Exchange Rates (FEERs) using April 2024 as the base month. These new estimates take as their point of departure the most recent issue of the World Economic Outlook (WEO) of the International Monetary Fund (IMF, 2024a, b). I apply the real effective exchange rate (REER) series of the Bank of International Settlements (FRED, 2024) to take account of changes in real exchange rates subsequent to the base period used in the WEO.

Trends in Principal Exchange Rates

The US dollar staged another rise in the first four months of 2024 after having eased from a local peak in October 2023. That peak was only slightly below the peak in October 2022 that had reflected the earlier US timing of monetary tightening than that in other key economies in the pandemic inflation shock. The real broad dollar index estimated by the Federal Reserve had risen from 106.6 in January 2019 to 121.1 in October 2022. The index then eased to 112.4 by July 2023, but rose again to 117.4 by October (Federal Reserve, 2024).[2] The Fed had raised the Federal Funds rate from zero in March 2022 to 3.1 percent in October 2022 and 5.3 percent by July 2023. The rate has remained at this high plateau since then (FRED, 2024, series DFF).

From October 2023 to December, the Federal Reserve's broad real effective dollar index eased to 113.8, but by April it was back up to 116.5. Financial markets had expected the Fed to begin to ease interest rates, but "The Fed [was] … stung by three months of stronger-than-expected inflation readings from January to March," and recent comments from several Federal Reserve Board governors have emphasized the need to keep interest rates at their recent plateau for some months until additional progress is curbing inflation is clear.[3]

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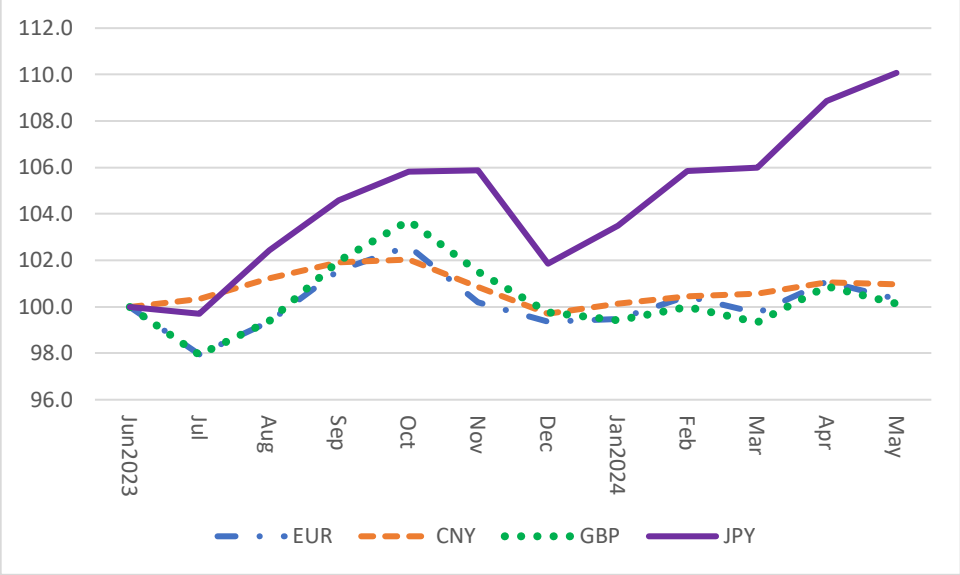
[2] The index begins at a base of 100 in January 2006 . The October 2022 level was the highest it has reached.
[3] Pete Schroeder and Howard Schneider, "Fed Officials Urge Patience on Timing of Initial Rate Cut," *Reuters*, May 21, 2024.

Figure 1 shows the strength of the dollar against four major currencies over the past year. The dollar rose against all four until the local peak in October, and fell against all four from October to December. From December to April, however, the rebound was particularly large against the Japanese yen, whereas the uptick was 1 percent or less against the euro, Chinese yuan, and British pound sterling. The sharp difference in Japan's monetary policy from that in other major economies helps explain why Japan's exchange rate path is such an outlier. After years of fighting disinflation, Japan's policy interest rate remains at less than one-tenth of one percent.[4] In contrast, the policy rate is 4.5 percent for the ECB and 5.25 percent for the Bank of England.[5]

Figure 1

Strength of the US Dollar against 4 Major Currencies (June 2023=100)



Main Calculations

Table 1 reports the current account projections of the IMF for the 34 countries (with the euro treated as one economy) covered in the FEERs series dating back to 2008. The first column reports the IMF's estimates of current account balances in 2023 in the April 2024 WEO. The second column reports the Fund's projection of the current dollar value of GDP for each economy in 2029.

The third column of the table reports the Fund's 2029 current account projections, as a percent of GDP. The fourth column then adjusts the 2029 outlook to take account of the change

[4] Statista.com. Japan's inflation averaged -0.6 percent annually in 2009-13; +0.8 percent in 2014-19; and -0.1 percent in 2020-21. Although it reached 2.5 percent in 2022 and 3.3 percent in 2023, the WEO projects it at 2.2 percent in 2024 and an average of 2.0 percent in 2025-29 (IMF, 2024a). Also see Leika Kihara, "Bank of Japan scraps radical policy, makes first rate hike in 17 years," *Reuters*, March 19, 2024.

[5] Bank of England (2024); European Central Bank (2024).

in exchange rates from the February base period used in the April WEO to the April base used in this report.[6] The adjustment applies the percent change in the real effective exchange rate (REER) to the current account impact parameter ("gamma", the percent of GDP change in the current account for a 1 percent rise in the country's REER).[7]

Notable increases in REERs from the February WEO base to April included a rise by 17.4 percent for Argentina, 3.0 percent for Colombia, and 2.2 percent for South Africa.[8] Notable declines included a fall by 7.4 percent for Chile, 5.7 percent for Czech Republic, 5.0 percent for Israel, and 4.6 percent for Mexico. For most economies, the adjusted 2029 current account estimate (next to last column) is close to the unadjusted WEO projection (previous column).

The FEERs methodology sets $\pm$ 3 percent of GDP as the permissible external imbalance.[9] A deficit of 3 percent of GDP could eventually bring the economy to a precariously high level of net external debt. The ceiling of 3 percent on the surplus is meant to provide symmetry for the purpose of global adding-up. The final column of table 2 accordingly shows the target current account as either $\pm$ 3 percent of GDP (the limit) or the actual projected current account if it is within this limiting range. The four oil-exporting economies are exceptions, with no limits imposed because they are primarily transforming resource wealth into financial wealth rather than increasing total wealth.

Table 2 reports the results of running the Symmetric Matrix Inversion Method (SMIM) model to obtain the globally-consistent set of exchange rate changes that most closely approximate the target changes of REERs needed to bring the current account imbalances to their target levels (Cline, 2008). The first column shows the target change in the current account as a percent of GDP. This change is the difference between the $\pm$3 percent limit and the baseline projection for 2029 if it is outside this limit. As usual in this series, there are large targeted reductions in the surpluses of Singapore and Taiwan (by about 11 percent of GDP for both). There are also targeted reductions of 4.9 percent of GDP for Hong Kong, 2.4 percent of

[6] The April 2024 WEO uses January 30 -February 27, 2024 as its base period (IMF, 2024b, p. 111). The adjustments apply February as approximately equivalent to the WEO base period. The REERs for February and April are from the Bank of International Settlements "broad" series. As the BIS has discontinued posting tables 12-B (Broad Real Effective Exchange Rates) and 13 (bilateral exchange rates against the US dollar), the estimates apply the BIS data compilations reported for major countries in FRED (2024) for the REER, and the bilateral dollar exchange rates reported by the IMF (2024c).

[7] This parameter is essentially an overall export price elasticity set at unity, applied to the size of exports of goods and services relative to GDP. The relationship is less than linear and is subject to a ceiling of 0.5, such that for a small open economy with exports at 100 percent of GDP a 1 percent rise in the REER would reduce the current account by 0.5 percent of GDP. Note that for the adjustment from the WEO base month, the calculation further applies only one-half of the normal impact calculation, reflecting past experience with slowly-changing IMF projections of the long-term current account. There is also a special adjustment reducing Switzerland's estimated surplus by 3 percent of GDP to account for the fact that current account data do not separate out the portion attributable to foreign multinational companies.

[8] The outsized rise in the REER for Argentina reflects high domestic inflation, reaching 133 percent in 2023 and 250 percent projected for 2024 (IMF 2024a).

[9] For a summary of the FEERs methodology, see Cline and Williamson (2012), Appendix A.

GDP for Switzerland, 1.9 percent for Korea, and 1.7 percent for Sweden. For Japan, the needed correction is small, at a targeted decline in the current account balance by only 0.3 percent of GDP, despite the prolonged and deep decline of the real effective exchange rate of the yen.

Table 1: Target Current Accounts (CA) for 2029

Country	IMF Estimate of 2023 CA (percent of GDP)	IMF 2029 GDP forecast (billions of US dollars)	IMF 2029 CA forecast (percent of GDP)	Adjusted 2029 CA (percent of GDP)	Target CA (percent of GDP)
Pacific					
Australia	1.2	2,208	-0.5	-0.6	-0.6
New Zealand	-6.9	314	-3.7	-3.5	-3.0
Asia					
China	1.5	24,842	1.1	1.3	1.3
Hong Kong	9.4	519	8.0	7.9	3.0
India	-1.2	6,437	-2.3	-2.4	-2.4
Indonesia	-0.1	2,195	-1.3	-1.2	-1.2
Japan	3.4	4,945	3.1	3.3	3.0
Korea	2.1	2,171	4.5	4.9	3.0
Malaysia	1.2	603	3.0	2.8	2.8
Philippines	-2.6	710	-0.9	-0.8	-0.8
Singapore	19.8	655	14.3	14.5	3.0
Taiwan	13.1	1,005	13.9	14.4	3.0
Thailand	1.3	710	2.9	3.2	3.0
Middle East/Africa					
Israel	4.7	682	3.5	3.8	3.0
Saudi Arabia	3.9	1,429	-2.9	-3.1	-3.1
South Africa	-1.6	443	-2.2	-2.5	-2.5
Europe					
Czech Republic	1.2	397	1.6	1.6	1.6
Euro area	1.9	18,829	2.3	2.2	2.2
Hungary	0.3	302	0.1	0.3	0.3
Norway	17.7	617	16.2	16.4	16.4
Poland	1.6	1,063	-1.0	-1.1	-1.1
Russia	2.5	2,211	3.0	3.1	3.1
Sweden	6.2	775	4.1	4.7	3.0
Switzerland	7.6	1,161	7.6	5.4	3.0
Turkey	-4.1	1,286	-1.8	-2.0	-2.0
United Kingdom	-2.2	4,661	-2.8	-2.9	-2.9
Western Hemisphere					
Argentina	-3.5	694	1.5	0.2	0.2
Brazil	-1.3	3,058	-2.0	-1.8	-1.8
Canada	-0.6	2,806	-0.6	-0.3	-0.3
Chile	-3.5	445	-3.0	-3.2	-3.0
Colombia	-2.7	485	-3.6	-3.8	-3.0
Mexico	-0.3	2,544	-0.9	-1.0	-1.0
United States	-3.0	34,950	-2.1	-2.3	-2.3
Venezuela	3.4	…	…	…	…

Source: IMF (2024a) and author's calculations

Only three of the 34 economies show required improvements in current account balances to limit their deficits to no more than 3 percent of GDP: Colombia (by 0.8 percent of GDP); New Zealand (by 0.5 percent of GDP); and Chile (by 0.2 percent of GDP. There are no required corrections for the United States, the euro area, or China.

The second column of table 2 reports the actual changes in the current accounts achieved in the globally-consistent simulation. There is a strong asymmetry between surplus reductions required for nine economies (median reduction: by 1.9 percent of GDP) but deficit reductions required for just three (median: by 0.5 percent of GDP). As a consequence, the globally-consistent solution under-adjusts for excess surplus countries and imposes current account improvements for 21 countries needing no change.

The third column shows the change in the REER implied by the target change in the current account. Thus, for Taiwan, the target reduction in the current account surplus by 11.4 percent of GDP requires an appreciation of the REER by 25 percent in view of Taiwan's "gamma" coefficient (-0.43 percent of GDP change for 1 percent REER change). The fourth column shows the change in the REER accomplished on a globally-consistent basis in the SMIM simulation. There is a REER depreciation by about 2 percent needed for many economies (including the United States) for this global adding-up, even though they do not require depreciation to remain within the 3 percent of GDP deficit limit.

The fifth column in table 2 reports the average exchange rate for each country against the US dollar in April 2024 (IMF, 2024c). The sixth column shows the percent change in the bilateral rate against the US dollar obtained in the globally-consistent simulation. The final column applies this percent change to the actual rate in April to arrive at the FEER-consistent dollar exchange rate for each country. This rate is $1.07 per euro, 147 yen per dollar, 7.03 Chinese yuan per dollar, and 1.24 dollars per pound sterling. Australia and New Zealand have FEER-consistent US dollar rates of 67 US cents and 60 US cents, respectively.[10]

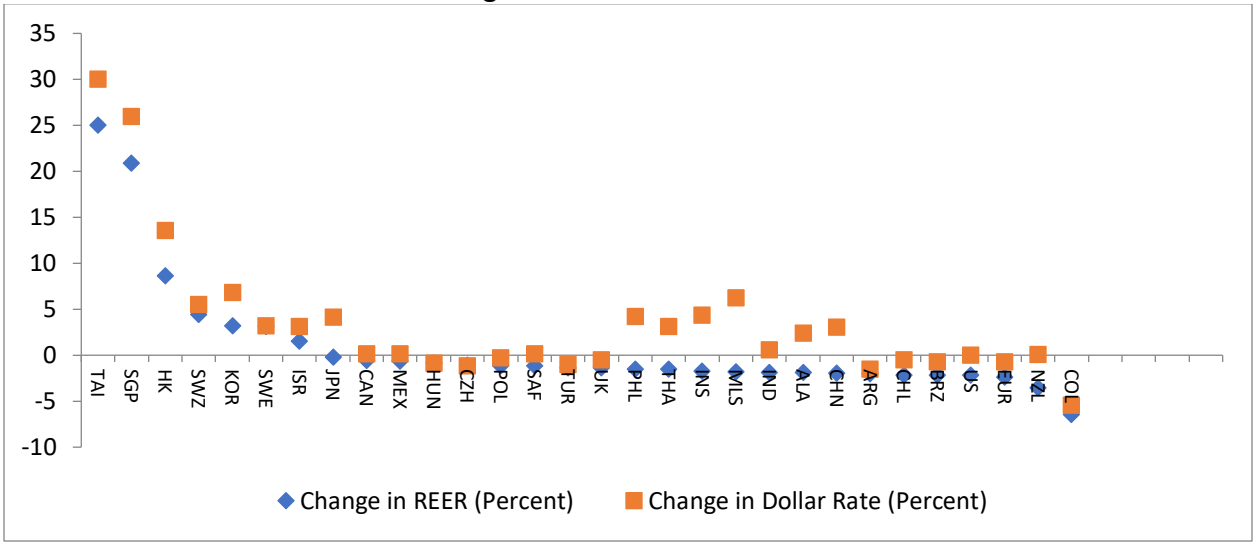
[10] There is no estimate for Venezuela, where hyperinflation and import controls turn an estimate meaningless.

Table 2: Results of the Simulation: FEERs Estimates

Country	Changes in Current Account as Percentage of GDP		Change in REER (percent)		Dollar Exchange Rate		FEER-consistent dollar rate
	Target Change	Change in Simulation	Target Change	Change in Simulation	Apr 2024	Percentage Change	
Pacific							
Australia*	0.0	0.4	0.0	-1.9	0.65	2.4	0.67
New Zealand*	0.5	0.9	-1.9	-3.6	0.60	0.0	0.60
Asia							
China	0.0	0.4	0.0	-2.0	7.24	3.1	7.03
Hong Kong	-4.9	-4.3	9.8	8.6	7.83	13.5	6.90
India	0.0	0.4	0.0	-1.9	83.4	0.6	82.9
Indonesia	0.0	0.4	0.0	-1.8	16100	4.3	15430
Japan	-0.3	0.0	1.6	-0.2	153	4.1	147
Korea	-1.9	-1.3	4.8	3.2	1368	6.8	1280
Malaysia	0.0	0.9	0.0	-1.8	4.77	6.2	4.49
Philippines	0.0	0.4	0.0	-1.5	57.0	4.2	54.7
Singapore	-11.5	-10.4	22.9	20.8	1.36	25.9	1.08
Taiwan	-11.4	-10.8	26.4	25.0	32.3	30.0	24.9
Thailand	-0.2	0.7	0.4	-1.5	36.8	3.1	35.7
Middle East/Africa							
Israel	-0.8	-0.4	2.8	1.5	3.74	3.1	3.63
Saudi Arabia	0.0	0.5	0.0	-1.3	3.75	1.4	3.70
South Africa	0.0	0.3	0.0	-1.1	18.87	0.1	18.85
Europe							
Czech Republic	0.0	0.5	0.0	-1.1	23.6	-1.1	23.8
Euro area*	0.0	0.6	0.0	-2.4	1.08	-0.8	1.07
Hungary	0.0	0.4	0.0	-0.9	366	-0.9	369
Norway	0.0	0.4	0.0	-1.3	10.89	-0.8	10.98
Poland	0.0	0.4	0.0	-1.1	4.01	-0.3	4.02
Russia	0.0	0.3	0.0	-1.3	92.9	-0.1	93.0
Sweden	-1.7	-1.1	4.7	3.1	10.81	3.2	10.47
Switzerland	-2.4	-2.0	5.5	4.4	0.91	5.5	0.86
Turkey	0.0	0.3	0.0	-1.4	32.27	-1.0	32.61
United Kingdom*	0.0	0.4	0.0	-1.4	1.25	-0.5	1.24
Western Hemisphere							
Argentina	0.0	0.3	0.0	-2.1	875.0	-1.5	888.30
Brazil	0.0	0.2	0.0	-2.2	5.13	-0.8	5.17
Canada	0.0	0.2	0.0	-0.6	1.37	0.1	1.37
Chile	0.2	0.6	-0.5	-2.2	960	-0.5	965
Colombia	0.8	1.0	-5.0	-6.4	3866	-5.5	4089
Mexico	0.0	0.2	0.0	-0.6	16.8	0.2	16.7
United States	0.0	0.4	0.0	-2.2	1.00	0.0	1.00
Venezuela	0.0	0.3	0.0	-1.2	...	…	…

Figure 2 shows the percent changes in exchange rates needed to bring current accounts into alignment with the FEERs targets. The economies are ordered from the largest REER appreciations to the largest REER depreciations. Following the pattern usually found, for the Asian economies there tends to be a greater (positive) difference between the amount of change needed in the bilateral rate against the dollar than in the multilateral REER. The countries with the highest needed appreciations (especially Taiwan and Singapore) tend to be in Asia, and the countries with high trade shares with these economies also tend to be in Asia. These regional trading partners tend to need to appreciate against the dollar to avoid experiencing a depreciation in the multilateral effective exchange rate as key partners appreciate against the dollar.

Figure 2
Changes Needed to Reach FEERs



ARG = Argentina, AUS = Australia, BRZ = Brazil, CAN = Canada, CHL = Chile, CHN = China, COL = Colombia, CZH = Czech Republic, EUR = Euro area, HK = Hong Kong, HUN = Hungary, IND = India, IDN = Indonesia, ISR = Israel, JPN = Japan, KOR = Korea, MLS = Malaysia, MEX = Mexico, NZ = New Zealand, PHL = Philippines, POL = Poland, SGP = Singapore, SAF = South Africa, SWE = Sweden, SWZ = Switzerland, TAI = Taiwan, THA = Thailand, TUR = Turkey, UK = United Kingdom, US = United States.
FEER: Fundamental Equilibrium Exchange Rate
REER: Real Effective Exchange Rate

Conclusion

The principal misalignments of exchange rates identified in this study are highly concentrated, with the globally consistent simulations showing large real appreciations needed for Taiwan (by 25 percent) and Singapore (by 20.8 percent) and Hong Kong (by 8.6 percent). Smaller globally-consistent real appreciations are needed for Switzerland (by 4.4 percent) as well as Korea and Sweden (both by about 3 percent). The needed REER depreciations in the globally consistent solution stand at 6.4 percent for Colombia and 3.6 percent for New Zealand.

In addition, global consistency imposes REER depreciations in the range of about 2 percent for many economies even though their deficits do not exceed the allowed ceiling deficit of 3 percent of GDP. This consistency effect is about the same for the euro (-2.4 percent REER change) and the United States (-2.2 percent).

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