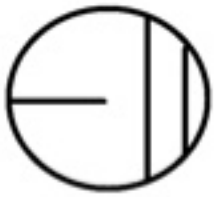

EII Financial Markets Analysis 18-02

Estimates of Fundamental Equilibrium Exchange Rates, November 2018

William R. Cline[1]
November, 2018

Abstract

The US dollar has rebounded following its decline in 2017, but it is only marginally overvalued. Aside from chronically undervalued Singapore, Taiwan, and Switzerland, only Japan and Korea are undervalued, and their undervaluation is moderate. Despite its decline this year against the dollar, China's currency is not undervalued, nor has China manipulated the exchange rate through intervention. The US-China trade war could reduce US GDP by 0.5 percent, and adverse effects on financial markets and investment could substantially increase the damage. Pressure on emerging market exchange rates this year in the face of rising US interest rates has primarily affected economies already vulnerable from external and fiscal imbalances and foreign currency debt, notably Argentina and Turkey.

Estimating Fundamental Equilibrium Exchange Rates (FEERs)

This study marks the first issuance by Economics International Inc of the periodic updates of estimates of Fundamental Equilibrium Exchange Rates (FEERs) previously issued by the Peterson Institute for International Economics. First introduced in Cline and Williamson (2008), the calculations of fundamental equilibrium exchange rates (FEERs) have examined the extent to which exchange rates need to change in order to curb any prospectively excessive current account imbalances back to a limit of ±3 percent of GDP. This target range is intended to be consistent with sustainability for deficit countries and global adding-up for surplus countries. The estimates apply the Symmetric Matrix Inversion Method (SMIM) model (Cline 2008). For a summary of the methodology, see Cline and Williamson (2012, appendix A).[2]

The Dollar Rebounds

In the first few months after the election of US President Donald Trump, the dollar strengthened significantly. From October to December 2016 the exchange rate moved from 1.10 dollars per euro

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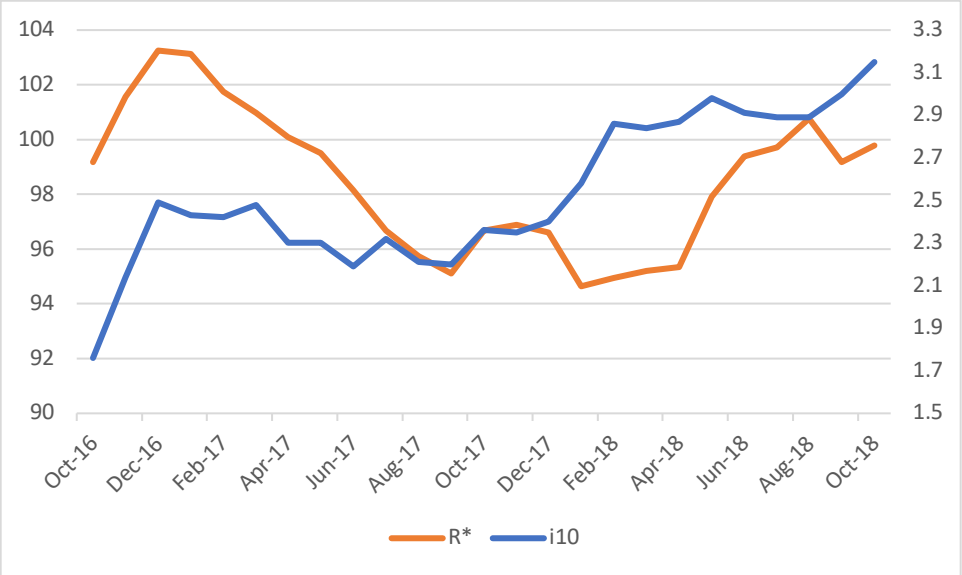
[2] Available at http://www.piie.com/publications/pb/pb12-14.pdf.

to1.05, and from 104 yen per dollar to 116. The real effective exchange rate (REER) for the dollar rose by 4.1 percent over the same period. However, after staying at a relatively high plateau in the first quarter of 2017, the dollar proceeded to fall. By January 2018 the exchange rate stood at 1.24 dollars per euro and 106 yen per dollar, and the REER for the dollar had fallen by 8.3 percent from its December 2016 peak (IMF, 2018b; Federal Reserve 2018a).

Cline (2017) emphasized three factors contributing to the decline of the dollar during 2017: a decline in the 10-year Treasury bond rate (from 2.6 percent in December 2016 to 2.0 percent in September 2017); concern about political inefficacy as the administration failed to repeal the Affordable Care Act; and uncertainty associated with confrontation with North Korea. Berkeley economist Barry Eichengreen quipped there were "at least 17 other narratives" for dollar weakness, but emphasized "Trump-related uncertainty" as the most plausible explanation.[3]

As shown in Figure 1, during the course of 2018 the dollar has staged a strong recovery. From its trough in January, the REER for the dollar rose by 5.4 percent by October.[4] Passage of the Tax Cut and Jobs Act in December 2017 has likely been an important reason, from its demonstration that the Trump administration could accomplish key goals and its prospective effect in boosting interest rates as a consequence of fiscal stimulus administered to an economy already at full employment.[5]

Figure 1
Broad Real Effective Exchange Rate for the US Dollar[a] (left) and
10-Year Treasury Rate (right)



a. March 1973=100
Source: Federal Reserve (2018a, b)

[3] Barry Eichengreen, "The Dollar's Doldrums," *Barron's*, March 17, 2018.
[4] The Federal Reserve's (2018a) broad real dollar index stood at 94.64 in January and 99.78 in October (March 1973 = 100).
[5] Another possible effect, from repatriation of assets held abroad by multinational corporations in response to the new tax law, is unlikely to have been a significant factor because "most offshore savings are in US dollar-denominated instruments already" (Pozsar, 2018).

The resurgence of the dollar has been closely related to a sharp rise in the ten-year Treasury rate, from an average of 2.2 percent in September 2017 and still only 2.4 percent in December to 2.86 percent in February 2018 and 3.15 percent in October (Federal Reserve, 2018b). The Congressional Budget Office has projected that the rate will average 3.6 percent in 2019 (CBO, 2018), suggesting pressure for further appreciation. Although Trump has sharply criticized the Federal Reserve for raising interest rates, the Fed has shown no signs of yielding to political pressure.[6]

Trends in Key Currencies

Figure 2 shows the paths of REERs over the past two years for five major world reserve currencies: the US dollar, euro, yen, pound sterling, and Chinese renminbi.[7] It is noteworthy that in the period of the dollar's rebound (by 9.1 percent from January to October in the BIS measure), there were also increases in the REERs of the euro (3.0 percent), the yen (3.2 percent), and the pound sterling (0.7 percent). For the RMB, by October the REER was only slightly below its January level (-0.5 percent), although it was 3.7 percent below the higher plateau it had reached in February through May. The fact that the REERs of the other key currencies were strengthening even as that of the dollar was doing so indicates that except for the RMB, they were rising against other currencies, particularly those of emerging market economies. This pattern allowed real appreciation (or approximate absence of change for the RMB) even though the dollar was appreciating in real terms bilaterally against each of them (by 7.3 percent against the RMB, 6.6 percent against the pound sterling, 6.2 percent against the euro, and 2.2 percent against the yen).[8]

In the high-profile case of China, the nominal bilateral rate against the US dollar fell from a high monthly average of 6.31 yuan per dollar in February to a monthly average of 6.92 in October.[9] As discussed below, however, China's current account surplus is low and is projected by the IMF to fall close to zero by 2023, so the currency has not become undervalued, nor has the government pursued intervention accumulating external reserves to exert downward pressure on the renminbi.

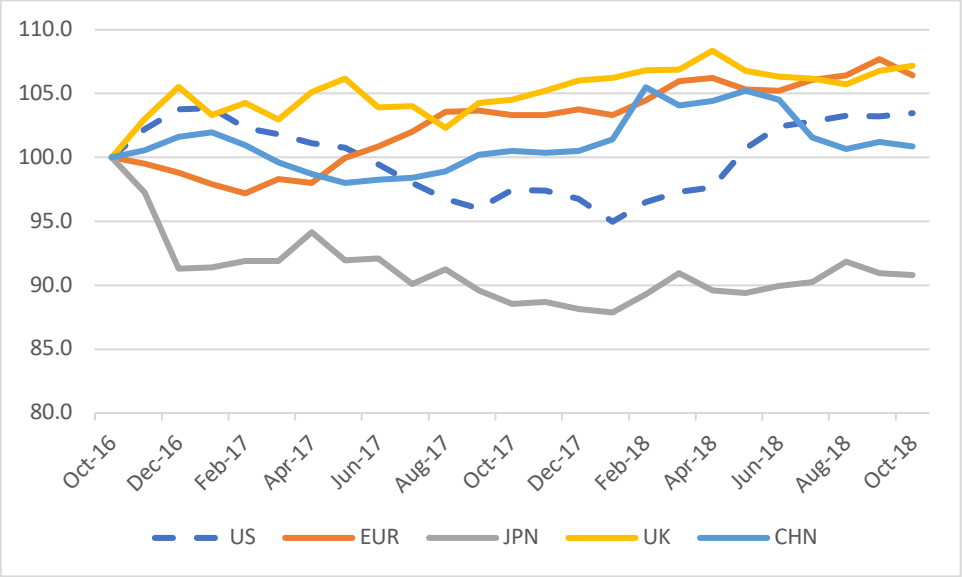
[6] Michael C. Bender, Rebecca Ballhaus, Peter Nicholas and Alex Leary, "Trump Steps Up Attack on Fed Chairman Jerome Powell," *Wall Street Journal*, October 24, 2018.

[7] The REERs are the broad real indexes calculated by the BIS (2018a). The REERs are shown converting all to October 2016 = 100. Note that the BIS REER for the dollar closely tracks that of the Federal Reserve (shown in Figure 1) until the first quarter of 2018, but thereafter diverges to about 2 percent higher than the Fed measure in May-August and about 3 percent higher in September-October. Note further that although the Chinese RMB has now been included in the IMF's Special Drawing Rights, world reserve holdings in Canadian dollars are slightly higher and holdings in Australian dollars are only slightly less (with all three in the range of US $180 billion to $200 billion, compared to $6.6 trillion in US dollars, $2.1 trillion euros, and about $500 billion each in yen and pounds sterling in June 2018; IMF, 2018e).

[8] Calculated from IMF (2018a, b).

[9] IMF (2018b) and Federal Reserve (2018c).

Figure 2
Real Effective Exchange Rates for the Key Reserve Currencies (October 2016 = 100)

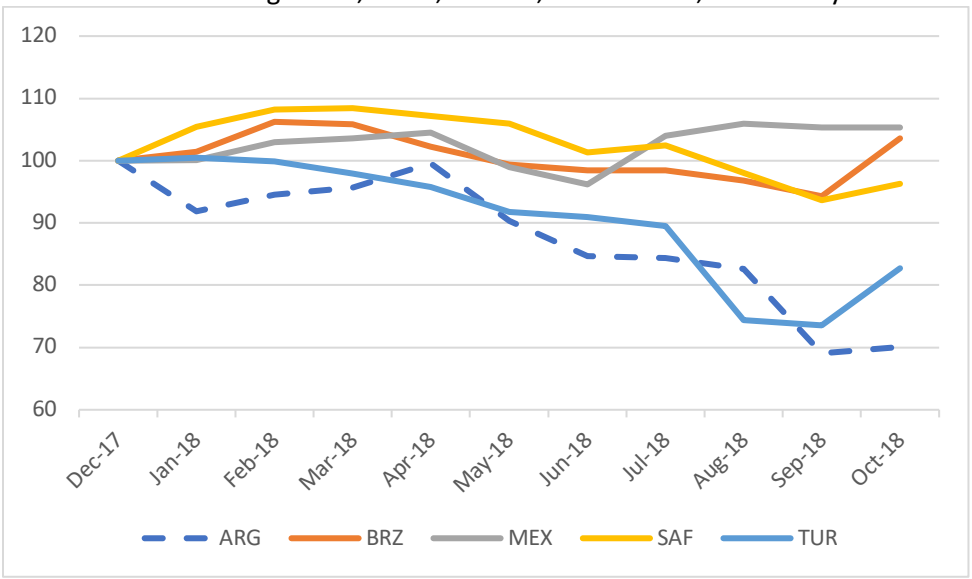


Source: BIS (2018a) and author's calculations

Vulnerable Emerging Market Currencies Decline

The surge in US interest rates in early 2018 did not cause a generalized repeat of the "taper tantrum" for emerging markets that occurred in May 2013 when then-Chairman of the Federal Reserve, Ben Bernanke, indicated that the Fed would begin to "taper" Quantitative Easing. This time steep currency declines were limited to a few particularly vulnerable economies. As shown in figure 3, these included Argentina, Turkey, and to a lesser degree, Brazil and South Africa.

Figure 3
REER for Argentina, Brazil, Mexico, South Africa, and Turkey



Source: BIS (2018a) and author's calculations

In ***Argentina***, the REER fell by 15 percent from April to June and a cumulative 34 percent by September, easing to 30 percent from a modest rebound in October. High inflation (25 percent in 2017), a high fiscal deficit (4.8 percent of GDP), and a large current account deficit (6.5 percent of GDP; IMF, 2018a) had made the economy vulnerable to a reversal in financial market conditions. The new Macri government had eliminated exchange controls at the end of 2015 and resolved the impasse with holdout creditors following the severe debt restructuring under the Peronist (Kirchner) governments. In 2017 the search for yield by international investors enabled the government to issue $2.75 billion in 100-year bonds.[10] But by the second quarter of 2018, in the face of new international financial pressures the central bank raised the policy interest rate (from 27 percent at the beginning of the year to 40 percent in May). With public debt back up to 57 percent of GDP in 2017 (from 33 percent when Macri took office), and with 70 percent of public debt in foreign currency, a rising debt burden from a falling currency represented a vulnerability for Argentina.[11]

Despite Argentina's turbulent past relationship with the International Monetary Fund and political unpopularity of the Fund in Argentina, in June the government reached agreement with the IMF on a $50 billion stabilization program. In August following a new round of contagion from Turkey, the peso fell again, and by September the central bank had raised the interest rate to 60 percent. In October the IMF agreed to a revised $57 billion program that accelerated disbursements and committed the government to cut its primary fiscal deficit to zero in 2019 (from 3.5 percent of GDP in 2018). The new program shifted monetary policy from inflation targeting to a monetary aggregate anchor (with a commitment to freeze the monetary base through June 2019), and adopted a wide exchange rate band (34 to 44 pesos per dollar, to be moved by 3 percent monthly). Necessary shock therapy had replaced gradualism, at the risk of political destabilization by the time of the October 2019 presidential election.[12]

In ***Turkey***, the lira fell from a plateau of about 3.8 per dollar in January-February to 4.8 in June-July and plunged to 7.1 in mid-August before recovering to an average of 5.8 in October.[13] Turkey too was vulnerable from relatively high inflation (11.9 percent in 2017) and a large current account deficit (5.5 percent of GDP), although its fiscal deficit was not high (2.3 percent of GDP in 2017; IMF, 2018a). Turkey's external debt of the private sector was relatively high, however, at 28 percent of GDP.[14] In June President Erdogan was re-elected to a new five-year term with increased presidential powers. He had criticized the central bank for raising interest rates to curb inflation, and his choice of his son as the new finance minister raised further market doubts about central bank independence.[15] The sharp additional decline of the currency in mid-August followed increased uncertainty associated with US imposition of financial sanctions against the Turkish ministers of justice and interior at the beginning of

[10] Pablo Rosendo Gonzalez, "Just 99 Years to Go as Argentine Century Bond Hits Record," *Bloomberg*, June 28, 2018.
[11] Maximiliano Rizzi, "How Argentina's sovereign debt could threaten Macri's program." *Reuters*, June 7, 2018.
[12] Daniel Politi, "Argentina Reaches $50 billion Financing Deal With I.M.F.", *New York Times*, June 7, 2018; Patrick Gillespie and Carolina Millan, "Argentina Boosts World's Highest Rates Amid Turkey Contagion," *Bloomberg*, August 13, 2018; IMF (2018c); BCRA (2018); Rafael Mathus Ruiz, "Arturo Porzecanski: 'La economía se va a reactivar en algún punto de 2019", *La Nacion*, October 1, 2018.
[13] IMF (2018b); Bloomberg; BIS (2018b).
[14] One report estimates foreign currency denominated debt of the private sector at $200 billion. "Turkey's ailing financial markets and foreign exposure." *Reuters*, June 22, 2018; IMF (2018a).
[15] "Turkish finance minister says he will not fight markets," *Reuters*, July 22, 2018.

August, over Turkey's refusal to release an imprisoned US pastor.[16] Contagion from Turkey affected not only Argentina but also ***South Africa***, where the principal imbalance was a sizable fiscal deficit (4.5 percent of GDP in 2017; IMF, 2018a).

In ***Brazil*** the REER fell by 11 percent from February to September. A high fiscal deficit at 7.8 percent of GDP in 2017 and political uncertainty from the 2018 elections made the economy vulnerable to pressure from higher US interest rates. However, financial markets warmed to presidential candidate Jair Bolsonaro, and with his strong lead in the initial vote in early October and his victory in the October 25 runoff, the REER for October rebounded to only 2 percent below its February level. One review observed that "Financial markets appear more than happy to overlook the authoritarian impulses and violent promises of Brazilian presidential candidate Jair Bolsonaro, hoping he will deliver decisive, pro-business economic policies."[17] One reason for the market optimism was that Bolsonaro's economic adviser, Chicago-trained Paulo Guedes, was a strong advocate of massive privatization, pension reform, and spending ceilings. Skeptical Brazilian economists have noted, however, that Brazil's new president may lack the political skills to obtain congressional support for reforms, and that his economic plans remained extremely vague.[18]

In ***Mexico***, the political agenda and trade negotiations added fluctuations to pressure from US interest rates. From its December 2017 level, the REER rose about 4 percent by March-April, then fell by 8 percent by June in the face of not only higher US interest rates but also growing concerns about delays in Nafta negotiations.[19] The REER then surged to a July-October plateau about 9 percent higher (and 5 percent above the December level), reflecting the decisive electoral victory by López Obrador at the beginning of July, followed by a US-Mexico (and eventually Canada) trade deal. But by the first half of November (not shown in the chart), the new president's decision to cancel the Mexico City airport project caused the rate to fall about 4 percent, back to about the same level at which it began the year.[20]

For other emerging market economies, from March to October real effective exchange rates either declined only modestly (by about 4 percent for *India*, 3 percent for *Indonesia* and *Chile*, and 2 percent for *Malaysia)* or rose (by about 2 percent for *Thailand* and 5 percent for the *Philippines*).[21] Overall the pattern was that the new environment of higher US interest rates caused currency shocks

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[16] Adam Goldman and Gardiner Harris, "US Imposes Sanctions on Turkish Officials Over Detained American Pastor," *New York Times*, August 1, 2018. The pastor was released by Turkey in mid-October. Carlotta Gall, "Turkey Frees Pastor Andrew Brunson, Easing Tensions with US," *New York Times*, October 12, 2018.

[17] Zaid Jilani and Lee Fang, "American Executives: Election of Far-right Jair Bolsonaro in Brazil is a 'Bullish Opportunity for Us'," *The Intercept*, October 25, 2018.

[18] Marcela Ayres, "O que pensa Paulo Guedes, o cérebro econômico de Jair Bolsonaro," *exame.abril.com.br*, August 31, 2018; Luciana Dyniewicz (interview with Paulo Leme), "Mercado erra ao subestimar riscos com Bolsonaro," *Estado de São Paulo*, October 4, 2018; Monica de Bolle, "A economia na escuridão," *www.fundacaoastrojildo.com.br,* October 10, 2018.

[19] Selcuk Gokoluk and Justin Villamil, "Mexican Peso Falls to Lowest in a Year as Nafta Seen Delayed." *Bloomberg*, June 5.

[20] Elisabeth Malkin, "Mexico's Incoming President Plans to Cancel Giant New Airport Project," *New York Times*, October 29, 2018. Although the decision raised fears the president would not respect investment agreements, it was consistent with his campaign pledges. The currency stabilized at about 20 per dollar in the first half of November after an abrupt decline triggered by the end-October announcement.

[21] Calculated from BIS (2018) as updated from September to October using Bloomberg, IMF (2018a) inflation, and SMIM model trade weights.

for countries vulnerable from fiscal and monetary imbalances rather than imposing indiscriminate collateral damage to emerging markets.

The US-China Trade (and Currency-Economic?) War

The prospect of escalation in the US-China trade war has become a major source of uncertainty for both countries as well as the world economy. By end-September the Trump administration had achieved a renegotiation transforming NAFTA into the US-Mexico-Canada Agreement (USMCA) – although the new deal will have to be passed by congress.[22] There had already been a late-July trade truce with the European Union, so the active theater in the administration's trade war shifted decisively to the China front.[23]

On June 15 the US announced tariffs of 25 percent on some 800 strategically important products amounting to $50 billion in annual imports from China. The action was based on trade law section 301 (unfair trade), and specifically charged that "China's government is aggressively working to undermine America's high-tech industries … through unfair trade practices and industrial policies like 'Made in China 2025' " (USTR, 2018). China announced it would retaliate with 25 percent tariffs on about 700 products representing $50 billion in imports from the US and notably including soybeans and autos.[24] Following up on his threat to impose further protection if China did retaliate, in mid-September Trump announced tariffs on additional goods amounting to $200 billion in annual imports from China. The rate was set at 10 percent and was to rise to 25 percent by January 1. Moreover, Trump stated he would place tariffs on the remaining imports of about $270 billion annually if China took further retaliation.[25] Whereas the first round of tariffs had focused on intermediate supply-chain products (with a surprisingly high fraction imported from US or other multinational affiliates in China), the larger second round was to cover a broad array of consumer goods.[26]

Back-of-the-envelope calculations suggest that the direct macroeconomic effects of a prolonged trade war with China would be negative but modest for the United States. However, adverse effects could be larger after taking account of the negative shock to China, to emerging markets exporting to

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[22] The new agreement boosts the North-American local content requirement for free entry of automobiles from 62.5 percent to 75 percent, with at least 40 percent required to come from factories paying an average wage of at least $16 per hour; reduces Canadian dairy protection; and retains the dispute resolution panel (which US negotiators had sought to eliminate) for Canada. Canada and Mexico are each guaranteed free entry of 2.6 million vehicles annually if the United States proceeds with national security tariffs against imported autos. Jim Tankersley, "Trump Just Ripped Up Nafta. Here's What's in the New Deal." *New York Times*, October 1, 2018.

[23] On June 1 the administration imposed tariffs of 25 percent on steel and 10 percent on aluminum, invoking a rarely used national security provision in US trade law (section 232). The tariffs excluded only Argentina and Australia for aluminum, and additionally Brazil and Korea for steel. (USCBP, 2018). The European Union retaliated in late June with targeted tariffs on such products as bourbon and Harley-Davidson motorcycles. Trump threatened counter-retaliation comprising a 25 percent tariff on auto imports from the EU. By late July a face-saving deal promising no new protection and future talks on eliminating non-auto industrial tariffs, plus an EU pledge to buy more US soybeans, provided at least a temporary trade truce. "The big lesson from Trump's truce on trade? Pushback works," *Washington Post* editorial board, July 26, 2018.

[24] David Lawder and Ben Blanchard, "Trump sets tariffs on $50 billion in Chinese goods; Beijing strikes back," *Reuters*, June 15, 2018.

[25] Jim Tankersley and Keith Bradsher, "Trump Hits China with Tariffs on $200 billion in Goods, Escalating Trade War," *New York Times*, September 17, 2018.

[26] PIIE (2018).

China, and to financial markets, as well as possible cutbacks in investment due to increased uncertainty. Over the medium term there would be ongoing efficiency losses from the disruption and replacement of supply chains.

In the 12 months October 2017 through September 2018, US imports of goods from China were $535.5 billion (FRED, 2018). One study estimates that 41.3 percent of US imports from China are dutiable, and the average tariff on these goods is 6.5 percent.[27] The average tariff is thus 2.7 percent. Raising the tariff by 25 percentage points on all goods would amount to a price boost of 24.3 percent, an incremental value of $130.4 billion.[28] This amount represents 0.64 percent of US GDP, so the price effect would be equivalent to a shock of 0.64 percent for all US prices. The Federal Reserve would likely treat part of the shock as a one-time event raising prices to a new plateau (or more likely a temporary, reversible shock) rather than higher ongoing inflation requiring tightening.[29] Suppose it treated one-half, however, as an acceleration in inflation, by 0.32 percentage point. By the Taylor rule, it would raise the real interest rate by 0.16 percent (and hence the nominal interest rate by 0.48 percent). A loose rule of thumb for macro models is that a 1 percentage point hike in the policy rate cuts real output by 1 percent. US output could thus fall 0.48 percent as a consequence of the China trade war. Increased output of import substitutes would moderate this fall, and shifting to non-Chinese imports could moderate the price shock. In the first instance, then, the consequence would not be massive, and not large enough to provoke recession.

The extra 25 percent tariff on all imports from China would cause some reduction in the trade deficit. Imports from China might fall by, say, 12 percent, (or $64 billion), reflecting a relatively low responsiveness of imports to price because of the large portion in the form of key supply-chain inputs to US manufacturing and retailing.[30] There would also be an induced reduction in all imports from the demand effect of the 0.48 percent decline in GDP. This import reduction might amount to a cut of 1 percent, or $30 billion, placing the total import reduction at $94.[31] Unemployment would likely rise by 0.25 percentage point, from 3.7 percent to nearly 4 percent.[32] It seems unlikely that the Trump administration could persuasively argue that the trade balance gains were a success when their collateral damage involved an increase in unemployment.

The impact on the economy could be more severe if trade-war uncertainty caused firms to cut back investment. Chicago Booth School economist Stephen Davis cites results of a survey by the Atlanta Federal Reserve in mid-July indicating that about 30 percent of manufacturers were already reconsidering investment plans as a consequence of "announced tariff hikes or concerns about

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[27] Drew DeSilver, "Despite talk of 'trade war' with China, highest U.S. tariffs are on imports from other Asian countries." Pew Research Center, April 5, 2018.

[28] That is: 25/102.7 = 0.243.

[29] The potential inflationary effect could be seen as partially moderated by the 7.5 percent real bilateral depreciation of the yuan against the dollar from the second quarter of 2018 to October, although the practice of invoicing these exports mainly in dollars would tend to reduce this influence.

[30] For final goods a more normal price elasticity for imports would be unity, such that the 24 percent price increase would cause a 24 percent reduction in import volume. The illustration here assumes a price elasticity of only 0.5.

[31] The cyclical elasticity of imports with respect to income is typically well above unity. The illustration here uses a cyclical income elasticity of 2. With the income decline at approximately 0.5 percent, the import decline is 1 percent. The import base for goods and services is approximately $3 trillion (BEA, 2018a).

[32] By Okun's Law, a decline of output by 1 percent is associated with an increase in unemployment by only 0.5 percentage point, as firms retain redundant labor to avoid rehiring costs. For an output decline of about 0.5 percent, the increase in the unemployment rate would be 0.25 percentage point.

retaliation".[33] Similarly, there is some risk that imposition of an incremental 25 percent tariff on all imports from China would trigger a significant decline in the US stock market, even though some calculations suggest a rather limited impact on corporate earnings.[34] Such effects could contribute to stagflation (sluggish growth with higher inflation), even if the Federal Reserve did not raise interest rates as much as a consequence. Already uncertainty from the pending trade war seems likely to have contributed to a risk-off decline in emerging market equities in September, and prospective effects on earnings of US companies relying on inputs from China may have contributed to the near-correction in the US stock market in October.[35]

Currency conflict could aggravate the trade war. Interest rate reductions by China to offset contractionary export losses would tend to weaken the renminbi.[36] The US Treasury Department appropriately declined to cite China as a currency manipulator in its semi-annual Foreign Exchange Report (Treasury, 2018). China did not meet the criterion of maintaining a current account surplus over 3 percent of GDP, nor the criterion of intervening to keep its currency from rising, although it resoundingly qualified under the third criterion – a bilateral goods surplus of more than $20 billion.[37] However, Treasury Secretary Steven Mnuchin indicated that the criteria might be changed.[38]

Some commentators have raised the specter of the trade war "nuclear option:" aggressive sales by China of its massive holdings of US dollar reserves.[39] The notion would be that China would try to impose economic pain on the United States by driving up US interest rates. However, the Federal Reserve could counter such a measure by purchasing Treasury obligations for its own account. Moreover, if China simply repurchased renminbi with the dollars sold, the effect would be to boost its currency, making its exports less competitive. In principle it could instead cut back its holdings of dollar reserves and increase holdings of euro, pound sterling, Japanese yen, and other-currency assets, but doing so would weaken the dollar against those currencies and improve US competitiveness.

The core argument in the US section 301 case against China is that "China's acts, policies and practices related to technology transfer, intellectual property, and innovation are unreasonable and discrimatory" (USTR, 2018). Importantly, there is no mention of the size of the bilateral trade imbalance

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[33] Steven J. Davis, "Trump's Trade Policy Uncertainty Deters Investment." *Econbrowser*, August 12, 2018. Available at: http://econbrowser.com/archives/2018/08/guest-contribution-trumps-trade-policy-uncertainty-deters-investment.

[34] A Barclay's estimate reportedly finds that a 25 percent tariff on all Chinese goods would cut projected increases in S&P500 earnings in 2019 from 10 percent to 7 percent. Al Root, "Trump's Trade War with China Is Starting to Hit Home for More Companies," *Barron's,* October 26, 2018. With stock market valuation at about 150 percent of GDP (FRED, 2018b) and assuming a propensity to consume out of wealth at 4 percent, if there were a sizable decline in the stock market, by say 15 percent, the reduction in consumption would amount to 0.9 percent of GDP.

[35] Sinéad Carew, "Trade war uncertainty drags on markets, world stock index down for 5th day," CNBC, September 6, 2018. From October 3 to October 26 the S&P500 index fell 9.7 percent and the Dow Jones index fell 8.9 percent. Yahoo Finance.

[36] "JP Morgan Now Expects Trump to Put Tariffs on Absolutely Everything China Sells to the U.S.," *Fortune*, October 1, 2019.

[37] Jason Furman, "Currency Manipulation Isn't Among China's Trade Sins," *Wall Street Journal*, October 15, 2018.

[38] Saleha Mohsin, "Mnuchin Open to Change in Currency Test as U.S. Spars with China," *Bloomberg*, October 21, 2018.

[39] Andrew Ross Sorkin, 'The Unknowable Fallout of China's Trade War Nuclear Option," *New York Times*, October 9, 2018.

in the US actions, in contrast to frequent rhetoric from the Trump administration implying that China must sharply reduce its bilateral surplus with the United States.[40] A shift in the trade war to a coordinated effort by the United States, European Union, and other major trading partners to obtain changes in China's practices in these areas (including on distortions associated with state enterprises) would be a far better outcome than a prolonged and escalating US-China trade war premised on US demands for a sharp reduction in China's bilateral surplus.[41]

Outlook for Current Accounts

The most recent World Economic Outlook (WEO) projections of the International Monetary Fund once again find relatively moderate external imbalances for most major economies. In broad terms, the extremely large international imbalances of the mid-2000s, driven by the large US deficits and large Chinese surpluses, are no longer present or on the horizon. There are the familiar exceptions of high excess surpluses for Singapore, Taiwan, and to a lesser extent Switzerland. Their medium-term (2023) surpluses stand at about 16 percent of GDP, 11 percent, and 6 percent, respectively.[42] Otherwise the major economies are within (or close to) the band of $\pm$ 3 percent of GDP, the benchmark for "equilibrium" in the FEERs estimates. Japan and Korea are significant exceptions, with medium-term surpluses at about 4 percent of GDP.

As shown in table 1, the medium-term current account balance for China is close to zero (0.2 percent of GDP), and the medium-term deficit of the United States is only slightly above the 3 percent target ceiling. The third column in the table shows the Fund's projections of the current accounts for 2023 for the 34 economies covered in the FEERs series.[43] The fourth column shows this projection after adjustment for the change in exchange rates from the base period of the IMF's estimates (second half of July and first half of August) to the base for this study (October).[44] The largest change in this period was a reduction of 1.3 percent of GDP in Argentina's projected current account deficit, reflecting a further depreciation of the REER by about 17 percent from the WEO base to October.[45] The IMF had already sharply reduced its estimate of Argentina's medium term deficit from 5.9 percent of GDP in its April issue of its WEO to 3.5 percent in its October issue (IMF, 2018a, d).

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[40] John W. Schoen, "Trump's demand that China cut its US trade deficit by $200 billion defies the laws of economics." CNBC, May 22, 2018.

[41] It should not be forgotten that in his presidential campaign Trump called for tariffs of 45 percent on Chinese goods, not 25 percent. See Peter Navarro, "Trump's 45% tariff on Chinese goods is perfectly calculated," *Los Angeles Times*, July 21, 2016. For approaches to a positive and negotiated outcome to the US-China trade war, see Bergsten (2018).

[42] As in previous recent issues in this series, the official Swiss statistics for the current account balance are adjusted downward by 3 percent of GDP to adjust for over-attribution to residents of capital income of multinationals headquartered in Switzerland.

[43] Note that the 34 economies account for 91.4 percent of 2018 world output at market exchange rates. Calculated from IMF (2018a).

[44] The adjustment applies the percent change in the real effective exchange rate (REER) over this 11-week period to the country's impact coefficient (γ), which is related to the share of exports in the economy (Cline, 2008). The adjustment dampens this estimated change by half, reflecting past tendencies of changing IMF forecasts as well as the consideration that the change may be only short-term.

[45] In this period the Argentine peso fell from about 29 per dollar to about 37 per dollar. High inflation (at a rate of 40 percent, year-end basis) moderated the corresponding decline of the REER. Calculated from IMF (2018a, b) and BIS (2018b).

Table 1: Target current accounts (CA) for 2023

		IMF Projections:		Adjusted	Target
	2018 CA	2023 GDP	2023 CA	2023 CA	2023 CA
Country	(percent of GDP)	(billions of US dollars)	(percent of GDP)	(percent of GDP)	(percent of GDP)
Pacific					
Australia	-2.8	1,794	-2.7	-2.4	-2.4
New Zealand	-3.6	272	-3.8	-3.7	-3.0
Asia					
China	0.7	19,581	0.1	0.1	0.1
Hong Kong	3.4	479	3.4	3.1	3.0
India	-3.0	4,330	-2.6	-2.0	-2.0
Indonesia	-2.4	1,446	-2.2	-1.7	-1.7
Japan	3.6	5,908	4.1	4.2	3.0
Korea	5.0	2,055	4.1	3.9	3.0
Malaysia	2.9	498	1.7	1.9	1.9
Philippines	-1.5	511	-1.3	-1.5	-1.5
Singapore	18.5	435	15.9	15.9	3.0
Taiwan	13.8	774	10.5	10.5	3.0
Thailand	9.1	652	4.2	3.6	3.0
Middle East/Africa					
Israel	2.3	469	2.9	2.8	2.8
Saudi Arabia	8.4	890	2.4	2.3	2.3
South Africa	-3.2	456	-3.6	-3.1	-3.0
Europe					
Czech Republic	-0.4	343	-1.9	-1.7	-1.7
Euro area	3.0	16,615	2.9	2.9	2.9
Hungary	2.3	205	1.0	1.0	1.0
Norway	7.8	504	7.1	7.0	7.0
Poland	-0.8	788	-1.5	-1.4	-1.4
Russia	6.2	1,818	3.4	3.8	3.8
Sweden	2.6	669	3.0	3.0	3.0
Switzerland	10.2	874	9.3	6.2	3.0
Turkey	-5.7	958	-2.4	-2.5	-2.5
United Kingdom	-3.5	3,257	-2.9	-3.0	-3.0
Western Hemisphere					
Argentina	-3.7	541	-3.5	-2.2	-2.2
Brazil	-1.3	2,351	-1.9	-2.3	-2.3
Canada	-3.0	2,322	-2.1	-2.3	-2.3
Chile	-2.5	378	-1.8	-1.4	-1.4
Colombia	-2.4	423	-2.4	-2.0	-2.0
Mexico	-1.3	1,527	-1.6	-1.6	-1.6
United States	-2.5	24,671	-3.3	-3.2	-3.0
Venezuela	6.1	68	0.0	-0.1	-0.1

Source: IMF (2018a); author's calculations

For the important case of the United States, it warrants remark that the Fund's medium-term (5 year) forecast of the current account deficit rose from 2.5 percent of GDP in the October 2017 WEO to 3.3 percent of GDP in the October 2018 issue (IMF, 2017; 2018a). The REER for dollar rose by 4.2 percent between the two corresponding base periods, implying a change broadly consistent with the impact parameter used in the SMIM model of the present study.[46] The most recent data for the US current account suggest that the actual 2018 deficit may be slightly lower than forecast by the Fund, suggesting that its medium-term forecast may not be understating the deficit.[47]

For the euro area, the Fund's 5-year forecast continues the plateau of a current account surplus of about 3 percent of GDP that has been maintained for the five years after the euro area debt crisis (3.2 percent in 2014-18). This level contrasts sharply with the average of -0.5 percent for the period 2006-08 (IMF, 2018a). Adjustment to the euro area debt-crisis caused the combined current account balances of the five countries most affected (Greece, Ireland, Portugal, Italy, and Spain) to swing from an average deficit amounting to 2.1 percent of *total* euro-area GDP in 2006-08 to a surplus of 0.6 percent of total euro area GDP in 2014-18 (IMF, 2018a), accounting for the bulk of the rise in the euro area balance. Going forward, the continuing gap of about six percentage points of GDP between the recent and prospective deficits of the US and surpluses of the Euro area does not primarily reflect an assumption of low growth and hence sluggish import demand in the Euro area. The IMF projects average growth in 2018-23 at 1.66 percent annually for the Euro area, relatively close to the projected average of 1.97 percent for the United States despite the greater demographic drag in Europe.

The FEERs analysis assumes that over the 5-year horizon, short-term departures from fundamental balance in domestic macroeconomic conditions will be eliminated. Hence, if an unacceptably large external imbalance remains despite the presence of domestic macroeconomic balance, there is a need for correction in the exchange rate. A reasonable question, however, is whether there will be domestic macroeconomic balance even in the medium term. On the basis of the WEO projections, this question seems most relevant for the case of the United States. The Fund projects that in 2023, the US output gap will have only partially corrected, from +1.1 percent of GDP (excess demand) in 2018 and +1.6 percent in 2019 to +0.9 percent in 2023 (IMF, 2018a). Its fiscal projections also suggest persistence of imbalance. The general government structural fiscal balance stands at -5.1 percent of GDP in 2018 and an average of -5.5 percent in 2019-22, before easing to -4.8 percent in 2023. With structural deficits larger than nominal GDP growth (around 4 percent, half real and half inflation), the ratio of debt to GDP is rising. The implication is that even by 2023 there would be a need for further fiscal adjustment to curb excess demand and stabilize or reduce the ratio of debt to GDP.

In contrast, the medium-term domestic imbalances projected for Japan and the euro area are considerably smaller and consistent with domestic equilibrium.[48] For the analysis that follows, the

[46] July-August averages for 2017 and 2018 respectively; Federal Reserve (2018a), broad real exchange rate. The SMIM impact parameter for the United States is an increase in the current account deficit by 0.165 percent of GDP for a 1 percent rise in the REER.

[47] Goods and services (including income) exports rose by 9.8 percent from the first half of 2017 to the first half of 2018, while goods and services imports rose 8.3 percent. If this same rate persists for the second half, the full-year deficit would be only 2.1 percent of GDP, compared to the Fund's projection of 2.5 percent. Calculated from BEA (2018a, b).

[48] For 2023 the output gap is projected at zero for Japan and +0.4 percent of potential GDP for the euro area. The structural fiscal gap is projected at -2.0 percent of GDP in 2023 for Japan and -1.0 percent for the euro area in 2019 (the most distant year with a forecast).

implication is that if medium-term domestic balance were achieved in the United States, any needed depreciation of the REER to achieve external balance would be *smaller* than calculated here, because lesser demand pressure would ease the external deficit.

Estimates of FEERs

The final column of table 1 indicates the "target" current account for 2023, which is set at the limit of ±3 percent of GDP if the (adjusted) projection lies outside this range, but otherwise set equal to the projected level. Except for the four oil-exporting economies (Norway, Russia, Saudi Arabia and Venezuela), calculation of the FEER is based on the change in the REER needed to bring the economy back to the acceptable limit for the current account imbalance. (Oil economies are treated as exempt from surplus ceilings because they are converting natural resource assets into financial assets when they export oil.) For Japan, for example, the adjusted 2023 projection stands at a surplus of 4.16 percent of GDP. To curb the surplus to the limit of 3 percent of GDP, the analysis applies the country-specific current account impact parameter. For Japan, this parameter is -0.1623, indicating that an appreciation of 1 percent in the REER reduces the surplus by 0.1623 percent of GDP. The target change of a reduction of 1.16 percent of GDP for Japan's current account surplus implies an appreciation of the REER by 7.1 percent.[49]

The first column of table 2 shows the target change in the medium-term current account balance for each of the economies. For 24 of the 34 economies, this target change is zero. There are seven economies with a needed surplus reduction (Hong Kong, Japan, Korea, Singapore, Taiwan, Thailand, Switzerland) but only three with needed increases in balances from excessive deficit (New Zealand, South Africa, United States). Moreover, the needed surplus reductions tend to be much larger than the needed balance increases. This asymmetry means that in the global adding up process, the SMIM model simulation yields smaller surplus reductions than desired for the excess surplus economies, and imposes larger increases in balances than targeted for not only the three excess deficit countries but also for all of the economies with no change needed at all. As shown in column 2 of the table, these "bystander" increases in current accounts are typically in the range of 0.2 to 0.4 percent of GDP (for example, 0.3 percent for India and Indonesia).

The third column of table 2 translates the target change in current account into the change needed in the country's REER, based on the country's current account impact parameter. The fourth column shows the corresponding REER change achieved in the globally-consistent simulation. For the United States, the REER change needed to achieve the small targeted reduction in the current account deficit (from 3.2 percent of GDP to 3.0 percent) is a small depreciation of 1.5 percent. However, the asymmetry phenomenon boosts the simulation result to a REER depreciation of 3.2 percent. For China and the euro area, where no change in the REER is needed at all for the zero target change, the simulation result yields REER depreciations of 1.3 percent and 1.6 percent, respectively.

[49] That is: -1.16/(-0.1623) = 7.147.

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	Oct 2018	Percentage Change	
Pacific							
Australia*	0.0	0.2	0.0	-1.3	0.71	4.0	0.74
New Zealand*	0.7	0.9	-2.6	-3.7	0.65	0.8	0.66
Asia							
China	0.0	0.3	0.0	-1.3	6.92	3.2	6.71
Hong Kong	-0.1	0.2	0.3	-0.5	7.84	4.9	7.47
India	0.0	0.3	0.0	-1.3	73.6	2.3	72.0
Indonesia	0.0	0.3	0.0	-1.2	15177	6.3	14285
Japan	-1.2	-1.0	7.1	6.0	113	10.1	102
Korea	-0.9	-0.5	2.2	1.2	1133	5.7	1072
Malaysia	0.0	0.6	0.0	-1.3	4.16	6.7	3.90
Philippines	0.0	0.3	0.0	-1.1	53.9	5.9	51.0
Singapore	-12.9	-12.2	25.8	24.4	1.38	29.4	1.07
Taiwan	-7.5	-7.1	17.4	16.3	30.9	21.1	25.5
Thailand	-0.6	-0.1	1.3	0.1	32.8	5.6	31.1
Middle East/Africa							
Israel	0.0	0.2	0.0	-0.9	3.66	1.9	3.59
Saudi Arabia	0.0	0.4	0.0	-0.9	3.75	3.7	3.62
South Africa	0.1	0.3	-0.2	-1.0	14.55	2.2	14.23
Europe							
Czech Republic	0.0	0.3	0.0	-0.7	22.5	1.1	22.3
Euro area*	0.0	0.4	0.0	-1.6	1.15	1.3	1.16
Hungary	0.0	0.3	0.0	-0.6	282	1.1	279
Norway	0.0	0.3	0.0	-0.8	8.27	1.2	8.17
Poland	0.0	0.3	0.0	-0.8	3.75	0.9	3.72
Russia	0.0	0.2	0.0	-0.8	65.8	1.9	64.7
Sweden	0.0	0.3	0.1	-0.9	9.05	0.9	8.97
Switzerland	-3.2	-2.9	7.1	6.5	0.99	8.7	0.92
Turkey	0.0	0.2	0.0	-0.8	5.83	1.5	5.72
United Kingdom*	0.0	0.3	-0.2	-1.0	1.30	1.3	1.32
Western Hemisphere							
Argentina	0.0	0.2	0.0	-1.4	37.3	0.8	36.62
Brazil	0.0	0.2	0.0	-1.5	3.75	1.2	3.71
Canada	0.0	0.1	0.0	-0.5	1.30	0.7	1.29
Chile	0.0	0.3	0.0	-1.1	677	1.8	668
Colombia	0.0	0.2	0.0	-1.1	3081	0.9	3073
Mexico	0.0	0.2	0.0	-0.5	19.2	0.9	19.1
United States	0.2	0.5	-1.5	-3.2	1.00	0.0	1.00
Venezuela	0.0	0.2	0.0	-1.1	63.1	1.8	62.0

FEER: fundamental equilibrium exchange rate REER: real effective exchange rate

* The currencies of these countries are in dollars per currency. All others are in currency per dollar.

Source: Federal Reserve (2018c), BIS (2018b), and author's calculations

As shown in the table, the largest REER appreciations needed in the simulation results amount to about 24 percent for Singapore, 16 percent for Taiwan, 6 percent for Japan, and 6 percent for Switzerland. Although Korea's target for current account adjustment is about the same as that for Japan (about 1 percent of GDP), the result for its REER appreciation is only 1.2 percent, reflecting a higher current account impact parameter as well as the general simulation effect of undershooting the target appreciation for the excess-surplus economies.[50]

The US Treasury (2018) included both Japan and Korea in its list of major trading partners on its Monitoring List warranting "close attention to their currency practices and macroeconomic policies" (p. 5). It noted that although Japan had not intervened in the foreign exchange market for almost seven years, its current account surplus of 4 percent of GDP was close to the highest level in a decade. The report urged Japan to carry out structural reforms that would sustain faster domestic growth, helping reduce the public debt burden and trade imbalances. For Korea, the report judged that the economy had maintained an excessively strong external position for many years, but noted some moderation recently. The report noted that a 7 percent appreciation against the dollar in the second half of 2017 had been largely reversed in 2018. Citing the IMF's view that Korea's external surplus is larger than justified by medium-term fundamentals, it urged Korean authorities to increase efforts, including in fiscal policy, to boost demand growth.

Only two countries show more than marginal REER depreciations in the simulation result: the United States (-3.2 percent change in the REER) and New Zealand (-3.7 percent). In both cases there is a considerable component of depreciation induced by the overall depreciation overshooting in the globally-consistent result (contributing 1.7 percentage point to the needed US depreciation and 1.1 percentage point to that for New Zealand).

The final three columns of table 2 show implications of the needed realignments for bilateral exchange rates against the dollar. The first of these columns shows actual average exchange rates against the dollar for the month of October 2018.[51] The penultimate column shows the percentage change in the country's bilateral rate against the dollar in the model solution, corresponding to the change of the REER in the simulation (fourth column). The final column applies this percent change to the actual October rate to arrive at the FEER-consistent bilateral exchange rate against the dollar. The resulting rates for key currencies stand at targets of 102 yen per dollar, 1072 Korean won per dollar, 1.16 dollars per euro, and 6.71 renminbi per dollar.

Figure 4 summarizes the results of the FEERs calculations by showing for each country the percent change in the REER and in the bilateral exchange rate against the dollar, in the model simulation. The two changes tend to be close together for countries trading heavily with the United States, especially Canada and Mexico and also most of the Latin American economies. In contrast, given the large real appreciations called for in the cases of Singapore and Taiwan, as well as the 6 percent rise in the REER for Japan, Asian economies with larger trading shares with these economies tend to need a larger gap between the rise in their currencies bilaterally against the dollar and the behavior of their exchange rates on a trade-weighted basis.

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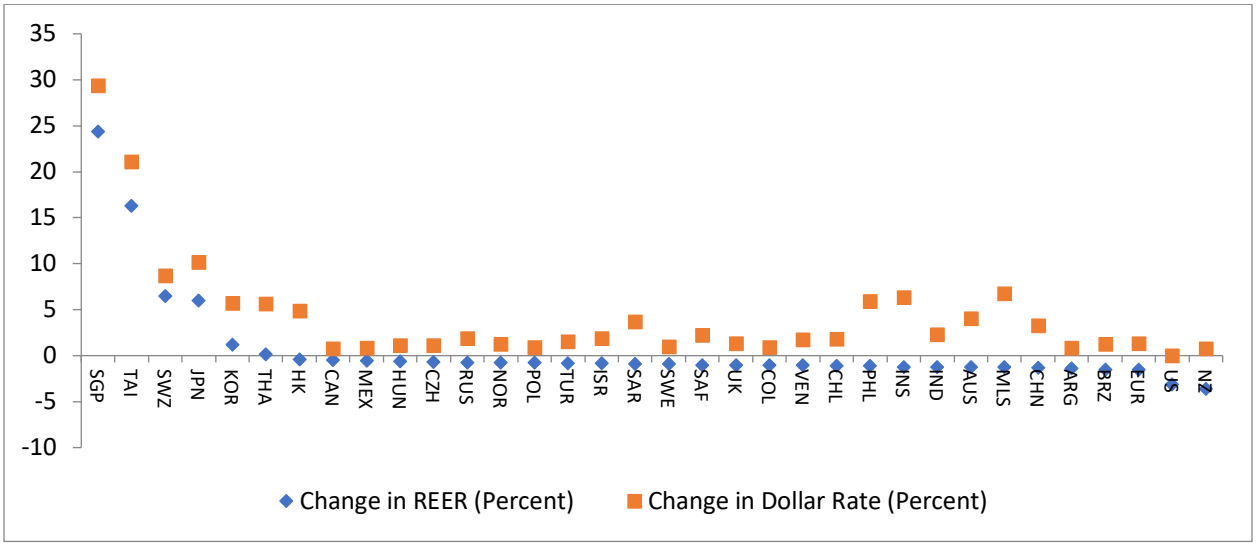
[50] For Korea, the impact parameter is -0.4, reflecting the high share of exports in the economy, yielding a target REER appreciation of only 2.4 percent. The generalized simulation curb for depreciation by surplus countries cuts the appreciation to only 1.4 percent.

[51] From Federal Reserve (2018c) and BIS (2018b).

Figure 4
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, INS = 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

Source: Author's calculations.

Conclusion

After rising by about 5 percent in real trade-weighted terms from its January 2018 low, the US dollar is slightly overvalued, as Its medium-term current account deficit slightly exceeds the 3 percent of GDP limit permitted in the FEERs calculations. There continue to be large under-valuations of the currencies of the chronic-surplus economies Singapore, Taiwan, and (to a lesser extent) Switzerland, the only other misalignments among the 34 economies considered are under-valuations of the Japanese yen and Korean won and modest overvaluation of the New Zealand dollar. China's currency is not undervalued, even though it fell against the dollar by about 9 percent from February to October. China's external surplus is less than 1 percent of GDP, and it is projected at close to zero by 2023, so it is no longer the major source of international imbalances that it was in 2007 when its surplus reached 10 percent of GDP. Nor has China been intervening in exchange markets to prevent appreciation. Pressure on emerging market exchange rates this year in the face of rising US interest rates has been more discriminating than in the 2013 "taper tantrum," and has been concentrated on economies with large external or fiscal imbalances, as illustrated by major depreciations in Argentina, Turkey, and to a lesser extent Brazil and South Africa. High foreign currency debt was also a source of vulnerability in Argentina (public) and Turkey (private). The severe depreciation of the Argentine peso has eliminated the significant overvaluation present a year ago.

The escalating US-China trade war represents a major risk to the international economy. Imposing a 25 percent tariff on all imports from China would cause a direct price shock of about 0.6 percent for the full US economy. Although this impact would be unlikely to be large enough to provoke a recession, indirect effects from slower growth in China and in emerging markets, and from a reduction in earnings of US firms relying on imports from China, would aggravate the negative impact. Disruption of supply chains would reduce efficiency. A further decline in the renminbi as a consequence of Chinese monetary ease to address contractionary effects of the trade war could heighten US-China tensions even if such a decline were not caused by intervention.

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