

Appendix: Analysis of Exchange Rates Pursuant to the Act

Introduction

Although reaching judgments about “whether countries manipulate the rate of exchange between their currency and the United States dollar for purposes of preventing effective balance of payments adjustments or gaining unfair competitive advantage in international trade” is inherently complex, there are several indicators that can provide helpful information in considering this question. However, no single indicator, or set of indicators, in and of itself, can establish that a specific economy has met the technical requirements for designation under the Act, and the context in which these questions are assessed varies with individual country circumstances.

Some of the most important indicators, *inter alia*, are: (1) trade and current account balances; (2) protracted large-scale intervention in one direction; (3) rapid foreign exchange reserve accumulation; (4) capital controls and payments restrictions; (5) measures of undervaluation and real effective exchange rate movements; and (6) unusually heavy reliance on net exports for growth. These indicators affect one another, jointly reflecting the complex interactions in modern economies.

Description of Indicators

Trade and Current Account Balances – The current account balance reflects an economy’s excess of saving over investment; it can be measured as the net transactions on trade in goods and services (normally the largest component), plus net balances on income and transfer flows; it is also mirrored in capital and financial account inflows or outflows (including changes in foreign exchange reserves). Trade and financial flows will be affected by a number of factors that influence costs and prices in one economy relative to those of its trading partners – for example, exchange rate movements, growth in productivity, relative inflation rates and relative monetary conditions – as well as by cyclical forces such as an economy’s growth relative to that of its major trading partners. The mere existence of a large global current account surplus does not mean that an economy meets the requirements for designation under terms of the Act.

Bilateral trade balances reflect unique patterns of demand or comparative advantage among countries and are therefore limited in their ability to help explain exchange rate movements. For example, it is quite understandable that the United States would have a large bilateral deficit with a country that is a major oil exporter. At the same time, in a multilateral trading system, an economy’s bilateral deficit with one economy can be offset by a bilateral surplus with another.

Protracted Large-Scale Intervention in One Direction – Protracted large-scale intervention in one direction could reflect an effort by an economy’s authorities to maintain a given exchange rate level in the face of market pressure for the purposes of preventing effective balance of payments adjustment or gaining unfair advantage in international trade. Intervention can, however, be carried out for a number of purposes. IMF surveillance procedures, for example, provide that members should intervene in the exchange market if necessary to counter disorderly market conditions. In addition, countries may intervene in order to build reserves to meet

external debt payments and establish a buffer against shocks. Evidence shows that the effectiveness of intervention in influencing the behavior of the exchange rate of a country with open capital markets is, at best, short lived, especially if such intervention is “sterilized.”

Rapid Foreign Exchange Reserve Accumulation – When a country’s financial authorities purchase foreign exchange, that country’s reserve holdings typically rise. There are many reasons why a country might wish to increase its reserves. A country may, for example, wish to accumulate reserves as insurance against sudden reversal of capital flows or the development of disorderly foreign exchange markets. It may need to repay debt. Some commodity producing countries, which see rapid gains in export earnings due to a rise in commodity prices, choose to save a portion of their currency earnings in order to build stabilization funds. Monetary authorities may intervene in the foreign exchange market, or maintain a fixed exchange rate, if the foreign exchange rate plays an important role in a monetary policy designed to achieve price stability.

The adoption of a fixed exchange rate is often appropriate for small and highly open economies, where the domestic price level is largely determined by international prices, and therefore changes in the foreign exchange rate lead directly to corresponding changes in the domestic price level. Avoiding an exchange rate appreciation may be particularly important for economies that are trying to avoid or escape from deflation. In this instance, the accumulation of foreign exchange reserves may be both a way of preventing exchange rate appreciation, which would exacerbate downward pressure on prices, and a tool for increasing the domestic money supply. Exchange rate policy in this event is effectively part of domestic anti-deflation policy. In these cases it would be difficult to construe the reserve accumulation by such economies necessarily as attempts to “manipulate the rate of exchange between their currency and the United States dollar for purposes of preventing effective balance of payments adjustments or gaining unfair competitive advantage in international trade.” There is no universally agreed optimum level of reserves.^{1,2}

Capital Controls and Payments Restrictions – Capital controls also warrant attention in making assessments. Capital controls can be applied to inflows (limiting upward pressure on domestic currency) or outflows (limiting downward pressure on domestic currency). Some countries have used controls on inflows out of concern that large, short-term portfolio investment from major financial centers could suddenly reverse – disrupting small domestic capital markets. Capital controls prevent capital from flowing to its most productive uses and can impose severe inefficiencies on an economy.

¹ Several rules of thumb have been used over the years to measure reserve adequacy, particularly for developing and emerging market economies. At a time when reserves were seen as buffers against shocks to the trade accounts, it was proposed that reserves should be at least equal to three months imports. Following crises in several emerging market economies in the late 1990’s, it was proposed that reserve holdings should be equal to short-term external debt outstanding (residual maturity basis).

² The ratio of reserves to short-term liabilities of the banking system, such as M2 or M3, has been used, similar to the ratio of reserves to short-term debt, as an indicator of reserve adequacy to reduce economies’ vulnerabilities to external shocks. Changes in this ratio may provide some information, as well, on the degree to which changes in reserves are sterilized.

Payments restrictions limit the use of foreign currency to buy goods and services and can be very distortionary. The IMF severely discourages restrictions on current international transactions.³ Countries that do not impose restrictions on current international transactions are deemed to meet their obligations under Article VIII of the Fund's Articles of Agreement.

Measures of Undervaluation – A large “undervaluation” of a market exchange rate may exist relative to a medium- or long-run “equilibrium exchange rate.” Such an equilibrium exchange rate is typically estimated as the level of a real effective exchange rate implied by medium- or long-term equilibrium conditions in a specific model. Current movements of real effective exchange rates, reflecting changes in both nominal exchange rates and prices in major trading partners, are consequently critical to interpreting the state of ongoing adjustment.

These models can provide valuable insights; however, these calculations need to be interpreted with caution since they are derived on the basis of numerous difficult and highly technical assumptions, and different models can focus on different features of an economy and produce very different results.⁴ A recent IMF staff paper and an April GAO report examined a number of different estimates of the deviation of China's real exchange rate from its estimated equilibrium value and found very wide variation in the results. The IMF staff study notes that data problems are substantial; it may take some time for key underlying relationships to stabilize sufficiently to estimate relevant relationships with confidence; and even when stable the complexity of these relationships may make accurately explaining movements in exchange rates an elusive objective.

Also, a currency may deviate substantially from its “equilibrium exchange rate” for a number of reasons; for example, the deviation could reflect supply and demand conditions in the marketplace (e.g., a currency could depreciate rapidly relative to its “equilibrium” value if confidence were lost in that country's economic policy management). Further, a “misalignment” might reflect, for example, problems with the model's description of market reaction to the fundamental macroeconomic policy mix.

An unusually heavy reliance on the export sector for growth may provide an incentive to prevent balance of payments adjustment. This could, for example, be seen a critical offset to an economy's weak domestic investment incentives. At the same time there are many conditions that naturally produce high export sector growth relative to the rest of an economy. For example, there may be extraordinary productivity gains concentrated in the external sector or the development of new resource deposits.

³ Section 2 of the Article VIII of the IMF's Articles of Agreement states that each member undertakes the obligation of “avoidance of restrictions on current payments.”

⁴ Dunaway, Steven and Li, Xiangming, “Estimating China's ‘Equilibrium’ Real Exchange Rate, IMF Working Paper October 2005; and Table 2 of the General Accounting Office's report, “Treasury Assessments Have Not Found Currency Manipulation, but Concerns about Exchange Rates Continue”. The IMF staff report can be found at <http://www.imf.org/external/pubs/cat/longres.cfm?sk=18614.0> and the GAO report at www.gao.gov/cgi-bin/getrpt?GAO-05-351.

Analysis of Indicators

In considering the question of designating countries pursuant to the terms of the Act, a range of indicators needs to be assessed. One indicator, in and of itself, does not provide meaningful information. Rather, the pattern of indicators typically provides more useful information. For example, a country with a large current account surplus would be viewed one way if the country also had a large reserve buildup and a depreciating exchange rate and viewed another way if its reserves were falling and the exchange rate were appreciating. Patterns of movements of indicators must, however, be examined in terms of the specific country and the global economic environment.

The complexity of the analysis can be seen, in part, in the following table of important numerical indicators. Countries in this table were selected to provide a cross section of significant major economies, without creating an unwieldy list. Periods were chosen that would yield data for the full set of countries.⁵ Although more recent data for some countries may differ in significant respects from those in the table, it is important for the illustrative purposes of the table to use a full data set.

Table 1⁶

	Current Account Balance		Foreign Exchange Reserves			Real Effective Exchange Rate (% appreciation over period) Jan02-Sep05	External Sector Contribution to Growth Rate (Average %) 2002-2004	Relative Dependence of GDP Growth on External Sector (Average %) 2002-2004
	Level (%GDP) 2004	Change over period (%GDP) 2001-2004	Ratio to 2004 GDP (%) June 2005	Ratio to short-term external debt (%) June 2005	Change in reserves (%) June04 to June05			
Singapore	26.1	7.3	107.7	131.0	13.8	17.8	4.2	4.1
Saudi Arabia	20.5	15.4	8.0	142.5	12.4	-19.9	0.7	-2.9
Switzerland	14.6	6.6	9.8	9.1	-22.9	-3.8	0.4	0.3
Norway	13.5	-2.0	18.1	48.9	14.9	16.0	-0.9	-3.2
Malaysia	12.7	4.5	62.6	366.9	40.9	-13.3	-0.6	-6.8
Venezuela	12.7	11.1	20.7	607.2	29.0	-11.6	0.3	0.8
Russia	10.3	-1.0	25.2	402.0	75.0	20.9	-0.2	-6.8
Sweden	8.2	4.0	5.8	11.0	11.0	-0.2	1.3	0.4
Taiwan	5.8	-0.5	82.9	689.4	10.2	-6.0	1.9	-0.6
Korea	4.1	2.4	30.0	291.8	22.9	16.9	1.9	-1.1
Thailand	4.0	-1.3	28.7	387.4	11.6	4.0	0.2	-5.7
China	4.0	2.5	41.3	1242.9	51.1	-4.3	0.6	-7.9
Germany	3.8	3.6	na	na	na	na	0.7	1.0
Japan	3.7	1.6	17.7	231.7	3.3	-6.5	0.7	0.1
Canada	2.2	0.0	3.2	23.3	1.0	20.0	-1.1	-5.0
Euro Area	0.6	0.6	1.8	5.1	-3.4	18.5	0.1	-1.1
India	0.0	-0.3	21.2	511.7	15.9	1.9	0.2	-6.1
Mexico	-0.3	0.4	9.5	287.1	8.5	-3.9	0.3	-1.6
United Kingdom	-2.0	0.2	1.8	2.0	9.6	-0.6	-0.7	-4.0
Turkey	-5.2	-7.5	13.4	119.4	18.4	15.2	-3.0	-13.5
Spain	-5.3	-1.4	na	na	na	na	-1.2	-5.3
United States	-5.7	-1.8	0.3	2.8	0.4	-18.3	-0.6	-4.1
Australia	-6.4	-4.1	6.5	28.3	26.8	40.0	-2.4	-8.4
Portugal	-7.5	2.8	na	na	na	na	0.4	0.7

As noted, reaching a judgment about what constitutes grounds for designation pursuant to the

⁵ For example, China and Saudi Arabia provide expenditure-based GDP series only on an annual basis.

⁶ The "Contribution to Growth of the External Sector" is calculated as the annual change in real net exports (in the National Income and Product Accounts) as a percent of real gross domestic product. The "Relative Dependence of GDP Growth on the External Sector" is measured as the external sector's contribution to GDP growth minus the contribution of the growth in domestic demand. This dependency measure reflects the view that a country will be generally more concerned about the contribution of the external sector to GDP growth if the contribution of the domestic sector to GDP growth is relatively small. For example, Singapore's export sector contributed 4.1 percent to GDP growth in 2004 while domestic demand contributed only 0.1 percent. China's export sector, on the other hand, contributed only 0.6 percent to GDP growth in 2004 while domestic demand contributed 8.5 percent. Turkey's external sector subtracted 3.0 percent from GDP growth in 2004 while domestic demand contributed 10.5 percent. The "Real Effective Exchange Rate" is J.P. Morgan's Broad Real Effective Exchange Rate Index.

Act is complex and cannot be based on single indicators. Moreover, it is inherently subjective. There is no mechanistic or formulaic approach to rendering such assessments. That said, it may help, in considering these questions, to summarize different patterns by constructing simple weighted indices of indicators. For example, various indicators in Table 1 were assigned qualitative values of low, medium, or high (numerically 0, 1, or 2) and indexes were constructed using alternative weighting schemes. Obviously, the potential number of weighting schemes is enormous. But for illustrative purposes, three schemes are set forth⁷:

- One weighting scheme concentrated on changes in the current account, foreign exchange reserves and real effective exchange rates, assigning each a 1/3 weight.
- Another concentrated on current account balances, changes in current account balances and relative dependence of GDP growth on the external sector, assigning each a 1/3 weight.
- A third scheme weighted many factors in Table 1 equally.

The three weighting schemes yielded the following rankings:

Scheme I	Scheme II	Scheme III
Saudi Arabia 1.7	Venezuela 1.8	Singapore 2.0
Malaysia 1.7	Saudi Arabia 1.6	Switzerland 2.0
Venezuela 1.7	Singapore 1.4	Venezuela 2.0
China 1.3	Switzerland 1.4	Saudi Arabia 1.7
Japan 1.3	Malaysia 1.4	Sweden 1.7
Singapore 1.0	Sweden 1.4	Germany 1.3
Switzerland 1.0	Japan 1.4	Japan 1.3
Sweden 1.0	Taiwan 1.2	Norway 1.0
Taiwan 1.0	China 1.0	Malaysia 1.0
Mexico 1.0	Norway 0.8	Taiwan 1.0
United Kingdom 1.0	Russia 0.8	Korea 1.0
Russia 0.7	Korea 0.8	Euro Area 1.0
Korea 0.7	Germany 0.8	Portugal 1.0
Thailand 0.7	Mexico 0.8	Russia 0.7
India 0.7	United Kingdom 0.8	China 0.7
Norway 0.3	Thailand 0.6	Canada 0.7
Germany 0.3	Canada 0.6	Mexico 0.7
Canada 0.3	Euro Area 0.6	United Kingdom 0.7
Euro Area 0.3	India 0.6	Thailand 0.3
Turkey 0.3	Portugal 0.6	India 0.3
Australia 0.3	Turkey 0.2	Turkey 0.0
Portugal 0.3	Australia 0.2	Spain 0.0
Spain 0.0	Spain 0.0	Australia 0.0

A number of conclusions can be derived from Table 1 and the weighting schemes.

- Several oil producing economies score high across the board on the various weighting schemes. These results reflect these economies' recent experiencing large current account surpluses and reserve accumulations, while maintaining relatively fixed exchange arrangements and witnessing real effective depreciation. For example, Saudi Arabia ran a current account surplus in 2004 of over \$50 billion, or more than 20 percent of GDP. Russia ran a current account surplus of nearly \$60 billion, or greater than 10 percent of GDP, while reserves rose 75%. This is the expected result of rapidly increasing oil prices and limited short-term absorptive capacity of a number of oil exporters. The reserve increases in oil

⁷ Scheme I assigns weights of 33 1/3 % to each of: change in the current account balance, change in reserves, and change in the real effective exchange rate.

Scheme II assigns weights of 20% to each of: current account level, change in the current account, change in reserves, change in the real effective exchange rate, and relative dependence of GDP growth on the external sector.

Scheme III assigns weights of 33 1/3 % to each of: current account balance, change in the current account balance and relative dependence of GDP growth on the external sector.

producing economies in certain respects reflect a policy choice to save the higher incomes generated from rising energy prices, rather than spending these resources. Though not spending these resources abroad results in larger global current account imbalances than would otherwise be the case, this choice may reflect a prudent use of national resources, especially given the variability in commodity prices and the fiscal policy stance.

- Some major industrial countries also appear toward either the bottom or top of the various weighting schemes. For example, Germany has a large nominal current account surplus. Germany is part of the Euro Area, which as a whole has a modest current account surplus as a share of GDP. The euro is a freely floating currency, and European Central Bank reserves did not increase in 2004. Yet, Germany ran a current account surplus of 3.8% of GDP. Germany's nominal current account surplus exceeded \$100 billion. Absent external demand, German growth would have been slightly negative in 2004. On balance, Germany's current account surplus is fundamentally associated with persistently weak domestic demand.
- Switzerland has a large current account surplus. This does not reflect, however, its merchandise trade balance, but rather significant surpluses in trade in financial services and investment income. The Swiss franc is an independently floating currency.
- Japan is in the upper half of the weighting schemes. Its current account surplus as a share of GDP in 2004 was 3.7%. The external sector provided an important contribution to overall growth. In dollar terms, Japan's current account surplus was over \$170 billion and its bilateral surplus with the United States over \$75 billion. Japan has at times in the recent past intervened heavily in foreign exchange markets. However, it has not done so since March 2004. Japanese reserves have not increased significantly since that time. The Japanese economy has recently strengthened. Though Japanese private saving has declined in past years and the public sector has run fiscal deficits, corporate saving has been strong, while growth in investment has been restrained due to low economic growth and financial sector weakness.
- China is toward the upper end of the first weighting scheme, in the middle of the second, and toward the bottom of the third. China's current account surplus as a share of GDP has risen in recent years, and continues to rise sharply this year. The currency is rigidly managed, and the real effective exchange rate has strengthened, reflecting the renminbi's relationship to the dollar. China's reserve accumulation was large and rapid last year, and reserves are continuing to rise rapidly this year. This explains the high ranking using the first weighting scheme. But China's 2004 current account surplus, at 4.0% as a share of GDP, is more modest than that of many other economies listed in Table 1. Though the contribution of the external sector to growth was positive, this contribution was modest. These considerations impact China's ranking in the second and third weighting schemes.
- Malaysia tends to have a high ranking, on the whole, in the weighting schemes. It has a rigidly managed exchange rate. It ran a nearly 13% of GDP current account surplus last year, in part due to higher oil export earnings, and its reserves rose rapidly. Taiwan's current account surplus was over 6% of GDP and South Korea's over 4%. Both have relatively large levels of reserves, which rose appreciably last year. Their external sectors contributed

significantly to growth. As discussed in the report, there have been important movements in the South Korean and Taiwanese currencies.

- Singapore also has a relatively high ranking, on the whole, in the ratings. Its current account surplus was 26% of GDP, partly due to high saving given prospective demographic trends, but Singapore has a small bilateral deficit with the United States; the country pursues a managed currency in terms of a currency basket, but the composition of the basket is not published. Singapore uses its foreign exchange rate as a monetary policy anchor. The real effective exchange rate appreciated 15 percent over the January 2002 – September 2005 period.

Conclusions

The three illustrative mechanical approaches above, using weighted indexes of indicators, produce very different outcomes. Saudi Arabia, Malaysia, Venezuela, and China are at the top of the first weighting scheme; Venezuela and Saudi Arabia are at the top of the second; while Singapore, Switzerland, and Venezuela are at the top of the third. An economy's position on the list depends on specific characteristics. Increased oil prices have contributed to high and rising current account surpluses and rising reserves for some oil producers. China's position on the list is heavily dependent on whether the weighting schemes factor in the current account as a share of GDP and the dependence of the economy on external growth. Singapore and Switzerland have large current account surpluses and strong growth of the external sector relative to that of domestic demand.

Although these numerical indicators provide insight into the operations of economies, a mechanistic application of them yields an incomplete picture of an economy's performance and cannot provide determinative evidence that an economy should be designated pursuant to the terms of the Act. Additional analysis is necessary. First it is important to consider the many interactions among indicators. For example, growing productivity in the production of traded goods relative to the production of non-traded goods can raise the real exchange rate. Second, it is important to consider developments that are specific to an individual economy. Oil price changes affect oil producers and oil consumers differently. Third, it is important to consider policy changes that will likely affect the adjustment process but may not yet be producing results.