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IMF Surveillance over China's Exchange Rate Policy

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In the revisions to its Articles of Agreement, approved in 1976 and formally ratified in 1978, the International Monetary Fund (IMF) is charged under Section 3(a) of Article IV with the responsibility to "oversee the international monetary system in order to insure its effective operation" and with the more specific responsibility to "oversee the compliance of each member with its obligations under Section 1 of this Article." To fulfill these functions, the Fund is instructed in Article IV, Section 3(b) to "exercise firm surveillance over the exchange rate policies of members, and . . . adopt specific principles for the guidance of all members with respect to those policies."

The provisions of the revised Articles of Agreement had two intentions: to maintain the Fund as the key international institution for establishing and enforcing reasonable rules for the operation of the international monetary system, especially the exchange rate and related policies of its members; and to adapt the policies and practices of the Fund in this vital area to the evolving character of the international monetary system that replaced the system of pegged-but-adjustable par values for national currencies prescribed by the original Bretton Woods agreement of 1946. Building on earlier experience and analytical work, much was done in the mid-to-late 1970s and early 1980s to adapt the Fund to its new responsi-

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bilities and authorities under the revised Article IV, including the establishment of the 1977 Guidelines for Exchange Rate Policies of Members.[1]

By the late 1980s, however, the Fund's role as arbiter of issues related to exchange rate policies and the functioning of the international monetary system had atrophied, as both the Group of Five (G-5) and Group of Seven (G-7) countries and the European countries participating in the Exchange Rate Mechanism (ERM) of the European Monetary System largely excluded the Fund from their deliberations. Most developing countries also resisted Fund involvement in decisions regarding their exchange rate policies. Facing nearly universal lack of support from member countries, Fund staff and management effectively abandoned vigorous efforts to implement firm surveillance over members' exchange rate policies, and related analytical work lost priority.

However, the ERM crisis of the early 1990s and the fall of the dollar in early 1995 brought renewed activity and interest in IMF surveillance over exchange rates. This activity and interest deepened as a number of important emerging-market countries faced foreign exchange crises from the mid-1990s through 2003. The recent evaluation of the Fund's policy advice on exchange rate and related issues by the IMF's Independent Evaluation Office (IEO 2007) testifies to the importance of this work and offers a critical appraisal. Even more impressive, for the first time in 30 years, in 2006–07 the IMF undertook a comprehensive review of the 1977 Surveillance Decision of the Executive Board. After extensive analysis and debate, the Board agreed to revisions of this important decision that many inside the Fund hope will improve the effectiveness of exchange rate surveillance.

Of all of the issues for which IMF exchange rate surveillance is relevant in the new millennium, two stand out as of particularly great importance. One is the general problem of global payments imbalances, in particular, the large and, until very recently, rising current account deficit of the United States and the corresponding surpluses of a number of other countries. On this issue, Fund surveillance has been effective in both recognizing the problem as it develops and promoting an agreed global strategy to address the problem.

In stark contrast to this success in Fund global surveillance stands the catastrophic failure of Fund surveillance in the critical case of China, now the third-largest trading economy in the world and a vital driver of global economic growth. Since 2002 the Chinese authorities have used massive and largely sterilized official intervention to resist substantial, economi-

1. The Fund has done much work on exchange rate issues under the par value system of the original Articles of Agreement, during the interregnum when the Second Amendment was being debated and agreed, and in the late 1970s and the early-to-mid 1980s. This included a good deal of work in the Research Department that found significant practical application, including in the actual setting of exchange rates. The histories of the Fund prepared by Margaret de Vries (1976, 1985) describe some of these activities. Jacques Polak's essay (1994) provides an excellent survey.

cally warranted appreciation of the renminbi against the US dollar. With the substantial appreciation of many other currencies against the dollar as well, the real effective exchange rate of the renminbi has depreciated significantly since 2002.[2] Meanwhile, China's current account balance, which typically ran a modest surplus of one to two percent of GDP in the decade through 2002, exploded to over 9 percent of GDP by 2006 and appears to be headed significantly higher in 2007. Beyond any reasonable doubt, the renminbi's exchange rate has become substantially undervalued and is being kept in this position by Chinese policies that powerfully resist, and are intended to resist, significant appreciation. Indeed, China is the one major country for which exchange rate policy and current account performance are clearly operating strongly in the wrong direction with respect to reducing major global payments imbalances, which the Fund has identified as a major concern for the world economy.[3]

Yet, in their surveillance of China's exchange rate and related policies before the summer of 2006, IMF staff reports and executive board deliberations speak only vaguely about the desirability of "greater flexibility" in the renminbi's exchange rate—not of the increasingly urgent need for a major appreciation of the renminbi. IMF Managing Director Rodrigo de Rato emphasized that the IMF was not the official "umpire" of exchange rate issues and that gentle persuasion—generally not in public—was the IMF's only appropriate means of dealing with the Chinese authorities on the sensitive issue of their exchange rate policy. Neither the managing director nor key IMF staff cared to point out forcefully to Chinese authorities the specific and general obligations regarding their exchange rate policy under Article IV, either in public, in executive board discussions, or in private.

In my view, the IMF's approach to the application of surveillance to China's exchange rate policy constitutes gross misfeasance, malfeasance, and nonfeasance by the managing director and the IMF more generally. Included in this indictment are key members of the staff—especially in the Asia and Pacific Department (APD)—much of the executive board, and the national authorities of leading members, most importantly senior officials of the US Treasury (with the notable exception of former Undersecretary Timothy Adams).

2. The extent of the real depreciation of the renminbi since early 2002, when the US dollar was at its peak on a real effective basis, depends on the particular measure that is used. If one accounts for rapidly rising productivity in Chinese manufacturing and rapidly falling unit-labor costs in this critical tradable goods sector, the real effective depreciation of the renminbi could easily be as large as 20 to 25 percent.

3. Several major oil-exporting countries, most notably Russia and Saudi Arabia, have seen recent major increases in their current account surpluses while resisting substantial exchange rate appreciations. However, in contrast with China, the enormous and relatively sudden rise in world oil prices accounts for these current account gains, and based on past behavior these surpluses may reasonably be expected to erode over time.

To support this conclusion, this essay takes up the following issues. First, it critically assesses Fund surveillance of China from 2001 to 2006. Using the 1977 Surveillance Decision, which was in force until the new decision was adopted in June 2007, this assessment details how and why China's exchange rate and related policies violated that country's specific and general obligations laid out in Article IV. Second, to provide further insight into how China's exchange rate and related policies have produced such untoward results, a traditional analytical tool developed in the Fund and elsewhere—the monetary approach to the balance of payments—is applied. This helps to explain some important and otherwise puzzling features of the recent spectacular surge in China's balance-of-payments surplus and the enormous rise in its saving-investment balance. Third, the essay reviews the general problem of global imbalances and the strategy that the Fund developed to address that problem. China's glaring failure to play its proper role in this strategy is highlighted. Fourth, the issue of what to do now regarding China's exchange rate and related policies is discussed. Finally, the essay appraises the accountability for the failures of Fund surveillance in the case of China.

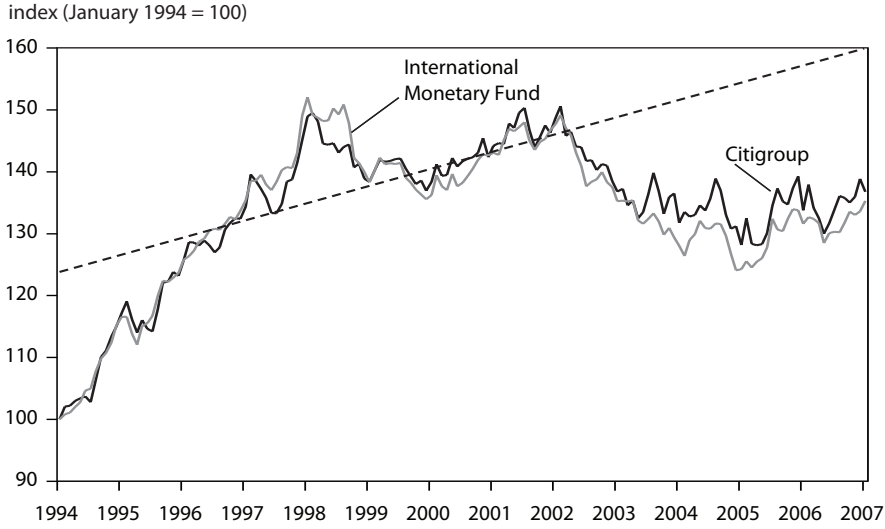
China's Exchange Rate Policy

Following the unification of the Chinese exchange rate regime at the beginning of 1994, the nominal exchange rate of the renminbi against the US dollar fluctuated within a relatively narrow range before being pegged quite rigidly at 8.28 renminbi to the dollar in 1996. It was kept at this pegged rate until July 2005. Subsequently, it moved gradually to about 7.50 renminbi to the dollar as of October 2007. While the renminbi's nominal exchange rate against the dollar has been quite stable, its real effective exchange rate fluctuated over a fairly wide range, as shown in figures 8.1 and 8.2.

The Chinese economy grew rapidly from 1993 through 2002, with annual real GDP growth averaging 9½ percent and not falling below 7½ percent. Chinese trade with the rest of the world grew at one-and-a-half times this pace, transforming China from the tenth- to the fourth-largest trading economy in the world. Chinese imports grew at nearly the same pace as Chinese exports, and Chinese trade and current account balances as shares of Chinese GDP were in moderate surplus, without pronounced and persistent tendencies to move into substantial surpluses, as shown in figures 8.3 and 8.4. During this period, official holdings of international reserves grew substantially, rising from $22 billion at end-1993 to $291 billion at end-2002; half of this increase occurred in 2001 and 2002 (see table 8.1). Reserve holdings were already relatively high at 5.4 months of imports even in 1994. Over the next eight years, they rose to 8.9 months of imports in 2002.

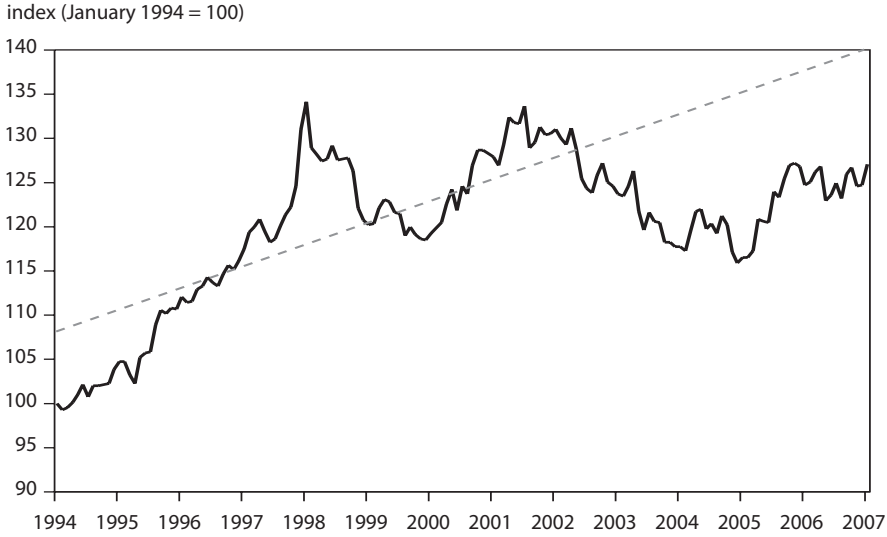
Consistent with the well-known Balassa-Samuelson effect, movements in China's real effective exchange rate and current account balance from

Figure 8.1 Real effective exchange rate of the renminbi (Citigroup and International Monetary Fund data), January 1994–September 2007



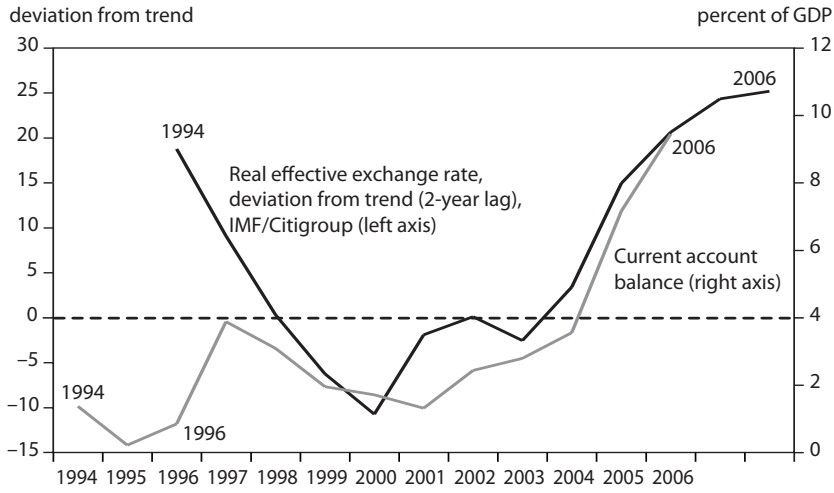
Sources: Citigroup and International Monetary Fund.

Figure 8.2 Real effective exchange rate of the renminbi (JPMorgan data), January 1994–September 2007



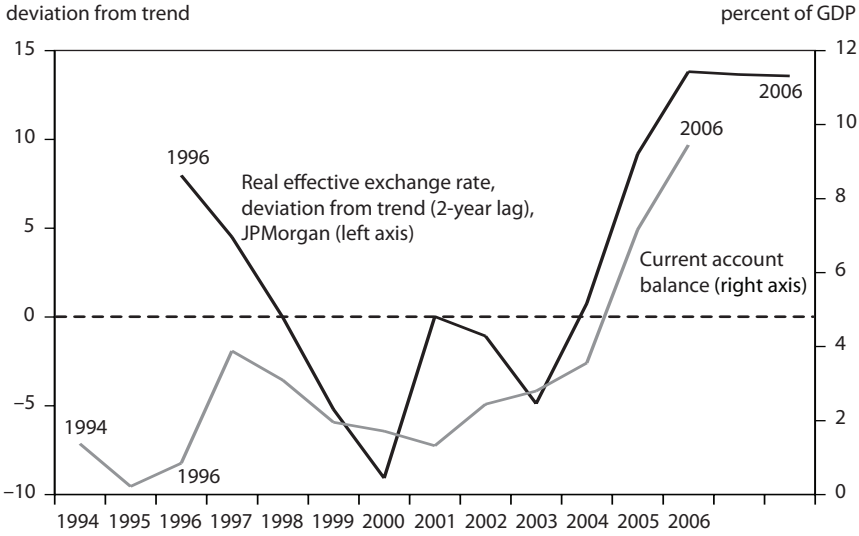
Source: JPMorgan.

Figure 8.3 Real effective exchange rate of the renminbi (IMF/Citigroup data) and China's current account balance



Sources: China State Administration of Foreign Exchange; International Monetary Fund; and Citigroup.

Figure 8.4 Real effective exchange rate of the renminbi (JPMorgan data) and China's current account balance



Sources: China State Administration of Foreign Exchange; JPMorgan.

Table 8.1 Indicators of reserve adequacy, 1994–2006

Year	Nongold reserves (billions of dollars)	Ratio of reserves to GDP (percent)	Reserves as months of imports (months)	Ratio of reserves to monetary base (percent)
1994	53	9.5	5.5	25.9
1995	75	10.4	6.4	30.2
1996	107	12.5	9.3	33.0
1997	143	15.0	12.0	38.7
1998	149	14.6	12.8	39.4
1999	158	14.6	9.6	38.8
2000	168	14.0	9.0	38.2
2001	216	16.3	8.9	44.8
2002	291	15.1	8.9	40.2
2003	408	24.9	12.1	64.0
2004	614	31.1	11.0	85.2
2005	822	36.6	14.8	103.0
2006	1,068	40.4	16.2	108.1

Source: Data are from International Monetary Fund, *International Financial Statistics Yearbook*, 2007 and earlier years.

1994 to 2002 suggest that the long-run equilibrium path for China's real exchange rate has a moderate upward tilt of about 2 percent per year.[4] In figures 8.1 and 8.2, this is indicated in two panels by a rising path for an artificially constructed estimate of the longer-run equilibrium exchange rate with a positive tilt of 2 percent per year.[5] The actual real exchange

4. See Balassa (1964) and Samuelson (1964). Impressive work that has demonstrated the general relevance of the Balassa-Samuelson idea that nominal exchange rates normally diverge from levels suggested by purchasing power parities (PPP) was presented by Kravis, Heston, and Summers (1978). Further development of the work by these and other scholars, with substantial support from the World Bank, has refined the initial analysis and extended the range of countries. This work provided the foundation for the innovation introduced in the IMF's *World Economic Outlook*, beginning in May 1993, of using PPP-based exchange rates to aggregate different countries' GDP growth rates to obtain a world total.

5. The IMF measure of the real effective exchange rate and the Citigroup measure are sufficiently similar that the same assumed path for the longer-run equilibrium real effective exchange rate of the renminbi makes sense. The behavior of the JPMorgan measure of the renminbi's real effective exchange rate is sufficiently different from the other two measures that a different path for the renminbi's longer-run equilibrium exchange rate is appropriate, also with a 2 percent upward tilt. There is no inconsistency in having different estimates for the longer-run equilibrium path of the real effective exchange rate associated with different measures of the actual behavior of this real effective exchange rate. The relevant question is whether the position and upward tilt of the assumed paths for the longer-run equilibrium real effective exchange rates reflect reasonably justified assumptions. I believe that they do. The general evidence supporting the Balassa-Samuelson effect and its likely relevance to

rate started out below this long-run equilibrium path in 1994–95. With the usual lag of about two years, the undervaluation was reflected in an improvement in the current account, from a surplus of about 0.8 percent of GDP in 1994–96 to a surplus of about 3½ percent of GDP in 1997–98. By 1997 the cumulative effects of somewhat higher inflation in China than in partner countries had pushed China's real effective exchange rate from below its long-run equilibrium path to modestly above it, and the collapse of a number of Asian emerging-market currencies in the crises of 1997–98 pushed China's real effective exchange rate even higher.

With a lag of about two years, which is common for many countries, the consequences of substantial movements in China's real exchange rate relative to its assumed longer-run trend are reflected in movements in China's current account, as figures 8.3 and 8.4 illustrate. Consistent with the assumed lagged effect of movements in the real effective exchange rate relative to its equilibrium path, the current account shows modest (below average) surpluses in 1994–96. The surplus expands significantly in 1997–98, reflecting, with a lag, the real undervaluation of the renminbi in 1994–96. This undervaluation resulted from rapid inflation in China and a relatively weak US dollar against other key currencies. By 1999–2001, the effects of the Asian crisis of 1997–98 and the moderate overvaluation of the renminbi from mid-1998 through 2000 contributed to declines in China's current account surplus. After 2001, the real effective exchange rate of the renminbi fell ever further below its longer-run equilibrium path, and this is reflected in a progressive widening of the current account surplus. At the same time, private capital flows into China began to pick up, with the result that the official settlements balance (or overall balance) increased even more rapidly than the current account balance. This was reflected in increasingly massive inflows of foreign exchange reserves, which reached 9 percent of China's GDP (as an annual flow) in 2006 and pushed China well ahead of Japan as the world's largest holder of reserves in 2007.

The above facts suggest that the Chinese renminbi has become substantially undervalued since 2002. It has been kept in this position by deliberate policies of the Chinese authorities. They intervened massively in the foreign exchange market to keep the exchange rate of the renminbi against the US dollar at a pegged rate of RMB8.28 until July 2005. Since then, they have used even larger intervention to limit appreciation of the renminbi-dollar exchange rate to no more than about 5 percent per year. To offset the effect that this enormous intervention would otherwise have

China is quite strong, and the 2 percent upward tilt of the path of the longer-term equilibrium rate is reasonable in light of the evidence. The choice of the vertical position of the two longer-run equilibrium paths is suggested by the behavior of China's current account balance. However, there should be no illusion. The assumed paths of the longer-run equilibrium real effective exchange rates are based on assumptions that I believe are well-justified, but that others might dispute.

had on China's domestic money supply and price level, the authorities have engaged in massive sterilization operations, in which the net domestic assets of the People's Bank of China (PBC) have been reduced from half of the monetary base at end-2001 to negative 10 percent of the monetary base at end-2006. The exceptional nature, scale, and duration of these policies, together with the extraordinary upsurge in China's balance of payments surplus over the past five years, necessarily raises a serious question as to whether China is violating its specific obligation under Article IV, Section 1 (iii) of the IMF Articles of Agreement, to "avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain unfair advantage over other members."[6]

Applying the Fund Guidelines

To address the question of whether China should be judged in violation of Article IV, Section 1 (iii) of the IMF Articles of Agreement, it is appropriate to look to the executive board's 1977 decision on Surveillance over Exchange Rate Policies.[7] Two key parts of the decision are particularly relevant.

The Principles for the Guidance of Member's Exchange Rate Policies (PGM) are:

> A. A member shall avoid manipulating the exchange rate or the international monetary system in order to prevent effective balance of payments adjustment or to gain unfair competitive advantage over other members.
>
> B. A member should intervene in the foreign exchange market if necessary to counter disorderly conditions which may be characterized inter alia by disruptive short-term movements in the exchange value of its currency.
>
> C. Members should take into account in their intervention policies the interests of other members, including those of the countries in whose currencies they intervene.

6. Formal consideration by the executive board of a violation of obligations under Article IV and the recommendation for such consideration by the managing director should only come after all other vigorous efforts at persuasion have been rejected without plausible justification. Unfortunately, in the case of China, the IMF did not begin these efforts when it should have in 2004 and 2005, and there is little indication that appropriately vigorous efforts at persuasion have so far been attempted.

7. In June 2007 the Executive Board adopted a new decision on bilateral surveillance over members' policies, which revised the 1977 decision. The new decision does not materially change the old decision in ways that are relevant to the present discussion, and it is the old decision that is relevant to the period under discussion here. For a discussion of the old and the new surveillance decisions, see IMF (2006a, 2006b, 2007a, 2007b).

The Principles of Fund Surveillance over Exchange Rate Policies (PFS) are:

> 1. The surveillance of exchange rate policies shall be adapted to the needs of international adjustment as they develop. The functioning of the international adjustment process shall be kept under review by the Executive Board and Interim Committee [now the International Monetary and Finance Committee] and the assessment of its operation shall be taken into account in the implementation of the principles set forth below.
>
> 2. In its surveillance of the observance by members of the principles set forth above, the Fund shall consider the following developments as among those which might indicate the need for discussions with a member:
>
> (i) protracted large-scale intervention in one direction in the exchange market;
> (ii) an unsustainable level of official or quasi-official borrowing, or excessive and prolonged short-term official or quasi-official lending, for balance of payments purposes;
> (iii) (a) the introduction, substantial intensification, or prolong maintenance, for balance of payments purposes, of restrictions on, or incentives for, current transactions or payments, or (b) the introduction or substantial modification for balance of payments purposes of restrictions on, or incentives for, the inflow or outflow of capital;
> (iv) the pursuit, for balance of payments purposes, of monetary and other domestic financial policies that provide abnormal encouragement or discouragement to capital flows; and
> (v) behavior of the exchange rate that appears to be unrelated to underlying economic and financial conditions including factors affecting competitiveness and long-term capital movements.
>
> 3. The Fund's appraisal of a member's exchange rate policies shall be based on an evaluation of the developments in the member's balance of payments against the background of its reserve position and its external indebtedness. The appraisal shall be made within the framework of a comprehensive analysis of the general economic situation and economic policy strategy of the member, and shall recognize that domestic as well as external policies can contribute to timely adjustment of the balance of payments. The appraisal shall take into account the extent to which the policies of the member, including exchange rate policies, serve the objectives of the continuing development of the orderly underlying conditions that are necessary for financial stability, the promotion of sustained sound economic growth, and reasonable levels of employment.

In the PGM, principle A simply reiterates Article IV, Section 1 (iii). Principle B is irrelevant to China because China's massive intervention cannot plausibly be justified as necessary to counteract disorderly conditions in exchange markets. Principle C raises a serious issue for China because China's massive and protracted intervention has clearly not accounted for the interests of other members, especially those of the country (the United States) in whose currency the Chinese authorities primarily conduct their exchange market interventions.

The PFS expounds on the key points that the Fund is supposed to examine in determining whether a member's exchange rate and related poli-

cies may violate its obligations under the IMF articles. In applying the PFS to China, it is efficient to look at points 1 and 3 and then turn to the list of items under point 2.

Point 1 is highly relevant to China.[8] The executive board and the International Monetary and Financial Committee (IMFC) have kept the functioning of the international adjustment process under close and continuous review. As discussed in detail below, they have concluded that global payments imbalances are a major concern and have espoused a strategy to deal with this concern that clearly involves China and its exchange rate and related policies—specifically, the need for China, as a major surplus country, to adapt its policies to reduce rather than further increase its balance of payments surpluses. Bilateral surveillance over China should have taken account of these systemic concerns.

Point 3 is also highly relevant to China. Recent developments in China's balance of payments and reserve positions have certainly been remarkable and present clear evidence of serious external payments disequilibrium. As expressed in the Outline of the 11th Five Year Plan approved by the Central Committee of the Chinese Communist Party, China's stated policy objectives include maintaining rapid growth of output and employment with low inflation and financial stability. They also include a clearly stated preference and intention to achieve better-balanced growth and economic development; specifically, a shift of growth toward lesser reliance on the tradable-goods sector and the coastal regions, where development has been very rapid, and greater expansion of consumption and more rapid development of the country's interior regions.[9] That this latter objective is not being achieved, the essential linkage of this failure to China's growing external payments disequilibrium and its exchange rate and related policies (as discussed further below) is further reason for the Fund to call for reform of these policies.

Turning to the subpoints under point 2 of the PFS, item (v) is directly concerned with the exchange rate and whether it is misaligned with "underlying economic and financial conditions including factors affecting competitiveness and long-term capital movements." When this language was drafted in the mid-1970s, the idea was that a country's exchange rate was reasonably aligned with relevant economic fundamentals if the current account deficit or surplus was financed by sustainable longer-term capital in-

8. It is highly relevant in other cases as well. Resolution of the problem of global payments imbalances requires efforts by many countries that should be examined in the context of the Fund's bilateral surveillance. Taking an earlier example, the Fund did not regard the strong dollar and the large and rising US current account deficit as an immediately pressing problem in the late 1990s because the international adjustment process generally benefited from a strong US economy that could absorb the improvements that other, more weakly performing economies needed to make in their current accounts.

9. For further discussion of the Chinese government's economic priorities and how they might better be achieved, see Bergsten et al. (2006, chapter 2) and Lardy (2006).

flows or outflows. In such circumstances, at the prevailing exchange rate, the current account imbalance would not give rise to unsustainable official settlements deficits or surpluses. However, if the current account balance associated with the prevailing exchange rate was unduly large relative to the sustainable level of longer-term capital flows, this was a key indication of a seriously misaligned exchange rate—"a fundamental disequilibrium," in the language of the original Article IV—and, accordingly, a strong reason for the Fund to question whether the country's exchange rate and related policies were consistent with Article IV, Section 1 (iii).

That China's exchange rate has become substantially undervalued is abundantly clear and has already been amply discussed. The massive increases in China's foreign exchange reserves and current account surplus since 2002 leave no doubt on this issue. That this undervaluation is to an important extent the consequence of China's exchange rate and related policies, rather than some fortuitous accident, is also quite clear. It is synonymous with the conclusion (discussed below) that an alternative feasible path of China's exchange rate and related policies would have produced much a smaller accumulation of reserves and a much smaller rise in China's current account surplus since 2002.

Items (ii), (iii), and (iv) are included on the list under point 2 of the PFS to deal with situations in which a country pursues policies that indirectly induce a seriously misaligned exchange rate without direct intervention into the foreign exchange market. Such policies include official or quasi-official borrowing, which does not show up in official reserves, government-sponsored incentives or restraints that affect trade flows or capital flows, and "monetary and other domestic financial policies that provide abnormal encouragement or discouragement to capital flows." As these policies generally have a variety of legitimate purposes from the Fund's perspective, the qualifying language that these policies are being pursued "for balance-of-payments purposes" is included in all three of these items.

For China, some concerns could be raised under items (ii), (iii), and (iv). In particular, on some occasions, the Chinese authorities apparently have sought to limit reported increases in official reserves by inducing Chinese banks to hold the proceeds of capital flows offshore. Such operations may have amounted to $50 billion of disguised reserve accumulation in 2006 and a similar or possibly greater amount in 2007. However, it is not essential to focus a great deal of attention on this issue because the Chinese authorities have relied primarily on direct intervention in the foreign exchange market to implement their exchange rate policy, and the massive scale of these operations leaves no room for reasonable dispute about the inconsistency of Chinese policies with obligations under Article IV, Section I (iii).

Indeed, on the list of factors that the Fund should consider in assessing whether there are serious problems with a country's exchange rate and re-

lated policies, the first item is "(i) protracted large-scale intervention in one direction in the exchange market." This item has pride of place for very good reason: Official intervention in the foreign exchange market corresponds precisely to a key measure of a country's balance of payments, namely, the official settlements balance. Even before the adoption of the Second Amendment in 1978 and the Bretton Woods conference in 1944, it was understood that protracted large-scale deficits or surpluses in the official settlements balance are, by themselves, a clear indicator of disequilibrium in a country's international payments and a critical signal that adjustments are required in policies that affect the balance of payments. Moreover, in contrast with other policies that may influence a country's exchange rate for reasons ancillary to their main intended purposes, official intervention in the foreign exchange market is, by its very nature, intended to influence the exchange rate and the official settlements balance. It is always carried out "for balance-of-payments purposes."

A nonreserve-currency country that persistently runs official settlement deficits will ultimately run out of reserves, rapidly so if the official settlements deficits are large. The result will almost always be a sharp depreciation of the exchange rate in the midst of a foreign exchange crisis, as speculation mounts against the currency peg and reserve outflows become very large. In such cases, protracted large-scale intervention to support an exchange rate is, by itself, a clear indicator that an exchange rate is seriously overvalued, and thus, the policy that is used to keep it overvalued—protracted large-scale intervention—is by its very nature an exchange rate policy pursued to prevent effective balance-of-payments adjustment, in contravention of Article IV, Section 1 (iii).

For countries with pegged or tightly controlled exchange rates and persistent official settlements surpluses, such as China at present, the judgment on whether this signals a significantly undervalued exchange rate and an important failure to allow appropriate adjustment in the balance of payments is somewhat more complicated. Countries with pegged or quasi-pegged exchange rates generally need foreign exchange reserves to operate their chosen exchange regimes, and prudent holdings of reserves tend to grow with the size of the economy and the volume of trade. Reserves significantly below prudent standards signal potential problems, including the risk of a disruptive foreign exchange crisis and a sudden large depreciation. Conversely, countries that continue to accumulate reserves when they are already well above prudent standards are not only frustrating adjustment of their own balance of payments, but they are also making it more difficult for countries that need to reduce their deficits to make the necessary and appropriate adjustments. It is relevant in this regard that the Fund's executive board has repeatedly expressed concern about persistently large and growing US balance-of-payments deficits. In accord with principle 1 of the PFS, these concerns imply that the Fund should not apply an overly lax standard in assessing when official settle-

ment surpluses of countries like China have become too large and persisted too long.

In looking at the circumstances of individual countries, the Fund has long maintained that foreign reserves equivalent to about three months of imports are prudent. Reserves of up to six months of imports probably should not be regarded as excessive. As table 8.1 reports, China's foreign exchange reserves stood at about 6 months of imports in 1994–95. They rose to almost 13 months of imports in 1998 before this ratio fell back to about 9 months of imports from 2000 through 2002. Subsequently, reserves surged to 16 months of imports by 2006, and reserve and trade data so far available for 2007 indicate a further rise in this ratio. This is massively beyond any reasonable standard of prudence for a country like China.

Another important standard for judging whether reserve accumulation is excessive is to look at its monetary implications (discussed in greater detail in the next section). A country with a pegged or tightly managed exchange rate normally wants to have reserves equal to a reasonable fraction of its monetary base, and it acquires additional reserves corresponding to a reasonable fraction of the annual increase in the domestic monetary base. As table 8.1 reports, China maintained a ratio of reserves to its monetary base of between 25 and 45 percent between 1994 and 2002. Annual increases in the monetary base during this period were supplied about equally by increases in foreign exchange reserves and increases in the PBC's net domestic assets. Since 2002, however, that situation has changed dramatically, with reserves rising to more than 100 percent of the monetary base and net domestic assets declining by nearly RMB3 trillion as a result of sterilization operations. From a monetary perspective, this clearly indicates that China has been maintaining a substantially undervalued exchange rate and that its exchange rate and related policies have frustrated balance-of-payments adjustment.

Applying the PFS, nothing more really needs to be said to conclude that China's exchange rate and related policies stand in violation of China's obligations under Article IV, Section I (iii). The facts concerning China's massive, protracted, one-way intervention to resist appreciation of the renminbi are, by themselves, overwhelmingly sufficient to make the case. There is no question that the Chinese authorities intended to do precisely what they did do. They intervened persistently and massively in the foreign exchange market to resist strong pressures for appreciation of the renminbi, and they sterilized much of the monetary effect of this intervention to avert real appreciation of the renminbi through the alternative mechanism of upward increases in China's domestic price level.

Unfair Competitive Advantage?

That the Chinese government is using massive, protracted, sterilized intervention to resist appreciation of the renminbi, resulting in massive in-

creases in official reserves and the current account surplus, is more than enough to conclude that China's policies are inconsistent with its obligations under Article IV, Section 1 (iii). There is no question of the intent of China's policies: Protracted, large-scale intervention in one direction in the foreign exchange market is indisputably intended to affect the exchange rate and the balance of payments. Such a policy is always pursued "for balance-of-payments purposes."

To conclude that China's policies are in violation of Article IV, Section 1 (iii), it is not necessary to go further to establish that the policies are intended to create unfair competitive advantage. There are, however, important grounds for the Fund to find the requisite intent.

First, some Chinese authorities and other commentators have argued that China faces a critical problem of assuring growing employment opportunities that will enable millions of workers in the rural and poorly developed sectors of the Chinese economy to move to the more modern sectors. However, while achievement of high levels of employment and employment growth is a domestic policy objective that is lauded by the Fund, there is one means for achieving this goal that is specifically prohibited by the Fund's Articles of Agreement. Purpose (iii) in Article 1 and the strictures in Article IV Section 1(iii) make clear that "competitive depreciation" is banned as a means for achieving domestic employment objectives. The assertion by Chinese officials that China is using its exchange rate and related policies for the purpose of stimulating domestic employment is a confession of guilt to violation of Article IV Section 1 (iii).

Second, aside from an explicit admission of guilt to pursuing a policy of competitive depreciation, the fact that the Chinese authorities have persisted for a number of years to maintain a substantially undervalued exchange rate that confers competitive advantage on Chinese producers relative to foreign rivals is important evidence that this effect is not unintentional. If the Chinese authorities are pursuing their exchange rate and related policies with the clear effect, but not the intent, of conferring competitive advantage on Chinese producers, then they owe the Fund and the world a convincing explanation for why this is not an meaningful part of what they intend their policies to achieve.

Third, the Fund needs to weigh carefully its responsibilities to the international economic system when considering how much deference to give to members' assertions that they are not pursuing policies of competitive depreciation when that is clearly the policies' effect. Supervising of the international trading system is not the responsibility of the Fund, but the effective operation of that system is one of the Fund's important concerns. If, with substantial justification, people and businesses in other countries see themselves as the victims of substantial and prolonged competitive depreciation practiced by the Chinese authorities, and if the Fund does not even acknowledge the problem, then the disaffected will seek redress through other channels and will be justified in doing so. The result could

ultimately be that, disgusted with the Fund's failure to fulfill its assigned responsibilities, others will be given the job. In view of countries' use and abuse of antidumping and countervailing duties to address other trade complaints, it is worrying to contemplate that similar mechanisms could substitute for more assiduous action by the Fund to deal with cases that appear to involve substantial and prolonged competitive depreciation.

Explaining China's Policy

If the purpose of China's policy is not actively to pursue unfair competitive advantage to boost domestic employment, one might well ask why the Chinese authorities have engaged for so long in such massive and largely sterilized intervention to resist appreciation of the renminbi.

The answer to this intriguing question was provided by the Fund's long-time and highly distinguished economic counselor, Jacques Polak, at virtually the same time that China embarked on its present exchange rate policy. In an essay on the occasion of the 50th anniversary of the Fund in 1994, Polak concluded with the following trenchant observation:

> Taking the past fifty years as a whole, the exchange rate problems that the Fund has had to deal with in connection with requests for use of its resources, or more generally in the surveillance of the policies of the great majority of its members, have been problems of overvaluation. In policy advice handed out by the Fund, "exchange rate flexibility" has almost always served as only a slightly veiled euphemism for devaluation or depreciation. In the most recent years, however, this has no longer necessarily been so. As an increasing number of developing countries are faced with large inflows of capital, some real appreciation of their currencies can usually not be avoided. . . . A few developing countries . . . have in recent years taken steps toward some revaluation of their currencies. These steps, however, have been quite modest, *providing confirmation of an asymmetry in countries exchange rate policy that can be observed over the entire period covered by this paper: countries often fail to take action needed to improve competitiveness, but they hesitate to take any action that would reduce it* [emphasis added]. (Polak 1994)

This conclusion accords perfectly with my experience as the Fund's economic counselor from 1991 to 2001. I had serious discussions with senior officials of a number of countries, both industrial and developing, that had clearly overvalued exchange rates. These officials advanced all sorts of arguments for why their exchange rates were not significantly overvalued. Ultimately, only collapse of these overvalued exchange rates proved to be a convincing argument. In my more limited experience with countries that had clearly undervalued exchange rates, I found officials at least equally determined to deny any significant undervaluation.

I believe that the fundamental reason for the officials' determination is that changing an exchange rate that is pegged, either de jure or de facto, is almost always seen as a defeat for the government officials involved, as they have been forced to change their policy. More than that, a change in

an exchange rate is a price change that always hurts somebody, even as it benefits others. When an exchange rate is changed as a visible act of government policy, the government is blamed by those who are hurt and gets little credit from those who benefit.

The Monetary Approach: Explaining Some Chinese Puzzles

To provide further insight into how China's exchange rate and related policies have driven recent developments in China's balance of payments, it is useful to consider these issues from the perspective of the monetary approach to the balance of payments.

The Basic Ideas of Monetary Approach to the Balance of Payments

In spirit, the monetary approach to the balance of payments dates back to David Hume's (1752) brilliant explanation of the price-specie-flow mechanism, and it can be traced through the writings of prominent economists well into the 20th century. The modern formulation of the monetary approach owes much to work done in the Research Department at the Fund, most notably by Jacques J. Polak.[10] In the early-to-mid-1970s, the monetary approach enjoyed a resurgence of interest in the academic community, particularly among economists associated with the University of Chicago, but interest in the approach waned with the shift to floating exchange rates among the major currencies.[11] Inside the Fund, key elements of the monetary approach continued to be applied, especially to countries to which the Fund was providing financial support (IMF 1987, Mussa and Savastano 1999, Robichek 1967).

The essential ideas of the monetary approach that are relevant to the present discussion can be exposited relatively concisely. In all countries, domestic residents demand domestic money, in both currency and bank

10. A useful and concise exposition of the monetary approach and a review of work done at the Fund on this subject are provided in Polak (1998). A number of the papers produced by IMF staff over the years up to the mid-1970s are collected in IMF (1977), including Polak (1957) and Polak and Boisenneault (1960).

11. A number of the Chicago papers dealing with the monetary approach are collected in Frenkel and Johnson (1976). Several of Dornbusch's insightful papers reappear in various chapters in Dornbusch (1980). The work of Mundell (1968) and Johnson (1958) provided much of the stimulus for many who worked on the monetary approach at the University of Chicago, including my colleague on the faculty at Chicago and my immediate predecessor as the Fund's economic counselor, Jacob Frenkel (1971, 1976) and my long-time friend Alexander Swoboda (1973). For a general description of the monetary approach and its field of relevance, see Mussa (1974, 1979) and Frenkel and Mussa (1985).

deposits, for use in transactions and as a liquid reserve or form of savings. The quantity of money demanded, M, depends on the level of real income, general domestic price level, interest rates, and other factors, including the degree of financial development in the country. For present purposes, it costs little and is convenient to assume that demand for money is proportional to nominal GDP, that is, $M = kY$, where k is the multiplier that summarizes all factors affecting money demand other than nominal GDP, denoted by Y. It is also convenient and costs little to assume that domestic residents want to hold currency, C, as a fixed fraction, a, of their total money holdings, $C = aM$, with the rest held as bank deposits, $D = (1 - a)M$. Banks need to hold reserves, R, with the monetary authority equal to a fraction, r, of their deposition: $R = rD$. It follows that the effective demand for base money, $B = C + R$, is given by $B = C + rD = aM + r\ (1 - a)\ M = (a + r\ [1 - a])\ M = (a + r\ [1 - a])\ kY = bY$, where $b = (a + r[1 - a])k$.

Base money is the liability of the domestic monetary authority. Corresponding to this liability, two items appear on the asset side of the (consolidated) balance sheet of the monetary authority: foreign exchange reserves, F, which are foreign assets held by the monetary authority; and N, net domestic assets held by the monetary authority. By definition, the net domestic assets of the monetary authority are all of the assets held by the monetary authority, except F, less all of the liabilities and capital (and any other items net) of the monetary authority, except base money, B. Thus, as a fact of accounting, $F + N = B = C + R$.

It follows that, for the monetary base to meet the effective demand for base money, $B = bY$, we must have $F + N = bY$. In precisely the spirit of David Hume's analysis, this equation should be viewed as an economic equilibrium condition. If $F + N$ is not equal to bY, then either the monetary authority needs to adjust $F + N$ or allow $F + N$ to adjust, or the public's effective demand for base money, bY, needs to change. In the latter case, if b is a constant, then Y has to change through changes in either real output or the general price level. For example, if $F + N < bY$ and the monetary authority refuses to allow any increase in $F + N$, then the public scrambles to acquire the base money they want to hold by cutting back on spending, putting downward pressure on output and the price level, and therefore on Y, until monetary equilibrium is achieved. Alternatively in this situation, if the monetary authority did not want to force a contraction in Y, it could issue additional base money and use it either to buy foreign exchange, F, or acquire more net domestic assets, N.

Applying the Monetary Approach to China

In principle, the monetary approach can be applied to countries that run either pegged or floating exchange rate regimes, but it is particularly rele-

vant to countries with pegged or tightly managed exchange rates. This is because the monetary approach is fundamentally attuned to explaining the behavior of a country's official settlements balance, which corresponds to the net gain of official loss of foreign exchange reserves.[12] The approach can also be useful in understanding the behavior of the current account balance, especially for countries with pegged exchange rates and limited openness to international capital flows. It is typically not very helpful in analyzing the behavior of the current account for countries that maintain floating exchange rates with little or no official intervention and have quite open capital accounts.

For example, using the monetary approach to explain the evolution of the US current account balance since the early 1990s does not get us very far. It is US policy to allow the exchange rate of the dollar to float freely, and exchange market intervention by US authorities has been sporadic and very small, relative to the size of the US economy. The monetary base in the United States is also relatively small, amounting to only about 6 percent of US GDP. Moreover, it is the policy of the US Federal Reserve to adjust the interest rate in the federal funds market to keep inflation low and help control fluctuations in economic activity. The supply of base money adjusts automatically through changes in the net domestic assets of the Federal Reserve to whatever the demand for base money may be. Hence, in accord with the monetary approach, the US official settlements balance does not deviate far from zero. But this is not helpful in explaining the behavior of the US current account, which has moved into increasingly massive deficit since the early 1990s. But differences between the growth in demand for US base money and the supply made available through increases in the net domestic assets of the Federal Reserve—which have been effectively zero—have played no meaningful role in determining the US current account. Instead, as described in detail in Mussa (2005), the evolution of the US current account balance involves the general equilibrium interactions of complex forces in the US economy and the rest of the world, which have influenced levels of spending relative to income (in the United States and in the rest of the world), the associated movements in both trade flows and international flows of capital (private and official), and the (mainly market-determined) movements of exchange rates against the US dollar.

By contrast, China's economy is quite different from the US economy in ways that make applying the monetary approach to explain developments in China's balance of payments far more relevant and fruitful. China runs a pegged exchange rate regime and uses massive official intervention to

12. The particular relevance of the monetary approach to explaining the behavior of the official settlements balance has been much emphasized in the literature; see, e.g., the introductory chapter by Rudolph Rhomberg and Robert Heller in IMF (1977), Johnson (1958), and Mussa (1974).

Table 8.2 China's monetary aggregates, 1993–2006 (billions of renminbi)

Year	Nominal GDP (Y)	Monetary base (B)	Ratio of (B) to (Y) (b)	Foreign assets (F)	Net domestic assets (N)	Money (M1)	Money plus quasi money (M2)
1993	3,533	1,315	.372	155	1,160	1,676	3,568
1994	4,820	1,722	.357	445	1,277	2,154	4,692
1995	6,079	2,076	.342	667	1,409	2,308	6,074
1996	7,118	2,689	.378	956	1,733	2,756	7,609
1997	7,897	3,063	.388	1,345	1,718	3,481	9,187
1998	8,440	3,134	.371	1,376	1,758	3,869	10,556
1999	8,968	3,362	.375	1,486	1,876	4,698	12,104
2000	9,922	3,649	.368	1,558	2,091	5,454	13,596
2001	10,966	3,985	.363	1,986	1,999	6,169	15,641
2002	12,033	4,514	.371	2,324	2,190	7,088	18,501
2003	13,582	5,284	.389	3,114	2,171	8,412	22,122
2004	15,988	5,886	.368	4,696	1,190	9,582	25,305
2005	18,387	6,434	.350	6,344	90	10,690	29,838
2006	21,087	7,776	.369	8,577	–801	12,604	34,609

Sources: Data are from International Monetary Fund, *International Financial Statistics Yearbook,* 2007 and earlier years; GDP data are from China's National Bureau of Statistics, based on estimates of national production.

keep the exchange rate of the renminbi against the US dollar from moving far from its policy-determined level, which has been allowed to appreciate very slowly since July 2005. Unlike the US Federal Reserve, Chinese monetary authorities do not automatically adjust their net domestic assets to meet fluctuations in the demand for base money. Rather, they adjust the growth of net domestic assets to offset increases in the supply of base money resulting from foreign reserve inflows that exceed China's monetary policy objectives. In recent years, this has required massive sterilization of very large foreign exchange inflows. Also, as reported in table 8.2, monetary aggregates in China are very large relative to the size of the economy, especially compared with those of the United States. Broad money in China is about 150 percent of GDP versus about 50 percent of GDP in the United States, and the monetary base in China runs about 37 percent of GDP versus only 6 percent of GDP in the United States. Moreover, with the annual growth rate of nominal GDP in China running about 16 percent versus about 6 percent in the United States, annual growth of demand for base money in China has averaged almost 6 percent of GDP, 20 times larger than the growth of base money as a share of US GDP.

In China the official settlements balance has not been virtually zero in recent years. Indeed, foreign reserve inflows (which correspond to the official settlements surplus) have ranged from a low of RMB31 billion, or

Table 8.3 Changes in China's GDP and monetary aggregates from the preceding year, 1994–2006

Year	GDP growth (percent)	Base growth (percent)	Change in monetary base (dB) (billions of renminbi)	Change in net domestic assets (dN) (billions of renminbi)	Change in foreign assets (dF) (billions of renminbi)
1994	36.4	30.1	407	117	290
1994	26.1	20.6	354	132	222
1996	17.1	29.5	613	324	289
1997	10.9	13.9	374	–15	389
1998	6.9	2.3	071	40	031
1999	6.3	7.3	228	118	110
2000	10.5	8.5	287	215	072
2001	10.5	9.2	336	–92	428
2002	9.7	13.3	529	191	338
2003	12.9	17.1	770	–19	790
2004	17.7	11.4	602	–981	1,582
2005	15.0	9.3	548	–1,100	1,648
2006	14.7	20.1	1342	–891	2,233

Source: Table 8.2.

0.4 percent of GDP in 1998, to RMB2,233 billion, or 10.6 percent of GDP in 2006. Clearly, for China the behavior of the official settlements balance is something that merits analysis and explanation.

The monetary approach provides the relevant framework for such analysis and explanation. For China the data in table 8.2 reveal a remarkably stable relation between base money and nominal GDP, with their ratio, b, averaging 0.369 and moving in a very narrow range between 0.342 and 0.389. It is noteworthy that b remains remarkably stable given the following: a more than a quadrupling of nominal GDP; considerable variations in the annual growth rates of nominal GDP, real GDP, and price level; and very large variations in the two factors—foreign exchange reserves and net domestic assets—that determine increases in the supply of base money. We may conclude with considerable confidence that demand for base money in China is highly stable, characterized by a nearly constant ratio of base money to nominal GDP of about 0.369. Applying the principles of the monetary approach, we may use this demand function for base money both to analyze what actually transpired in China's official settlements balance and to consider the implications of counterfactual experiments of what would have been different under alternative policy scenarios.

Consider first what actually happened from 1994 through 1999. As table 8.3 reports, from 1994 through 1996, Y rose very quickly, reflecting both

rapid real growth and high inflation. Correspondingly, the demand for base money grew quite rapidly. The Chinese monetary authorities met about half of this rising demand for base money through increases in the PBC's net domestic assets. To maintain the exchange rate of the renminbi, the authorities were also compelled to increase foreign exchange reserves by the amount corresponding to the rest of the increase in the demand for base money. The word "compelled" is used advisedly, as the authorities could have intervened less in the foreign exchange market if they had been willing to allow the renminbi to appreciate—which would have affected the behavior of Y. Alternatively, the authorities could have met a larger fraction of the increasing demand for base money by expanding net domestic assets or done something else to change the behavior of nominal GDP. However, given the behavior of Y, the growth of demand for base money was determined by the stable demand function, and the authorities had to meet this growing demand with either increases in net domestic assets or official intervention that increased in foreign reserves.

From 1997 through 1999, growth of nominal GDP slowed considerably, reflecting both slower real growth and much lower inflation. Correspondingly, the demand for base money grew much more slowly than in the preceding three-year period, only 25 percent compared with 104 percent in the earlier three years. Increases in net domestic assets also slowed in percentage growth, providing about one-third of the increase in the total supply of base money. Increases in foreign exchange reserves resulting from intervention to maintain the exchange rate peg were also somewhat smaller than in the earlier three years, accounting for about two-thirds of the increase in the supply of base money. The slower growth of China's nominal GDP in this period reflects both Chinese government efforts to reduce inflation, which are reflected in the slower growth of net domestic assets, as well as some negative impact on China's economy from the crises affecting a number of Asian emerging-market economies. The Chinese authorities' decision to hold the exchange rate peg of the renminbi in the face of large depreciations of a number of other Asian currencies helped to transmit some negative effects to China's GDP growth. Thus, as in the earlier period, the behavior of Y was not entirely exogenous with respect to the exchange rate and related policies pursued by Chinese authorities. Nevertheless, given the behavior of Y and the increase in demand for base money it implied, the Chinese authorities were compelled to intervene in the foreign exchange market to the extent necessary to meet that part of the growing demand for base money that they chose not to meet with increases in net domestic assets.

The three years from 1999 though 2002 saw China's nominal GDP grow by 34 percent, with the GDP deflator rising cumulatively by only 3 percent. Characteristically, base money expanded proportionally with nominal GDP by 34 percent, but net domestic assets supplied none of this increase. Instead, the authorities were compelled, in the sense already de-

fined, to meet the rising demand for base money by acquiring additional foreign exchange reserves through their interventions to prevent the renminbi from appreciating against the US dollar. Again, of course, the behavior of the Chinese economy was not entirely exogenous to the authorities' policy. For example, with the exchange rate pegged, suppose that net domestic assets had been expanded by half of the actual increase in base money of RMB1,152 billion. This increase in *N* would have been only partly offset by a decline in acquisition of foreign exchange rate reserves. Base money would have risen by significantly more than RMB1,152 billion. The more rapid growth of base money—and of other money and credit aggregates—would have been reflected in somewhat higher inflation and probably a temporary stimulus to stronger real growth. With downward pressure on the real effective exchange rate of the renminbi from higher Chinese inflation, and with somewhat stronger growth of domestic demand in China, the current account surplus would have been somewhat smaller, implying less need to intervene in the foreign exchange market to maintain the exchange rate peg.

In the four years since 2002, China's nominal GDP has risen cumulatively by 75 percent, and base money expanded by 72 percent. In this period, as previously discussed, the real effective exchange rate of the renminbi became increasingly undervalued relative to its longer-run equilibrium path, despite modest nominal appreciation of the renminbi against the dollar beginning in July 2005. This increasing undervaluation contributed to significant expansion of China's current account surplus. Especially in 2004, increasing private capital inflows added to upward pressures on the exchange rate of the renminbi. To hold the exchange rate, the authorities intervened in increasingly massive amounts in the foreign exchange market. To prevent this massive intervention from being fully reflected in growth of the supply of base money and ultimately in an upsurge of inflation, the Chinese authorities engaged in massive sterilization operations, reducing net domestic assets by almost RMB3 trillion between end-2002 and end-2006. To meet the rising demand for base money implied by the growth of China's nominal GDP, Chinese residents compelled the authorities to intervene in the foreign exchange market to the extent that such interventions both met the rising demand for base money and offset the reductions in the supply of base money induced by the authorities' sterilization operations.

Thus the monetary approach explains the explosion of China's official settlements surplus from 2002 through 2006: The explosion was the direct consequence of the exchange rate and related policies pursued by Chinese authorities in the face of exogenous factors that were affecting China's economic situation. China's policy of pegging the nominal exchange rate of the renminbi against the US dollar, together with the upward trend in the longer-run equilibrium real effective exchange rate of the renminbi and the depreciation of the US dollar against many currencies beginning

in early 2002, induced an expanding surplus in China's current account. The policy of sterilizing an important part of the increase in base money that would otherwise have resulted from exchange market intervention had the intended effect of limiting domestic inflation, and thereby, also forestalled adjustment of the renminbi's real effective exchange rate through David Hume's classic price-specie-flow mechanism. In addition, as is argued below, these operations probably depressed spending relative to income in China, contributing directly to an expanding current account surplus and official settlements surplus.

Of course, if circumstances had been different, the results of China's exchange rate and related policies would have been different. Experience provides many examples of countries that have sought to maintain pegged nominal exchange rates through extensive exchange market intervention, sterilizing much of the effect of such intervention on the domestic monetary base. In many of these cases, the exchange rate is or becomes substantially overvalued, leading to rapidly expanding official settlements deficits and ultimately a crisis in which the country is forced to adopt sharply contractionary domestic credit policies, devalue, or both. Cases like China, in which a country seeks to maintain an exchange rate peg that becomes increasingly undervalued, are relatively rare. But economic logic implies that such cases must be possible. The facts demonstrate that China's recent experience in one such case.

It is also clear that China's exchange rate and related policies must be treated as a package. The policy of pegging the nominal exchange rate of the renminbi tightly to the US dollar is linked to the policy of intervening in the foreign exchange market as required to keep the exchange rate on its prescribed path. These interventions are tied to the policy of offsetting the expansion they imply in the domestic monetary base by adjusting the behavior of net domestic assets. Changing an element of this policy package affects the other elements and the consequences of the policy package. The only way to speak of the effects of the policy package in an analytically meaningful way is to consider the counterfactual of how things would have been different if an alternative package of policies had been pursued.

In this regard, it is relevant to consider what would likely have happened if the Chinese authorities had maintained the same path for the nominal exchange rate of the renminbi against the dollar from 2002 through 2006 and had intervened as required to do so, but had not sterilized the effect of reserve inflows on the growth of the monetary base. Instead, suppose that Chinese authorities expanded net domestic assets to retain the same ratio of N to B, 48.5 percent, that prevailed at the end of 2002. Assuming for a moment that reserve inflows remained unchanged under this alternative policy scenario, the monetary base would have expanded from RMB4,514 billion at end-2002 to RMB17,669 billion—a whopping 2.72 times larger than the actual monetary base of RMB7,776 billion at end-2006.

One does not need to be a devout monetarist to understand that in view of Chinese residents' desire to maintain a ratio of base money to nominal GDP of 37 percent, this massive supposed increase in the monetary base could only have been consistent with a massively higher level of nominal GDP than the actual level of RMB21,087 billion in 2006. Correspondingly, there would have been a huge increase in China's price level between 2002 and 2006.

Of course, the outcome under the alternative policy scenario would not have been quite so extreme. Substantially greater money and credit expansion beginning in 2003 would have started to push up the Chinese price level even during that year and during the years that followed. The real effective exchange rate of the renminbi would have depreciated considerably due to this more rapid inflation, leading to significantly smaller current account and official settlements surpluses. China's foreign exchange reserves would have risen by substantially less than the actual increase (RMB6,253 billion), leaving the level of reserves well below the actual level of RMB8,577 billion.

Assuming, for concreteness and simplicity, that the reserve gain would have been cut in half, the implied level of reserves at end-2006 is RMB5,461 billion. With the PBC keeping net domestic assets at 48.5 percent of the monetary base, the implied size of the monetary base is RMB10,604 billion, 36 percent above the actual figure of RMB7,776 billion but well below the initially hypothesized figure of RMB17,669 billion. This significantly larger monetary base implies increases in China's nominal GDP and price level of about 36 percent by 2006. With such inflation inducing real effective appreciation of the renminbi by 36 percent, China's current account surplus in 2006 would have been substantially less than the actual level of $240 billion. Combined with the 36 percent rise in China's GDP, measured in dollars, the result would probably have been a current account surplus of no more than 3 to 4 percent of China's nominal GDP in 2006, rather than the actual surplus equal to 9 percent of China's GDP.

There is no escape from the conclusion that, in the circumstances that have confronted China's economy since 2002, the Chinese authorities' package of exchange rate and related policies induced massive official settlements surpluses. The usual objection to the monetary approach—that there is insufficiently stable demand for base money—is clearly irrelevant for China. The issue is not whether there is some variation in the ratio of base money to GDP indicating flexibility in the demand for base money but rather whether there is credible evidence of sufficient stability in the demand for base money to support the conclusion that a significantly different package of exchange rate and related policies than that actually pursued by Chinese authorities would have led to substantially different behavior in China's balance of payments.

Indeed, the only situation in which the above analysis applying the monetary approach to recent developments in China would be invalid is

if China was operating in conditions approximating a liquidity trap in which fluctuations in the supply of base money would have been willingly accepted without any meaningful change in the factors that are normally thought to affect the demand for base money.[13] But the evidence contradicts any notion of a liquidity trap in China. That the ratio of base money to nominal GDP is highly stable across a wide range of variation in growth rates of nominal GDP and the price level—and in the face of vast differences in the factors accounting for the growth of the supply of base money—points unequivocally to a reasonably stable demand for base money.[14] The gross magnitudes of the variables that the monetary approach relies upon to explain the behavior of the official settlements balance are so large that they overwhelm any concerns about minor instabilities in the money demand function or money supply process. If, at an unchanged nominal exchange rate path, Chinese authorities had increased net domestic assets *pari passu* with the increases in international reserves that actually occurred between end-2002 and end-2006, no competent economist could doubt that this would have led to vastly higher inflation in China, a substantially appreciated real exchange rate, and a significantly smaller current account surpluses.

Moreover, the argument that the monetary approach is all a tautology or the result of reverse causation is clearly nonsense. It was not by accident or whim that Chinese authorities engaged in massive sterilization to offset much of the rapid rise in the monetary base that would otherwise have resulted from massive foreign reserve gains. They understood fully that allowing such increases in the monetary base would have pushed up

13. Japan in recent years provides the unique recent example of a major economy operating in conditions of a liquidity trap, in which fluctuations in the supply of base money have little effect on anything. Under a monetary policy by which the Japanese authorities pushed the nominal interest rate in the short-term interbank market down to zero and engaged in massive quantitative easing to force large increases in excess reserves (up to 30 trillion yen during 2005), it should be expected that large fluctuations in foreign exchange market intervention, as occurred in 2004 when the Japanese authorities suddenly stopped massive intervention to depress the exchange value of the yen, would have little or no effect. The situation in China, however, was in no way comparable to Japan's very peculiar situation.

14. Anderson (comment to chapter 1) notes that the ratio of currency to base money in China has not been constant and that Chinese banks have sometimes held substantial excess reserves. These facts do not undermine the present analysis using the monetary approach. It is not unusual for currency to decline somewhat as a ratio of total money demand, nor for the demand for broad money to rise relative to income as income rises in a country such as China. To the extent that Chinese banks voluntarily decide to hold excess reserves, this is a component of the demand for base money. To the extent that the government requires banks to hold higher required reserves or persuades them to hold excess reserves, this too is a component of the demand for base money. The fact is that the ratio of base money to nominal GDP has been highly stable, indicating quite stable demand for base money. This observed stability is far beyond the minimum required to demonstrate that the demand for base money is sufficiently stable to rule out the anomaly of the liquidity trap and validly apply the basic principles of the monetary approach to the balance of payments.

inflation to uncomfortable rates. China's experience in the mid-1990s demonstrated this effect. The understandable desire to avoid rapid domestic inflation, however, is not a reason to deny the analytical conclusion that the package of exchange rate and related policies pursued by Chinese authorities generated enormous official settlements surpluses and frustrated appreciation of the real exchange rate of the renminbi, through both nominal appreciation against the dollar and through the operation of Hume's price-specie-flow mechanism. Any economist who does not understand this essential point should retire permanently from commenting on issues related to exchanges rates and the behavior of the balance of payments.

The Monetary Approach and China's Current Account

While application of the monetary approach convincingly explains why China's package of exchange rate and related policies generated huge official settlements surpluses after 2002, it leaves open an important question: How did Chinese policies induce the reduction of national spending relative to national income that is necessarily the counterpart to China's rising current account surplus?

The theoretical literature on the monetary approach has elaborated several mechanisms to explain this phenomenon. In circumstances such as those in China, where the growing demand for base money is not met by increases in net domestic assets, Rudi Dornbusch's classic hoarding function is highly relevant (Dornbusch 1973a, 1973b, 1974; Dornbusch and Mussa 1975). Chinese households own much of the currency and bank deposits that constitute the money supply. Lacking other financial alternatives, much of the saving of Chinese households takes the form of increased money holdings. The part of these increased money holdings arising from household savings that is not base money gets recycled as loans by the banking system and ultimately contributes to somebody's spending. The part of increased money holdings that is sequestered into base money does not get recycled (except to the extent that the authorities expand their net domestic assets); the monetary authorities impound it and add it to an already huge hoard of foreign exchange reserves. The mechanisms through which this sequestration is achieved are generally opaque. For example, the income that Chinese residents earn on their massive bank deposits is very low. Real interest rates paid to depositors have typically been negative in recent years, partly because Chinese banks are required to hold significant reserves against their deposit liabilities, which depresses the returns they can afford to pay to depositors. As the income that deposit holders should receive never appears, we do not see the national savings that result because the government effectively collects this income and uses it to acquire foreign exchange assets. Nevertheless, the ef-

fect is essentially the same as if the government imposed a tax on bank deposits and used the proceeds to buy foreign exchange assets.

More generally, the Chinese government earns substantial seigniorage from its monopoly over the creation of base money. Since 2002 it has used all of this seigniorage to buy additional foreign exchange reserves. It has also borrowed an additional RMB3,000 billion from the Chinese people—corresponding to the reduction in monetary authorities' net domestic assets—to finance purchases of foreign exchange assets. Suppose instead that the government made the seigniorage revenues available to the Chinese people through transfer payments (or, equivalently, lowered taxes while maintaining the level of government expenditure). Suppose further that the government did not borrow from the people to finance reserve accumulation but instead imposed an explicit tax to finance its accumulation of foreign exchange reserves, amounting cumulatively to RMB6,253 billion between 2002 and 2006. The effects of this alternative would have been essentially the same as what actually happened in China. But with reserve accumulation financed by an explicit tax, it would be much clearer why spending by Chinese residents was depressed relative to income as the counterpart of the large increase in the current account surplus.

To develop a more formal analysis of how the monetary approach helps to explain the increase in the current account surplus after 2002, it is useful to return to our earlier notation and formulas. When China's GDP rises by an amount dY, where d stands for the change, the demand for base money by Chinese residents rises by bdY, where b is the desired ratio of base money to nominal GDP explained earlier. There are two ways in which the supply of base money may rise to meet this increased demand: (1) from an expansion of the net domestic assets of monetary authorities, dN; or (2) from increases in base money that the monetary authorities must issue as the counterpart to increases in their foreign exchange reserves, dF.

The increase in foreign exchange reserves corresponds to China's official settlements balance, which must equal the sum of China's current account balance, CA, and the net capital inflow into China (other than accumulation of official foreign reserves), dK; that is, $dF = CA + dK$.[15] For the increase in the supply of base money to meet the increase in demand, we must have $bdY = dN + CA + dK$.

If the rules of accounting are properly implemented, a country's current account balance must correspond to the country's net saving, S, which in turn must equal the excess of national income, Q, over national expenditure, E; that is, $CA = S = Q - E$. National income, Q, differs (modestly) from

15. In the data reported in the IMF's *International Financial Statistics*, there are modest differences between the level of China's foreign exchange reserves (valued in renminbi) and the value of foreign assets of the PBC. For annual changes, differences between the official settlements balance (valued in renminbi) and the change in foreign assets of the PBC are significant in some years.

GDP, Y, to the extent that a country's residents receive net income from the rest of the world: $Q = Y + Nfi$. For this purpose, net foreign income, Nfi, is defined to include both private and official international transfers, which are part of a country's balance of payments receipts but not counted in the usual national income aggregate of gross national product or gross national income. National expenditure on goods and services, E, is comprised of consumption, Cn, investment, Iv, and government spending on goods and services, G; that is, $E = Cn + Iv + G$. As GDP = $Y = Cn + Iv + G + (Ex - Im)$, we may immediately conclude that $CA = S = Q - E = (Ex - Im) + Nfi$; that is, the current account balance is, as it should be, the sum of net exports plus net income, including transfers from abroad.

In applying the monetary approach to analyzing the current account, the monetary activities of monetary authorities are distinguished from the economic and financial activities of the aggregate of all other Chinese residents and from the activities of the rest of the world. The monetary activities of the monetary authority consist precisely and exclusively of expanding (contracting) the supply of base money, B, in exchange for increases (decreases) in the authority's holdings of foreign exchange assets, F, and net domestic assets, N. These activities are summarized by the equation $dB = dF + dN$.

All domestic residents other than the monetary authority have a flow of current receipts $Q + dK + dN$ consisting of national income plus net inflows of capital from abroad plus the proceeds of net sales of domestic assets to the monetary authority. These current receipts must all be spent either on current purchases of goods and services, $E = Cn + Iv + G$, or on the acquisition of additional base money, dB. As previously emphasized, the essential idea of the monetary approach is that the amount of current receipts that is devoted to acquiring additional base money does not float freely in the breeze and automatically accommodate to whatever additional base money the monetary authority may decide to supply. Instead, there is a reasonably well-defined demand for additional base money, bdY, that depends to an important degree on the growth of nominal GDP. To the extent that current receipts must be devoted to satisfying the demands of domestic residents for additional base money, these receipts are not available to pay for spending on goods and services. Because current receipts include net capital inflows, dK, and the proceeds of net sales of domestic assets to the monetary authority, the amount that is available to finance domestic spending, E, after satisfying the demand for additional base money, is given by $E = Q + dK + dN - bdY$. As the current account, CA, is equal to $Q - E$, this condition implies that

$$CA = Q - E = (bdY - dN) - dK.$$

Using this formula, movements in the current account balance may be decomposed into movements of two factors: a monetary factor, $bdY - dN$,

which measures the excess of growth of demand for base money over the increase of net domestic assets of the monetary authorities; and a capital flow factor, $-dK$, which corresponds to the net capital outflow, excluding official reserve transactions.

Unlike the United States, for China the behavior of the monetary factor is highly relevant to explaining the evolution of China's current account, especially the upsurge of the current account surplus in recent years, but it clearly falls short in explaining everything important about the behavior of China's current account. Table 8.4 helps to illuminate these conclusions. The first two columns report China's current account balance, CA, in billions of renminbi and as a share of China's GDP (the current account as a share of national income, CA/Q, is very similar to CA/GDP). The next two columns report the capital flow factor, $-dK$, in billions of renminbi and as a share of China's GDP.[16] It is apparent that, although China maintains significant restrictions on private capital flows, the magnitude of these flows and fluctuations in them is quite substantial. Capital flowed into China from 1995 through 1997, leaving a current account surplus that was somewhat smaller than that implied by the monetary factor. From 1998 through 2000, capital flowed out of China, probably partly reflecting spillovers from the crises in other Asian emerging-market economies, and this was associated with current account surpluses that were larger than the monetary factor implied. Since 2001 capital inflows have returned to China, with a very large inflow in 2004 probably related to speculation that the renminbi might be revalued.[17] Correspondingly, in recent years the current account surplus has been somewhat smaller than the monetary factor implied. This probably reflects efforts to circumvent the government's policy of repressing increases in the supply of base money and the supply of credit inside China. In other words, some Chinese residents have decided to exploit their access to foreign capital rather than reducing their spending and raising their saving as the means of acquiring additional base money.

A key consequence of the fluctuations in capital flows is that the influence of the monetary factor on China's current account is not one to one; movements in the monetary factor cannot explain everything that is im-

16. The figures for the capital account factor are the sum of the capital account balance, the financial-account balance, and net errors and omissions in China's balance-of-payments accounts as reported by the IMF. Net errors and omissions are included here because, for many countries, they appear to reflect primarily unrecorded capital flows, although they also surely include some misreported trade flows.

17. The sharp falloff in capital inflows in 2006 partly reflects efforts by Chinese authorities to persuade Chinese banks to hold the proceeds from foreign investment inflows in external accounts, with the result that these inflows were not recorded in the balance of payments and did not require explicit PBC sterilization to forestall their effect in raising the monetary base. Through these efforts the Chinese authorities effectively engaged in disguised foreign exchange market intervention to help limit the appreciation of the renminbi.

Table 8.4 Monetary factors and the current account in China, 1994–2006

Year	Current account balance (CA) (billions of renminbi)	Current account balance relative to GDP (CA/Y) (percent)	Net capital inflow (–dK) (billions of renminbi)	Net capital inflow relative to GDP (–dK/Y) (percent)	Change in monetary factor (dB – dN) (billions of renminbi)	Change in monetary factor relative to GDP (dB – dN)/Y (percent)	Change in monetary factor (bdY – dNa) (billions of renminbi)	Change in monetary factor relative to GDP (bdY– dNa)/Y (percent)
1994	60	1.2	203	4.0	290	5.8	288	5.7
1995	14	0.2	174	2.8	222	3.5	341	5.4
1996	60	0.8	203	2.7	289	3.9	151	2.0
1997	306	3.8	–9	–0.1	384	4.7	134	1.6
1998	261	3.1	–209	–2.4	31	0.4	189	2.2
1999	130	1.4	–58	–0.6	110	1.2	116	1.3
2000	170	1.7	–81	–0.8	72	0.7	186	1.9
2001	144	1.3	249	2.3	428	3.9	324	3.0
2002	293	2.4	329	2.7	338	2.8	345	2.9
2003	380	2.8	585	4.3	790	5.8	488	3.6
2004	568	3.5	1,137	7.1	1,582	9.9	1,390	8.7
2005	1,318	7.0	381	2.0	1,648	8.7	1,928	10.2
2006	1,992	9.4	–24	–0.1	2,233	10.1	1,995	9.0

Sources: International Monetary Fund, *International Financial Statistics Yearbook,* 2007 and earlier years, and author's calculations; GDP data are "production estimates" from China's National Bureau of Statistics.

portant in the behavior of China's current account. This relates to the point made above that the monetary approach is fundamentally a framework for analyzing and understanding the behavior of the official settlements balance, and in turn, its relevance and usefulness in explaining the behavior of the current account—or other subaccounts of the overall balance of payments—depends on the circumstances of particular countries, especially in their arrangements regarding international capital mobility.

The next two sets of columns in table 8.4 report two alternative measures of the monetary factor, in billions of renminbi and as shares of GDP. The first of these measures, $dB - dN$, is simply the change in the monetary base less the change in the PBC's net domestic assets, measured using year-end data. The argument for using this measure is that in annual data, the actual change in base money is a good proxy for the change in the demand for base money, and $dB - dN$ is therefore a reasonable measure of excess growth of demand for base money over the supply that the monetary authority provides through acquiring net domestic assets. Comparing the movements in this measure of the monetary factor with movements in the current account, as reported in table 8.4, the series for both $dB - dN$ and CA are consistently positive and have similar average ratios to GDP: 4.4 percent versus 3 percent. The ratio $(dB - dN)/Y$ also varies considerably over the period, ranging from under 1 percent in 2000 to over 9 percent after 2003. Thus—in contrast to the monetary factor in the United States, which is always essentially zero—it is at least possible that movements in the monetary factor for China might help to explain something important about the behavior of the current account, or might fail dramatically to provide a relevant explanation if the scale and pattern of movements in the monetary factor were decisively different from those of the current account.

As the monetary approach implies, movements in $dB - dN$ show some rough correspondence to movements in the current account, especially for the large upsurges in both $(dB - dN)/Y$ and CA/Y after 2003. This rough relation applies not only to the general pattern of movements of the two time series but also to similar absolute scales of the movements in the two series. If the theory is right, then movements in the monetary factor should drive movements of the same sign and similar scale in the current account, not movements of the opposite sign or a much greater or smaller scale.

The rough relation between $(dB - dN)/Y$ and CA/Y works best when movements in the monetary factor are related to movements in the current account balance a year or so later. The relatively high levels of $(dB - dN)/Y$ in 1995–97 are reflected in relatively high values of CA/Y in 1997–98; the much lower values of the monetary factor in 1998–2000 are reflected in the lower levels of CA/Y in 1999–2001; and the upsurge in the monetary factor that begins in 2003 and strengthens significantly in 2004 is followed one year later by an upsurge in the current account surplus, which also grows through 2006. Data so far available for 2007 indicate that

the further rise in the monetary factor to 10.1 percent of GDP in 2006 will be reflected in a further rise in the current account surplus this year.

The timing in the relation between movements in the monetary factor, $(dB - dN)/Y$, and the current account balance, CA/Y, as well as the rough correspondence of the gross magnitudes of these two series, is important evidence there is some causal effect running from movements in $dB - dN$ to subsequent movements in the current account. There is also a mechanism of reverse causation—or, more appropriately, simultaneous causation—through which movements in the current account balance lead to changes in the supply of base money and, particularly in recent years, to sterilization operations, by which the monetary authorities reduce net domestic assets to prevent undesired increases in the supply of base money. But this alternative mechanism clearly does not explain the lead in the apparent relationship of changes in $(dB - dN)/Y$ ahead of changes in CA/Y. Thus, as the monetary approach implies, the monetary factor $dB - dN$ appears to be driving at least an important part of the developments in China's current account; the relation is not predominantly the other way around.

The second measure of the monetary factor reported in the final two columns of table 8.4 provides an alternative approach to addressing the issue of possible reverse or simultaneous causation. For these columns, the alternative monetary factor, $bdY - dNa$, is calculated as follows. It is assumed that the growth of demand for base money for a given year may be reasonably approximated by the average ratio of base money to GDP, $b = 0.37$, multiplied by the change in Y from its level the preceding year. Because the data for Y are year-average figures and the data for N are year-end figures, it is not appropriate simply to subtract dN from bdY to calculate the alternative monetary factor. Instead, a series for the average level of N during the year, Na, is calculated by taking the average between N at the end of the year and N at the end of the preceding year; then dNa is calculated as the change in Na from the preceding year to the current year. This procedure for calculating the monetary factor $dbY - dNa$ forecloses any channel for reverse causation as far as the measure of change in demand for base money, dbY, is concerned but still leaves partially open the channel for some reverse causation affecting dNa.

Comparing the behavior of the alternative measure of the monetary factor $bdY - dNa$ with that of the current account yields essentially the same conclusions as does the comparison using the monetary factor $dB - dN$. The two series have similar average magnitudes and are uniformly of the same sign. There is also a rough correspondence of their movements that works best when movements in the monetary factor have a lead over movements in the current account. Again, the monetary approach appears to contribute something useful to the explanation of the behavior of China's current account balance, especially the remarkable upsurge in the surplus after 2003.

Of course, this conclusion must be interpreted with due caution. As previously emphasized, the monetary factor does not perfectly explain the behavior of the current account; other forces that are not captured by the monetary factor are clearly important. Also, in considering the relation between the monetary factor and the current account, there is surely some reverse or simultaneous causation. With their policy of resisting appreciation of the renminbi, Chinese authorities automatically respond to upward pressures on the exchange rate with official intervention, and they tend to sterilize this intervention to the extent that its effects in increasing base money threaten to generate too much domestic inflation. Thus the authorities' reaction to a rising current account surplus tends to push up the monetary factor, $dB - dN$, in reaction to increases in CA, creating a process of reverse causation. The timing of the relation between movements in the monetary factor and movements in the current account shows that causation cannot be going only in this reverse direction. There must be significant causation going in the primary direction—from movements in the monetary factor to subsequent movements in the current account.

Moreover, the presence of an important mechanism of reverse causation—from the current account to the monetary factor—does not in any way weaken the primary mechanism of causation from the monetary factor to the current account. The authorities' reaction to large foreign exchange inflows with sterilization operations affects the behavior of the monetary factor. But whatever the reasons for the authorities' actions, Chinese residents adjust their behavior to the fact that the authorities' increases in net domestic assets are supplying them with less of an increase in base money than they desire. Chinese residents thus reduce their spending relative to their income or seek additional foreign capital inflows to acquire the additional base money. Thus, causation runs in both directions in what has become a vicious spiral, as ever more vigorous efforts to resist appreciation and sterilize the domestic monetary consequences of official reserve accumulation leads to stronger efforts by Chinese residents to raise saving to acquire the additional base money they require, generating ever-larger current account surpluses.

Explaining Some of the Chinese Puzzles

The above analysis of how monetary factors have influenced China's current account is helpful in explaining some otherwise very puzzling features of the evolution of China's economy in recent years.

First, the rise in China's current account surplus is exceptionally large: from about 2 percent of GDP in 2002 to over 9 percent of GDP in 2006 and probably to about 12 percent of GDP in 2007. Moreover, this rise in the current account surplus has occurred despite two factors that should have pushed China's current account toward deficit: (1) growth of China's

economy that has substantially exceeded the growth of its trading partners; and (2) large increases in the prices of China's commodity imports, especially energy. The depreciation of China's real effective exchange rate relative to a plausible estimate of its longer-run equilibrium path can rationalize an important part of the improvement in China's current account improvement—but not all of it.

Second, China's current account surplus is necessarily equal to its national savings–investment balance. A rising current account surplus necessarily corresponds to an equal increase in the excess of national saving over national investment. In China over the past four years, there has been an extraordinary boom in investment, as fixed investment has risen to over 40 percent of GDP and GNP, and the average annual growth rate of real fixed investment has outstripped significantly the average growth rate of China's real GDP. It is surprising, even bizarre, that with such rapid growth in investment, China's saving-investment balance has improved by 6 percentage points of GDP or GNP between 2002 and 2006, and probably by another 2 to 3 percent by 2007.

A third puzzle concerns the distribution of investment in China. Contrary to the proclaimed objectives of China's government, business investment has been particularly concentrated in the tradable-goods sector, related infrastructure, and real estate development in China's large commercial cities, rather than in the underdeveloped hinterland. Capital-intensive industries have seen large investments that have caused the capital-labor ratio in these industries to rise.[18] Total factor productivity growth in these industries appears to have been relatively poor, but labor productivity growth has benefited from rising capital-labor ratios, while employment growth in these sectors has been relatively meager.

The three puzzles are logically interconnected. The extraordinary rise in China's current account surplus is clearly linked both to the remarkable improvement in China's saving-investment balance and to the extraordinary rise in productive capacity in China's tradable-goods industries. Hence, an explanation of these puzzles that relies entirely on the coincidental effects of special factors is neither satisfying nor convincing. Rather, it is relevant to ask whether there is a common factor that helps to explain at least an important part of all of the puzzles.

The preceding discussion of applying the monetary approach to China provides such a common factor. It explains how the government's policy of resisting renminbi appreciation through massive and largely sterilized official intervention has induced large increases in net saving as Chinese residents seek to acquire the additional base money that they want to hold in a rapidly growing economy. It also helps to explain why the Chinese current account balance has improved substantially more than would normally be expected from only the real effective depreciation of the ren-

18. See Lardy (2007a) for further discussion of these phenomena.

minbi. Increases in net saving automatically tend to improve the current account by reducing import demand, even if the exchange rate does not change.

The remarkable combination of an enormous investment boom and substantial improvements in China's net saving-investment balance reflects the effect of China's exchange rate and related policies in putting strongly biased downward pressure on consumption spending while stimulating investment, especially by businesses in the tradable-goods sector. These policies force Chinese households to restrain spending growth if they want to accumulate additional currency and bank deposits, or they achieve the same result from depressing the incomes that households would otherwise receive on their huge money holdings. By contrast, many Chinese businesses have favorable access to credit from domestic banks at real interest rates that are kept artificially low. Those with such favorable access can afford to invest. Much more than Chinese households, Chinese businesses also enjoy access to foreign capital inflows, much of which come in the form of financing for direct investment. Thus business investment has another important avenue to escape the downward pressure on domestic spending exerted by the government's exchange rate, intervention, and sterilization policies.

Some businesses are much more advantaged than others, and these businesses tend to be linked to the tradable-goods sector of the Chinese economy, including related infrastructure and real estate in China's large commercial centers. The policy of keeping the renminbi substantially and increasingly undervalued is an important part of this special advantage. This policy keeps the prices of the outputs of firms in the tradable-goods sector high relative to output prices for firms in the nontradable-goods sector. This situation tends to make firms in the tradable-goods sector more profitable, and hence, both more able to generate internal funds to finance investment and more attractive to domestic lenders and to domestic and foreign investors. Also, as Nicholas Lardy (2007b) has argued recently, the situation tends to enhance the real effective undervaluation of the renminbi, measured using unit-labor costs rather than consumer prices.[19] The

19. In contrast to consumer price indices, which are essentially universally available, consistent measures of unit-labor costs in tradable-goods industries are not generally available for a wide range of countries. Also, relative unit-labor costs in manufacturing—the key tradable-goods industries for most countries—have some deficiencies of their own when used in calculating real exchange rates. Nevertheless, where reliable measures of unit-labor costs are available, they can be very useful. In measuring real exchange rates within the euro area, the nominal exchange rate between different member countries has been fixed since the start of 1999. Inflation rates measured by consumer price indices have moved somewhat differently in different euro-area countries, but these differences do not indicate large changes in real exchange rates. Hence, consumer price index–based measures of euro-area real exchange rates are not very useful in explaining the quite wide divergences in the current account performances of different euro-area countries, in particular the large growth of Germany's surplus versus the growth of Italy's deficit. In contrast, measures of real exchange

effective output subsidy for capital-intensive firms in the tradable-goods sector does this directly. In addition, increases in capital intensity normally increase labor productivity by raising the capital-labor ratio.

It would be an exaggeration to suggest that the monetary approach explains almost all of the puzzles described earlier. However, the approach clearly helps to provide a unified explanation for phenomena that are logically linked, while leaving considerable room for a variety of special factors that are not part of the monetary approach. The most worrying feature of this explanation is not that it is incomplete, but rather that it suggests that the phenomena of China's rising current account surplus and its interaction with the policies of the Chinese authorities to resist appreciation of the renminbi through increasingly massive, increasingly sterilized foreign exchange market intervention has a self-reinforcing internal dynamic. China started down the path of a substantially undervalued renminbi by deciding to maintain the renminbi's nominal peg against the US dollar as the dollar depreciated substantially against many other important currencies. This policy is now operating like a huge snowball rolling rapidly downhill, augmenting in size and increasing in speed as it goes.

A Digression on Accounting

Before leaving the monetary approach, it is (unfortunately) necessary to clarify certain points concerning the accounting for aggregates that appear, or should appear, in a comprehensive statement of national income and expenditure accounts. As explained in the above discussion, net national saving S is defined as the excess of national income Q over gross national expenditure $E = Cn + Iv + G$, where Q is gross domestic product $Y = Cn + Iv + G + Ex - Im$ plus the net foreign income of Chinese residents Nfi. Net national saving is explicitly not attributed to particular sectors of the Chinese economy.

Jonathan Anderson (in his comment on chapter 1 in this volume) has raised the objection that the empirical application of the monetary approach to explain an important part of the recent behavior of China's current account is flawed because there has been no significant increase in the saving rate of Chinese households in recent years corresponding to the rise in China's current account surplus. Instead, much of the increase in saving in China has been in business saving, that is, the profits retained by corporate businesses and state enterprises that are not distributed to shareholders or paid as taxes. This is correct if we apply the usual measure of household saving as the excess of household disposable income

rates based on relative unit-labor costs in manufacturing show more than 30 percent real depreciation of Germany's exchange rate vis-à-vis Italy. This helps considerably in explaining why Germany's current account has moved into substantial surplus in recent years while Italy's deficit has grown.

Yhd over consumption spending *Cn*, and if we account separately for saving in the business sector *Sb*.

The above analysis does not follow such an approach, as doing so requires description and analysis of dozens of the details of national-income accounting that are required to deal with the multifaceted economic and financial transactions among the many sectors of China's economy. For China, at a minimum, sectors of interest include households; private businesses, both incorporated and unincorporated; state enterprises; state banks and financial institutions; private banks and other private financial institutions; securities markets; government operations, including production and purchase of goods and services from business, households, and foreigners, direct and indirect taxation of households, business, and foreigners, transfers and subsidies paid to household, business, and foreigners, and issuance of public debt and payment of interest thereon; the nonmonetary operations of the monetary authority; the monetary operations of the monetary authority; and transactions with the rest of the world. Getting into this morass is tedious, confusing, and unnecessary for the purposes of establishing the main points of the present discussion. Instead, we focus attention on just three sectors: (1) the aggregate of all Chinese residents except the monetary operations of the monetary authority; (2) the monetary expectations of the monetary authority (summarized by the relation $dB = dN + dF$); and (3) the rest of the world. In this simplified framework, the following points are essential.

First, there is the essential idea of a reasonably stable demand for base money. This means that for a given behavior of Y (nominal GDP), the quantity of base money B cannot float freely in the breeze. More specifically, with the monetary authority holding the exchange rate to a fixed path, if the monetary authority expands its net domestic assets N, thereby tending to generate an expansion in the supply of base money, then either foreign exchange reserves F are forced to flow out to keep the monetary base from expanding or an increase in Y is induced that raises the level of demand for base money to the higher level of supply. Nothing about the details of multisector national income accounting changes this principle.

Second, Chinese residents (exclusive of the monetary authority) can obtain the additional base money that they effectively demand as Y rises from only three sources: (1) increases in N that the central bank pays for by issuing base money; (2) net inflows of foreign capital K that Chinese residents exchange with the monetary authority for additional base money, as the monetary authority intervenes to keep the nominal exchange rate on its desired path; and (3) reductions in gross national expenditure $E = Cn + Iv + G$ relative to national income, $Q = Y + Nfi = Cn + Iv + G + Nfi$, that result in a current account surplus, $CA = Q - E = Ex - Im + Nfi$, and a corresponding inflow of foreign exchange that the monetary authority absorbs by issuing additional base money. Given a reasonably stable demand for base money, it follows that movements in the

monetary factor $bdY - dN$—the difference between growth of demand for base money and growth of net domestic assets—must be reflected in the sum of the current account and private net capital flows, that is, $bdY - dN = CA + dK$. Nothing about the details of multisector national income accounting changes any of this.

Third, China is partially open to private international capital flows, and there is little doubt that movements in dK have absorbed part of the impact of movements in the monetary factor $bdY - dN$ on the current account. However, the flexibility of private net capital flows into China is sufficiently limited that movements in the monetary factor have also been reflected to a significant extent in movements in China's current account balance. Details concerning the functioning of China's multisector economy are probably of some importance in understanding how capital flows have responded to movements in $bdY - dN$ and how much this has affected particular sectors. But they do not alter the basic result that the current account has absorbed a substantial part of the movements in $bdY - dN$.

Fourth, movements in the current account balance, $CA = Ex - Im + Nfi$, necessarily correspond to movements in the difference between national income $Q = Y + Nfi = Cn + Iv + G + Ex - Im + Nfi$ and gross national expenditure $E = Cn + Iv + G$, as emphasized by the fact that $CA = Q - E$. Given the value of Nfi, which is small relative to Q and Y, it follows that significant movements in the ratio of the current account to Q, that is, $CA/Q = (Q - E)/Q = 1 - (Cn/Q) - (Iv/Q) - (G/Q)$, must be reflected in significant movements in one or more of the ratios: Cn/Q, Iv/Q, or G/Q. Therefore, movements in the monetary factor $dbY - dN$ that induce significant movements in CA—and hence, CA/Q—must also be reflected in significant movements in one or more of the ratios of consumption spending, investment spending, or government spending to Q. Nothing yet says which of these ratios will move or by how much, but one or more of them must move. Nothing about the details of China's multisector economy alters this general conclusion either, although the details may be relevant to which ratios move and how much.

Regarding the explanation of how the ratios Cn/Q, Iv/Q, and G/Q moved in China between end-2002 and end-2006 as CA/Q rose sharply, the analysis above does suggest reasons why Cn/Q declined significantly while Iv/Q rose. As table 8.5 indicates, this is what happened.[20] The share of consumption spending in Q fell by 8 percentage points, from 43.7 to 35.7 percent, while the share of investment spending in Q rose by 4 percentage points, from 37.9 to 41.9 percent. The share of government spending in Q fell by 2.4 percentage points, from 15.9 to 13.5 percent. The sum

20. The GDP data used to construct table 8.5 are the "demand side" series that is released with a lag of about one year (after the standard series used in earlier tables). This series for GDP provides a breakdown into the main components of GDP: consumption, government spending, and net exports.

Table 8.5 Movements in ratios of consumption, investment, and government spending to GNP, 1994–2006

Year	Gross national income (Q) (billions of renminbi)	Consumption (Cn) (billions of renminbi)	Cn/Q (percent)	Investment (Iv) (billions of renminbi)	Iv/Q (percent)	Government spending (G) (billions of renminbi)	G/Q (percent)
1994	5,018	2,184	43.5	2,074	40.5	740	14.8
1995	6,236	2,837	45.5	2,547	40.8	838	13.4
1996	7,330	3,346	45.6	2,878	39.3	996	13.6
1997	8,117	3,692	45.5	2,997	2997	36.9	13.8
1998	8,551	3,923	45.9	3,131	36.6	1,236	14.4
1999	9,033	4,192	46.4	3,295	36.5	1,372	15.2
2000	9,806	4,586	46.8	3,484	35.5	1,566	16.0
2001	10,808	4,921	45.5	3,977	36.8	1,766	16.3
2002	12,018	5,257	43.7	4,556	37.9	1,912	15.9
2003	13,701	5,683	41.5	5,596	40.8	2,062	15.1
2004	16,488	6,387	38.7	6,917	42.0	2,320	14.1
2005	19,165	7,122	37.2	7,957	42.1	2,660	13.9
2006	22,443	8,012	35.7	9,410	41.9	3,029	13.5

Sources: China's National Bureau of Statistics for GDP data and its composition; International Monetary Fund, *International Financial Statistics Yearbook,* 2007 and earlier years, for data on net foreign income included in (Q).

of the changes in the three ratios, of course, corresponds (with sign reversed) to improvements in the ratio of the current account to *Q*.

Especially in light of Anderson's criticisms, it should be reemphasized that the ratio of consumption spending referred to here is the ratio of *Cn* to *Q*, not the ratio of *Cn* to household disposable income *Yhd*. In recent years, consumption in China has not fallen to a substantial degree relative to *Yhd*, but growth of *Yhd* has been suppressed relative to the growth of *Q*. This has happened through a multiplicity of channels that would take far too much space to attempt to elaborate in any detail and would probably more confuse than clarify. An example, however, helps to illuminate the matter. Disposable income of Chinese households is repressed because the interest paid to households on their large holdings of bank deposits is kept very low, and they receive no interest at all on holdings of currency. The repression of interest paid to households enables banks to hold large (low-interest) reserves without suffering corresponding reductions in their profits. It also enables banks to charge relatively low interest rates to borrowers. Businesses in both the state and private sectors benefit from relatively low real borrowing costs and their profits reflect this benefit. Higher profits for banks and businesses enable higher levels of business saving, while household saving, although not necessarily the saving rate as a percentage of *Yhd*, is constrained by the repression of *Yhd*.

Of course, this does not entirely explain why the growth of household disposable income in recent years has been repressed relative to the growth of *Q*. And not all of the reasons that *Yhd* growth has been repressed relative to the growth of *Q* can necessarily be related to the effects of Chinese exchange rate and related policies. But the notion that all of this is merely a fortuitous accident does not pass the smell test. At the aggregate level, we know that the effect of China's exchange rate and related policies, given the circumstances of recent years, must have been to depress the ratio of gross national expenditure to *Q*, and hence, to depress the sum of the ratios *Cn*/*Q*, *Iv*/*Q*, and *G*/*Q*. It is not merely happenstance that *Cn*/*Q* has fallen substantially while *Iv*/*Q* has risen significantly. This result also must have been driven to a meaningful extent, if not exclusively, by the interaction of China's exchange rate and related policies with other features of the Chinese economy.

The Problem of Global Imbalances

The large and growing US current account deficit and the significant apparent overvaluation of the US dollar relative to medium-term economic fundamentals were already a matter of concern to the Fund in the late 1990s. This concern, however, was primarily forward looking. In the second half of the 1990s, the strong US dollar and the rising US current account deficit were more of a solution to the world's economic problems

than a cause of them, even if the US external deficit and the dollar's overvaluation would eventually need to be corrected.

In recent years, however—and especially since 2002—the large and (until 2007) growing US current account deficit and the corresponding surpluses of a number of countries have been seen as an important concern, part of the problem of global payments imbalances and the worry that their correction might become rapid and disorderly. In particular, the IMF executive board, which is under international law the adjudicator of issues concerning the effective operation of the international monetary system, has found repeatedly in connection with its semiannual assessments of the *World Economic Outlook* (WEO) that the large US external payments deficit and the corresponding surpluses of several other countries, including China, are a major issue. The executive board has also elaborated a strategy for addressing this concern, including the contributions that should be made by various members of the Fund. In view of this agreed strategy, it is relevant to examine the efforts to implement it.

The United States

While further progress in improving the structural fiscal position would be desirable, the US federal budget deficit has contracted from 3.6 percent of GDP in FY2004 to 1.2 percent in FY2007. Also, in recent quarters, growth of domestic demand in the United States has slowed, from more than 3½ percent annually from mid-2003 through mid-2006 to around 2 percent annually since the first quarter of 2006. Sharp declines in residential investment and slowing consumption growth linked to falling home values point to likely continuing improvements in the private-sector savings-investment balance.

As table 8.6 indicates,[21] except for the Japanese yen, the real exchange rates of industrial-country currencies against the US dollar have all appreciated substantially since 2002. The current accounts of Australia, the euro area, and the United Kingdom have moved in the direction consistent with reducing the US deficit. The improvements in Canada's and Norway's current accounts reflect higher world energy prices. For Switzerland and to a lesser extent Sweden, there might be more of a question about the contribution to reducing global imbalances, but large real exchange rate appreciations indicate that these countries are not resisting necessary adjustments. For Japan, there is more of an issue. The yen has depreciated since 2002 from a level that was already probably somewhat undervalued, and the

21. In this table, nominal exchange rate changes are measured from end-2001. Real exchange rate changes are calculated by adjusting the nominal exchange rate change for the ratio of the rise in consumer prices from 2001 to 2006 for the country (or region) in question to that of the United States. GDPs for 2005 are converted into US dollars using the average exchange rate for 2005.

Table 8.6 Exchange rate and balance-of-payments developments: United States and industrial countries

Country	Change in exchange rate versus US dollar (percent)	Change in consumer prices (percent)	Change in real exchange rate versus the United States (percent)	Current account balance (billions of dollars) 2002	Current account balance (billions of dollars) 2006	Nominal GDP, 2005 (billions of US dollars)
United States	—	13.9	—	–472	–857	12,456
Australia	55.0	15.1	56.6	–16	–41	685
Canada	36.7	11.6	33.9	13	21	1,130
United Kingdom	35.3	14.3	35.9	–25	–80	2,232
Euro area	49.4	11.4	46.1	51	–20	9,609
Germany	49.4	7.9	41.6	41	147	2,787
France	49.4	9.9	44.2	11	–28	2,137
Italy	49.4	12.7	47.9	–9	–28[a]	1,770
Spain	49.4	17.1	53.6	–22	–106	1,125
Netherlands	49.4	9.6	43.8	10	57	629
Belgium	49.4	10.2	44.7	12	7	372
Norway	44.0	8.3	36.9	24	56	296
Sweden	55.4	7.8	47.1	13	24[a]	357
Switzerland	37.4	2.0	23.1	25	63	366
Japan	10.7	–1.1	–1.7	112	171	4,549

a. Figure is from 2005.

Note: Exchange rate change is cumulative from end-2001 to end-2006; positive indicates appreciation.

Source: International Monetary Fund, *International Financial Statistics Yearbook,* 2007.

current account surplus has expanded by about $50 billion. But excluding Japan, the non-US industrial countries have generally made important contributions to the strategy for reducing global payments imbalances.

Meanwhile, the current accounts of major oil exporters generally have moved into massive surpluses over the past five years, as world oil prices have nearly quadrupled.[22] When world oil prices rise sharply, exporters initially find it difficult to spend all of the increased export revenues, and foreign assets are accumulated.[23] However, oil exporters do increase their spending relatively rapidly, and their current account surpluses conse-

22. As noted in the earlier quotation from the Summing Up of the Executive Board discussion, chapter 2 of the April *2006 World Economic Outlook* provides a detailed analysis of the effects of oil price shocks.

23. There was considerable concern after the first world oil price shock over whether the surpluses of the major oil exporters could be recycled efficiently to countries that raise their spending (in reasonable and productive ways) to offset the negative impact that higher savings by oil exporters would otherwise have on world aggregate demand, and hence, on world output and employment. This has not been a significant concern in the present round of oil price increases, although it is still possible that the very low interest-rate environment to which increased savings by oil exporters have contributed may yet lead to important difficulties.

quently decline. This is what is happening in the present round of world oil price increases. Russia's imports have surged upward by 160 percent between 2002 and 2006. In Saudi Arabia, imports rose by 150 percent between 2002 and 2006. Once world oil prices stop rising rapidly, import spending may reasonably be expected to catch up with much if not all of the increase in revenues of oil exporters. The rest will be saved in accumulations of foreign assets, and this increased saving will be relatively efficiently recycled by the international financial system. So far at least, the process has operated effectively.

Table 8.7 reports key results regarding developments in the trade and current account balances and exchange rates from 2002 through 2006 for important emerging-market countries that are not significant oil exporters. Leaving aside China, Hong Kong, Malaysia, and Singapore, all but two of the countries covered in table 8.7 share two general characteristics: Their current accounts are either in deficit or in modest surplus as shares of their respective GDPs, and their exchange rates have appreciated significantly against the US dollar since 2002. For these countries, these developments indicate that they are not making the problem of global payments imbalances any worse, and in many cases, are making modest contributions to resolve this global problem.[24]

Developments in the balance of payments and exchange rates of Hong Kong, Malaysia, and Singapore raise important concerns that these economies are not making the appropriate contributions to resolving the problem of global imbalances. Adding in Taiwan, which is not a member of the Fund, the combined current account surplus of the four economies rose from about $80 billion in 2002 to $120 billion in 2006. A reduction of this combined surplus by about one-third would provide the counterpart to about 10 percent of the needed reduction in the US current account surplus—not small for countries with combined GDPs that equal about 6 percent of that of the United States.

Even though China is a major oil importer, its current account surplus rose by $200 billion from 2003 to 2006 and appears headed for a further $80 billion rise in 2007. As previously emphasized, China's exchange rate and related policies have clearly played a central role in stimulating this massively rising current account surplus.

Thus, in assessing implementation of the agreed strategy for reducing global payments imbalances espoused by the Fund in connection with its responsibility to "oversee the international monetary system in order to ensure its effective operation," the following conclusion is justified: China is the one major player in the world economy that is making large and growing negative contributions toward resolving the problem of global

24. For Chile, the rise in the current account surplus reflects surging world copper prices. For Argentina, there is more of a question about whether policies are appropriate from both a domestic and international perspective.

Table 8.7 Exchange rate and balance-of-payments developments: United States and selected emerging-market countries

Country	Change in exchange rate versus US dollar (percent)	Change in consumer prices (percent)	Change in real exchange rate versus the United States (percent)	Current account balance (billions of dollars) 2002	Current account balance (billions of dollars) 2006	Nominal GDP, 2005 (billions of US dollars)
United States	—	13.9	—	–472	–857	12,456
Asia						
China	6.0	7.6	1.4	46	250	2,278
Hong Kong	nil	–3.1	–14.9	12	21	178
Malaysia	7.6	11.3	5.1	7	26	131
Singapore	20.5	3.2	9.2	12	36	117
India	8.9	18.6	18.6	7	–13	809
Korea	41.3	15.8	43.7	5	6	801
Philippines	4.7	29.2	18.8	0	5	99
Thailand	22.7	15.2	24.1	5	3	177
Latin America						
Argentina	–67.1	81.4	–47.6	9	8	177
Brazil	8.6	47.8	40.9	–8	13	882
Chile	22.8	13.4	22.3	–1	5	119
Colombia	3.4	32.1	19.9	–1	–3	123
Mexico	–16.0	23.9	–8.6	–14	–2	768
Other regions						
Czech Republic	73.4	9.5	66.7	–4	–5	124
Hungary	45.6	26.6	61.8	–5	–6	119
Poland	40.0	9.9	35.1	–5	–8	304
Turkey	2.8	144.3	120.5	–2	–32	363
South Africa	74.0	16.1	77.4	1	–16	242
Oil exporters						
Indonesia	15.3	58.3	91.1	8	10	281
Nigeria	–11.9	88.8	46.0	1	24[a]	95
Russia	14.5	80.3	81.2	29	95	764
Saudi Arabia	nil	4.0	–8.7	12	87[a]	316

a. Figure is from 2005.

Note: Exchange rate change is cumulative from end-2001 to end-2006; positive indicates appreciation.

Source: International Monetary Fund, *International Financial Statistics Yearbook,* 2007.

payments imbalances. In so doing, China is clearly failing to meet its general obligation under Article IV to "collaborate with the Fund and with other members" in implementing the agreed-upon strategy, espoused and repeatedly reaffirmed by the Fund.

What To Do Now

In view of the above conclusions concerning China's failure to meet both its specific and general obligations under Article IV of the IMF Articles of

Agreement, it is relevant to ask what should be done about the substance of Chinese policies that are problematic.

Reduction of the Chinese current account surplus to reasonable proportions will require reduction from about 12 percent of China's GDP in 2007 to no more than about 3 percent of GDP within five years or so. This will need to be accompanied by a very substantial real effective appreciation of the Chinese renminbi, probably on the order of 20 to 30 percent over a number of years. Appreciation of the renminbi against the US dollar will need to be even larger, though appreciation against some Asian currencies, including the Japanese yen, should be quite limited.

It is important not to try to be too precise about such figures and not to be either too lax or too ambitious about the pace of achieving them. China clearly has a long way to go. How far cannot be estimated very precisely now, but it will become clearer as China moves along the adjustment path. Indisputably, the pace of adjustment implicit in Chinese policy since July 2005—of very gradual appreciation of the renminbi against the US dollar and continued massive intervention to prevent more rapid appreciation—is woefully inadequate. This is apparent from the continued massive expansion of China's current account surplus. China needs a policy that will stop this expansion and bring about its gradual decline.

That said, the desired policy is surely not an abrupt end to all intervention and a sudden massive appreciation of the renminbi that could impart a sharp negative shock to the Chinese economy. Rather, the best policy would be something like that suggested by my Peterson Institute colleagues, most prominently, C. Fred Bergsten, Morris Goldstein, and Nicholas Lardy: a step appreciation of the renminbi sufficiently great—probably between 10 and 15 percent—to stop the further widening of China's current account surplus and to permit a meaningful scaling back of intervention; a refocusing of exchange rate policy on a suitable basket of foreign currencies; further gradual appreciation of the renminbi to bring its value up to a plausible estimate of longer-run equilibrium within a period of three to five years;[25] and various other measures to redirect and strengthen growth of domestic demand in China. Eventually, China should move to a market-determined exchange rate after critical reforms of the Chinese financial system are implemented.[26]

25. This part of the policy is tricky to implement because predictable appreciation of the renminbi tends to induce capital inflows. If these inflows are large, then allowing them to come in without sterilization can generate excessive inflation, while sterilizing their monetary effect can, as has been discussed, contribute to other problems.

26. A properly functioning (mainly) market-determined exchange rate requires market makers (usually banks and other financial institutions) that can take large long and short positions in domestic and foreign currencies and that have some efficient way of laying off part of the risks associated with such positions. To be willing to operate on any significant scale, market makers generally need credible assurance that the government will not suddenly step in (with intervention or regulation) because it does not like the way the exchange rate

In such a strategy, sufficiently large initial real appreciation of the renminbi is essential to get the dynamic of China's current account operating in the right direction. Sufficient appreciation would forestall further rises in China's current account. Once this was accomplished, the rapid growth of China's nominal GDP and the appreciated value of the renminbi relative to the US dollar would automatically reduce significantly China's current account surplus as a share of GDP. Suppose that real effective appreciation of the renminbi and scaling back of intervention and sterilization were sufficient to stabilize China's current account surplus approaching a level of $400 billion in 2007. Assuming that China's nominal GDP grows at a compound annual rate of 12 percent, which is below recent growth rates, in five years nominal GDP would rise by 75 percent—even more measured in dollars, as the renminbi's exchange rate continues its moderate adjustment. Without any decline in its dollar value, China's current account surplus as a share of China's GDP would fall from 12 percent to barely more than 5 percent in 2012. A decline in the dollar value of the surplus from $320 billion in 2007 to $200 billion in 2012 would reduce the surplus to about 3 percent of China's nominal GDP in 2012. This is an achievable outcome without the prospect of serious damage to the growth of China's economy.

Accountability

"Mistakes were made," Ronald Reagan famously observed in connection with the Iran-Contra controversy. The same may be said about China's exchange rate policy over the past five years and about Fund surveillance of that policy. These mistakes were the errors and omissions of particular people in specific positions of responsibility who failed to do their jobs as they should have been done.

Officials of China's Government

Senior officials of the Chinese government have authority over the substance of China's exchange rate and related policies and must take responsibility for them. These officials have received a wide array of advice concerning these policies from inside China and a host of outside commentators, including Fund staff and management and officials from various national governments. Often the advice has been inconsistent and, not infrequently, conflicting. But like key policymakers in other governments,

is moving, or for some other reason. In view of the Chinese government's long history of intervention and regulation in markets of all sorts, and the fact that it will undoubtedly retain huge foreign exchange reserves, it may well prove somewhat difficult to make commitments that potential market makers will find credible.

senior Chinese policymakers have the responsibility to sort through the chatter and arrive at appropriate conclusions. In fact, they have stubbornly adhered to a policy of resisting anything more than very modest nominal appreciation of the renminbi against the dollar through massive, largely sterilized official intervention, and through this policy, they have begot an increasingly undervalued real exchange rate, an increasingly massive current account surplus, and severe distortions of the direction of the Chinese economy's development. Although advice has been conflicting, enough of it has been sound that, together with the plain facts of what has been happening and available analyses, senior Chinese officials cannot be excused on the basis of ignorance or other grounds for persisting in their policies and producing the results that these policies continue to yield.

Other National Authorities

Senior officials of other national governments also have some responsibility for the problems that have arisen from China's exchange rate and related policies and the failure of Fund surveillance to recognize and emphasize these problems and press for actions to correct them. Fund staff and management have always found it difficult to press a member on sensitive surveillance issues, especially exchange rate policy, if they do not enjoy the support of the Fund's key members. And in the end, it is the executive board, which is appointed or elected by member countries and responsible to them, that determines the position of the Fund on all key issues.

In both of these respects, the United States is usually the most important member of the Fund. The US Treasury is primarily responsible for international economic policy issues and relations with the IMF inside the US government, and the performance of its top officials on the issue of China's exchange rate policy has been erratic. Through 2004, the attitude of the key Treasury official, the undersecretary for international affairs, was that China should gradually allow greater flexibility of its exchange rate to respond to market forces, leading ultimately to a fully flexible, market-determined exchange rate. This may be a fine idea for the long run, when China has advanced to the point where it can successfully operate a fully flexible exchange rate. But it was irrelevant to China's situation in 2001–04, is still irrelevant today, and will be irrelevant for a number of years to come.

With the arrival of a new undersecretary, Timothy Adams, US policy became much more focused on getting Chinese authorities to allow their currency to appreciate and on getting the Fund to press China on this issue (Adams 2006). The thrust behind this approach, however, dissipated after Adams' departure. The new Treasury secretary, Henry Paulson, has instituted a strategic economic dialog with senior Chinese officials in which

China's exchange rate policy is one of many issues being discussed. Top priority, however, has not consistently been given to this critical issue. Moreover, in its most recent report to Congress on exchange rate policies under the Exchange Rate and Economic Policy Coordination Act of 1988, the Treasury once again declined to name China as an exchange rate manipulator, citing as its reason the lame excuse that it was not clear—to the Treasury or the IMF—that Chinese authorities intended to do what they clearly were doing with their exchange rate policy.[27]

Other members of the Fund have been even less forceful than the United States on the issue of China's exchange rate policy. Because the exchange rate of the yen is also very weak and China is a very important customer for Japanese exports, it is not particularly surprising that Japan has not been a critic of China's exchange rate policy. It is more surprising that, until the autumn of 2007, the European Union was virtually silent on the issue, only periodically expressing concern about the weak dollar and the weak yen. Among emerging-market countries, even those that are clearly suffering from intense competition from Chinese exports are reluctant to press on the issue of China's exchange rate policy. Perhaps this reflects the not entirely unreasonable concern that their own exchange rate policies could come under more intense Fund scrutiny.

The IMF Executive Board

Until 2006, Fund staff, in the published versions of the Chinese Article IV staff reports, spoke only of the desirability for a more flexible exchange rate policy, not about the urgent need for a significant appreciation of the renminbi. The managing director, Rodrigo de Rato, explicitly denied that the Fund was the umpire of exchange rate issues in the international monetary system and decried the notion that the Fund should pressure the Chinese authorities to appreciate the renminbi.

Not surprisingly, in view of the performance of Fund staff and management, the executive board did not press the Chinese authorities on the issue of their exchange rate policy. The Chairman's Summing Up of Board Discussion of recent Chinese Article IV consultations generally endorse "greater exchange rate flexibility" but place no urgency on either accelerating the pace of appreciation of the renminbi or scaling back the immense magnitude of (largely sterilized) official intervention that resists such appreciation. The relevant paragraph from the 2006 discussion reads as follows:

27. See Mark Sobel, Statement before the Joint Hearing on Currency Manipulation and Its Effects on US Business and Workers, Committee on Ways and Means, Committee on Energy and Commerce, and Committee on Financial Services, United States House of Representatives, Washington, May 9, 2007.

> Many Directors found it appropriate for China to continue to allow greater flexibility in its exchange rate in a gradual and controlled manner. They shared the authorities' concern that accelerating exchange rate flexibility could have an adverse impact on macroeconomic stability. Some Directors also viewed that the exchange rate adjustment alone would have a limited impact on external imbalances. A number of other Directors, however, stressed that the flexibility afforded by the current strength of the Chinese economy provides a favorable context for adjustment and should serve to alleviate the authorities concerns about potential adverse economic effects. Directors noted that greater exchange rate flexibility, along with other policy changes and reforms in China, will aid in rebalancing the economy over the medium term, and will contribute to orderly resolution of the global current account imbalance, in conjunction with concerted policy efforts by other key economies.[28]

Such mush—and the even more equivocal language in the Summing Up of Executive Board discussion of China Article IV consultations of earlier years—clearly does not convey to Chinese authorities any notion that the Fund's executive board has serious and urgent concerns about China's exchange rate policy and is looking for decisive and expeditious actions to begin correcting an important exchange rate misalignment and massively and increasingly unbalanced balance-of-payments account position. Moreover, because of politeness, fear of giving offense, raising the specter of criticism of their own policies at present or in the future, or simple lack of understanding of the issues, other national authorities have generally not pressed the Chinese on their exchange rate policy.

Fund Staff

Like most bureaucracies, the Fund is quite poor at recognizing that serious mistakes have been made, at identifying the people who made them, and at holding these people accountable. Tilting the analysis and assessment in Fund surveillance or program cases in the direction that suits the sensitivities of the countries under review, and that serves the objectives or predilections of Fund management, often tends to be career enhancing. The ability to get along well with the authorities of the Fund's members is a very highly valued skill for Fund staff, especially in the area departments, and is much appreciated in and by Fund management. Provided "clientitis" does not go too far, it facilitates the Fund's ability to work with its members. However, Fund surveillance over members' economic policies inherently involves the possibility of serious tension and disagreement, particularly when a member's exchange rate policy is rightly subject to Fund criticism. In such situations, the strong tendency of Fund staff

28. From the Summing Up of the 2006 Article IV consultation with China, discussed by the executive board on July 31, 2006; see IMF Public Information Notice (PIN) No. 06/103, released on September 11, 2006. Available at www.imf.org (accessed on February 10, 2008).

to sympathize with the authorities and ignore, play down, or explain away important problems undermines the Fund's capacity to fulfill key responsibilities mandated by the Articles of Agreement.

Largely out of frustration with the reluctance of Fund management to face up to such problems and be more forthcoming in recognizing mistakes and more aggressive in seeking to correct them, the executive board established in 1999 the Fund's Independent Evaluation Office (IEO 2007), which has conducted a number of important evaluations of Fund work in various areas, including a recent assessment of Fund surveillance over exchange rates. But this assessment did not look specifically at the recent case of China. Pending such an assessment by the IEO, I offer the following observations.

The Research Department (RES) is primarily responsible for preparation of the WEO and other materials relevant to analysis and assessment of the problem of global payments imbalances. Any fair reading of the WEOs of the past six years (since I left the Fund) will find that the RES has done a good job of analyzing and explaining a variety of important issues related to global payments imbalances, and, as evidenced by the Summing Up of Executive Board discussions of the WEO, this work has provided an excellent foundation for the board to establish an agreed strategy for reducing global imbalances.

The Policy Development and Review Department (PDR) has many important responsibilities, including that of ensuring reasonable consistency across Fund staff in work on surveillance. If, as appears to be the case, the RES was making the case in the context of the WEO that substantial exchange rate adjustments were needed as an important part of the strategy to reduce global imbalances, and the APD was simultaneously taking the position that there was no clear case for renminbi appreciation, then the PDR should have noted this inconsistency and insisted that it be resolved.

Within Fund staff, primary responsibility for surveillance work on individual members rests with the various area departments; China is covered by the APD. We know from the published Article IV staff reports that the APD did not press Chinese authorities on the issue that their exchange rate was substantially undervalued. The desirability of greater exchange rate flexibility was mentioned in 2004 and 2005 as a gentle suggestion that adjustment of China's exchange rate would be desirable. Explicit mention of the appropriate direction of that adjustment, appreciation, only comes in 2006, and without any clear indication of magnitude or urgency.

This analysis and advice is far too timid and late for the IMF staff principally responsible for surveillance work on China's exchange rate and related policies. My colleagues at the Peterson Institute, Morris Goldstein and Nicholas Lardy, began a series of papers in 2003 that analyzed clearly the issue of the undervaluation of the Chinese renminbi (see Goldstein 2004, 2006a, 2006b, 2007; Goldstein and Lardy 2003, 2005, 2006), and most

of their work was widely known and discussed before its formal publication. Other work on exchange rate issues at the Peterson Institute during this period strongly endorsed the Goldstein-Lardy conclusions (see Bergsten et al. 2006; Bergsten 2007; Cline 2005, 2007; Mussa 2004, 2005, 2007; Williamson 2004, 2007). Moreover, while some disputed the initial Goldstein-Lardy analysis, such disputes became increasingly unreasonable in 2004 and beyond, especially for IMF staff.[29] By 2004 China's current account surplus rose to 3.6 percent of GDP, well above its average in the preceding decade. Monthly figures on China's trade indicated that this surplus was continuing to grow very rapidly. Also the IMF executive board had concluded by 2002 that the large and growing US external payments deficit was an important concern as a key part of the problem of global imbalances, and it was clear that substantial real effective depreciation of the dollar would be an essential part of resolving this problem. This necessary correction of the real effective exchange rate of the dollar could not plausibly exclude significant appreciation of the renminbi against the dollar, along with significant appreciations of other key currencies. However, the Chinese renminbi remained pegged to the dollar until July 2005 and depreciated significantly in real effective terms from its level at the beginning of 2002. The implications of this real effective depreciation of the renminbi—versus the rising real equilibrium value of the renminbi—should have been clear to IMF staff. The IMF staff should have been at the forefront in pointing out to the Chinese authorities, at the earliest possible moment, the implications of these developments for the unsuitability of China's exchange rate policy.

IMF staff did not take such actions. In the staff reports on Article IV consultations presented to the executive board, and presumably in its confidential discussions, the APD did not press the Chinese authorities on the urgent need to allow the renminbi to appreciate significantly. Nor does it appear that Chinese authorities were advised that their exchange rate and related policies—specifically the policy of resisting appreciation of the renminbi through massive, protracted, and heavily sterilized intervention—could be easily seen as violating China's obligations under Article IV. The department head of the APD, the senior immediate office staff (B4s) responsible for China, and the division chief for China, in that order, are most responsible for these failures.

29. The Deutsche Bank trio—Michael Dooley, David Folkerts-Landau, and Peter Garber (2003)—argue in a series of papers that under the so-called Bretton Woods II system, there is a symbiotic relationship in which China and other developing countries maintain undervalued exchange rates and run substantial current account surpluses that, in turn, finance a substantial continuing US current account deficit and help to maintain an overvalued dollar. Goldstein and Lardy (2005) provide an extensive critique of the Bretton Woods II theory applied to China. I would note that whatever sense this theory might have made in 2003, with a Chinese current account surplus at 2.8 percent of GDP, it makes no sense as an explanation and justification for the massive increase in the surplus since that time.

The Renminbi Stops with the Managing Director

The foremost responsibility for the Fund's failure in the case of surveillance over China's exchange rate and related policies resides with Fund management. The deputy managing directors who were involved in the China case, especially the first deputy managing director, deserve some of the blame. In a management team where disagreements over a variety of issues were not unknown, there was no indication that deputy managing directors were anything other than fully on board with a see-no-evil, gentle-persuasion approach to the issue of China's exchange rate policy.

The primary responsibility, however, must rest with the managing director. Horst Kohler succeeded Michel Camdessus as managing director in May 2000. In the face of considerable and not entirely justified dissatisfaction among some of the Fund's Asian members about how countries in the region were treated during the Asian crisis, Kohler took a conciliatory approach. Asian countries were not challenged when they unfairly criticized the Fund for its deficiencies during the Asian crisis and ignored the fact that the problems were largely of their own making. Nor were Asian countries pressed on current policy issues, including the extraordinary rise of their foreign exchange reserves well beyond reasonable standards of prudence. Beginning in 2002, as the renminbi remained pegged to the dollar and the dollar began to depreciate significantly against most industrial currencies, the Fund should have raised the issues of China's exchange rate policy and its accelerating reserve accumulation. The concerns expressed by the Fund on these issues should have intensified in 2003 and 2004. Kohler did not press these issues in public, and there is no indication that he did so in private.

He resigned as managing director in May 2004 to become president of Germany. By that time, China's exchange rate and related policies were clearly becoming a major problem and the Fund should have been pressing the Chinese authorities to modify their policies. The Fund's next managing director, Rodrigo de Rato, faced this critical challenge. Like his predecessors, de Rato exercised immense authority over Fund staff and held the position of leadership of the executive board. He had the authority and the responsibility to push Fund surveillance to the forefront on the issue of China's exchange rate and related policies. Under his direction and leadership, the Fund could have fulfilled its mandated responsibilities for exchange rate surveillance under Article IV. Without his direction and leadership, failure by the Fund was inevitable.

de Rato's publicly announced positions on the issue of China's exchange rate and related policies are simply extraordinary. He denied that the Fund was or should be anything more than a confidential adviser using gentle persuasion to coax its members to adopt better policies. He failed to recognize that under the provisions of Article IV, the Fund has the responsibility both to oversee the international monetary system in order

to ensure its effective operation and to oversee members' compliance with general and specific obligations under this article and is supposed to exercise "firm surveillance over the exchange rate policies of members." The Fund is supposed to police the international monetary system, and the managing director is the top cop, with the Executive Board serving as a final resort for those rare and highly regrettable cases where all vigorous but less extreme efforts at persuasion have failed.

de Rato should not have been managing director. Fortunately, he has left. Unfortunately, he leaves his successor, Dominique Strauss-Kahn, with a real mess to straighten out and a real challenge to restore order to, and instill confidence in, the Fund's essential surveillance activities.

The issue of how the Fund should address the issue of necessary adjustments in China's exchange rate and related policies is clearly key. With China's current account surplus continuing to surge upward, the time for gentle persuasion of Chinese authorities concerning the need for substantial modification of their exchange rate and related policies has long since passed. However, after five years in which the Fund has failed to press the issue clearly and forcefully, it would be premature for the executive board suddenly to proclaim that China stands in violation of general and specific obligations under Article IV. Rather, the current need is for the Fund and its key members to speak to Chinese authorities with a clear and unified voice that China's exchange rate and related policies are, in fact, seriously inconsistent with their international responsibilities and a key impediment to the strategy to which all countries have agreed for reducing global payments imbalances. It is in China's best interest, in the broader interests of the international community, and necessary to a properly functioning international monetary system that China adjust its policies in a sufficiently aggressive manner as to start its current account surplus on a downward path to a sustainable share of GDP within about five years. This will require a significant scaling-back of official intervention to resist renminbi appreciation and a significant acceleration of the pace of the real effective appreciation of the renminbi, preferably beginning with a step appreciation of at least 10 percent.

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Comment
The IMF's Approach to Surveillance

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I would like to explain the approach of the International Monetary Fund (IMF) to surveillance of China's economy. I am not the IMF truth squad, sent to correct factual errors made by Michael Mussa. However, I must admit that I do not understand the basis for Mussa's assertion that essentially everyone but him and possibly Timothy Adams have been wrong in their approach to surveillance of China's exchange rate. When I sort through the Mussa paper and pare its arguments down to their essence, I am not surprised to find that he is simply advocating the traditional IMF approach to surveillance, which is exactly what we have been doing for the last several years.

In looking at what the IMF has done, one must keep in mind that the public record on IMF work is really just the tip of the iceberg. A significant part is done out of the public eye. It has to be that way if the IMF is to play a role as a trusted policy adviser—to have a seat at the table, as Mussa puts it—especially on a sensitive issue such as the exchange rate. As a consequence, the IMF at times makes a handy target and a convenient scapegoat.

In broad policy terms, the staff report on the Multilateral Consultation exemplifies where the IMF stands on surveillance of the economic policies of the major economies that participated in that exercise (China, the euro area, Japan, Saudi Arabia, and the United States). The policy plans laid out in that context were judged to meet the objective set by the Interna-

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tional Monetary and Financial Committee (IMFC) of bringing about an orderly adjustment in global imbalances over time through policies that were in each individual countries' own interest. But those policy plans did not come out of thin air; to a significant extent, they reflect results from the IMF's regular bilateral and multilateral surveillance work.

In the case of China, since 1999—long before there were any questions about the value of the exchange rate—the IMF was pressing the Chinese authorities to increase the exchange rate's flexibility. The record on the IMF's position is reflected in public statements by IMF management and senior staff in various venues. Managing Director Rodrigo de Rato made several trips to China during his tenure, meeting with Premier Wen Jiabao on three occasions. During each trip and in subsequent public statements and remarks, he stressed the need for greater exchange rate flexibility and an appreciation in the renminbi.

A clearer view on the IMF's position comes from the staff reports for the annual Article IV consultations with China, which became publicly available starting in 2004. These reports reflect how the staff's position on the renminbi has evolved in line with economic developments in China. In the 2004 report, the staff said:

> The staff continued to stress that greater exchange rate flexibility would enhance China's ability to pursue an independent monetary policy.
>
> The staff also maintained its view that it is difficult to find persuasive evidence that the renminbi is substantially undervalued. [The report in other parts, however, makes clear that the renminbi was undervalued and the exchange rate needed to be adjusted.]
>
> While recent strong capital inflows potentially complicate the introduction of flexibility, it is best for China to move from a position of strength, which should serve to limit adverse effects, and a move to greater exchange rate flexibility should not be unduly delayed.

With the current account widening further in 2005, the report said:

> Although it is difficult to reach firm conclusions about its extent, the continued strengthening of the external balance points to increased undervaluation of the renminbi, adding to the urgency of making a move.
>
> Greater exchange rate flexibility continues to be in China's best interest, with an early move desirable.
>
> The continued strengthening of China's external position has added to the urgency of making a move.
>
> The costs associated with a continued delay in moving toward greater exchange rate flexibility are growing.

The above statements were written in June 2005; China's new exchange rate regime was introduced that July. At that time, the IMF said that the change represented a move in the direction of greater exchange rate flexibility, and we encouraged the authorities to utilize fully the scope for flexibility in the new exchange arrangement.

In 2006, the staff report said that

> developments point to the currency as being undervalued and that this undervaluation has increased further since last year's Article IV consultation.
>
> Now is the time to more fully utilize the flexibility afforded by the current exchange rate system and allow greater movement in the renminbi-US dollar exchange rate and a further significant appreciation of the currency in nominal effective terms.

Given the above record, I admit to being absolutely puzzled about how Mussa concludes that the IMF has not pressed China on the exchange rate issue and that the IMF "speaks only vaguely about the desirability of greater exchange rate flexibility." His comments give the distinct impression that he is not completely familiar with what the IMF has publicly released on this subject.

Because China has persisted in heavily managing its exchange rate, it has created for itself a major problem with macroeconomic control. Trying to contain investment and credit growth has been the major preoccupation of macroeconomic policy over the past four years. It has not and will not be possible to solve this problem without a faster pace of renminbi appreciation to provide scope for monetary policy to operate.

Maybe part of what bothers Mussa about the IMF's performance on China—or a potential source of his misunderstanding—is the IMF's emphasis on the fact that, while appreciation of the exchange rate is important, it alone is not enough. Only by rebalancing its economy away from heavy reliance on investment and exports for growth toward consumption will China be able to sustain rapid growth and provide a permanent contribution to resolving global imbalances.

The exchange rate is only one of several key prices in China that are badly distorted. Energy, other utilities, land, and pollution are others. But above all, the cost of capital in China is very low. We have laid out the impact of these price distortions on investment in a working paper (Aziz 2006), we have looked at the effects on consumption in another working paper (Aziz and Cui 2007), and the overall case for rebalancing the economy is laid out in a September 2007 *Finance and Development* article by Aziz and Dunaway.

The exchange rate and the cost of capital are linked. There can be no meaningful increase in the cost of capital without an appreciation of the exchange rate. If the cost of capital and the exchange rate are raised, credit and investment growth will be slowed and the composition of investment will shift away from producing tradable goods. If at the same time, bank intermediation is improved and the capital markets are permitted to develop further, capital will be better allocated.

One key element in financial-market reform is removing the ceiling on bank deposit rates in China, which—with appreciation of the currency—will raise household real incomes and boost consumption over time. The

government also has to play a major role in rebalancing the economy by removing uncertainties that have contributed to very high precautionary savings, particularly in the areas of education, health care, and pensions.

The authorities recognize that China's economy needs to be rebalanced along these lines, and this is reflected in China's policy plans put forth in the context of the Multilateral Consultation. The IMF also has argued that it is critical to maintain focus on the appropriate primary objective, which is rebalancing China's economy. Reducing the current account surplus should not be the goal, however; as mentioned above, only by rebalancing the economy will a permanent reduction in the current account surplus be achieved.

So we agree on the basic policies. The key remaining difference between the IMF staff and the Chinese authorities is the speed of implementation. The IMF continues to warn the Chinese that it is not costless to them to delay reform. Distortions in the economy grow day by day. By proceeding slowly, they also test the patience of the rest of the world. So the IMF closely monitors the situation and continues to push for speedy implementation of reforms.

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