

V. Foreign exchange markets

Highlights

The broad appreciation of the US dollar, the stability of the euro and the overall downward trend of the yen were the salient developments in foreign exchange markets over most of 2005. Until December, the dollar appreciated markedly against the euro, the yen and a number of other floating currencies, in particular the pound sterling and the Australian and New Zealand dollars. Its trend vis-à-vis emerging market currencies was less uniform. Asian currencies remained fairly stable or depreciated, while some Latin American currencies strengthened. Starting in December 2005, the upward trend of the US dollar reversed.

As in previous years, three main factors underpinned exchange rate developments during the period under review. First, against the background of a further normalisation of policy rates in the major economies, but still ample global liquidity, interest rate differentials continued to be a major determinant of exchange rate movements. The search for yield often took the form of carry trades. Second, the current account deficit and net international liabilities of the United States rose further but attracted less attention than during the period 2002–04. In spite of the growing debt burden, net income remained positive for most of 2005, reducing pressure for an immediate correction. The chapter explores trends and determinants of net income in the United States and other industrial countries and discusses possible implications for the sustainability of external imbalances. Third, continuing reserve accumulation in China limited the dollar's depreciation against the renminbi. By contrast, reserves grew more slowly in other emerging market countries in Asia. The change in China's exchange rate policy introduced in July 2005 received much attention, but by mid-May 2006 it had had only a modest impact on foreign exchange markets.

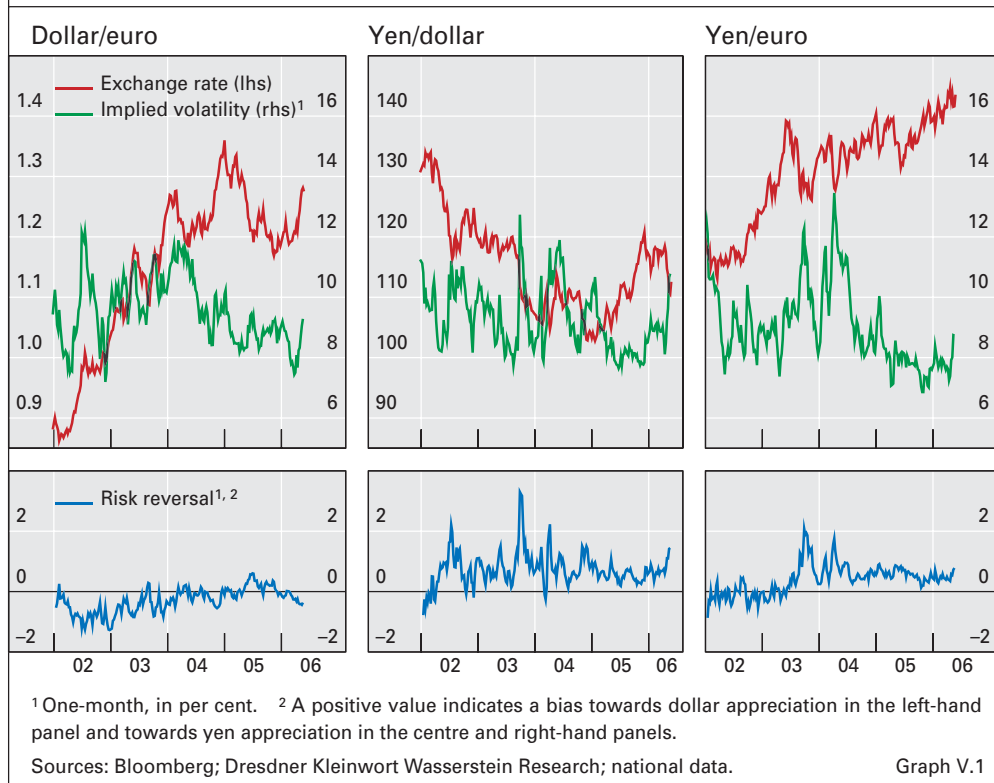
Foreign exchange markets were characterised by strong activity and generally low volatility. However, some smaller markets experienced sharp increases in volatility, particularly in 2006.

Developments in foreign exchange markets

The period under review can be divided into two distinct phases. During the first, from February to end-November 2005, the dollar generally appreciated. It gained 5% in nominal effective terms and some 10% and 15% against the euro and the yen respectively (Graph V.1). It also appreciated against other floating currencies, in particular the Australian and New Zealand dollars and most European currencies outside the euro area, notably sterling (Graph V.2). In contrast, the Canadian dollar appreciated by 5% against the US dollar, breaking

Broad appreciation of the dollar between February and end-November 2005 ...

Exchange rates, implied volatilities and risk reversals of the dollar, euro and yen



the pattern of broad synchronicity with the Australian and New Zealand dollars observed in the past.

Up to December 2005, the euro remained roughly stable in nominal effective terms. It tended to appreciate against the yen, while its performance vis-à-vis other European currencies was mixed. It gained with respect to the Swedish krona, showed no clear trend vis-à-vis the Swiss franc and lost some ground against sterling and the Norwegian krone. The yen trended broadly downwards. It depreciated significantly against the dollar and the euro, as well as most emerging market currencies in Asia.

The behaviour of the currencies of emerging economies was less uniform. While several of them – in particular the Thai baht, the New Taiwan dollar and the Indonesian rupiah – depreciated substantially against the US dollar (Graph V.3), many Latin American currencies strengthened. Trends in the South African rand and currencies of eastern European countries were less clear-cut.

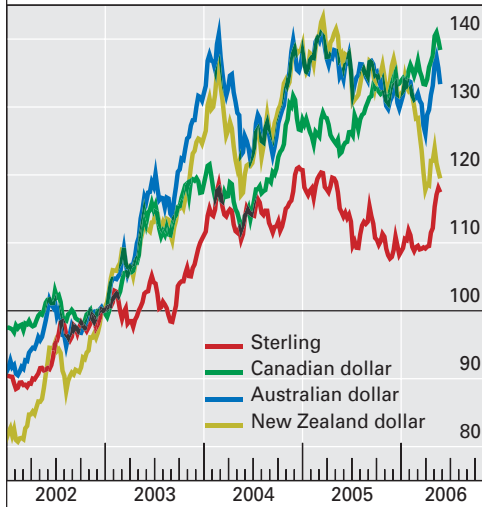
In the second phase, between December 2005 and mid-May 2006, the dollar lost some ground against a number of currencies. It depreciated by around 9% against the yen, and by 10% against the euro and sterling. The yen ended its broad downward trend. As suggested by risk reversals, this was accompanied by a shift in investors' bias against future dollar strength (Graph V.1). The euro tended to strengthen against a number of currencies and in nominal effective terms. The Canadian dollar continued its broad-based rally.

... partially reversed starting in December 2005

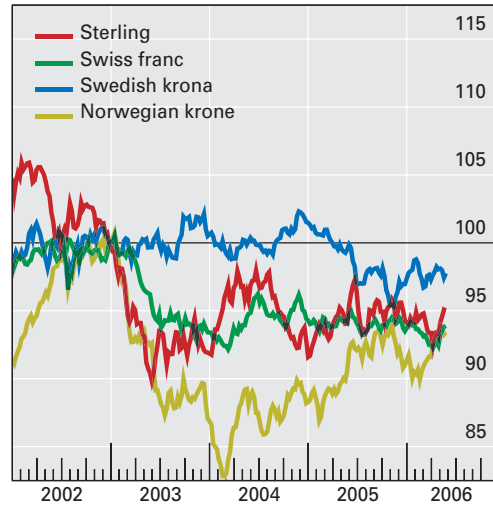
Exchange rates of other industrial countries

Weekly averages, end-2002 = 100

Against the US dollar



Against the euro



Note: An increase indicates an appreciation.

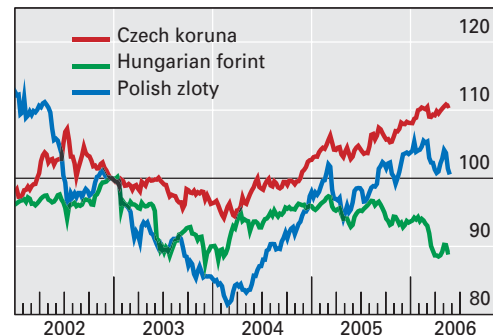
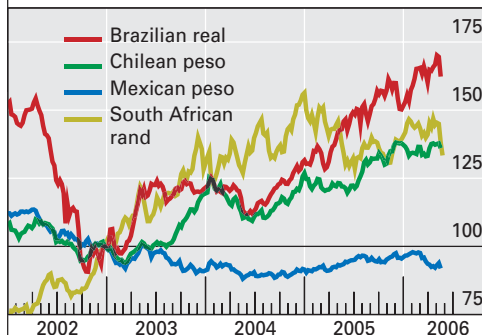
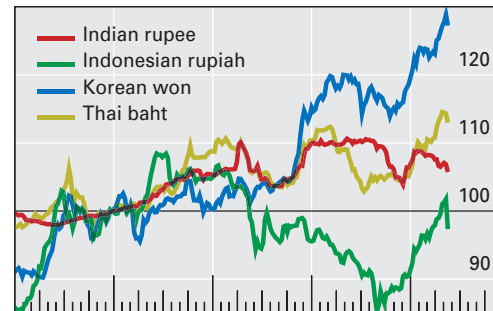
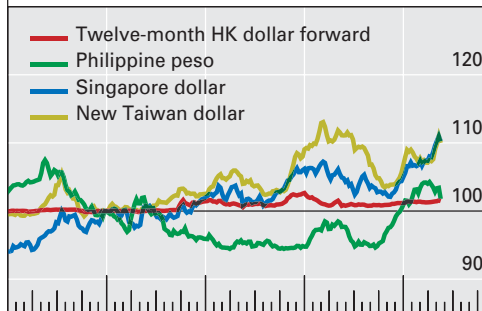
Source: National data.

Graph V.2

During this second phase, the currencies of some industrial countries fell visibly. The Australian and New Zealand dollars continued their earlier decline until April 2006. Also noteworthy was the Swiss franc's decoupling from the

Exchange rates in emerging markets¹

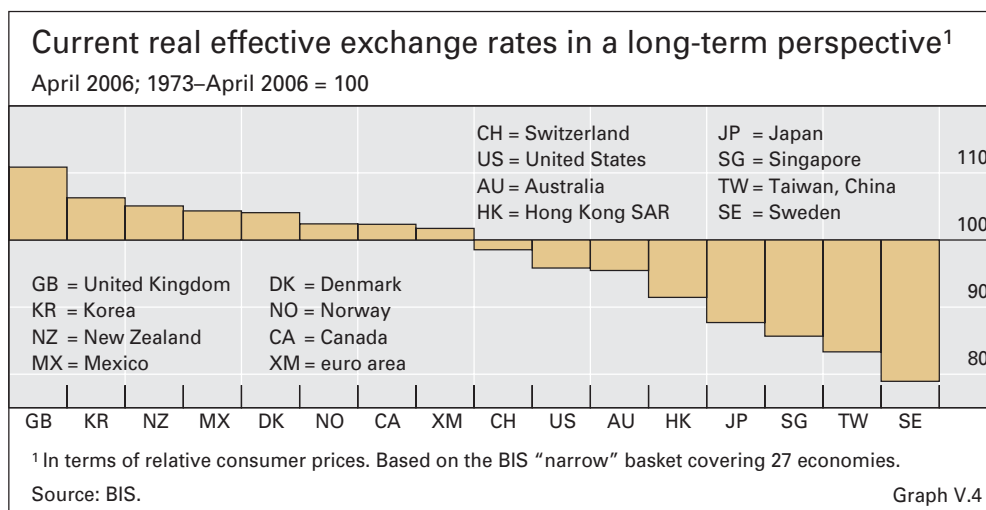
Weekly averages, end-2002 = 100



¹ Against the US dollar (in the bottom right-hand panel, against the euro); an increase indicates an appreciation. For the bottom left-hand panel, compressed scale.

Sources: ECB; Bloomberg; Datastream.

Graph V.3



euro. In contrast, emerging market currencies in Asia generally – and the won, rupiah, baht, Philippine peso and Singapore dollar in particular – tended to strengthen appreciably against the dollar and to a lesser extent against the yen.

In evaluating the current levels of the main exchange rates from a longer-term perspective, it is worth noting that in real effective terms the dollar and the euro remain close to their long-term averages, while sterling is still about 10% above (Graph V.4). In contrast, the Swedish krona, the yen and a number of emerging market currencies in Asia are more than 10% below their historical averages.

Foreign exchange market conditions

Volatility and activity were somewhat similar across these two main phases of exchange rate movement. From January to November 2005, against a background of ample global liquidity, foreign exchange markets were fairly calm and turnover was high. The implied volatility of the main exchange rates was lower than in previous years and tended to decline (Graph V.1). Starting in December, there was an increase in volatility in some markets, most notably the yen/dollar and the yen/euro markets, indicating a rise in uncertainty. As discussed below, this higher uncertainty about the yen was triggered by speculation over the ending of Japan's policy of quantitative easing and its potential implications for financial markets, in particular for the funding of carry trades. In some smaller markets, the increase in uncertainty led to sharp depreciations, with some spillover to other currencies.

Calm but active markets

The high level of activity continued to reflect a large volume of funds from investors searching for yield across a broad range of currencies. This search also contributed to upward pressure on prices in commodity markets, which have been influenced by burgeoning inflows of investable funds on the back of strong global demand. Annualised increases in broad commodity price indices since the beginning of 2002 have been almost 10%, and the price rises for some commodities, such as gold, even greater. Gold prices increased at an annualised rate of around 14% between mid-2001 and September 2005. By mid-May 2006, gold prices had risen to 25-year highs of \$726 per troy ounce, a 60% rate of growth since September.

Trends in official reserves

Reserve
accumulation
continues

Central banks continued to accumulate sizeable amounts of official foreign exchange reserves (Table V.1). Unlike previous years, when several Asian central banks had contributed to the large build-up in reserves, 80% of the increase in Asia in 2005 was concentrated in China. Chinese reserves expanded by another \$200 billion, with holdings by end-2005 exceeding \$800 billion, or 20% of world reserves. Oil exporters also accumulated reserves at a fast pace. The largest increase was seen in Russia. In contrast, the pace of reserve accumulation slowed in most other economies, particularly India, Korea, Malaysia and Taiwan (China).

Annual changes in official foreign exchange reserves							
In billions of US dollars							
	2000	2001	2002	2003	2004	2005	<i>Memo: Amounts outstanding (Dec 2005)</i>
	At current exchange rates						
Total	158.8	110.5	356.0	620.0	720.3	421.7	4,170.8
Industrial countries	59.6	3.1	112.3	218.5	195.5	-22.3	1,292.2
United States	-0.9	-2.3	4.8	5.9	3.0	-4.9	37.8
Euro area	-9.4	-10.7	7.9	-27.8	-7.3	-13.4	167.3
Japan	69.5	40.5	63.7	201.3	171.5	4.5	828.8
Emerging Asia	52.5	76.0	173.9	263.9	363.4	249.9	1,821.6
China	10.9	46.6	74.2	116.8	206.6	209.0	818.9
Hong Kong SAR	11.3	3.6	0.7	6.7	5.0	0.7	124.3
India	5.3	8.0	21.7	30.6	27.5	5.9	131.0
Indonesia	2.0	-1.2	3.7	4.0	-0.0	-1.9	32.8
Korea	22.2	6.6	18.3	33.7	43.7	11.8	210.0
Malaysia	-1.0	1.0	3.7	10.2	21.9	4.3	69.7
Philippines	-0.2	0.4	-0.2	0.3	-0.5	2.8	15.8
Singapore	3.4	-4.8	6.5	13.6	16.5	3.8	115.3
Taiwan, China	0.5	15.5	39.4	45.0	35.1	11.6	253.3
Thailand	-1.9	0.4	5.7	2.9	7.5	2.0	50.5
Net oil exporters ¹	31.9	16.4	18.5	51.2	68.5	83.1	351.8
Mexico	4.2	9.2	5.5	7.8	5.0	10.2	73.0
Russia	15.8	8.3	11.5	29.1	47.6	55.1	175.9
Venezuela	0.9	-3.8	-0.8	7.5	2.3	5.6	23.5
Middle East ²	11.0	2.7	2.2	6.8	13.5	12.2	79.5
Latin America ³	2.1	-0.3	4.2	30.6	21.1	25.4	217.2
Argentina	-1.7	-9.9	-4.1	2.7	4.9	4.7	22.7
Brazil	-2.3	3.2	1.7	11.7	3.6	0.8	53.5
Chile	0.5	-0.6	0.8	0.4	0.3	1.2	16.7
CEE ⁴	18.8	12.6	36.6	51.1	69.0	70.2	335.1
	At constant end-2004 exchange rates						
Total allocated	230.3	54.5	216.0	341.0	355.7	249.8	2,890.0
Dollar reserves	100.9	40.1	84.5	263.7	271.3	132.6	1,869.8

¹ Economies with net oil exports exceeding 0.5 million barrels per day. ² Excluding Iran and Iraq. For Saudi Arabia, excluding investment in foreign securities. ³ Countries shown plus Colombia, Mexico, Peru and Venezuela. ⁴ Central and eastern Europe: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia and Slovenia.

Sources: IMF; national data.

Table V.1

Exchange rate movements: determinants

Once again, three main factors appeared to underpin exchange rate movements during the period under review. First, domestic growth prospects and interest rate differentials seemed to influence the main currencies, as well as a number of emerging market ones. Second, the widening external imbalance of the United States at times weighed on the dollar, although its influence was felt much less than in previous years. Finally, exchange rate policies and intervention practices in emerging market countries, particularly in Asia, while differing somewhat from the past, continued to shape the behaviour of their currencies.

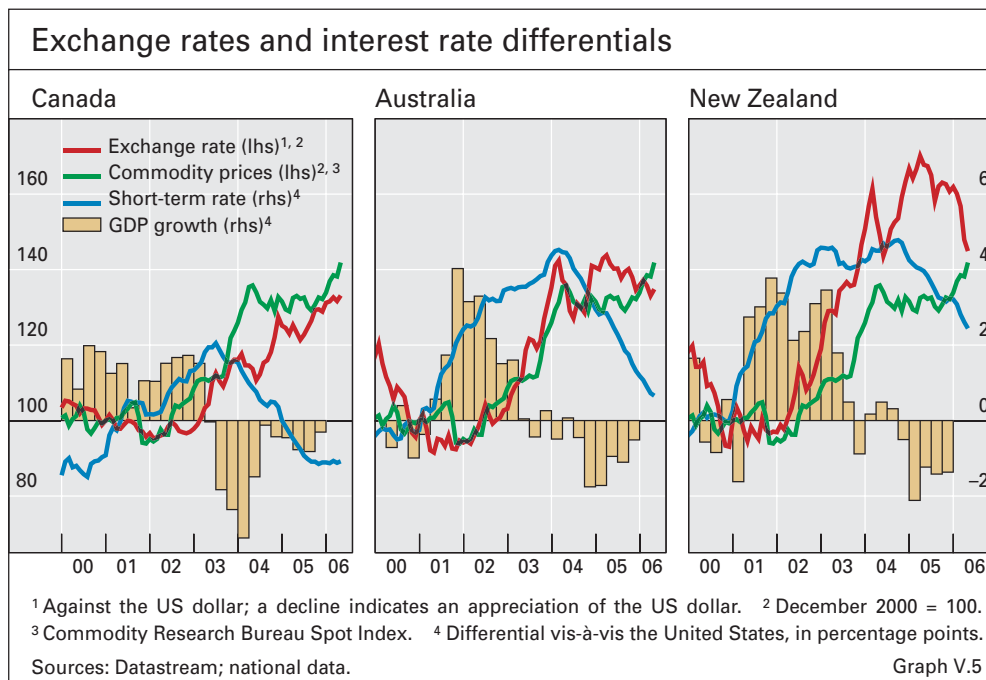
Three main factors behind exchange rate movements

Growth and interest rate differentials

Growth and interest rate differentials – both actual and expected – seem to have been the main drivers of exchange rate movements over the past year. Although there is no evidence of a robust statistical link between current or expected interest rate differentials and exchange rate movements over long time spans, there is evidence of a positive correlation for certain currency pairs during the two phases in the period under review.

In particular, the strengthening of the dollar against the euro and the yen during most of 2005 reflected the positive impact of the further tightening by the Federal Reserve on interest rate differentials. Similarly, after several years of strong appreciation, a number of currencies – in particular sterling, the Australian and New Zealand dollars and the Swedish krona – weakened against the dollar when interest rate differentials moved in favour of the United States. In contrast, with its interest rate differential remaining relatively stable, the Canadian dollar appreciated against the US dollar.

Interest rate differentials favoured the dollar

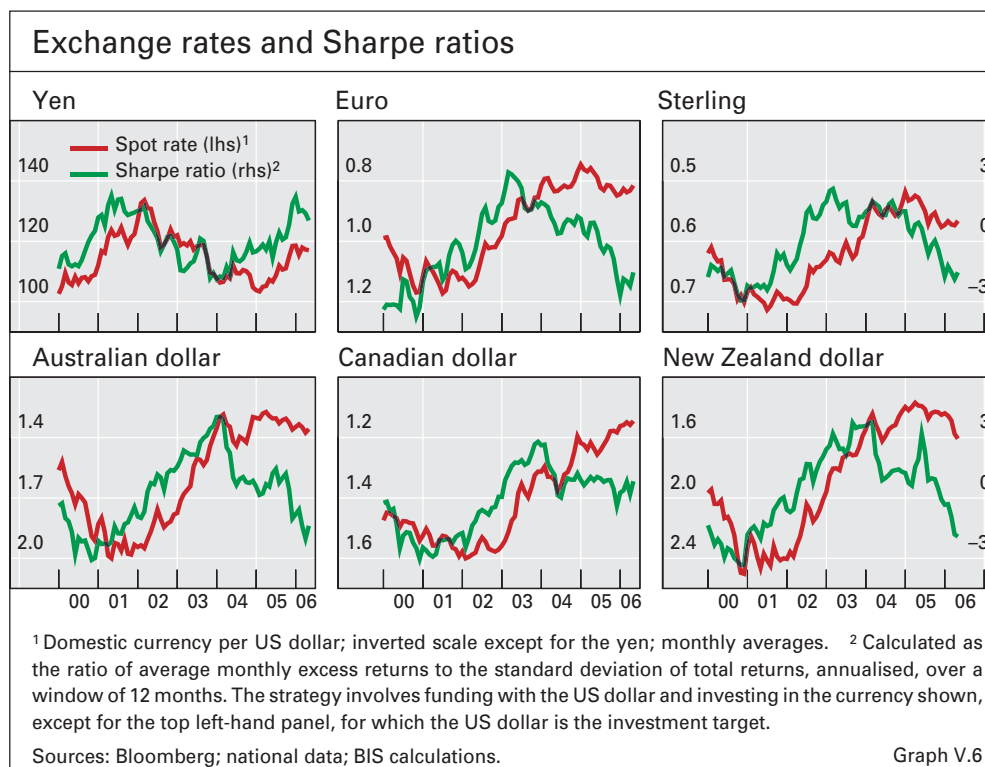


Changes in interest rate differentials might have had an even stronger dampening effect on the Australian and New Zealand dollars, and the Canadian dollar might not have strengthened, had these currencies not benefited from high commodity prices (Graph V.5). Commodity price rises also put upward pressure on currencies of other commodity-exporting countries such as Chile and South Africa.

Starting in December 2005, the partial reversal of the dollar's earlier appreciating trend against the euro and the yen coincided with a change in perceptions about the monetary policy cycles in the main economies. In particular, market participants started to expect rising policy rates in the euro area and Japan.

The prospect of rising Japanese rates and the possibility of a related appreciation of the yen attracted particular attention, especially in the context of carry trades. These trades involve borrowing in a low-yielding currency and investing in a high-yielding one, and are predicated on an expectation that the high-yielding currency will not depreciate enough to offset the interest rate advantage. As in previous years, carry trades were used by different types of international investors in their search for yield and provided an important mechanism through which interest rates and exchange rates were linked. Market commentary pointed to the yen and the Swiss franc as two major funding currencies in 2005, while the dollar switched from being a funding currency to a target currency as the tightening cycle of the Federal Reserve progressed. During this period, as US interest rates moved up steadily, borrowing in yen and investing in dollar-denominated assets appeared to be increasingly attractive. This is clearly the message provided by Sharpe ratios,

In December, the prospect of rising Japanese rates attracted attention



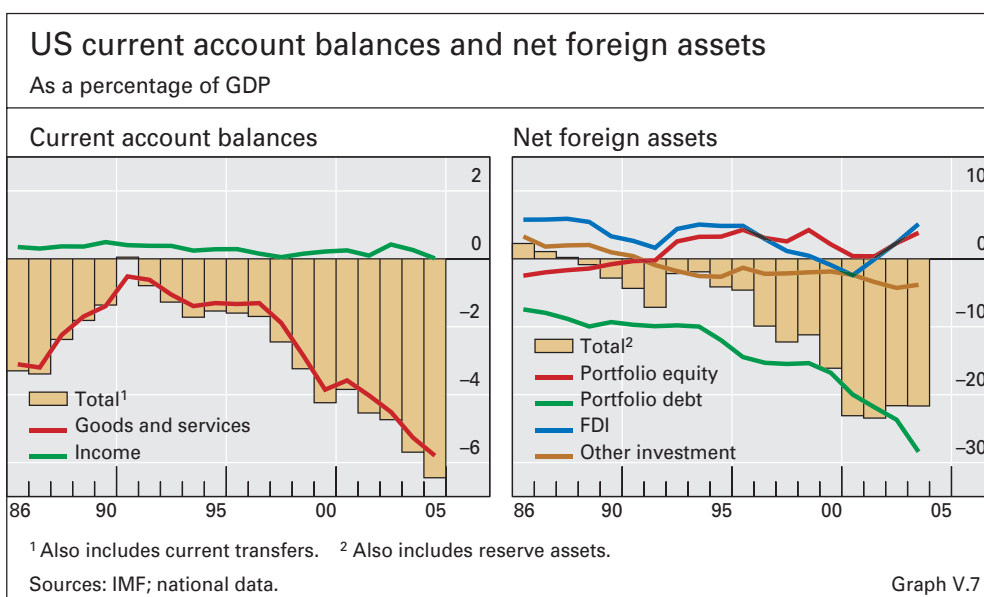
which adjust excess returns by their volatility (Graph V.6). Market sources also suggested that short yen positions started to be unwound towards the end of the year.

The effect of the reversal of carry trade positions on exchange rate volatility is hard to predict and depends, inter alia, on the speed with which these positions are closed. In some cases, the gradual unwinding of carry trades caused visible changes in exchange rates without a sizeable impact on short-term volatility. The slow decline of the Australian dollar that started in March 2005, when carry trades targeting that currency became less attractive, is a case in point. In other instances, carry trades were unwound suddenly, causing sharp exchange rate movements and spillovers – albeit short-lived – across markets. Around early December 2005, an appreciation of the yen against the US dollar triggered a rapid closing of long positions in the Brazilian real and the New Zealand dollar and a drop in their value. The price of gold was also affected. An even more striking example of a disorderly correction following the unwinding of carry trades was the sharp fall of the Icelandic króna in February 2006, following one rating agency’s change in the outlook for Iceland’s sovereign rating. The unwinding of positions involving the króna caused a 10% depreciation of the currency within two days. While such an event would not normally influence other foreign exchange markets, it spilled over within hours to the high-yielding currencies of Australia, Brazil, Hungary, New Zealand and South Africa, all affected by carry trades.

Unwinding of carry trades at times caused volatility spikes

The US external imbalance

The US external imbalance widened further in 2005. The current account deficit for the first time reached 6.4% of GDP and the net foreign asset position is likely to have exceeded –25% (Graph V.7). In addition, net income on the US net foreign asset position, which had been consistently positive since the mid-1980s, was negative in the second and fourth quarters of 2005.



Market participants continued to react to data releases showing unexpectedly large increases in the US current account deficit, and at times also to very sizeable revisions of these data. However, the US external position overall attracted less attention than in previous years. This was also reflected in the fact that, during most of 2005, there was no reduction in the willingness of the private sector to finance the current account deficit. This was suggested by a shift in the composition of financial flows into the United States towards private flows. In particular, the shares of portfolio debt and foreign direct investment (FDI) rose significantly. In contrast, the share of financial inflows attributable to official reserves fell visibly.

The US external imbalance came back into focus in 2006

In early 2006, however, the US external imbalance came back into market participants' focus. This took place as new data showed the US trade deficit reaching record highs and discussions about China's exchange rate policy moved into the spotlight. It also appeared that external imbalances began to matter for other currencies: the selling pressure that hit the Icelandic króna at the end of February and in early March mostly spilled over to currencies of other countries with large current account deficits.

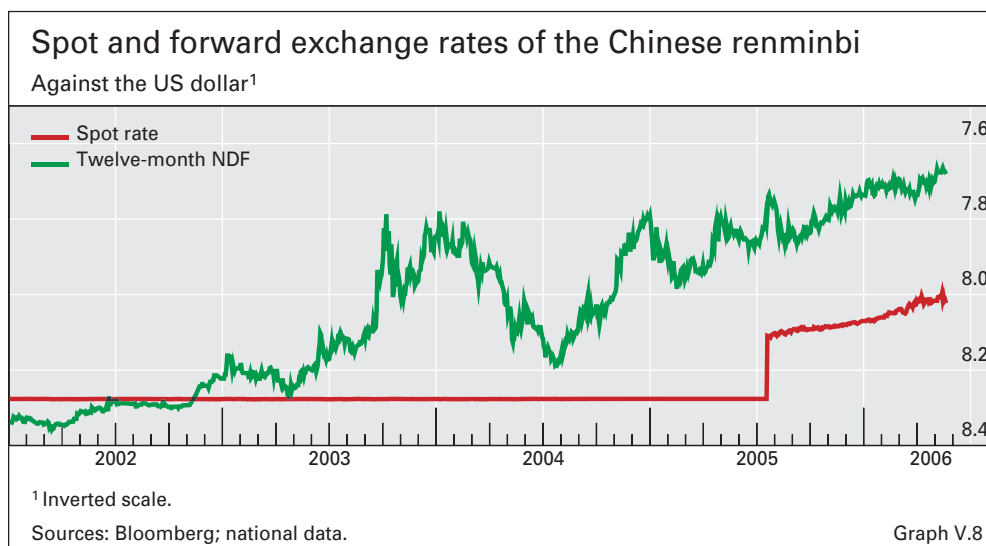
Exchange rate policies in Asia

Intervention in Asia still a factor

Reserve accumulation by a number of central banks, particularly in Asia, continued to influence exchange rates. However, compared to previous years, the more marked appreciation of a number of Asian currencies against the US dollar indicates that heightened upward pressure from foreign exchange markets was not fully offset by reserve accumulation, which generally occurred at a slower pace than hitherto (Table V.1).

The People's Bank of China in July 2005 announced some potentially important changes in its exchange rate regime. The three main elements were: an immediate 2% revaluation of the renminbi against the dollar; a continuation of the managed float regime, whereby the exchange rate is allowed to fluctuate within a $\pm 0.3\%$ band around a daily announced central parity; and the introduction of a reference basket of currencies, although details of weights, parities and band width were not released. No changes in existing capital controls were initially announced.

Since the beginning of 2006, the Chinese monetary authorities have announced a number of measures to develop the infrastructure of the domestic foreign exchange market. The primary objective has been to help avoid disorderly fluctuations of the renminbi once it is allowed to float more freely. These changes are being implemented gradually. First, 13 Chinese and foreign banks have been authorised as market-makers in the renminbi spot market. Second, market-making and over-the-counter (OTC) trading systems have been officially introduced. These two measures allow market-makers and other qualified participants in the onshore renminbi spot market to trade directly with each other rather than only through a centralised matching system, although that system will continue to operate in parallel. The new OTC system will still operate within the China Foreign Exchange Trade System under the auspices of the central bank. Such expanded trading could lead to greater exchange rate flexibility. Third, the renminbi's central parity is now set as a weighted average



of the collected quotes of the market-makers before the trading of the same business day, rather than based on the closing price of the previous trading day. Through the removal of any possible crawling peg-type mechanism, the renminbi/dollar spot rate may now move significantly from one trading day to the next. Finally, the authorities have allowed domestic financial institutions, including banks, insurance companies and fund management firms, to invest in overseas securities under the Qualified Domestic Institutional Investor scheme.

The effect of the initial changes in July differed across currencies. It was very limited on the main currencies. The only visible reaction was the 2% appreciation of the yen against the dollar in the first few hours after the announcement. In contrast, the changes had wider implications within the Asian region. The most immediate consequence was the move by the Malaysian authorities from a US dollar peg to a managed float for the ringgit. In addition, most Asian emerging market currencies appreciated by 2% against the US dollar.

Pressure on the renminbi eased in the months following the regime change, and the renminbi/dollar exchange rate remained very stable for several months. Only in early 2006 were there signs that the monetary authorities in China were allowing the renminbi to appreciate following renewed upward pressure (Graph V.8). Between the beginning of 2006 and mid-May, the currency gained about 1% against the dollar.

Net income and the sustainability of the US external position

Despite the steady deterioration in the US current account and international investment position since the early 1990s, the US net income balance has been consistently in surplus and relatively stable as a share of GDP, although deficits have been reported in two of the past four quarters (Graph V.7). The fact that the United States has continued to run a net income surplus, while accumulating foreign liabilities faster than foreign assets, has been highlighted as an indication that the country's external position is more sustainable than

it might at first appear. What follows explores this question in more detail, bringing to bear the experiences of a range of industrialised countries to cast further light on the US situation.

Trends and determinants of net income

The net income balance can be broken down into a composition effect and a return effect

In an accounting sense, the US net income balance can be broken down into a composition effect and a return effect. The composition effect mainly arises because a relatively large share of foreign assets is made up of higher-risk, high-yielding FDI, while a relatively large share of foreign liabilities is made up of lower-risk, low-yielding portfolio debt (Table V.2). The return effect arises because there has been a large and persistent yield differential between US direct investment abroad and FDI in the United States.

The United States is long equity and short debt ...

The pattern of being long net equity assets and short net debt assets, which underlies the composition effect, has been a feature of the US external position for some time, although there have been important differences in the trends of these stock variables (Graph V.7). The stock of net FDI assets has averaged around 5% of GDP for the past three decades, albeit with significant swings around this average, mostly relating to changes in FDI in the United States. Offsetting this has been a sharp increase in the rate at which net portfolio debt liabilities have accumulated since the mid-1990s. As will be discussed below, the evolution of these trends is likely to be important looking forward.

... but this does not guarantee a net income surplus

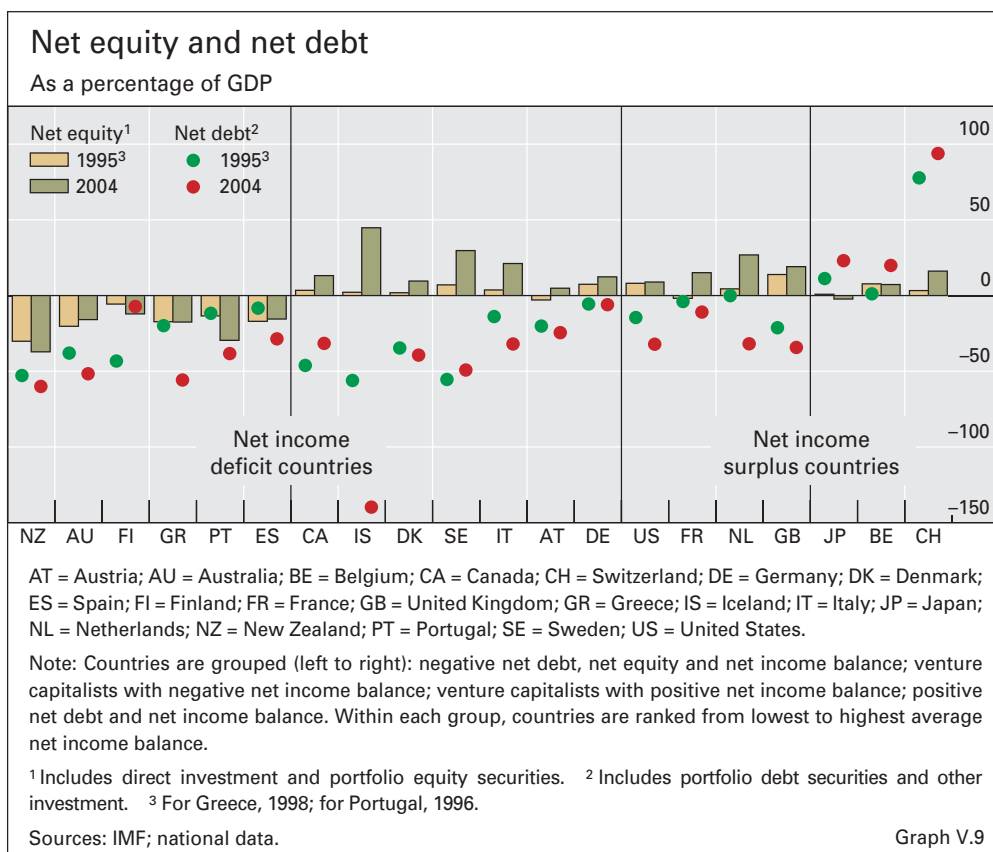
The cross-country experience suggests that this “venture capitalist” profile of being long net equity and short net debt is associated with consistent net income surpluses in several countries, in particular France, the Netherlands, the United Kingdom and the United States (Graph V.9). Interestingly, the United Kingdom and the United States are the only two countries to have consistently run a net income surplus in combination with a current account deficit over this period. However, this profile is neither sufficient, nor necessary, for running a net income surplus. Hence, the composition effect alone is unlikely to be able to explain the stability of the US net income surplus.

US external assets and liabilities, 2004					
In per cent					
		Direct investment	Portfolio equity	Portfolio debt	Other investment ¹
Assets ²	Share of total	33.3	25.6	9.3	31.0
	Income yield	8.6	2.6	4.0	2.2
	Ratio to GDP	28.0	21.5	7.8	26.1
Liabilities	Share of total	21.5	16.5	34.0	28.0
	Income yield	4.3	2.0	4.3	1.7
	Ratio to GDP	22.9	17.6	36.2	29.9
Net assets ²	Share of total	22.6	16.9	-125.5	-16.9
	Income yield	4.3	0.6	-0.3	0.5
	Ratio to GDP	5.1	3.9	-28.4	-3.8

¹ Includes loans, currency and deposits, trade credit and other accounts receivable and payable. ² Also includes reserve assets; therefore, shares of the total do not sum to 100.

Sources: IMF; BIS calculations.

Table V.2



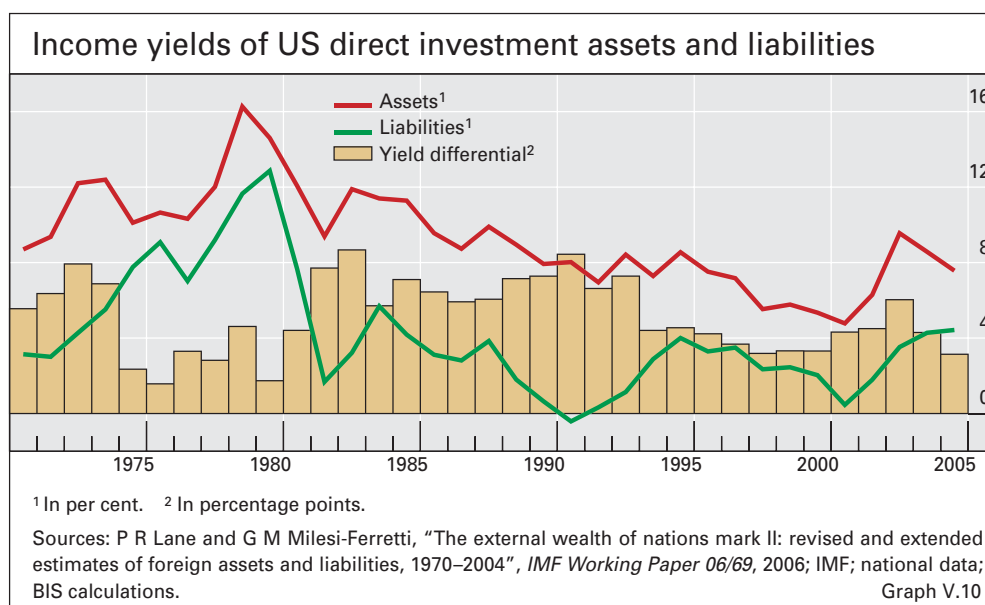
It is not sufficient because a number of venture capitalist countries, for example Canada and Italy, have consistently run net income deficits. It is not necessary because there are a number of countries, such as Japan and Switzerland, which have consistently run net income surpluses with long net debt positions.

It has been argued that the United States gains a return advantage in terms of a low income yield on some of its liabilities because they provide liquidity and insurance services that are valuable to the purchaser. This argument is particularly applicable to portfolio debt and other investment. However, the yield differentials between assets and liabilities for these asset classes are typically quite small (Table V.2).

For the United States, the return effect largely captures the differential between income yields on US direct investment abroad and yields on FDI in the United States. The income yield on US-owned direct investment abroad has been on average around 5 percentage points higher than the income yield on foreign-owned direct investment in the United States since the 1970s (Graph V.10).

The importance of having a yield advantage in FDI is also apparent for a number of other countries with net income surpluses. France, the Netherlands, Switzerland and the United Kingdom also had a positive difference between the income yields on their FDI assets and liabilities on average between 2000 and 2004 (Table V.3). For France, Switzerland and the United Kingdom, these differentials have been consistently positive since the early 1990s, averaging 1, 2 and 4 percentage points respectively. Interestingly, net income receipts on

The return effect is driven by low income yields on FDI in the United States



FDI made the largest positive contribution to the net income balance in all these countries over the past five years.

Four main explanations for this differential:

Four main explanations have been put forward as to why US residents' direct investment abroad generates a higher income yield than FDI in the United States: US direct investment abroad is riskier than FDI in the United States; US FDI assets are bundled with relatively more knowledge-based assets that, while unmeasured, still generate income, eg intellectual property and branding ("dark matter"); the average age of FDI in the United States is relatively low; and companies have tax incentives to minimise the income reported by US affiliates.

riskier US direct investment abroad ...

There is little evidence that the United States earns a risk premium on its FDI assets because they are located in places that are riskier than the United States. One reason is that most FDI flows occur between the United States and other countries with similarly high credit ratings: over 50% of US direct investment abroad is in Europe, with a further 15% going to Australia, Canada and Japan. In the reverse direction, over 70% of FDI in the United States comes from Europe. Moreover, the United States does not appear to earn a higher yield on assets located in countries with a lower sovereign debt rating. In addition, the income yield on US direct investment abroad does not appear to be more volatile, and therefore more risky, than the income yield on FDI in the United States.

... "dark matter" ...

The dark matter explanation has received a lot of attention recently and also addresses the question of why the yield on US direct investment abroad should be high. However, the international evidence suggests that the more relevant question is why foreigners earn such a low yield in the United States (Table V.3). The yield on US direct investment abroad is indeed on the high side compared with yields earned by other countries. This is reinforced by taking into account that some countries measure FDI stocks at book rather than market value, which typically leads to an overestimation of yields. All the same, what stands out more clearly in the international comparison is that the

Foreign direct investment, 2000–04					
In per cent					
	Assets		Liabilities		Difference
	Share of total	Income yield	Share of total	Income yield	Income yield
United States	33.1	6.8	24.7	2.3	4.5
Netherlands ¹	26.5	6.4	21.6	4.3	2.1
Switzerland ¹	19.0	10.0	12.5	8.0	2.0
United Kingdom ¹	18.8	9.0	10.2	7.1	1.9
France	34.1	1.5	22.1	0.5	1.0
Sweden	43.8	5.4	27.1	5.8	-0.3
Portugal ²	13.5	3.5	16.3	4.1	-0.6
Spain ¹	29.6	3.6	23.4	4.2	-0.6
Germany ¹	18.3	2.1	16.8	3.0	-1.0
Denmark	26.5	5.4	23.9	6.5	-1.1
Italy	15.9	2.1	11.0	3.6	-1.5
Greece	10.2	1.2	10.0	2.6	-1.5
Austria ¹	12.4	7.1	11.3	9.1	-2.0
Iceland ¹	20.4	13.1	6.3	15.3	-2.2
Australia	38.7	5.4	27.6	7.5	-2.2
Japan	9.5	5.0	3.9	7.5	-2.4
Finland ¹	27.8	8.4	11.9	11.5	-3.0
Canada ¹	44.4	3.9	31.0	7.5	-3.6
New Zealand	21.3	2.4	34.1	8.8	-6.4
Ireland ³	5.9	8.8	15.6	19.3	-10.5

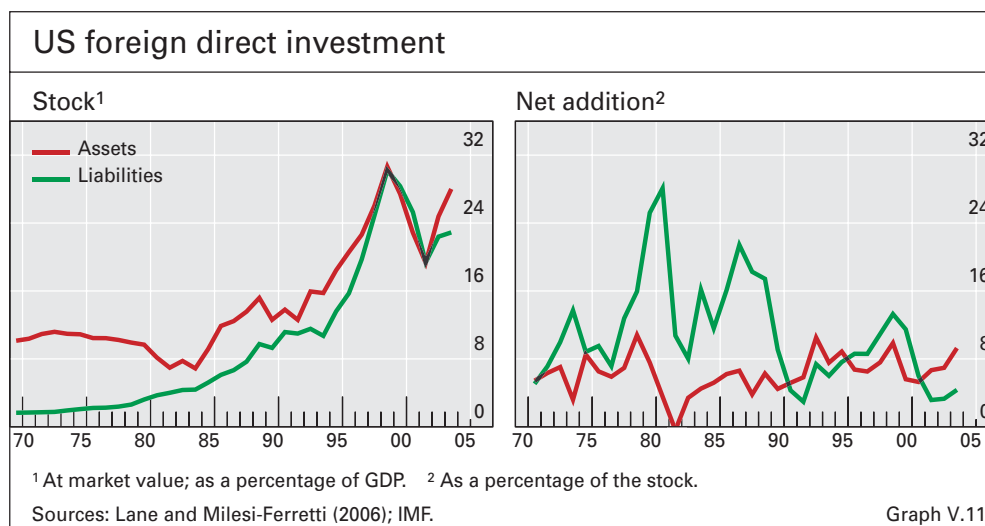
¹ FDI assets and liabilities are reported at book value rather than market value. Based on national data for France, Sweden and the United States, the ratio of market to book value lies in the range of 1¼ to 1¾, suggesting that the income yields for assets and liabilities for these countries could be overstated by a factor in this range. ² Stocks valued at current cost. ³ 2002–04.

Sources: IMF; national data; BIS calculations. Table V.3

main anomaly is the comparatively low income yield on FDI in the United States, even when these measurement issues are factored in. This point is confirmed by micro evidence, which shows that returns for foreigners investing in the United States are also low compared with returns to local investment by US firms.

There are several pieces of evidence which support the view that the income generated by new investments increases over time, and that FDI in the United States is relatively young compared with US direct investment abroad. Evidence from firm-level data suggests that the earnings of foreign-controlled firms rise to levels closer to those of US domestic firms over time, reflecting a broader positive relationship between earnings and the age of investment found in micro-level studies. In addition, it has been well documented that, at least until the 1980s, the stock of US direct investment abroad was older than the corresponding stock of FDI in the United States (Graph V.11). This can partly be explained by US investment in Europe following the Second World War. The rapid increase in net additions to the stock of FDI in the United States over the 1980s suggests that the average age of this stock could have fallen. Consistent with this, the yield differential does appear to have widened over this period.

... the relative maturity of FDI assets and liabilities ...



Since the 1980s, the stocks of assets and liabilities have been growing at roughly comparable rates, which suggests that the average maturity of FDI in the United States should be converging to that of the stock of US direct investment abroad. This would imply that the yield gap should be closing gradually. While the yield differential has fallen to close to its historical average, there is no indication of an ongoing decline, which suggests that relative age can only be part of any explanation of the yield differential. Moreover, there does not seem to be a robust relationship between income yields and the maturity of the FDI stocks using cross-country data.

... and tax arbitrage

Corporate tax rates could provide foreign-owned firms in the United States with incentives to shift profits out of the United States and therefore report low income flows from FDI in the United States. The profits of a foreign-owned US affiliate could be shifted to the foreign parent, for example, by paying elevated prices for imports from the parent firm, or charging the parent firm low prices for its exports. The use of transfer pricing between affiliated companies in this way would lower the reported income flows to the owners of FDI in the United States, and increase the value of intra-firm trade in goods and services. Therefore, there would be no net effect on the current account.

In a number of respects, this fourth hypothesis does appear to be part of the explanation. While there is little direct evidence that transfer pricing is used to minimise taxes, anecdotal evidence suggests that this does occur. Moreover, there are incentives for foreign-owned firms in the United States to shift profits to their foreign parent, and these appear to have grown over time. While the average corporate tax rate across industrialised countries has been falling steadily since the late 1980s, the US corporate tax rate has been roughly constant and is now one of the highest. On a bilateral basis, differences in corporate tax rates can be very large and are widely recognised as one of the factors underlying the rapid increase in FDI inflows to countries such as Ireland. Finally, there is evidence that reported reinvested earnings, which are an important component of income for US direct investment abroad but not for FDI in the United States, are influenced by tax considerations.

In summary, although yields on US direct investment abroad are high, the US advantage on FDI is primarily related to the fact that foreigners appear to earn low yields on their direct investment in the United States. The two most promising explanations for these low yields are that FDI in the United States is relatively young and that foreign parents have tax incentives to minimise income reported in the United States. However, there are insufficient data to quantify the relative importance of these two factors.

The sustainability of the US external balance

How likely is it that the negative impact of a large trade deficit on the US external position will be offset by a net income surplus and positive valuation effects going forward? Two negative quarterly net income balances in 2005 suggest that the US external position may be close to the point where the income received from assets is no longer sufficient to offset income payments made. More generally, the answer to this question depends on the evolution of the stocks of foreign assets and liabilities, the evolution of income yields, and the extent to which exchange rate and asset price movements generate

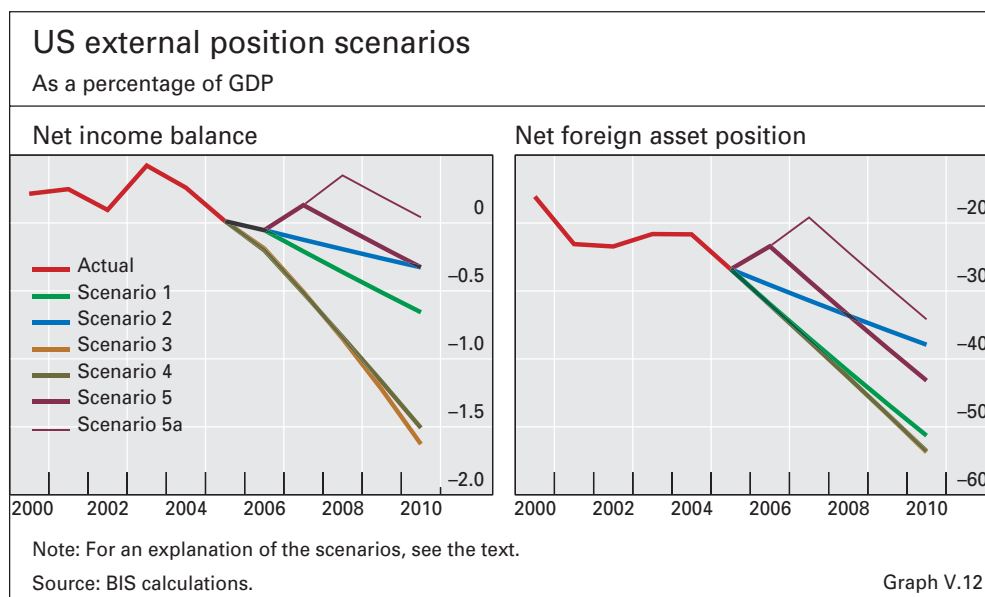
The net income balance is not likely to remain in surplus

US external position						
As a percentage of GDP (yields in per cent)						
	2005 ¹	Scenario in 2010				
		1	2	3	4	5
Assumptions						
Trade balance	-5.8	-5.8	-3.0	-5.8	-5.8	-5.8
Income yield on:						
FDI assets	7.6	7.6	7.6	7.6	6.1	7.6
FDI liabilities	4.4	4.4	4.4	4.4	5.9	4.4
Portfolio equity assets	2.6	2.6	2.6	2.6	2.6	2.6
Portfolio equity liabilities	2.0	2.0	2.0	2.0	2.0	2.0
Debt assets ²	2.7	2.7	2.7	4.7	2.7	2.7
Debt liabilities ²	3.1	3.1	3.1	5.1	3.1	3.1
Outcomes						
Income balance	0.0	-0.7	-0.3	-1.6	-1.5	-0.3
Net foreign asset position	-26.8	-51.3	-37.9	-53.7	-53.6	-43.2
Assets	85.0	85.0	85.0	85.0	85.0	93.5
Liabilities	111.8	136.3	122.9	138.7	138.6	136.7
FDI	4.0	-1.2	1.6	-1.8	-1.7	1.5
Portfolio equity	3.0	-1.1	1.1	-1.5	-1.5	1.0
Debt ²	-35.4	-50.6	-42.3	-52.1	-52.0	-47.5

Note: The assumption that stocks of assets and liabilities grow in line with nominal GDP ensures that the ratio of these stocks to GDP is constant, *ceteris paribus*. However, this assumption does not ensure that the net asset position is equal to the last period's net asset position plus the current account balance and any valuation effects, which is an accounting identity. To ensure that this identity holds, the difference between the net foreign asset positions generated by the baseline assumption and the accounting relationship in each period is added to the baseline net foreign asset position. In particular, the difference is allocated to the four classes of liabilities in proportion to their share in total liabilities in 2004. A different allocation would lead to a different evolution of the net income balance.

¹ Actual data for trade balance, income balance and income yields on FDI assets and liabilities. Other income yields are at 2004 values. ² Includes portfolio debt and other investment.

Source: BIS calculations. Table V.4



valuation effects. The sensitivity of the net asset position and the net income balance to each of these factors will be discussed in turn, using five scenarios.

As a benchmark for the analysis, it is assumed in scenario 1 that the trade balance, current transfers and compensation of employees remain constant as a share of GDP at their 2005 values, and that income yields do not change (Table V.4). US nominal GDP is assumed to grow by 5.5% per year, which is close to average growth over the past 10 years. The stocks of foreign assets and liabilities are assumed to grow in line with nominal GDP. In addition, adjustments are made to ensure that changes in the net asset position are consistent with the value of the current account balance in each period. Under scenario 1, the aggregate net foreign liability position increases from less than 25% of GDP in 2004 to over 50% by 2010 (Graph V.12). The net income balance shifts into deficit from 2006 onwards and is -0.7% of GDP by 2010.

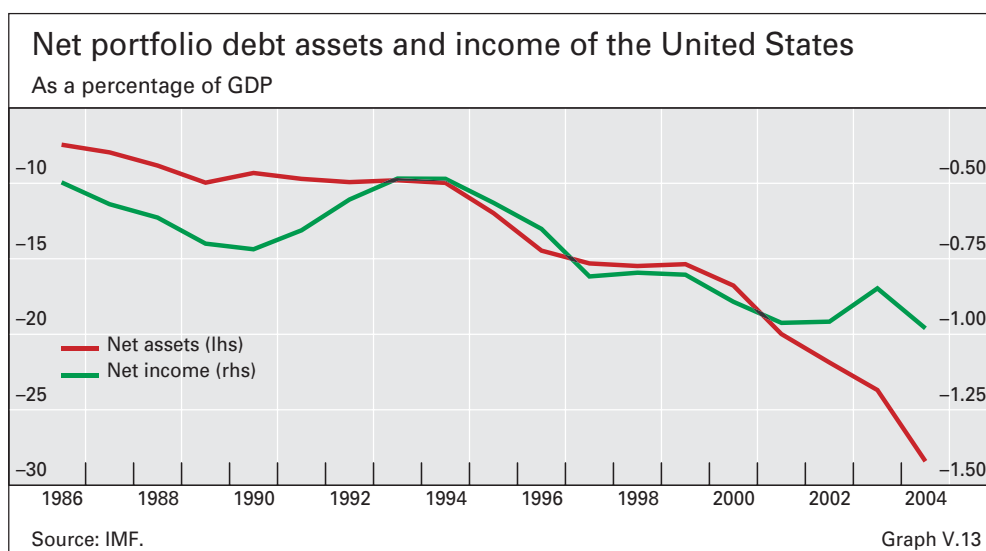
Scenario 2 tests the sensitivity of the US external position to an improvement in the trade deficit, which dominates the current account deficit. It assumes that the trade deficit falls from 5.8% to 3% of GDP in 2006 and remains at this lower level. This change has a first-order effect: compared to the first scenario, the net foreign liability position deteriorates less rapidly, and is still less than 40% of GDP by 2010. There is also an improvement in the net income balance, which reaches -0.3% of GDP by 2010.

The third scenario considers the sensitivity of the external position to changes in income yields arising from changes in interest rates. During periods of lower than average official interest rates, income payments tend to grow less rapidly than the stock of portfolio debt liabilities (Graph V.13). During a tightening cycle, such as that starting in mid-2004 in the United States, income yields on these asset classes are likely to increase. In addition, looking forward, the downward pressure on income yields from strong demand by Asian central banks for safe liquid assets could be expected to fade.

Under this scenario, compared to scenario 1, the income yields for both debt assets and liabilities are allowed to increase by 0.4 percentage points per

The path of the trade deficit matters

The evolution of income yields matters



year until 2010. This is based on the historical correlation between US interest rates and yields on portfolio debt liabilities, and the increases seen in the federal funds rate to date. The results suggest that a rise in the yield on debt has a significant negative effect on the net income balance, leading to a deficit of 1.6% of GDP by 2010 compared with a deficit of 0.7% under scenario 1, and to a further deterioration in the net foreign asset position.

Scenario 4 illustrates the effect of a change in the path of income yields on FDI. The analysis above suggests that there are two factors which could be important for FDI yields going forward. The first is that the stock of FDI in the United States is maturing and this may be associated with an increase in the income yield on these liabilities. The second is that corporate tax rates in the United States have become increasingly high relative to those in the rest of the industrialised world. This suggests that the incentives to shift profits out of the United States are, if anything, growing, and this could have an offsetting negative effect on the yields of FDI in the United States. Given that the analysis above does not provide an unambiguous indication of the likely path of FDI yields, it is assumed in an adverse scenario that yields on FDI steadily converge to around 6%, which is the midpoint between yields on assets and liabilities in 2005 and close to the average yield on US FDI assets between 2000 and 2004. This generates deteriorations in the net income balance and the net foreign asset position that are similar to those yielded by the assumptions underlying scenario 3.

The fifth scenario considers the sensitivity of the US external position to valuation effects. Unlike the external liabilities of many other countries, US external liabilities are almost entirely denominated in domestic currency, whereas two thirds of US assets abroad are denominated in foreign currency. Around one quarter of these foreign currency assets are denominated in euros, a quarter in other European currencies such as sterling and the Swiss franc, and another quarter in Canadian dollars, Caribbean currencies and the yen. This currency mismatch between assets and liabilities, combined with the degree of leverage in the external position, means that exchange rate

Valuation effects may also be important

movements can be an important source of valuation effects. Historically, valuation effects have been positive for the United States, with the result that the net foreign asset position has deteriorated by less than the current account balance alone would suggest.

Under scenario 5, it is assumed that, because of a valuation effect, foreign assets as a percentage of GDP increase by 10% in 2006. In the absence of precise estimates, there are at least two possible proxies that provide some idea of the possible magnitude of exchange rate movements that could result in a valuation effect of this size. First, the fact that two thirds of assets are denominated in foreign currencies suggests that a uniform 15% depreciation of the US dollar against these currencies would be consistent with the assumed valuation effect, *ceteris paribus*. Second, historical correlations suggest that a 10% increase in assets would be associated with a depreciation of the US nominal effective exchange rate of around 25%.

Scenario 5 demonstrates that a positive valuation effect has a significant one-off positive impact on the US external position compared with scenario 1. Although it is deteriorating at a more rapid pace, by 2010 the net income balance is roughly in line with where it would be under scenario 2, which assumes that the trade deficit improves to 3% of GDP. However, by 2010, the net asset position under scenario 5 deteriorates significantly further than under scenario 2. Scenario 5a demonstrates the impact of consecutive 10% valuation effects in both 2006 and 2007. The consequences of this assumption are significant enough to ensure that the net income balance remains in surplus until 2010, and that the ratio of net foreign assets to GDP only deteriorates by 10 percentage points between 2006 and 2010.

In summary, the most important change required for an improvement in the US external position would be an improvement in the trade balance, which would result in a slower deterioration in the net asset position. Positive valuation effects associated with a dollar depreciation could also be important, but would have a one-off impact. As such, unless they are repeated, they would simply postpone rather than permanently offset the deterioration in the external position. Changes in income yields also have a significant effect on the income balance and the net foreign asset position. However, given the historical relationship between interest rates and income yields on debt, these effects are likely to lead to a further deterioration rather than an improvement in the external position.