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1. Overview: appetite for risk lifts markets

Financial markets around the world rallied into the new year, adding to the impressive gains recorded in 2003. Improvements in global growth prospects and corporate finances, coupled with a robust appetite for risk, underpinned increases in equity and credit prices. Not even further revelations of corporate malfeasance seemed to unsettle investors.

Even as equity and credit markets rallied, the general level of yields declined. Government securities markets appeared to pay greater attention to the lack of inflationary pressures and the likely stance of US and euro area monetary policy than to the global recovery per se. Possibly illustrating the importance of the low level of interest rates for current market valuations, a rise in yields in late January following a change in the US Federal Reserve's language on policy accommodation led to a temporary fall in credit and equity prices.

Prior to the brief sell-off in late January, equity and debt prices in emerging markets had outperformed most other markets. Investors' appetite for risk contributed to a marked pickup in equity issuance in Asia and international bond issuance in Latin America. It also led Asian authorities to intensify their efforts to stem the appreciation of their currencies against the US dollar, efforts which may have contributed to the low level of dollar yields.

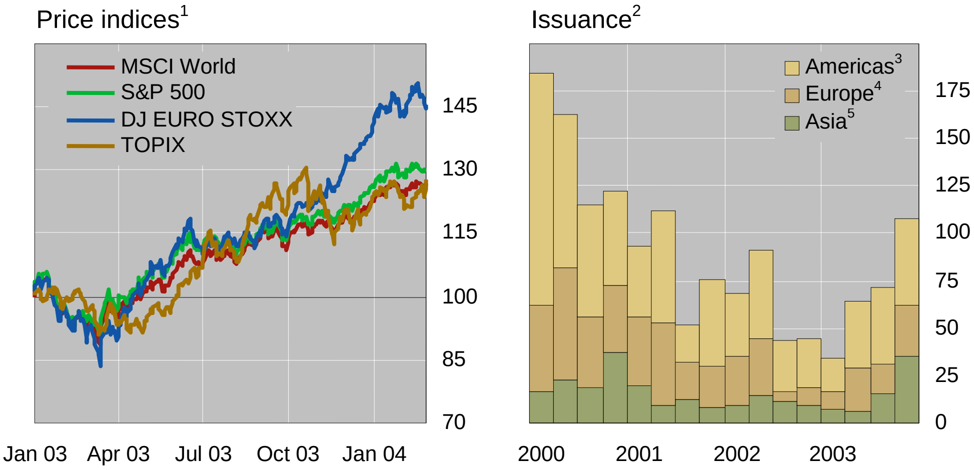
Equity prices outpace earnings growth

The rally in global equity markets which had begun in March 2003 continued through the early part of 2004. Following three successive years of losses, the MSCI World index gained 23% in 2003 and a further 3% over the first eight weeks of 2004 (Graph 1.1). Markets were especially buoyant in December and early January, on expectations of robust earnings growth.

Profits exceed expectations ...

Earnings have recovered strongly from their 2001–02 lows. Profits of listed firms rose by more than expected in 2003: 27% year-on-year in the United States and almost 100% in the euro area according to I/B/E/S (Graph 1.2). For 2004, analysts forecast another year of double digit earnings growth. The impressive results posted by many firms in the final quarter of 2003 appear to have given analysts greater confidence in their forecasts. However, firms seem less confident in the strength of the economic recovery. US companies

Equity markets



[1] End-December 2002 = 100; in local currency. [2] Announced initial and follow-on public offerings; domestic and international data are not fully comparable and so some issues may be counted twice; in billions of US dollars. [3] Canada and the United States. [4] France, Germany, Italy and the United Kingdom. [5] China, Indonesia, Japan, Korea, Malaysia, the Philippines, Taiwan (China) and Thailand.

Sources: Bloomberg; Datastream; Dealogic; BIS calculations. Graph 1.1

announcing negative outlooks for future earnings continued to outnumber those announcing positive outlooks.

... but equity valuations still seem high ...

Since early 2003 the improvement in earnings has been outpaced by increases in equity prices. Consequently, price/earnings ratios have trended upwards. Although still below their recent peak, valuations in some major markets are high relative to their historical average. Based on a five-year average of trailing earnings – which smooths out the effects of the business cycle – the price/earnings multiple for the S&P 500 equalled 29 at the end of January 2004, well above its 1961–2003 average of 20. If based on forward earnings, the price/earnings ratio is closer to historical norms.

Investors were not insensitive to news that might call current valuation levels into question. The S&P 500 fell by 1.4% on 28 January after the US Federal Reserve was perceived to have weakened its commitment to leaving policy rates unchanged and by 0.8% on 4 February following a profit warning by leading technology firm Cisco Systems. The TOPIX fell by 0.8% on 26 January in response to a news report that regulators would make a special inspection of UFJ Bank's valuation of its non-performing loan portfolio.

... boosted by declining risk aversion

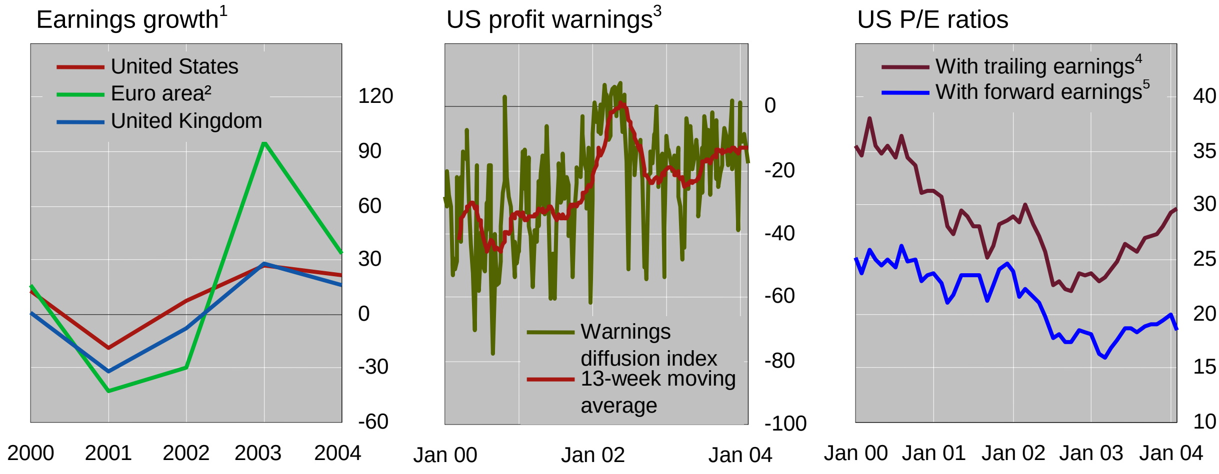
Yet any doubts proved short-lived. Indeed, the implied volatility of options on US equity indices, which reflects investors' perceptions of future volatility as well as their aversion to risk, fell to a record low early in the new year. Estimates of effective risk aversion derived from these options suggest that investors' aversion to risk continued to decline up to December before increasing slightly in January and February (see the box on page 4). This is consistent with an ongoing portfolio shift by US investors out of cash equivalents and into equities and other higher-risk assets.

The worldwide rally in equity markets stimulated a pickup in equity issuance in late 2003 (Graph 1.1). Equity issuance rose to its highest level in more than two years. Led by Japanese and Chinese companies, Asian firms raised $35 billion in domestic and international equity markets in the fourth quarter of 2003. The largest initial public offering of the year was by a Chinese life insurance company, China Life, which tapped international markets for almost $4 billion. Domestic Chinese investors seemed not to share international investors' enthusiasm for Chinese equities; the Shanghai stock market, where the participation of international investors is tightly restricted, was one of the worst performing markets in the world in 2003, rising by only 10% in local currency terms. By contrast, the Thai and Indonesian stock markets rose by 117% and 63% respectively in 2003. Thai and Indonesian firms took advantage of the rally by tapping domestic equity markets for funding.

Rally leads to an increase in equity issuance and mergers

Current equity market valuations facilitated firms' efforts to strengthen their balance sheets as well as to engage in mergers and acquisitions (M&As). In Europe and North America, several fallen angels (companies whose debt had once been rated investment grade but was subsequently downgraded to below BBB–) raised large amounts in equity markets as part of their restructuring plans. Dutch food retailer Ahold, which had reported serious accounting irregularities in early 2003, offered rights totalling €3 billion, with the proceeds directed towards the retirement of debt. M&A activity also began to revive, with several multibillion dollar deals announced in late 2003 and early 2004. In the largest deal for several years, JPMorgan Chase announced in January a stock-for-stock merger with Chicago-based Bank One worth $58 billion.

Earnings and valuations



[1] Annual percentage changes; earnings of listed companies as reported by I/B/E/S. For 2003, estimated earnings; for 2004, forecast earnings. [2] France, Germany and Italy. [3] Difference between positive and negative announcements by companies regarding future earnings as a percentage of all announcements. [4] Based on a five-year average of trailing earnings. [5] Based on a one-year average of forecast earnings.

Sources: Bloomberg; Datastream; I/B/E/S; BIS calculations. Graph 1.2

Measuring risk aversion

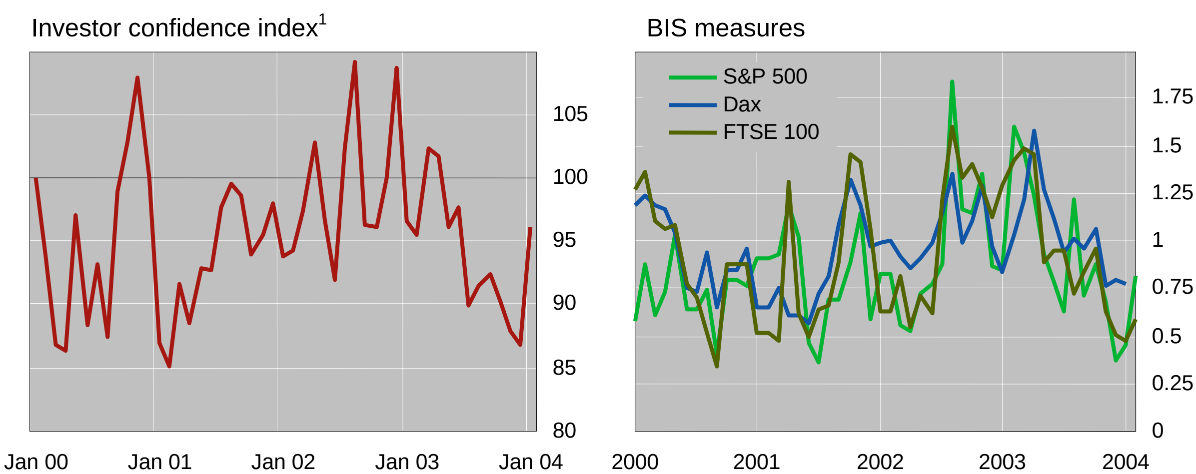
Movements in asset prices may be driven by a shift in fundamentals or a change in investors' effective aversion to risk. It is difficult to disentangle the two effects because neither is directly observable. Market participants often rely on simple proxies to capture risk aversion. One popular such proxy is JPMorgan's Liquidity, Credit and Volatility Index (LCVI).[①] It incorporates seven different measures of risk – from the swap spread and high-yield spreads to the implied volatility of currency options – but its conceptual link to risk aversion is not well specified. In recent years, modern finance theory has provided tools that have facilitated the construction of indicators of risk aversion with solid conceptual underpinnings.

One such indicator, State Street's Investor Confidence Index (ICI), relies on information from global portfolio flows.[②] The ICI is based on a model that employs information about global investors' equity holdings and purchases to separate changes in fundamentals from changes in the relative risk aversion of global (institutional) investors and domestic (retail) investors. Changes in risk aversion are captured by the common component across all countries of sales or purchases of equities by global investors as a proportion of their individual country holdings.

A second indicator, reported in this *Quarterly Review* since June 2003, exploits information from the prices of equity index options.[③] It measures risk aversion by comparing the empirical distribution of equity returns with the distribution implied in options prices. The latter distribution weights the empirical probabilities according to investors' risk preferences, attaching greater value to the avoidance of low payoffs and less value to the possibility of high payoffs. The greater the area under the left tail of the option-implied distribution, the greater is investors' effective aversion to negative outcomes.

Despite different sources of information, the ICI and the BIS indicator seem to give similar signals regarding risk aversion. According to both indicators, risk aversion declined during much of 2003 and increased slightly in January 2004. One possible reason for the similarity of the signals is that the global investors in the ICI model may also represent the marginal investor driving options prices in the BIS model.

Alternative measures of risk aversion



[1] Shown as the inverse of the index, ie a lower number indicates less risk aversion; January 2000 = 100.

Sources: State Street; Bloomberg; BIS calculations.

[①] See JPMorgan Chase: "Using equities to trade FX: introducing the LCVI", Global Foreign Exchange research note, 1 October 2002. [②] See Kenneth Froot and Paul O'Connell: "The risk tolerance of international investors", *NBER Working Papers*, no 10157, December 2003. [③] See Nikola Tarashev, Kostas Tsatsaronis and Dimitrios Karampatos: "Investors' attitude towards risk: what can we learn from options?", *BIS Quarterly Review*, June 2003, pp 57–65.

Credit markets rally despite the collapse of Parmalat

Credit spreads tighten ...

Like equity markets, credit markets also continued to rally into the new year. The spread between dollar-denominated BBB-rated corporate bonds and US Treasuries fell to approximately 130 basis points by 27 February 2004, 260 basis points below its October 2002 peak and its lowest level since August 1998 (Graph 1.3). Spreads on emerging market debt declined to near record lows, a remarkable 490 basis points below their October 2002 level.

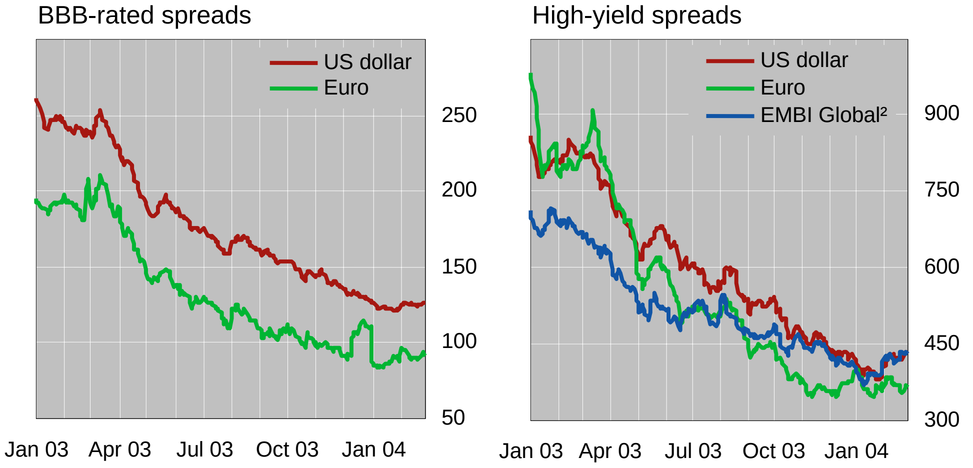
... supported by stronger financials ...

Improvements in corporate finances helped to support the narrowing of credit spreads. Corporate defaults fell sharply from their 2001 high, and measures of default risk derived from equity prices declined from their 2002 high (Graph 1.4). Despite exceptionally favourable financing conditions, borrowing by investment grade corporations remained restrained in the latter half of 2003. Business investment in the major economies accelerated in 2003, with the increase financed largely from rising profits; firms seemed hesitant to take on new debt to fund investment. While corporate issuance in the international bond market picked up towards the end of the year, in large part this reflected firms' efforts to lengthen the maturity of their debt.

As a result of such improvements in corporate balance sheets, the number of credit rating downgrades declined substantially over the past year. Although downgrades of US companies continued to exceed upgrades, the share of downgrades in all rating actions by Standard & Poor's fell from 82% in 2002 to 74% a year later. In Japan, upgrades exceeded downgrades in 2003, with downgrades accounting for only 48% of rating actions. Europe lagged the other two regions but still recorded a decline in the share of downgrades, to 83% of all rating actions.

Credit spreads[1]

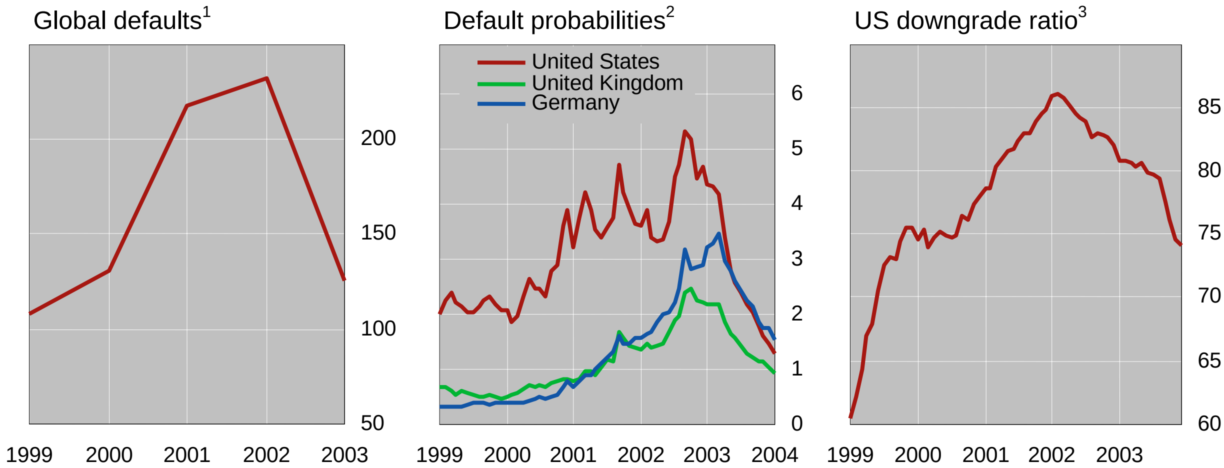
In basis points



[1] Option-adjusted spread over government bonds as calculated by Merrill Lynch for corporate bond indices. [2] Spread of sovereign debt instruments over US Treasury securities as calculated by JPMorgan Chase.

Sources: Bloomberg; JPMorgan Chase; Merrill Lynch. Graph 1.3

Credit quality



[1] Number of financial and non-financial issuers that defaulted during the year. [2] Expected default frequency for non-financial corporations over a one-year horizon, as calculated by KMV; in percentages. [3] Credit rating downgrades by Standard & Poor's as a percentage of all rating actions on US non-financial corporations; 12-month moving average.

Sources: Bloomberg; KMV; Standard & Poor's Global Fixed Income Research. Graph 1.4

... and a growing appetite for risk

Investors' growing appetite for risk – manifested in credit markets as a search for yield – also contributed to the narrowing of spreads. This was especially evident in the high-yield debt market, where investors bid up prices even while sovereign and corporate borrowers stepped up their activity. Emerging market borrowers raised $19 billion in the international debt securities market in January 2004, the largest amount since June 1997 prior to the Asian financial crisis. A surprisingly large amount, 35% of the total, was raised by borrowers rated B or lower, including Brazil, Turkey and Venezuela (see "The international debt securities market" on page 31). By contrast, in 2003 such borrowers had accounted for 20% of gross issuance by emerging markets, and in 2002 only 10%.

In a further sign of investors' willingness to discount risks in their search for yield, financing for leveraged buyouts (LBOs) increased after years of lacklustre activity (see "International syndicated credits in the fourth quarter of 2003" on page 29). Whereas the LBOs of the late 1980s had contributed to rising levels of corporate indebtedness, the same was not necessarily true of the most recent deals. Several of the largest LBOs involved the sale of subsidiaries of firms seeking to strengthen their balance sheets, such as Fiat's sale of its aviation division.

Credit markets shrug off Parmalat ...

Thanks in large part to the favourable credit environment, contagion from new revelations of corporate malfeasance, most notably at the Italian dairy conglomerate Parmalat in December, was limited. Parmalat is estimated to have understated its net indebtedness by upwards of €12 billion, more than even Enron or WorldCom. Parmalat's collapse appeared to interrupt temporarily the narrowing of credit spreads in the euro market; however, the widening was in fact driven almost entirely by Parmalat's own spreads, and euro spreads narrowed sharply once Parmalat was removed from the index at the end of December (Graph 1.3). The default swap premium on several of

Parmalat's major creditors, mainly Italian banks, widened as events unfolded, but not significantly so.

... but are unsettled by the prospect of higher interest rates

Possibly foreshadowing events that could end the long rally in credit markets, financing conditions in the high-yield market deteriorated in late January. The trigger was a perceived weakening in the Federal Reserve's commitment to leaving policy rates unchanged. In the days that followed the Fed's policy meeting on 28 January, spreads on high-yield corporate bonds and emerging market debt widened by approximately 35 basis points. Sovereign spreads on Brazilian dollar debt widened by as much as 100 basis points. While the high-yield market quickly stabilised, the episode illustrated the importance of the low level of interest rates for the rally in credit markets.

Yields less certain of economic recovery

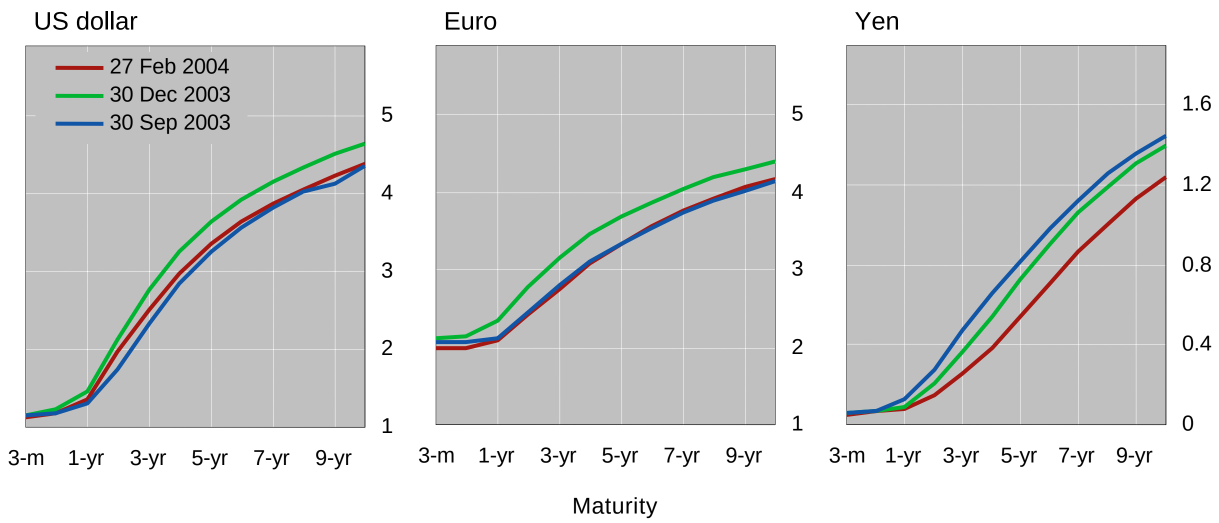
US yields decline on weak employment and subdued prices ...

Despite the improved economic outlook and related gains in other markets, government yields in the G3 declined markedly in the new year. The most pronounced decline was in the US dollar market, where 10-year Treasury yields sank under the 4% mark on 14 January for the first time since early October. The key data release was the December employment report announced on 9 January, which greatly undershot market expectations. Evidence of subdued producer prices also helped keep yields down, as did a number of speeches made in early January by Federal Reserve officials suggesting that the Fed would not raise rates until the emergence of risks of inflation, which at the time were seen as remote.

Other major bond markets saw less pronounced declines in yields, but the general direction of moves tended to mirror those in the US dollar segment (Graph 1.5). In the euro market, yields declined in December and early January

Swap yield curves

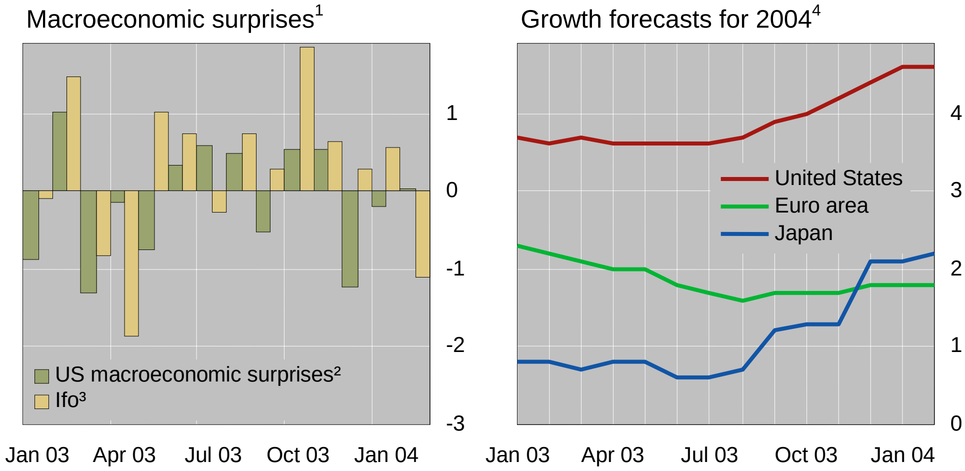
In percentages



Note: For three-, six- and 12-month US dollar and yen maturities, Libor; for three- and six-month euro maturities, euro deposit rates.

Source: Bloomberg. Graph 1.5

Macroeconomic data and growth forecasts



[1] Normalised announcement surprises, based on the difference between actual numbers and consensus forecasts. The observations are positioned in the month in which the actual numbers were released. [2] Weighted average of normalised surprises of the ISM survey, non-farm payrolls, retail sales and producer price and consumer price announcements. [3] The German Ifo survey is a business climate index derived by the Institut für Wirtschaftsforschung from survey responses. [4] Percentage changes over previous year. Forecasts as published monthly by Consensus Economics. The observations are positioned at the end of the month in which the forecast was made.

Sources: Bloomberg; © Consensus Economics; BIS calculations. Graph 1.6

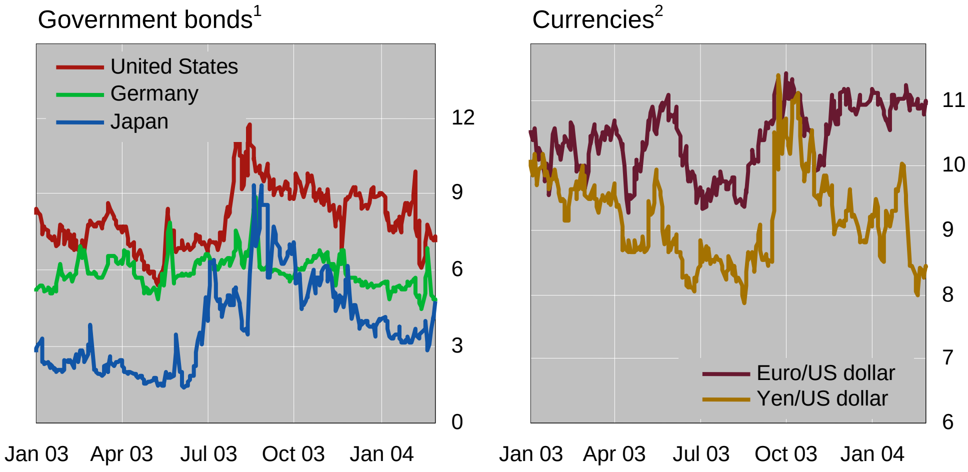
despite a positive tenor to euro area macroeconomic announcements (Graph 1.6). One contributing factor seems to have been the appreciation of the euro, which many market participants appeared to associate with lower growth prospects. In Japan, yields declined till late February as indicators pointed to persistent deflation, despite surprising momentum to the recovery. Meanwhile, declining implied volatilities for Japanese government bonds suggested that the increased uncertainty that had accompanied the sharp bond market sell-off of mid-2003 had diminished considerably (Graph 1.7).

... but increase briefly following a Fed policy meeting

A number of factors that had been keeping down yields in the dollar bond market weakened in late January. Markets appeared to be reminded of the United States' deteriorating fiscal situation on 23 January, when yields rose by nearly 10 basis points on news that the US Treasury was considering plans to introduce a 20-year inflation-indexed bond. More importantly, the change on 28 January in the Federal Reserve's language on policy accommodation, which dropped mention of "a considerable period" and inserted a reference to "patience", temporarily shifted forward most market participants' expectations of a policy rate hike in 2004. Nonetheless, a sustained move up in yields was stopped short by a weaker than expected US employment report on 6 February, which signalled again that the US labour market had yet to join in fully in the recovery.

Despite the low level of nominal yields on longer-dated dollar bonds, the slope of the term structure remained steep by historical standards. For instance, in the early part of 2004 the difference between 10-year and three-month rates remained above 300 basis points, more than twice the average

Implied volatilities



[1] Price volatility implied by the price of at-the-money call options on 10-year government bond futures contracts. [2] Three-month currency option volatilities.

Source: Bloomberg. Graph 1.7

since January 1990. The steep slope of the term structure can be viewed as largely attributable to expectations of a change in the monetary stance beyond the short term as well as increased risk premia due to uncertainty about that stance. Indeed, in contrast to Japanese government securities, implied volatilities on 10-year US Treasuries remained at relatively elevated levels (Graph 1.7).

New concerns over euro appreciation

Euro strength becomes more of a concern ...

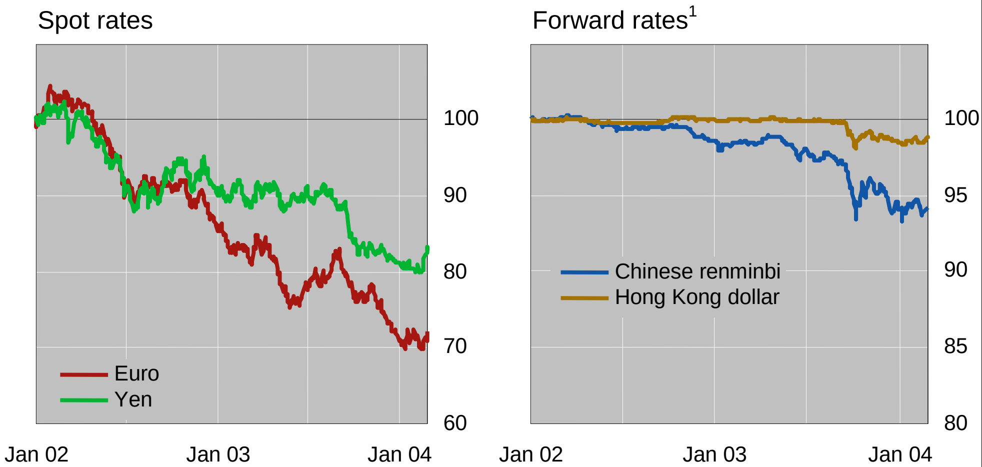
Exceptional volatility was evident in foreign exchange markets at the turn of the year, particularly for the euro. The euro's steep appreciation against the dollar dating from November intensified further in early January, contributing to a pickup in trading of currency derivatives (see "Derivatives markets" on page 41). Subsequently, the ECB President's remarks on 12 January about "brutal" moves in the euro were interpreted as indicating that European financial authorities at the highest levels were concerned and helped temporarily to halt the euro's rapid rise (Graph 1.8). Nonetheless, the implied volatility of the euro/dollar exchange rate remained high, suggesting considerable uncertainty over whether an appreciating euro might continue to bear the brunt of the adjustment of US external imbalances (Graph 1.7).

... while Asian intervention to support the dollar continues

Upward pressures on Asian currencies vis-à-vis the US dollar remained a concern in many Asian countries. Asian financial authorities continued to accumulate dollar reserves in the new year as a by-product of foreign exchange intervention to stem those pressures. Many observers also cited this accumulation as a technical factor holding down dollar yields, although the direction and degree of causation are by no means clear (see the box on page 11). In the case of Japan, the scale of foreign exchange intervention seen in 2003 was raised a notch with a record ¥7 trillion of yen sales in January

US dollar exchange rates

1 January 2002 = 100



[1] Twelve-month forward rate; for the renminbi, non-deliverable forwards.

Sources: Bloomberg; national data. Graph 1.8

alone. An unexpected increase in the Bank of Japan's target range for current account deposits on 20 January was interpreted as supporting the government's efforts to restrain the pace of yen appreciation. As China continued to accumulate reserves at more than $10 billion per month to maintain the renminbi peg, speculation grew over the possibility of a revaluation, reflected in forward markets (Graph 1.8). In Korea the authorities took measures to curb offshore trading of foreign exchange derivatives, which they viewed as contributing to upward pressure on the won.

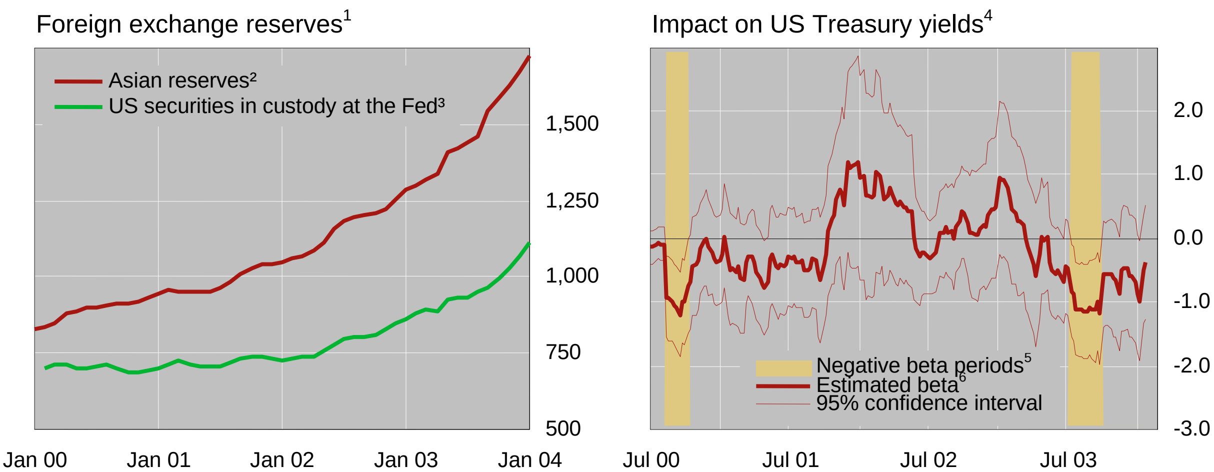
Treasury yields and foreign official holdings of US bonds

Robert McCauley and Guorong Jiang

In the process of resisting appreciation of their currencies, Asian central banks have recently accumulated substantial foreign exchange reserve holdings. A large portion of reserves are held in US dollar assets, and many central banks invest much of their dollar holdings in US Treasury and agency securities. Even though not all central banks use the Federal Reserve as custodian for such securities holdings, market participants try to track these holdings by closely watching the Federal Reserve's weekly report on changes in marketable securities held in custody for foreign official and international accounts (the H.4.1 release). Treasury and agency securities held in custody by the Fed for foreign official and international accounts started to rise more quickly after the dollar began to depreciate in early 2002 (see graph below).

The effects and sustainability of such flows have become an important topic of discussion among market participants. Many have persuaded themselves that such securities flows are holding down US long-term interest rates and worry about potential bond market turbulence if Asian official flows stopped or even reversed. Official investment in US fixed income markets might affect yields on long-term securities because official buying is nowadays focused on Treasury and agency coupon securities, rather than the more traditional Treasury bills.[①] Others have downplayed the significance of Asian central bank buying, however, highlighting more fundamental factors as well as private inflows as determinants of US interest rates. To shed some light on this controversy, we go beyond the often indirect inferences based on deviations from warranted yields or spreads between swap and Treasury yields. Instead, we use regression analysis to examine the hypothesis of a negative relationship between central bank investment in US bonds and their yields and consider alternative explanations for the observed results.

Foreign official holdings of US bonds



[1] In billions of US dollars. [2] Foreign exchange reserves held by China, Hong Kong SAR, Japan, Korea, Taiwan (China), Thailand and Singapore. [3] US Treasury and agency securities held in custody by the Federal Reserve for foreign official institutions, including Asian and other central banks. [4] Estimated from a 26-week rolling regression of the weekly change in 10-year US Treasury bond yields on the change in custody holdings for foreign official accounts; in basis points per $1 billion change in foreign official custody holdings. [5] Period in which the beta coefficient from the bivariate regression is significant at the 95% level of significance. [6] Coefficient on the change in custody holdings.

Sources: US Federal Reserve; International Monetary Fund; Bloomberg; BIS calculations.

[①] Treasury international capital data show that officials purchased three times as many Treasury and agency coupon securities as Treasury bills in 2002–03, similar to the proportions in the benchmark survey of 2000 reported in Robert McCauley and Ben Fung: "Choosing instruments in managing dollar foreign exchange reserves", *BIS Quarterly Review*, March 2003, pp 39–45.

Some initial evidence can be found for such a negative relationship, but this evidence is mixed and seems even less strong upon closer examination. A simple regression of the weekly changes in 10-year Treasury yields on the weekly change in custody holdings suggests a statistically significant relationship, but only over a specific and short period last year, despite continued reserve accumulation by Asian central banks. Moreover, changes in the methodology indicate that these results are not very robust.

The yield change is measured as the weekly change to Tuesday's closing yield to match the custody data on the weekly change up to Wednesday, given the one-day settlement lag in the US bond market. This way of specifying the relationship posits that the flow of purchases itself affects yields; separate tests find no evidence of an effect of the Thursday announcement of custody holdings. Each coefficient (beta) is estimated from a (rolling) regression over a 26-week period. The estimated relationship only reached standard levels of statistical significance from mid-July to end-September last year and in an even shorter period during 2000, from mid-August to mid-October. To be sure, if taken at face value, the estimates would suggest that the impact of the central bank buying at the time was economically sizeable. A $1 billion inflow was associated with about a 1 basis point decline in the 10-year yield, based on an average weekly inflow of around $2.3 billion. Much the same results are obtained if one analyses the five-year yield, which may better approximate the official habitat. These findings would seem to underpin the market perception of the significance of Asian central bank inflows on yields. However, such an estimated impact should not be taken at face value. A widening of the regression window to 52 weeks results in less reliable estimates.

More fundamentally, a third factor may underlie both bond market performance and central bank investments. In particular, surprisingly well behaved US inflation readings, weak job growth or indications of the Federal Reserve's patience in setting policy might lead to lower short-term rates, lower bond yields, a weaker dollar, intervention by Asian central banks and thus strong official inflows. Indeed, the inclusion in the regression analysis of the change in six-month Libor six months forward, as a proxy for short-term interest rate expectations, lowers the estimated coefficient from about 1 basis point per billion dollar inflow to about 0.7 basis points per billion dollar inflow during the period when a significant relationship was found. Even the direction of causality in the relationship is not clear. The data show a stronger relationship between the previous week's change in yields and the current week's change in custody holdings than between the contemporaneous changes. One could read this to suggest the dominance of official reactions to the exchange market effects of lower US bond yields, compared to the effects on the bond markets of official investments.

Analysis of this matter to date has certainly not settled the question of the importance of foreign central bank buying of US bonds to US fixed income markets. While the asserted importance has gained currency through the force of repetition, robust direct evidence for it is not so easy to come by.