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4. Derivatives markets

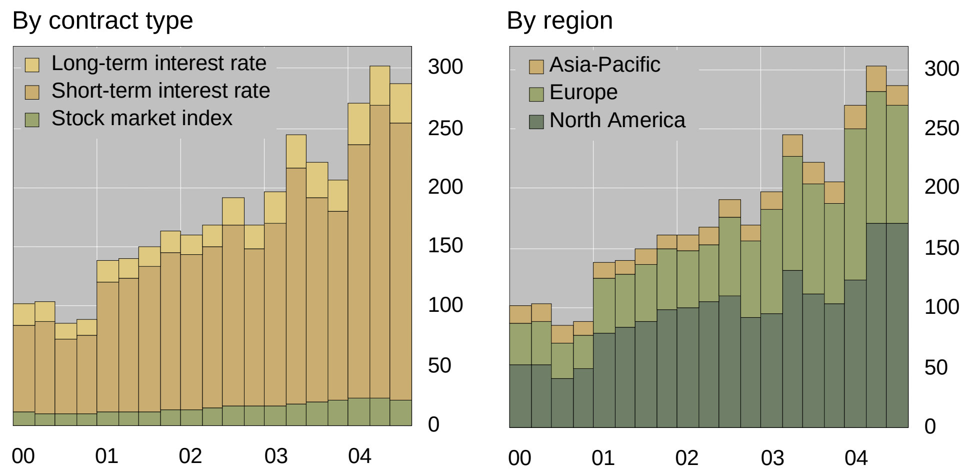
The aggregate turnover of exchange-traded financial derivatives contracts declined in the third quarter of 2004. The combined value of trading in interest rate, stock index and currency contracts amounted to $288 trillion, a 5% fall from the second quarter of the year (Graph 4.1). After remarkably strong activity in the first half of 2004, business appears to have paused for breath.

The decline in activity took place in all the risk categories, with the exception of currencies. The decline was probably driven in large part by a greater convergence of views about the likely path of monetary policy in the major economies after the first increase in US policy rates in June. The lack of disagreement limited the scope for trading.

Geographically, turnover was weak especially in Asia, where trading activity in stock market indices and interest rates dropped. Business contracted significantly in Europe as well, down by 11% for interest rate products alone. In the United States, activity in interest rate products was virtually stagnant while it saw a 4% decrease for stock indices.

Turnover of exchange-traded futures and options

Quarterly data, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.1

Measured pace of rate hikes limits trading

Activity in fixed income contracts falls

The aggregate turnover of exchange-traded fixed income contracts fell by 5% in the third quarter of 2004 after two quarters of vigorous growth. The volume of transactions amounted to $266 trillion. The decline in activity on interest rate contracts came after the first increase in the US federal funds target rate in June. Not only did the rate increase confirm expectations, but the accompanying statement appeared to reassure market participants about the "measured pace" of future rate rises from the Federal Reserve.

The decline in fixed income turnover was fairly even across contracts. Trading in money market contracts, including those on eurodollar, Euribor and euroyen rates, fell by 5%, to $233 trillion; activity in bonds dropped by 3%, to $33 trillion (Graph 4.2).[1] The slowdown in activity occurred for both futures and options, with turnover falling by 3% and 11% (to $173 trillion and $59 trillion) respectively.

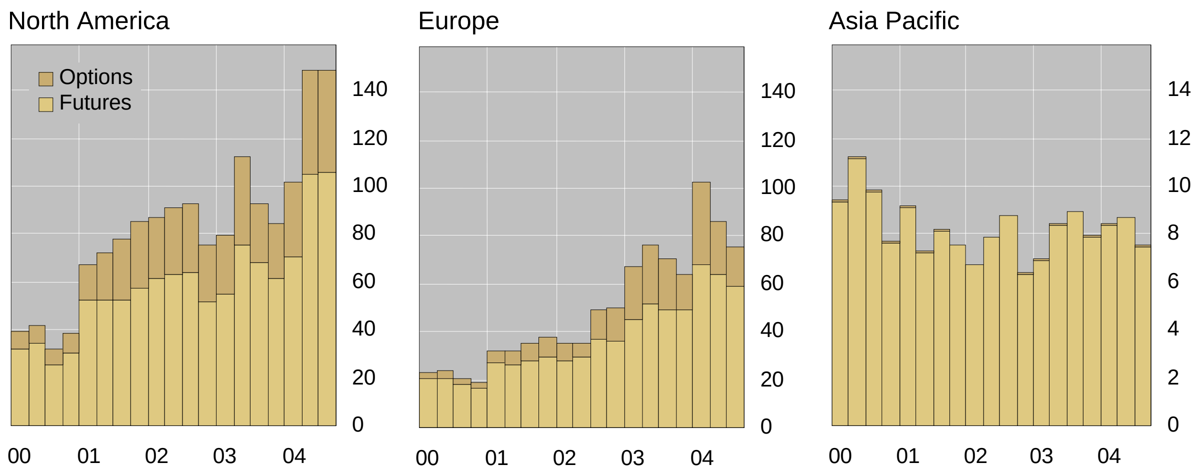
Activity did vary significantly across geographical regions, however. In the United States, it was rather flat, remaining close to $146 trillion overall, with both the futures and options segments stagnant after rapid growth the previous quarter (Graph 4.2). In Europe, business fell by 13%, to $75 trillion, mainly due to declining options on short-term rates. Thus, recorded activity in the United States was nearly twice that in Europe.

Declining volatilities may have played a role ...

The weakest months were the first two of the third quarter. In the United States, sluggish activity in July (–9%) was followed by a flat August and a pickup in September of 14%. Declining volatilities in the United States suggest that the fall in activity observed in the early summer was probably related to the

Turnover of short-term interest rate contracts

Quarterly contract turnover, in trillions of US dollars



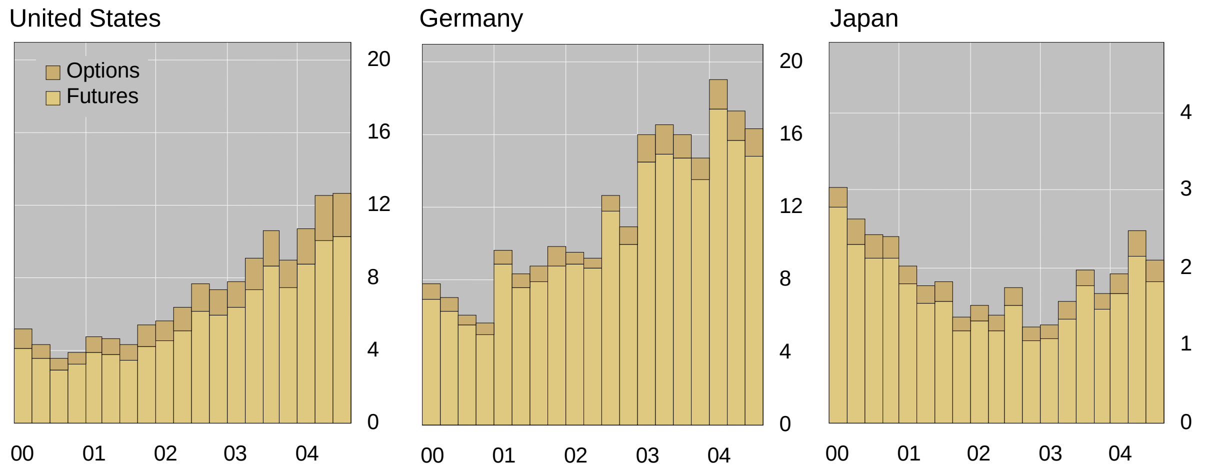
Sources: FOW TRADEdata; Futures Industry Association; BIS calculations.

Graph 4.2

[1] It is worth noting that the decline in activity was accompanied by an unwinding of open positions in short-term derivatives. Overall, the 5% fall in trading on short-term interest rate products coincided with a 9% fall in open interest, measured in terms of notional amounts. The phenomenon has been especially noticeable in the United States.

Turnover in government bond contracts

Quarterly contract turnover, in trillions of US dollars



Sources: FOW TRADEdata; Futures Industry Association; BIS calculations. Graph 4.3

above-mentioned communications of the Federal Reserve, as well as weaker than expected economic news which further reduced the likelihood of a precipitous hike in rates (see the Overview in the September 2004 *BIS Quarterly Review*). These developments lowered uncertainty about the future movements of short-term interest rates, and reduced position-taking.

... as well as increased consensus over monetary policy

The link between trading in interest rate derivatives and the degree of consensus over the course of monetary policy is particularly evident from trading in federal funds futures. From February to June, trading in federal funds futures had risen by 235%, reflecting the greater position-taking in the face of the divergent views ahead of the first official interest rate change by the Federal Reserve at the end of June. Transactions in federal funds futures then fell by 28% in July, reflecting a movement towards greater consensus. More muted swings in the same direction were evident on three-month eurodollar futures contracts over the same period.

European contracts also showed considerable monthly variation. In Europe, business was weak in the months of July and August, with volumes falling by 20% and 12%, respectively; however, they then rose by 40% in September, far more than the increase that might have been expected from seasonal patterns. Relatively stable implied volatilities of three-month rates in Europe suggest that the pickup in activity in September may have stemmed largely from liquidity trades rather than trades based on the availability of new information; in addition, the fact that the path of European short rates became more uncertain in relation to US short rates than it had been in the past may have boosted activity.[2]

[2] There has been a negative correlation between the changes in trading in US and European interest rate derivatives over the past few years, which has accompanied rising short-term volatility in the United States (see "Derivatives markets" in the September 2004 *BIS Quarterly Review*). By contrast, a positive correlation emerged last quarter just when the volatility gap narrowed.

Long-term bond contracts also stagnate ...

Activity in long-term bond contracts was broadly similar to that in the short-term segment, with business virtually flat in the United States at $13 trillion, and down by 5% in Europe to around $17 trillion (Graph 4.3). Turnover, in both the United States and the euro area, was weak in July and then strong in the subsequent months. Activity in the United States was particularly robust in August, up by 35%, but less so in September, up by only 6%. By contrast, business in Europe was flat in August and then rose in September by a striking 47%, again far more than would be anticipated on the basis of seasonal factors alone.

The increasing activity in the United States in the latter two months of the quarter for long-term interest rate derivatives may have reflected a divergence of volatilities on long- and short-term rates. The difference in volatilities, as measured from the prices of swaptions on five- and one-year swap rates with life to maturity of one year, have widened since August in the United States and since September in the euro area. The difference probably reflects the fact that weaker than expected economic news in the United States increased uncertainty (and divergences of opinion) on long- rather than short-term rates.

... particularly in Asia

In the Asia-Pacific region, turnover contracted by 13% to $10 trillion. At 25%, the contraction was particularly sharp in Asia, with declines in short- and long-term futures turnover of 29% and 15%, respectively. Among Asian countries, the slowdown in business was especially marked in Singapore, where short-term contracts decreased by 47%, mainly due to a 56% fall in futures on three-month eurodollar instruments.[3] A decline in activity was also recorded in Japan, where short- and long-term contracts were down by 10% and 15%, respectively. Thus, business in Japanese interest rate contracts recorded its first slowdown of the year on a quarterly basis. This probably reflected, at least in part, diminished demand for positions hedging a possible exit from Japan's zero interest rate policy, given signs of a decelerating recovery.

Australia bucked the trend of declining transactions in the Asia-Pacific region. Interest rate derivatives transactions in that country rose by 18%, mostly reflecting increases in short-term rate derivatives turnover, which was up by 21%.

Rising business in currency contracts

In sharp contrast to the decline in interest rate derivatives trading, turnover of exchange-traded currency derivatives amounted to $1.7 trillion in the third quarter of 2004, a 10% rise from the second quarter of the year. The increase in activity came especially from the United States, up 12%, and from Europe, up by 6%. The one exception to the pattern of increased FX derivatives trading was Asia, where activity contracted by 10%.

Turnover is concentrated on US exchanges

In terms of geographic location, currency derivatives remain strongly concentrated in US exchanges, which account for 90% of the market. Trading

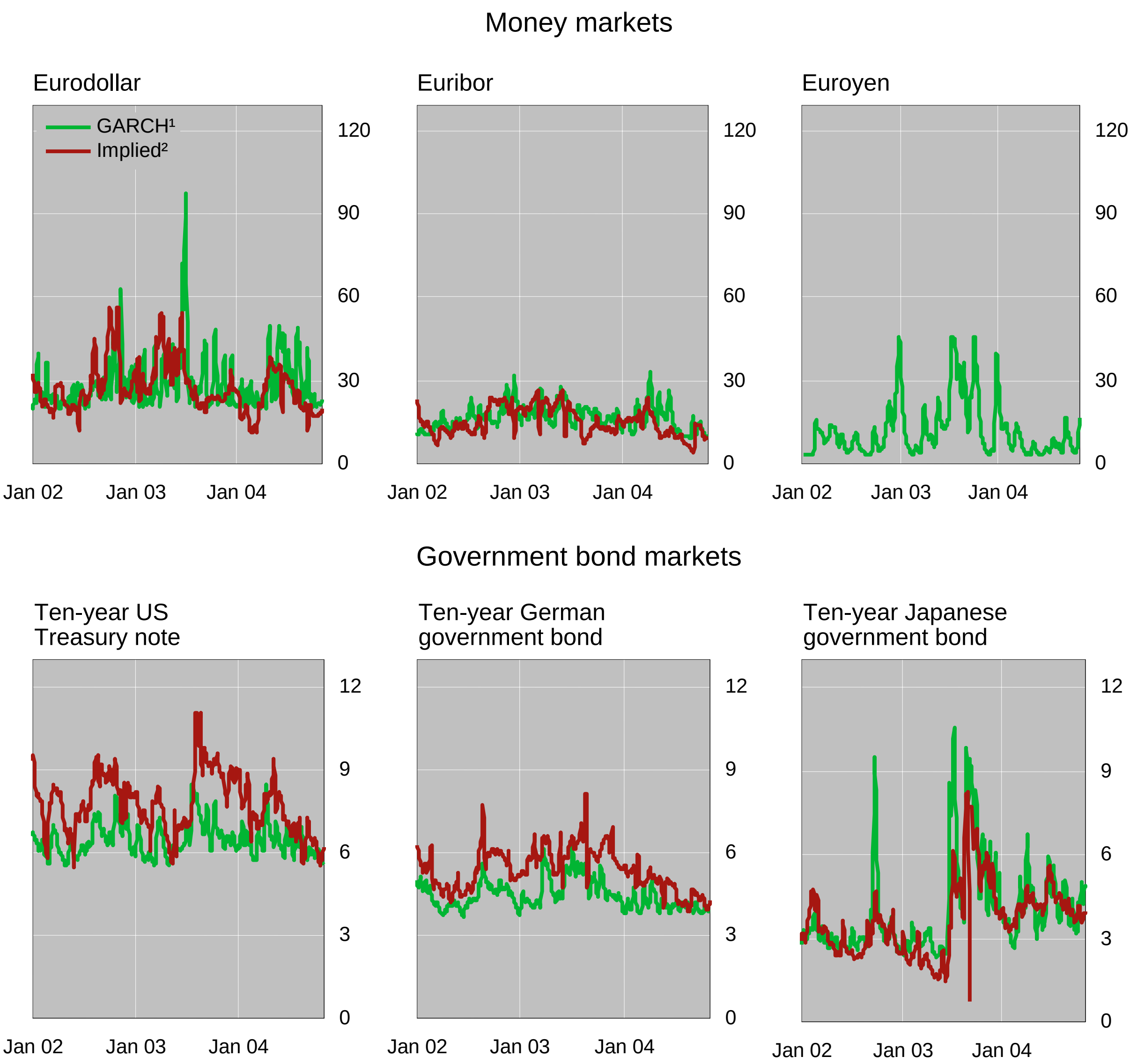
[3] These contracts are traded in Singapore under a Mutual Offset System Agreement with the Chicago Mercantile Exchange.

on both US and other exchanges is concentrated in futures, which make up fully 93% of overall exchange-traded currency derivatives.

Overall, the greater activity in the third quarter derived from strong business in the Canadian dollar, Swiss franc and sterling segments, where turnover expanded by about 20%. Transactions involving the euro remained unchanged, while those on the dollar grew by 4%. At the regional level, transactions involving the dollar increased noticeably on US exchanges, with turnover rising by 16%, while those based on the euro were nearly flat on both US and European exchanges. Futures contracts involving the dollar were particularly actively traded in Brazil, with volumes up by 68%. The increase in

Volatility of major fixed income rates

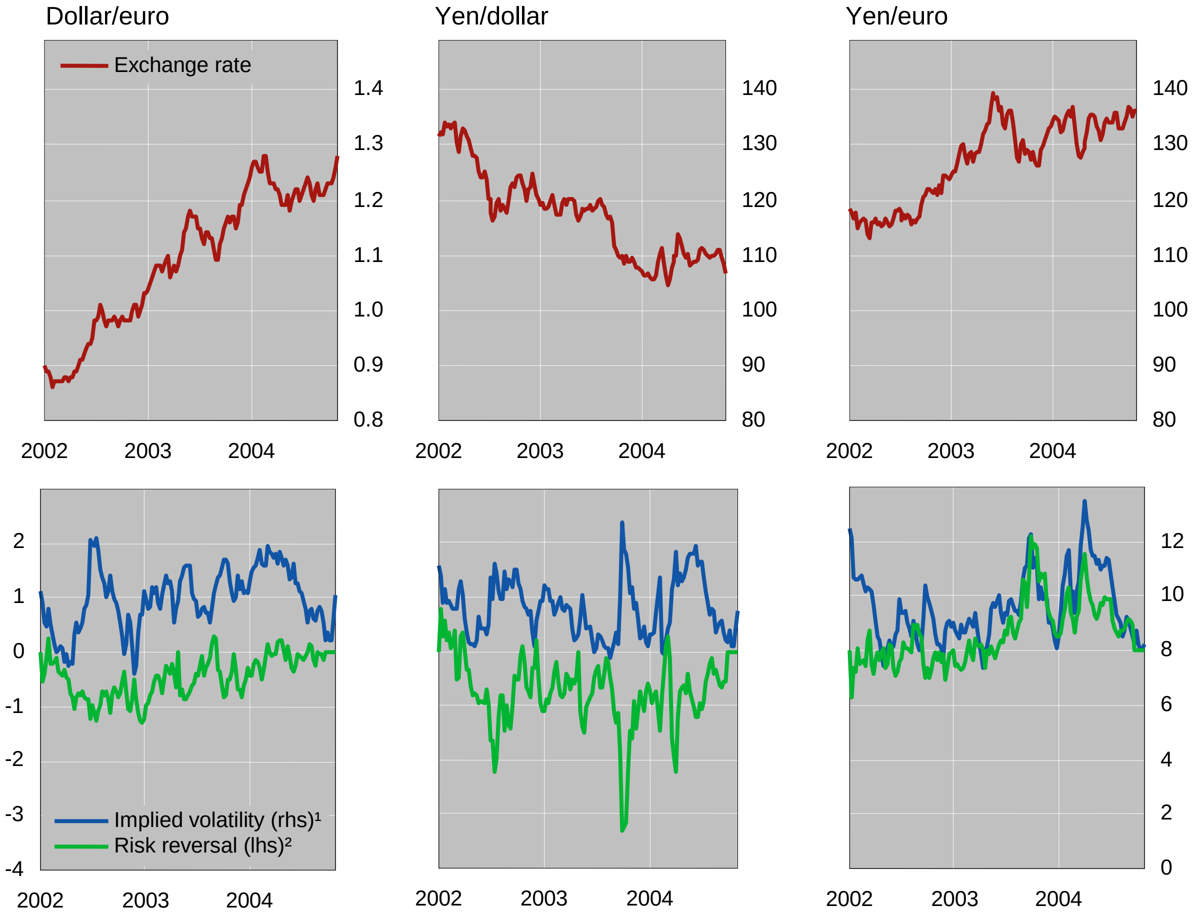
Five-day moving averages



[1] Annualised conditional volatility of daily changes in eurocurrency yields and bond prices from a GARCH(1,1) model. [2] Volatility implied by the prices of at-the-money call options.

Sources: Bloomberg; national data; BIS calculations. Graph 4.4

Exchange rates, implied volatilities and risk reversals



[1] One-month horizon, in per cent. [2] A positive value indicates a bias towards dollar strength in the left-hand and centre panels, and towards euro strength in the right-hand panel.

Sources: DrKW Research; Reuters; BIS calculations. Graph 4.5

activity from the second to the third quarter was mostly concentrated in September; transactions during the first two months of the quarter were fairly subdued.

Higher volatility may have contributed to trading

The movements of market activity through the quarter, especially the peak recorded in September, probably resulted from the weakening of the dollar against the euro as well as the spike recorded by implied volatilities in that month (Graph 4.4). Clear trends as well as higher volatility in foreign exchange markets can lead to increased investment and hedging activity in these markets (see the special feature by Galati and Melvin on page 67 of this *Quarterly Review*). On the other hand, business was not obviously associated with expected changes in the bilateral rates of main currency pairs, which can also stimulate hedging activity. In fact, risk reversals remained in all cases very close to zero, indicative of a neutral view about the future development of dollar exchange rates. This contrasted markedly with the abrupt decline in the yen/dollar risk reversal measure during an episode of dollar depreciation last September (Graph 4.5).

Activity in Asian stock indices falls sharply

Stock index turnover declines worldwide

Global turnover in stock index contracts, which had stagnated in the second quarter after a prolonged period of growth, fell sharply by 11% in the third quarter to $21 trillion. Trading was particularly subdued in the Asia-Pacific region, dropping by 24% to $7 trillion. Meanwhile, transactions on North American marketplaces declined by 4% to $9 trillion, while on European exchanges they remained stable at around $4.8 trillion. Across European countries, trading was flat in Germany and in the United Kingdom, but fell sharply in France, Italy and Spain, by between 7 and 10%.

Lacklustre business in stock index derivatives reflected a variety of factors. The fall in activity recorded in Asia is probably related to ongoing investigations by Korean authorities concerning alleged bribery on derivatives trades which took place between 2001 and 2003. Trading in Asia is dominated by options on the Korea Stock Exchange's KOSPI 200 index, which make up 69% of total stock index derivatives in the region. In regions outside Asia, diminished trading probably reflected the stability of the underlying indices. Just as in the previous quarter, stagnant business mirrored unusually low market uncertainty, as measured by the volatility implied in index options. Indeed, implied volatilities, which were already close to historical lows in both the United States and the euro area at the end of the second quarter, continued to drop during the period.

Individual stock contracts also fall

The decrease in position-taking through equity derivatives can also be seen from contracts written on individual stocks (data on which are available only in terms of the number of contracts). After increasing for five consecutive quarters since the beginning of 2003, the number of contracts was down by 18% and 6% in the last two quarters. The decline in activity was sharper in Europe than in the United States, with the number of contracts falling in the last quarter by 14% and 5%, respectively; in Asia, business has grown by 4%.

Less trading in commodities

Activity in commodity markets also fell in the third quarter, with the number of contracts traded declining by 9%. Non-precious metals, agricultural products and precious metals were all down in turnover terms, by 23%, 17% and 12%, respectively.

Only energy derivatives trade more actively

The one exception to the general trend was energy derivatives, where turnover rose by 8%. The volatility of oil prices, as well as increased disagreement about their future course, probably led to greater use of oil derivatives for speculative and hedging purposes (see the Overview in the September 2004 *BIS Quarterly Review*). Geographically, the largest increases were in the United States (6%) and in Japan (13%). It is also worth noting that growth in non-precious metals derivatives trading fell significantly, by 9% in Europe, 14% in the United States and 36% in Asia. Changes in trading activity in these commodities tend to lead changes in coincident cyclical indicators; the lower trading activity may reflect the downward reassessment of future global growth that took place in the third quarter.

Activity in the OTC segment and measures of concentration

Fifty-two central banks and monetary authorities participated early this year in the Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity. The survey was in two parts, the first on turnover in foreign exchange markets, and the second on notional amounts outstanding and gross market values of over-the-counter (OTC) derivatives, including foreign exchange, interest rate, equity, commodity and credit derivatives. The results of the second part are especially useful because they have been released in the format of the regular semiannual survey of positions in the global OTC derivatives market (but with more respondents and broader coverage of instruments than the seminannual survey). This box highlights some results from this survey, as well as some findings about concentration in the OTC derivatives market which were published in the same press release.[①]

Overall activity in the OTC market remained strong in the first half of 2004. The total notional amounts of outstanding contracts stood at $220 trillion at the end of June, a 12% increase over end-December 2003. Notional amounts were up by 16% for interest rates and by 10% for foreign exchange products. These two types of instruments accounted for 87% of overall notional amounts, standing at $165 and $27 trillion, respectively. Business was also buoyant for equity-related instruments, up by 19%. By contrast, outstanding amounts of commodities-related derivatives were down by 10%.

Gross market values, which provide a measure of the cost of replacement of outstanding contracts, fell by 8%, to $6.4 trillion. The vast majority of the cost of replacement, 62%, is concentrated in the interest rate segment, at $4.0 trillion. Across counterparties, the reduction in gross market values was sizeable in the case of reporting dealers, down by 14% to $2.3 trillion, and less so for other financial institutions, a category including mutual funds, hedge funds, small commercial banks and insurance companies, which was down by 5%.

Thanks to the broader coverage of the triennial survey, information is also available about developments in the credit derivatives market, a segment which is not typically surveyed at semiannual frequency. Notional amounts for such derivative instruments have recorded remarkable growth over the last three years. At end-June 2004 notional amounts were $4.5 trillion, more than six times the amount of three years ago. Most of the increase comes from the widespread use of credit default swaps (CDSs), spurred by the standardisation of contractual terms and the emergence of CDS indices and trading platforms.

The report on concentration measures reveals a number of stylised facts. First, the concentration in the main OTC derivatives markets either remained stable or increased slightly between end-1998 and mid-2004. Second, the concentration levels for the larger OTC derivatives markets (measured by outstanding notional amounts) have been lower and more stable than concentration levels in smaller markets. Third, the inter-dealer market for most types of derivatives contracts has a level of concentration similar to or slightly higher than that of the overall market.

Among the various components of interest rate derivative activity (the largest segment of the global OTC market), concentration levels decreased slightly in interest rate swaps denominated in US dollars, yen, sterling, Swiss francs and Canadian dollars, and remained unchanged for euro and Swedish krona swaps. For interest rate options, concentration was largely unchanged on US dollar-, euro- and sterling-denominated instruments, while it increased for instruments denominated in the other major currencies. Overall, forward and options markets continued to display higher levels of concentration than swap markets.

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① *Triennial and semiannual surveys on positions in the global over-the-counter (OTC) derivatives market at end-June 2004* and *Concentration measures for OTC derivatives markets from December 1998 to June 2004*, released on 6 December 2004. Measures of concentration for OTC derivatives were provided by counterparty, risk category and contract type, using data collected by central banks from the major global dealers in the OTC derivatives market. Global aggregates of the concentration data will be published by the BIS in the semiannual OTC derivatives statistics. The data-collecting central banks are: National Bank of Belgium, Bank of Canada, Bank of France, Deutsche Bundesbank, Bank of Italy, Bank of Japan, Netherlands Bank, Sveriges Riksbank, Swiss National Bank, Bank of England and Board of Governors of the Federal Reserve System.