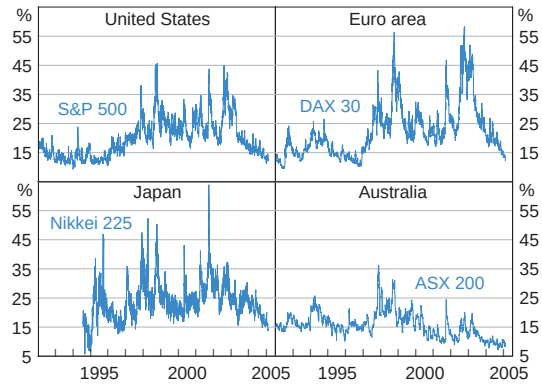
Box A: Declining Volatility in Global Asset Markets

As derivative markets have become more liquid and the use of instruments such as options more widespread, it has become increasingly possible to use information from these instruments to analyse underlying asset markets. For example, pricing of options on equity, fixed-interest or foreign exchange instruments contains information about the respective derivatives markets' assessment of current conditions and expected future price movements in the underlying markets. In this box we use the implied volatility of options[1] to contrast fixed-interest and equity markets, where implied volatility has declined noticeably, with foreign exchange markets where volatility has not fallen as sharply.

Graph A1
Implied Volatility of Equity Index Returns



Sources: Bloomberg; RBA; SFE

Implied volatilities of the major equity indices have declined substantially since the start of 2003 (Graph A1). The high volatility seen over 2002 reflected heightened uncertainty about the global economic outlook following the US recession, corporate malfeasance, the unwinding of the equity market bubble and the war in Iraq. Volatility moderated as major equity indices began to rebound, corporate profits staged a strong recovery, and the general economic outlook improved. The recent levels of implied volatilities for the three major overseas equity markets are low, but not unprecedented. Implied volatilities in the US and Europe have returned to levels that were typical between 1992 and 1996. Implied volatility in Japan, despite its recent fall, remains well above the lows reached in 1994. In contrast, the implied volatility of Australian equities is at an all-time low.

Implied volatilities in fixed-interest markets have also declined significantly, with the volatilities of shorter-term instruments falling by more than those of longer dated ones (Graph A2). Implied volatilities gradually declined around the world in the second half of 2003, as it became clearer

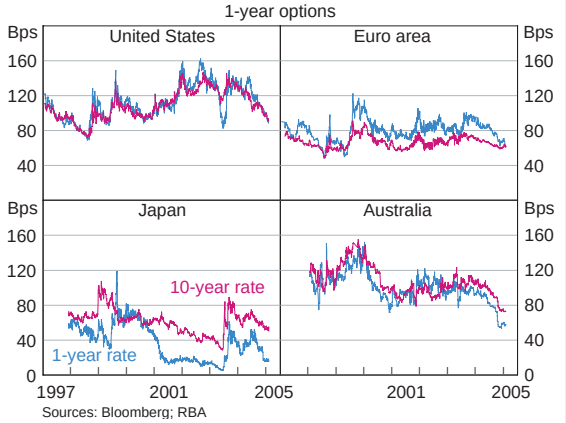
1 *The expected future volatility of the underlying asset is one of the most important determinants of the option price. There is a higher chance that an option will provide a larger payoff when the future volatility of the underlying asset is higher, because it is more likely that the price of the underlying asset will move more in favour of the option buyer while at the same time the option buyer is not exposed to the adverse movements in the price. Therefore, option prices are higher when the expected future volatility is higher. The implied volatility is the value of the volatility that equates the market price of an option to its theoretical value. Implied volatility is higher when the option price and the expected volatility are higher. As a matter of convention, the prices of options traded in over-the-counter markets are quoted in terms of the option implied volatility rather than in monetary units.*

that the easing cycle was drawing to a close, with some central banks beginning to tighten monetary policy after a prolonged period of relatively low and stable interest rates. It is possible that a large part of the decline in implied volatilities of interest rates can be attributed to reduced uncertainty about the future path of monetary policy at that turning point.

Graph A2

Implied Volatility of Changes in Swap Rates

1-year options



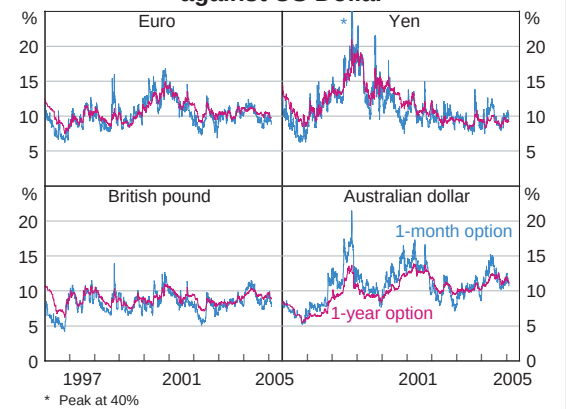
Sources: Bloomberg; RBA

There appears to be little evidence that the compression of volatilities in equity and debt markets is being driven by an increased willingness to supply (write) options. If options writers were underpricing options in order to try to expand their activities, then implied volatility would be persistently below the subsequently realised volatility of the underlying assets over the life of the options. But recently, implied volatilities have generally moved in line with realised volatilities across the major global asset markets.

In January 2002 the US dollar reached a multi-year high on a trade-weighted basis against the major floating currencies. Since then, developments in implied volatilities of currencies against the US dollar have been mixed. Some currencies, such as the Australian and Canadian dollars, have seen increases in both short- and long-term implied volatilities. But for other currencies, such as the euro and the yen, implied volatilities remain broadly unchanged (Graph A3). Overall, implied volatilities of foreign exchange rates have exhibited a less clear trend than those observed in equity and fixed-interest markets.

Graph A3

Implied Volatility of Currency Returns against US Dollar



* Peak at 40%

Source: JPMorgan

In general, recent developments in option markets indicate an expectation of continued low volatility in equity and bond markets, but continuing uncertainty in foreign exchange markets. Despite these developments, it is possible that the recent low level of realised volatility may have led markets to become a little complacent and hence the low implied volatility may not reflect future risks in these markets.