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III. Special feature:
The co-movement of US stock markets and the dollar

The relationship between US stock markets and the dollar has been the subject of increased interest recently. In part, this interest reflects the view that portfolio flows may have exerted an important influence on recent movements of the major exchange rates (BIS (2000)). Indeed, while fixed income securities still account for the bulk of cross-border financial transactions, equities markets are playing an increasing role in such transactions. In 1995, cross-border transactions in bonds into and out of the United States amounted to 110% of US GDP, more than five times the corresponding ratio for equity flows. In 1999, cross-border transactions in bonds rose to 126% of US GDP, while transactions in equities tripled and reached 75% of US GDP. From a policy point of view, the interest in this topic reflects in part concerns about the current high valuation of the US stock market and the consequent global deflationary impact should the dollar fall along with that market.

The co-movement of returns on US stock markets and the dollar along with other related statistics are reported in Table III.1. The first four rows show correlations between the Dow Jones Industrial Average and four other equity indices, the broader S&P 500, the technology-heavy Nasdaq, the German Dax and the Japanese Nikkei. The next row reports correlation coefficients for the nominal effective exchange rate (EER)[10] of the dollar and the Dow Jones. All these correlations are based on equity and currency market returns, measured as log differences.[11] The next two rows show the correlations of the differential returns between the Dow Jones and the Nikkei and Dax and the corresponding yen/dollar and Deutsche mark (euro)/dollar currency returns. The correlation coefficients are reported for daily, weekly, monthly and quarterly frequencies for the sample period January 1983 to May 2000. The next three rows report correlations between bilateral equity flows and the corresponding currency returns for the United States, Japan and the euro area, computed with monthly data. Finally, the table presents correlation coefficients of equity and currency volatilities based on daily returns.

Two results stand out. First, stock market indices are generally highly and positively correlated at all frequencies both within a country and, albeit to a lesser extent, across countries. Second, there is little evidence of a robust significant correlation between stock market indices and the major exchange rates.[12] The correlation coefficient for the Dow Jones index and the nominal effective dollar rate is positive but very small and not statistically significant. In other words, during the period 1983-2000, rising US stock markets have been associated on average with only very small dollar appreciations. A similar result holds for the co-movement of the return on the Dow Jones relative to the Nikkei and

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[10]   The results presented in this note are almost identical if real rather than nominal exchange rates are used.

[11]   We use log differences because we are interested in the correlation of returns rather than levels. From a statistical point of view, log differentials are appropriate as they are stationary, whereas levels have a unit root according to augmented Dickey-Fuller tests. Moreover, Johansen's cointegration tests suggest that stock market indices and the nominal effective dollar exchange rate (or the yen/dollar and mark (euro)/dollar rates) are not cointegrated.

[12]   The result is in contrast with the finding that, in recent years, stock markets in emerging market countries and the dollar exchange rate of the domestic currency have moved together quite strongly (BIS (2000)).

Table III.1

Correlation coefficients, January 1983-May 2000

	Daily	**Weekly**	**Monthly**	**Quarterly**
Between equity indices				
Dow Jones and S&P	0.96**	0.95**	0.94**	0.94**
Dow Jones and Nasdaq	0.66**	0.71**	0.68**	0.63**
Dow Jones and Dax	0.27**	0.43**	0.52**	0.55**
Dow Jones and Nikkei	0.10**	0.32**	0.37**	0.33**
Between equity and currency markets				
Dow Jones and EER	0.03	0.04	0.04	0.11
Dow Jones-Nikkei and JPY/USD	0.04*	0.07*	0.08	0.11
Dow Jones-Dax and DEM/USD	– 0.17**	– 0.15**	– 0.25**	– 0.22*
Between flows and currencies				
JP-US equity flows and JPY/USD			0.04	
US-EU equity flows and DEM/USD			0.05	
JP-EU equity flows and JPY/DEM			– 0.26	
Between equity and currency volatilities				
Dow Jones and EER***			0.17*	
Dow Jones-Nikkei and JPY/USD***			0.24**	
Dow Jones-Dax and DEM/USD***			0.20**	

Note: * and ** mean statistically significant at the 5% and 1% level respectively. Long-term interest rate differentials are computed as United States-Japan and United States-Germany respectively. The sample period for the three bottom rows is January 1988-January 2000, January 1995-January 2000 and January 1997-January 2000, respectively. *** means historical volatilities computed as annualised standard deviations of daily log differentials over calendar months.
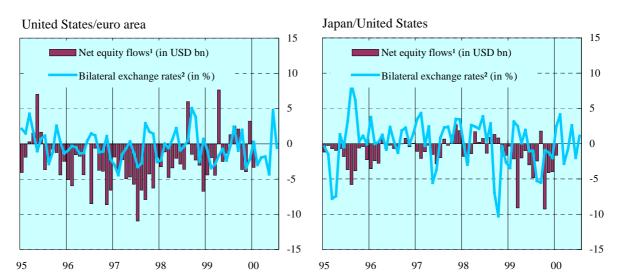
Sources: National data; BIS.

percentage changes of the bilateral yen/dollar rate. The correlation coefficients are positive but small and statistically significant only at daily and weekly frequencies. By contrast, the correlation between the return on the Dow Jones relative to the Dax and mark/dollar movements is negative and statistically significant. This means that on average rising US stock markets relative to the German stock market have been associated with a declining dollar.

The weak average association between stock market returns and exchange rate movements is consistent with the fact that, over a long horizon, international portfolio equity flows have not been correlated with exchange rate movements (see Graph III.1 and Table III.1).

Graph III.1

Portfolio equity flows and exchange rates between the three major economies

United States/euro area

Japan/United States

¹ A positive value indicates a net flow, in the right-hand panel, into the United States, and in the left-hand panel, into the euro area (defined as Germany, France, the Netherlands and Luxembourg). ² Monthly percentage changes. Shown as USD/EUR and JPY/USD respectively.

Sources: Japanese Ministry of Finance; US Treasury; national data

While the statistical relationship between returns on US stock markets and changes in the value of the dollar seems weak, Table III.1 indicates a much higher correlation between the volatility of returns on US equity prices and the volatility of dollar exchange rates. On average, a 1% increase in US stock market volatility is accompanied by a 0.2% increase in the volatility of the dollar. This finding suggests that even though price movements in equity and foreign exchange markets are not closely related, there is some link between the volatility of these markets. To the extent that volatility may be related to market liquidity, one possible interpretation of this finding is that changes in liquidity are correlated across markets.

The weak average correlation between the US stock market and the dollar does not depend on which segment of the market is considered. Table III.2 suggests that the correlation between stock market
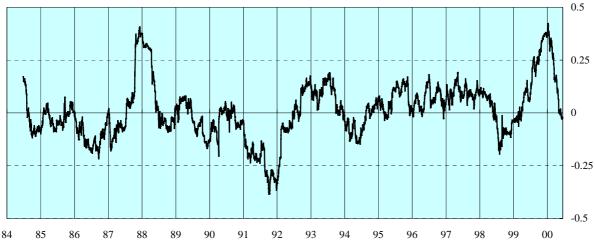
Table III.2

Correlation coefficients for sectors, February 1991-May 2000

S&P	Banks	Biotech	Capital goods	Chemical	Consumer cyclicals	Electronics
0.06	0.04	0.04	0.07	0.00	0.07	0.00
Energy	**Gold mining**	**Insurance**	**Manufacturing**	**Oil**	**Semiconductors**	**Steel**
– 0.01	– 0.09	0.09	0.04	– 0.01	0.04	– 0.01

Note: Coefficient of correlation with nominal effective exchange rate computed with daily data.

Sources: Standard & Poor's DRI; BIS.

Graph III.2

Rolling correlation coefficients for the Dow Jones and the dollar[1]

¹ Rolling correlation (six-month window) of daily stock market and nominal effective exchange rate log differences.

Sources: National data; BIS

returns and the dollar is fairly uniform among different sectors of the US economy.[13] The correlation coefficients for different components of the S&P 500 index and the nominal effective dollar rate are quite close to the statistic for the S&P 500 as a whole and small in absolute value.

In 1999, market commentary repeatedly focused on the view that US stock markets and the dollar were moving more closely together than in the past. Graph III.2 confirms that the correlation of the Dow Jones index and the nominal effective dollar rate was much higher in 1999 than in previous years. In the second half of the year, the correlation coefficient rose to almost 50% before declining sharply in early January 2000, when jitters in US stock markets were accompanied by a strong dollar. Over the last two decades, there have been only two other episodes in which the correlation coefficient for US stock markets and the dollar was high in absolute value, but the coefficients were of opposite sign. The first episode occurred around the October 1987 stock market crash, when falling equity prices were accompanied by a weakening dollar. The second took place in autumn 1991 and was characterised by a strong and negative co-movement, as US stock markets rallied while the dollar depreciated.

In summary, the results presented in this note do not support the idea that US stock markets and the dollar move together in a robust fashion. At the same time, as evidenced by rising correlations in the more recent period and some historical episodes, a contemporaneous sharp movement in US equity markets and the dollar cannot be ruled out. In other words, although movements in stock and currency markets tend to be related, the nature of the relationship changes over time. This is not surprising, given that the correlation could be driven by factors whose influence changes over time. For example, although the US stock market and the dollar may at times respond similarly to news about economic growth or to changes in market sentiment, there are also times when they react differently.

Reference

BIS (2000): Bank for International Settlements, *70th Annual Report*.

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[13] The shorter sample period used in Table III.2 is dictated by the availability of disaggregated data on stock market prices.