Box 1

FINANCIALISATION OF COMMODITIES AND CROSS-MARKET RETURNS

Since the mid-2000s trading activity in commodity futures has intensified, a phenomenon often referred to as the "financialisation of commodities". One of the key drivers of this process is the increasing appetite of investors for holding commodities – or investment instruments linked to commodities – as part of their portfolio diversification strategy, based on the historically low correlation between commodity and financial returns.

In the last few years, more intense trading activity may also have originated from the behaviour of banks, which have set up and marketed mutual funds aimed at tracking specific commodity price indices (referred to as index funds), thus providing their holders with an easy way to gain exposure to commodity price fluctuations. Index funds replicating a given commodity index – thus following passive investment strategies involving mainly the purchase of futures contracts[1] – might have contributed to a constant pressure on futures prices of various commodities, thereby making their developments more similar.

Policy-makers have been devoting attention to the reported evidence of increasing correlations between commodity and financial returns – i.e. above what may be justified by developments in fundamental determinants of the commodity prices – since such a development may have a number of adverse consequences for monetary policy and financial stability. If commodity prices have become more closely related to financial prices and more weakly linked to their specific

1 Index funds typically take long positions in the futures markets and roll over these contracts to the subsequent maturity as the delivery date approaches, as they are not interested in the physical delivery of the commodity. These long positions do not, therefore, reflect any stance or expectation of subsequent price developments. It is only in the rollover period, i.e. when a futures contract is approaching expiration, that these funds intervene by selling the contract about to expire and replacing it with one that has a longer maturity. It has to be acknowledged, however, that some index funds do physically store precious metals and, in some cases, also copper.

fundamentals, inflation could turn out to be excessively volatile and business cycles could be dampened or boosted by more volatile swings in commodity prices than experienced up to now. In addition, higher correlations between commodity and financial returns may affect the risk exposure of global portfolios.

Against this background, the aim of this box is to examine developments in such correlations over the last decade and provide some evidence about whether changes in trading activity for selected commodities may have had the potential to affect them.

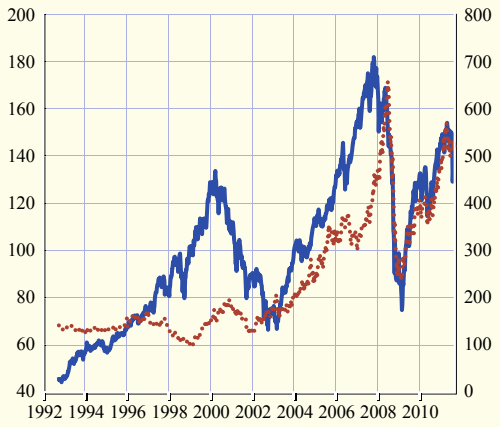
Correlation between commodity and financial returns

Empirical evidence clearly suggests that the correlations between commodity and financial returns have increased since the early 2000s. As shown in Chart A, commodity prices and world stock markets have become increasingly synchronised since around 2003 and have followed largely the same pattern since 2008.

Analysing time-varying correlations between selected commodity returns and the world equity index return (expressed in US dollars) at a weekly frequency since 30 September 1997 confirms this picture (see Chart B). While the three selected correlations oscillated in a rather narrow interval between 1997 and 2008, they jointly spiked upwards amid the turbulence ignited by the bankruptcy of Lehman Brothers (to around 0.5) and remained heightened relative to the average of the previous decade.

Chart A Developments in commodity and equity prices

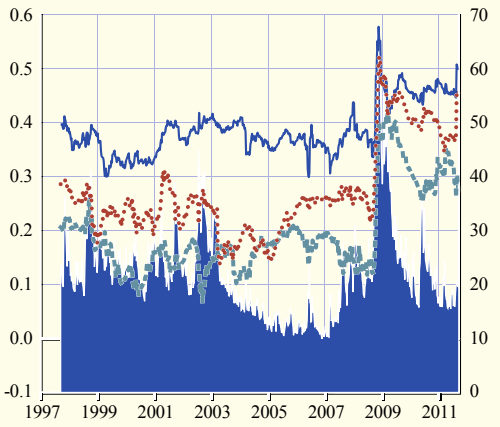
(index: 29 December 1998 = 100; weekly data)



Source: Thomson Reuters.
Note: Latest observation refers to 13 September 2011.

Chart B Correlations between commodity and equity returns

(left-hand scale: correlation; right-hand scale: volatility; weekly data)



Sources: Bloomberg, Thomson Reuters and ECB staff calculations.
Notes: The equity index is the world stock index expressed in US dollars. VIX is the implied volatility of the US stock market index. WTI is West Texas Intermediate crude oil. Latest observation refers to 13 September 2011.

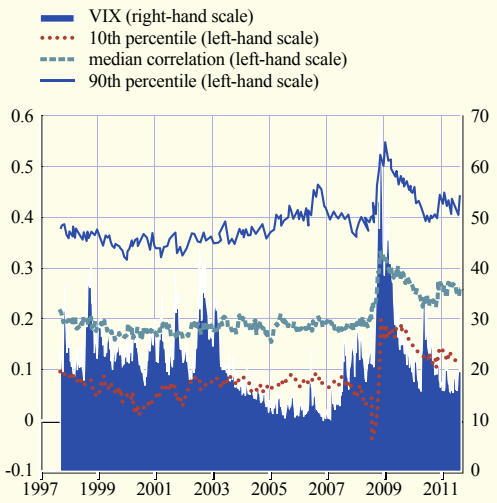
The theoretical rationale for a higher correlation between commodity and equity returns is that financial investors may be more sensitive to the release of macroeconomic news than to the fundamentals prevailing for the various commodities, meaning that developments in key macroeconomic indicators may represent joint drivers for commodities and financial assets, thereby raising their correlation.

Correlation across commodity returns

Chart C reports summary information from the correlation matrix of the returns on 12 selected commodity futures,[2] i.e. the median correlation and its 10th and 90th percentiles. Similar to the link between commodity and equity prices, correlations across commodity returns remained rather stable between 1997 and mid-2008, to subsequently record a sudden spike with some persistence at heightened levels.

Chart C Correlations across commodity returns

(left-hand scale: correlation; right-hand scale: volatility; weekly data)



Sources: Bloomberg, Thomson Reuters and ECB staff calculations.
Notes: VIX is the implied volatility of the US stock market index. The median correlation is the median of the 66 correlations among the 12 commodity returns (see footnote 2). The percentiles also refer to these 66 bilateral correlations. Latest observation refers to 13 September 2011.

The behaviour of index funds that simultaneously allocate the inflows of funds from investors to the commodities composing the tracked index could have contributed to this development. However, recent research[3] remains rather inconclusive on this issue and the majority of results available so far suggest the absence of any significant effects.

In sum, both the correlations between commodity returns and equity returns and the correlations across commodity returns rose in the aftermath of the financial turmoil in September 2008. However, such correlations did not reach values comparable to those seen for the correlations between equity markets worldwide.[4] Therefore, the reported argument that commodities could have lost their usefulness as a method of diversification in international portfolios does not seem to be well grounded.

Furthermore, Charts B and C also report the VIX index of US equity market volatility along with correlations and show that the joint spike in correlations occurs exactly when the global perception of risk, as captured by the VIX, reached a historical peak. This development is in line with the well-established finding that correlation-based tests of contagion are biased upwards by the swings in the volatility level. Furthermore, as risk perceptions do not seem to have increased

2 Coffee, copper, cotton, gas, gold, heating oil, maize, silver, soybean, platinum, wheat, WTI crude oil.

3 Irwin, S.H. and Sanders, D.R., "The impact of index and swap funds on commodity futures markets", *OECD Food, Agriculture and Fisheries Working Papers,* No 27, 2010.
Singleton, K.J., "Investors flows and the 2008 boom/bust in oil prices", *Working Paper,* Stanford Graduate School of Business, 2011.
Stoll H. and Whaley R., "Commodity index investing and commodity futures prices", *Journal of Applied Finance,* 20, 2010, pp. 7-46.
Tang, K. and Xiong, W., "Index investing and the financialization of commodities", *Working Paper,* Princeton University, 2011.

4 For example, correlations between US and euro area equity market returns are normally estimated to be in the range of 0.8 to 0.9.

permanently, correlations are expected to recede from recent peaks as global risk perceptions ease. Indeed, some declines in correlations have already been observed as volatility has scaled back from the recent highs.

Trading activity and cross-commodity return correlations

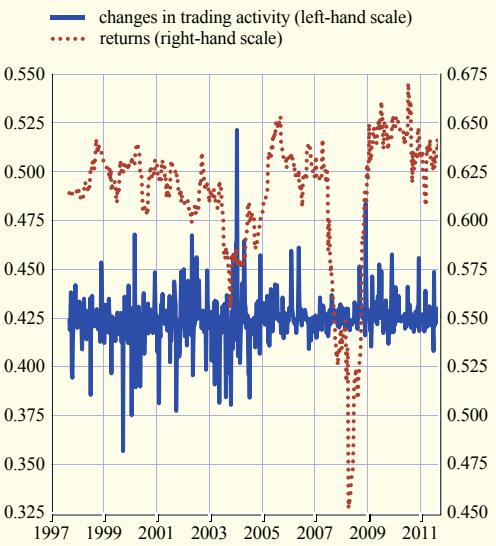
Analysing the linkage between trading activity and cross-commodity correlations is another way of assessing the impact of index funds. If index funds affect correlations through their joint purchase of the commodities in a given index, the returns of a given commodity pair should be more highly correlated precisely when the corresponding developments in trading activity are more closely correlated. The trading activity measure employed is the rate of change in the open interest, i.e. the number of outstanding futures contract for the selected commodities.[5]

Chart D reports results for a pair of commodities that normally exhibit a high structural correlation owing to the common influence of weather-related factors: maize and wheat.[6] First of all, the correlations in trading activity appear to be quite low and erratic, whereas return correlations are much higher and less volatile. Moreover, most of the spikes in correlation between the two measures of trading activity occur at times of low return correlations, pointing to the absence of a strong effect of activity on the co-movement of commodity returns.[7]

In a nutshell, since mid-2008 correlations among commodity returns as well as between commodity and equity returns have spiked, albeit not to levels that could alter the diversification role of commodities in international portfolios. In addition, the analysis presented here does not provide any strong justification for the often reported conclusion that trading activity has played a role in raising cross-commodity return correlations. Instead, the observed increase in correlations is more likely to be due to other factors, such as common drivers of the global macroeconomic cycle.

Chart D Dynamic correlations between trading activity for maize and wheat and the corresponding correlation between their returns

(correlations; weekly data)



Sources: Bloomberg, CFTC and ECB staff calculations.
Note: Latest observation refers to 13 September 2011.

5 Trading activity is measured through the open interest in futures contracts held at US stock exchanges. Such data are collected by the U.S. Commodity Futures Trading Commission (CFTC) at weekly frequency.
6 The same analysis has been performed for the remaining 65 commodity pairs of those commodities listed in footnote 2 in this box, with even weaker results.
7 The sample correlation between the two correlation measures is around 0.05.