Investors' uncertainty about future returns on their assets is a key variable in explaining their portfolios' composition, size and leverage. This uncertainty is factored in to the most widely used risk valuation models and therefore influences the risk premium on market traded assets and the cost of funding certain projects. It can also explain the movement of capital between the various international markets, as it affects the returns on the carry trade.[1]

In short, uncertainty is a key variable in explaining economic agents' investment and consumption decisions. This uncertainty is usually measured from the volatility of the returns on each individual asset. This may be observed directly from markets or implicitly from financial instruments based on the future course of certain prices (such as those of futures and options) enabling investors' expectations regarding this uncertainty to be estimated.[2]

1   A carry trade involves taking on debt in a currency with low interest rates (for example, the yen) to invest in assets in another country where interest rates are higher (e.g. Brazil). The return on the transaction is calculated based on the interest rate spread and the volatility of the exchange rate between the currencies involved, or between these currencies and the market benchmark, which is normally the dollar.

2   The volatility of the US stock market is measured with the VIX index calculated by the Chicago Board Options Exchange (CBOE) based on the market prices of one-month S&P 500 options. The CBOE also publishes an indicator of the implied volatility of options on the MSCI Emerging Markets Index. The benchmark indicator for interest rates is Bank of America's MOVE, which reflects the implied volatility in one-month

Chart 1
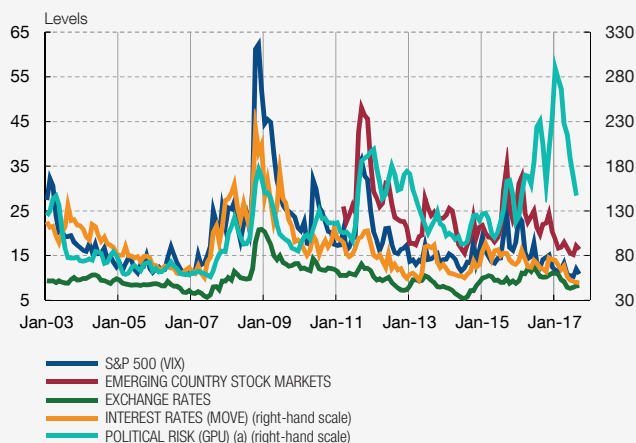VOLATILITIES AND POLITICAL RISK

S&P 500 (VIX)
EMERGING COUNTRY STOCK MARKETS
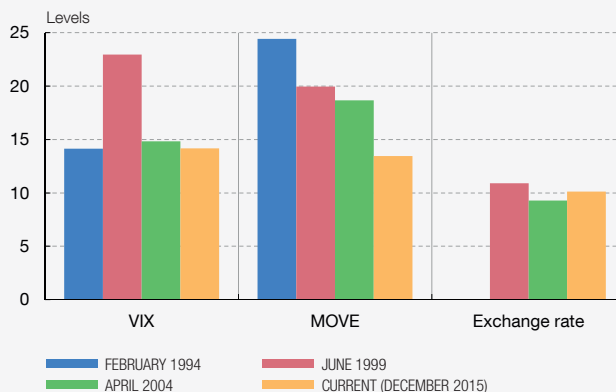EXCHANGE RATES
INTEREST RATES (MOVE) (right-hand scale)
POLITICAL RISK (GPU) (a) (right-hand scale)

Chart 2
VOLATILITY AND BASE RATES

FEBRUARY 1994
APRIL 2004
JUNE 1999
CURRENT (DECEMBER 2015)

Chart 3
VOLATILITY AND ECONOMIC INDICATORS

S&P 500 (VIX)
SURPRISE INDEX: G-10 (b)
SURPRISE INDEX: EMERGING COUNTRIES (b)

Chart 4
TAIL RISKS AND FINANCIAL STRESS

SKEW
VVIX
FINANCIAL STRESS (right-hand scale)
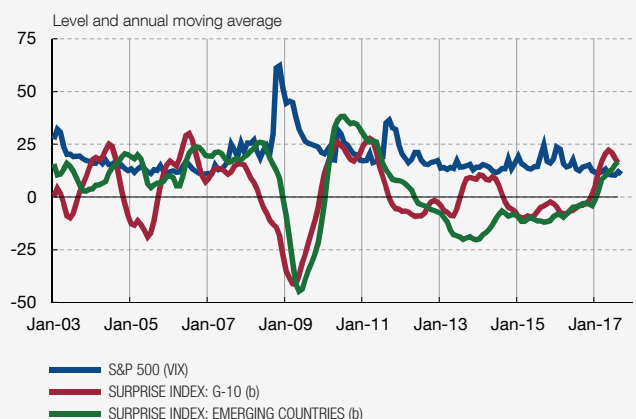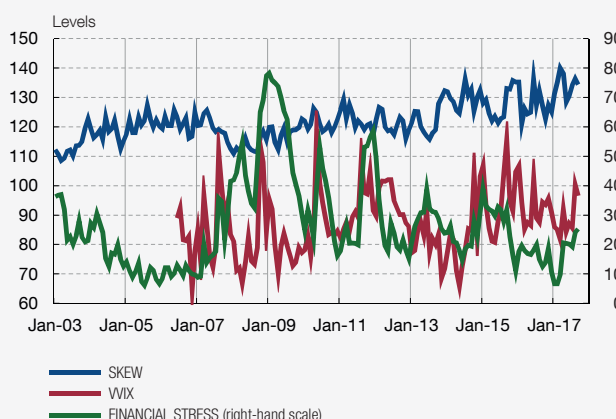
SOURCES: Datastream and own calculations.

a   Global Economic Policy Uncertainty Index. Baker, Bloom and Davis (2016), Measuring Economic Policy Uncertainty, The Quarterly Journal of Economics, Volumen 131, Issue 4, pp 1593-1636.
b   The Citigroup Economic Surprise Index is defined as the weighted historical standard deviations of "surprises", which are defined as the difference between the published data and the consensus forecast. A positive figure indicates that the published figures exceed the consensus. The emerging countries CESI includes China, Hong Kong, India, Indonesia, South Korea, Malaysia, the Philippines, Singapore, Taiwan, Turkey, South Africa, Poland, the Czech Republic, Hungary, Brazil, Mexico, Chile, Colombia, and Peru, whereas the G-10 includes the United States, the euro area, the United Kingdom, Japan, Norway, Sweden, Australia, New Zealand and Canada.

One of the most notable characteristics of recent developments in international financial markets has been their low volatility. Thus, after rising in mid-2015 on the back of turbulence caused by the fall in the Chinese stock market and the slump in the oil price, the volatility of a range of financial assets, such as the stock market, interest rates, or exchange rates, has remained on a constant downward trend (see Chart 1). What makes this pattern particularly striking is that it is taking place in a context in which there have been a number of unexpected political events, such as the United Kingdom's vote to leave the EU or the outcome of the US presidential election in November 2016. Similarly, many emerging economies, including the largest of them, have registered increases in their political risk indicators and cuts to their sovereign ratings.[3]

Moreover, this downward trend in volatility is taking place against the backdrop of a gradual rise in base rates and the announcement of the withdrawal of monetary stimulus in the United States, something that has traditionally coincided with periods of low stock market volatility and higher interest rate volatility. In this instance, however, after four base rate hikes, the average volatilities of the stock market and the exchange rate are close to the average observed in other periods of rising base rates, but interest rate volatility is clearly lower (see Chart 2).

The possible causes of the decrease in volatility may include certain short-term factors, together with other factors of a more structural nature, associated with changes taking place in the operation and structure of financial markets. As regards short-term factors, the effect of geopolitical uncertainty may have been offset by the positive surprises in the economic indicators (see Chart 3). Similarly, the profits of banks and listed companies beat expectations in the first quarter of 2017. Meanwhile, the ultra-expansionary monetary policies of advanced economies' central banks, and their reaction to certain bouts of instability[4] may have created expectations among investors that the monetary authorities will try to avert or curb abrupt corrections in asset prices and the accompanying spikes in volatility. Finally, high volumes of equity buybacks could also have contributed to reducing stock-market volatility by supporting share prices.

As regards considerations of a more structural nature, in recent years the share of active investors has shrunk relative to that of investors holding assets to maturity or with passive investment strategies, i.e.

those tracking asset allocations determined by indices, as in the case of exchange traded funds (ETFs).[5] This would tend to reduce volatility, given the smaller presence of investors with positions differing from that of the average investor.[6] Furthermore, the emergence of new financial products allowing investors to bet on future volatility,[7] in a context of negative or ultra-low interest rates and the search for returns,[8] could be leading to trading strategies focusing on volatility itself, resulting in its becoming more persistent.[9]

In any event, volatility is only an approximate measure of the really important variable, namely uncertainty about future returns. In purely statistical terms, implied volatility measures expected average deviation in asset prices, but situations may arise in which this average deviation may be small, although the probability of extreme events occurring is high (tail risk). In order to measure these risks, the Chicago Board Options Exchange (CBOE) calculates an indicator of the skew of the distribution of S&P 500 index and VVIX (the implied volatility of the VIX) options. The recent behaviour of these metrics suggests that although low levels of volatility are expected to continue, investors are demanding ever increasing protection against a sharp change in volatility (see Chart 4). There are also alternative financial stress indices produced by various banks, such as the CSFB (Credit Suisse Fear Barometer), which has moved in closer synchrony with political risks. Finally, Chart 4 shows a financial stress index (FSI) for the United States, which is basically calculated using volatilities and stress indicators in six US financial market segments.[10] This indicator has risen slightly since the start of the year.[11]

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5   In the case of global bond markets, almost 50% of the total volume is held by central banks and commercial banks, which often keep their positions to maturity. In 2002 their share was 40%. In the case of the US stock market, the share of active investors dropped from 85% to 62% between 2005 and 2017. For evidence regarding other markets, see the IMF's Global Financial Stability Report (GFSR) April 2014, Chapter 2, and GFSR April 2015, Chapter 3.

6   The substitution of active investors by passive investors also produces a reduction in trading volumes and market liquidity, making it more expensive to take a position against the general trend. This reinforces the tendency to drive out the more active investors. This leads to lower volatility of each individual security and ultimately lower aggregate market volatility.

7   The Chicago Board Options Exchange (CBOE) currently trades around 1.5 million options and 500,000 futures on the VIX.

8   For example, the Velocity Shares Daily Inverse VIX (XIV), an investment product offering a return that depends inversely on the VIX, has produced a return of 80% so far this year, and has a daily trading volume of USD 818 million. Strategies of "selling volatility" over the medium term would also be reflected in the short, non-commercial positions on VIX futures, which reached peak levels in the summer of 2017.

9   Recently there has also been a proliferation of so-called "controlled volatility funds", which aim to keep a given institutional investor's portfolio volatility levels stable. These funds behave procyclically, as they reinforce low volatility when it is low, but amplify its rise in the face of unexpected changes in market conditions.

10 The United States FSI is constructed daily using information from six financial markets (equities, public fixed income, private fixed income, banks, money markets, and exchange rates). It has been designed such that an increase in the FSI indicates an increase in financial stress.

11 Other indicators referring to the value of put and call options on the S&P 500 and on the VIX would also suggest that investors' demand for protection against an upturn in volatility is increasing.

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    options on US Treasury note futures. To ensure a variety of underlying instruments when calculating the various segments of the interest rate curve, options on bonds with two-, five-, ten- and thirty-year maturities are used. Finally, for foreign exchange markets, the implied volatility of three-month options on the exchange rate of the euro, the yen and the pound sterling against the dollar are used.

3   Since December 2015, a number of countries, including Nigeria, Tunisia, South Africa, Saudi Arabia, Poland, Turkey, Brazil, China, Chile, Venezuela and Ecuador, have had their sovereign ratings cut by one or more of the three major rating agencies, whereas only Argentina, Hungary, Indonesia and South Korea have had their ratings upgraded.

4   Such as the delay in the first base rate hike in the United States, which was expected in September 2015, the deterioration in the external environment, or the cut in the United Kingdom's base rate, and the postponement of the second rate rise in the United States after the Brexit referendum in the summer of 2016.

The current apparently benign scenario of low volatility should not lead to complacency. Firstly, as we have seen, other indicators are behaving less reassuringly than traditional indices. Secondly, some of the factors that appear to underlie the trend in volatility, such as the reaction of the monetary authorities to certain events or the participation of passive investors, could change in the future or intensify sudden price adjustments. In this regard, in the current context it is important to ensure that excessively leveraged positions do not build up, based on this context of low volatility levels.[12]

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12 On the effects of low volatility on the build-up of imbalances, see: The volatility paradox, in OFR Markets Monitor, Second Quarter 2017 (Office of Financial Research). Also, Learning from History: Volatility and Financial Crises, by J. Danielson, M. Valenzuela and Ilknur Zer (2016, Board of Governors of the Federal Reserve System) highlights that a protracted period of low volatility in stock markets can herald the outbreak of financial crises.