

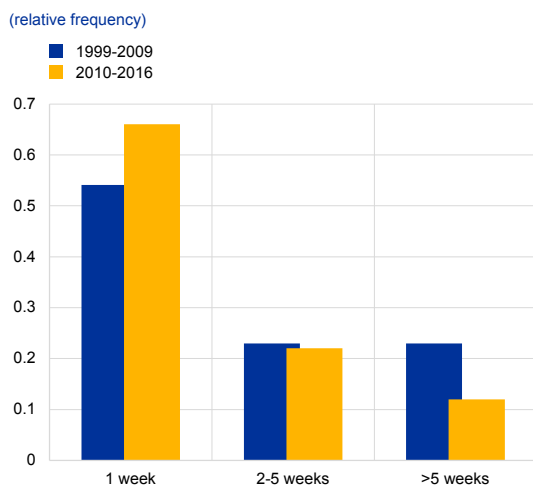
### Box 3

Have global uncertainty shocks become less persistent?

**Global financial markets have been marked by a number of short-lived episodes of elevated volatility in recent years.** Strong corrections in asset markets can have adverse financial stability implications for the financial system owing to the losses that have to be absorbed, thereby reducing available buffers. A prolonged period of volatile and falling asset prices may also weaken the real economy via wealth effects and confidence channels. While large or persistent shocks to asset price volatility can cause clear harm to financial stability, so too might seemingly more insidious short-lived corrections. Indeed, amid surges in market volatility that are short-lived and quick to fade, investors are more likely to take undue risks.

#### Chart A

Fewer episodes of protracted increases in S&P 500 volatility



Sources: Bloomberg and ECB calculations.

Notes: Weeks until elevated volatility of the US S&P 500 index reverts back to its five-year moving average. The volatility of the S&P 500 index is derived using a GARCH(1,1) estimation of daily returns.

**As the global financial crisis fades, periods of elevated financial market uncertainty have become increasingly short-lived in recent years.**

Looking at the US stock markets, in the past six years there have been fewer protracted episodes of high volatility of the S&P 500 index than in the pre-financial crisis era. In particular, only one out of ten surges in the S&P index's return volatility has persisted for more than five weeks, down from two out of ten in the late phase of the so-called "Great Moderation" between 1999 and 2009 (see **Chart A**). Conversely, the occurrence of short-lived surges, when volatility declined back to average levels within a week, has increased.

**This falling duration of shock impacts also becomes evident in a systematic econometric analysis.** **Chart B** shows, for US and euro area stock markets, respectively, time-

varying estimates of the share of a one-standard-deviation shock to the return volatility of the US

and euro area equity markets that persists beyond ten trading days, derived from a univariate GARCH model. A higher measure indicates that shocks to volatility are slower to fade and vice versa.

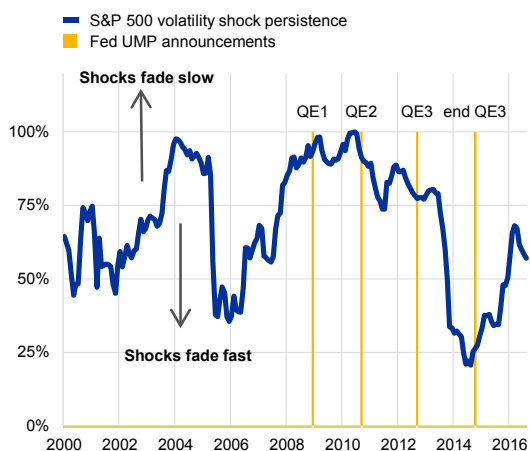
**The credibility and efficacy of monetary policy measures may have been a contributor to this observed decline in protracted stock market volatility.** Dynamics of volatility persistence estimates over time suggest that monetary policy accommodation may have influenced the persistence of shocks to market uncertainty. **Chart B** also shows the timing of major unconventional monetary policy measures in the two economies. Indeed, the different dynamics in this indicator appear to reflect the different stages of unconventional monetary policy accommodation across the two economies. For the United States, volatility persistence gradually declined after the introduction of the various asset purchase programmes (QE 1-3), but rose again after the Federal Reserve ceased to engage in large-scale asset purchases in October 2014. Likewise, volatility persistence in the euro area stock market declined after major non-standard measures were announced by the ECB. Recently, the decline in persistence coincided with the adoption of the ECB's public sector purchase programme and corporate sector purchase programme.

### Chart B

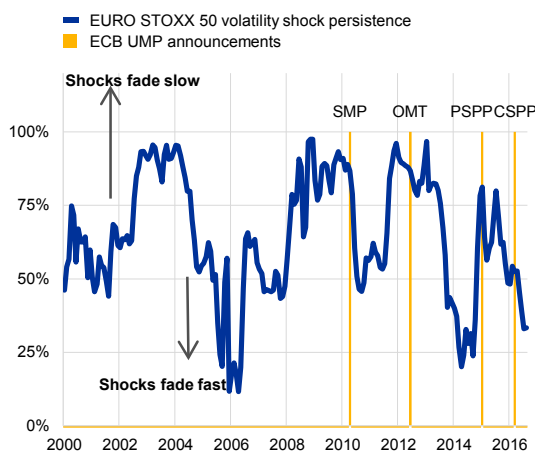
Time-varying estimates of persistence implied in GARCH(1,1) stock market volatility

(share of shock to volatility persisting beyond ten trading days)

#### a) United States: S&P 500



#### b) Euro area: EURO STOXX 50



Sources: Bloomberg and ECB calculations.

Notes: The y-axis shows the percentage share of a shock to stock market volatility, derived from the impulse response function (IRF) of a GARCH(1,1) model for the respective stock index, estimated over a one-year rolling window of daily information. UMP stands for unconventional monetary policy, QE for quantitative easing, SMP for Securities Markets Programme, PSPP for public sector purchase programme and CSPP for corporate sector purchase programme.

**From a financial stability viewpoint, neither extremely high levels, nor extremely low levels of volatility persistence appear to be desirable.** If volatility is highly persistent, as was the case during the global financial crisis and the euro area sovereign debt crisis, adverse shocks to financial market confidence are long-lasting and potentially self-feeding as markets are slow to recover from asset price turmoil. In these situations, central bank actions are likely to be stabilising for financial markets and the economy at large. However, low volatility persistence can incentivise risk-taking, as experienced in the run-up to the global financial crisis when both persistence and the overall level of volatility were very low for an extended period of time. Specifically, shorter durations of elevated volatility mechanically compress backward-looking risk measures, which shape investors' risk

management decisions. The decline in the price of risk changes the relative price of assets with a given risk/return trade-off and may lead to portfolio rebalancing in favour of riskier assets.<sup>13</sup>

**Monetary policy alone does not explain this falling persistence – clearly, other factors could also affect the persistence of uncertainty shocks.** Monetary policy is likely not the sole factor determining the persistence of shocks to market uncertainty. In general, high levels of economic uncertainty as well as uncertainty about the political economy might explain a higher persistence of uncertainty shocks. Conversely, overall low levels of economic and policy uncertainty are likely to be associated with lower levels of shock persistence as investors are quick to digest any negative news and refocus on an overall sound economic outlook. Moreover, changes in market liquidity could help to explain varying degrees of shock persistence. In particular, a more liquid market should *ceteris paribus* contribute to absorbing adverse shocks faster and vice versa. Finally, the level of investor leverage might be another determinant; if investors, whether banks or non-banks, are highly leveraged, balance sheet losses incurred as a result of market turmoil are more likely to necessitate fire sales of assets which could reinforce the initial shock. Hence, declining shock persistence, as recently recorded for the overall euro area equity market, might reflect higher capital buffers of banks as well as the increased (decreased) share of asset managers (e.g. hedge funds) among investors with generally lower (higher) levels of leverage.

**All in all, there have been significant changes in the persistence of shocks to market volatility over the last years.** A standard GARCH-based approach applied to global stock markets finds evidence that volatility since 2010 has tended to return more quickly to its long-term mean (compared with the pre-crisis situation). Clearly, the factors explaining this are manifold, ranging from stronger regulatory standards amid an evolving financial market microstructure, elements of the macro-financial environment, to the efficacy of monetary policies. The latter, in particular, appears to be associated with the fact that there have been fewer manifestations of financial instability in recent years. While this suggests strong monetary policy credibility and efficacy, these policies should not inadvertently lead to insufficiently vigilant risk management at an entity level. Clearly, countercyclical policy settings will need to internalise this to avoid any undue build-up of system-wide risk.

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<sup>13</sup> For a more detailed discussion of that channel, see Box 3 entitled “Financial market volatility and banking sector leverage”, *Financial Stability Review*, ECB, November 2014.