

Equity market corrections and the economy

William de Vijlder

At a given moment during the month of February, the S&P500 was down 10% from its historical high. Using the commonly used definition, this meant it was in correction territory. This was considered by some as a healthy correction whereas others argued it might very well mark the beginning of an era of structurally higher volatility. Econometric research and model-based simulations show that the economic impact of equity market corrections is rather small. The stylised facts however show the key role of the reciprocal influence between equity markets and growth expectations. In this respect, particular attention should be devoted to the evolution of the corporate bond spread.

Though it has rebounded since, the S&P500 was down more than 10% down from its peak during the recent sell-off, so it fits the commonly used definition of a market correction. This development has triggered comments ranging from “a healthy correction” to marking the beginning of an era of structurally higher volatility. In such a case, it could even end up weighing on the economic outlook. Rather than trying to anticipate the future market evolution, this paper discusses how equity market corrections can influence the economy. To this end it presents theoretical arguments, empirical research, model-based simulations and stylised facts.

Equity markets and the economy: the theory

Declining markets raise concerns about a possible negative impact coming from wealth or confidence effects. Under the former, households reduce spending and increase savings so as to increase their level of wealth, which has dropped with the decline of the market. In the case of the latter, spending is reduced because consumers feel more uncertain and less confident about the future. In reality, both channels co-exist and can act as a drag on growth.

US: consumer sentiment and net worth

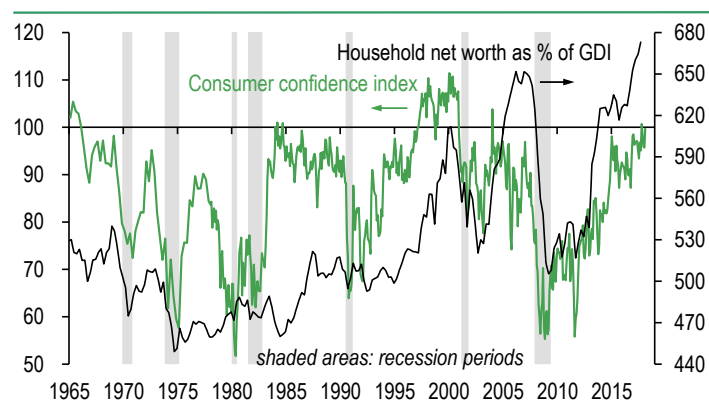


Chart 1 Sources: University of Michigan, Federal Reserve, NBER, BNP Paribas

In addition, a funding channel can also exist: the decline in net worth can make it more difficult to get access to bank credit. When looking at the evolution of US household wealth in recent years, it is not difficult to imagine that a market correction could weigh on consumer spending. Indeed, chart 1 shows a close correlation between consumer confidence and household wealth as a percentage of personal income. Moreover, the personal savings rate has declined (chart 2).

US: household savings and net worth

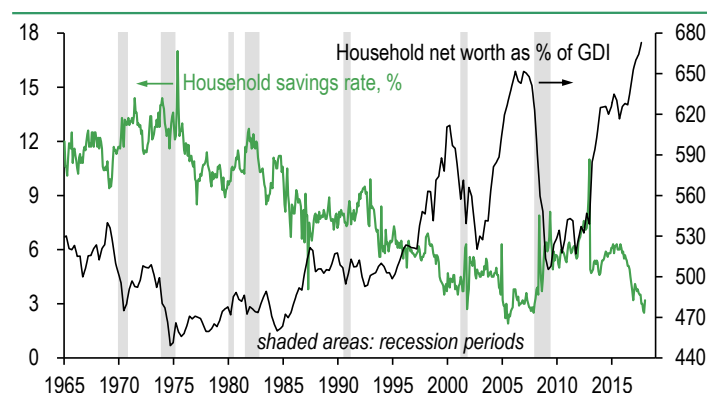


Chart 2 Sources: BEA, Federal Reserve, NBER, BNP Paribas

US: evolution of house prices and equity market

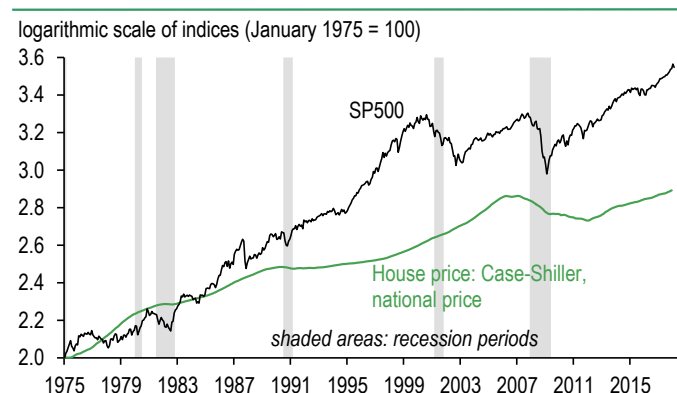


Chart 3 Sources: Thomson Reuters, Case-Shiller, BNP Paribas



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It is tempting to argue that the rise in asset prices (property and equities) (chart 3) has *caused* an increase in consumer confidence, but both occurrences might simply *reflect* a more positive assessment of the economic environment and outlook, an illustration of the usual problem of distinguishing correlation and causality.

Empirical research

There is extensive empirical research on the existence of wealth effects. Typically it consists of looking at the relationship between changes in wealth and changes in per capita consumption.

Carroll et al. (2010)¹ analyse housing and wealth effects in the US by using an estimation method that takes into account the smoothness or stickiness of consumption. This behaviour arises from consumption habits that take time to change, or it could also be that households do not pay sufficient attention to changes in the macroeconomic and market environment. The authors find that the marginal propensity to consume out of a one-dollar increase in housing wealth is about 2 cents in the short run and 9 cents in the long run. For financial wealth, the long-run effect is smaller with an estimate of about 6 cents. The difference in size is not large enough to allow stating with confidence that the effects are different.

Using a variety of regression models for the US for the period 1975-2012, Case et al. (2013)² show that on a consistent basis, changes in housing wealth have an effect on per capita household consumption that is two to three times greater than the effect of changes in stock market wealth. Elasticities in most model specifications are in the range of 0.07-0.10 for housing versus 0.03 for financial wealth. The effect of declines in house prices is larger than that of increases: 0.10³ versus 0.03. Likewise, the relationship between stock market wealth and consumption is larger when stock prices go down (elasticity of 0.10) than when they increase (elasticity of 0.03)⁴.

For the eurozone, research by the ECB for the period 1980-2007 finds different results: the effect of housing wealth is not significant whereas the effect of financial wealth is significant though smaller than in the US: *"financial wealth effects are relatively large and statistically significant and housing wealth effects are virtually nil and not significant. The marginal propensity to consume out of financial wealth typically ranges between 0.7 cents per euro (immediate response) and 1.9 cents per euro (long-run impact)."*⁵

¹ Christopher D. Carroll, Misuzu Otsuka and Jiri Slacalek (2010), *How large are housing and financial wealth effects? A new approach*, ECB working paper 1283

² Karl E. Case, John M. Quigley and Robert J. Shiller, *Wealth effects revisited: 1975-2012*, NBER working paper 18667, January 2013

³ This implies that a 10% decline in house prices would reduce per capita consumption by 1%.

⁴ So although on average, housing wealth changes have a bigger impact than changes in equity prices, only looking at declines in housing wealth and equity prices shows that consumption is as sensitive to housing wealth as to declines in financial wealth. When both occur simultaneously, equity declines have an even bigger impact.

⁵ Ricardo M. Sousa, *Wealth effects on consumption. Evidence from the euro area*, ECB working paper 1050, May 2009

Arrondel et al. (2015)⁶ estimate the marginal propensity to consume out of wealth (MPC) across the whole wealth distribution and take into account differences in the wealth composition at the household level. They use the French Wealth Survey of 2010 along with the Household Budget Survey (INSEE-EUROSTAT). This allows them to take into account the fact that wealth distribution is skewed to the right and asset allocation (housing versus financial wealth) varies across the wealth distribution. This means that depending on the type of wealth shock, the impact can be quite different. The consumption-to-income ratio is estimated to be a function of the wealth-income ratio and several control variables. Across the wealth distribution, they find a decreasing marginal propensity to consume out of financial and housing wealth: *"The marginal propensity to consume out of financial wealth decreases from 11.5 cents in the bottom of the wealth distribution to a nonsignificant effect in the top of the distribution. The marginal propensity to consume out of housing wealth decreases from 1.1 cent in the bottom of the wealth distribution to 0.7 cent in the top of the distribution."* Nevertheless, given the skewness of the wealth distribution, a one percent increase in wealth still has a bigger overall impact on consumption at the top end of the distribution. The authors also find that *"consumption for households facing heavy debt pressures is more sensitive to financial wealth except in the bottom of the net wealth distribution, where highly indebted households would rather reimburse their debt than consume an additional euro of financial wealth."* Finally, the authors also show that the relationship between wealth and consumption reflects a direct wealth effect but not so much a confidence effect.

Jawadia et al. (2017)⁷ examine the effects of wealth on consumption for the US, the UK and the eurozone⁸. Their analysis focuses on whether wealth effects are asymmetric or time-varying. For the former, it could be explained by consumers attaching a greater importance to declines in wealth than to increases, liquidity constraints, habit formation etc. For the latter, it could be related to household expectations about whether asset price declines are perceived to be permanent or temporary. For the three countries they find that housing wealth effects are not significant. The financial wealth effect is not significant in the eurozone. In the US and the UK, the financial wealth effect is time varying. Initially it is significant⁹ but when household wealth (in the US) and lagged consumption (in the UK) reach a certain threshold value, the financial wealth effect is no longer significant. This would mean that in the case of a considerable decline in housing wealth, the relationship between financial wealth and consumption is no longer significant in the US. A possible explanation is the increased cautiousness of households. In the UK, subdued lagged consumption would be the factor triggering the precautionary behaviour.

⁶ Luc Arrondel, Pierre Lamarche and Frédérique Savignac (2015), *Wealth effects on consumption across the wealth distribution: empirical evidence*, ECB working paper 1817

⁷ Fredj Jawadia, Richard Soparnotb,*, Ricardo M. Sousa (2017), *Assessing financial and housing wealth effects through the lens of a nonlinear framework*, Research in International Business and Finance, vol. 39, pp. 840-850

⁸ They use quarterly data for the US, the UK and the eurozone for respectively 1947:1 to 2008:4, 1963:1 to 2008:1 and 1980:1 to 2008:1.

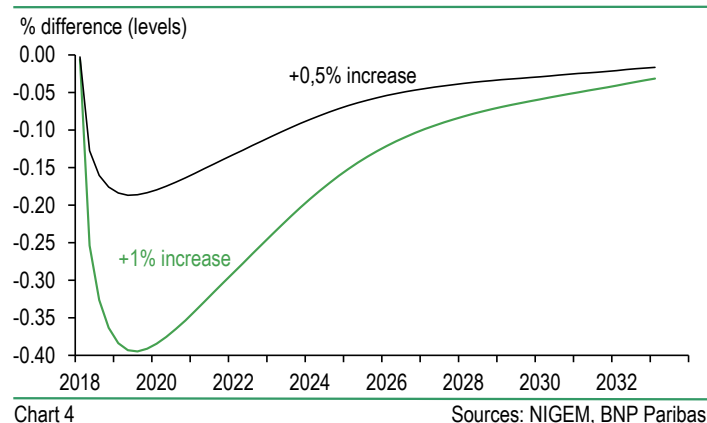
⁹ In the US, an increase in financial wealth of 1% implies an increase in consumption of 0.07%. In the UK the consumption increase is bigger: 0.18%.



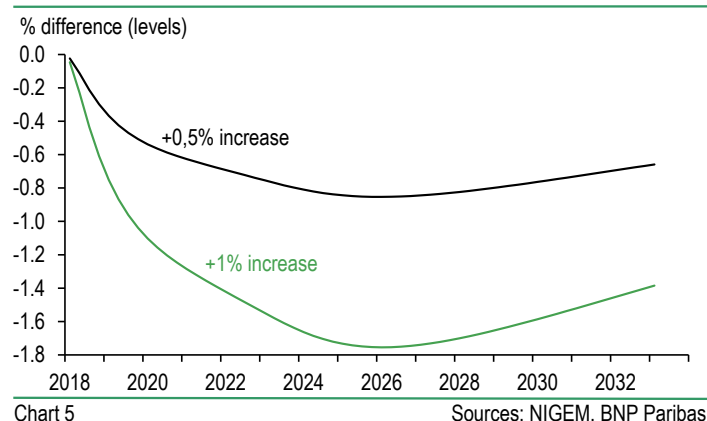
This brief overview of the recent empirical literature illustrates the complex interaction between wealth and consumption. Depending on the country or the study, housing wealth has a significant impact, or, on the contrary, financial wealth. Sometimes there is no significant relationship at all. These results complicate the assessment of the economic consequences of equity market declines.

Model-based simulations

US: impact of a permanent increase in the equity risk premium on the level of real GDP



US: impact of a long-term interest rate increase on the level of real GDP

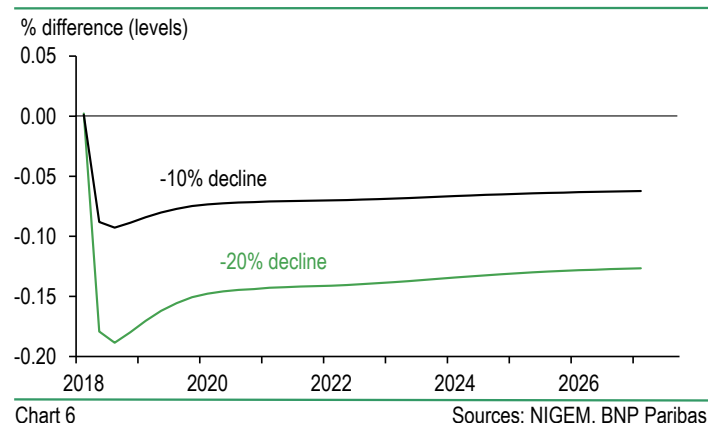


Econometric models can provide an interesting, complementary way of looking at the relationship between equity markets and growth. Using the NiGEM model¹⁰, we simulated the effect of a 50bp (100bp) shock in the US equity risk premium. As shown in chart 4, the peak impact on real GDP is a negative 0.4% (-0.2%). Interestingly, although a risk premium shock is equivalent to an interest rate shock in terms of its impact on the discount rate that is used for calculating the present value of future cash flows, the economic impact is quite different. The impact of the interest rate shock (chart 5) is slower to manifest itself but bigger

¹⁰ NiGEM is a multi-country macroeconomic model developed by the National Institute of Economic and Social Research in the UK.

than a risk premium shock. This must be related to the broader impact of higher interest rates on the financing cost of households, companies and the government. The model also allows simulation of the effect of an exogenous decline in the stock market. A drop of 20% (10%) reduces real GDP by 0.2% (0.1%)¹¹ (chart 6).

US: impact of an equity market decline on the level of real GDP



Historical experience: stylised facts

Finally, we can also look at the history of equity market drawdowns (chart 7) and what happens to economic variables during such periods. A drawdown is defined as the percentage difference of an equity index in a given month compared to its most recent historical peak. In a bear market, the drawdown will become bigger month after month, and when the market starts to recover, the drawdown will obviously decrease. This creates a V-shaped market pattern typical of recessions and recoveries. It implies that economic data can start improving although the drawdown is still huge: a rising market environment would reflect an improved economic outlook but could also contribute to a pick-up in confidence. The horizontal line in chart 7 at -10% shows the commonly used definition of a market correction. The grey bars show recessionary periods as defined by the NBER.

Making a judgemental distinction between minor (slightly more than 10%) and major drawdowns (significantly more than 10%) and linking the drawdowns with the economic environment (recession versus no recession) gives the following result:

Drawdowns distribution

	Recession	No recession
minor	1	3
major	5	1

Table 1 Sources : NBER, BNP Paribas

¹¹ This implies that an exogenous market decline of 20% has effects that are similar to those of an increase in the required equity risk premium of 50 bps.



During recessions, the equity market drawdown tends to be huge (1974, early 2000s, 2008) though there is no general rule (the drawdowns in the early '80s and in 1990 were more limited). The 1987 crash led to a big drawdown but did not cause a recession.

US: equity market evolution and drawdown

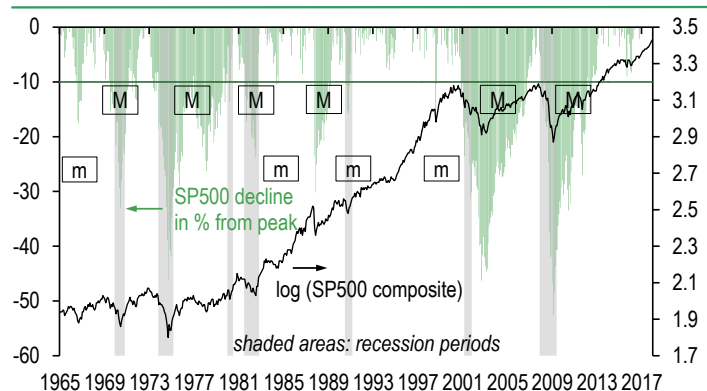


Chart 7 Sources: Thomson Reuters, NBER, BNP Paribas

US: equity drawdown and bond yield

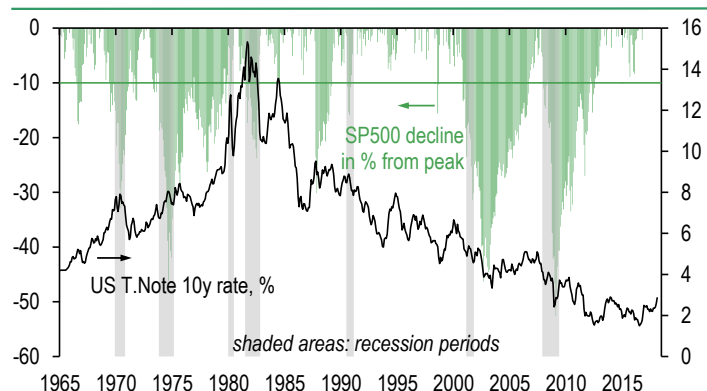


Chart 8 Sources: Thomson Reuters, Federal Reserve, NBER, BNP Paribas

What has been the relationship in the past between significant equity market drawdowns and economic variables? Given the current concern about the outlook for inflation and how it would influence the bond market, a useful starting point is to look at the behaviour of 10-year US treasury yields. Chart 8 shows that quite often drawdowns have been preceded by rising bond yields, which would suggest that higher rates eventually contributed to a decline in the equity market. This should of course not come as a surprise. On the other hand, the bond market crash of 1994 did not lead to a major decline in the equity market, whereas the drawdowns of the early 2000s and of 2008 occurred when yields were respectively declining and relatively stable. This would point towards concern about the growth outlook as a key driver rather than fears about higher rates. Indeed, to the extent that rising nominal yields reflect a pick-up in inflation, real yields may stay more or less the same, or, to put it differently, higher inflation may very well lead to higher nominal dividends and a higher nominal discount rate, implying that the present value of future dividends, i.e. share prices, would hardly change.

Chart 9 shows the relationship between the equity market and real GDP growth. The recession periods are quite obviously marked by negative year-on-year growth rates of real GDP. The 1987 crash was followed by high real growth, and the 1998 correction (LTCM crisis) did not dent growth either.

US: equity drawdown and real GDP growth

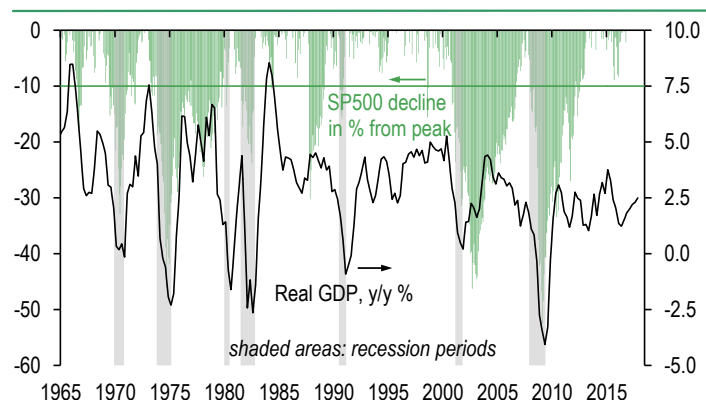


Chart 9 Sources: Thomson Reuters, BEA, NBER, BNP Paribas

Chart 10 shows the evolution of consumer confidence. Data are monthly, which could show a greater sensitivity to short-term stock market turmoil than to quarterly data as is the case in chart 9. Consumer confidence declines quite significantly during drawdowns that occur in the run-up to and during a recession. On the other hand, the impact on confidence of the 1987 crash was very short lived, and the same is true for the 1998 correction.

US: equity drawdown and consumer confidence

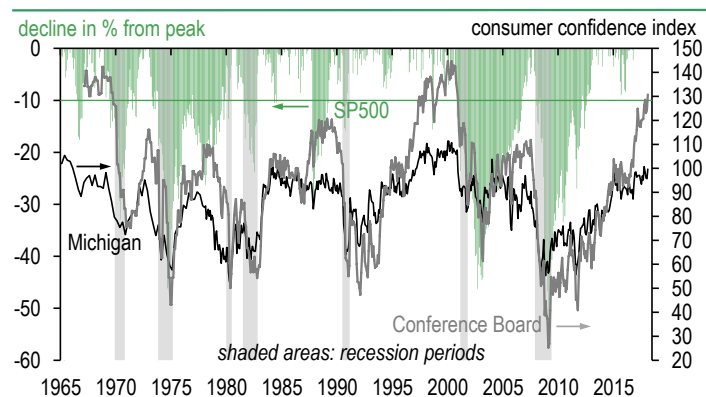


Chart 10 Sources: T.Reuters, Conf. Board, University of Michigan, NBER, BNPP

Consumer confidence is relevant because of its possible influence on the savings rate and consumer spending. The evolution of the former is shown in chart 11. During and in the immediate aftermath of recessionary periods, the savings rate tends to increase. The 1987 crash did not cause a lasting increase in the savings rate nor did the market events of 1998. The chart is also a reminder of the current very low savings rate.



US: equity drawdown and household savings rate

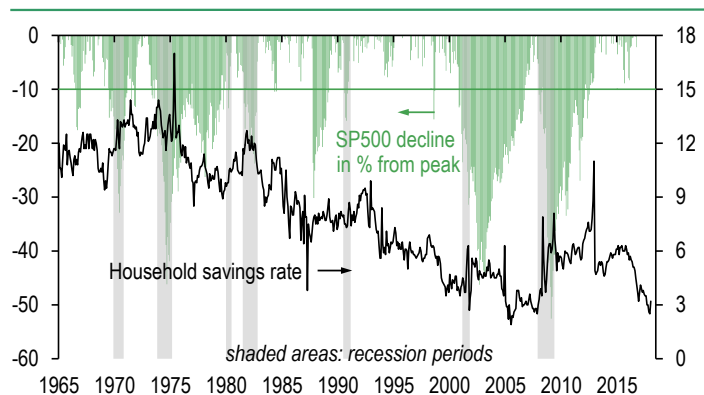


Chart 11

Sources: Thomson Reuters, BEA, NBER, BNP Paribas

US: equity drawdown and real personal consumption growth

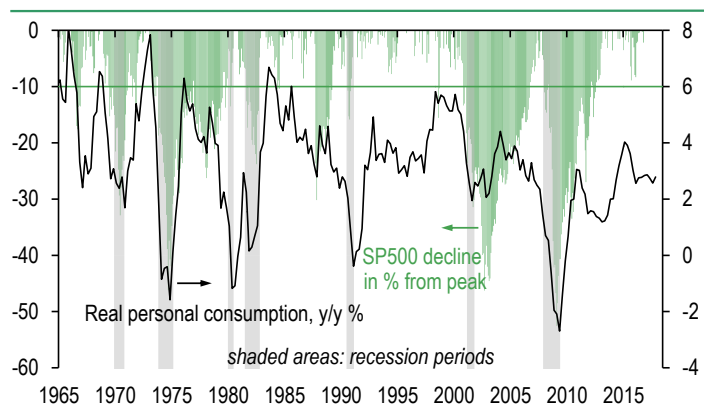


Chart 12

Sources: Thomson Reuters, BEA, NBER, BNP Paribas

Chart 12 shows the growth in consumer spending. The results confirm those of the previous charts: the significant impact of recessions and the absence of impact in 1987 and 1998.

In summary, the following conclusions can be drawn:

1. When drawdowns are differentiated between minor and more significant, the S&P500 has experienced 4 minor and 6 major drawdowns since 1965
2. Of the 6 major drawdowns, only one did *not* occur in a recessionary environment
3. Of the 4 minor drawdowns, only one occurred in a recessionary environment (1990)¹².

¹² The 1990 recession in the US was caused by a combination of factors. A significant tightening of monetary policy to fight an acceleration of inflation, weakening real growth in combination with negative growth surprises and higher oil prices triggered by Iraq's invasion of Kuwait. This and the threat of the upcoming Gulf war caused a big drop in consumer sentiment (source: Stephen K. McNees, The 1990-91 recession in historical perspective, New England Economic Review, January-February 1992).

4. Unlike major drawdowns, minor ones do not tend to be followed by big declines in growth (GDP, spending) and consumer confidence.

The role of the financing channel

The problem is of course that this is circular reasoning: the equity market is influenced by expectations about the economy, which in turn is influenced, in particular in the case of considerable declines, by the evolution of share prices. To put it differently, an equity market correction will be of a limited nature and, as a consequence, will only have a limited impact on the economy if investors think that the impact will be limited. It is as is expectations become self-fulfilling. What influences investor psychology? What causes a market decline to end up becoming anxiety-provoking?

Broadening the perspective, chart 13 shows the evolution of the high-yield spread¹³ during equity downturns.

US: equity drawdown and high yield spread vs treasuries

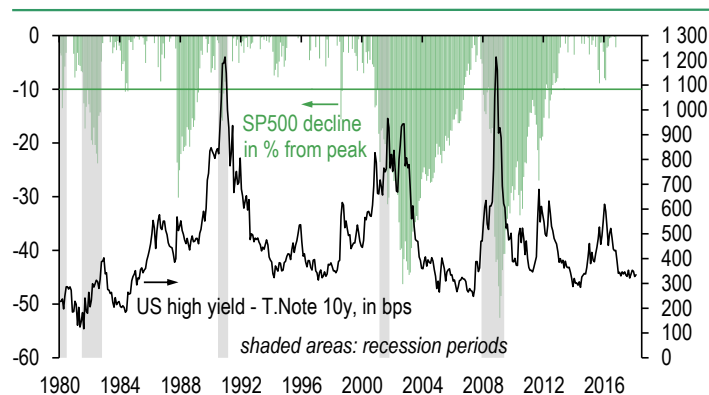


Chart 13

Sources: Thomson Reuters, Federal Reserve, NBER, BNP Paribas

Except in the early '80s, recessions have seen a huge widening of spreads, a reflection of increasing defaults and a jump in the required risk premium because of concern about default-related losses and reduced liquidity in the corporate bond market. The major equity market drawdown in the aftermath of the 1987 crash, which was not followed by a recession, saw a very muted increase in high-yield spreads. The minor drawdown in 1998 saw a considerable jump in the corporate spread, but this was short lived as the economy kept on growing.

As is the case for equities, when the corporate bond spread is analysed, there is a risk of circular thinking: it is influenced by expectations about the economy, which in turn is influenced by the evolution of the spread¹⁴. On the other hand, a number of stylised facts make the signals of this market perhaps easier to interpret:

¹³ The high-yield spread was calculated as the difference between the yield of a high-yield bond index and the 10-year US treasury yield.

¹⁴ To illustrate this point: empirical research on what drives corporate investment shows that the corporate bond spread plays a very significant role.



1. Recessions see huge increases in spreads (600 basis points and more)
2. Quite often the increase in spreads is very gradual
3. Widening spreads not followed by recessions are followed by rapidly narrowing spreads.

The last point is particularly important: a gradual, significant increase in the spread *not* followed by a swift narrowing would be a matter of concern and could flag corporate investors' anticipation of an increase in default risk, which means that growth would slow significantly. In addition to signalling a growth slowdown, the spread widening would also contribute to this development.

US: ISM, economic uncertainty and high yield spread

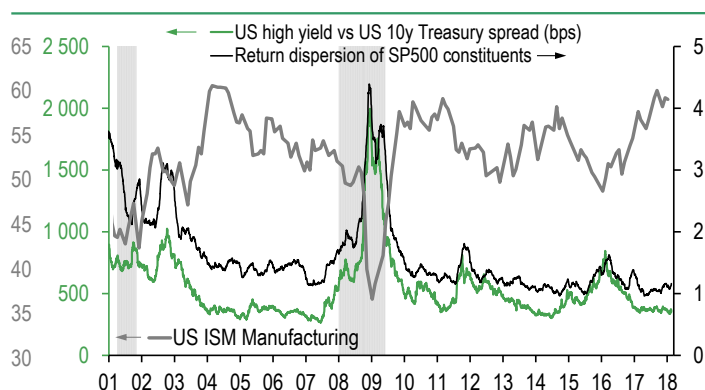


Chart 14 Sources: Thomson Reuters, ISM, Federal Reserve, BNP Paribas

In order to explore the role of investor psychology, chart 14 shows the evolution of the purchasing managers index (ISM) in the US, the volatility of the S&P500 index measured as the 60-day moving average of the cross-sectional standard deviation of the daily returns of the constituents of this index as well as the spread of high yield corporate bonds versus US treasuries. The volatility as defined above is a proxy for economic uncertainty: an increase in dispersion shows that investors pay more attention to the differences between listed companies with respect to their balance sheet, the evolution of earnings etc. As shown by the chart, the relationship between the cyclical indicator (ISM) and uncertainty (dispersion of individual stock returns) tends to fluctuate. Initially, the slowdown which started in 2004 was not accompanied by an increase in uncertainty whereas the growth acceleration of 2017 did not cause a decline in uncertainty. The chart also shows that the relationship between uncertainty and the corporate bond spread varies over time. Starting in 2004, there was a downward trend in the spread although the uncertainty measured remained stable. In 2017, there was a slight increase in uncertainty whereas the spread narrowed somewhat. It should be emphasized however that periods with a significant increase in the uncertainty measure also see a significant widening of the corporate bond spread.

Conclusion

Based on theoretical considerations, empirical research and model-based simulations, it seems safe to assume that major equity market downturns have a detrimental impact on the economy. This is far less, or even not, the case for minor corrections. The problem in assessing the impact of an ongoing market downturn is that its extent and hence its impact are conditioned by expectations about the economy, which introduces a circularity in the analysis. For this reason, it is recommended to also look at the evolution of the high-yield spread against US treasuries. Equity market declines are typically accompanied by a widening of the corporate bond spread and our simulations have shown that a bond yield shock has a bigger economic impact than a stock market decline¹⁵. As a consequence, a significant widening of the spread that is not soon followed by a narrowing would be even more a source of concern than the equity market drawdown per se.

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¹⁵ Because it was not possible to simulate the effect of a corporate bond spread shock, the results of a bond yield shock have been used as a reference point. This may somewhat overestimate the impact considering that a shock to the spread should weigh on corporate investment whereas a bond yield shock has a broader impact on the economy: it influences corporate investment but also consumer spending and housing investment.

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