INFOCUS

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How likely is a sharp rise in inflation?

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In this edition of *Infocus*, Stefan Gerlach argues that sometimes it is necessary to think the unthinkable – in this case, the risk of a sharp rise in inflation. Though remote, the potential impact is too serious to be casually dismissed.

The possibility of a sudden rise in inflation seems remote to many investors. With most central banks having struggled for some time to achieve their inflation objectives, often without success, the risk of a large jump seems extraordinarily remote. But if it were to happen, it would be a turning point for central banks and risk leading to a marked tightening of monetary policy.

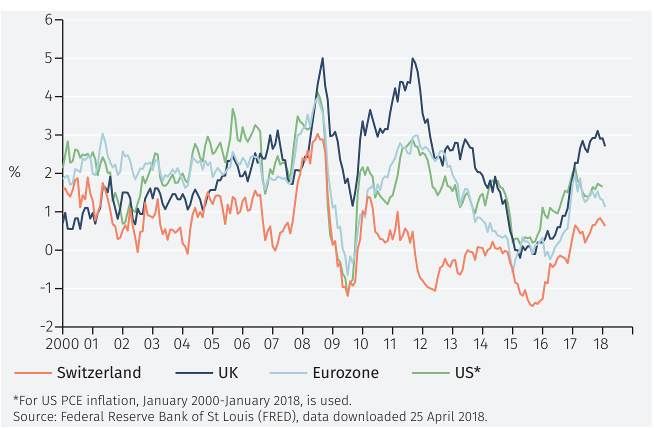
Recent inflation

How uncertain is inflation? Figure 1 shows headline inflation over 12 months in Switzerland, the eurozone, the UK and the US (for which the personal consumption deflator is used) since 2000. While inflation is perceived to have been low and stable in these economies in this period, the figure suggests that it has in fact varied substantially, largely because of marked changes in oil prices.

In particular, there were pronounced gyrations in 2008-2009 as a consequence of the onset of the global financial crisis. This had a direct effect on demand for goods and services and therefore for prices, but also a large indirect effect by triggering declines and later recoveries in the prices of oil and other commodities. Since oil prices have risen in recent months, we may be about to see another burst of inflation.

There are two views of the 2008-2009 episode. One can argue that it was an extraordinary event that will not happen again. That seems odd: there have been several episodes in history – most obviously the oil shocks of the 1970s and the Korean War boom in the early 1950s – in which inflation rose abruptly due to global economic shocks. Indeed, from an historical perspective, it seems appropriate to think of inflation as affected by a combination of a large number of small shocks that have an impact every month, and a small number of large shocks that lead to occasional marked swings in inflation.

1. Headline CPI inflation (over 12 months), January 2000 – February 2018



*For US PCE inflation, January 2000-January 2018, is used.
Source: Federal Reserve Bank of St Louis (FRED), data downloaded 25 April 2018.

The fact that large shocks are rare increases the risk that investors will underestimate the likelihood of a significant change in inflation over a short time span. That risk may be magnified if there have been no large but rare shocks in the recent past, which investors may misinterpret as suggesting that they are unlikely to happen again.

How much does inflation vary?

To think about these issues, it is useful to consider how much inflation (measured over 12 months) might vary over time. Computing the standard deviation of the change in inflation over 12 months, using data for the full sample period January 2000-February 2018 and for a shorter period that disregards the volatile data from the 2008-2009 period, the following results are obtained:

Table A. Standard deviation of changes of inflation over one year, January 2000 – January 2018

	FULL SAMPLE		WITHOUT 2008-2009	
	Standard deviation	Distribution	Standard deviation	Distribution
Switzerland	0.96	Fat tailed	0.85	Normal
Eurozone	0.86	Fat tailed	0.82	Normal
UK	1.07	Fat tailed	1.03	Normal
US	1.05	Fat tailed	1.00	Normal

Source: EFG calculations as at 25 April 2018.

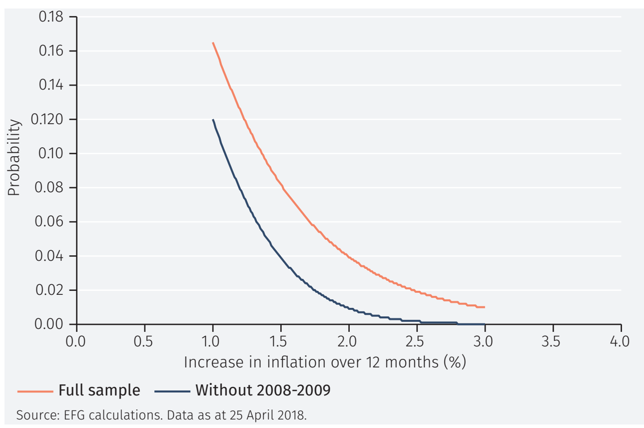
Table A warrants two observations. First, the volatility of changes in inflation is higher in the US and the UK than in Switzerland or the eurozone. In comparison to the three other economies, eurozone inflation is more stable.

Second, changes to inflation are more volatile in the full sample than in the sample that omits the large swings in inflation from 2008-2009. Not only are the standard deviations of the changes larger in the full sample but, more importantly, the distribution in the full sample is "fat tailed" and does not follow the normal "bell curve" as it does in the sample disregarding the data from 2008-2009. A fat-tailed distribution differs from the normal distribution in that it allows for a disproportionate number of "large" changes.[1]

The likelihood of a large increase in inflation

Figure 2 plots the probability of various changes in inflation.[2] Consider first the likelihood of an increase in inflation of 1% (plotted on the horizontal axis) over the coming 12 months. Depending on the source of the increase, it is easy to imagine that if inflation in Switzerland was 1% higher than now, or about 1.5%, the SNB would want to tighten monetary policy. Thus, a 1% increase in inflation could well constitute a meaningful change in the Swiss monetary policy environment.

2. Estimated probabilities of an increase of inflation over 12 months[3]



Source: EFG calculations. Data as at 25 April 2018.

The orange line shows that the probability of such a large rise in inflation is small but not trivial: the estimated probability is about 17%. Thus, we can think of a 1% jump in inflation spread over 12 months as occurring on average once every six years. Any observer who was certain that no commodity price shocks similar to those of 2008-2009 could occur would still attach a 12% likelihood to inflation rising by 1% in the coming 12 months, or on average once every eight years.

Consider next a 2% increase in inflation. With inflation around 2.5%, a jump of this size would require the SNB to take immediate action to return inflation to the price stability range. It constitutes a sea change in the monetary policy environment. While very unlikely, it is an event that does happen on average once every 25 years or 4% of the time. Furthermore, an investor who felt it appropriate to exclude the volatile period in 2008-2009 would attach a 1% probability to this event.

Table B shows the calculations for Switzerland, the eurozone, the UK and the US for a range of changes in inflation, using the data from the full sample. Table C shows the same results but drops the data for 2008-2009.

Table B. Estimated probabilities of an increase of inflation over 12 months. Full sample January 2001 – February 2018

	Switzerland	Eurozone	UK	US
1.0%	17%	14%	17%	19%
1.5%	8%	7%	9%	10%
2.0%	4%	3%	4%	5%
2.5%	2%	2%	2%	3%
3.0%	1%	1%	1%	2%

Source: EFG calculations as at 25 April 2018.

Table C. Estimated probabilities of an increase of inflation over 12 months. Dropping 2008-2009

	Switzerland	Eurozone	UK	US
1.0%	12%	11%	17%	16%
1.5%	4%	3%	7%	7%
2.0%	1%	1%	3%	2%
2.5%	0%	0%	1%	1%
3.0%	0%	0%	0%	0%

Source: EFG calculations as at 25 April 2018.

One conclusion from Table B is that, on average across economies, there is a little less than a one in five chance of a 1% increase in inflation over the coming 12 months, an event that would have a large impact on central banks' policy thinking. Investors who feel that the likelihood of a repeat of the large gyrations in inflation in 2008-2009 is zero would attach a likelihood of about one in six of a 1% increase in inflation over the coming months.

[1] For instance, while the likelihood that a variable will be 2 standard deviations above its mean is 2.2% if it is normally distributed, it is 5.1%, and thus more than twice as large, if it follows a t-distribution with 5 degrees of freedom (appears to fit these data well).
[2] Since the average change of inflation is almost zero, it is disregarded in what follows.
[3] The probabilities are computed using the results in Table A

Furthermore, the full sample suggests that the likelihood of a 1.5% increase in inflation is about one in twelve, and the likelihood of a 2% increase in inflation, an event that would be likely to transform the monetary policy environment, is about one in twenty-five.

Conclusions

Most investors are not considering the risk of a sharp rise in inflation. Were it to be realised, it would be a turning point for central banks and might trigger a marked tightening of monetary policy. The overall conclusion from the analysis above is that an increase in inflation of at least 1% over 12 months is not so unlikely – by the standards of the last two decades of data – that investors can safely ignore this possibility. Whilst such an increase is not expected, it is an event that investors should carefully consider.

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