

On the sources of macroeconomic stability

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In September 2007, the Bank of England hosted an international conference on the sources of macroeconomic stability. This article summarises some of the ideas and debates that were raised at the conference. It focuses particularly on the role of monetary policy in fostering macroeconomic stability and draws out some of the implications for policy and research. These issues are relevant to the current economic situation. The UK economy is likely to be better able to withstand the turbulence it is currently experiencing if the previous prolonged period of stability was caused by sustainable structural change and an improved policy framework.

Introduction

The volatility of output and inflation has varied substantially across countries and over time. While the global economy was very turbulent in the 1970s, macroeconomic volatility declined sharply in the following years in what has been termed the 'Great Moderation'. This decline took place to different extents in different countries. In the United States, for example, the Great Moderation is usually dated from around 1984.

Macroeconomic conditions in the United Kingdom became more stable after 1992. But monetary policy makers have been at pains to stress that a continuation of such 'nice' (Non-Inflationary Consistently Expansionary) economic conditions could not be taken for granted.⁽¹⁾ Indeed, the major economies are currently experiencing a set of shocks that may mean that the Great Moderation period is eventually judged to be one of only temporary respite from a more normal level of macroeconomic volatility. Whether this is the case or not depends on its causes. If the Great Moderation was caused by sustainable changes in the structure of the global economy and an improved policy framework then it is likely to be more enduring than if it was simply a lucky period of smaller or offsetting economic shocks.

To facilitate greater understanding of the sources of macroeconomic stability, the Bank hosted an international conference on the topic in September 2007.⁽²⁾ The participants included many of those who have contributed to the academic literature on this issue. Disentangling the causes of changes in macroeconomic performance is not straightforward and remains controversial: there is not yet any clear consensus on what caused the reduction in both output and inflation volatility in a wide range of countries around the end of the 20th century.

This article summarises some of the explanations of the Great Moderation discussed at the conference, sets them in the context of the wider academic literature and notes some directions for future research. The first section of the article sets out some of the key facts of the Great Moderation; the second section reviews some of the possible causes that have been suggested; and the final section concludes.

Macroeconomic stability

In order to set the scene, this section outlines some of the facts that underlie the debate about the causes of greater macroeconomic stability, focusing mainly on the unusually stable conditions achieved in the United Kingdom from the end of 1992 until the beginning of the recent financial market turbulence in the middle of 2007.

Macroeconomic evidence

One of the main characteristics of the Great Moderation period is that inflation in most advanced economies was low and stable. Indeed, in the United Kingdom, inflation was more stable than could reasonably have been predicted. In the ten years after the Monetary Policy Committee (MPC) was established in May 1997, inflation deviated by more than 1 percentage point from its target in only one month, whereas calculations made at the start of this period had suggested that this would happen almost as often as not (Bean (1998)).⁽³⁾ Moreover, low and stable inflation appears to have been achieved at negligible cost in terms of lost output, consistent with the consensus view that there is no long-run trade-off between output and inflation. For a range of countries, the

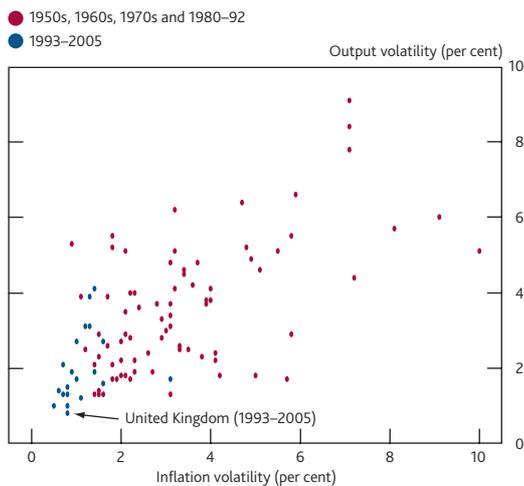
(1) See, for example, the Governor's speech at the East Midlands Development Agency/Bank of England dinner, October 2003 (King (2003)).

(2) The conference programme and links to papers and slides is available at www.bankofengland.co.uk/publications/events/gskonsep07/programme.htm.

(3) Economic performance over the ten years since the Monetary Policy Committee was established is described in Bank of England (2007).

combinations of inflation and output growth volatility achieved in the period from 1993 to 2005 were generally more favourable than had been the case throughout the rest of the post-war period (Chart 1).⁽¹⁾ In the United Kingdom, inflation and output volatility fell sharply from around 1992 (Chart 2). The box on pages 176–77 shows that there was no obvious change in the relative volatility of the different components of demand over this period — most fell broadly in line with the volatility of output.

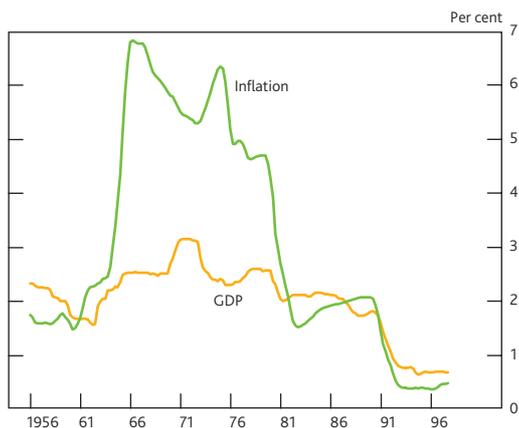
Chart 1 Inflation and real output growth volatility across countries



Note: The scatter plot shows the standard deviation of inflation and output growth for each of 20 industrial countries in different periods of similar length from 1950 to 2005.

Source: Global Financial Data.

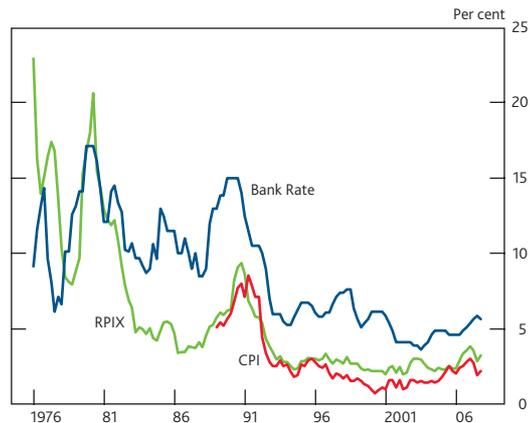
Chart 2 Inflation and real output growth volatility in the United Kingdom



Notes: Rolling ten-year standard deviations of four-quarter GDP growth and RPIX (RPI before 1976) inflation. Standard deviations are leading, so the final observation on the chart is 1998 Q1 showing the standard deviation over the subsequent ten years.

Not only was inflation low and stable during the Great Moderation, it was also less persistent than it had been at other times in the past: in other words, fluctuations in inflation tended to be short-lived. Greater stability was also achieved without an increase in nominal interest rate fluctuations. In fact, nominal interest rates were more stable between 1992 and 2007 than they had been in the past (Chart 3).

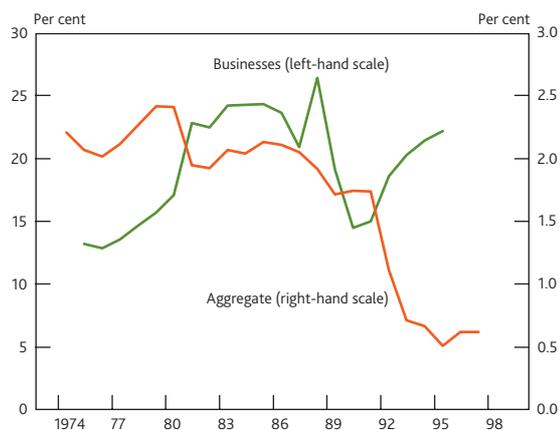
Chart 3 UK inflation and nominal interest rates



Business-level evidence

In his contribution to the conference, Diego Comin drew attention to evidence that greater stability at the aggregate level had not been matched among individual businesses.⁽²⁾ A similar feature is present in the United Kingdom (Parker (2006)). In general, business-level volatility is much higher than aggregate output volatility because many of the shocks facing individual businesses cancel each other out at the national level — what is good for one business is often bad for another. Aggregate volatility is largely accounted for by the common macroeconomic shocks that do not cancel each other out. Chart 4 shows that, in contrast to aggregate output volatility, the volatility of constant-price sales by publicly listed firms did not show any clear decline after 1992.

Chart 4 Volatility of aggregate output growth and average constant-price sales growth among individual businesses



Notes: The business-level measure is the weighted mean of the ten-year rolling standard deviation of constant-price sales growth of UK companies listed on the London Stock Exchange and the Alternative Investment Market. Standard deviations are leading, so the final observation on the chart is 1997 showing the standard deviation over the subsequent ten years.

Sources: ONS and Parker (2006).

(1) Benk, Gillman and Kejak (2007) show that the moderation in inflation and output volatility in the United States following the Second World War was much larger than that in the Great Moderation.
 (2) Comin and Philippon (2005) and Comin and Mulani (2007).

Volatility of expenditure components, employment and productivity

One possible way to diagnose the cause of the Great Moderation is to investigate whether there were any changes in the cyclical behaviour of the individual components of demand or supply. **Table 1** reports relative standard deviations for the business cycle component of key UK

Table 1 Standard deviations of key variables

Variable	1971 Q1–1992 Q3	1992 Q4–2006 Q2
GDP	1.59	0.80
Real expenditure components (relative to standard deviation of GDP)		
Consumption	0.94	0.92
Investment	4.37	3.44
Government consumption	1.23	1.30
Net exports	0.32	0.45
Subcomponents of real consumption (relative to standard deviation of GDP)		
Non-durable goods	0.99	0.84
Services	1.10	1.17
Subcomponents of real investment (relative to standard deviation of GDP)		
Durable consumer goods	3.93	3.14
Fixed business investment	3.04	3.66
Dwellings	4.71	4.93
Change in inventories	0.18	0.26
Labour input (relative to standard deviation of GDP)		
Employment (heads)	0.60	0.68
Total hours	0.87	0.96
Average hours	0.40	0.41
Average labour productivity	0.73	0.71
Nominal variables (relative to standard deviation of GDP)		
GDP deflator	1.66	1.26
GDP deflator inflation	2.64	1.38
Treasury bill yield	1.22	1.12

Notes: Except for net exports and the change in inventories, which are measured as fractions of GDP, and the inflation rate and the nominal yield, all series are in logs. All series are filtered using the Christiano and Fitzgerald (2003) band-pass filter.

variables in two subsamples: 1971 Q1–1992 Q3 and 1992 Q4–2006 Q2. The business cycle component of a series is calculated by removing both long-run trends and very short-term volatility, for instance that associated with seasonality. It shows that there was a general reduction in volatility over this period rather than a shift in particular categories. The main exception is that investment volatility fell by a little more than GDP volatility, due mainly to a relative decline in the volatility of household spending on durable goods, which is treated here as a component of investment rather than consumption.

Chart A plots correlations of the expenditure components and other real variables with GDP at different leads and lags for the two separate periods. For the most part there was little change in the cyclical behaviour of most of the expenditure components, including inventories, though investment in consumer durables became less procyclical.

There is also little evidence of a change in the relative volatility or business cycle properties of employment and labour productivity per hour (**Table 1** and **Chart A**). It would appear that there was simply a scaling down of the size of all fluctuations. The well-known tendency for employment to lag behind movements in output did not change. In particular there was no decline in the contemporaneous correlation between output and labour productivity per hour, such as that identified for the United States by Gali and Gambetti (2007).⁽¹⁾

(1) Gali and Gambetti estimate that the contemporaneous cross-correlation between output and productivity in the United States fell from 0.62 before to 0.12 after 1984.

This suggests that the decline in aggregate volatility was due to there being a reduction in common, macroeconomic shocks that are correlated across individual firms.

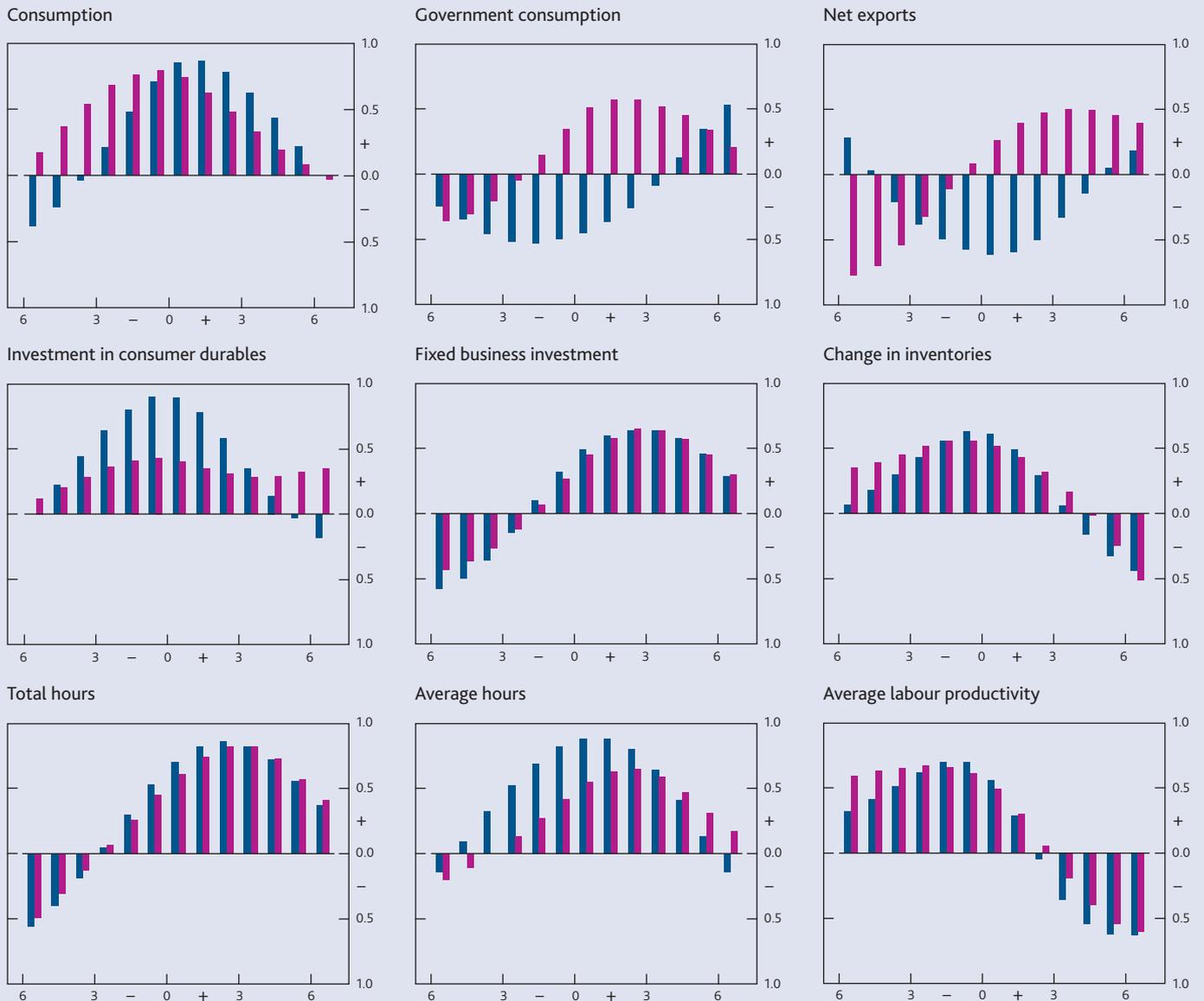
Possible causes of greater macroeconomic stability

The possible causes of greater stability in both inflation and output growth can be understood within a simple framework used by many of the participants at the conference. **Chart 5** shows the 'stability possibility frontier' or 'Taylor frontier' that plots the lowest possible inflation volatility that is achievable for any given output volatility (Taylor (1979)). The position and shape of the Taylor frontier depends on the structure of

the economy and the distribution of the shocks that it experiences. According to this framework, monetary policy makers can be thought of as choosing a point on the frontier depending on the relative importance they place on stabilising inflation and output growth. But the evidence presented above (**Chart 1**) suggests that, rather than moving from one point to another on the same frontier (ie from B to C), economies experienced lower volatility of both inflation and output growth during the Great Moderation (such as a move from B to A).

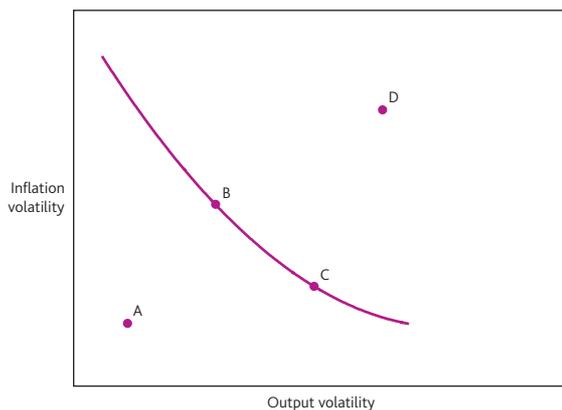
Chart A Cross-correlations of expenditure components and employment with GDP at various quarterly leads and lags

■ 1971 Q1–1992 Q3 ■ 1992 Q4–2006 Q2



Note: The charts plot the correlation coefficient between x_{t+k} and y_t for $k = -6, \dots, 6$ quarters, where x is the cyclical component of the variable in question and y is the cyclical component of real GDP.

Chart 5 Stability possibility frontier ('the Taylor frontier')



Within this framework, there are three possible causes of periods of greater stability in both output growth and inflation:

- (a) Good luck. It could be that the Great Moderation period was one of unusually small or offsetting shocks that caused the frontier to shift inwards independently of any change in policy or the structure of the economy.
- (b) Structural change that shifted the frontier inwards. For example, an increase in the responsiveness of prices to the output gap would cause the Taylor frontier to shift inwards. This is because when prices are more responsive to the output gap, policymakers need to move the output gap by less to control inflation in response to cost shocks.

- (c) Improved monetary policy that moved the economy closer to the frontier from an inferior position (such as D in **Chart 5**). While the frontier depicts the best achievable combinations of output and inflation volatility, poor monetary policy would result in the economy operating within the frontier. Eliminating the errors caused by poor monetary policy could result in a reduction in both output and inflation volatility.

It is likely that each of these possible causes contributed somewhat to the Great Moderation. But quantifying the contribution of each more precisely is not straightforward. The remainder of this section discusses each possible cause in turn, drawing on contributions made at the conference, and some of the informal supporting evidence. More formal attempts to quantify their significance are discussed in the box on page 179.

Good luck

The 1970s is often thought of as a period of severe economic shocks that caused both output and inflation volatility to be high. But, as the Governor pointed out when commenting on the first decade of the MPC, 'the environment in which the MPC has had to operate has not been without excitement' (King (2007)). To support this, he drew attention to the large number of shocks to both the United Kingdom and world economies that occurred during this time, including: wars in Afghanistan and Iraq; global financial crises; a housing market boom; a boom, bust and recovery in equity prices; and a rise in oil prices comparable in size to that seen in the 1970s and 1980s.

This is not to deny that the broader macroeconomic environment, including beneficial tailwinds from globalisation, contributed to the Great Moderation. But the greater stability of this period might also be because the structure of the economy and the policy framework mitigated, rather than amplified, the effects of shocks on the economy as a whole. This possibility is being tested by the turbulence facing the global economy at present.

Structural change

Several different types of structural change have been suggested that might have improved the ability of the economy to absorb shocks over this period. These include changes in technology, business practices and inventory management, as well as labour market reform and other policy initiatives.

One important type of structural change that occurred in many countries from the early 1980s was a relaxation of household credit restrictions. With easier access to credit, households became better able to absorb shocks without changing their spending.⁽¹⁾ In an innovative paper presented at the conference, Campbell and Hercowitz (2007) examined the overall effect of reduced down-payments on consumer

durables purchases. They argued that in an economy with high down-payments, a shock that increases borrowers' demand for durable goods also creates a need for households to work more to provide the down-payment required. This would accentuate the economic cycle. So a relaxation of these restrictions would have had a stabilising influence. Consistent with this, the evidence shown in the box on pages 176–77 suggests that spending on consumer durables was less procyclical in the Great Moderation period than it had been previously. But a challenge to this argument is that hours worked did not also become more stable relative to output. In an analysis of changes in volatility in the United States economy from 1919–2004, Benk, Gillman and Kejak (2007) found that 'good' credit shocks from financial deregulation helped promote stability after 1983, but 'bad' credit shocks contributed to high GDP volatility in the period before the Second World War.

A different type of structural change is that which has occurred within businesses. Changes in inventory management practices, for example, are sometimes argued to have helped stabilise the economy by providing a more effective buffer between fluctuations in sales and production. In one of the early contributions to the literature on the Great Moderation, McConnell and Perez-Quiros (2000) traced the reduction in US output volatility to a fall in the share of durables output accounted for by inventory investment. But it is not clear that this explanation can account for much of the Great Moderation. First, just-in-time inventory management within firms would tend to make production more sensitive to sales and so make inventories a less good shock absorber. Second, the evidence for the United Kingdom does not appear consistent with inventories playing a greater stabilising role. The evidence in the box on pages 176–77 shows that the relative volatility of the contribution to GDP of the change in inventories increased in the Great Moderation period and there was little change in the cyclicity of inventories. Further, the evidence provided by Comin and Mulani (2007) that volatility increased among businesses suggests that greater macroeconomic stability is unlikely to have been caused by changes in business processes alone.

There have been other stability-enhancing changes in the economic environment that have acted to dampen the response of the economy to shocks. For example, widespread formal and informal price indexation in the 1970s and early 1980s meant that shocks to individual prices were propagated throughout the economy in wage-price spirals. The apparent disappearance of such indexation is likely to have contributed to greater stability. To some extent this is likely to have been induced by better monetary policies and consistently lower inflation. As noted by Bernanke (2004), 'monetary policies that brought down and stabilised inflation

(1) See Benito *et al* (2007) for a discussion of this issue.

Econometric studies of the causes of the Great Moderation

Any attempt to measure the contribution of shocks, structure and policy to macroeconomic fluctuations requires a framework that explains how these all fit together. Given the lack of consensus about the appropriate way to model the macroeconomy and the absence of a single, coherent model that encompasses others it is doubtful that such an exercise will produce convincing results.

As an example, Benati (2007) used state-of-the-art techniques to investigate the causes of the Great Moderation in the United Kingdom. He reported that these methods suggest a dominant role for smaller or offsetting shocks — good luck — in fostering the more stable macroeconomic environment of the Great Moderation period, with little effect from changed monetary policy. But there is considerable doubt about the reliability of such results because of the difficulty in taking account of the various ways in which monetary policy works through expectations. Bernanke (2004) noted in comments on similar analyses for the United States that 'changes in inflation expectations, which are ultimately the product of the monetary policy regime, can also be confused with truly exogenous shocks in conventional econometric analyses'. As a consequence, econometric methods which do not make explicit allowance for changes in inflation expectations might wrongly attribute the Great Moderation to 'good luck' when it was actually caused by more firmly anchored inflation expectations due to improved monetary policy.

In their contribution to the conference, Benati and Surico (2007) explored this more formally and asked whether sophisticated analyses using vector autoregressions (VARs) were capable of correctly diagnosing the reasons for the Great Moderation. To answer this, they generated artificial data from an economic model in which the only source of change is a move from 'bad' to 'good' monetary policy; that is from one where the Taylor principle that nominal rates should rise by more than the rise in expected inflation was not satisfied to one where it was (Taylor (1999)). They found in this example that VARs would misinterpret an improvement due to good policy as being caused by good luck, because they were not able to distinguish between more stable inflation expectations due to better policy and smaller shocks.

This result suggests that VAR methods might be unreliable when they do not take explicit account of the role of good monetary policy in anchoring inflation expectations. In response, Canova and Gambetti (2007) presented a paper at the conference that investigated whether they could take explicit account of the role of good monetary policy in anchoring inflation expectations by using survey measures of

inflation expectations for the United States. They argued that, despite playing some role in explaining inflation and interest rate dynamics, changes in the behaviour of inflation expectations appeared not to be sufficient to suggest an enhanced role for good monetary policy in explaining the Great Moderation. The use of explicit measures of inflation expectations in analyses of this type is likely to be a fruitful area for further research.

A different critique of models that find that the Great Moderation was caused by good luck has been put forward by Giannone, Lenza and Reichlin (2008). They claimed that the small-scale VAR models often used for this type of exercise do not reflect accurately the information processed by both markets and central banks when producing their forecasts. In principle this could have a serious effect on the reliability of the results produced by these small-scale models. In an empirical exercise they found that larger models were less likely to attribute the Great Moderation to a reduction in the volatility of shocks.

In their contribution to the conference Gali and Gambetti (2007) examined the nature of the shocks faced by the US economy over time. They decomposed the shocks into those which could be identified as having a permanent effect, associated with shifts in technology, and non-technology shocks, that could be thought of as shocks to aggregate demand. Gali and Gambetti claimed that the Great Moderation could be largely explained by a sharp fall in the contribution of non-technology shocks to the variance of output. Using a highly stylised model they showed how this change might be related to changes in the conduct of monetary policy.

may have led to stabilising changes in the structure of the economy as well, in line with the prediction of the famous Lucas (1976) critique that economic structure depends on the policy regime'.

Empirical research presented at the conference suggested that changes in the structure of the economy, such as businesses' price-setting behaviour, might have been linked to changes in monetary arrangements. For example, Rubio-Ramirez and Fernandez-Villaverde (2007) found strong evidence that prices in the United States are adjusted less frequently by businesses when inflation is lower. Groen and Mumtaz (2008) found that, in setting prices, businesses placed more weight on current costs rather than inflation expectations when average inflation was low.

Changes in the conduct of fiscal policy might also have contributed to greater stability. In a cross-country study covering the OECD countries, Aghion and Marinescu (2007) found that public debt has tended to become more countercyclical.

Change in monetary policy arrangements

In both the United States and the United Kingdom, improved macroeconomic performance followed changes in monetary arrangements, encouraging the view that this played a causal role. While ideas about monetary policy have evolved over time, the 'new consensus' about how monetary policy should be conducted is now very different to what it was at the beginning of the 1970s. The new consensus places particular emphasis on monetary policy as the primary tool of nominal demand management, central bank independence, a focus on ends (such as inflation) rather than means (such as intermediate monetary aggregates) as targets for policy and the key role of expectations and credibility in the monetary transmission mechanism (Bean (2007)).

Some influential academic papers have highlighted the role of more active monetary policy in bringing about greater stability in a single country. For example, Clarida, Gali and Gertler (2000) found that before 1979, the US Federal Reserve typically raised nominal interest rates by less than any increase in expected inflation, thus letting real interest rates decline in response to increased inflationary pressure. This is a violation of the 'Taylor principle' that nominal rates should rise by more than the rise in expected inflation and so bear down on nominal demand growth (Taylor (1999)). Clarida, Gali and Gertler argued that a weak monetary response to shocks of this type can create macroeconomic instability by leaving open the possibility of bursts of inflation that result from self-fulfilling changes in expectations and by failing to insulate the economy sufficiently from fundamental shocks. In a simple model they showed that a more responsive monetary policy leads to less output and inflation volatility and less

inflation persistence, consistent with the facts of the Great Moderation.

In their paper at the conference, Blake and Markovic (2007) examined the effect of different monetary policy rules across countries. In particular, using a calibrated dynamic stochastic general equilibrium (DSGE) model of the United States, the United Kingdom and the rest of the world, they examined how the macroeconomic performance of a small country like the United Kingdom was affected by various monetary policies at home and abroad. In their model, monetary policy in each country can either be 'good', where the Taylor principle holds and nominal interest rates respond by more than any increase in inflation, or 'bad', where the Taylor principle is violated. Their results suggest that the economy is more stable under 'good' domestic monetary policy no matter what other countries do. Moreover, 'good' global policy cannot substitute for 'good' domestic monetary policy. If domestic monetary policy is 'good', then 'good' global monetary policy helps stabilise the economy. But if domestic monetary policy is 'bad', then 'good' global policy does not help.

The importance of the Blake and Markovic exercise is that it suggests that the cross-country reduction in macroeconomic volatility observed in **Chart 1** might be explained by improved monetary policy in each country. This can help explain why some countries, like West Germany, were able to avoid much of the instability of the 1970s by running a 'good' monetary policy at the time. It is also consistent with the view that the reduction in macroeconomic volatility was due to the spread of ideas of how monetary policy should be conducted and the widespread adoption of the new consensus.

Exercises like that of Blake and Markovic compare the properties of model economies under different monetary policy rules, where households and businesses are assumed to know the structure of the economy, including the rules followed by the central bank. This knowledge has important effects on how expectations of inflation are formed. But Blake and Markovic do not consider how the economy might move from one equilibrium to another when monetary policy rules change. One way of analysing this is to suppose that people know that there is always a possibility that monetary policy might switch between being 'good' and 'bad'. Davig and Leeper (2007) have argued that the prospect that a 'bad' monetary policy might subsequently be replaced by a 'good' one can in itself be a stabilising influence on the economy. But, in their contribution to the conference, Farmer, Waggoner and Zha (2007) showed the opposite result that the prospect of 'bad' monetary policy in the future can be destabilising today even if current policy is 'good'.

Changes in the conduct of monetary policy over time can be explained by policymakers learning about the effect of their actions on the economy. In his contribution to the conference,

Nelson (2007) examined detailed contemporary evidence on the views of UK policymakers covering most of the post-war period and drew attention to the overhaul of doctrine that took place in response to experience. He focused particularly on changes in understanding of the monetary transmission mechanism. Nelson's research provides compelling evidence that a lack of understanding among policymakers of how monetary policy affected the economy can help explain why it contributed to macroeconomic volatility in the 1970s. With hindsight, monetary policy before the Great Moderation period can be seen as having added extra volatility to the economy that resulted in excessive output and inflation volatility — a combination lying above the Taylor frontier depicted in **Chart 5**.

In his contribution to the conference, Sargent (2008) explored the changing dynamics of inflation and unemployment in models where policymakers do not understand fully how the economy behaves but learn about it based on their own limited experience. It is possible in these models, for economies to be settled for long periods of time in situations where policymakers falsely think they understand how the economy behaves, in the sense that their beliefs are not contradicted by events. But then unexpected shocks can cause stresses while policymakers adjust their behaviour and beliefs to new circumstances. The example Sargent considers is where there is an apparent trade-off between inflation and unemployment that occurs when inflation expectations are well anchored. But this trade-off cannot be exploited by policymakers because the attempt to do so would cause inflation expectations to become de-anchored. A worrying aspect of the equilibrium described by Sargent is that in this model it is possible for policymakers temporarily to learn that the optimum policy ignores the apparent trade-off between inflation and unemployment, only to re-adopt the suboptimal policy once they notice an empirical trade-off that they think they can exploit. As he notes, 'if this is a good parable for the Volcker-Greenspan stabilisation, we should be worried'. In other words, the Great Moderation could be temporary, having been brought about by a good policy chosen by good luck.

Alongside this pessimistic case, Sargent also raised the more intriguing and optimistic possibility that, in inflation targeting, policymakers might have discovered a device that compensates for their lack of full understanding of how economies work. If there is no exploitable trade-off between inflation and unemployment, then a mandate to target inflation prevents policymakers pursuing suboptimal policies. He considers a number of different examples showing the possible interactions between policies, expectations and outcomes for the economy where inflation targeting results in the best outcome in each case. This is consistent with the idea that inflation targeting promotes stability by providing a simple rule of thumb that people might use in forming their

inflation expectations. Brazier *et al* (2006) show that the introduction of inflation targeting can stabilise inflation in this way.

In their contribution to the conference, Branch *et al* (2007) examined the case where people choose how much information to acquire in forming their expectations. They argued that when policymakers place greater emphasis on price stabilisation, the variance of the price level falls, and this provides less incentive for agents to update their information. That is, it may be rational for them not to pay attention to the general price level and, in the authors' words, this 'indirectly anchors expectations, which decreases output volatility'. This means that the Taylor frontier shown in **Chart 5** may not always be downward sloping, but may contain a region where greater stability in inflation brings about greater output stability too.

Understanding how economies respond to changes in monetary policy is still developing and remains controversial. It is partly for this reason that there is also controversy about how to quantify the contribution of each of the possible causes of changes in macroeconomic volatility.

Conclusions

The Bank of England conference on the sources of macroeconomic stability provided a strong sense of the range of possible explanations for changes in macroeconomic volatility over time. It also highlighted many of the controversies that surround the theory and empirics of how to interpret it. The debate on the relative contributions of good luck, structural change and good monetary policy to the Great Moderation is not yet settled.

Despite the lack of certainty on these issues, there is broad agreement that the adoption of the new consensus in monetary policy made some contribution to greater macroeconomic stability around the world, particularly with regard to inflation. This echoes the judgement of Federal Reserve Chairman, Ben Bernanke (2004) that 'few disagree that monetary policy has played a large part in stabilising inflation'. In purely descriptive terms, the timing of changes in monetary policy arrangements in different countries appears to fit with greater subsequent stability, and the narrative evidence indicates the extent of confusion about the role of monetary policy among policymakers in the 1970s. The business-level evidence is consistent with the improvement having had a macroeconomic cause since stability was associated with a reduction in the size of common shocks. And some of the possible structural changes that have been identified might also have been facilitated by lower inflation due to improved monetary policy. The evidence from the Great Moderation period and some of the explanations of structural change suggest that achieving

low and stable inflation also helps to stabilise the real economy.

It is certainly possible then that monetary policy has contributed to the greater macroeconomic stability observed in the Great Moderation period. According to the new consensus in monetary policy, it does this primarily by anchoring inflation expectations. A lesson from some of the papers presented at the conference and the wider academic literature is that those expectations cannot be taken for granted — they depend on the actions of monetary policy makers. Some of those papers suggested that the response of policy to an increase in incipient inflationary pressure must be

strong enough that real interest rates rise to push back against it. Others suggested that the challenge for monetary policy is more complex than this.

There is clearly a need for more research on the issues covered at the conference. There was a general consensus that the literature has focused too much on a few macroeconomic time series from the United States and, to a lesser extent, the United Kingdom and that different types of evidence, covering more countries and using micro data sets, would be valuable. There was also general agreement that further research on learning and expectations formation on the part of both the private sector and policymakers was likely to be fruitful.

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