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MACROECONOMIC ADVISERS'

MACRO FOCUS

THE GREAT MODERATION: WHAT CAUSED IT AND IS IT OVER?

In this MACRO FOCUS, our resident time series econometrician, James Morley, tries to rehabilitate the "Great Moderation." His findings are both surprising and encouraging:

- *Contrary to conventional wisdom, the Great Moderation was not a myth. There has been a very real, broad-based decline in U.S. macroeconomic volatility since the mid-1980s.*
- *The reduction in volatility does not appear to be primarily the result of better policy or changes in the structural response of the economy to shocks.*
- *Instead, the Great Moderation appears to be mostly due to smaller economic shocks (e.g., oil price shocks, productivity shocks, and inventory mistakes).*
- *The technological basis for the smaller shocks means that the prognosis for the continuation of the Great Moderation is much better than you might think.*

Given the financial and economic turmoil of the past few years, it would be easy to believe the "Great Moderation" was a myth based on wishful thinking. Many commentators have proclaimed as much and even many of us who study the phenomenon have started to wonder whether it was all too good to be true.

Despite these doubts, a dispassionate examination of the data suggests that the stabilization of economic activity since the mid-1980s was very much a reality. The more legitimate question is whether or not it is now over. This MACRO FOCUS seeks to answer this question through careful analysis of what caused the Great Moderation. The finding that it was largely due to smaller economic shocks for technological reasons implies a surprisingly optimistic prognosis for its continuation.

WHAT IS THE GREAT MODERATION?

The idea of "the Great Moderation" came to widespread public attention in a 2004 speech by then-Federal Reserve Governor Ben Bernanke.[1] He began his speech with a statement of empirical fact: "One of the most striking features of the economic landscape over the past twenty years or so has been a substantial decline in macroeconomic volatility."

This empirical fact was established in two influential academic papers by Kim and Nelson (1999) and McConnell and Perez-Quiros (2000).[2] Both papers presented evidence of a large

[1] See Bernanke, B., 2004, "The Great Moderation," Remarks at the Meetings of the Eastern Economic Association, Washington D.C. (http://www.federalreserve.gov/BOARDDOCS/SPEECHES/2004/20040220/default.htm).

[2] See Kim, C.-J. and C.R. Nelson, 1999, "Has the U.S. Economy Become More Stable? A Bayesian Approach Based on a Markov-Switching Model of the Business Cycle," *Review of Economics and Statistics* 81, 608-616 and McConnell, M. and G. Perez-Quiros, 2000, "Output Fluctuations in the United States: What Has Changed Since the Early 1980s?" *American Economic Review* 90, 1464-1476.

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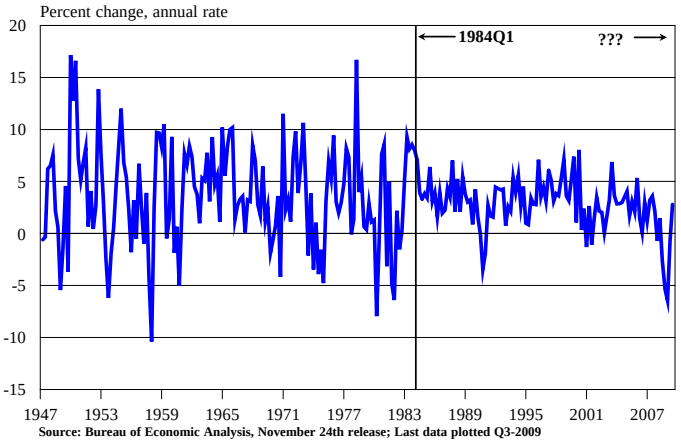
Figure 1
Postwar U.S. Quarterly Real GDP Growth



Source: Bureau of Economic Analysis, November 24th release; Last data plotted Q3-2009

reduction in the volatility of U.S. real GDP growth over the past half-century. Furthermore, both papers found that the reduction was sudden and estimated to have occurred in 1984Q1.

This sudden reduction in volatility is visible to the naked eye in Figure 1, which plots seasonally-adjusted quarterly U.S. real GDP growth for the period of 1947Q2-2009Q3. While annualized growth rates routinely fluctuated between numbers like +10% or -5% in the pre-moderation period, they hover much more closely to the long-run average growth rate of about 3% in the post-moderation period, with the obvious exception of recessionary periods, especially the recent severe recession that began at the end of 2007.

Why so slow to know?

Given how clear the volatility reduction is to the naked eye in Figure 1, the first question is why it took academic researchers so long to identify it. The answer (other than publication lags) is that there was nothing particular about 1984 that should have led economists to expect a fundamental change in the behavior of aggregate output growth in that year, especially since the volatility of postwar quarterly growth rates had been reasonably homogenous up until then.[3]

It is true that 1984 was a time of economic recovery following the double-dip recessions of 1980 and 1981-82 brought on by the Federal Reserve's tight monetary policy under the leadership of Paul Volcker that succeeded in bringing inflation down from its high levels in the 1970s. But exactly why that should have prompted much more stable output growth than in the 1950s and the early 1960s, when inflation was also low, is not entirely clear.

It is also true that the structure of the economy and the measurement of economic activity have both changed dramatically over the past half-century as the economy has shifted from manufacturing to services. So, perhaps, we might expect an ongoing secular decline in volatility due to these changes. But neither the reality of the shift to services nor the data collection issues involved would have suggested that 1984 was the year that volatility would fall suddenly.

Indeed, the point of the statistical tests conducted in the academic literature is that they were done without *a priori* knowledge of when the volatility reduction occurred. This lack of a known break date is precisely why it took so long to say for sure that *any* apparent change in volatility for *any* possible splitting of the sample period was not just a statistical fluke. Of course, once the evidence was in place, it was clear that the relatively stable growth

[3] By contrast, changes in data collection did provide one obvious reason why the volatility of measured economic activity should be different before 1947 than afterwards. See Romer, C., 1986, "Is the Stabilization of the Postwar Economy a Figment of the Data?" *American Economic Review* 76, 314-334.

TABLE 1
STANDARD DEVIATIONS OF ANNUALIZED GROWTH RATES

	Pre-Moderation	Post-Moderation
Real GDP	4.8%	2.5%
Real GDP - Expansions	3.8%	1.7%
Real GDP - Recessions	3.4%	2.7%
Durable Goods	19.3%	8.9%
Nondurable Goods	8.4%	6.6%
Services	3.8%	1.4%
Final Sales	4.0%	2.4%

Notes: Growth rates for 1947Q2-2009Q2 sample period are based on BEA data (Aug. 27th, 2009 release). The break date is 1984Q1. The within expansion and recession standard deviations are relative to within expansion and recession mean growth rates. Expansion and recession periods are based on NBER business cycle dates.

rates since the mid-1980s were not a fluke, but represented a fundamental downward shift in the underlying volatility of output growth.

A Broad-Based Phenomenon

Beyond the dramatic and sudden reduction in output volatility, the other notable feature of the Great Moderation is just how broad-based it has been. Table 1 reports pre- and post-moderation standard deviations of growth rates for U.S. real GDP, including within expansion and recession periods and for different types of production.

Overall, output volatility declined by about half with the Great Moderation. However, the decline was even more pronounced *within* expansions. Thus, contrary to popular belief, the Great Moderation does not just reflect longer expansions and (until recently) more mild recessions. Indeed, within-recession growth rates are still reasonably volatile, consistent with the recent experience. Likewise, the Great Moderation does not merely reflect a shift from manufacturing to services. It is evident *within* the production of both durable goods and services.

Meanwhile, Figures 2a-2d plot quarterly real GDP growth for a selection of other industrialized economies over the period of 1960Q2-2008Q4. Evidently, the Great Moderation is not just a U.S. phenomenon, but has occurred in other countries too, albeit sometimes at different points of time.[4] Interestingly, Japan stands out

Figure 2a
Australian Quarterly Real GDP Growth

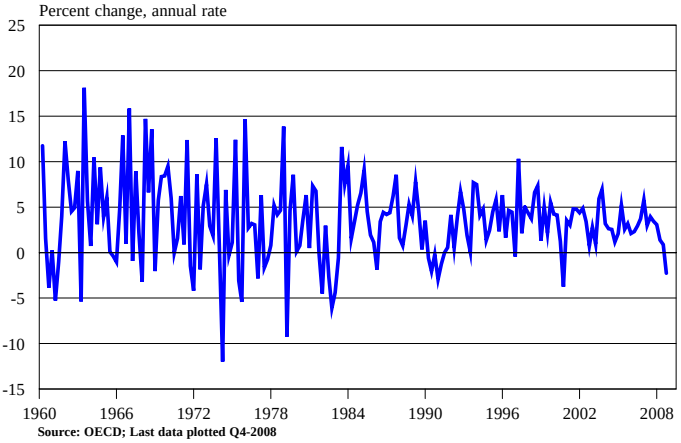
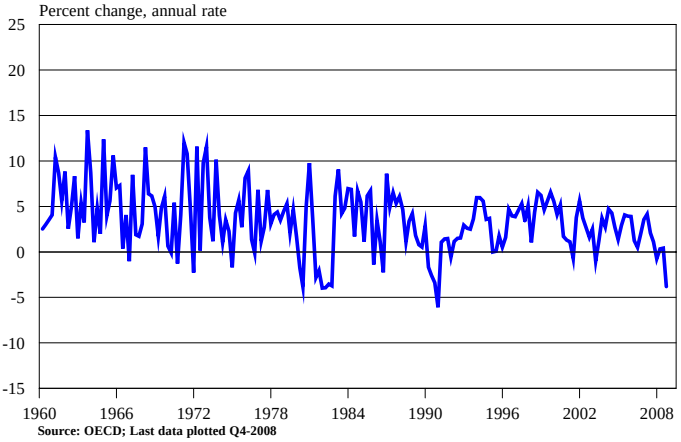
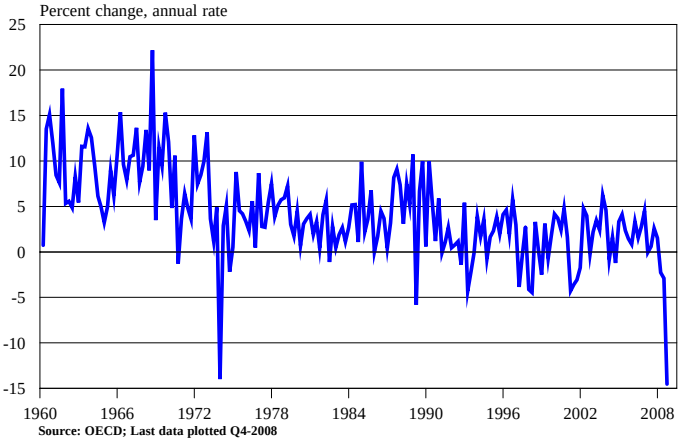


Figure 2b
Canadian Quarterly Real GDP Growth



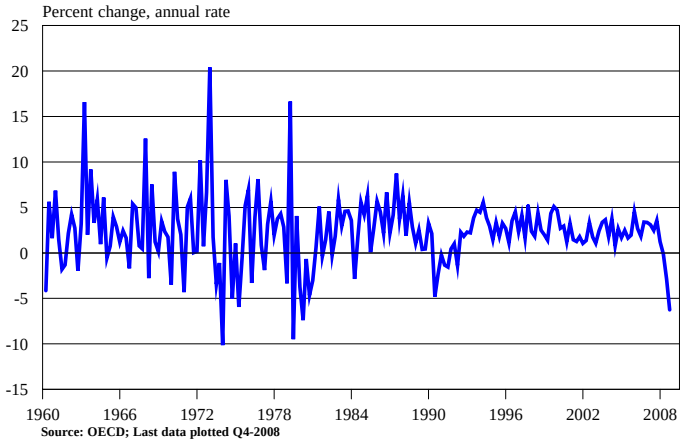
[4] For comprehensive analyses of the international data, see Stock, J. and M. Watson, 2003, "Has the Business Cycle Changed and Why?" *NBER Macroeconomics Annual* 17, 159-218 and Smith, P. and P.M. Summers, 2009, "Regime Switches in GDP Growth and Volatility: Some International Evidence and Implications for Modeling Business Cycles," *The B.E. Journal of Macroeconomics (Topics)* 9, article 36.

Figure 2c
Japanese Quarterly Real GDP Growth



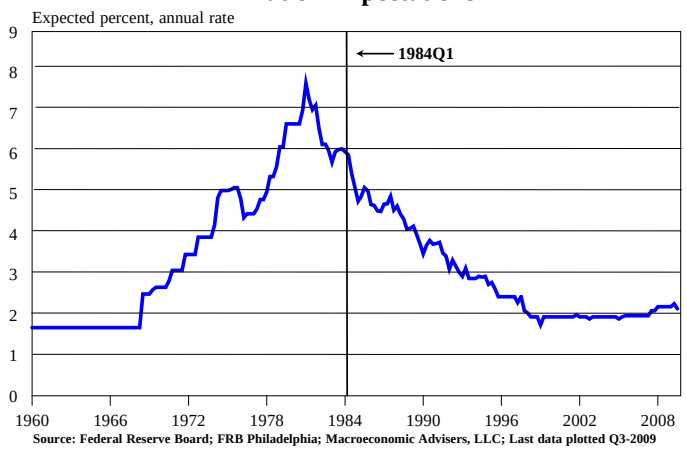
Source: OECD; Last data plotted Q4-2008

Figure 2d
U.K. Quarterly Real GDP Growth



Source: OECD; Last data plotted Q4-2008

Figure 3
Inflation Expectations



Source: Federal Reserve Board; FRB Philadelphia; Macroeconomic Advisers, LLC; Last data plotted Q3-2009

as a notable exception. We will return to this below when contemplating possible causes of the Great Moderation.

What Caused the Great Moderation?

Many hypotheses have been put forward on the causes of the Great Moderation. In his 2004 speech on the Great Moderation, Ben Bernanke highlighted three of them: 1) Better Policy; 2) Changed Economic Structure; and 3) "Good Luck".

Better Policy?

The idea that better policy — monetary policy in particular — led to the Great Moderation stems from its timing, including across different countries. As mentioned above, 1984 corresponded to economic recovery after the successful disinflation brought about by Paul Volcker's policies at the helm of the Fed.

More formally, Clarida, Gali, and Gertler (2000) have argued that Fed policy has been systematically more stabilizing in the post-moderation period than before.[5] Unlike in the 1970s, the Volcker Fed (and, subsequently, the Greenspan Fed) adjusted interest rates by more than one-for-one to a change in inflation, thus satisfying the so-called "Taylor principle". This stabilized inflation and, through the Phillips Curve relationship, presumably stabilized real economic activity. Indeed, most "structural" analysis of the Great Moderation that involves a strong Phillips Curve relationship finds support for a large role of policy in output stabilization.

To help understand the possible role of policy in the Great Moderation, Figure 3 plots Macroeconomic Advisers' preferred measure of long-term inflation expectations (PTR) based on the Federal Reserve Board of Governors compilation of data from the Survey of Professional Forecasters and other sources for the period of 1960Q1 to 2009Q3. Consistent with Clarida, Gali and Gertler's (2000) story, expectations became unmoored at the beginning of the 1970s, but were slowly brought under control during the Volcker and Greenspan years. Notably, by the late 1990s, the expectations were fully anchored and have only inched up slightly during the recent economic turmoil. The timing of these changes in inflation expectations matches broadly

[5] See Clarida, R., J. Gali, and M. Gertler, 2000, "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics* 115, 147-180.

with the high output volatility of the 1970s and the relatively low output volatility of the Great Moderation, although it clearly does not explain the high output volatility prior to the 1970s.

In terms of international evidence, the timing of the stabilization in output growth for, say, Canada or the United Kingdom matches fairly closely with the introduction of formal inflation targeting rules in those countries. Meanwhile, Japan's lack of output stabilization could easily be related to the inability of its central bank to stabilize long-term inflation expectations.

Changed Economic Structure?

The idea that it was a change in economic structure (other than macroeconomic policies) that led to the Great Moderation has many adherents, both among those who expect the Great Moderation to continue and those who do not. Globalization, especially the rise in trade flows over the past half-century, would seem to provide an obvious explanation for the international nature of the stabilization of output growth. International trade means more diversification in terms of sources of demand, suggesting that domestic business cycles should have a less pronounced effect on aggregate output (unless, of course, there is a global recession, as occurred recently). Improvements in financial intermediation, in part due to the globalization of finance, have also been cited as a source of increased stability. Of course, many who believe the Great Moderation is now over argue that the increased stability due to financial "innovations" was an illusion that sowed the seeds of its own undoing with the global economic crisis that began in late 2007.

In terms of the academic literature, the globalization story never received much weight due to a lack of compelling empirical evidence to support it. Instead, the main structural story that has some support in the data is one of "better inventory management".[6] In particular, output growth volatility appears to have declined by more than the volatility of final sales growth (compare the first and last rows of Table 1). Given the accounting identity that output equals final sales plus the change in inventories, this excess volatility reduction for output directly implies a role of inventories in the Great Moderation. How big the role is depends on what data are considered. For durable goods output, inventories appear to be the primary source of the decline in volatility. For total output, inventories play a secondary, but still important role.

Good Luck?!?

While inventories appear to have played a role in the Great Moderation and policy may have played some role too, empirically-minded economists have been skeptical about the overall importance of these factors and instead have argued for the somewhat vague explanation of "good luck".

The reason for skepticism about the role of policy and structural factors is that, as much as we would like to be able to say the Great Moderation reflects a more stable response of the economy to the various economic shocks due to better policy or improvements in invento-

[6] See Kahn, J., M. McConnell, and G. Perez-Quiros, 2002, "On the Causes of the Increased Stability of the U.S. Economy," *FRBNY Economic Policy Review* 8, 183-202.

ry management, the evidence for a change in the dynamic response of the economy to shocks is weak at best. As mentioned earlier, more "structural" analysis that assumes a strong Phillips Curve relationship implies a role for policy. But this reflects changes in the behavior of inflation and the assumed Phillips Curve structure, not changes in output dynamics themselves.

To investigate output dynamics, empirical macroeconomists have considered "counterfactual experiments" in which they mix economic shocks from one sample period (e.g., the pre-moderation period) with the estimated dynamic responses of output and other variables to these shocks from another sample period (e.g., the post-moderation period). The shocks are measured using exogenous variables or error terms and standard identification schemes for vector autoregressive (VAR) models, while the dynamic responses are estimated based on data for each sample period.

The problematic finding for the policy and structural stories is that pre-moderation shocks combined with the supposedly "new-and-improved" post-moderation dynamics imply output growth that is just as volatile as it was during the pre-moderation period. Conversely, pre-moderation dynamics combined with post-moderation shocks implies output growth that is just as stable as it has been during the post-moderation period. For example, using on data from 1960Q2 to 2005Q4 and a standard structural VAR model due to Blanchard and Quah (1989), Kim, Morley, and Piger (2008) found that the estimated standard deviation of U.S. output growth dropped from 4.7% to 2.3% with the Great Moderation, while the counterfactual standard deviation based on pre-moderation shocks and post-moderation dynamics was 5.0% and the counterfactual standard deviation based on post-moderation shocks and pre-moderation dynamics was 2.3%.[7] Thus, the direct implication is that the size of economic shocks mattered much more than the dynamic response of the economy to the shocks.

This conclusion has the nebulous title of the "good luck hypothesis" because it suggests that the U.S. economy was merely fortunate enough to be hit by smaller economic shocks from 1984 on, not that policymakers were so much better at responding to these shocks or that changes in the economic structure meant that the economy was more robust to shocks.

Admittedly, the idea that smaller shocks "explain" the Great Moderation is the sort of thing that gets academic economists into trouble. We are expected to have deep, insightful explanations for economic phenomena. When our explanations boil down to something like "it was due to an exogenous change in the size of shocks", we are simply begging the question of what caused the reduction in the size of shocks in the first place and hoping no one asks.

Wishful Thinking

Yet, despite the unsatisfactory nature of the good luck hypothesis, the key point is that to

[7] See Kim, C.-J., J. Morley, and J. Piger, 2008, "Bayesian Counterfactual Analysis of the Sources of the Great Moderation," *Journal of Applied Econometrics* 23, 173-191 and Blanchard, O. and D. Quah, 1989, "The Dynamics Effects of Aggregate Demand and Supply Disturbances," *American Economic Review* 79, 655-673. In principle, the counterfactual changes need not correspond to an exact decomposition of the overall volatility reduction because changes in the size of shocks and changes in dynamics could be related. However, the fact that output dynamics have not changed much throughout the entire postwar period directly implies that the size of shocks and the dynamics are not closely related in practice.

give into the temptation of providing a seemingly clever economic explanation such as "better policy generated the Great Moderation" is most likely just giving in to wishful thinking. While we are all guilty of wishful thinking at times, those who make public speeches can suffer the most for it. With that in mind, let's return to Ben Bernanke's 2004 speech. Having outlined the different hypotheses for the Great Moderation, he states the following: "My view is that improvements in monetary policy, though certainly not the only factor, have probably been an important source of the Great Moderation. In particular, I am not convinced that the decline in macroeconomic volatility of the past two decades was primarily the result of good luck."

Ben Bernanke was fully aware of the empirical evidence discussed above. So, why did he doubt the good luck hypothesis? In his speech, he discusses many carefully thought-out reasons for the better policy hypothesis.[8] But he also mentions the following uncomfortable truth: "Notably, if the Great Moderation was largely the result of good luck rather than a more stable economy or better policies, then we have no particular reason to expect the relatively benign economic environment of the past twenty years to continue."

It is, perhaps, worth taking a moment to note that the recent bout of soul-searching going on in academic circles about the failure of economics to anticipate the severity of the recent recession does not reflect a failure of empirical work. Instead, it seems to reflect a natural tendency to cloud our judgments with wishful thinking about the power of policy to tame or even eliminate recessions at some points of time or excessive handwringing about the ineffectiveness of policy at other points of time. These emotional swings in the profession's psyche are exactly why it is so important to step back and look at the data. In terms of the Great Moderation, data-driven analysis suggested that it was not primarily driven by better policy or improved economic structure. Instead, it appears to have been mostly due to luck. So, what do the data really imply about whether our luck has finally run out?

Is the Great Moderation Over?

If the Great Moderation had been due to improved structure, then we could be fairly confident in saying it will continue, despite some large negative shocks to the global economy over the past few years. If it had been due to better policy, its continuation would hinge on the future actions of policymakers — in particular, will they repeat the mistakes of the 1970s? However, as suggested by the last quote from Ben Bernanke's speech, the idea that the Great Moderation was due to "good luck" does not, on its own, tell us very much of anything about what to expect from the future.

So how do we judge whether the Great Moderation is really over? The unavoidable answer is that we need to go back to the data and try to determine what caused the so-called "good luck" in the first place.

[8] One reason not to completely dismiss the better policy hypothesis despite the counterfactual analysis is that policy can have more subtle effects than simply stabilizing output in response to shocks. It can potentially lead to fewer shocks in the first place. Specifically, to the extent that some shocks to output arise due to changing inflation expectations (i.e., so-called "sunspot" shocks), policy that fails to anchor inflation expectations can lead to more output volatility, even if the response to output fluctuations remains the same. Thus, the unmooring and subsequent anchoring of inflation expectations that is evident in Figure 3 is certainly consistent with the idea that the overall policy environment created more volatility in the 1970s and less volatility afterwards. However, the path of inflation expectations does not seem to capture the abrupt decline in output volatility or explain why output volatility was high in the 1960s when inflation expectations were low.

Which Economic Shocks Really Mattered?

Suppose smaller monetary policy shocks were responsible for the Great Moderation. Then the better policy story could actually be consistent with the counterfactual analysis after all. Alas, standard approaches to identifying monetary policy shocks with a short-run VAR model or aggregate demand shocks with a long-run VAR model both suggest only a limited role for smaller policy shocks in the overall reduction of output volatility.[9]

Instead, based on long-run VAR analysis at least, permanent productivity shocks appear to have become much less volatile. The estimates in Kim, Morley, and Piger (2008) for the standard deviation of permanent shocks in Blanchard and Quah's (1989) structural VAR model dropped exactly by half from 3.4% to 1.7% with the Great Moderation. The decline in the volatility of permanent productivity shocks is presumably due to changes in the nature of technological innovation and its implementation, with the diffusion of information technology (IT) since the mid-1980s evidently being more stable than previous technological revolutions. In particular, the Great Moderation coincides with the widespread adoption of personal computers, which could have provided a platform for much wider and more continuous (smoother) diffusion of IT.

Meanwhile, a sequence of high volatility in the 1970s, lower volatility in the 1980s and 1990s, and a return of high volatility more recently is clearly consistent with the story that post-moderation "good luck" was just the mirror of the "bad luck" of large positive oil price shocks in the 1970s and their subsequent absence until recently. But, much like with the policy story based on inflation expectations, it is hard to reconcile this oil price story with the relatively high volatility in the 1950s and early 1960s when oil prices were low and very stable. Also, the decreasing share of oil as an input into overall production suggests that a return of high and volatile oil prices should have less of an aggregate impact than before.

Large financial shocks provide an obvious explanation for the recent economic turmoil, but they are much less useful for explaining the Great Moderation than they are for explaining the Great Depression or large economic crises in other countries. Recall that the Great Moderation has involved lower volatility *within* expansions, not just lower volatility due to less frequent or more mild recessions. To the extent that financial shocks are strongly asymmetric (i.e., negative shocks are much larger than positive shocks), it is not entirely clear why fewer or smaller financial shocks would reduce the within-expansion volatility by more than the within-recession volatility, although a possible interaction between investment decisions and cash-flow constraints could, in principle, be used to link some of the overall volatility reduction due to financial shocks.

[9] Again, see Kim, Morley, and Piger (2008). The VAR estimates suggest that smaller aggregate demand shocks accounted for only 25% of the overall decline in volatility, with smaller monetary policy shocks accounting for about 15% of the overall decline. Meanwhile, to the extent that unmoored inflation expectations in the 1970s allowed for "sunspot" shocks, one might expect these shocks to have had mostly transitory effects on the level of output and, therefore, be labeled as aggregate demand shocks by the long-run VAR model. Thus, the importance of an elimination of these expectations-based shocks for the Great Moderation appears to be somewhat limited by the 25% role played by all aggregate demand shocks. On the other hand, if the disappearance of these expectations-based shocks really did play a larger role in the Great Moderation, the fact that inflation expectations have remained reasonably well-anchored during the recent economic turmoil implies little reason on its own to believe the Great Moderation is now over.

In terms of inventories, there appears to be a reduction of inventory mistakes, rather than an increase in production smoothing that would have affected the dynamic response of output to shocks.[10] Inventory mistakes reflect the fact that some production must be set in advance of sales. Thus, because changes in production technology have lead to more "just-in-time" production, inventory mistakes have been smaller. This is consistent with the larger reduction in volatility of output relative to final sales in the post-moderation period (see Table 1). It is also consistent with the changed forecasting role of inventories for future output and sales, with inventory accumulations implying less of a future reduction in output and more of a future increase in sales.

So, to summarize, the "good luck" hypothesis reflects a mix of different kinds of smaller economic shocks. A change in the size of policy and financial shocks appears to have played only a minor role in the volatility reduction, even if financial shocks have had large effects on output at certain points of time, including recently. Oil shocks have also been large at certain points of time and their diminished size and importance for production must have played some role in the volatility reduction. But it is productivity shocks and inventory mistakes that appear to have played the starring roles in the Great Moderation. The good news is that, because these shocks are related to technology, it seems unlikely that they will revert to their pre-moderation volatilities.

The Recent Experience in Perspective

It is also helpful to consider what the data really suggest about how unusual the recent economic turmoil has been. It might seem *prima facie* obvious that recent events imply the Great Moderation is over. But to jump immediately to such a conclusion is more likely to reflect an emotional response to the crisis than a careful look at the data.

To be sure, the recent recession is the deepest in the postwar period in terms of percentage decline from peak-to-trough. The labor market is in ruins, with the unemployment rate over 10%. Capacity utilization, another measure of slack, reached historic lows (since the 1960s). The list of dismal numbers could go on and academic discussions about the possible continuation of the Great Moderation are little comfort to those directly affected by this recession.

Yet, what has happened to output volatility in the past few years? The recession has produced some of the largest quarterly declines in output in the postwar period. But do these portend a permanent increase in volatility? Clearly, from the point of view of testing for another break in the level of volatility, it is too soon to say there has been a permanent increase. This is related to how long it took to say that volatility had declined with the Great Moderation, although, as discussed above, some of that delay was due to the fact that we didn't know the timing of volatility change when testing for it. Presumably we can better imagine a known break date this time around.

However, even if we take the start of the recent economic crisis as a known date for increased volatility, there is not sufficient evidence to suggest a permanent increase in

[10] See Morley, J. and A. Singh, 2009, "Inventory Mistakes and the Great Moderation," Working Paper (http://artsci.wustl.edu/~morley/ms.pdf).

volatility. One intuitive way to see this is to consider Table 2, which reports quarterly economic growth rates since the beginning of the recession (for both output and final sales). The striking numbers are the large negative output growth rates in 2008Q4 and 2009Q1. However, aside from these two quarters, it would be hard to argue that the growth rates are consistent with a permanent increase in volatility.

TABLE 2
ECONOMIC ACTIVITY IN THE RECENT RECESSION

	Real GDP Growth	Final Sales Growth
2008Q1	-0.7%	-0.5%
2008Q2	1.5%	2.7%
2008Q3	-2.7%	-2.9%
2008Q4	-5.4%	-4.7%
2009Q1	-6.4%	-4.1%
2009Q2	-0.7%	0.7%

Note: Annualized growth rates are based on BEA data (Nov. 24th, 2009 release).

So how likely is it if the Great Moderation is actually continuing for the U.S. economy to observe two growth rates like -5.4% and -6.4%? Answering such a question is difficult, but we can think about it with some back-of-the-envelope calculations based on a simple parametric statistical model of output growth. For example, consider output growth in recessions to be Normally distributed with mean and variance based on quarterly growth in the 1990-91 and 2001 recessions. How often would we expect to get a severe growth rate of the magnitude of -6%? The answer is that, out of 13 quarters of recession in the post-moderation period (assuming the recession ended in 2009Q2), we would expect 1.2 quarters of such severe growth rates. This calculation does not take into account positive serial correlation in growth rates or a fatter tailed distribution than a Normal, both of which would imply a higher expected number. So, the actual occurrence of 2 quarters is more than we would have expected, but hardly out of the realm of possibility.

If we look at final sales growth, we can see that it has not been as volatile as output growth. This suggests that, perhaps, the recession involved some inventory mistakes as firms cut production by more than needed. To the extent that the recent output volatility reflected inventory mistakes, the fact that some of the Great Moderation was due to structural change that reduces the general magnitude of inventory mistakes implies that we shouldn't expect such output volatility going forward.

Meanwhile, it has long been noted that inventories contribute more to output growth volatility in recessions and recoveries than in "mature" expansions. So we might expect the inventory cycle to contribute to higher volatility in the near term as the economy recovers from such a deep recession in which inventories were severely depleted. But there is little reason to expect that quarterly volatility in mature expansions will return to the annualized standard deviation of 5%, with numbers like 10% occurring on a regular basis (again, see Figure 1 for a sense of what a full return to pre-moderation volatility would involve).

Summary

The conventional wisdom overstates the case that the Great Moderation is now over. To be sure, some of the pronouncements of its death or even that it was a myth in the first place are due to a conflation of the phenomenon with the specific hypothesis that it was due to "better policy".[11] But, despite the current skepticism, the onset of the Great Moderation in the mid-1980s was an empirical reality and the rumors of its death appear to be, as the line goes, greatly exaggerated. While the simple fact that volatility changed dramatically 25 years ago certainly suggests that it can change again, careful empirical analysis finds that smaller economic shocks related to oil prices, productivity, and inventories explain much of the Great Moderation. Furthermore, to the extent that the size of these shocks reflect permanent changes in the nature of production and the diffusion of technology and information, their role in explaining the Great Moderation provides an optimistic prognosis for its continuation.

[11] See, for example, Eichengreen, B., 2009, "The Last Temptation of Risk," *The National Interest* May/June Issue (http://www.nationalinterest.org/Article.aspx?id=21274). He writes, "We thought that because changes in central-bank policies had delivered low and stable inflation, the volatility of the pre-1985 years had been consigned to the dustbin of history; they had given way to the quaintly dubbed 'Great Moderation.'... We now know that much of what we thought was true was not. The Great Moderation was an illusion." He goes on to argue that the failure of contemporary economists to see through this "illusion" means that the 21st Century will belong to empirical economics, which is somewhat ironic given the strong empirical support for the existence of the Great Moderation, but certainly fits in with the fact that the more empirical the analysis, the weaker the support for the "better policy" hypothesis.