

Has There Been a Change in the Volatility of Real GDP?
Discussion of the paper by Margaret M. McConnell and Gabriel Perez Quiros

By Charles R. Nelson, University of Washington

I found it interesting to compare the classical inference methodology of this paper with the Bayesian approach in a paper by Chang-Jin Kim and myself that also investigates the evidence for a break in the behavior of the business cycle using the Hamilton model. The two are compared in the following table:

<u>Approach</u>	<u>Classical:</u> <u>McConnell & Quiros</u>	<u>Bayesian:</u> <u>Kim & Nelson (1999)</u>
Models:	AR(1). Hamilton, 2 regimes.	Hamilton model, 2 regimes.
How break is represented in Hamilton model:	Variance state in which mean growth rates also differ.	Structural break in means and variance is switch to absorbing state.
Inference:	Asymptotic	Bayes Factor, ratio of marginal likelihoods.
Limitations:	Nuisance parameters. Test for change in means is conditional on a break in variance.	Priors. Results will not be invariant to priors.
Advantage:	Less burdensome computationally.	Inference fully reflects uncertainty about break. Can test for break in variance or means or both.
Conclusions:		
Was there a change?	Yes!	Yes!
When?	1984:1	1984:1
Parameters that changed:		
- primary importance	Variance of shocks.	Difference between growth rate in boom vs. recession.
- secondary		Variance of shocks.
- no evidence	Difference between growth rates.	
Agree with NBER business cycle dating?	Better with break in variance.	Better with break in both, neither should be ignored.

Some comments on the 1990s and evidence of a “new economy”:

The most notable feature of the recovery from the 1990-91 recession is that it was the only non-inflationary recovery in recent decades. It was also the slowest recovery,

and it had to be in order to avoid restarting inflation. This is consistent with a slower mean growth rate post-1994 in the expansion regime of the Hamilton model as found by Kim and Nelson (1999). It also is consistent with faster growth rates later in the decade, and the danger is that this higher growth rate has been confused with a “new economy” of permanently higher growth rates.

Was monetary policy responsible for this pattern of less volatile and steadier growth? When we look at nominal GDP growth (a crude measure of nominal shocks), the nominal long term T bond yield, and the real long term rate using smoothed inflation as a proxy for expected inflation, we see similar patterns of less volatility in the post 1984 period. These casual observations support the hypothesis that it is a steadier hand at the monetary tiller that accounts for at least a substantial part of the lower volatility of real growth.

McConnell and Quiros present evidence that the main source of lower volatility among the components of GDP is seen in durables, and indeed that it is most clear for the change in inventories of durables. This is consistent with the monetary policy explanation above, though does not explain why the same phenomenon is not present in structures. That the change is most evident in inventories is consistent with the idea that inventory change is largely unintended and thus represents forecasting error on the part of producers. When the economy becomes more predictable, it becomes easier to plan production to match sales and thus maintain a desired inventory level. The evidence of change for components of GDP in this paper is based on the AR(1) model where lower volatility is manifest only in a change in the variance of the shocks. It would be useful to test for structural breaks in the growth rates of durables sales, production and inventories in the Hamilton model as well. A test for a break in the difference between mean growth rates in expansion and recession, without assuming a break in the variance of the shock, can be carried out in the Bayesian framework. Judging only from the figure in the paper, I would anticipate that such a test would show that the difference in means has diminished for all three durables series discussed here, and it would be interesting if that reverses the conclusions of the paper for any other components of GDP.

Reference

Kim, Chang-Jin and Charles R. Nelson, “Has the U.S. Economy Become More Stable? A Bayesian Approach Based on a Markov-Switching Model of the Business Cycle,” *The Review of Economics and Statistics*, November 1999, 81(4): 608-616.

Contact: cnelson@u.washington.edu