Predictable Recoveries

CFM-DP2015-20

Xiaoming Cai[4], Wouter J. Den Haan[1,2,3], and Jonathan Pinder[2,3]

[1]Centre for Economic Performance, [2]Centre For Macroeconomics, [3]London School of Economics and Political Science, [4]Tongji University

Campbell and Mankiw (1987) argued that:

"The data suggest that an unexpected change in real GNP of 1 percent should change one's forecast by over 1 percent over a long horizon."

On Mankiw's blog, this claim was repeated when the financial crisis erupted.[1]

Forecasting economic growth is an important element of empirical macroeconomics. It is not an easy task and there are many different forecasting models. The interest in forecasting economic growth typically increases during recessions when one is keen to know how long the "misery" will last and whether the recession will have permanent effects on aggregate real activity. It is well known that real gross national product (GNP), a common measure of aggregate real activity, either is a first-order integrated or $I(1)$ process or is approximately an $I(1)$ process. If a random variable Y_t is an $I(1)$ process, then there must be shocks that have permanent effects on Y_t. A simple example is a random walk. If Y_t is a random walk, then the law of motion for Y_t can be written as

$$Y_t = a + Y_{t-1} + \varepsilon_t,$$

where ε_t is an i.i.d. innovation. If $a \neq 0$, then we say that Y_t, is a random walk with drift. Another example of an $I(1)$ process is

$$Y_t - Y_{t-1} = a + \delta(Y_{t-1} - Y_{t-1}) + \varepsilon_t,$$

[1] See http://gregmankiw.blogspot.co.uk/2009/03/team-obama-on-unit-root-hypothesis.html

where ε_t is again an i.i.d. innovation. Both processes imply that a one-time shock to the innovation, ε_t , has a permanent effect on Y_t. If the law of motion for Y_t is given by equation (1), then the permanent effect of a shock with magnitude x will be equal to x. If the law of motion is given by equation (2), then the permanent effect would be equal to $x/(1-\delta)$.

Campbell and Mankiw (1987) — and many others — focus on univariate processes like the ones given above. In this paper, we point out that such univariate representations can give misleading insights regarding the permanent effects of shocks even if they are correctly specified. The reason is that such simple representations impose that all unexpected changes in Y_t have a permanent effect on Y_t. It is unlikely that this is true. Surely, there must be some unexpected events that only have a temporary effect. Univariate representations only allow for one type of shock. As long as the truth is such that there are some shocks that have a permanent effect, then Y_t is an $I(1)$ process, which means that the (only) shock of the univariate process must have a permanent effect on Y_t. This is even true if shocks with temporary effects are more important for cyclical changes in Y_t than shocks with permanent effects on Y_t. A much better insight in the impact of innovations on future values of Y_t can be obtained by using a richer model that allows for different types of shocks.

Although richer model have richer implications, it still may be the case that a univariate representation gives accurate predictions for some variables. In this paper, we show that this is not the case for both UK and US GNP. In particular, we show that a relatively simple model that allows for different types of innovations is much better than a univariate model in predicting how GNP behaves after either economy has entered a recession. In particular, we show that the forecasting rule of Campbell and Mankiw often generates forecasts that are too pessimistic.