Macroeconomics as a Science

Foreword to
William A. Barnett, Getting it Wrong: How Faulty Monetary Statistics Undermine the Fed, the Financial System, and the Economy

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There have been dramatic advances in macroeconomics as a science during the past 30 years, but this book’s findings nevertheless provide compelling reasons to be cautious about the field’s current state of the art, the quality of data on which its conclusions are based, and the central bank policies associated with those conclusions. In this foreword, I provide my own views. In this book, the author, William A. Barnett, wrote Part 1 without mathematics and with minimal use of technical terminology. His reason was to make Part 1 accessible to all readers. His Part 2 is for professionals, and uses both mathematics and professional terminology. While my foreword similarly avoids the use of mathematics, I do use terminology that may be unfamiliar to non-economists. As a result, general readers may find this foreword to be more challenging to read than this book’s Part 1. But I hope that all readers will be able to grasp the general point that I am trying to make in this book’s foreword.

Following the powerful critique by Robert E. Lucas Jr. in 1976, the modern core of macroeconomics includes both the real business cycle approach (known as freshwater economics) and the New Keynesian approach (known as saltwater economics). Previously there was a political gap, with the freshwater approach associated mostly with economists having a conservative philosophy, and the saltwater approach associated mostly with economists having a politically liberal philosophy. The current more unified core makes systematic use of the “dynamic-stochastic-general-equilibrium” (DSGE) framework, originally associated with the real business cycle approach. It assumes rational expectations and forward-looking economic agents, relies on market-clearing conditions for households and firms, relies on shocks (or disturbances) and mechanisms that amplify the shocks and propagate them through time, and is designed to be a quantitative mathematical formalization of the aggregate economy.
The real business cycle approach, developed by Finn Kydland and Edward Prescott (1982), is a stochastic formalization of the neoclassical growth model and represents the latest development of the classical approach to business cycles. According to the original real business cycle model, under the classical assumption that wages and prices are fully flexible, most aggregate fluctuations are efficient responses to random technology shocks, and government stabilization policy is inefficient. On the other hand, the opposing New Keynesian approach advocates models with sticky prices, consistent with the assumption of sticky nominal wage rates in Keynes’s (1936) famous book, *The General Theory*. It points to economic downturns like the Great Depression of the 1930s and the Great Recession that followed the subprime financial crisis, and argues that it is implausible for the efficient level of aggregate output to fluctuate as much as the observed level of output, thereby advocating government stabilization policy.

In recent years, however, the division between the real business cycle approach and the New Keynesian approach has greatly decreased, with the real business cycle approach dominating in terms of its modeling methodology. Thus, the current New Keynesian approach to macroeconomics is based on the methodology originally associated with the real business cycle theory (that is, the “dynamic-stochastic-general-equilibrium” framework) and combines it with Keynesian features, like imperfect competition and sticky prices, to provide a theoretical framework for macroeconomic policy analysis. Also, most recent real business cycle models assume some type of nominal rigidities, so that both technology and demand shocks play a role in determining business cycles. Exceptions include models based on search theory, rather than price rigidities. Both the real business cycle model and the New Keynesian model are largely immune to the Lucas critique, and both recognize that some form of government stabilization policy is actually useful.

How does monetary policy analysis relate to modern macroeconomics? The mainstream approach to monetary policy analysis has primarily become the New Keynesian model. In this New Keynesian modeling approach, monetary policy is often not expressed in terms of money measures (known as monetary aggregates), but in terms of the short-term nominal interest rate. It is to be noted, however, that although monetary policy in those models is not expressed in terms of monetary aggregates, the Fed’s
adjustments of the nominal interest rate translate into changes in the monetary aggregates. For example, when the Fed conducts open market operations to achieve the desired target for the federal funds rate, it exchanges the “monetary base” (the monetary aggregate directly affected by the Fed’s open-market operations) for government securities. In New Keynesian models that do not include money directly in the transmission mechanism of monetary policy, money is a derived demand determined in general equilibrium with other important variables. In such models, money remains an important indicator of the state of the economy and of other variables, often a lead indicator.

Within most New Keynesian models, central banks use the short-term nominal interest rate as their operating instrument, but the effects of monetary policy on economic activity stem from how long-term real interest rates respond to the short-term nominal interest rate. In particular, under the assumption of sticky prices, an expansionary monetary policy that lowers the short-term nominal interest rate (such as the federal funds rate in the United States) will also lower the short-term real interest rate. Moreover, according to the expectations hypothesis of the term structure of interest rates, the decline in short-term interest rates will also lead to a decline in long-term interest rates and ultimately affect aggregate demand.

This transmission mechanism is intended to work well, even when the short-term nominal interest rate is at or close to zero. With a nominal interest rate of zero, a commitment by the central bank to expansionary monetary policy raises the expected inflation rate, reduces the real interest rate, and leads to a rise in aggregate output. Thus, expansionary monetary policy could stimulate spending, even when the short-term nominal interest rate is at zero. In fact, this mechanism is a key element in many monetarist discussions of why an expansionary monetary policy could have prevented the sharp decline in output in the United States during the Great Depression of the 1930s, why it would have helped the Japanese economy, when nominal interest rates fell to near zero in the late 1990s, and why it could help the United States accelerate the economic recovery in the aftermath of the Great Recession.

However, the collapse of stable relationships in financial markets may be causing the term structure of interest rates relationships, upon which the New Keynesian
transmission mechanism depends, to loosen. For example, the Federal Open Market Committee in the United States raised the target federal funds rate in 17 consecutive meetings between June 2004 and July 2006, from 1% to 5.25%, but long-term interest rates in the United States declined for most of this period. In fact, long-term interest rates throughout the world had exhibited similar declines over that period despite steady increases in short-term interest rates. Similarly, in the aftermath of the financial crisis, the decline in the federal funds rate to (its current range of) between 0 and 0.25%, from 5.25% in August of 2007, has not led to desirable declines in long-term interest rates.

The decoupling of long-term interest rates from short-term interest rates has significant implications for monetary policy. As the federal funds rate has reached the zero lower bound (and cannot become negative), the Federal Reserve has lost its usual ability to signal policy changes via changes in the federal funds rate. Moreover, with the federal funds rate close to zero, the Fed has also lost its ability to lower long-term interest rates by lowering the federal funds rate. For these reasons, in the aftermath of the subprime financial crisis, the Fed and many central banks throughout the world have departed from the traditional interest-rate targeting approach to monetary policy and are now focusing on their balance sheet instead, using quantitative measures of monetary policy, such as credit easing (the purchase of private sector assets in critical markets) and mostly quantitative easing (the purchase of long-term government securities). Both credit easing and quantitative easing represent expansionary monetary policy designed to reduce long-term nominal interest rates, in the same way that traditional monetary easing reduces short-term nominal interest rates.

A quantitative easing policy in the United States has been the Large Scale Asset Purchase program. It called for the Federal Reserve to buy $300 billion of long-term Treasury securities, approximately $175 billion of federal agency debt, and up to $1.25 trillion of agency-guaranteed mortgage-backed securities. Most analysts have concluded that this program reduced long-term interest rates (for example, the yield on 10-year Treasury securities) by as much as 100 basis points below levels that would have otherwise prevailed. Also, the second round of quantitative easing (known as QE2), announced on November 3, 2010, will involve the purchase of another $600 billion of long-term U.S. government debt between now and June, 2011. There are, however,
diminishing returns to quantitative easing and QE2 is not expected to reduce long-term yields by more than 4-5 basis points per $100 billion of Treasuries bought. However, the main objective of quantitative easing is to raise inflationary expectations and reduce real interest rates. Whether this will work remains elusive and is hotly debated. Consider, for example, the following headlines from *The Economist* (November 27th-December 3rd, 2010): “American Monetary Policy: Fed under Fire” and “The Politics of the Fed: Bernanke in the Crosshairs.” If it does, it may create even bigger headaches for the Fed.

In particular, a by-product of the Fed’s quantitative easing is the creation of a large quantity of excess reserves, as can be seen in Figure 1 (where the shaded area represents the Great Recession).

![Figure 1. Total Reserves (in billions) Adjusted for Changes in Reserve Requirements](image)

During normal times, when the opportunity cost of holding excess reserves is positive (either because bank reserves earn no interest or if they do, the interest rate that bank reserves earn is less than the market interest rate), banks will increase lending and expand deposits until excess reserves are converted into required (or desired) reserves. The money supply will increase (as the money multiplier will be fully operational), the level of economic activity will rise, and this may lead to inflation. However, to prevent this from happening, and for the first time in its history, the Federal Reserve began paying interest on bank reserves in October 2008, and in fact set that interest rate equal to its target for the federal funds rate. Other central banks took similar actions. In Canada, for example, from April 1, 2009 to June 1, 2010, the Bank of Canada lowered the
operating band for the overnight interest rate from (the usual) 50 basis points to 25 basis points (a band with rates between ¼% and ½%) and instead of targeting the overnight rate at the midpoint of the band (as it does during normal times), it targeted the overnight rate at the bottom of the operating band. On June 1, 2010, the Bank of Canada re-established the normal operating band of 50 basis points for the overnight interest rate, currently being from ¾% to 1¼%.

By paying interest on bank reserves, the Federal Reserve reduces the opportunity cost of holding excess reserves toward zero and removes the incentives on the part of banks to lend out their excess reserves. In this case, multiple deposit creation does not come into play (that is, the money multiplier fails) and the thinking is that the Fed can follow a path for market interest rates that is independent of the quantity of excess reserves in the system. However, as the Fed is searching for new tools to steer the U.S. economy in an environment with the federal funds rate at the zero lower bound and the level of excess reserves in the trillions of dollars (see again Figure 1), no one is sure how this will unfold!

Recently, in the aftermath of the subprime financial crisis and the Great Recession, policymakers, the media and a number of economists have raised questions regarding the value and applicability of modern macroeconomics. For example, Narayana Kocherlakota (2010, p. 5) wrote:

“I believe that during the last financial crisis, macroeconomists (and I include myself among them) failed the country, and indeed the world. In September 2008, central bankers were in desperate need of a playbook that offered a systemic plan of attack to deal with fast-evolving circumstances. Macroeconomics should have been able to provide that playbook. It could not. Of course, from a longer view, macroeconomists let policymakers down much earlier, because they did not provide policymakers with rules to avoid the circumstances that led to the global financial meltdown.”

Also, Ricardo Caballero (2010, p. 85) wrote that the dynamic-stochastic-general-equilibrium approach

“has become so mesmerized with its own internal logic that it has begun to confuse the precision it has achieved about its own world with the precision that it has about the real one. This is dangerous for both methodological and policy reasons. On the methodology front, macroeconomic research has been in ‘fine-tuning’ mode within the local-maximum of the dynamic stochastic general equilibrium world, when we should be in ‘broad-exploration’ mode. We are too far from absolute truth to be so specialized and to make the kind of confident
quantitative claims that often emerge from the core. On the policy front, this confused precision creates the illusion that a minor adjustment in the standard policy framework will prevent future crises, and by doing so it leaves us overly exposed to the new and unexpected."

It seems that the inability to predict the subprime financial crisis and the Great Recession, together with the inability to speed up the pace of economic recovery that followed, has damaged the reputation of macroeconomists. This brings me to this unique book by William A. Barnett, a superstar economist who uses mainstream economic theory to explain what happened and why.

For the last thirty years, since the publication of his seminal *Journal of Econometrics* (1980) paper, “Economic Monetary Aggregates: An Application of Index Number and Aggregation Theory,” Barnett has taken the scientific approach to macroeconomics, promoting “measurement with theory,” as opposed to “theory without measurement” or “measurement without theory.” He has been insisting on measurement methods that are internally consistent with the economic theory that is relevant to the use of the data. As Barnett, Diewert, and Zellner (2011) recently put it

“… all of applied econometrics depends on economic data and if they are poorly constructed, no amount of clever econometric technique can overcome the fact that generally, garbage in will imply garbage out …”

Although modern macroeconomics has largely solved the problems associated with the Lucas critique, it has so far failed to address the economic measurement problems associated with the “Barnett critique,” to use the phrase coined by Alec Chrystal and Ronald MacDonald (1994).

Barnett (1980a) argued that the monetary aggregates used by the Federal Reserve are problematic, being inconsistent with neoclassical microeconomic theory and therefore should be abandoned. These monetary aggregates are simple-sum indices in which all financial assets are assigned a constant and equal (unitary) weight. This summation index implies that all financial assets contribute equally to the money total, and it views all components as dollar for dollar perfect substitutes. This summation index made sense a long time ago, when assets had the same zero yield. It is, however, indefensible today, as the data overwhelmingly show that financial assets are far from being perfect substitutes -- see, for example, Serletis and Shahmoradi (2007). The summation index completely ignores the complex products and structures of modern financial markets.
Barnett argued that with increasing complexity of financial instruments, there is a need for increasingly extensive data based on best-practice theory. He took the high road and introduced modern economic index number theory into monetary and financial economics. In doing so, he applied economic aggregation and index number theory to construct monetary aggregates consistent with the properties of Diewert’s (1976) class of superlative quantity index numbers. Barnett’s monetary aggregates are Divisia quantity indices, named after Francois Divisia, who first proposed the index in 1925 for aggregating over goods. Barnett (1980) proved how the formula could be extended to include monetary assets.

Yet, thirty years later, the Federal Reserve and many other central banks around the world continue to ignore the complex structures of modern financial markets and officially produce and supply low quality monetary statistics, using the severely flawed simple-sum method of aggregation, inconsistent with the relevant aggregation and index number theory. In doing so, they mislead themselves, as well as households and firms, regarding the levels of systemic risk in the economy. Unfortunately, thirty years later, the Federal Reserve System does not even include an autonomous data bureau staffed with experts in index number and aggregation theory, such as the Bureau of Labor Statistics, within the Department of Labor, or the Bureau of Economic Analysis, within the Department of Commerce, to produce and supply high quality monetary statistics.

In this excellent and research-based book, William A. Barnett departs from the view that the financial crisis and the Great Recession were caused by the failure of mainstream economic theory. He argues the converse: that there was too little use of the relevant economic theory, especially of the literature on economic measurement and on nonlinear dynamics. Barnett argues that rational economic agents make decisions based on conditional expectations and do the best they can with the information they have available. He shows that decisions by private economic agents were not irrational, conditionally upon their information sets and conditionally upon rational nonlinear dynamics. But the contents of their information sets were inadequate and seriously defective.

In providing an explanation of what caused the subprime financial crisis, Barnett also departs from the widely held view by the popular press and most politicians that
Wall Street professionals, bankers, and homeowners are to blame for having taken excessive, self-destructive risk out of "greed." He argues instead that many bankers and homeowners are the victims of the financial crisis and that the causes of the crisis were inadequate supervision and regulation of financial firms, inadequate consumer protection regulation, and, most importantly, low quality data produced and supplied by the Federal Reserve. Regarding the latter, Barnett argues that poor or inadequate data originating at the Federal Reserve produced the misperceptions of superior monetary policy and supported excessive risk-taking by investors and lenders.

The origins of these problems are tracked back to the early 1970s and are shown to have been growing in importance since then, as data production procedures have fallen increasingly far behind the growing public needs from increasingly sophisticated financial markets. The problem is that the Federal Reserve and other central banks have not been producing monetary data consistent with neoclassical microeconomic theory. Under the misperception that the business cycle had permanently ended, economic agents had an incorrect assessment of systemic risk and significantly increased their leverage and risk-taking activities. This led to the credit-driven, asset-price bubble in the U.S. housing market, with prices departing significantly from fundamental values. When the bubble burst, it ended up bringing down the financial system, which not only led to an economic downturn and a rise in unemployment in the United States, but also to a global recession.

In this book, in addition to providing evidence that data problems may have caused the subprime financial crisis and the global recession, Barnett also implicitly proposes a new business cycle theory, stressing monetary misperceptions due to low quality data provided by central banks as sources of business fluctuations. This theory could be viewed as an extension of the work originated from Milton Friedman (1968), Edmund Phelps (1970), and Robert Lucas (1981). In their price-misperceptions model, in a rational expectations setting, economic agents have incomplete information about prices in the economy, and monetary shocks (created by the monetary authority) are a principal cause of business cycles. In Barnett’s approach, rational economic agents have incomplete information about the economy, because of the unprofessionally produced data by the central bank.
This scholarly book is more timely than ever, after the subprime financial crisis and the wreckage of the Great Recession, written by a maverick in the science of economics. Barnett provides a compelling and fascinating perspective on what happened and why, approaching macroeconomics as a science. He moves orthogonally to the view that the financial crisis and the Great Recession were caused by the failure of mainstream economic theory and the irrationality and greed of private economic agents.
References


