Getting It Wrong

How Faulty Monetary Statistics Undermine the Fed, the Financial System, and the Economy

WILLIAM A. BARNETT

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The MIT Press
Cambridge, Massachusetts
London, England

This book was set in Palatino by Graphic Composition, Inc., Bogart, GA. Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Barnett, William A.
Getting it wrong : how faulty monetary statistics undermine the Fed, the financial system, and the economy / William A. Barnett ; foreword by Apostolos Serletis.
p. cm.
Includes bibliographical references and index.
ISBN 978-0-262-01691-9 (hbk. : alk. paper) — ISBN 978-0-262-51688-4 (pbk. : alk. paper)
1. Monetary policy—United States. 2. Finance—Mathematical models. 3. Financial crises. 4. Econometrics. 5. United States—Economic policy—2009– I. Title.
HB139.B3755 2012
332.401'5195—dc23

2011021050

10 9 8 7 6 5 4 3 2 1

Dedicated to the memory of the great econometrician,
Henri Theil, 1924–2000

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Foreword: Macroeconomics as a Science

Apostolos Serletis

There have been dramatic advances in macroeconomics as a science during the past thirty 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 I without mathematics and with minimal use of technical terminology. His reason was to make part I accessible to all readers. His part II 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 noneconomists. As a result general readers may find this foreword to be more challenging to read than this book's part I. 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. However, 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*. The New Keynesians point to economic downturns like the Great Depression of the 1930s and the Great Recession that followed the subprime financial crisis, and argue 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 (i.e., 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 (e.g., 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.

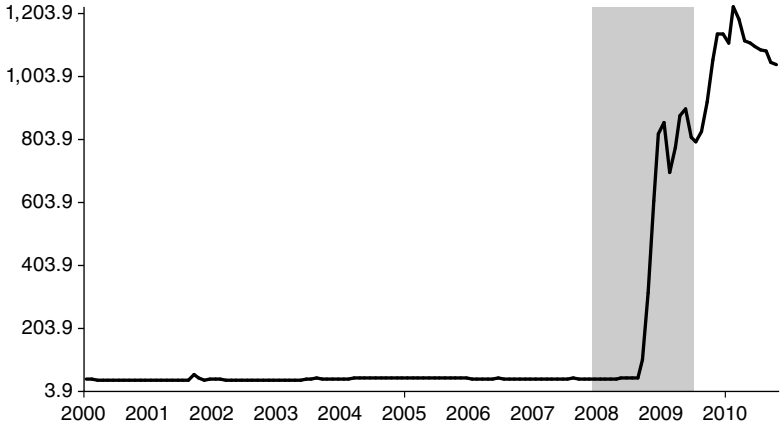
This transmission mechanism is intended to work well, even when the short-term nominal interest rate is at or close to zero. With a nominal interest rate of zero, a commitment by the central bank to expansionary monetary policy raises the expected inflation rate, reduces the real interest rate, and leads to a rise in aggregate output. Thus expansionary monetary policy could stimulate spending, even when the short-term nominal interest rate is at zero. This mechanism is in fact 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, on 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 percent, but long-term interest

rates in the United States declined for most of this period. Long-term interest rates throughout the world had in fact 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 percent, from 5.25 percent in August 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 (e.g., the yield on ten-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 US 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 to 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 the figure above (where the shaded area represents the Great Recession).

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 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 percent) 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 percent.

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 (i.e., 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 US 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 the preceding figure), no one is sure how this will unfold!

Recently, in the aftermath of the subprime financial crisis and the Great Recession, policy makers, 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 policy makers down much earlier, because they did not provide policy makers 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 indexes, 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 indexes, named after Francois Divisia, who first proposed the index in 1926 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 misled themselves, as well as households and firms, regarding the levels of systemic risk in the economy. Also, 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 important, 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 US 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.

Preface

A foolish faith in authority is the worst enemy of truth.
—Albert Einstein, letter to a friend, 1901

Many books have been written about the Great Recession, precipitated by the financial crisis beginning in 2007 with the breaking of the real estate price bubble.[1] Many explanations have been proposed. In a sense, I agree with them all, since they consist of descriptions of what actually happened.[2] Being descriptions of fact, they need not be viewed as competing. What distinguishes among them is who gets blamed. Just about everyone has been blamed (scapegoated?), including Wall Street firms, bankers, the economics profession, trial attorneys, the medical profession, insurance companies, the media, various governmental agencies, and Congress. What seems to be in common about those blamed is being among the smartest people in the country. Nearly everyone else has also been blamed, by inclusion of homeowners, Democrats, and Republicans. Only those blue collar Independents who are renters are

1. The stock market did not crash until 2008, when Lehman Brothers closed.

2. Examples include the astonishingly foresighted books by Shiller (2000, 2005). While I do not disagree with anything in those brilliant books, empirically distinguishing between nonlinear rational-expectations bubbles, nonlinear rational-expectations sunspots, nonlinear rational-expectations chaos, and behavioral-economics explanations are beyond the state of the art of econometrics, especially when the rational decision makers have limited information or are subject to learning, as in state-of-the-art rational-expectations models. For example, no analytical approach yet exists for locating the boundaries of the chaotic subset of the parameter space with a model having more than four parameters. To make matters worse, chaos violates the regularity assumptions of all available sampling-theoretic approaches to statistical inference, since chaos produces a nondifferentiable likelihood function, having an infinite number of singularities. Economic "sunspots" produce even more difficult problems, since the underlying theory assumes incomplete contingent-claims markets. Regarding rational-expectations bubbles, the critically important transversality conditions are notoriously difficult to test.

innocent. But as I argue in this book, all of those explanations are inadequate, if treated as "cause." While there is plenty of blame to spread around, something deeper has happened and needs to be understood to recognize the real source.

As an indication of the problems with the usual explanations, consider the following. It has become common to blame "greed." To my knowledge, the word "greed" has never appeared in a peer-reviewed economics journal. No definition exists within the economics profession, which assumes people do the best they can to pursue their self-interests. How can anyone do better than best? While psychologists, anthropologists, and sociologists may have a rigorous way to define and use that word, economists do not. For example, see Tett (2009) for a social anthropologist's view of greed and its role in the crisis. That point of view usually emphasizes misleading or deceptive behavior. In economic game theory, misleading or deceptive behavior is not necessarily considered to be irrational, but rather a problem for the mathematical literature on "mechanism design," the topic of chapter 3's section 3.7. In media discussions of the financial crisis and the Great Recession, greed is often closely connected with, and sometimes synonymous with, fraud. In economics, fraud is indeed relevant to the fields of law and economics, mechanism design, and institutionalism. But in economic theory, it is hard to see why only fraud should be labeled as "greed," and other crimes not. What about jewel and art thieves and hit men? Are they not "greedy"?

As an economist, I share the usual view of my profession: accusing someone of "greed" is a form of name calling, rather than an adequate explanation of cause. Inadequate regulation is also commonly blamed. Indeed, the weak response of the Federal Reserve ("the Fed") was puzzling, while some banks were sending email messages to random people, including dead people, offering them loans.[3] More effective regulation would have been very helpful to moderate the excesses that grew to ludicrous levels prior to the financial crisis. Certainly there is a colloquial sense in which some sort of "greed" was evident during those years.

But what about the 1920s? Leverage on Wall Street increased to 35:1 prior to the recent Great Recession, but never previously had exceeded 30:1 in US history. Since leverage was lower during the 1920s for many

3. For example, my mother, who had died years before and never owned a home, received a mortgage loan offer in a letter sent to my address.

Wall Street firms, some financial firms survived the Great Depression of the 1930s but did not survive the recent financial crisis.[4] Why was leverage lower in the 1920s? Far less regulation existed during the 1920s than prior to the Great Recession, margin requirements were much lower than now, and the "unit investment trusts" of the 1920s were no less capable of facilitating and masking high leverage than the more recent credit default swaps. As explained by Galbraith (1961, p. 52), "The virtue of the investment trust was that it brought about an almost complete divorce of the volume of corporate securities outstanding from the volume of corporate assets in existence. The former could be twice, thrice, or any multiple of the latter." With very low margin requirements, availability of unit investment trusts, and very little regulation, financial firms easily could have matched or exceeded the more recent 35:1 leverage. Were people less "greedy" in the 1920s? That would be a very hard case to make. The common explanations say little more than that people recently made unwise decisions because they did. Certainly something is missing.

4. The most widely discussed example is Bear Stearns, which was founded in 1923 and survived the Great Depression. See, for example, *Fortune* magazine, March 10, 2008 online at http://money.cnn.com/2008/03/28/magazines/fortune/boyd_bear.fortune/, by Roddy Boyd. Also see The Wall Street Journal's *Market Watch*, by Alistair Barr, March 13, 2009 online at http://www.marketwatch.com/story/post-bear-stearns-a-chastened-wall, which includes the statement: "In early 2007, Bear Stearns was hooked at record-high levels, sporting a so-called leverage ratio of 35 to 1. For every $1 in equity, it borrowed about $35 to hold a wide array of assets. Around the same time, Goldman, Morgan Stanley, Merrill, and Lehman together averaged leverage ratios of 30 to 1, up from 20 to 1 in 2003, according to Bernstein research." Leverage data were made available to the public in the Form 10-K and 10-Q report filings of the Security and Exchange Commission's (SEC) Consolidated Supervised Entity (CSE) Holding Companies and from General Accountability Office (GAO) leverage statistics.

In *The New York Times*, October 3, 2008, page A1 of the New York Edition, Stephen Labaton imputed the increase in leverage to a 2004 change in rules by the SEC. But why did the SEC change its rules? Perhaps was the SEC convinced that there had been a change in systemic risk, so that increased leverage had become prudent? But in the Wikipedia, you can find the following statement, "financial reports filed by the same companies before 2004 show higher reported leverage ratios for four of the five firms in years before 2004." See http://en.wikipedia.org/wiki/Net_capital_rule#cite_note-7.

Of course, there were no SEC regulations at all during 1920s leading up to the Great Depression, since the SEC was created in 1934. Similarly Lehman Brothers survived the Great Depression. Lehman Brothers was founded as a commodity house in 1850 and entered the underwriting business in a big way in 1906. Merrill Lynch was founded in 1915 and survived the Depression. Goldman Sachs was founded in 1869. One of its closed-end funds, which resembled a Ponzi scheme, failed during the 1929 stock market crash, but Goldman Sachs survived and prospered. Morgan Stanley is a "younger" firm, which was founded during the depths of the Depression.

Although I began as a rocket scientist (a real one), I was subsequently on the economics staff of the elite Special Studies Section of the Board of Governors of the Federal Reserve System in Washington, DC, during the chairmanships of Arthur Burns, William Miller, and Paul Volcker. Unfortunately, the Special Studies research section no longer exists.[5] The kind of intellectual strength and credibility that the Fed had previously centered at that group in the Watergate Building has now been dispersed thinly throughout the Federal Reserve System.[6]

After Arthur Burns left the Federal Reserve Board, he moved to the American Enterprise Institute (AEI) in Washington, DC, to write his memoirs, with the assistance of his ghost writer. I was surprised to receive a phone call from Burns at my Federal Reserve Board office. He asked me to have lunch with him at the AEI. I had never personally met

5. Its successor at the Federal Reserve Board in Washington, DC, is the Monetary and Financial Studies (MFS) section. But MFS is not what the Special Studies Section once was, when it was located in the Watergate Building. In fact the Special Studies Section itself was no longer what it once was, when it lost its two miles of distance from the Board Building. That happened when the Martin Building's construction was completed next door to the Board Building, and the economists in the leased Watergate Building space were moved to the Martin Building. The departure of Special Studies economists for academe began soon after that move.

6. Whether the existence of an elite research section, highly visible to the profession, is warranted at public expense in Washington, DC, is debatable, and resentment toward that section by other Federal Reserve economists had much to do with why that section was terminated a few years after it was moved to the Martin Building. But the fact that the Special Studies Section was unique in Washington, DC, government is not debatable.

While I was employed at the Board, I was invited by Arnold Zellner at the University of Chicago to edit a special issue of the *Journal of Econometrics* on the subject of Federal Reserve research. Arnold was an editor and founder of that highly regarded professional journal. I then sent a memorandum inviting submissions from economists in all research sections within the Federal Reserve Board staff and throughout all of the system's regional banks nationwide. Most of the submissions were immediately withdrawn, when I revealed I was going to send the papers out for peer review relative to the journal's normal standards. The exceptions were almost exclusively from within the Special Studies Section and its sister section, Econometrics and Computer Applications (E&CA), which also no longer exists.

At present, long after the termination of the Special Studies Section, Federal Reserve economists' publications in academic journals are thinly spread over all parts of the Federal Reserve System. Many of the associate editors of the Cambridge University Press journal, *Macroeconomic Dynamics*, of which I am founder and editor, are Federal Reserve economists. All of the journal's Federal Reserve associate editors are presently at regional banks, most heavily concentrated at the New York and Chicago Federal Reserve Banks. The journal's advisory editors have only once recommended to me an economist at the Federal Reserve Board for including on the journal's editorial board. She served successfully as an associate editor at the Federal Reserve Board for a few years, but resigned from the Federal Reserve Board staff for a professorship at George Washington University in Washington, DC.

him, while he was the chairman at the Fed. Of course, I agreed to have lunch with him and met him at the AEI. First his ghost writer walked into the room alone. I asked the ghost writer why, during Burns's chairmanship, the rate of growth of the money supply had kept increasing until Burns's second successor, Paul Volcker, stepped in to stop the consequent escalating inflation. Since the days of David Hume (1711–1776), the relationship between money growth and inflation has been well known.[7] Certainly Burns had been aware of the accelerating money growth rate, since the Fed maintained data on an astonishing number of monetary aggregates during his chairmanship. The ghost writer told me it was not Burns's fault, since Burns had to compromise with Congress to retain the independence of the Federal Reserve.

Then Burns walked into the room, and his ghost writer left. Burns told me that he had learned about my work on producing monetary aggregates based on aggregation and index-number theory, and he agreed with me. Encouraged by his favorable comment on my work, I then asked him the same question I had asked his ghost writer. Burns told me to ignore what his ghost writer had said. Burns said he had intentionally been pumping up the money supply to try to lower the unemployment rate, which was growing during the 1970s. He said that he had been educated in the economics of the depression and felt that keeping down unemployment was his primary obligation. He insisted that congressional pressure had nothing to do with it. In retrospect, he said he had been slower than other economists of his generation to recognize that the structural ("natural") rate of unemployment, which cannot be lowered by monetary policy, was rising. All that his accelerating money growth could do was to increase the inflation rate. I believed him to be telling me the truth, and he said something very similar in a speech in Belgrade, Yugoslavia.[8]

Burns's successor as chairman, William Miller, was inadequately qualified for the position and soon was replaced by Paul Volcker. Volcker recognized the source of the problem and instituted the "monetarist experiment" period, during which the rate of growth of the money supply was decreased to bring inflation back under control. But he overdid it, producing a recession. What has been going on since then is heavily documented in this book. In short, the early concept of money, computed by adding up imperfect substitutes, was rendered obsolete

7. David Hume, *Political Discourses*, "Of Money," 1752.

8. Arthur F. Burns, "The Anguish of Central Banking," the 1979 Per Jacobsson Lecture, Belgrade, Yugoslavia, September 30, 1979.

by payment of interest on various monetary assets, including checking accounts and checkable money-market deposit accounts. Those interest rates increased to high levels in the late 1970s. When monetary assets yielded no interest, computing monetary aggregates by adding up different kinds of monetary assets was consistent with the relevant economic aggregation theory. Once monetary assets began paying different interest rates, simple-sum monetary aggregation became obsolete, and more complicated formulas became valid. But most of the world's central banks did not fix their severely defective monetary aggregates. As a result monetary data became nearly useless to the public, to the financial industry, to the economics profession, and to the world's central banks. The whole world has recently been paying the price of this fundamental mistake by many of the world's central banks, most conspicuously the Federal Reserve Board in Washington, DC. Monetary data availability and quality from the Federal Reserve Board have been in a steady decline for decades. This book documents the resulting consequences and damage.

During Volcker's chairmanship, Alan Greenspan was on the semiannual panel of advisors to the Federal Reserve Board. I witnessed first-hand the origins of the current economic dysfunctions. Contrary to popular opinion, the origins go back farther than usually believed—to the 1970s—and grew rapidly during the Great Moderation period (1987–2007) of unusually low economic volatility. Following eight years at the Federal Reserve Board, I resigned in December 1982 to accept a position that was too good to refuse: full professor of economics at the University of Texas at Austin, where I was Stuart Centennial Professor of Economics for the next eight years. An "exit interview" is customary upon resignation from the Federal Reserve. I received an exit threat.

A high-ranking Officer of the Board's Staff walked into my office and declared ominously that if I ever became known as a critic of the Fed, its attorneys would harass me for the rest of my life. Not viewing myself as a Fed critic, I viewed the threat as reflecting little more than the intellectual insecurity of that Officer and the weakened state of the Board's staff. Many of the best economists from the Special Studies Section already had left for academic positions. The "exit threat" was unknown to the brilliant Special Studies Section Chief (Peter Tinsley), for whom I worked, until I mentioned it to him 26 years later. He was distressed to learn about it. But maybe the high-ranking officer who delivered the threat was more prescient than I realized at the time. Perhaps he saw this book coming nearly thirty years in advance. I did not.

I have served as an advisor to the Federal Reserve Bank of St. Louis, as a consultant to the European Central Bank, and as an advisor to the Bank of England.[9] Those roles along with my editorship of the Cambridge University Press journal, *Macroeconomic Dynamics*, my editorship of the monograph series, *International Symposia in Economic Theory and Econometrics*, and my own research and extensive publications have kept me close to the thinking of the economics profession's major players. This book uses basic principles of mainstream economic theory to explain what has happened and why. If the economics profession was in any way at fault, it was not from using too much economic theory. It was from using too little.

An objective of this book is to make my conclusions accessible to everyone, including those who have never taken an economics course. As a result the book is divided into two parts. Part I uses no mathematics and is written in a manner accessible to all readers, with the exception of the Foreword by Apostolos Serletis and the book's footnotes. The emphasis is on graphical displays and verbal explanations. But this book connects with a body of very mathematical research developed over a period of more than thirty years. Readers with the necessary level of mathematical preparation can find the underlying mathematics in part II, which serves as appendixes to the chapters in part I. Parts I and II say essentially the same thing, but part I with words and part II with math.[10]

Mathematics is a more rigorous language than English and is inherently important to the economics profession as a means of making clear the logic and internal consistency of analysis. The appendixes may not fully meet the needs of those professionals who might wish to cite the original source publications. Such experts can find the original journal articles collected together and published in three books: Barnett and Serletis (2000), Barnett and Binner (2004), and Barnett and Chauvet (2011b).

9. At the St. Louis Federal Reserve Bank, I was a member of the MSI Divisia Advisory Panel during the initial years of construction of that database. MSI stands for "monetary services index," as explained further in section 2.6.3 of chapter 2. My assistance to the European Central Bank included work I did at the bank in Frankfurt, publication of a working paper for the bank, and publication of a resulting journal article. My assistance to the Bank of England was limited to replying to faxed requests for advice about its Divisia monetary aggregates.

10. This division into two parts, one nonmathematical and one mathematical, is unusual in recent economics books. But it is consistent with an earlier tradition, made particularly famous by John Hicks's (1946) classic book, *Value and Capital*.

An unavoidable amount of professional jargon is necessary to make clear the connection between parts I and II. While I am keeping such jargon to a minimum, I define all such words and terms as they are introduced in part I. Exceptions are in some of the footnotes, which are provided for professional economists. Readers who are occasionally distracted by technical terminology can simply skip over such words and phrases. The book is written in a manner that can make its point even to rapid readers who choose to skim over details. *In short, reading this book can be as casual and rapid or as challenging and deep as the reader may choose.*

You will not need to know any of the book's technical results to find previously unrevealed insights into Fed operations. For example, you will learn about a case in which the chairman of the Federal Reserve Board called in the FBI to investigate his entire Washington, DC, staff, including hundreds of economists, to track down the person who provided bank interest rate data to *Consumer Reports*, perhaps in accordance with the Freedom of Information Act. When the person was found, he was fired. Such chilling practices, whether or not justified, are relevant to controversies about the central bank's openness and transparency and to the nature of the Federal Reserve System's incentives, as seen by its employees. You also will learn how faulty monetary aggregate data led Chairman Volcker to overtighten during the period of the "monetarist experiment" in 1979 to 1982 and thereby to induce an unintended recession (chapter 3, section 3.2, table 3.1). You will learn how faulty monetary aggregates more recently led the Fed to be unaware it was fueling the bubbles preceding the financial crisis (chapter 4, section 4.3.1, figure 4.7) and then to be unaware its policy was turning the financial crisis into the Great Recession (chapter 4, section 4.3.3, figure 4.12).

"Fed watchers" routinely obsess about the federal-funds interest rate as an indicator of the stance of monetary policy. Throughout the Great Recession, the federal-funds rate remained stably nearly zero, implying negligible changes in policy for a long period of time. But during those years, Federal Reserve policy was the most volatile in its history (e.g., see figures 4.5, 4.9, and 4.12 of chapter 4), while the federal-funds rate hardly varied at all. As an indicator of Fed policy, the federal-funds rate, contrary to official pronouncements, was a nearly useless indicator of monetary policy. From this book you will learn about the right places to look for policy indicators. The federal-funds rate is among the least important of them.

With growing complexity of financial instruments and institutions, a private-ownership economic system needs increasingly extensive, best-practice information from the central bank. Without such information availability, the second-best alternative is dramatically expanded and costly regulation to constrain poorly informed private decisions. *Increasing financial complexity with decreasing data quality is a toxic mix*.

As in mainstream economic theory, I assume throughout this book that people are rational and do the best they can to pursue their self-interests[11]—*conditionally upon the information that is available to them*. "Ay, there's the rub." (Shakespeare's *Hamlet*)

11. The concept of rationality used in economics is weaker than in common usage. To an economist, a person is considered to be "rational," if she does not intentionally act in a manner inconsistent with her own preferences, with full knowledge that the outcome of the decision will be inconsistent with her preferences. Economists are not judgmental about what a person's preferences should be.

Acknowledgments

I have benefited from comments on this book's manuscript from many readers, both inside the government and outside the government, both economists and noneconomists. Those readers include an economist currently inside the Federal Reserve System, two economists formerly inside the Federal Reserve System, a congressional committee staff economist, a Wall Street professional, a currency trader, two attorneys, one physician, one magazine columnist, a few students, many economics professors, and my wife. Since the list is long, I mention below only a few of those to whom I am indebted for valuable comments. They include Apostolos Serletis, Gerald Whitney, Charles Mandell, Richard Anderson, Kurt Schuler, Bruce Rayton, Melinda Barnett, Joshua Hendrickson, Isaac Kanyama, Ryadh Alkhareif, Jing Fu, Kablan Alkahtani, Lili Chen, Febrio Kacaribu, Ibrahima Diallo, Neepa Babulal, Lee Smith, Salah Alsayaary, Mingming Zheng, and Josephine Lugovsky.

I The Facts without the Math

1 Introduction

Central banks in many countries, the venerable Bank of England not excepted, have for decades published deliberately misleading statistics. . . . if the Bank of England lies and hides or falsifies data, then how can one expect minor operators in the financial world always to be truthful, especially when they know that the Bank of England and so many other central banks are not? . . . Inaccuracy as a consequence of privilege is a frequent occurrence. . . . The economist will do well to guard against an interpretation of "data" which are often anything but economic measurements; rather they are tools in the continuing struggle for power.

—Oskar Morgenstern (1965, pp. 20–21, 159, 193), Princeton University

The recent financial crisis that began to mount in 2008 followed the "Great Moderation." Some commentators and economists concluded that the decline in business cycle volatility during the Great Moderation should be credited to central bank countercyclical policy. As more and more economists and media people became convinced the risk of recessions had moderated, lenders and investors became willing to increase their leverage and risk-taking activities. Mortgage lenders, insurance companies, investment banking firms, and home buyers increasingly engaged in activities considered unreasonably risky prior to the Great Moderation. The Great Moderation did not primarily reflect improved monetary policy. The actual sources of the Great Moderation cannot be expected to produce permanent, long-run decreases in economic volatility. The misperception of permanent decrease in volatility was at the core of the financial crisis and recession.

One of this book's objectives is to expand upon the position taken by Barnett and Chauvet (2011a), with inclusion of a systematic unified presentation of the evidence and with documented discussion of the relevancy to current economic problems, but in a manner accessible to

all interested readers.[1] In that paper we found most recessions in the past fifty years were preceded by more contractionary monetary policy than was indicated by the official simple-sum monetary aggregates. Monetary aggregates produced in accordance with reputable economic measurement practices grew at rates generally lower than the growth rates of the Fed's official monetary aggregates prior to those recessions, but at higher rates than the official aggregates since the mid-1980s. Monetary policy was more contractionary than likely intended before the 2001 recession and more expansionary than likely intended during the subsequent recovery. This book also shows that monetary liquidity going into the Great Recession of December 2007 to June 2009 was much tighter than indicated by interest rates.

Low-quality and inadequate Federal Reserve data not only fed the risk misperceptions of the public, the financial industry, and the economics profession, but also likely contributed to policy errors by the Federal Reserve itself.

1.1 Whose Greed?

Many commentators have been quick to blame insolvent financial firms, investors, lenders, and borrowers for their "greed" and their presumed self-destructive, reckless risk-taking. Perhaps some of those commentators should look more carefully at their own role in propagating the misperceptions that induced those firms to take such risks.

The following comment from *The Wall Street Journal* (May 12, 2009, p. A16) editorial, "Geithner's Revelation," is informative: "The Washington crowd has tried to place all the blame for the panic on bankers, the better to absolve themselves. But as Mr. Geithner notes, Fed policy flooded the world with dollars that created a boom in asset prices and inspired the credit mania." While I agree the emphasis on expansionary policy is relevant, focusing only on that factor is an oversimplification and does not explain the unprecedented levels of risk exposure. There have been many other periods of comparably expansionary policy, during which financial firms' leverages did not reach such high levels. But I do agree with Geithner that it is time to move beyond scapegoating bankers, Wall Street firms, and just about everyone else, and to look more deeply into what induced rational firms and households to

1. Citations, such as this one to Barnett and Chauvet (2011a), refer to references contained at the end of this book in its References section.

believe that such high risk exposure was prudent. Clearly they did not intentionally "underprice" risk.

Then who is to blame for the recent crisis, which is the worst since the Great Depression? A common view is that the troubled firms and households are themselves to blame. According to much of the popular press and many politicians, Wall Street professionals and bankers are especially to blame for having taken excessive risk, as a result of "greed." Homeowners similarly are viewed as having taken excessive risk. But who are the Wall Street professionals, who decided to increase their leverage to 35:1? They include some of the country's most brilliant financial experts. Is it reasonable to assume that such people made foolish, self-destructive decisions out of "greed"? If so, how should we define "greed" in economic theory, so that we can test the hypotheses? What about the mortgage lenders at the country's largest banks? Were their decisions dominated by greed and self-destructive, foolish behavior? If the hypotheses imply irrational behavior, how would we reconcile a model of irrational behavior with the decisions of some of the country's most highly qualified experts in finance? Similarly why did the Supervision and Regulation Division of the Federal Reserve Board's staff close its eyes to the high risk loans being made by banks? Was the Federal Reserve Board's staff simply not doing its job, or perhaps did the Fed too believe systemic risk had declined, so increased risk-taking by banks was prudent? To find the cause of the crisis, we must look carefully at the data that produced the impression Fed policy had improved permanently. That false impression supported the increased risk-taking by investors, homeowners, and lenders.

The federal-funds interest rate has been the instrument of policy in the United States for over a half century. Although no formal targeting procedure has been announced by the Fed, its basic procedure for targeting that interest rate is commonly viewed to be the "Taylor rule," in one form or another. The Taylor rule puts upward pressure on the federal-funds interest rate, when inflation increases, and downward pressure on that interest rate, when unemployment increases. Rather than being an innovation in policy design, the Taylor rule is widely viewed as fitting historic Fed behavior for a half century.[2] The Great Moderation in business cycle volatility was more credibly produced by events unrelated to monetary policy, such as the growth of US

2. See, for example, Orphanides (2001). As an illustration of how oversimplified the usual views of that policy are, see Woodford (2003) for an exposition of the complexities of that approach to policy.

productivity, improved technology and communications, financial innovation, and the rise of China as a holder of American debt and supplier of low priced goods. The Great Moderation alternatively could have resulted from "good luck" in the form of smaller than usual external shocks to the economy. The Great Moderation was widely viewed as permanent—and was not. This book does not take any position on what actually did produce the Great Moderation, but does take a position on what did *not* cause the Great Moderation. This book provides an overview of the data problems that produced the misperceptions of superior monetary policy and thereby induced the increase in risk-taking. With the federal-funds rate at near zero, support for the current approach to monetary policy, which has been dominant for so long, is now declining.[3]

The focus of this book is on the need for central bank transparency, and the damage that can be done to transparency, and thereby to the economy, by poor or inadequate data. Where should we look for the source of the current economic problems? Should we look at the country's most brilliant financial experts: such as those on Wall Street and at the biggest banks, where Fed data and information were accepted and entered into formation of their expectations? Were they irrational, greedy people who foolishly were self-destructing? No, that does not get to the root of the problem. How about the stockholders in those firms, who often lost everything? Did their greed blind them to an outcome that wiped them out, but should have been obvious to them from the available data? No, I do not think so.

1.1.1 Ponzi Games, Transversality, and the Fraud Explosion

There was extensive fraud in mortgage origination, beginning in 2005, as is confirmed by the successful Federal Trade Commission (FTC) and Security and Exchange Commission (SEC) actions against Countrywide Home Loans, Inc. There also was fraud in the securitization of mortgages. Just about everyone was receiving emailed offers of unwanted mortgages. The explosion of fraud was associated with the treatment of risk as an asset class, bought and sold without concern for where it ended up. But aggregate risk does not disappear by being traded. The vehicles for the trading of risk were credit default swaps, or CDS. Once the CDS market collapsed, many assets ceased trading, and asset prices became difficult to establish. The financial crisis was on. The "players"

3. An excellent analysis of the defects of that policy can be found in Cochrane (2007).

in all this were among the world's most sophisticated investors. Is it reasonable to assume that they blindly ignored the risks they were taking out of stupidity? Did credit default swaps appear out of nowhere for no reason? Was fraud a new invention?

An even more extreme case exists: Bernard Madoff. He was perhaps the most sophisticated con man in recent history.[4] He had been president of NASDAQ and was the originator of the computer information technology that produced NASDAQ. His illegal Ponzi game grew for years.[5] At the risk of sounding pretentious, I'd like to introduce a technical term from formal mathematical economics: the "transversality condition." Dynamic mathematical models of the economy have an initial condition, explaining where the economy starts, and a terminal condition, called the transversality condition, toward which the economy approaches in the distant future. Satisfaction of the transversality condition is critical for success of an economy. Violation of the transversality condition produces bubbles and other damaging phenomena, undermining the success of a market economy. The transversality condition is normally a constraint on the growth of debt over very long periods of time. A critical transversality condition in dynamical macroeconomic models is, in fact, called the "no–Ponzi game condition," ruling out the explosion of debt produced by Ponzi game behavior. Madoff must have known he was violating the most fundamental of all transversality conditions in economic dynamics: the no–Ponzi game condition. Had his calculations told him he would end up broke, disgraced, and in prison? I don't think so. Then why did he do it?

Consider Social Security. It is not invested but is backed by an intergenerational social contract. What guarantees the contract will remain

4. In the 1700s there were perhaps more extreme confidence schemes, including John Law's Mississippi Bubble and the South Sea Bubble, while in the early 1900s there was the Ivar Kreuger pyramid scheme, which collapsed in the Depression. In explaining his famous match business bubble, Kreuger once said: "I've built my enterprise on the firmest ground that can be found—the foolishness of people" (Robert Shaplen 1960, p. 128).

5. "Ponzi game" is the technical term used in mathematics. In popular terminology, this fraudulent scam is called "Ponzi scheme," named after the famous American swindler, Charles Ponzi (1882–1949), who died in poverty in Rio de Janeiro 15 years following his release from prison in the United States. He did not originate that pyramid scheme, which carries his infamous name. He was inspired by a similar scam 20 years earlier by William F. Miller in Brooklyn, and in fact the same scheme is described in Charles Dickens' 1857 novel, *Little Dorrit*. Funds provided by unsuspecting investors are not invested but rather used to pay returns to prior investors. A "Ponzi game" pyramid, if it absorbs much of a country's wealth, can devastate the economy of an entire country, as nearly happened in Albania after its sudden privatization following the collapse of communism.

acceptable to all future generations? The system's rules prevent early withdrawal. Social Security is a Ponzi game; it does not violate the transversality condition, because of the social contract imposed across generations. But that is not enough. To be a good "investment," the pool of funds from the Social Security tax must grow at a rate faster than the rate of interest. Then future generations will receive pensions from a fund that is growing at a rate exceeding the alternative investment rate-of-return. In short, the population must grow faster than the rate of interest, as was very dramatically the case when immigration to the United States was rapid.

Analogously, Madoff screened his "investors" to accept only long-term investors, who would not withdraw early. He also must have expected available funds to grow at an adequate rate to permit him to continue paying the moderate rate of return he provided. Clearly he had all that figured out. He was too sophisticated not to have known. What he had not counted on during his lifetime was a serious recession producing net withdraws from his pool. Could the SEC have suspected what Madoff was doing, but perhaps had a similar view of the future, so was willing to close its eyes? Madoff's strategy was illegal, while the strategies in the banking industry and on Wall Street were not. But the misperception producing the failures of their plans was the same. They all believed there would never again be a major recession, and the steady economic growth that continued for many years during the Great Moderation would extend far into the future. They were wrong. All of them were wrong.

1.1.2 Conditional Expectations

In mainstream economic theory, consumers and firms are considered to be rational and to do the best they can to pursue their self-interests. But to make their economic decisions rationally, they need to form expectations about the future. Here I need to introduce more technical jargon: "conditional expectations." Conditional expectations are formed, while making use of the information available to the decision maker. To ignore relevant available information in forming expectations is not consistent with pursuit of self-interests. Why would someone intentionally ignore relevant information in forming expectations? The information available to an economic agent is called the "information set."

This is elementary in economic theory: if economic decisions seem misguided—look at the information set. That is the *first place* to look. Should we assume that the information set is just fine, but the decision

makers are irrational, greedy fools, not intelligently pursuing their self-interests? To make that assumption flies in the face of a century of mainstream economic research. I must admit to being entirely mystified by the emphasis in the popular press on the converse representation of heavily established economic theory. This book will not fall into that trap. Instead of throwing out a century of economic research, while scapegoating just about everyone in sight, this book will focus on the information set and its role in distorting expectations throughout the economy: some with well-meaning intent, and some not (e.g., Bernard Madoff).

Many considerations are relevant to the misguided actions of private firms, individuals, and central banks during the years leading up to the recent financial crisis. But one common thread applies to all of them: misperceptions induced by low quality monetary statistics, disconnected from the relevant economic aggregation theory. As has been emphasized by the theoretical literature in economics, information shocks can do much economic damage. This book documents the fact that Fed financial data do not meet the standards of best practice methodology and have been declining in quality for decades. The efficacy of economic decentralization, as is central to a private ownership economy, depends heavily upon information availability to individual decision makers. This fact is well established in a highly technical area of mathematical economics called "system design." With financial instruments growing in complexity and increased decentralization from deregulation, what was needed was more and better data and information. *The growth of financial complexity and decentralization with simultaneous decline in data quality was a toxic mix leading up to the misperceptions about systemic risk that were the root cause of the financial crisis and recession.*

1.1.3 Regulation in History and in Theory

In addition to blaming "greed," commentators also often blame deregulation. There is much truth to this point of view, but we must think more deeply to recognize the role of that problem. In economic theory, two kinds of solutions exist to the decisions of consumers and firms: "interior solutions" and "corner solutions." Interior solutions are voluntary solutions constrained only by market prices, incomes, tastes of consumers, and technologies of firms. Under idealized assumptions, a market economy can be proved mathematically to attain a form of optimal allocation of goods and services, called "Pareto optimality" in the field of "welfare economics." This fundamental mathematical proof is widely

known to economists and is used as a justification for "laissez faire" policy prescriptions by some. In contrast, regulation produces corner solutions, with binding quantity constraints on consumers and firms. Those rationing constraints are in addition to the economic system's constraints from market prices, incomes, tastes, and technology. When there are violations to the perfect-markets assumptions, used in the famous, welfare-optimality proofs, regulation can increase welfare. But otherwise the imposition of governmental constraints on private economic decisions decreases welfare. As a result the design of regulation is not a trivial matter, since poorly designed or unnecessary regulation can do damage. Examples of suboptimal economic outcomes are not hard to find in economies subject to excessive or badly designed regulation. Consider, for example, Cuba, North Korea, or recently Greece. All three have large governments and much regulation.

Indeed corner solutions might have been better in the United States than the interior solutions that produced the recent economic problems. As this book argues, the voluntary interior solutions, produced using poor information, were not consistent with the assumptions of classical optimality proofs. Regulations, constraining the economy from drifting far off course along bubbles, would have been advantageous. But far less regulation existed during much of the past century, especially prior to the Great Depression, which was survived by many of the underwriting firms that recently failed on Wall Street. During the 1920s, with less regulation, lower margin requirements, and no shortage of "greed," Wall Street leverage never reached the levels attained prior to the recent financial crisis. In the 1920s, the SEC, the Federal Deposit Insurance Corporation (FDIC), and Regulation Q, permitting the Fed to regulate saving account interest rates—didn't even exist.[6] Deregulation does not force the resulting voluntary interior solutions to incorporate excessive risk-taking exposure.

Leading up to the Great Depression of the 1930s, the "unit trusts" of the 1920s provided a vehicle to create leverage and mask growing risk exposures. See Galbraith's (1961) chapter, "In Goldman, Sachs We

6. The Glass–Steagall Banking Act was passed in 1933. The SEC was created in 1934. Other relevant congressional laws passed following the 1929 stock-market crash included the Securities Act of 1933, the Trust Indenture Act of 1939, the Investment Company Act of 1940, the Investment Advisers Act of 1940, and the Sarbanes–Oxley Act of 2002. Regulation by the Federal Reserve, which had been created in 1913, expanded in the 1930s, not just through the availability of the new Regulation Q, but in many other ways. The Gramm–Leach–Bliley Act, enacted in 1999, decreased regulation but left in place far more regulation than existed prior to the Depression. See Patrick (1993) and Meltzer (2002).

Trust." Credit default swaps, or CDSs, and especially the more fiendishly complex collateralized debt obligations, or CDOs, were similarly central to the recent crisis. Rather than decreasing risk, by permitting risk to be priced and traded in markets, the complexity of CDSs and CDOs increased the information burden on decision makers. With inadequate and distorted information within decision makers' information sets, the need existed for increased regulation, especially of the CDS and CDO markets, as poorly understood insurance markets. Instead, we incredibly got both deregulation and decreasing information availability—simultaneously. While more and better regulation could have helped, deregulation alone cannot explain what happened. Again, the place to look is the "information sets," upon which firms and consumers conditioned in making their decisions. Somewhere within those information sets lies the explanation of why private sector decisions drifted so far off the economy's optimal course.

1.2 The Great Moderation

As mentioned earlier, those who believed the Great Moderation would last forever included some of the most sophisticated people in the country. But what about the world's leading economists? In my opinion, the greatest living macroeconomist is Robert Lucas, a Nobel laureate in economics at the University of Chicago. In terms of influence on the macroeconomics profession, another great macroeconomist is a more recent Nobel Prize winner: Edward Prescott. Let's see what the two of them were saying during the Great Moderation.

In his 2003 presidential address to the American Economic Association, Lucas declared that the "central problem of depression-prevention [has] been solved, for all practical purposes." Lucas, who had become a major authority on the business cycle through his path-breaking publications in that area (e.g., see Lucas 1987), had concluded economists should redirect their efforts toward long-term fiscal policy aimed at increasing economic growth. Since central banks were presumed to have become very good at controlling the business cycle, he concluded few gains remained available from further improved countercyclical policy. In particular, he concluded that the welfare gains from further moderations in the business cycle would be small and not worth the cost of the research.

Edward Prescott, with his coauthor Ellen McGrattan, published an article in the fall 2000 *Minneapolis Federal Reserve Bulletin*, "Is the Stock

Market Overvalued?" They concluded that the stock market was properly valued. On January 1, 2001, the Dow Jones Average was at 10,788. By October 9, 2002, the Dow was 7,286, a decline of 32 percent. Lucas and Prescott are giants of the macroeconomics profession and rightfully so.[7] Were Lucas and Prescott at fault for what happened to the economy? No way. Could we accuse Lucas and Prescott of bad motives and "greed"? Of course not. But if Prescott believed the stock market was valued properly in 2000, and Lucas in 2003 concluded that the Great Moderation's decrease in volatility was permanent, why should we be throwing stones at Wall Street professionals, bankers, and homeowners for having similar views? Ben Bernanke spoke on the Great Moderation at the meetings of the Eastern Economic Association, in Washington, DC, on February 20, 2004. He argued the primary cause was improved monetary policy. Of course, Ben Bernanke is now the chairman of the Federal Reserve Board and is one of the best qualified chairmen the Fed has ever had. But the business cycle is not dead, and the Great Moderation cannot convincingly be explained in terms of superior monetary policy.

Given the views of some of the world's greatest macroeconomists at the time, the widespread misperceptions about systemic risk leading up to the financial crisis are far from surprising. The remaining question, addressed by this book, is the information upon which such views were based and whether better information might have produced different behavior, involving less risk exposure.

1.3 The Maestro

Many commentators believe Alan Greenspan should get much of the blame for what has happened. He is a disciple of Ayn Rand. His setting of low interest rates and his libertarian views, favoring decreased regulation, are often criticized. While there is some truth to those criticisms, Greenspan's primary role in contributing to the crisis lies elsewhere: in being so good at what he does best.

During Volcker's chairmanship, Alan Greenspan was on the semiannual Panel of Academic Advisors to the Federal Reserve Board,

7. Perhaps my views might be somewhat biased. I took Lucas's courses, while I was a graduate student at Carnegie Mellon University. Prescott had recently received his PhD from Carnegie Mellon and was on the faculty there, having returned from the University of Pennsylvania.

although paradoxically he had never been on the faculty of a university, so was not an "academic." I was on the staff of the Federal Reserve Board during most of those Volcker years and attended some of those Academic Advisors meetings. The meetings were held in the Board Room in the presence of the Board's Governors and some of their staff economists. Greenspan was very different from the rest of that panel. As is normal with serious academic researchers, the others tended to be cautious with their statements and rarely commented forcefully on topics and issues outside their own areas of research and expertise. Greenspan, in conspicuous contrast, was very flamboyant and presented himself as a person who could comment with great authority on anything of concern to the Board. Why the difference in approach, you ask?

Alan Greenspan ran the consulting firm, Townsend–Greenspan & Company, for nearly thirty years, since becoming the principal owner in 1958. The firm was organized in the 1930s by William Townsend and Dana Skinner. Greenspan joined the firm in 1953. The firm ceased operation, when Greenspan was appointed Chairman of the Federal Reserve Board in 1987. Writing an academic research paper for a peer-reviewed journal is very different from writing a consulting report. No customer, employing the services of a consulting firm, wants to be told that answering questions requires a couple of years of research and a government grant to fund graduate-student research assistants. The most important role of the principal owner of a consulting firm is—salesman. Townsend–Greenspan was a very successful consulting firm, largely due to the exceptional sales ability of Alan Greenspan. He did not just sell the firm and its services to clients. He sold himself and his personal authority and expertise. I saw his sales ability firsthand in some of the Academic Advisors meetings.

Others on the panel often included famous economists, such as Franco Modigliani, from whom I took a graduate course at MIT. In addition I interviewed Franco for the professional journal I edit and for the book, *Inside the Economist's Mind* (Barnett and Samuelson 2007). As I learned from personal experience as a student, an editor, and an interviewer, Modigliani was a very flamboyant and outgoing speaker. But Greenspan dominated much of the discussion at the Academic Advisors meetings, even when Modigliani was on the panel. If it had not been for his personality, Greenspan would have seemed out of place, because of his claims to know so much about everything, to be able to

predict nearly everything, and to be able to determine the best policy under all possible circumstances. With such a formidable group in the room, such claims easily could have been dismissed. But that was never the case. He was such an interesting, outgoing, friendly person that everyone in the room treated him with respect.

The few research staff members invited to attend those semiannual meetings would leave the room together and take the elevator from the Board room level on the second floor down to the first floor, while sometimes shaking their heads in disbelief at Greenspan's "performance." I was no longer on the Board's staff, when President Reagan appointed Greenspan to be chairman. At that time I was at the University of Texas at Austin. But I would guess that many staff members at the Board were surprised by Greenspan's appointment.

During his chairmanship, the whole world witnessed Greenspan's skills as a salesman. He won over large numbers of persons, including influential members of Congress. Many began referring to him as "the Maestro," following the appearance of Woodward's (2001) book by the same name. But to my knowledge, he had never published a peer-reviewed research article in a major economics journal. His PhD dissertation at the New York University School of Business (no, not the Economics Department) was never published and is virtually unknown within the economics profession. In sharp contrast, Ben Bernanke, a professor at the Princeton University Economics Department, is a highly regarded scholar, who has published extensively in major journals.[8]

I have no doubt that Greenspan did the best he could as chairman of the Federal Reserve Board, and he certainly cannot be faulted for having an exceptionally commanding sales personality. If he didn't, Townsend–Greenspan would never have become as successful as it

8. Some people think a person with business experience, such as Greenspan's business consulting experience or G. William Miller's corporate background, is better qualified to be chairman of the Federal Reserve Board than an eminent academic such as Ben Bernanke. If that is your view, I recommend that you read part II of this book. You also might want to consider the consequences of Miller's and Greenspan's chairmanships. G. William Miller was the first, and so far only, Federal Reserve chairman to come from a corporate background, rather than from economics or finance. He had previously been chairman and CEO of Textron, Inc. He was appointed in January 1978 by President Carter and removed from that office by President Carter on August 1979, as one of history's most unsuccessful and least respected Federal Reserve chairmen. When presented with staff economists' research at Board meetings, Miller's response was usually to flatter them for their presentations, which he often admitted he did not understand. We thought he was a very nice guy, who didn't have a clue.

did.[9] What set Townsend–Greenspan apart from the others was—Alan Greenspan's persona. But that was the problem. During Greenspan's chairmanship, Wall Street began talking about the "Greenspan put," according to which no need existed to worry about declining asset prices, since the Maestro could be depended upon to intervene successfully. This unjustified belief fed into the misperceptions about the Great Moderation, further increasing the widespread confidence in permanently decreased systemic risk.[10]

The economics profession knew Greenspan had never published well-regarded research in major peer-reviewed journals. It would be comforting to believe that the economics profession did not fall into the trap of viewing him as the Maestro. But sad to say, that is not the case. A primary channel for academic dissent had been the Shadow Open Market Committee (SOMC), founded by Karl Brunner at the University of Rochester and Allan Meltzer at Carnegie Mellon University. The SOMC, comprising a group of eminent economists, met at the same time as the Fed's policy-making Federal Open Market Committee (FOMC). The SOMC issued a dissenting opinion, along with its policy recommendations, following each such meeting. The SOMC opinions and reports were widely influential in the financial press, especially *The Wall Street Journal*. During the Greenspan years, criticism of the Fed by the SOMC was greatly toned down, thereby muting the most visible channel for dissent from within the economics profession. In addition, during most of the years leading up to the recent financial crisis and recession, the SOMC did not meet at all.[11] Between 1997 and 2009, the SOMC met only once, and that was not until 2006.

When I was hired by the Federal Reserve Board, I was informed that I was to fill the position left by Bill Poole, who had moved to the Boston Federal Reserve Bank and then to Brown University. He left the Board

9. That firm had a mathematical (econometric) model used in its consulting. There were other major consulting organizations, some at universities and some at banks, having well known models. The Townsend–Greenspan model was largely unknown to the econometrics profession.

10. The term, "Greenspan put," was coined in 1998, after the Fed lowered interest rates following the collapse of the firm, Long-Term Capital Management.

11. At the time that Greenspan became chairman, Karl Brunner had died. Allan Meltzer, a founder of the SOMC, is a formidable authority on monetary policy and has been working for many years on a series of important books about the history of the Federal Reserve. He is a professor at Carnegie Mellon University, from which I received my PhD. I know him well and respect him greatly. During the Greenspan years, I asked him why the SOMC's policy critique had become so muted. His reply was "Greenspan is a different kind of a guy." Clearly, Allan liked Greenspan a lot. Ah, the Maestro's sales ability again at work!

under a cloud of trouble. I was told that his departure was not entirely voluntary. As was explained to me, he had sent to *The Washington Post* a letter-to-the-editor in opposition to the Burns/Nixon wage and price controls. Arthur Burns, chairman of the Fed's Board at the time, was angry about the letter-to-the-editor and had some role in Poole's move out of Washington, DC.[12] At academic conferences there often were sessions at which former Fed staff economists would speak. It seemed to me that Poole had become the angriest, most uncompromising critic of Federal Reserve policy. He then was brought into the SOMC and acquired a regular byline in a newspaper called the *American Banker*.

Some of the Board's senior staff members were worried about Poole's byline, since they knew he was angry at the Fed and was under pressure to write a regular article for the *American Banker*. Previously, staff research economists could submit their research to peer-reviewed journals without prior approval from the Board. When Poole began his byline, a new Fed policy was instituted. Before submitting to a peer-reviewed journal, we were required to send our paper to a high ranking Board staff officer, who would edit the wording. I was puzzled by the nature of the rewording. It was always harmless, never changing my intent, and the changes never were substantive in any way. I asked what the purpose of the censorship was. I was told it was to ensure that the paper would not include wording Poole might consider to be quotable in the *American Banker*.

When Greenspan became chairman, he understood, as a business consultant, that the best way to silence dissent and minimize competition is to bring in the dissenters and merge with the competition. The St. Louis Federal Reserve Bank's Board of Directors employed a firm to search for a new president, when the bank's prior president retired. Poole was selected. To my astonishment, Greenspan did not prevent Poole from becoming president of the St. Louis Fed. At the time, I mentioned to Allan Meltzer that I was amazed Poole had been brought back into the Fed in such a high position, despite the history of bad feelings. Meltzer told me he and the SOMC had a role in that decision. [13]

12. This is what I was told at the Federal Reserve Board, when I was on its staff in Washington, DC. I have recently heard that Poole could already have been planning to leave the Board at the time he sent the letter to *The Washington Post*.

13. During the years I was at the Board, Karl Brunner and Allan Meltzer were very visible critics of Board policy through the SOMC they had founded. But there was a difference in their degree of willingness to be cooperative with the Board. Allan, who got along well with the Board, was often included among the Academic Advisors to the Board. However, Brunner, who tended to be uncompromising in his policy advocacy, was banned from

Again, recall the critical importance of the information sets in guiding expectations relevant to the success of a decentralized economic system. There was the Great Moderation; there was the "Greenspan put"; and there was the near silence of the SOMC's primary channel of dissent. Is it a surprise that so many major financial players believed the Fed had succeeded in ending the business cycle through superior monetary policy? Is it a surprise that even the great Nobel laureate Robert Lucas had reached that conclusion? So, of course, increasing private risk appeared to be prudent.

But there was a problem. It was not true. It was all a myth. There were no great improvements in monetary policy design, which was based fundamentally on the same approach used for over a half century. The sources of those appearances of improvements were developments outside the Federal Reserve System. The one genuine, noteworthy change in Fed activities was the decline in data quality. When more and better data were needed by the private sector, as the complexity of financial products grew, the quantity and quality of Fed data declined.

1.4 Paradoxes

Going back to 1974, Federal Reserve monetary data have produced a series of paradoxes, continuing to the present time. These paradoxes were purported to demonstrate that behavior by consumers and firms was irrational and thereby raised questions about the relevancy of economic theory. The paradoxes were the subject of research in major economics journals and resulted in hundreds, perhaps thousands, of published articles and books. The central banks throughout the world, and most conspicuously the Federal Reserve, used those paradoxes to justify their advocacy of increased discretionary power and less oversight, based upon the need for judgmental policy free from accountability to Congress. The story was: *you can't understand this; just trust us; we*

the Board building. In fact the security guards at the entrances were instructed never to permit Brunner to enter the building. Brunner once confided to me that the ban had done wonders for his career.

There had been security guards at the entrance to the building, since Burns had become chairman. Anti-Semitic conspiracy theorists had threatened Burns's life, when he was appointed as the Board's first Jewish chairman. But those guards rarely interfered with the public's access until years later, while Greenspan was chairman, after the staff found a critic wandering the building with a shotgun. The ban on entry by Brunner was subsequent to the posting of guards to protect Burns and prior to Greenspan's stepped up security.

know best; even the economics profession can't understand this; only we can. In fact a high-ranking, staff officer of the Federal Reserve Board stated in a meeting that he did not trust academics, whom he considered to be "glory seekers." On the contrary, excessive confidence in the Fed, free from dissent, is inconsistent with proper functioning of a decentralized economy. But the Fed's growing influence within the profession tends to limit dissent, as has been documented by White (2005). The economy's private sector needs to have a clear understanding of the risks it is taking.

As this book establishes, the paradoxes resulted from Federal Reserve bad data, inconsistent with the economic-measurement methodology established by the profession. The paradoxes fed into the misperceptions that distorted expectations and thereby eventually damaged the economy. Internal inconsistencies exist between the way the data were produced and the way they were used. Those internal inconsistencies have become known as the "Barnett critique" (see Chrystal and MacDonald 1994; Belongia and Ireland 2010).

Recently it has become fashionable to criticize the scientific basis for modern economic theory. Such criticisms often argue that macroeconomics is founded upon distorting oversimplifications. I would not disagree. Indeed the problem is not the use of too much economic theory, but rather the use of too little theory for purposes of analytical simplification. I have published extensively on the need to bring into macroeconomics more of the recent advances from the physical sciences and mathematics in nonlinear dynamics.[14] I also believe that the economics profession should take more seriously the distribution effects of macroeconomic policy. But there is a deeper question. Why are distorting oversimplifications in macroeconomic modeling so widely acceptable to the profession? Why are we not better able to determine which simplifications provide justifiable approximations and which are distorting oversimplifications. The following simple Aristotelian syllogism could shed some light on that question:

Major premise: Good science is not possible without good data.

Minor premise: The Federal Reserve Board is not providing good data.

Conclusion: _____ (fill in the blank).

14. See, for example, Barnett and Duzhak (2008, 2010), Barnett, Serletis, and Serletis (2006), Barnett et al. (1997), and Barnett, Geweke, and Shell (1989). This literature is well established and respected in economics but is not at the center of the field. See Caballero (2010).

While this logic may appear to be harsh, I do not consider myself to be a general critic of the Federal Reserve, which I respect as being among the world's most distinguished central banks. I consider myself to be a scientist. My statements in this book are directed solely at the mathematically provable fact the Federal Reserve Board is not producing data based on best-practice principles of the economics profession. For that mathematical proof, see part II of this book.

In contrast, what the real critics of the Fed say is far harsher than what I am arguing in this book. Consider, for example, the devastating book by the great Princeton economist, Oskar Morgenstern (1965), *On the Accuracy of Economic Observations*, from which a brief quotation is provided at the start of this chapter.[15] Everything in Morgenstern's book is as relevant today as it was then.

1.5 Conclusion

Decisions are made conditionally on information. Yes, many bad decisions were made by many people and firms, as well as by central banks, economists, and governments. But insulting those who made bad decisions fails to get to the root of the problem: the information on which the decisions were made was defective. Fraud was not a new invention. Clearly, something was wrong with the information on which decisions were being made. What was it and why? How did it get transmitted throughout the economy?

This book does not seek to provide easy answers to difficult problems, but rather to deepen insight into the root causes of the economy's problems. Those causes have not been remedied by the Band-Aids applied so far.

15. I am indebted to Steve H. Hanke at Johns Hopkins University for recommending to me the Morgenstern (1965) book.