

CHAPTER 4

Rethinking Macro

Reassessing Micro-foundations

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“[I]t appears that policymakers, if they wish to forecast the response of citizens, must take the latter into their confidence. This conclusion, if ill-suited to current econometric practice, seems to accord well with a preference for democratic decision-making.”

—ROBERT LUCAS, 1976

It has been about five years since the economy buckled under the force of the global financial crisis. It happened much as Hemingway (1926) described how a person goes bankrupt. “Two ways,” Hemingway wrote, “Gradually, then suddenly.”

Well, the pattern of recovery has not followed the pattern of the crash. The recovery of the United States’ economy can only be characterized as gradual. We hear repeated talk of escape velocity and confident, model-based predictions of sustained economic liftoff. There remain, however, insufficient real data—as of yet—to support the proposition. Instead, more than four years into recovery, we are growing accustomed to rationalizations that excuse economic malaise and comparisons to comfort us along the lines of at-least-we-are-doing-better-than-they-are.

Economists debate what transpired. Many hold the view that the period of steady growth and stable prices that preceded the crisis—the so-called Great Moderation—was largely the result of well-implemented macroeconomic policies. But the long period of benign economic results bred a complacency that sowed the seeds of crisis.

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So, they ask, what should be done to return to the prosperity of the Great Moderation without inviting a repeat of the crisis? The emerging consensus has it that a grant of new powers to central bankers and regulatory authorities will go a long way to righting the ship. The standard tool-kit of periodic doses of fiscal and monetary stimulus (or restraint) should do its part to ensure economic growth and price stability. The zero-lower-bound constraint on interest rates can be managed effectively through asset purchases and forward guidance, the new vanguard of monetary policy. The tool-kit should be supplemented further, authorities tell us, with newfangled macroprudential policies that can be mastered to ensure macroeconomic stability.¹

We are at a critical policy juncture, both in assessing macroeconomic policy and in evaluating the prospects for our economy. Many economic policymakers are convening in forums—publicly and privately—to “rethink macro.” In my remarks, I will offer my own modest contributions to this undertaking.²

Economists disagree on the macroeconomic policy choices made in recent years, including the Federal Reserve’s expansive asset purchase program and the new macroprudential regulatory regime. But there should be broad agreement that these policies are fundamentally different than practiced previously.

In some sense, these new policies have a common, understandable motivation: to bring greater stability to the financial markets and the economy. In practice, however, we should be particularly wary of top-down policies that risk undermining the economy’s micro-foundations. If new macro-policies fundamentally alter the reaction functions of individuals and businesses, then that would go a long way to explaining why many leading policymakers and econometric models continue to err systematically in forecasting the performance of the economy.

I posit that changes in the conduct of macroeconomic policy may well be altering the underlying micro-foundations of the economy. Reviewing these micro-foundations of macro—the behavior of individuals, households, and firms—is essential to evaluate optimal policy and understand the future contours of the economy.

1. See, for example, Yellen (2012).

2. This paper is focused on the conduct of US policy, but the themes are applicable more broadly.

Lucas critique revisited

In the 1970s, Bob Lucas, Tom Sargent, Ned Phelps, and others challenged some of the leading macroeconomic forecasting models of their day. They worried that excessive enthusiasm for certain stylized macro models led policymakers—and the real economy—astray.

They took issue with the existing macroeconomic frameworks that were built largely on the relationship among aggregated data, such as consumption, spending, and investment. Their scholarship recognized that economic actors do not tend to react passively to policy changes. Individuals, households, and firms are not easily fooled. Instead, they tend to see through short-term policy fixes and assess the medium-term implications of changes in government policy on their everyday economic decisions.

Under the going theory that it “takes-a-model-to-beat-a-model,” Lucas *et alia* applied new techniques and methods to improve the discipline of economics. In some sense, they recognized starkly the dynamic interaction between macro-policymakers and micro-economic actors.

Building on this literature, most of today’s dynamic stochastic general equilibrium (DSGE) models seek to simultaneously incorporate rigidities—such as prices and wages—and rational expectations. The impact of any change in monetary policy is then calibrated, including a potential behavioral response. Note that these tend *not* to be real business cycle models which incorporate explicitly the decisions of individual agents.

So, are these models likely to be reliable predictors of the actual contours of the economy?

Even the latest generation of DSGE models does not incorporate a financial sector. In effect, the models assume that liquidity and risk can be intermediated with sufficiently low friction so as to not materially affect economic outcomes. Some strides have been made to correct this omission (Bernanke and Gertler 1995). But considerably more attention is required. As the financial crisis and its aftermath made clear, financial frictions are of first-order importance to the macroeconomy. If not, the failure of financial intermediaries during the crisis should not have caused such losses to the overall economy. If the financial sector were not of great import to the real economy, the imperative to reform our regulatory structure would also be sorely misplaced.

Of even greater consequence, today’s leading macroeconomic models are structured to be mean-regressing. The economy is thought to respond

similarly to prior economic periods. But these models lose much of their predictive capacity when policy regimes change. When confronted with persistently large tracking errors, forecasters (including at the Fed) now often resort to importing subjective “add-factors” to massage the model outputs, seeking to reconcile the differences between the predicted outcomes and the stark reality of slow growth.

As Lucas reminded us more than forty years ago, “any change in policy will systematically alter the structure of economic models . . . for the question of short-term forecasting, or tracking ability of econometric models . . . this conclusion is of only occasional significance . . . [but] for issues involving policy evaluation, in contrast, it is fundamental” (Lucas 1976).

In some sense, the Lucas critique—as it came to be known—was not just an academic debate taking place inside ivy-covered walls. It was about a fundamental rethink to help reconcile economic theory with economic policy, and economic policy with economic reality. While the economics profession learned much since the so-called rational expectations school emerged, the critique reminds us that the adoption of new policy regimes alters the structure of models, which consist of the decision rules of economic agents.

So, how can the notion underlying the Lucas critique inform our current economic predicament?

Today—perhaps even more so than in the late 1970s—getting the model right appears to be a predominant factor in getting policy right. Central bankers talk regularly about policy that is data-dependent and forecast-dependent. They go out of their way to describe their models’ assumptions and outputs. They laud transparency and consider it a foremost virtue in the conduct of policy. Their forecasts for GDP, employment, and inflation tend to drive the policy debate, both inside the corridors of the Federal Open Market Committee (FOMC) and among financial market participants. The resulting policy judgments have large and consequential effects on the economy.³

If, for example, the Federal Reserve’s FRB/US model—among the foremost DSGE models—estimates that the unemployment rate will remain

3. Given the shortcomings of leading models and the large tracking errors of forecasts, it is not obvious why model-centric policy should predominate. A compelling alternative would include a broader review of financial market conditions and real-time economic data to be considered alongside a broad range of model-based outputs.

above the natural rate of unemployment for a couple more years, that tends to weigh heavily on the staff's judgmental forecast. In my experience, the staff forecast then plays a central role—maybe even an anchoring role—from which many members of the FOMC make their individual forecasts. The latest iterations of the Fed's model, if they are believed, provide ample rationale for continuation of highly accommodative policy.

But what happens if the reaction function of economic agents changed along with policy regimes after the crisis of 2008?

This change in micro-behavior could be, in part, a function of the crisis itself. Economic agents never experienced an environment akin to the panic of 2008 and its resulting shock to wealth, confidence, and incomes. Nor should we downplay the impact on our citizenry of the failure or near-failure of many financial firms with various degrees of attachment to the US government, including Fannie Mae, Freddie Mac, and the largest banks.

Changes in the micro-foundations could also be a function of the macroeconomic policy response which differed markedly from historical precedent. In both cases, we should not be surprised if there were a different post-crisis economic response by our fellow citizens.

What is so new about policy? Consider the following:

- A renewed belief by policymakers that large, temporary government stimulus (e.g., Economic Stimulus Act of 2008 and American Recovery and Reinvestment Act of 2009) could be timed, sized, and deployed effectively to offset private shortfalls in demand.
- An unprecedented monetary policy response, which became more aggressive even as time elapsed from the depths of the financial crisis.
- A more expansive role, if not responsibility, for central banks as default providers of aggregate demand.
- A complex, novel macroprudential regulatory framework to oversee banks and systemically important financial firms.

I don't wish to devote these remarks to any detailed critique of particular policy choices. But these new policies share a common, if unexplored, narrative: they represent regime change. A broad, new financial stability agenda has become our government's primary policy objective. Stability is the new dominant guidepost for policy, its North Star.

The new stability agenda

Economists and policymakers have long struggled to draw lines between stability and efficiency (Sargent 2011). The line-drawing in the post-crisis era appears to be moving to favor macro-policies that elevate stability over efficiency. This is understandable and, by some lights, necessary. But, of no less consequence, I worry that the new stability agenda now in vogue seeks to do far more under the high-sounding auspices of stability than simply mitigating tail risks.

What is this stability about?

If it's about making our financial system more resilient to shocks, then it strikes me as consistent with past motivations, if not practice. Ensuring that the plumbing of the financial system works to promote prosperity is a noble and worthy pursuit. The Fed's creation a century ago, arising from the Panic of 1907, was aptly focused on mitigating future crises. Growth and employment are well-served if policymakers are able to reduce the likelihood of cataclysmic disruptions in financial intermediation, which would otherwise imperil the allocation of savings to profitable investment opportunities.

But, in practice, upon surveying the broad suite of new policies, the new stability agenda may be something quite different, something untested, with implications unclear. The new stability agenda appears at least as focused on smoothing macroeconomic aggregates as on mitigating tail risks. It seems keen, in effect if not intent, to remove significant risk from financial markets—even in benign times—as if volatility itself were anathema to prosperity. The new stability regime seems committed to taming the normal business cycle, as though economic growth that deviates somewhat from trend intrinsically and systematically harms long-term prospects.⁴

I worry that the new stability agenda, however well-intentioned, is more inclined to accept statism than risk the consequences of dynamism. It thereby risks undermining the micro-foundations of macro. To achieve

4. Central bankers have long sought to minimize large deviations in output, employment, and inflation from target in the conduct of monetary policy. So, macroeconomic aggregates have long mattered. But I contend that the new stability agenda, including the Fed's large, direct, and prolonged participation in long-term funding markets, represents a quantitative and qualitative break with past practice, especially with respect to changing the resulting incentives of economic agents.

long-run stability, we must be accepting of considerable turbulence along the way. Turbulence or, more aptly, economic vitality is scarcely an unhealthy condition. It may be essential at the micro-economic level to achieve sustainable macroeconomic prosperity. Yet, if economic vitality is frowned upon in the new policy regime, then we might be lessening the economy's long-run potential.

Seeking to banish recessions is a fundamentally different endeavor than taking steps to avoid another financial panic. A look back at the Great Moderation offers some key—perhaps unexpected—insights on the interaction between micro-economic foundations and macroeconomic outcomes.

The Great Moderation unmasked

The moderation of the business cycle marked the generation that preceded the financial crisis. It is easy to review the period with some longing. It's understandable that the desire to return to a period of reduced volatility of aggregate economic data—GDP, employment, industrial production, inflation—is motivating policymakers.

But, if we are seeking to return to those halcyon days without the pernicious after-effects, we should be clear what the period was really all about.

The Great Moderation is a great misnomer. The seeming stability of the aggregate data during the Great Moderation belied significant disruption at the household and firm level. The period was marked by extraordinary changes at the level of individuals, households, and businesses. And this vitality served to propel growth, standards of living, and, yes, aggregate stability for more than a generation.

Taylor (1998) was among the first to note the reduction in aggregate macro-volatility and improved economic outcomes during the “long boom.” He rightfully assigned a significant portion of the credit to the improved conduct of monetary policy. Indeed, during the 1980s and 1990s, central bankers established—and followed—a clearer policy framework which contributed to the superior outcomes that marked the era.⁵

5. I am persuaded that improved conduct of macroeconomic policy, including monetary policy, was an important contributor to better economic outcomes during much of the Great Moderation. Especially since the financial crisis, however, the conduct of broad macroeconomic policies changed. This paper seeks to better understand the resulting behavioral responses of key economic agents.

McConnell and Perez-Quiros (2000) and Stock and Watson (2002) demonstrate the extent of the moderation across the US economy beginning in the early 1980s. They offer a range of explanations for the benign macroeconomic outcomes, including acceleration to a services-oriented economy and less severe exogenous shocks to supply and demand.

Dynan, Elmendorf, and Sichel (2006) add to the growing literature on the year-over-year volatility of earnings and income at the household level. Their review of disaggregated data from households shows greater economic uncertainty during the Great Moderation than in prior periods. Although aggregate economic activity became less volatile than previously, individual households appear to have faced more volatile economic circumstances.

The careful data work of Davis and Kahn (2008) is consistent with these findings. When they consider household-level consumption changes, they “find no evidence of a decline in volatility after 1980. The evidence on individual earnings uncertainty points to a longer-term rise, not a decline.”

What helps to explain this apparent divergence? Greater access to financial products—and the concomitant ability of individuals to offset shortfalls in income—helps to soften the blow from income shocks. In addition, the greater heterogeneity of households means that changes in income are less correlated with their peers. Other leading explanations include innovation in inventory management, allowing firms to be more nimble in their use of labor and capital.

The growth models of Aghion and Howitt (1992) describe a simple model of growth through creative destruction. Growth results from technological progress being undertaken by competing firms seeking to innovate. These innovations positively affect an entire economy, notwithstanding near-term turbulence. New research and development beget economic profits, which raise wages for highly skilled workers until the next innovation makes the prior enhancements obsolete.

That stronger growth and muted volatility arise from vitality inside of the economy should be of little surprise to those familiar with Silicon Valley. Schumpeter’s creative destruction finds its exemplar in the area around Stanford University. Disruptive technologies threaten incumbent firms and workers with impunity, but this difficult transition should not be confused with weaker growth or macro-instability.

In my view, then, both economic theory and empirical data from the Great Moderation suggest that the period of macro-stability was consistent with micro-instability. It may well be that disruptions in the

micro-foundations of the economy were a necessary condition for the benign macro-conditions of the period.

If the new primary objective of our nation's public policy, however, is to stabilize macro-fluctuations, then harm may be done to the Schumpeterian dynamics that are crucial to economic growth. Leaving growth considerations aside, it is not even apparent that a new stability agenda will achieve the macroeconomic stability to which it aspires.

Let's turn to the possible effects of these new macroeconomic policies. The task is to judge—as much as practicable—the impact of changes in macroeconomic policy on the micro-foundations of the real economy. I will review possible changes in reaction functions of banks and business in the new regime. The changing decision calculus likely has significant consequences for individuals and households as well. Considerably more attention is owed to the actual behavioral responses of economic agents to changes in macroeconomic policy.

The new financial regulatory regime: de-risking the banking business?

In regulatory policy, the new stability brigade is in full force. Inspired by the Dodd-Frank Act (DFA), a new financial architecture is being implemented. The new financial oversight regime represents not just a change in rules and an escalation in boots-on-the-ground to police financial firms. It fundamentally changes the roles, responsibilities, and institutional design of our government's oversight of financial institutions.

Purportedly to resolve conflicts and confusion among more than a dozen regulatory authorities, the law did something to which Washington leaders are long accustomed: it created a committee. And it appointed the secretary of the treasury as the chair of the new committee, the Financial Stability Oversight Council (FSOC), a break with two decades of practice that sought to insulate regulators from political influence.

Today, the FSOC's constituent members, including the Fed and nine other voting members, are in the midst of reorganizing themselves to fulfill their new responsibilities. With characteristic understatement, Ben Bernanke, chairman of the Fed at the time, acknowledged the difficult task at hand (Bernanke 2012):

“The crisis, the recession it sparked, and the subsequent slow recovery . . . demonstrated that we have much to learn about the workings

and vulnerabilities of our modern, globalized financial system and its interactions with the broader economy. In responding to these stressful financial and economic developments, the Federal Reserve and other central banks have had to deploy a variety of new tools and approaches to carry out their responsibilities in the area of macroprudential supervision, with the objective of promoting financial stability and reducing the likelihood and costs of a future financial crisis. Although much progress has been made, we are still at an early stage in understanding how best to meet these new macroprudential responsibilities.”

My intention, however, is not principally to critique the new law or its implementation, or to suggest what might constitute more significant regulatory reform of our largest financial firms (Warsh 2012a). Rather, it is to highlight the possible consequences of the new regime on the decision-making of key economic agents and to suggest that the effects on the overall economy should not be dismissed. In fact, the effects of these changes go well beyond our ability to forecast.

A new, comprehensive set of rules for banking—virtually any new set of rules—can, over time, be constructive or destructive to the micro-foundations of the economy. But when these rule changes are still largely unknown more than three years after the reforms were enacted into law, there is good reason to be concerned about their detrimental effects. Since DFA was enacted, 848 pages of statutory text expanded to 13,789 pages of new regulation, more than 15 million words. And, according to Davis, Polk & Wardwell, this represents only 39 percent of required rule-makings, with much of the remainder well past legislative deadline (Davis Polk 2013).

In addition, the banking “reforms” are not likely to be known even once the DFA-designated rule-makings are ostensibly complete. Jeremy Stein, a member of the board of governors of the Federal Reserve, describes the difficulty in calibrating this broad set of authorities (Stein 2013a). A longer period of adjustment to the rules is likely to prevail.

“One way to resolve this tension is to refrain from putting ourselves in the position of having to make a once-and-for-all decision in a setting of substantial uncertainty. Rather, it might be preferable to try to learn from the incoming data and adjust over time, particularly since the recent changes to capital regulation already on the

books may represent an informative experiment . . . For example, the capital-surcharge schedule proposed by the Basel Committee for globally important systemic banks may be a reasonable starting point. However, if after some time it has not delivered much of a change in the size and complexity of the largest of banks, one might conclude that the implicit tax was too small and should be ratcheted up. . . . Of course, I recognize that its gradualist nature presents practical challenges . . . ”

The behavior of financial intermediaries during a period of prolonged limbo is particularly vexing. Might the firms reduce the extension of credit to the real economy until the final capital rules are ultimately adjudicated? Shrinking their asset base may prove far more attractive than raising new capital and thereby diluting their firms’ existing equity holders.

The legislation also promises a new remit in overseeing a complex, interconnected financial system: macroprudential oversight. In the decade before the financial crisis, many authoritative reports—replete with compilations of aggregate data—suggested that the global financial system was fundamentally sound. With the benefit of hindsight, a deeper review would have found significant infirmities. So, the search for a new approach to overseeing the banking system is necessary and understandable.

Macroprudential oversight scarcely sounds like an Orwellian plot. But what is it exactly? I don’t know. There remains precious little economic literature or policy practice to provide informed guidance.

Adrian, Covitz, and Liang (2013) are among the first, and most knowledgeable, to conceptualize this new regime. Given the high costs to the economy of fragile financial institutions, the new regime is intended to implement policies “preemptively” to ensure greater financial stability. They lay out a laudable principal objective: “Macroprudential policies are designed to reduce vulnerabilities to mitigate the amplification of negative shocks, and also to pre-position institutions so that they can absorb shocks.”

The Fed has assuredly made progress in its monitoring regime. But the task of identifying bubbles or vulnerabilities is daunting. Suffice it to say that the new macroprudential policy tools, including tools to assess and to pop asset bubbles, are still a subject of considerable debate among policymakers.

The Adrian-Covitz-Liang framework is especially useful in helping to frame the policy trade-offs when pursuing the new macroprudential remit. Evidently, there is no free lunch policy to be pursued. Instead, they

highlight how policies that seek to reduce the likelihood of systemic crises may do so only by raising the costs of financial intermediation in non-crisis periods.

The framework implicitly asks how much “sand in the gears” of financial intermediation a country is prepared to accept. Several unresolved questions follow:

- What will be the effects on the cost and availability of credit to businesses and households?
- Will the added costs of financial intermediation correspond to a material reduction in the odds of a negative systemic event?
- If the initiatives pursued in the name of macroprudential oversight turn out to be detrimental to growth, are we confident that longer-term stability benefits are attainable?

Moreover, the new remit may well conflict with the Fed’s conduct of monetary policy. Are lower employment and lower macroeconomic risk preferable to higher employment and higher macroeconomic risk? When such a conflict occurs, how should it be resolved? By whom? How much confidence must the authorities have in their own judgment to decide? Will the Fed make that judgment in its independent conduct of monetary policy? Or will it be resolved by the treasury secretary as the head of the FSOC?

It is also critical to understand the new decision-making calculus of the largest banks in this new regime. How are the executives and boards of directors likely to respond to an avalanche of new and changing rules, an overlapping set of regulators, and a new overseer endowed with a new remit when the downside risks are apparent and the upside gains are impossible to observe? Might the largest banks fight the new regime fiercely? Or are they more likely to decide that fighting their overseers is a battle that cannot be won?

We have long worried that our largest financial institutions were “too big to fail.” Under DFA, these firms are redefined as systemically important financial institutions (SIFIs). If recent behavior is any indication, I fear they will most likely become public utilities.

In my judgment, the temptation for SIFIs to become public utilities is a troubling development. Significant political science literature suggests that the tensions and uncertainties among regulators and those regulated are often ultimately resolved by truce, by negotiated settlement, or by implicit arrangement. Fannie Mae and Freddie Mac are only the latest

examples of entities that became quasi-public utilities over time while retaining some quasi-private attributes. And as their demise makes apparent, the “constructive ambiguity” associated with these firms turned out to be neither constructive nor ambiguous.

Some large “systemically important” firms may well be willing to accept new, permanent government masters and supplementary public purposes in order to protect their privileged status. In so doing, they may be persuaded to apportion some of the economic rents—gained in part by virtue of being perceived as backed by the government—to the official sector as a sort of peace offering.

For many of the banks themselves, this might not be an irrational response. John Mack, the former chairman and CEO of Morgan Stanley, captured the sentiment recently (Lucchetti and Steinberg 2013) when he reportedly advised his successor, James Gorman: “Your number one client is the government.”

This new regime may be useful for large bank executives, boards of directors, bondholders, or even shareholders. But the consequences for our financial and economic system may be far less comforting. A small number of large public utilities atop the banking sector would invariably change the business of banking. The uneven playing field may well be creating perverse incentives for the erstwhile competitors of the biggest firms—small and medium-sized banks and other financial intermediaries. More work should be done to evaluate better the resulting impact on credit flow to businesses, households, and individuals in the real economy.

The public utility model is at odds with the best of US economic history. The new regime may be more consistent with statism than dynamism, more consistent with short-run stability than growth-enhancing vitality. And, over the medium term, we should query whether this new policy regime is useful to achieve either a higher growth trajectory for our economy or a mitigation of tail risks. And even if the public utility model makes the business of banking less volatile in most periods, it may be riskier still in times of significant financial stress.

The new monetary policy regime: boosting business capital expenditures?

In the depths of the financial crisis, a newly aggressive, volatility-reducing monetary policy was instituted by the Federal Reserve. It represents an important component of the broader stability agenda.

The United States was suffering from old-fashioned panic, in which volatility measures jumped and asset prices fell dramatically. Quantitative easing, as it came to be known, was established. QE1's objectives included stopping the run on wholesale funding, infusing liquidity into the banking system, and improving market functioning. The panic, ultimately, was averted and the recession turned to a recovery, albeit a muted one.

The expansion and extension of the Fed's asset purchase program (so-called QE2 and QE3) was instituted to accelerate the pace of the economic recovery, according to its proponents. The refined goal was to transmit the Fed's aggressive policies through financial markets to strengthen aggregate demand. As a massive buyer of Treasury and mortgage securities, the Fed removed significant duration and associated volatility from financial markets. It thereby enticed new investors—unnatural buyers—into the market, especially for riskier assets like housing and equities.⁶

Risk assets, like stocks, rallied at least as much as the Fed expected. The Standard & Poor's 500 and the Russell 1000 are up more than 150 percent since the recovery began in March 2009. Lower measured market volatility is also consistent with higher asset prices. The VIX (Volatility Index) averaged less than fifteen during the last twelve months. That is 60 percent lower measured equity volatility than the crisis average and nearly 30 percent lower than the long-term average.

What about the predicted strengthening of the real economy? Increases in asset values and net worth were predicted to have significant follow-on wealth and confidence effects that would thereby bolster the real economy.

Let's isolate one critical cog in the transmission mechanism of QE: did higher share prices induced in part by monetary policy translate into significantly higher business investment?

6. Still, legitimate questions can be raised about QE's long-term consequences. But what is the optimum quantum of volatility removal from markets? Can the Fed's QE permanently lower volatility in markets? Or is it akin to the law of conservation of matter, in which actual volatility is neither created nor destroyed, but simply moved from one place to another and from one time period to another? See, for example, similar concerns expressed by Jeremy Stein in remarks delivered at a symposium sponsored by the Center for Financial Studies (Stein 2013b): "If the Fed's control of long-term rates depends in substantial part on the induced buying and selling behavior of other investors, our grip on the steering wheel is not as tight as it otherwise might be."

Pre-tax corporate profits represent a record of more than 12 percent of GDP. These profits have no doubt been aided by lower interest rates, cost savings, and significant productivity improvements. This explains in part the significant share price appreciation during the last four years. QE proponents believe, quite reasonably, that the aggressive asset purchase regime supported additional share price appreciation.

Historically, high share prices are associated with increased business confidence and higher capital expenditures. But when comparing business investment patterns during this cycle to history, the results are clearly disappointing. Despite a contraction far more severe than the six previous cycles, recovery of real non-residential fixed investment delivered only a moderate improvement from trough levels. As figure 4.1 below makes clear, investment is only slowly returning toward its pre-recession highs.

In fact, real non-residential fixed investment remains roughly 1.5 percent below its pre-recession peak, substantially lower than the last six post-recession recoveries in which previous peaks were surpassed by nearly 20 percent after a similar period of time.

Business investment is also lagging most forecasters' projections. The Philadelphia Federal Reserve Bank survey of professional forecasters, for example, consistently overestimated investment growth (by approximately 1 percentage point per annum) throughout this period. Model-based forecasts, such as those employed by Macroeconomic Advisers, also point to errors of similar magnitude in overestimating investment growth post-crisis.

There is a common litany of explanations for the lack of capital investment by the private sector, including lack of aggregate demand, regulatory uncertainty, and Washington dysfunction.

Might there be another reason why the historical regression broke down?

I posit that QE-induced share price appreciation is not fully internalized by corporate chieftains. They are unsure if monetary policy at the zero lower bound can usher in a stronger real economy. While pleased with their stock performance, corporate leaders question whether their share prices will remain elevated in a post-QE world. So, company executives are not taking their elevated share prices at face value and investing accordingly. Instead, they appear to be looking through some of the share price appreciation, concluding that it was bolstered by a surge in QE that

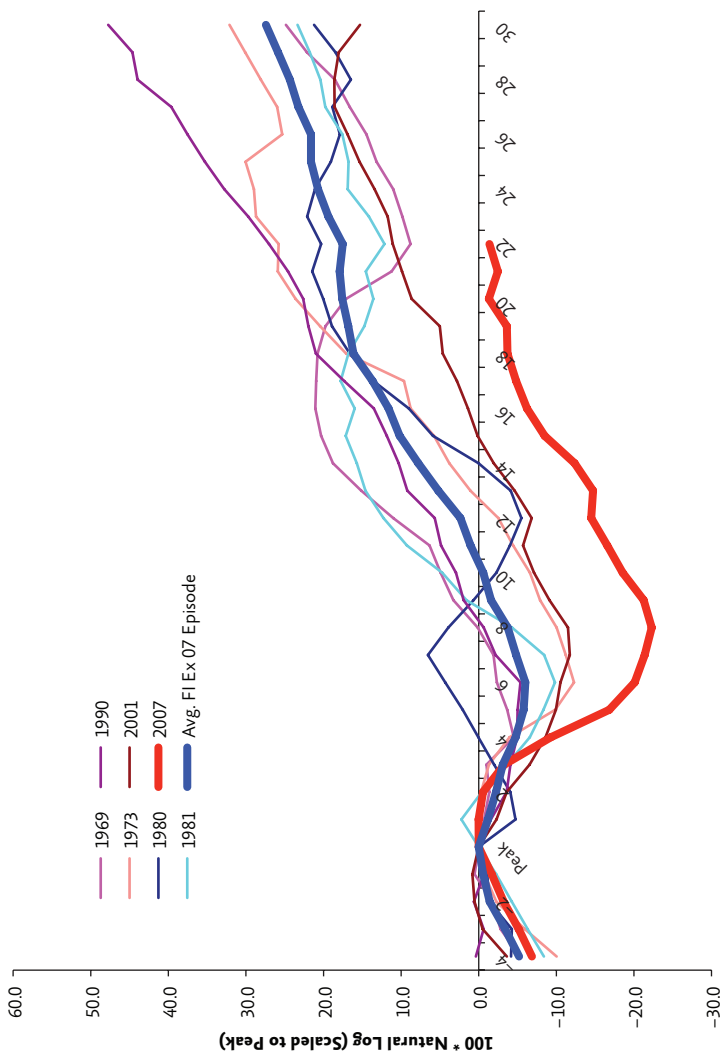


FIGURE 4.1 Real non-residential fixed investment—quarters after business cycle peaks.

Source: Morgan Stanley Research

may not persist. So, they remain underinvested relative to past economic cycles and recent share performance.

If true, we might have to wait until an exit from QE before an actual acceleration in capital expenditures on long-lived assets is observed. Company executives may then be in a position to evaluate their unaffected share price—that is, uninfluenced by QE—before committing to a more robust investing regime. Well-intended macro-policy—solving for higher share prices and lower market volatility by use of non-conventional tools—may have changed micro-behavior. Leading econometric models may be unable to account for such behavioral responses.

Ultimately, a sustainable equilibrium will be established between asset prices and the real economy. But given the novelty of the government's policy response, it is difficult to know whether the current mix of low market volatility, higher prices for risk assets, and modest economic recovery puts the United States on a path toward sustained improvement in the next year or two. In the alternative, the aggressive macroeconomic response may have lowered potential GDP and created a pretense of stability that is susceptible to an unexpected deterioration in conditions. Business leaders may well be confronted by the same riddle. It's no surprise, then, that capital expenditures continue to fall short of forecasts.

Closing comments

The efficacy of the US government's post-crisis macroeconomic policy response is the subject of considerable debate. The reaction function of key economic agents, however, is worthy of considerably more discussion and empirical assessment. We should seek to better understand the particular behavioral responses of economic agents to policymakers' novel designs.

The broad suite of new policies may be changing the micro-foundations of macro, threatening the supply and demand sides of the real economy. The new regulatory architecture might be altering the decision-making of credit providers and users alike. The resulting public utility banking model could well be causing banks and their customers to act differently than forecasted. Lagging business capital expenditures are another illustration of how the promised benefits of new macroeconomic policy may be faltering due to the behavioral responses of key economic decision-makers.

As a result, more of the burden of economic growth is being placed on the pocketbook of consumers. Yet, consumption spending has generally disappointed model-based predictions and policymakers' expectations. Consumers may have initially pulled back on their spending due to the shock caused by the panic of 2008. But, in spite of massive monetary intervention, consumers may continue to hesitate taking the bait, reckoning that the novel policy regime will not deliver a recovery nearly as robust as they had grown accustomed to observing in prior periods.⁷

Just five years after the financial crisis, the instinctive preference for stability over turbulence is understandable. But we should be humble in any undertaking that seeks to remove substantial turbulence, upend the business cycle, or reorder stability and growth in an economy that is dependent on millions of decisions made every day far afield from Washington.

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7. See, for example, Cochrane 2013.

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