

A Revolution in Monetary Policy: Lessons in the Wake of the Global Financial Crisis¹

Joseph E. Stiglitz

It is a real pleasure for me to be able to deliver this lecture in memory of the Reserve Bank of India's first Indian Governor, who set an example and a tradition which has resulted in the Reserve Bank of India being viewed as one of the exemplars of central banks around the world. As I shall comment later, one could not help but notice this in the aftermath of the 2008 Global Financial Crisis—which to a very large extent was brought about by failures of central banks in the United States and Europe. C.D. Deshmukh understood not only the importance of the financial sector to the functioning of an economy, but that to ensure that the financial sector fulfills its roles requires regulation—otherwise, there is a risk that it won't do what it should and that it will do what it shouldn't. He did not succumb to ideology that has plagued central banks in so many countries: he understood that the state may have to play an important role in providing credit, either directly or through regulation, especially as part of the early stages of the development process and in the rural sector.

The themes that I will take up today would, I think, resonate with Governor Deshmukh. I want to lay out a vision of what Central Banks should do, a vision that is markedly different than that which was fashionable in the years before the Great Recession.

It is understandable that the global financial crisis should give rise to considerable reflection among macroeconomists, and especially monetary theorists and policymakers. After all, their models didn't predict the crisis—the most important economic event in three quarters of a century. Economics is supposed to be a science, and the test of any science is its ability to predict; and if a sub-discipline can't predict something of this importance, then it *suggests* something is wrong.

I say *suggests* because devotees of the model claim that there are always random exogenous shocks that cannot be anticipated. But this crisis was not an exogenous shock: the credit bubble that brought the economy down was *endogenous*. It was a shock created by the market itself. And it was the kind of shock that the theory said couldn't happen: for if markets are rational, there won't be bubbles.

This is but one example of the many flaws in the prevalent paradigm that were exposed by the crisis. In this lecture, I do not want to dwell so much on the flaws in the economic theories and

¹ This lecture is given in Mumbai on January 3, 2013, to commemorate C.D. Deshmukh, who capped his 21 years in the Indian Civil Service with an outstanding stint as Governor of the Reserve Bank of India from 1943-1949. During his tenure, he oversaw the Bank's transformation to a nationalized institution, promoted regulation of banks, and established India's first financial institution for the provision of long-term credit to industry. He later served as Union Finance Minister, India's Special Financial Ambassador to America and Europe, and among many other notable achievements, made his mark in academia and public service. It is my honor to give this lecture in recognition of his deep contributions to India and to his field.

models that dominated mainstream thinking, including thinking inside many central banks, but on the central policy stances that typically followed—sometimes quite loosely—from those theories and models.

These theories and models not only contributed to the failure to see the crisis coming, but led some leading central bankers to argue that its effects were contained, even after the bubble broke.² They were also extra-ordinarily influential in shaping the policies that both contributed to the crisis and to its rapid spread around the world, and have contributed to the lack of effectiveness in responding to the crisis. A half decade after the beginning of America's recession, more than six years after the breaking of the bubble, unemployment in Europe and America remains unacceptably high, the GDP in many countries is still below the level attained before the crisis, a few countries are mired in depression, and the global economy is on the verge of another recession.

In this lecture, then, I will enunciate 14 lessons for monetary policy that I believe emanate from the recession. Some are controversial. Most reflect a marked departure from the stances taken by at least many monetary authorities.

1. *Self regulation doesn't work*

The notion that financial markets are self-regulating seems slightly quaint now, but we should not forget how widespread and deeply believed that doctrine was. That that was so is testimony to the ability of ideology to prevail over the lessons of history and theory. Financial markets have repeatedly been prone to bubbles, which when they burst would bring havoc in their wake.³ Conflicts of interest and predatory and abusive practices had repeatedly marked financial markets. These were among the reasons that the sector had become highly regulated. To think that somehow, things would have suddenly changed, beginning around 1980, was sheer fantasy.

Indeed, advances in economic theory had explained why unfettered markets—and unfettered financial markets in particular—were likely not to be efficient or stable, and why they were likely to be marked by abuses and exploitation.

The general theory of imperfect and asymmetric information, developed in the 1970s and 80s, had shown that whenever information is imperfect and asymmetric (that is, some individuals know things that others do not) and risk markets incomplete—that is, always—the economy is

² Bernanke said, as late as March 2007, that “the impact on the broader economy and financial markets of the problems in the subprime market seems likely to be contained.” Statement of Ben S. Bernanke, Chairman, Board of Governors of the Federal Reserve System, before the Joint Economic Committee, U.S. Congress, Washington, DC, March 28, 2007.

³ See, for example, Charles Kindleberger's *Manias, Panics, and Crashes: A History of Financial Crises* (New York: Basic Books, 1978).

not likely to be (constrained) Pareto efficient.⁴⁵ Adam Smith's invisible hand was invisible because it was not there. The theory also explained why risk markets are likely to be incomplete—why key risks could not be insured against.

The theory explained too why markets in which information was important were not likely to be fully competitive—for instance, someone who offered the same product at a lower price would not attract the entire market, as assumed in the conventional theory, simply because not everyone would know about the offer.

Moreover such markets could well be characterized by rationing—unemployment and credit rationing were real phenomenon, with important economic consequences.

Finally, markets in which information problems were important were likely to be marked by severe agency problems—where those making decisions might not fully reflect the interests of those on whose behalf they were supposed to be acting. Managers might not maximize shareholder value, let alone societal welfare.

These issues are of particular relevance to financial markets, precisely because information is at the center of what financial markets do. They are supposed to allocate scarce capital resources and manage risk, but what makes these tasks difficult and interesting are information imperfections, ascertaining the returns and risks associated, for instance, with different assets, determining which risks are best suited for different individuals, etc. That America's financial markets did an abysmal job in this, their central function, should be obvious. The failures were not, however, that of a single bank, or an isolated banker: they were systemic, suggesting that the problems that gave rise to them were systemic, as indeed they were.

Further, the reason that we care so much about failures in the financial system (or even of a single large bank) is that there are systemic consequences—there are large externalities on the rest of the economy.

The implication is that there is a need for strong governmental regulation of financial institutions. Much of the rest of this lecture will be concerned with the design of a good regulatory system.

This brings me to the second important lesson:

⁴ B. Greenwald and J. E. Stiglitz, "Externalities in Economies with Imperfect Information and Incomplete Markets," *Quarterly Journal of Economics*, Vol. 101, No. 2, May 1986, pp. 229-264

⁵ The term "constrained Pareto optimal" refers to the fact that the costs of creating new markets and obtaining more information are included in the analysis: information is not a free good.

2. *Regulation is needed for a well-functioning market and economy.*

Financial sector regulation is required both because it is a sector characterized by large market failures, and where there are systemic consequences (large externalities) arising from these market failures. Regulators need to bear this in mind, as they think both about the need for regulation and its design. In subsequent sections (in particular, points 3-7 below), I touch on the multi-faced nature of this regulation, a long list that includes ensuring the safety and soundness of individual banks and systemic stability; maintaining competition; promoting access for all; protecting consumers and investors from exploitation, predation, manipulation, and a wide range of abusive practices that have become part of every-day business in the sector; and enhancing transparency. While regulations and regulators may be imperfect, the track record of success—in India, and even in the United States in the decades after the last great crisis, the Great Depression—shows that good regulation is both possible and can make a difference.

In the aftermath of the financial collapse in 2008, Alan Greenspan, the chairman of the Federal Reserve, lamented about the flaw in his reasoning.⁶ He was surprised that the banks had not managed their risk better. I was surprised at his surprise: after all, banks had repeatedly not managed risk well. Why did he think they would do so in the twenty first century, when they had done such a bad job in previous centuries? Moreover, anyone looking at the incentive structures facing banks and bankers should have understood that they had incentives to engage in excessive risk taking and short sighted behavior. They acted as any economist should have predicted that they would.

Even if there had not been such perverse incentive structures, those in the financial sector have often been prone to irrational exuberance. Even Greenspan had commented on this. History was replete of instances of such irrational exuberance. What distinguishes banks from other institutions is that in this sector, irrational exuberance has systemic consequences—there are large externalities. Bankers with irrational exuberance are gambling with other people's money,

But the problems go deeper. Bank managers and industry leaders often seem to show remarkable ignorance of some of the basic principles of risk—including the Modigliani-Miller theorem, which asserts that increasing leverage doesn't increase market value—it doesn't create wealth, it simply shifts more risk upon the residual equity base. (Of course, there could be an

⁶ In Congressional testimony on October 23, 2008, Greenspan described being “in a state of shocked disbelief” that the lending institutions' self-interest had not protected shareholders' equity. Testimony available at

<http://democrats.oversight.house.gov/images/stories/documents/20081023100438.pdf> (accessed December 14, 2012).

increase in value because of market imperfections, either because (a) market participants are irrational, and don't fully understand the increased risk imposed on equity; (b) shareholders as a whole may gain because of the shift of risk to the government, resulting from an increase in what might be termed the "bail-out subsidy"; or (c) distortions in the tax code. But none of these are reasons to countenance an increase in leverage.)⁷

Thus, the widely held notion in the banking community that increased capital requirements (say under Basel III) will increase the cost of borrowing either reflects a profound misunderstanding of risk among those in the banking community; and/or their understandable desire to increase the subsidy the sector gets from the public, disguising this in terms of the benefits to their customers; and/or their understanding of risk, but their understanding that other market participants don't understand risk.

This implies that there should be strong regulations on the incentive structures of banks—it is not just the size of the bonuses that should be of concern, but the design. Higher deposit insurance fees levied on banks engaged in higher levels of risk taking might also discourage excessive risk taking, offsetting the implicit subsidy associated with government bailouts. But because of pervasive irrationalities, we cannot rely on incentive structures to curb excessive risk taking. There have to be strong restrictions on the risk taking, including the degree of leverage. Excessively rapid expansion of a bank's assets, particularly within a given area, are almost a sure sign of excessive risk taking. There need to be "speed bumps." The costs of such restriction—a slight postponement of perhaps some socially profitable lending—is far less than the benefit—avoiding the kind of financial collapses that have occurred repeatedly.

It is natural to ask why so many financial institutions chose to adopt incentive structures that seem so perverse. Traditionally, one of the purported virtues of the market economy is that it provides not just strong incentives but well designed incentive structures. That has obviously not been the case. The explanation lies in deep rooted failures in corporate governance. Much of our thinking about the market economy is based on simple models of Marshallian nineteenth century economics, with little relevance to understanding the functioning of managerial and corporate capitalism of the twenty-first century. (This illustrates a more general theme, to which we return later in this lecture: The financial sector cannot be viewed as separate from the rest of the economy. It is affected by the laws and mores that affect other sectors—laws like those related to bankruptcy and corporate governance, and mores such as those that affect the acceptability of exploitation and the primacy of material values and incentives. I will have little

⁷ For a more extensive discussion of these issues see "On the Need for Increased Capital Requirements for Banks and Further Actions to Improve the Safety and Soundness of America's Banking System," witness testimony of Joseph E. Stiglitz to the Senate banking Committee, August 3, 2011, available at http://banking.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=97cec3e1-2d1d-44fa-acd9-a0a1bc640bc4 (accessed December 14, 2012), and A.R. Admati, P.M. DeMarzo, M.F. Hellwig and P. Pfleiderer, 2010, "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive," Stanford University Working Paper No. 86.

to say about these issues of social mores, except to note that as trust and social capital weakens, the need for public regulation is enhanced.)

There needs to be deep reform of corporate governance laws, providing in particular better provisions for say in pay.

The problems of distorted incentives are especially important with financial institutions which cannot be allowed to fail because of the systemic consequences. This brings me to the third major lesson:

3. *Banks that are too big to fail, too interconnected to fail, and/or too correlated to fail present a real danger to the financial system and the economy*

Financial institutions which are too big to fail, too interconnected to fail, or too correlated to fail have an incentive to gamble: if they win, they walk off with the profits, if they lose, the public picks up the losses. But the problems are deeper: banks have an incentive to become too big, too intertwined, and too correlated to fail; and because of the implicit guarantee that is provided to such institutions, they have an advantage over other institutions. The private returns to growth in size and to interconnectedness exceed by a large measure the social returns (which may, in fact, be negative.)

One aspect of “correlated” risk taking is the herding behavior that marks credit bubbles. Such irrational bubbles are a major source of macroeconomic volatility. In the past, regulation has typically focused on the safety and soundness of individual banks, but once we recognize the central role of the correlated behavior of banks in causing macroeconomic fluctuations, we have to ask how can we design a regulatory structure to reduce the scope and severity of such finance induced fluctuations.

There should be strong regulations restricting the size and interconnectedness of banks. (Some of these restrictions relate to derivatives and CDS’s, are discussed under point 6 below.) Taxes on large banks should be levied to “level the playing field.”

Reducing the risk of “too correlated to fail” is more complex, and requires ensuring a diversity of financial institutions, with different ownership, incentives, and objectives.⁸ This argues strongly against the universal bank model. While more specialized financial institutions may face a greater risk of bankruptcy, the risk of systemic failure is greater where all banks are universal banks, and the social costs of systemic failure is an order of magnitude greater than the costs of the failure of individual institutions. (Much of that cost can be handled through diversification of the ownership shares.)

⁸ This was a key point emphasized in *The Stiglitz Report: Reforming the International Monetary and Financial Systems in the Wake of the Global Crisis*, with Members of the Commission of Experts of the President of the United Nations General Assembly on Reforms of the International Monetary and Financial System, New York: The New Press, 2010.

Macro-prudential regulation is essential to prevent the growth of credit bubbles and other forms of macroeconomic volatility. Of particular concern is collateral based lending—where the value of the collateral, and thus the magnitude of lending, increases in a bubble, thus reinforcing the bubble. By demanding high lending standards and increased collateral in boom periods, the financial system can act as an automatic stabilizer, rather than the automatic destabilizer that it is under current arrangements.

4. *The Pervasive Imperfections in Competition need to be curbed*

In most countries, the financial sector is far from perfectly competitive. In many markets, even in advanced countries, there are only one or two lenders to small businesses. In many countries, banks have acted collusively to obtain outsized returns from their control of the payments mechanism. In most countries, the persistence of returns that are far higher than could be justified by effective competition in certain lines of business are suggestive of limitations of competition.

Imperfections of information naturally give rise to imperfections in competition, so we should not be surprised that even in countries where there are many banks, markets are far from competitive. Because markets that are fully transparent are more competitive, and less profitable, there are strong market incentives for reducing and impeding transparency. That is just one of the reasons that we need strong regulation ensuring transparency, including—and especially—for derivatives (see the discussion below).

But even with reasonable laws governing transparency, effectively enforced (not the situation today), in many areas within the financial markets competition is likely to remain limited. We can however circumscribe the worst practices. Modern technology has, for instance, made it possible to have an efficient electronic payments mechanism, where it would cost but a fraction of a cent to transfer money from a customer's bank account to the merchant from which he has purchased a good. But the banks, in their attempt to extract monopoly rents out of their control of the payments mechanism, have resisted the creation of this kind of an electronic transfer mechanism.

There need to be strong restrictions on credit card fees, interchange fees charged merchants, and other anti-competitive practices. Restrictions on the size and ranges of bank activities and the interconnectness of banks would not only increase systemic stability, it would also enhance competitiveness.

5. *Consumer and investor protection: information asymmetries and exploitation*

In most countries, the financial sector has been actively engaged in exploiting poorly educated and financially uninformed users. They have engaged in deceptive practices, and even in market manipulation and fraudulent practices with seemingly sophisticated customers. They have demonstrated a remarkable level of moral turpitude. This has contributed not only to creating

high levels of inequality—moving money from the bottom and middle of the pyramid to the top—but also to a lack of trust in markets and the market economy. Markets cannot function well without such trust—and this is another way in which the banks have exhibited enormous adverse externalities. More generally, there are large costs to the sector's rent seeking activities—money doesn't move from the bottom to the top costlessly; the benefits to those at the top are less than the losses to the rest.

There needs to be strong consumer protection legislation, a regulatory framework along the lines of the US Consumer Financial Protection Bureau. There need to be strong restrictions on usury, overdraft fees, credit card fees and penalties, predatory lending, etc.

But the consumer protection agency needs to do more than just protect against abuses of the private financial sector. It needs to innovate—to design, for instance, mortgage products that help ordinary citizens manage the risks of home ownership.

The London Interbank Offered Rate (Libor) scandal illustrates the potential depth of the consequences of unfettered markets: there is a \$350 trillion derivative market and somewhat smaller loan market indexed to a number that we now know is manipulatable and manipulated, that doesn't represent what the words seem to suggest it represents.

The continuation of the market linked to Libor is itself scandalous. There is ample evidence that even today it does not reflect any true lending rate: is it conceivable that interbank lending rates for a particular bank whose cds's spread have soared barely move?

Contracts should be indexed to T-bill rates, which are less manipulable, and may be even more linked to the kinds of risks which these indexed contracts are suppose to handle.

But even if the T-bill rate is less correlated with the risks that individuals care about, the advantages in the reduction of potential for manipulation and exploitation make the movement away from Libor desirable.

6. *Derivatives and CDS's: We need to make Markets Work like Markets*

Derivatives and CDS's bring together many of the issues discussed so far: the market is far from competitive, with a few big banks deriving significant returns (in the billions) from these activities, making it understandable why they resist regulation so strongly. The lack of transparency facilitates market manipulation and a lack of competition, enhancing bank profits, but at the same time posing significant systemic risk, which became so evident in the 2008 crisis. There is also an element of regulatory arbitrage, or what might more accurately be described as regulatory deception. If regulators treat a bank's holding of a risky bond combined with a CDS (supposedly an insurance policy on the bond) as if the bank were holding a safe asset, it allows

the bank to lend more money—to leverage its portfolio even more. But the insurance may be phony insurance—sold at a low price because the benefits would never be paid by the insurance company because in the event of the insured against event occurring, the insurance would default: this was precisely what happened with AIG.

Moreover, by failing to net out their positions and by not trading through exchanges, the banks increase systemic risk and reduce transparency, another instance of externalities imposed upon others. Indeed, they reduce the overall efficiency of the market, since the standard arrangements undermine principles of market decentralization. For example, with large credit default swaps not cleared through an adequately capitalized clearing house, knowing the risk of default of any one firm required knowing the risk position of every firm with which it was financially interlinked—in a vast, difficult, simultaneous equation system.

Transparency and the euro-crisis

The euro crisis has once again brought out the consequences of the lack of transparency in derivative positions. No one knew for sure the full consequences of a Greek restructuring, partly because no one knew who bore the risks, or what banks may have taken a speculative positioning. One of the explanations for the ECB's hard-to-justify position that the restructuring should be done in a way that was not a credit event—that is, so that the banks who had bought insurance would not be repaid—was that they were more concerned with the banks who had taken a speculative position.

Government insured financial institutions (whether the insurance is explicit, or implicit—as a result of being too big to fail) should not be allowed to issue derivatives. While it is not clear whether such financial products are insurance products or gambling instruments, they are not loans, there is no justification for government encouraging them through implicit or explicit insurance. There is no evidence of compelling economies of scope to offset the market distortion arising from such subsidies.

Derivatives should be traded over adequately capitalized exchanges and positions should be transparent. Some critics have worried that trading over exchanges will concentrate risk; there could be systemic consequences to the failure of an exchange. The response is to increase capitalization and to require all those who make use of the exchange to be jointly and severally liable for the losses. The rest of society should not have to bear the consequences of their failure at risk management.

It should be clear that Dodd-Frank went only a little way towards addressing the problems posed by derivatives. A fundamental flaw of Dodd-Frank was that it did not recognize the deep disparity between private rewards and social returns; it did not recognize that market participants had incentives to design transactions in ways that increased systemic instability *and* decreased the economy's efficiency, either in gathering and disseminating information or in assessing or distributing risk.

Derivatives and other new financial productions were championed as part of financial innovation. But as Paul Volcker pointed out, it was hard to see that any of this financial innovation had led to faster real economic growth. It had contributed to more inequality—to greater wealth for the bankers—but it was hard to see societal benefits. Indeed, it has been associated with more instability.

We now understand better why that is the case. Much of the financial innovation was not directed at improving the efficiency of the economy and enhancing the ability of ordinary Americans to manage the risks which they faced. Some of the innovations were directed at improved ways of exploiting poor Americans; some at regulatory arbitrage; some at new forms of market deception. In each of these cases, *there were marked discrepancies between social and private returns*. Whenever there are such discrepancies, not only will markets not be efficient, innovation will not be directed at enhancing societal welfare.

The one part of the agenda that *seemed* to have some rationale was called “completing the market.” Since the earlier work of Arrow and Debreu, one of the widely recognized market failures was the absence of key risk markets. The notion was that the new products enabled individuals to manage risks better. Ironically, they were typically priced by using “spanning” theorems—the new products were viewed as a linear combination of existing products, or at least near enough so to be able to base prices on these related products. In this view, the real advantage of the new products was the lower transactions cost. But as those in the financial sector heralded these benefits, total transactions costs soared—to the point that *just* profits in the financial sector amounted to 40 percent of all corporate profits.

But there is a basic result called the theory of the second best, which says that when there are many market distortions, eliminating one of them may actually make matters worse. In the presence of imperfect risk markets, for instance, removing trade barriers may make *everyone* in both countries worse off.⁹ In the presence of imperfect risk markets, capital market liberalization may increase volatility in consumption and make the economy worse off.¹⁰

In this case, matters may be even worse. When individuals have different assessments of risk (the probability of a given event), they can through buying and selling derivatives create pseudo-wealth—both parties believe that they will win the bet, and hence both believe that they are well off. In reality, of course, this is just a zero sum game, and next period, one will be proven right, the other wrong. But at that point, there can be large destruction of this pseudo-wealth, with

⁹ See D. Newbery and J. E. Stiglitz, “Pareto Inferior Trade,” *Review of Economic Studies*, 51(1), January 1984, pp. 1-12.

¹⁰ See J. E. Stiglitz, “Capital Market Liberalization, Globalization, and the IMF,” in *Capital Market Liberalization and Development*, J.E. Stiglitz and J.A. Ocampo (eds.), New York: Oxford University Press, pp.76-100.

severe macroeconomic consequences. Of course, if only two individuals engaged in such bets, the macroeconomic consequences would be negligible. But when they are engaged in by large numbers, there can be severe consequences.

This provides a still further reason for restricting derivatives—or at the very least, making sure that they are not facilitated and subsidized, implicitly or explicitly, by government policy.

Unfortunately, not only do we encourage the derivatives through allowing them to be sold by government-insured institutions, we implicitly encourage them through bankruptcy laws that give them priority in bankruptcy.

It is imperative for government to try to correct discrepancies between social returns and private rewards because in the presence of such distortions, not only will markets be inefficient, but innovation will be misdirected.

Legal frameworks—corporate governance laws, competition laws, bankruptcy laws, financial sector regulations—provide the rules of the game, affect the distribution of income and the relationship between social and private returns, and can be thought of as providing (implicitly) the basis of industrial policy, encouraging some sectors at the expense of others. The legal framework in some countries, such as the United States, has resulted in a distorted and bloated financial sector. For example, among the reforms needed in our bankruptcy law are the following:

Bankruptcy law should treat derivatives junior to workers and senior creditors. Bankruptcy law should be used to encourage transparency: any derivative not registered would be junior to all other claimants; and losses on derivatives that are not fully disclosed would not be tax deductible.

7. *The shadow banking system*

Prior to the crisis, many thought that the shadow banking system did not pose systemic risk. An investment bank that failed would (some believed) have no systemic consequences. We now know that that is not true. Even a large insurance company can pose systemic risk.

Much of the shadow banking system arose to circumvent regulations imposed on commercial banks. And much of the theory providing justification for the shadow banking system has been put into question by the crisis. For instance, while the benefits of risk diversification through securitization are well recognized, the crisis has exposed the downside to securitization:

One of the arguments for institution- (bank-) based lending is the internalization of information externalities. Securitization offered advantages in risk diversification, but these advantages were

more than offset by the attenuation of the quality of information. A great deal of attention has been focused recently on the failures of the rating agencies; but the problems associated with the inadequacy of incentives for gathering good information are partially inherent and have long been recognized: if markets perfectly conveyed information (as the advocates of informationally efficient markets claimed), then there would be no incentives to gather information.¹¹ Earlier, we noted that private decisions with respect to sharing and transferring risk are not, in general, socially optimal. Even worse, the way private markets balance risk and information efficiency is not, in general, optimal. Systems that disperse risk inherently weaken “accountability” and incentives not just for gathering information, but for ensuring the “quality” of the financial products being produced.

If diversification leads to an attenuation of incentives for obtaining good information,¹² it can lead not only to poorer overall performance, but more instability. Hence, the trade-off is markedly different than has traditionally been envisaged in the securitization literature, where it was presumed that securitization would lead to enhanced systemic stability. Different policy frameworks (rules of the game) can lead to different financial architectures; and different financial architectures balance the trade-offs differently, some better than others, some enhancing the ability to absorb small risks, but making the economy more prone to systemic risk in the event of a large shock, or a set of correlated smaller shocks.

The shadow banking system has to be tightly regulated, e.g. with tight leverage (capital and liquidity) requirements—and because wholesale deposits may be even more fickle than consumer deposits in commercial banks, the requirements may even have to be higher. Originators of securities have to have “skin-in-the game,” i.e. they have to retain at least a 10% stake in the security.

There need to be deep reforms in the credit rating agencies. The quasi-public role (delegating responsibility in ascertaining which securities are safe enough to be held by a pension fund) needs to be re-examined. There needs to be standardization of the ratings. There needs to be a rating of the rating agencies performance. They need to be held more accountable. (Litigation in Australia where the credit rating agencies were found culpable is a beginning in doing so.)

8. *The centrality of banks and the necessity of central banks using a full range of instruments*

¹¹See Sanford Grossman and J. E. Stiglitz, “Information and Competitive Price Systems,” *American Economic Review*, 66(2), May 1976, pp. 246-253, and Sanford Grossman and J. E. Stiglitz, “On the Impossibility of Informationally Efficient Markets,” *American Economic Review*, 70(3), June 1980, pp. 393-408.

¹²As in Calvo, Guillermo A. and Mendoza, Enrique G., 2000. “Rational contagion and the globalization of securities markets,” *Journal of International Economics*, Elsevier, 51(1), pp. 79-113

Banks, and their failures, were central to the crisis of 2008. But curiously, banks play little role in standard macroeconomics models, in which the financial sector is often summarized in a money demand-and-supply equation. These models typically didn't model the banking sector carefully—or at all. Such a reduced-form approach may suffice in normal times, but not now, or in other times of crisis, such as the East Asia crisis.¹³

The importance of banking (including the shadow banking system), as opposed to the provision of credit through markets, is rooted in information economics. In particular, they are the repository of institutional knowledge (information) that is not easily transferred, and the internalization of information externalities provides better incentives for the acquisition of information, but, as we have noted, at the cost of a lack of *direct* diversification of risk.¹⁴

It should now be clear why an analysis of banking has to be central in any macroeconomic analysis: A key channel through which monetary policy affects the economy is the availability of credit and the terms at which it is available. It is the lending rate that firms can borrow at that they care about—not the interest rate at which the government can borrow. The spread between the two can and does vary greatly; banks are central to the setting of the lending rates at which small and medium sized enterprises can borrow. Government policy can affect the spread through both conventional monetary instruments and a variety of regulatory policies, and monetary authorities need to be sensitive to the various market forces which might affect the spread, so that they could take offsetting actions.

If we are to understand the impact of monetary policy, we must better understand how what Central Banks do (either in conventional open market operations, reserve requirements, interest provided on reserves, or regulatory requirements) affects the behavior of banks and the shadow banking system. This is especially so because banks are still the locus of most SME borrowing, and because variability in SME investment and employment is central to understanding macroeconomic variability.

Greenwald and Stiglitz¹⁵ provide a beginning of a research program of creating macroeconomic models where banks play a central role and are explicitly modeled. Credit availability too plays a central role—rightly so, because credit markets are often characterized by credit rationing. If there were no credit rationing, there would be no liquidity crises.

¹³ The irony is that many of the proponents of these models made a great fuss over the fact that they were *structural*, i.e. deriving savings behavior from intertemporal utility maximizing behavior.

¹⁴ Though shareholder risk diversification can still occur. The fact that this is so raises questions even about the validity of the risk argument for diversification through securitization.

¹⁵ B. Greenwald and J.E. Stiglitz, *Towards a New Paradigm in Monetary Economics*, Cambridge: Cambridge University Press, 2003.

Already, though, there are clear policy prescriptions both about policies aimed at macro-stability (preventing crises) and in restoring the economy after an economic crisis—prescriptions that may differ markedly from those arising out of the standard conventional (DSGE) models.

Quantities (credit availability) and liquidity can be as, or more important, than interest rates.

The interest rate that matters is the lending rate, not the Treasury bill rate, and this should be the focus of attention.

Credit availability and the terms at which banks lend money is affected by the T-bill rate (which in turn is affected by open market operations) but also by a host of regulatory measures, such as capital requirements. These regulatory instruments have first order macroeconomic consequences and should be treated as macroeconomic instruments. In some cases, they can be far more effective. Increasing margin and down payment requirements would have been far more effective in curbing the tech and housing bubbles than just adjusting interest rates.

Changes in technology and market structure and some regulations can affect the effectiveness of other instruments. In particular, the elimination of regulation Q has meant that changes in T-bill rates have a smaller wealth-effect on banks, so that much of the effect of conventional monetary policy is through substitution effects, which typically are far weaker.

Most importantly, central banks need to use all of the instruments at their disposal. The artificially self-imposed constraint adopted by many central bankers influenced by neo-liberal doctrines—that central bankers should limit themselves to adjusting short term interest rates—has been costly. It was predicated on the false notions that markets were always efficient, and therefore central banks should minimize their interventions. But all central banks intervene—that is why they were created. And there is no theorem that says that optimal intervention should be limited to short term rate setting. Indeed, in other contexts, such as tax policy, we know that optimal intervention (taxation) involves imposing a multiplicity of interventions (taxes)—it is better to have a large number of small interventions than one large intervention¹⁶.

The crisis has forced many Central Banks to rethink their doctrinaire policies. Even the Fed has become more active in the use of alternative instruments. I should say a word a few words later about one such instrument, quantitative easing.

9. ***Broader objectives—beyond inflation—as well as more instruments***

In the aftermath of the crisis, it is evident that the single-minded focus of some central banks on inflation was misplaced. The losses in welfare from low to moderate inflation were of orders of magnitude smaller than the losses from the financial collapse. But the underlying hypothesis, held by many central bankers, that keeping inflation low was necessary, and almost sufficient,

¹⁶ P.P. Ramsey, "A Contribution to the theory of Taxation." *Economic Journal* (1927), 47-61.

for stable and strong growth has been shown to be wrong—and was never really justified by sound economic models. By diverting attention from what was really important, inflation targeting may accordingly not only have failed to enhance macro-stability, it may actually have contributed to instability. (Of course, high levels of inflation are a problem, but they are often symptomatic of other more general problems in the economy.)

The period immediately before the crisis showed another aspect of the destabilizing effects of inflation targeting: developing countries exposed to an adverse supply shock which results in “imported” inflation increased interest rates, slowing the economy down even more, and imposing even greater costs on workers already suffering from high food and energy prices. The only way that the increased interest rate would have had a significant effect on inflation was by imposing such stress on the non-traded sector and on wages that prices of non-traded goods and labor declined enough to offset the rising international prices. But then the cure would have been worse than the disease.

The more general point is that the response to any shock to the economy should depend on the nature of the shock. If it is, for instance, a demand shock, then it *may* be appropriate to curb demand through interest rate policy.

This and the preceding point illustrate another more general one: for years, Tinbergen's approach to policy has been extremely influential. If the number of instruments equals the number of objectives, it has been argued that one should “match” instruments with objectives, and different institutions should be assigned an instrument and a target for which they are responsible. The central bank should be responsible for inflation, using its instrument of choice, the interest rate. Tinbergen focused on controllability, but this system has been argued for on the basis of accountability: there is a simple metric (the level of inflation), in this view, by which central bank performance can be judged.

But Tinbergen's analysis was conducted in a highly stylized linear model, in which with n instruments one could control n objectives. In a complex non-linear system with risk—including instrument uncertainty¹⁷—and where one is concerned not just with the ultimate equilibrium (which in practice may never be attained) but with real-time performance—one should use all the instruments at one's disposal, and coordination among policymakers is essential. There are no general theorems on decentralization—to the contrary, what theorems we have relate to the dangers of decentralization.

¹⁷ That is, one cannot be sure about the consequences of any action. See, e.g. B. Greenwald and J.E. Stiglitz, “Toward a Theory of Rigidities,” *American Economic Review*, 79(2), May 1989, pp. 364-69.

In practice, this means that monetary and fiscal policy needs to be coordinated, and it makes no sense for the body controlling one of these to be allegedly independent, while the one responsible for the other is politically accountable, a point to which I shall return shortly.

Central banks should broaden their objectives beyond inflation. They need to focus too on employment, growth, and financial stability. And monetary policies need to be coordinated with fiscal policies.

10. ***The complex effects of monetary policy: asymmetries, irreversibilities, sectoraleffects, distributionaleffects***

Monetary authorities need to be especially sensitive to asymmetries in "controllability" and the costs associated with the conduct of monetary policy. While monetary policy may be an effective instrument in constraining output, it may be far less effective in stimulating the economy in a deep downturn. This, in turn, implies asymmetries in the conduct of monetary policy. There is always going to be uncertainty, for instance in judging the level of employment or growth at which inflation starts to increase or in judging whether there is a bubble. But a slight restraint on the economy in dampening a potential bubble has a miniscule cost relative to the costs imposing by the breaking of a bubble.

This is an example where there are long-term, hard-to-reverse effects of mistakes. There are other examples: prolonged high unemployment gives rise to hysteresis effects, as skills atrophy.

So too, advocates of monetary policy as a control instrument (over fiscal policy) stress its flexibility, the ability to fine tune policies as new information comes in. But they fail to note that some parts of the economy are more interest-sensitive than others, and some parts are more sensitive to the availability of bank credit than others. Hence loosening and tightening of credit induces more volatility in some sectors than others, and because of imperfections in risk markets, this imposes significant costs on these sectors. In a sense, the way monetary policy is conducted distorts the economy.

At the same time, the way monetary policy is conducted can have significant distributional effects. While it is often asserted that inflation is the cruelest tax, in advanced countries at least we have protected the poor against much of the consequences, since social security and other programs are often indexed to inflation. With competitive labor markets, wages tend to rise with inflation, and so even workers are protected. (Sometimes it seems that this is not the case, but that is because the shocks to the economy that set off inflationary episodes often are shocks that affect labor productivity; we confuse correlation with causation.) Inflation has redistributive effects--against holders of long term bonds. But fighting inflation by raising interest rates and increasing unemployment also has distributive effects—not only is the cost of the higher unemployment borne directly by workers, but workers suffer doubly as the higher

unemployment exerts downward pressure on wages, and triply, as lower GDP leads to lower tax revenues and cutbacks of public programs aimed at the bottom and middle.

Not only have monetary authorities often failed to note the significant distributive effects of their policies, the models on which they rely have not given them the prominence that they should. Even if one did not put much weight on inequality, inequality can have large macroeconomic effects. My own work (summarized in my recent book *The Price of Inequality*)¹⁸ highlights this. So too did the International Commission of Experts appointed by the President of the UN General Assembly examining the causes of the 2008 crisis.¹⁹ And so too has the IMF, which has noted the systematic relationship between inequality and instability.²⁰

While I can't in this brief lecture go into all the channels through which this occurs, let me note one that was evident in the run up to this crisis. As incomes of most Americans stagnated and declined, they incurred greater indebtedness as they strived to maintain their standards of livings and to keep up with those at the top who were doing so well. Had monetary authorities not offset the effects of growing inequality (because the marginal propensity to consume of those at the top is so much lower at the top than at the bottom and middle, as income shifts from the middle and bottom to the top total consumption demand is lowered) by lowering interest rates and relaxing regulations, thereby helping create a housing bubble, aggregate demand would have been lowered, and unemployment would have increased. But such actions provided only a temporary palliative. The temporizing was sowing the seeds of destruction: it was simply a matter of time before the bubble which sustained the economy, offsetting the effects of the growing inequality, broke. But the period of recovery, during which actual output remains substantially below potential output, may be longer and the costs far greater than the benefits and duration of the bubble. And this is especially so when the underlying problem is not addressed; for the downturn itself gives rise to adverse distributional effects which weaken the economy further.

Monetary authorities need to be more sensitive to the distributive and sectoral consequences of their policies, and to the fact that some mistakes--letting bubbles grow, or allowing unemployment to rise in an excessive zeal for fighting inflation--have long term consequences which are hard to correct.

11. ***Limited effectiveness of monetary policy and the channels of monetary policy: exploiting market imperfections***

¹⁸*The Price of Inequality: How Today's Divided Society Endangers Our Future*, New York: W.W. Norton, 2012; see also J. E. Stiglitz, "Macroeconomic Fluctuations, Inequality, and Human Development," *Journal of Human Development and Capabilities*, 2011, 13(1), pp. 31-58.

¹⁹ Available as *The Stiglitz Report: Reforming the International Monetary and Financial Systems in the Wake of the Global Crisis*, Op.cit.

²⁰ See Andrew G. Berg and Jonathan D. Ostry, "Inequality and Unsustainable Growth: Two Sides of the Same Coin?," IMF Staff Discussion Note, April 8, 2011, available at <http://www.imf.org/external/pubs/ft/sdn/2011/sdn1108.pdf> (accessed December 14, 2012).

This discussion has highlighted one of the lacuna in the models used by many monetary authorities--the lack of attention to distribution. Earlier remarks highlighted other lacuna--the lack of attention to banks and the details of the financial system more broadly. But these are not just mistakes of modeling, about which I have written more extensively elsewhere²¹, but they lead to misguided views about the channels through which monetary policy affects the economy, and indeed, the very reasons that monetary policy affects the economy. And without understanding these channels, one can't understand why sometimes monetary policy is less effective than at other times, nor can we design policies to maintain stability or restore the economy to full employment.

The effectiveness of monetary policy hinges critically on certain market imperfections.²²

Some years ago, I proved a generalization of the Modigliani-Miller (MM) theorem, which had shown the irrelevance of corporate financial policies, for the public sector.²³ I showed that, under the idealized conditions under which the MM theorem held, public financial operations, such as a change in the maturity structure of government debt, should have no effect. (The result could also be thought of as a generalization of the Barro-Ricardo theorem, suggesting that government debt itself had no effect.) In a simple model with infinitely lived individuals, putting aside any distributive effects, we owe money to ourselves, so government debt is simultaneously a liability and an asset. That that is so provides an important critique to those excessively worried about government debt, at least when it is internally held (it's another matter when the

²¹J.E. Stiglitz, 2011, "Rethinking Macroeconomics: What Failed and How to Repair It," *Journal of the European Economic Association*, 9(4), pp. 591-645; J. E. Stiglitz, *Freefall: America, Free Markets, and the Sinking of the World Economy*, New York, W.W. Norton, 2010.

²² This section of my lecture is adapted from my paper, "Monetary Policy in a Multi-Polar World," presented to an IEA Roundtable on capital flows at Izmir, Turkey on November 1-2, 2012

²³ That work itself was based on my generalization of the MM theorem (J. E. Stiglitz, "A Re-Examination of the Modigliani-Miller Theorem," *American Economic Review*, 59(5), December 1969, pp. 784-793; J. E. Stiglitz, "On the Irrelevance of Corporate Financial Policy," *American Economic Review*, 64(6), December 1974,), work which itself, together with J. E. Stiglitz "Information and Capital Markets," in *Financial Economics: Essays in Honor of Paul Cootner*, William F. Sharpe and Cathryn Cootner (eds.), Prentice Hall, New Jersey, 1982, pp. 118-158; reprinted in *The Selected Works of Joseph E. Stiglitz, Volume II: Information and Economic Analysis: Applications to Capital, Labor, and Product Markets*, Oxford: Oxford University Press, 2013, pp. 55-84), explained the limitations on the theorem. For instance, in "On the Irrelevance of Corporate Financial Policy," *American Economic Review*, 64(6), December 1974, pp. 851-866, I showed the irrelevance of corporate financial policies in a general equilibrium model, under much more general conditions than those that Modigliani and Miller had established the result.

I subsequently extended these results to the public sector in "On the Almost Neutrality of Inflation: Notes on Taxation and the Welfare Costs of Inflation," in *Development in an Inflationary World*, M. June Flanders and Assaf Razin (eds.), New York: Academic Press, 1981, pp. 419-457; "On the Relevance or Irrelevance of Public Financial Policy: Indexation, Price Rigidities and Optimal Monetary Policy," in *Inflation, Debt and Indexation*, R. Dornbusch and M. Simonsen (eds.), MIT Press, 1983, pp. 183-222 and of *Economic Education*, 19(2), Spring 1988, pp. 171-177; and "On the Relevance or Irrelevance of Public Financial Policy," in *The Economics of Public Debt*, Proceedings of the 1986 International Economics Association Meeting, London: Macmillan Press, 1988, pp. 4-76.

debt is held by foreigners, because then the debt amounts to a diminution in the country's "net worth.")

The intuition, of course, is simple, and it is the same that underlies the Barro-Ricardo analysis (in its general equilibrium form): if the government borrows more now (say, instead of paying for current expenses by raising taxes), to be repaid at some later date, the effect can and will (in general equilibrium) be precisely offset by the representative consumer saving more, and using the funds to repay the government debt later. But in the general equilibrium formulation, there can be multiple heterogeneous individuals, and the result holds, assuming, of course, that those who would have paid the taxes now pay the "equivalent" amount later, i.e. that there are no distributive consequences to the postponement of the taxes. And the same holds if the government decides to raise more funds by a sequence of short-term borrowings, rather than by long term debt.

The empirical evidence is overwhelming that the Barro-Ricardo theorem, and my generalization of it, are wrong.²⁴ The question is not the validity of the proposition, but why it fails. And what insights does this provide us into capital markets and the workings of monetary policy?

Distributive effects, capital constraints, and seeing through the public veil

It should be obvious, as we have already noted, that it is hard to avoid distributive effects and political economy considerations (the absence of which are essential to the validity of the Barro-Ricardo result). In the limiting case, with an overlapping generations model, the decision to postpone financing for current expenditures through taxes has potentially important intergenerational effects. To be sure, there may be partially offset through changes in intergenerational transfers, but the fact is that most individuals do not leave any significant bequests to their children²⁵, in which case there can't and won't be such offsetting bequests.

A variety of capital market imperfections provide the basis of the strongest theoretical critique. If, for instance, individuals would have wanted to have borrowed more, but are constrained from

²⁴See for example, D.S. Johnson D S, J.A. Parker, N.S. Souleles, 2006, "Household Expenditure and the Income Tax Rebates of 2001," *The American Economic Review*, 96(5): 1589-1610. Anecdotally, when Bush cut taxes dramatically in 2001 and 2003 the average savings rate fell to near zero—it did not increase as the Barro-Ricardo analysis would have suggested. Of course, there were many other things going on, and defenders of the theory might argue that were it not for the tax cut, savings would have been even lower, i.e. minus 2 or 3% of GDP. But with credit constraints already binding for so many individuals—and with the bottom 80% of America already consuming 110% of their income—it is hard to believe that in the absence of the tax cuts, the savings rate would have been that low.

²⁵ In fact, most individuals have almost no wealth--and hence no bequests of significance. See, for example, E.N. Wolff and M. Gittleman, "Inheritances and the Distribution of Wealth Or Whatever Happened to the Great Inheritance Boom?" BLS Working Paper 445, January 2011, who find that between "1989 to 2007, 21 percent of American households at a given point of time received a wealth transfer and these accounted for 23 percent of their net worth."

doing so, the existence of an incremental future liability will not induce them to start saving. The borrowing constraint will simply be less binding than it was before. By the same token, were the government to decide to tax more and borrow less, the individual facing a borrowing constraint won't be able to offset the effect through increased borrowing.

In reality, most individuals do not fully incorporate future tax liabilities into their budget constraints—and even less so, do they incorporate the “risk pattern,” so that changes in the risk pattern, as a result of a change in say the maturity structure of debt (or a shift from unindexed debt to indexed debt) are not offset by corresponding changes in their portfolios. (As another example: as the Fed bought long term bonds, there was the obvious risk that should it reverse the purchases as the economy recovers, there would be a capital loss.²⁶ The expectation of such a capital loss, with full integration of the public and private budget constraints, should have had a contractionary effect on consumption, offsetting the intended expansionary effect. The Fed suggested it might hold the bonds to maturity, using other ways of tightening credit, e.g. by paying interest on deposits at the Federal Reserve, in effect enabling it never to realize the capital losses. But these only mask the reality that (the present discounted value of) government revenues are less than they otherwise would have been; they don't change the predicted adverse effect on consumption, assuming full integration of public and private budget constraints and full rationality.²⁷)

Monetary policy in a world of interest bearing money

It is clear that the idealized world of Modigliani-Miller provides an inadequate description of the economy.²⁸ There is a widespread assumption that monetary policy has *some* effects.

But modern monetary theory lives in a half-way house of incompletely articulated assumptions of imprecisely defined market imperfections and distributive effects, leading to speculative observations about possible channels through which monetary policy might yield effects, with ambiguous quantitative significance.

Today, for instance, with cash management accounts, T-bills can, in effect, be used as money for purposes of transactions. In the standard model in which interest rates are determined by the demand and supply for money, an open market operation entailing an exchange of T-bills for, say, “money”, doesn't change the effective supply of money, since T-bills themselves can be

²⁶ The general point that it is hard to explain why temporary interventions (such as associated with IMF short term loans to a country) should have long term effects in models with rational expectations was made in Stiglitz [1999]

²⁷ The irony is that government insists that banks use mark to market accounting, but the central bank doesn't do so for itself.

²⁸ My own earlier work on asymmetric information and stressing the importance of bankruptcy provided part of the critique. Higher debt ratios may entail higher (expected) losses from bankruptcy and may have signaling/screening effects. (Stiglitz, J.E., 1969, 1982, *Op.cit* . But these “limitations” are not relevant, at least for countries like the United States, where there is essentially no risk of sovereign default.

used for transactions, and so such an exchange (open market operations) shouldn't have any effect on interest rates. And this is especially so in a world in which T-bills are yielding close to zero nominal interest rates.

Institutional constraints, credit availability, profit maximizing risk-averse firms, and the liquidity trap

But it is possible in a world of banks with institutional rigidities that such open market operations could have an effect. For an increase in deposits held by the banking system in the Federal Reserve ("base money") can, through the credit multiplier, lead to increased lending. I say, *can*, not necessarily *will*. For banks are (for the most part) profit maximizing risk averse firms²⁹, and they may decide the best way to allocate their portfolios is not to issue new loans to, say, SME's, but to buy government bonds from the household sector or from abroad, or simply to hold the excess liquidity at the Fed. This can give rise to a liquidity trap, though one that is distinctly different from that discussed by Keynes (where it arises because the demand function for money becomes infinitely elastic at low interest rates) and some more recent commentators focusing on the zero lower bound on the interest rate.

We have already referred to one reason that today, monetary policy may be much less effective than in the past: with the abolition of Regulation Q, restricting competition in the setting of deposit rates, the wealth-effects of monetary policy are largely eliminated, implying that monetary policy exerts its effects through much weaker substitution effects.

But in deep downturns, there are two further reasons for the inefficacy of monetary policy: the interest insensitivity of investment (and consumption) and the blocking of credit channels, so that the impact of monetary policy on the flow of credit is diminished.

The distinction between the situation confronting Keynes in the Great Depression and that of today is important: Keynes was confronting a situation where prices were falling at 10% a year, so real interest rates remained in excess of 10%, so it was plausible that the inability to lower real interest rates represented a constraint on the ability of monetary authorities to ignite the economy. Today, however, there is moderate inflation, of say 2%, so that real (T-bill) interest rates are negative. To be sure, at a sufficiently negative real interest rate, individuals might be spurred to consume more and firms to invest more, but within reasonable ranges, further lowering (expected) real T-bill interest rates, to say -4%—even were that feasible— is unlikely to spur much further investment or consumption.

²⁹ I should be more cautious: given the agency issues that were revealed so vividly in the crisis, they might be better described as managerial enterprises, maximizing the well-being of the managers, subject to certain constraints on the access to credit. In either case, we have to describe the *behavioral* responses to a change in, say, base money or T-bill interest rates.

There are some obvious reasons for this interest inelasticity: with firms sitting on excess capacity, even large changes in interest rates are not likely to induce much more investment. Why would firms acquire even more excess capacity, just because the interest rate is lowered? Moreover, as Greenwald and I have explained in our earlier work³⁰, because of information imperfections, capital markets are imperfect; and because of capital market imperfections, firms act in a risk averse manner. In deep downturns, firms are likely to be particularly risk averse, and so particularly unresponsive to even moderate changes in interest rates.

Today, large firms are sitting on some \$2 trillion dollars of cash. It is hard to believe that small changes in T-bill rates are going to result in large changes in their willingness to convert those cash holdings into real investments.

For many smaller businesses, however, the real constraint *is* the lack of *availability* of credit (a problem that simply cannot be analyzed in a model with perfect capital markets). For these firms, credit availability is far more important than interest rates. Providing more liquidity to banks does not necessarily lead either to more lending or to lower lending rates (Greenwald-Stiglitz, 2003).

The ineffectiveness of temporary interventions: QE as an example

One of the arguments often put forward *in favor* of monetary policy is its flexibility—the ability to change interest rates quickly up and down. But while that is undoubtedly an advantage (over the much slower process of adjustments of tax rates or government expenditures—though not of well-designed automatic stabilizers built into sound fiscal and financial frameworks), there has been a long standing theoretical conundrum: why should policy measures that are seen to be (and often announced to be) temporary have much of an effect?³¹

Consider, for instance, the temporary intervention of Quantitative Easing—buying long term bonds now, under the presumption that the economy will recover in say a couple of years, in which case the action will be reversed. Apart from slight changes in endowments (increases in the levels of state variables like human and financial capital) that might have been induced by the temporary intervention, at the later date, asset prices will be the same as they would have been

³⁰ 1993, 2003, *Op. cit.*

³¹ Temporary interventions can have long term effects if (a) they move the economy from one equilibrium to another, in a model in which there are multiple equilibria; (b) there are large *substitution* effects, so that, for instance, investment that might have occurred in a later period occurs earlier; or (c) it can generate large “permanent” income effects, with longer last effects on the evolution of the economy. Many of the interventions associated with monetary policy have none of these characteristics. See, for instance, my Keynote address before the 1998 Annual Bank Conference on Development Economics, “Knowledge for Development: Economic Science, Economic Policy, and Economic Advice,” in *Annual World Bank Conference on Development Economics*, B. Pleskovic and J. Stiglitz (eds.), Washington: World Bank, 1998, pp. 9-58.

before the intervention. Knowing this, it is hard to see why there should be large changes in asset prices (share prices) today. With lifetime budget constraints essentially unchanged, it is hard to see why there should be any *significant* changes in consumption during the period of the temporary interventions, even if there should be some changes in asset prices during that period.

Moreover, as we noted earlier, the capital gain on long term government bonds that individuals might enjoy today as long term interest rates fall will be offset either by a capital loss on their holdings when the intervention is reversed and/or by the capital loss that the government will realize when it sells back the long term bonds back to the public at a time when long term interest rates are lower. If public and private life-time budget constraints are largely integrated, then these effects are offsetting, and it is hard to believe that there will be large effects on aggregate demand.

Market imperfections and why QE may have some effects

Of course, in models with less than perfect rationality, high degrees of risk aversion, and significant capital market imperfections, such temporary interventions can have *some* effects.

The financial press continually describes the response to low interest rates as leading to a “drive for yield.” There is, of course, no general theory that would suggest that as yields go down, individuals act in a less risk-averse manner; quite the contrary, the adverse wealth effects might more plausibly lead to more risk-averse behavior. But such behavior, if widespread, could in turn lead to an increase in the price of stocks—even if “rationally” the forces leading to this increase (above what the prices would otherwise be) are just temporary. The standard wisdom from the advocates of QE are that the higher stock prices will lead to more consumption. We have questioned, though, whether that is so, if they rationally expect the intervention to be temporary.

But there is a more fundamental problem: if the reason for the increase in stock prices is the “drive for yield,” then it reflects a *worsening* of the life-time budget constraint as a result of lower interest rates, and net, that should have ambiguous effects on consumption, with wealth and substitution effects operating in opposite directions.

But there is another set of effects that may be operating that may also imply that QE can have an adverse effect on consumption (and aggregate demand). The standard model ignores the effects of distribution, including across generations. Those that go into retirement at, say, t , and had been planning to sell their assets, will, if QE results in an increase in stock or bond prices, now receive more from them than they otherwise would have received, and this group may consume more than they otherwise would have.³²

³² But those among the elderly who expect to live long will obtain lower yields as they re-invest the proceeds, and this will largely cancel out these benefits.

But once we start focusing on distributive effects, we need to take into account other effects associated with the lowering of interest rates: those prudent older people who had invested in say government bonds will find their incomes lowered as interest rates are reduced, and for many of these, a lowering of income translates quickly into a lowering of consumption. Their consumption is cash-constrained, and their cash flows will be diminished.

There are many other potentially significant effects that are typically ruled out in the “standard” model: lower interest rates lead to more capital intensive technologies, laying the seeds for a “jobless” recovery; lower interest rates can lead to asset price booms, increasing the prices of oil and other commodities which act much like a tax on consumers.

Market imperfections and the ineffectiveness of QE

While capital market imperfections help explain why monetary interventions like QE might have larger effects than one would have expected in a “perfect markets” model, capital market imperfections also help explain why QE may have less of an effect than expected. (The most important reason for the limited effect of QE in the United States is globalization of financial markets, and that is discussed in the next part of this lecture.)

As we noted earlier, what matters for aggregate demand is the availability of credit and short and long term lending rates, and even with quantitative easing, credit availability and the spread between T-bill rate or other rates set by the Fed and the lending rate are endogenous variables. In deep downturns, changes in conventional monetary policies may have limited effects, especially if the monetary authorities have not done what they should have done to ensure the health of the institutions responsible for the flow of credit.

One of the hoped for effects was that lower long term interest rates would lead to lower mortgage rates, which in turn would lead to large numbers of Americans refinancing their mortgages, and the lower interest rates would effectively put cash in the pockets of households, leading to more consumption.

Note that underlying this analysis are implicit assumptions about distributive effects of interest rate changes. Lower interest payments by households corresponds to lower receipts of interest by lenders. In representative agent models, the effect would be a wash. More realistically, given large differences in the marginal propensities to consume of creditors and debtors, the redistribution from creditor to debtor should increase consumption (as the advocates of QE hoped. In the presence of capital constraints (limiting borrowing by households), the effect is even stronger.

However, in more general models focusing on capital and institutional constraints, the effects are more complex and ambiguous. For instance, in the presence of institutional constraints on

banks, lower revenues/profits for the banks translates into less lending, an effect which could be stronger than that generated by differences in marginal propensities to consume.

The many and growing imperfections in the mortgage market help explain the ineffectiveness of monetary policy, including quantitative easing. There has been increasing concentration³³--to the point where no one would describe the market as a competitive one. Without precisely specifying the appropriate model of tacit collusion or oligopoly, it is certainly conceivable that the banks would not pass on to consumers the full benefits of the lower long term government rates; they would limit the supply of mortgages so much as to increase their spread, their profit margins. And this is precisely what has happened. (This is especially the case because of the multiplicity of conflicts of interests that have been creating under existing institutional arrangements. The banks also derive large revenues as “service providers,” from servicing existing mortgages, and the contracts as service providers also provide them with incentives not to refinance.) The result is that the consumer benefits (and thus the increase in aggregate demand through that channel) have been less than had been touted. Critics suggest that, like so many of the Fed’s programs, the real beneficiaries are the banks, especially the large banks that control the lion’s share of the mortgage market. If that is the case, the short run benefit to the economy, at least through this channel, will be limited.

Another market imperfection may have reduced the benefits derived from QEIII even more. Mortgages that could easily be refinanced have already been refinanced; borrowers who have not have either insufficient income or are “underwater.” The mortgage could be refinanced only if there were a principal write down. In a standard model with rationality, it would pay both lenders and borrowers to engage in debt restructuring. Foreclosures are expensive for everyone involved, including the communities in which they occur. There is enormous dead weight loss. But principal write downs entail a recognition of losses faster than would otherwise be the case, especially since the change in accounting regulations in 2009 that allowed even impaired mortgages *not* to be written down. That would make the *seeming* profits in the short run lower, even if it would make long run profits higher. But agency problems pervade the banking system, and bank management has incentives to focus on the short run. Moreover, some banks may face

³³ William C. Dudley, President of the Federal Reserve Bank of New York, noted in a recent speech, “Federal Reserve MBS purchases have succeeded in driving down mortgage rates to historically low levels. But these purchases would have had still more effect on the economy if pass-through rates from the secondary market to the primary market had been higher [...]The incomplete pass-through from agency MBS yields into primary mortgage rates is due to several factors—including a concentration of mortgage origination volumes at a few key financial institutions and mortgage rep and warranty requirements that discourage lending for home purchases and make financial institutions reluctant to refinance mortgages that have been originated elsewhere.” William C. Dudley, “The Recovery and Monetary Policy”, Remarks at the National Association for Business Economics Annual Meeting, New York City, 15 October 2012, available at <http://www.newyorkfed.org/newsevents/speeches/2012/dud121015.html>.

high costs in raising funds (a natural capital market constraint, arising in part from the high level of non-transparency of the banks.)³⁴

In short, the level of refinancing may be far smaller than would be the case if financial markets were perfect, but analyzing the extent to which there will be refinancing, and the impact on banks and aggregate demand, entails a complex analysis of institutional constraints and imperfections.³⁵ Monetary policy ignores these at its peril.

Balancing

Here, I do not wish to argue for the quantitative importance of any of the effects that I have described. What I do contend is that once one moves away from the “perfect markets” model, or the “almost perfect markets model” in which we know that monetary policy should have no (or negligible) effects, we have to be careful in thinking through the source of “imperfections” and their consequences.

Too much reasoning on the impacts of monetary policy interventions has been based on an almost incoherent pastiche of analyses based on “rationality,” “rational expectations,” and “well functioning markets” overlaying a variety of forms of imprecisely specified and explained market imperfections. I’ve alluded to some examples already: while there is ample discussion of markets “discounting” future actions, temporary measures, it is still believed, can have significant effects.³⁶

Some of the disappointments with QEII and QEIII would not have come as a surprise, if monetary authorities had grasped better the nature of market imperfections *as they existed at the time of the implementation of these policies*. Given the role that local (community) and regional banks play in the provision of credit to SME’s, given the weaknesses that persist in these banks, given the role that collateral plays for such lending, given that real estate is the predominant form of collateral, and given that real estate prices remain persistently and markedly below the level before the crisis, it should be no surprise that QE would have limited effects on SME lending.

³⁴ Still further problems are posed by the conflicts of interest between the holders of the first and second mortgages. See J. E. Stiglitz, *Freefall: America, Free Markets, and the Sinking of the World Economy*, New York: W.W. Norton, 2010. Still further problems have resulted from the put-backs of flawed mortgages and the surrounding litigation: risk-averse banks now realize that there is more risk associated with the process of mortgage origination and securitization than they had realized.

³⁵ The list of imperfections in the mortgage market is not meant to be exhaustive. Institutional arrangements, for instance, make it difficult for lender A to refinance a mortgage held by lender B, and lender A often has little incentive to refinance the mortgage—it will simply lower his revenues. More broadly, the mortgage servicers have little incentive to facilitate mortgage restructurings. There is Congressional legislation under consideration as this paper goes to press attempting to deal with some aspects of these issues.

³⁶ They can, but typically only through substitution effects (a temporary investment tax credit or VAT tax), or through redistributive effects (e.g. the recapitalizations of the banking system, transferring, often in a non-transparent way, resources to the banks at the expense of others.)

Given that large firms were sitting on large amounts of cash, it should be no surprise that QE might have little effect on lending to large firms and/or investment by these firms.

It is at least conceivable in a situation where there is excess capacity in industry and real estate and excess leverage in households, that the adverse effects of QE described earlier (including the adverse consumption effect among the elderly) could outweigh any inducement towards more investment or consumption among firms or households, and so lowering interest rates could have an adverse affect on aggregate demand.

The realization that it is partly because of--and in some cases mainly because of--market imperfections that monetary policy has the effects it does (or does not have the effects it is supposed to have) complicates monetary policy in many ways.

It means that the simplistic notion, current in recent years, that all one needs to focus on is the real interest rate is simply wrong--even if one could figure out which real interest rate one should focus on.

It implies too that the current fad to suggest that the reason that monetary policy is ineffective today is the zero lower bound is misguided. We are not in a Keynesian liquidity trap.

It implies too that the effectiveness of monetary policy can be increased if monetary authorities work on increasing the effectiveness of the credit channel--strengthening the banks that are responsible, for instance, for SME lending and eliminating blockages in the mortgage market.

These insights help us understand why QE II and QE III have not been effective--and are not likely to be.

12. *Access to credit*

These experiences also highlight a point which is especially important in developing countries: lower T-bill rates do not necessarily translate into more access to credit. Access to credit for SME's is especially important for growth; and private financial systems, on their own, may not provide adequate access. (Emran and Stiglitz³⁷ provide a partial explanation for why this is so: it is difficult to ascertain who will be good entrepreneurs, and repay their loans; those who prove themselves good get poached away by others. It is thus difficult for those providing capital to appropriate the full value of the information associated with their lending activities.)

Governments and central banks need to have explicit programs to encourage lending to certain groups/sectors that are underserved.

This may entail partial government guarantees and direct government lending programs and specialized institutions (like development banks) as well as regulatory interventions (like CRA lending requirements in the United States and geographical requirements.)

It is important that such requirements be imposed not only on domestic institutions but also on foreign banks.

13. *International finance*

Globalization has changed the way that monetary policy operates, and its effectiveness. Capital and financial market liberalization was supposed to help stabilize financial markets, but the evidence is to the contrary: it has brought new and higher levels of instability, without bringing the promised growth.

Even the IMF, long the champion of capital market liberalization, has suggested that capital account interventions may be desirable.³⁸

These changes in view are not a surprise. Liberalization/globalization played a central role in the rapid movement of the 2008 crisis from the United States around the world. The world of liberalization has been one marked by far higher levels of volatility--and in the advanced countries far lower rates of growth--than the era before liberalization. Closer studies of financial

³⁷ S. Emran and J.E. Stiglitz, 2009, "Financial Liberalization, Financial Restraint and Entrepreneurial Development," working paper, Columbia University, available at http://www2.gsb.columbia.edu/faculty/jstiglitz/download/papers/2009_Financial_Liberalization.pdf (accessed December 14, 2012).

³⁸ See, e.g., Jonathan D. Ostry et al., "Capital Inflows: The Role of Controls," IMF Staff Position note 10/04, February 19, 2010, available at <http://www.imf.org/external/pubs/ft/spn/2010/spn1004.pdf> (accessed December 14, 2012).

market liberalization have shown that the flow of funds to SME's is often reduced, with consequent adverse effects on economic growth.

QEII too has heightened these concerns. In a world of globalization, money goes where the returns are highest--and not necessarily to the country increasing liquidity. Thus, some argue that the major impact of the increased liquidity by the Fed has been to increase demand in emerging markets (and perhaps to support asset price increases globally); and in response to the overheating to which it has contributed in the emerging markets, the central banks there have tried to undo the effects of what they view as the US competitive devaluation and have constructed impediments to the free flow of capital. In effect, they have tried to offset, in their country, the expansionary effect of US Fed policy. In short, money has been going where it's not needed, and not going where it's needed. Why should an investor with access to funds invest them in the United States or Europe, where there is excess capacity and a long term slump, rather than in the high return booming emerging markets? In the older, closed economy models, they had no choice: but in a globalized world with free capital markets, they do. From a global point of view, one needs to ask: of what value is there for the Fed to increase liquidity, which then moves to other parts of the world, and the Central Banks in these countries then take largely offsetting actions?

(One of the effects of that policy that may have increased US aggregate demand is a lowering of its exchange rate. But this attempt at competitive devaluation is a beggar-thy-neighbor policy, one to which emerging markets have rightly responded, suggesting that the US policy of quantitative easing has let loose a "currency war.")

Advances in economic theory have helped us to understand what was wrong with earlier models, which assumed that risk diversification associated with liberalization would obviously enhance stability and efficiency; and why the promised gains have not been materialized. The standard models made strong assumptions not only about perfect markets (including the absence of information imperfections and asymmetries) but also about the absence of non-convexities, so essentially *by assumption*, risk diversification worked. But as I showed in some recent papers, in the presence of such non-convexities, financial market integration may increase risk.³⁹ A host of papers have now shown that greater interlinkages (among financial institutions, across countries) may lead to a greater risk of systemic failure.⁴⁰

³⁹ "Contagion, Liberalization, and the Optimal Structure of Globalization," *Journal of Globalization and Development*, 2010, 1(2), Article 2, 45 pages; and "Risk and Global Economic Architecture: Why Full Financial Integration May be Undesirable," *American Economic Review*, 100(2), May 2010, pp. 388-392.

⁴⁰ See, e.g. S. Battiston, D. Delli Gatti, M. Gallegati, B. Greenwald, and J. E. Stiglitz, "Default Cascades: When Does Risk Diversification Increase Stability?" *Journal of Financial Stability*, 2012, 8(3), pp.138-149; Gallegati, M., B. Greenwald, M. Richiardi, and J. E. Stiglitz (2008), "The Asymmetric Effect of Diffusion Processes: Risk Sharing and Contagion," *Global Economy Journal*, 8(3), Article 2; Stefano Battiston, Domenico Delli Gatti, Mauro Gallegati, Bruce Greenwald, and J. E. Stiglitz, 2012 "Liaisons Dangereuses: Increasing Connectivity, Risk Sharing,

Advances in economic theory have also highlighted some of the reasons that foreign banks are different from domestic banks: their risk profile is different, and they face greater asymmetries of information (e.g. about which small firms are likely to be good). Imperfections and asymmetries of information help also explain the high level of volatility associated with foreign capital flows.⁴¹

There is now an emerging consensus among economists on several aspects of policy concerning cross border capital flows:

- (a) *Just as there is a need for financial sector regulation, there is a need for regulation of cross-border flows—countries should be cautious both about capital and financial market liberalization.*⁴²
- (b) *Cross-border flows and foreign banks behave differently in important respects from domestic sources of funds and domestic banks, and therefore there is a need for a different regulatory regime. Of course, foreign financial institutions will oppose these regulations.*
- (c) *Of particular concern is that many international agreements, signed in the hey-day of neoliberalism, restrict the ability of governments to impose adequate regulatory regimes, and these need to be changed.*
- (d) *There is a need for closer cooperation among monetary authorities around the world, and*
- (e) *Larger central banks, the Fed and ECB in particular, need to recognize that they can impose large externalities on other countries; by contrast, the externalities imposed by any small country are limited.*

14. Institutional design: The failure of independent central banks

Modern development economics has stressed the importance of good institutions.⁴³ Before the crisis, American financial institutions and American regulatory institutions (including the Fed) were often held up as models for others to imitate. The crisis has not only undermined confidence in these institutions, but has also exposed deep institutional flaws. It has shown that one of the central principles advocated by Western central bankers—the desirability of central

and Systemic Risk," *Journal of Economic Dynamics and Control*, 36, pp. 1121-1141; Haldane, A. G. (2009), "Rethinking the Financial Network," address to the Financial Students Association, Amsterdam, April, available at <http://www.bankofengland.co.uk/publications/speeches/2009/speech386.pdf>; and Haldane, A. G. and R.M. May (2010), "Systemic Risk in Banking Ecosystems," University of Oxford mimeo.

⁴¹See Greenwald and Stiglitz, 2003, *op. cit*

⁴² Reflective of this new trend, the IMF has recently supported the imposition of capital controls in certain instances, a major change in their stance, since 1997, when they tried to change their charter to give them a mandate to impose capital market liberalization. See Ostry et al., *op. cit*. For a discussion of that older debate, see J. E. Stiglitz, *Globalization and its Discontents*, New York: WW Norton, 2002.

⁴³ See, for instance, the World Bank, 2002, *Building Institutions for Markets: World Development Report 2001-2002*, Washington, D.C.: The World Bank.

bank independence—was questionable at best. In the crisis, countries with less independent central banks—China, India, and Brazil—did far, far better than countries with more independent central banks, Europe and the United States. Elsewhere⁴⁴ I have provided part of the explanation. There is no such thing as truly independent institutions. All public institutions are accountable, and the only question is to whom. America's central bank was captured by Wall Street: it came to reflect the ideology and interests of the financial sector, which it was supposed to regulate. As we saw earlier in this lecture, it glossed over central issues like externalities and agency problems, as it came to believe in self-regulation. The pervasive conflicts of interest--with the New York Fed President being at the center of bailouts of the very banks that had played a role in his appointment--were a model of bad governance. The Fed had allowed the development of a financial structure that was rife with conflicts of interests, and had turned a blind eye to practices that not only exploited the poor, but put into jeopardy the American and global financial system.

The notion of the desirability of an independent central bank was predicated on the belief that monetary policy was a technocratic matter, with no distributional consequences. There was a single policy that was best for all—a view to which the simplistic models that the central banks employed may have contributed, but which was not supported by more general models. There does not, in general, exist a Pareto superior monetary policy.

That in turn implies that delegating the conduct of monetary policy and regulations to those who come from and reflect the interests of the financial market is going to result in policies that are not necessarily (and weren't) in society's broader interests.

Even if one wanted independence, one could have combined independence with broader representativeness--making sure that consumers who were hurt by banks' predatory and exploitive behavior, merchants who were hurt by banks' anti-competitive behavior, or workers who were hurt by higher levels of unemployment--had a greater voice in the conduct of monetary policy and regulation.⁴⁵

The crisis has called into question the notion of independence on other grounds: monetary authorities have been engaged in quasi-fiscal operations, giving away tens of billions of dollars, in ways that are non-transparent, and often seem capricious. The Fed saved some banks, throwing tens of billions of dollars at them, but let other banks go. It saved some bondholders, but not others. The loans by the Fed and ECB to banks at low interest rates--which they could then use to buy higher yielding bonds--was, in effect, a gift worth tens of billions of dollars, a

⁴⁴ J.E. Stiglitz, *Freefall, Op. cit.; The Price of Inequality, Op. cit.*

⁴⁵ See J. E. Stiglitz, "Central Banking in a Democratic Society," *De Economist* (Netherlands), 146(2), 1998, pp. 199-226. (Originally presented as 1997 Tinbergen Lecture, Amsterdam, October).

gift from the public, but which circumvented the usual public appropriations process. It is unconscionable that such power over the purse be given to a non-elected body.

Monetary authorities need to be held more accountable, especially when they are engaged in policies with strong distributive consequences and which are quasi-fiscal in nature. Monetary institutions need to be designed to ensure that they are more reflective of societal interests.

Concluding Comments

Some years ago, in joint work with my colleague Bruce Greenwald, we provided a critique of traditional models in which the effects of monetary policy are mediated just through interest rates, and interest rates reflect the balancing of the demand and supply of money. We pointed out that with most “money” being interest bearing, the traditional view that the interest rate is the opportunity cost of holding money is just wrong; furthermore, most transactions are not income generating, but rather the exchange of assets, so even if money were required for transactions, there would still be no simple and stable relationship between money and the level of economic activity (since the ratio of asset transactions to income can be highly variable.) Further, most transactions do not require money; credit is typically an effective substitute, and when it is not, one needs to explain why not.

Over the past thirty years, macroeconomics has made a valiant struggle to place itself on firm micro-foundations, but it chose the wrong micro-foundations—that based on the perfect markets models that were just then becoming discredited, as the economics profession gained deeper insights into the related effects of transactions costs, imperfections of competition, absence of risk markets, and imperfections and asymmetries of information. Most disappointing, the standard models for the most part didn’t even provide structural foundations for the financial sector. (And when they attempted to do so, it was as a result of peculiar and unconvincing assumptions. For instance, cash-in-advance models simply *assume* that credit is not an effective substitute for cash.)

In the 1930s there was an active debate between two approaches to the determination of the interest rate, the Keynesian approach, based on the demand for money used for transactions purposes, and that of Robertson⁴⁶, based on the demand and supply of loanable funds. In some ways, our approach represents a further development of the work of Robertson, with two important changes.

⁴⁶ See, for instance, D. Robertson, 1951, "Some Notes on the Theory of Interest," a contribution to *Money, Trade and Economic Growth, Essays in Honor of Professor J. H. William* (New York: Macmillan, 1951); reprinted in Sir Dennis Robertson, *Essays in Money and Interest* (Manchester: Collins, 1966), pp. 203-22.

First, in his model, the supply of loanable funds was based just on savings. In ours, there is a critical role for banks, who make assessments of the credit worthiness of potential borrowers. Imperfect and asymmetric information is central. (Such information tends to be local and specialized; foreign lenders (suppliers) of funds have different information than domestic lenders, so that their allocation of funds is markedly different. This is one of the reasons that there is a need for special regulation of cross-border capital flows and foreign banks.)

Secondly, in both Keynes and Robertson, demand always equals supply; yet in models with imperfect and asymmetric information, there can exist rationing equilibrium. Indeed, such equilibria are pervasive.

Thus, traditional models (of both the Keynesian and Robertsonian version) have little to say about the determination either of credit availability or of the spread, the difference between the T-bill rate and the lending rate. If there is a difference, it only reflects a difference in (objectively determined) risk. With risk neutral lenders, the expected payments are the same. In the absence of a theory of credit rationing, it is hard to explain a liquidity crisis—and without a theory of liquidity (credit availability) it is hard to know how to respond to a liquidity crisis.

In the Greenwald-Stiglitz models, monetary policy is largely mediated through the banking system. The lowering of interest rates may (or may not) be reflected in a commensurate lowering of lending rates or a commensurate increase in credit availability. Indeed, there is a new version of a liquidity trap—not caused (as Keynes suggested) by a high elasticity of the demand for money, but by a low responsiveness of bank lending, even as the central bank provides the banking sector with more liquidity. This is precisely what has been happening in the United States and Europe; and the theory developed by Greenwald and Stiglitz anticipated and predicted this kind of liquidity trap well before it became evidenced in the aftermath of this crisis.

Keynesian models of monetary economics came into fashion in the last Great Crisis, the Great Depression. The world has changed much since then; and our understanding of economics too has advanced. And yet, in some circles, we are wedded to ways of thinking that have not kept pace. Worse, in the interlude between the Great Depression and the Great Recession, some were lulled into believing that markets *normally* worked well; and the old classical model, slightly modified, came back into fashion. There was, as I have already noted, an irony in this, for among the advances in economics (game theory and theories of imperfect and asymmetric information) was an enhanced understanding of what was wrong with that model, and why it provided such a poor description of what was going on, both in normal times and even more so in times of crises.⁴⁷

⁴⁷ For a broader discussion of the evolution of these two strands of thinking, see B. Greenwald and J. E. Stiglitz, “Keynesian, New Keynesian and New Classical Economics,” *Oxford Economic Papers*, 39, March 1987, pp. 119-133. Within the so-called New Keynesian tradition, there have also been two traditions. One following Keynes

These alternative theories provided the foundations of a new theory of financial markets--an understanding of why financial markets are typically not perfectly efficient, and of how imperfect financial markets actually work. The effects of monetary policy are, of course, mediated through financial markets, so this new theory of financial markets is central to monetary theory. Modern monetary policy has to be based on these foundations.⁴⁸

Monetary policy (understood broadly, to include financial regulatory policy) is of such importance in part because the financial sector is so important: the financial sector has been likened to the brain of an economy, and if the financial sector does not work well, the economy does not work well. In many countries around the world--including the US and the EU--the financial sector has not done what it should have done and done what it shouldn't have done; the costs of their failures in the US alone amount to trillions of dollars.

In this lecture, I hope I have tried to describe what monetary policy based on a deeper understanding of the functioning of financial markets might look like. Most of the propositions that have been at the center of monetary policy for the past quarter of a century need to be rethought. Monetary policy has not served our economies and societies well. It has arguably contributed to the growing inequality that has marked most countries around the world.⁴⁹ But of this there can be no doubt: It has not only failed to stabilize the economy in the way that was hoped; but the way that some central banks have conducted monetary policy and regulation has been at the center of our greatest crisis in three quarters of a century.⁵⁰ This should be the grounds for a revolution in monetary policy.

ignored the details of financial markets, and, following Hicks' interpretation of Keynes, focused on wage and price rigidities. The other focuses explicit on financial market imperfections (e.g. H.P. Minsky's, "The Financial Instability Hypothesis," The Jerome Levy Economics Institute of Bard College, Working Paper No. 74, May 1992; as well as the work of Greenwald and Stiglitz to which I referred earlier), and encompasses an analysis of the consequences of *deflation* (following the work of Fisher [I. Fisher, "The debt-deflation theory of great depressions," *Econometrica* 1 (1933), pp. 337-357]). See B. Greenwald and J. E. Stiglitz "New and Old Keynesians," *Journal of Economic Perspectives*, 7(1), Winter 1993, pp. 23-44.

⁴⁸See Greenwald and Stiglitz, 2003, *Op. cit.*

⁴⁹ See, in particular, Chapter 9 of J. E. Stiglitz, *The Price of Inequality*, *Op. cit.*

⁵⁰ Thus, I take strong issue with Bernanke who has tried to suggest that there was nothing wrong with standard macroeconomic and monetary theory; there were only some minor flaws in its implementation. See Ben Bernanke, "On the Implications of the Financial Crisis for Economics," address delivered September 24, 2010 at Princeton University, available at <http://www.federalreserve.gov/newsevents/speech/bernanke20100924a.htm>, (accessed July 28, 2011).