

**The Great Depression, the Global Financial Crisis and Old versus
New Keynesian Thinking – What Have We Learned and
What Remains to Be Learned?[×]**

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ABSTRACT

Following a brief overview of major developments in macroeconomic thought since the Keynesian revolution in the introduction the paper features three main sections plus a conclusion. The first section presents a detailed comparison of background institutions, policy responses and economic performance during the great depression (GD) and the Global Financial Crisis (GFC). The second section discusses the role of lessons from the GD in shaping fiscal and monetary policy responses to the GFC as well as newer problems that emerged during the second crisis. Among the newer issues are runs between financial institutions, the role of financial derivatives, the opaqueness of securitization, the too big to fail problem, the incompleteness of micro-based risk assessments by financial institutions and a modern reinterpretation of the liquidity trap. The next section contains a systematic comparison of the methodological similarities and differences between old Keynesian economics and its recent New Keynesian Economics reincarnation. The concluding section points out missing elements in both old and new Keynesian methodologies and speculates about the likely path of future macroeconomic research in the aftermath of the GFC.

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1. Introduction

Economics science tends to respond and adapt to major economic crises. Long-ruling paradigms are replaced or modified by new ones following large unanticipated economic events. This feature is particularly in evidence with respect to public policy and institutions in the areas of fiscal and monetary policies. Thus, macroeconomics came into being due to wide discrepancies between observed reality during the Great Depression (GD) and the classical view that market forces always propel the economy back to full employment within a reasonable time interval.

Since the official birth of macroeconomics with Keynes's General Theory, macro and monetary economics have undergone a non-negligible number of "revolutions" and "counterrevolutions." The Keynesian challenge to classical economics as encapsulated in Hicks's (1937) IS-LM model was propelled into textbooks and became the ruling paradigm during the sixties. As a young student in a freshly created macro course in macroeconomics at the Hebrew University in the mid-sixties, I learned that the world can be dichotomized into a (downward sticky prices/wages) excess capacity regime and a full capacity regime. In the first regime, expansionary fiscal and monetary policies raise output and employment without changing the price level, while in the second they only induce price and wage inflation. The empirical work of Phillips (1958) provided a more continuous view of the underlying relation between inflation and economic activity. Two years later Samuelson and Solow (1960) argued that the Phillips curve represents a stable tradeoff between inflation and unemployment. By judicious choice of fiscal and monetary

instruments, policymakers could choose an inflation-unemployment combination along this tradeoff.

The inflation of the seventies dispelled this view, replacing it by Friedman's (1968) and Lucas's (1972, 1973) view that this tradeoff lasts only as long as inflationary expectations have not fully caught up with actual inflation.¹ As those expectations became a prime conceptual mover of actual inflation and employment macro theory needed a paradigm for their formation. Lucas and others proposed the "rational expectations" or model consistent hypothesis according to which expectation formation should be consistent with the actual behavior of the economy up to stochastic disturbances. The view that there is no long-run tradeoff between inflation and unemployment along with the work of Patinkin (1965) resuscitated the neutrality of money paradigm, establishing it as a permanent fixture of macroeconomic thinking.

Being closely associated with the view that prices are flexible, the neutrality of money paradigm led to the construction of macroeconomic frameworks with flexible prices, in which nominal money balances affect only the price level while real variables are affected by factors such as productivity, production functions, tastes, market structure and fiscal policy. A prominent branch of this approach is represented by real business cycle models (RBC) pioneered by Kydland and Prescott (1982) and extended in various directions during the eighties and the nineties. The distinctive feature of these models is that they insist on dynamic optimization at the individual level and use utility functions and production functions as the primitive building blocks of their analysis. Due to the

¹ Interestingly, the view that the long run Phillips curve is vertical and that money is neutral in the long run took hold in spite of the fact that econometric studies of the time indicated that, although worse than in the short run, the tradeoff between inflation and unemployment does not totally disappear in the long run (Solow (1969), Cukierman (1974)).

analytic difficulties involved in characterizing their behavior, these models have been largely confined to representative individual frameworks.

During the second part of the nineties and the early twenty-first century, temporarily sticky prices were introduced into the basic core of RBC models by using, *inter alia*, the Calvo (1983) formalism as a proxy for costs of price adjustments. Woodford's (2003) book is a prominent example of this approach. Since they reintroduce sticky prices into an otherwise nominally neutral RBC framework, this class of models is often referred to as New Keynesian. One can view them as a modern, micro-based synthesis between the Keynesian sticky price view and the micro-founded rigor required by RBC methodology. An important advantage of those models is that they feature price-setting firms whose occasional pricing decisions are affected by inflationary expectations, making it possible to meaningfully discuss monetary policy in dynamic micro-based frameworks. Full-scale dynamic stochastic general equilibrium (DSGE) models based on this approach are now routinely estimated and calibrated by the research departments at major central banks.

Although they represent a coherent synthesis of broadly accepted methodological principles with the view that nominal wages and/or prices are sticky, it is likely that the still unfolding global financial crisis (GFC) will challenge and modify the construction and use of New Keynesian models. It is gradually becoming clear that the roots of the GFC reside within the supervision, regulation and *modus operandi* of the financial sector (Cukierman 2009). From this perspective, an important limitation of New Keynesian frameworks is that they do not provide a sufficiently detailed (and therefore realistic) view of the incentives, the constraints and the behavior of financial intermediaries. More

generally it is likely that, somewhat similarly to the GD that led to the reconsideration of the economic doctrines of the time, the GFC will trigger a reevaluation and refocusing of currently accepted views and methodologies within monetary and macroeconomics.

This paper utilizes a broad brush to compare between the GD and the GFC with particular emphasis on what has been learned from the experience of the GD and on what remains to be learned in view of the recent experience with the GFC. The paper highlights differences in the policy responses to the two crises as well as differences in fiscal and monetary policymaking institutions prior to each crisis. Besides the conclusion, the remainder of the paper contains three sections. Section 2 presents comparative evidence on economic institutions on the eve of the two crises, on the policy responses and on economic performance during the GD and the GFC. Section 3 focuses on what has been learned since the GD and on what remains to be learned in view of the current crisis. The emergence of the traditional Keynesian view is directly traceable to the experiences of the GD. Much has been learned from this experience as well as from the subsequent stagflation of the seventies and the competing economic methodologies that evolved in the process. Section 4 compares and contrasts the traditional Keynesian models of the sixties with its novel, New Keynesian, microfounded counterpart. This is followed by concluding remarks.

2. The Great Depression and the global financial crisis: A comparison of background institutions, policy responses and economic performance

Clearly, the global financial crisis (GFC) is the most serious crisis since the Great Depression (GD). There are some striking similarities between the two crises. Both

started in the financial sector and gradually spread to the real sector. During both crises many financial institutions were wiped out or had to be bailed out. In both cases the crisis appears to have started with the bursting of a bubble and banking credit drying up. In both cases the lower zero bound on the policy rate became effective. Finally, in both cases the crisis started in the US and subsequently spread to other countries. In spite of those similarities there are important differences between the GFC and the GD in three main areas: Background institutions on the eve of each crisis, policy responses and economic performance during the crisis. This section focuses on those differences.

2.1 Comparison of institutions on the eve of the GD and of the GFC

There are several important differences in the structure of institutions between the eves of the two crises. First, during the first three years of the Great Depression, the US was on the gold standard. During those years, the maintenance of a fixed parity with gold collided with the use of monetary policy to achieve internal balance. The US abandoned the gold standard only after Roosevelt was elected president during the first half of 1933. As a consequence, US monetary policy was effectively “attached to the mast” during the first three years of the GD. Some other countries – such as France, that abdicated the gold standard early on – benefited from this self-imposed constraint. No such constraint was present at the eve of the GFC. In fact the dollar depreciated substantially between summer 2007 and summer 2008 in line with the expansionary policy of the Fed reaching a peak of \$ 1.6 to the Euro in July of that year. It appreciated again, reaching a trough of \$ 1.24 to the Euro in November 2008 due to the “flight to safety” triggered by the demise

of Lehman Brothers and other investment banks, and continued to fluctuate in a relatively wide range till the writing of this article in July 2009 (see figure). INSERT FIGURE

Second, and most importantly, deposit insurance did not exist on the eve of the GD but was a long-established fixture of the US banking system on the eve of the GFC. Deposit insurance became a permanent fixture of US monetary institutions following the massive banking failures of the thirties. Deposit insurance and the Federal Deposit Insurance Corporation (FDIC) were created as part of the Banking Act of 1933 (also known as the Glass-Steagell Act) which has been in effect ever since. On the eve of the GFC individual deposits were insured by the FDIC up to a ceiling of \$ 100 thousand. With the intensification of the crisis during the second half of 2008 the ceiling was temporarily raised to \$ 250 thousands.² Had deposit insurance existed during the 1930-1933 period, many of the banking failures triggered by bank runs and the associated monetary disruptions of the GD would have been averted.³ Due to deposit insurance there hardly were runs on the banks by depositors during the GFC.⁴ However, during the GFC there were runs by financial institutions on other financial institutions. The reasons and consequences of this somewhat different type of runs are discussed in the next section.

Third, there were no bank capital requirements on the eve of and during the GD. By contrast, under the Basel agreements banks were subject to capital requirements on the eve of and during the GFC.

Fourth, the orders of magnitude of the Federal Government on the eve of the two crises and the associated fiscal institutions were completely different. On the eve of the

² The higher ceiling is expected to be in effect till the end of 2009.

³ In a classic article Diamond and Dybvig (1983) show that deposit insurance neutralizes the incentive of depositors to run on banks.

⁴ An isolated exception was the case of Northern Rock in the UK. Following the broadening of deposit insurance by UK authorities, this run too was quickly quelled.

Great Depression, in 1929, the share of federal taxes in Gross Domestic Product (GDP) was less than 4 percent. On the eve of the GFC, in 2007 or 2008, it was around 18 percent. Between 1929 and the pre-GFC period the tax collection capacity of the US government expanded dramatically. Indirect taxes were replaced by direct taxes, and universal filing of income-tax returns was instituted at the end of the thirties. Those differences in initial conditions facilitated the quick deployment of fiscal stimulus and bailout packages during the recent crisis.

Although obvious, the last difference cannot be overemphasized. The GD started prior to the Keynesian revolution. As is well known, it triggered this revolution. Since then Keynesian policy prescriptions have been tried, criticized, digested and synthesized into more realistic modes of thinking and of policymaking. Much has been learned about their benefits and limitations. Consequently, today's policymakers are better informed about the potential salutary effects of expansionary fiscal and monetary policies than Hoover or Roosevelt were when they launched their policies. Largely because of the lessons from the GD, the responses of both fiscal and monetary policies during the GFC have been swifter, stronger and more focused than during the thirties.

2.2 A comparison of policy responses – the GD versus the GFC

The differences between the responses of fiscal and of monetary policies to the GFC and to the GD are huge in more than one dimension.

2.2.1 Fiscal policy

Under Hoover, who presided over the first three years of the GD, fiscal policy was

passive at best. The federal budget had a small surplus during 1930, a small deficit in 1931 and a deficit of 4 percent of GDP in 1932. The bulk of the increase in 1932 was due to a decrease in tax collections caused by the sharp contraction in income rather than to autonomous fiscal policy. Although the deficit share in GDP increased under Roosevelt, reaching a peak of 5.9 percent in 1934, it pales in comparison to the magnitude of fiscal expansion during the current crisis. In spite of his image as a practical Keynesian, Roosevelt also displayed concern for fiscal discipline. As a consequence, during the second part of the thirties the budget deficit shrank, leading to a temporary recession in 1938. Table 1 shows the deficit to GDP ratio and nominal GDP during the thirties and the beginning of the forties. Interestingly, the deficit increased dramatically only in 1942, when the US formally entered WWII and when unemployment was no longer a problem. The deficit to GDP ratio in this year was *almost three times* higher than the highest such ratio during all the years of the GD.

The contrast with the fiscal policy response during the current crisis cannot be overemphasized. Following the demise of Lehman Brothers in September 2008, Congress and the Bush administration committed \$ 700 billion to restore confidence in the US financial system by taking stakes in many US banks and by outright buying of troubled assets. The Emergency Economic Stabilization Act of October 3, 2009 (also known as the Troubled Assets Relief Program or TARP) empowered the Treasury Department to spend this huge amount in order to clean banks and other financial institutions from so-called “toxic assets” and to recapitalize them by taking equity positions in the US banking system. This was soon followed by a \$ 787 billion fiscal stimulus package for the rest of the economy under Barack Obama. This package, known as the American

Recovery and Reinvestment Act of 2009 (ARRA), quickly went through Congress, and was signed into law by Obama on February 17, 2009.

TARP is a bailout package designed to recapitalize the financial system; ARRA is a fiscal stimulus package, one-third of which is for tax relief, another third for aid to the states, the unemployed and health care, and the rest for labor, education, infrastructure spending, water and a green agenda. The sum total of those two packages amounts to \$ 1.487 trillion which (at a current GDP of about 14 and a half trillions) amounts to about 10 percent of GDP. As of April 2009, almost \$ 600 billion of TARP money has been spent or committed. The US administration estimates that as of May 2009, only 11 percent of the ARRA money has been given out, creating 150 thousand jobs. The rest of the money is to be spent over the remainder of 2009 and 2010. Although those additional expenditures come on top of a deficit of about 3 percent of GDP during fiscal 2008, they do not necessarily raise the 2009 deficit by this full amount since disbursement is staggered. Nonetheless, as of May 2009 the Treasury forecasts that the US deficit during fiscal 2009 will be *13 percent* of GDP.⁵ Forecasts for fiscal 2010 range between 10.6 and 8.7 percent of GDP.

Clearly, even the maximum fiscal stimulus under Roosevelt pales in comparison to those figures. Another major difference between the two crises is the swiftness of the fiscal response. It took at least three years from the official start of the GD until a sizable fiscal response was worked out. By contrast, the two huge packages mentioned above were conceived, legislated and enacted into laws rather quickly.

⁵ An additional reason for this large figure is the decrease in tax collections due to the recession. Fiscal year 2009 started on October 1, 2008 and will end on September 30, 2009.

Table 1: The Share of Deficits and GDP During the Great Depression

<i>Year</i> ⁶	<i>1929</i>	<i>1930</i>	<i>1931</i>	<i>1932</i>	<i>1933</i>	<i>1934</i>	<i>1935</i>
Deficit/GDP (percentages)		-0.8	0.6	4.0	4.5	5.9	4.0
GDP (In current billions of \$)	103	91	77	59	56	66	73
<i>Year</i>	<i>1936</i>	<i>1937</i>	<i>1938</i>	<i>1939</i>	<i>1940</i>	<i>1941</i>	<i>1942</i>
Deficit/GDP (percentages)	5.5	2.8	0.5	3.8	3.6	4.9	14.8
GDP (In current billions of \$)	84	92	86	92	101	127	162

Depending on where we place the beginning of the GFC, those responses occurred somewhere between a year and less than half a year from the beginning of the crisis. The longer response is obtained when the beginning of the crisis is located at the official beginning of the recession in the last quarter of 2007. The shorter (and probably more realistic) period places the beginning of the crisis in mid-September 2008 when the depth of the financial crisis became painfully apparent following the downfall of Lehman Brothers.

2.2.2 Monetary policy

The difference in the responses of monetary policy between the two crises is equally dramatic. Friedman and Schwartz (1963) argue convincingly that during the first three years of the Great Depression, the Fed tolerated and even reinforced a substantial shrinkage of the money supply. Instead of pumping liquidity into the financial system in

⁶ Sources: The deficit GDP ratio is from Budget of the US Government for Fiscal Year 2006, Historical Tables, Office of Management and Budget, Table 1.2. GDP is from the National Income and Product Accounts, Bureau of Economic Analysis, Table 1.1.

order to prevent the transformation of liquidity shortages into insolvency problems, the Fed often withdrew funds from problematic banks in order to shield its balance sheet from further losses. This policy precipitated thousands of problematic banks into default, accelerated the downfall of others and contributed to further declines in the dwindling supplies of money and of credit.

The disappearance of many banks during the GD led to the destruction of “informational capital” produced by banks during the intermediation process. One of the main intermediate outputs of the banking system is the creation of information about the credit-worthiness of different borrowers. This information enables banks to distinguish between adequate and sub-standard credit risks, inducing banks to supply credit to the first group. This process prevents the drying up of credit to this group and maintains the (individually rational) flow of credit to the real economy. The disappearance of many banks during the Great Depression led to the destruction of borrowers’ credit ratings, causing serious and protracted declines in the supply of credit by banks. Bernanke (1983b) argues convincingly that this mechanism was partly responsible for the propagation and the persistence of the recession to the real sector during the GD.

By contrast, since August 2007, the Fed gradually eased monetary policy by reducing the discount rate from 5.25 percent to practically zero during the first quarter of 2009. In parallel the Fed also started buying more risky assets than during normal times. Quantitative easing was stepped up during the last quarter of 2008 through the establishment of a Term Auction Facility (TAF), purchases of government securities and of some categories of Mortgage Backed Securities (MBS). Through these mechanisms the Fed poured huge amounts of liquidity into the financial system. Since August 2008

till the beginning of 2009 the Fed's balance sheet has expanded roughly 2.5 times (*from around \$ 800 billion to over \$ two trillion*). Essentially, the Fed has become a major financial intermediary replacing banks and other private intermediaries that have temporarily lost their ability to intermediate funds effectively due to the GFC.

Contrary to the GD there were no mass bank failures during the GFC. Such failures were avoided not only due to the existence of deposit insurance but also because the Fed injected large amounts of liquidity and took over insolvent financial institutions or arranged their takeover by other financial institutions. As a consequence the destruction of information about the quality of borrowers and the associated adverse impacts on the flow of credit have been small in comparison to the GD. But, on the flip side, there was widespread destruction of information about the value of financial assets due to opaqueness induced by the complicated structure of MBSs and other Collateralized Debt Obligations (CDO). Finally, monetary policy during the GFC started to respond early on, and this response was quickly intensified as the subprime crisis expanded into a full-blown GFC crisis in September 2008.

2.2.3 Trade policy

The GD was characterized by beggar-thy-neighbor policies. In mid-1930 the US Congress passed the Smoot-Hawley Tariff Act that raised tariffs on over 20,000 imported goods to record levels. Other countries retaliated by also imposing restrictions on imports and engaged in competitive devaluations. This led to a serious contraction of international trade. Major trading partners have largely avoided the temptation to engage on this path during the GFC.

At their April 2009 meeting in London the leaders of the G20 group pledged to do whatever is necessary to “*promote global trade and investment and reject protectionism*” (G20 Communique 2009). Although it remains to be seen whether that declaration will be followed, the atmosphere of international cooperation that permeated the meeting is a far cry from the trade wars of the thirties.

2.3 Comparison of economic performance – - the GD versus the GFC

Table 1 shows that nominal GDP was below its 1929 level throughout the entire decade of the thirties. It surpassed this level only at the beginning of the forties when the US was gearing up toward WWII. At the peak of the GD, in 1932, *nominal* GDP was lower by about 40 percent than in 1929.⁷ By contrast, during 2009, the US economy contracted by a comparatively modest 2.6 percent and forecasts for 2010, although low, are non-negative.

During the entire decade of the thirties unemployment was persistently above 15 percent, peaking at 25 percent in 1933. The highest US unemployment figure during 2009 is a bit above 10 percent. Although it is the highest such figure over the last twenty-six years, it is still substantially lower than the unemployment figures during the GD. Unemployment in the US is likely to peak around the ten percent and to subsequently go down during 2010.

The previous observations are consistent with the view that although we have not seen all the ramifications of the GFC yet, this crisis is substantially shorter and milder than the GD. These differences in economic outcomes are, in large part, attributable to

⁷ Since the price level went down the real decrease was lower. Romer (2009) puts it at over 25 percent.

differences in policy responses and to differences in economic institutions on the eve of the two crises.

3. What has been learned and what remains to be learned?

3.1 What has been learned from the GD and applied during the GFC?

The experience of the Great Depression and the related emergence of Keynesian economics demonstrated the potency of expansionary fiscal and monetary policies in the face of credit shocks originating in the financial system. Thirty years after the GD the work of Friedman and Schwartz clarified that letting the money supply shrink during such times can be extremely disruptive for the financial system as well as for the real economy. The lesson of this momentous policy mistake has been strongly internalized by current policymakers at the Fed. The swift and large monetary policy reaction to the GFC is, no doubt, partly due to Bernanke's academic familiarity with the consequences of this mistake. It probably also had an impact on the structuring of the fiscal bailout package devised under secretary Paulson.

During the peak of the GFC, the Fed and the Treasury were essentially accommodating the desires of both users and suppliers of funds in the private sector in order to reestablish credit flows and prevent the disappearance of crucial financial institutions. Final users of funds need a steady stream of credit, banks require sufficient liquidity to operate effectively and, during times of great uncertainty, providers of funds seek safety first. By stepping in, the Fed and the Treasury accommodated both sides of

the capital market and assured the continuation of some intermediation in spite of the panic that has taken hold of the financial industry.

The Treasury and the Fed are in a unique position to provide such systemic insurance, since the first institution is backed by the power to tax and the second by the privilege to print money.⁸ When confidence returns to private financial intermediaries, the need for the involvement of governmental institutions will abate. Hopefully, they will then be able to reduce their substantial involvement in financial intermediation in parallel to the orderly return of private financial institutions into this market.

Other lessons from the GD include the virtual disappearance of traditional bank runs after the enactment of deposit insurance and the creation of an anti-protectionist awareness among policymakers. The disappearance of traditional bank runs following the permanent creation of the FDIC in 1933 clearly demonstrates the benefits and long-term viability of deposit insurance.

The statement against protectionism made at the April 2009 official communique of the G20 attests to the fact that major policymakers today are keenly aware of the dangers of trade wars. This is due to institutional memories about the adverse consequences of such actions during the GD. Paralleling this tendency, there is substantially more coordination of monetary policy, mainly through swaps agreements between central banks and related arrangements. Hopefully, the world's major policymaking centers will continue to largely avoid such trade inhibiting policies. The likelihood that this will indeed be the case is greater than during the great depression for two reasons: First is the demonstration effect of the adverse consequences triggered by

⁸ Interestingly, the flight to safety at the end of 2008 and the beginning of 2009 enabled the Treasury to borrow funds needed to finance the recapitalization of banks and other activities at low interest rates.

such policies during the GD. Second, since the current crisis is likely to be milder and shorter than the GD, the temptations to engage in beggar-thy-neighbor policies will be weaker.

3.2 Lessons from the GFC and open issues⁹

3.2.1 Runs among financial institutions

Due to deposit insurance and the vigorous involvement of the Fed, there hardly were runs on the banks by depositors during the GFC. But opaqueness about the valuation of certain classes of sophisticated financial assets like MBSs and other CDOs brought interbank credit to a virtual standstill, inducing a serious reduction in the availability of credit to firms and households and a flight to safety by savers and institutional investors.

The inability to assess the value of such assets in conjunction with their huge quantities induced a run-like behavior among financial institutions rather than between depositors and banks. Those institutions stopped advancing funds to each other even for very short periods of time and attempted to repatriate all the liquid assets owed them by other financial institutions. In this context it should be noted that runs by sophisticated financial institutions on each other can materialize much more forcefully and swiftly than traditional bank runs by less financially sophisticated depositors. During the last quarter of 2008 this forced the Fed and the Treasury to inject huge amounts of liquidity and of taxpayers' money to buy questionable financial assets in order to prevent a meltdown of the US (and with it of the world) financial system.

⁹ This subsection introduces some of the most salient new issues raised by the GFC but does not discuss possible solutions. Those are discussed in greater detail in Cukierman (2009).

Although it is clear that the root cause of the panic following the demise of Lehman Brothers resided in opaqueness about the valuation of assets, several factors combined to produce this lack of transparency. In a nutshell, opaqueness about the value of assets is due to the rise of an unregulated and unsupervised shadow banking system in conjunction with the creation of sophisticated, but poorly conceived, financial instruments. Clearly, an important general lesson from the GFC is that regulation and supervision of financial institutions have to be restructured in ways that will enhance transparency about the valuation of assets and about the financial positions of intermediaries. Although this general principle is simple enough, the devil is in the details. Those details raise difficult tradeoffs between wide and efficient intermediation on one hand, and transparency on the other, and are beyond the scope of this paper.

3.2.2 Leverage during the GD and the role of financial derivatives during the GFC

Prior to the GD, banks were lending on margin against stock collateral. As a result, when the stock market crashed in October 1929, the value of collateral went down and the banks contracted credit to the real economy. Once the bubble burst, the large amounts of leverage built up during the twenties ruined numerous investors and financial firms. This initial adverse shock to the financial system was subsequently transmitted to the real sector through inaction and policy mistakes on the part of policymakers. A similar mechanism of over-leverage operated during the GFC. During the real-estate boom over-optimism led to the buildup of excessive amounts of leverage. Once the real-estate boom turned into a bust, this leverage severely impacted the liquidity and solvency of major financial institutions.

Although there are strong analogies between the broad mechanisms that burst the financial bubbles at the starts of the GD and the GFC, the latter crisis is characterized by financially sophisticated derivative products that did not exist during the GD. One prominent derivative, if only because of its size, is the collateralized debt swap (CDS) invented by Black and Scholes. CDSs are typically bilateral contracts that enable one party to either assume or reduce credit exposure on one or more debt obligations of named issuers (further details appear in chapter 18 of Sundaresan (2009)). This market – initiated as late as the mid-nineties – grew enormously during the last ten years, reaching an estimated stock of over \$ 60 trillion in 2008. Prior to the crisis, CDSs written by AIG covered more than \$440 billion in bonds, but AIG did not possess the funds required to cover losses of such magnitude in case the contingencies stipulated in the CDS contracts materialized. The collapse of Lehman Brothers triggered such an event, exposing AIG to bankruptcy and forcing the authorities to bail it out. Due to their derivative nature, CDSs are either not regulated or very poorly regulated. This, in conjunction with the fact that they are not traded on organized exchanges, raises important new questions about the pros and cons of such instruments and about their regulation.

3.2.3 The too-big-to-fail problem

The GFC brought to the forefront the too-big-to-fail problem. This problem was largely non-existent during the GD because, at the time, the central bank and government did not believe they should rescue ailing financial institutions. They simply let thousands of US banks fail.¹⁰ The attitude of contemporary policymakers is completely different. Rescue

¹⁰ There was some attempt to recapitalize banks during the GD under Roosevelt. However its size was modest in comparison to the bailout effort, to date, during the GFC.

operations of US investment banks during the GFC, as well as the downfall of Lehman Brothers, clearly demonstrate that the Fed and the US Government will not tolerate failures of systemically important financial institutions.¹¹ Managers of systemically important institutions expect therefore that, if they fail, the authorities will come to their rescue. They consequently choose portfolios that carry risk levels higher than the socially optimal levels, not only because they do not internalize systemic risks, but also because they expect to be bailed out.

Once a crisis develops, it is likely that bailouts of systemically important institutions are preferable to the financial disruptions that would otherwise occur. But this induces *ex ante* opportunistic behavior on the part of large financial institutions – raising the likelihood of crises. Appropriately devised, and tightly enforced, regulation of financial institutions is currently developed with the aim of minimizing this moral hazard problem in a world for which bailouts of large institutions are common practice.

3.2.4 The incompleteness of micro based risk assessments by financial institutions

The GFC revealed that, in spite of the modern financial wizardry at their disposition, many financial institutions seriously underestimated the risks inherent in some of their investments. Although they often did a reasonable job in estimating micro risks of default on assets, major financial institutions often overlooked systemic risks due to correlations between macro aggregates. In addition, even purely micro based probabilities of default

¹¹ During 2008 Bear-Stern, AIG, Citibank, Merrill-Lynch, Fannie Mae and Freddie Mac were bailed out in various ways. Although Lehman Brothers was not rescued it is clear that the financial shock waves created by its downfall raised the likelihood that systemically important institutions will, most likely, be bailed out in the future.

were estimated using data on several recent years rather than data from at least a full cycle. This reinforced the overly optimistic view of risks during the latter part of the real-estate boom.

3.2.5 A reinterpretation of the Keynesian liquidity trap in view of the GFC

When I was first exposed to the (IS-LM type) Keynesian liquidity trap during the mid-sixties, I was told that there is a sufficiently low interest rate (not necessarily zero) at which the demand for money becomes infinite. As a result, any attempt to reduce the interest rate by monetary expansion is doomed to failure since the public is willing to passively absorb any demand for money at that interest rate. I recall that this argument always mystified me, since I could not imagine circumstances under which the public would demand such large quantities of money. While watching the unfolding of the GFC I finally understood what I tend to believe now is a realistic (and correct) interpretation of the liquidity trap story.

Two bases for this reinterpretation should be clarified upfront. First, the “infinite” or, more appropriately, “large” demand for money originates mainly in the banking and financial sector rather than with the “public” at large. Second, during the peak of a financial crisis those institutions are willing to passively absorb any amount of liquidity rather than transform it into return yielding assets because of two main reasons. One is the preceding depletion of their liquid assets and capital, and the other is a very substantial increase in the perceived riskiness of lending during the peak of the financial crisis. Microfoundations for such behavior in the presence of learning about the economy during periods of increased uncertainties are developed in Cukierman (1980) and in

Bernanke (1983a). Those observations are, I believe, appropriate for both the GD and the GFC.

The above scenario implies that the transmission of monetary policy to the real economy crucially depends on the behavior of individual financial firms. This behavior depends, in turn, on the state of their liquidity, their capital and on their perceptions about the level of uncertainty in the economy. When times are perceived to be tranquil, injections of central bank money into the economy are swiftly transformed into additional credit and lower rates. But when, as was the case during the peak of the GFC, uncertainties are high, the injected liquidity sits in the balance sheets of banks and has little impact on both the quantity and the price of credit to the real economy.

The reinterpretation above leads to three conclusions: First, the transmission of monetary policy actions to the real economy depends on the reaction of the banking system. Second, this reaction is likely to be quite different during normal than during crisis periods. Last, but not least, a reasonable description of the transmission of monetary policy generally requires sufficiently detailed descriptions of the behavior of banks and other financial intermediaries.

4. Comparison of New Keynesian models with Keynesian frameworks of the sixties

4.1 *Introduction*¹² The sixties are generally believed to be the heyday of Keynesian economics with respect to both theory and policy prescriptions. During the last decade, a technically sophisticated body of theory known as “New Keynesian” managed to introduce Keynesian sticky price ideas into dynamic stochastic general equilibrium

¹² This section draws on section 2 of Cukierman (2005).

(DSGE), opening the door for integration of real business cycle (RBC) with monetary theory and policy. Woodford's (2003) impressive monograph lays foundations for this approach. Gali (2008) is a compact graduate textbook introduction to the area.

This new body of literature has been taught to recent generations of PhD students and is quite active research-wise. To many young researchers in the sub-area it is the standard way of doing macro models with sticky nominal variables. My experience has been that many (of the highly clever young researchers) in this active area possess only vague notions about the "old" Keynesian models of the sixties. By the same token, most older researchers who contributed to the development of such models are largely ignorant of the contributions made within the New Keynesian framework. The main objective of this section is to close some of this intergenerational gap by presenting a non-technical but conceptually precise comparison of the main similarities and differences between the new and the old Keynesian frameworks.

4.2 Comparison

1. The main factor common to both frameworks is that, at least within some range, prices and/or nominal wages are sticky and economic activity is demand determined. In the old version the microfoundations of this process are not explicitly specified and, at least in its polar version, old Keynesian thinking admits of one of the two following alternative regimes: In one, output adjusts fully to satisfy demand while the price level does not respond at all to demand shocks. In the other, "full employment" regime output does not respond and all the burden of adjustment to demand shocks is borne by the price level. In New Keynesian models (NKM) there are explicit microfoundations based on

monopolistic competition, due to product differentiation and sticky prices that are motivated by costs of price adjustments. An early theoretical formulation of such a framework appears in Blanchard and Kiyotaki (1987). Due to the temporary stickiness of prices and the existence of positive profits, it is optimal for firms to accommodate demand shocks by means of higher production within some range. The micro foundations of practically all New Keynesian frameworks originate in the microeconomic model of Dixit and Stiglitz (1977).¹³

2. Contrary to standard old Keynesian models (OKM), prices in NKM are sticky only temporarily.¹⁴ When the appropriate time comes, the individual firm's price is reset at an optimal level that takes into consideration the fact that resetting the price again in the future is costly. As a consequence, current price-setting behavior is a function of current inflationary expectations. This requires the explicit modeling of inflationary expectations which are normally specified as being model consistent expectations. The optimal resetting of prices and the influence of inflationary expectations on this activity are absent in OKM, since firms in this model are price takers rather than price setters.

3. Asymmetries in upward versus downward adjustments of nominal variables is an important element of OKM. In particular, OKM postulate that prices, and particularly nominal wages, are more sticky downward than upward.¹⁵ By contrast, in NKM the degree of nominal stickiness is independent of the direction of pressure for price change.

¹³ This statement is also true for open economy versions of New Keynesian frameworks like Obstfeld and Rogoff (1995).

¹⁴ In the old models there is no explicit mention of the length of time over which prices are sticky.

¹⁵ Recent evidence for the US supports the view that nominal wages are particularly sticky downward (Bewley (1999)).

4. All firms in the economy normally do not adjust their prices simultaneously. OKM are silent on this issue. An attractive feature of NKM is that they attempt to evaluate the positive and normative consequences of price staggering. For tractability reasons the costs of price adjustment are not modeled explicitly. Following a suggestion by Calvo (1983), it is postulated instead that each firm can reset its price in any given period with a constant probability that is smaller than one. As a consequence, when a firm gets the opportunity to reset its price, it takes into consideration that it might not be given such an opportunity again for a number of periods to come. This formalism is widely used in NKM to evaluate the costs of inflation and to draw conclusions for optimal monetary policy.¹⁶

5. Like RBC models on which they are anchored, NKM feature explicit dynamic optimization at the level of the individual economic unit. For the most part, OKM of the sixties were static and did not incorporate micro based consequences of those dynamics. In particular, intertemporal substitution of consumption is absent in OKM.

6. The dynamics of inventory accumulations and decumulations play an important role in Keynes's original thinking and in some large-scale econometric models of the sixties. To this point NKM has not incorporated inventories into the analysis.

7. Both old and new Keynesian models largely abstract from supply constraints when dealing with the effects of demand on economic activity. This is usually assumed explicitly in the old models. In the new models this is done by implicitly assuming that

¹⁶ Explicit modeling of the consequences of costs of price adjustments for *endogenous* price setting decisions have been extensively studied during the eighties at the *micro* level. A collection of relevant articles appears in Sheshinski and Weiss (1993). Another device occasionally used to model costs of price adjustments in New Keynesian models are quadratic costs of price adjustments (Rotemberg and Woodford (1997)). Although convenient analytically, this device is less attractive than its Calvo counterpart for two reasons: First, it does not generate nominal staggering. Second, its implicit assumption – that the costs of price adjustments increase at an increasing rate with the size of the adjustment – appears rather unrealistic.

the demand shocks are not too large, so that total demand facing a typical firm is smaller than the level of output at which the firm's marginal cost of production becomes larger than its temporarily fixed price. In the absence of this assumption, actual economic activity would have to be specified as the minimum between that level of output and demand.

In summary, the main distinguishing feature of NKM is that they incorporate sticky prices and monopolistic competition into RBC frameworks. In so doing, they build a bridge between neoclassical and Keynesian frameworks in which economic activity is demand determined. But it seems that one could have characterized the body of research with equal justification under the NKM heading as a “new neoclassical synthesis.” This equally plausible characterization is reflected in the title of Goodfriend and King’s (1997) paper. Titles aside, an attractive byproduct of this synthesis is that it makes it possible to explicitly recognize the effects of inflationary expectations on current price-setting behavior.

4.3 Further reflections

The experience with the subprime crisis, which preceded the GFC, revealed the importance of the housing market and of supervision and regulation of the financial system. In particular, it reminded economists that prices in the housing and construction sector are largely determined by the availability of credit and by the relative returns and risks on other assets. Thus a change in prices in the housing sector can occur just because of a shift in portfolio preferences, or because of changes in the availability of credit. Such mechanisms are nonexistent in the NKM but are recognized in more elaborate OKM

from the sixties. Examples are Tobin's (1969) general equilibrium approach to monetary theory and Ando and Modigliani's (1969) evaluation of stabilization policies within a large-scale econometric model of that time (the Federal Reserve Board MPS quarterly econometric model).

A large number of supervisory and regulatory failures surfaced as a consequence of the GFC (details appear in Cukierman (2009)). Both old and new Keynesian models are largely silent about the impact of supervision and regulation of the financial system on the likelihood of financial crises.

5. Concluding remarks

What are the main analogies and differences between the GD and the GFC? A nutshell answer is that both crises originated in the financial sector following periods of over-optimism, excess leverage and low interest rates. The GD was propagated and extended to the real sector by inadequate institutions, prolonged policy inaction and subsequent aggregate policy errors. To a large extent those second-round problems have been avoided, at least to date, during the current crisis.

The GFC was allowed to develop due to interactions between the common factors above on one hand, and regulatory forbearance, insufficient financial regulation of the shadow banking system and financial innovations that seriously hampered the ability of market participants to estimate the value of large classes of financial assets, on the other.

The GD led to the Keynesian revolution in economics. It is natural, by analogy, to expect that the GFC will also engender changes in the agenda of economic research. I conclude this article with some speculations about possible changes in the focus of

economic research in the aftermath of the current crisis. First, much more attention will be devoted to explicit modeling of the behavior of financial intermediaries. The currently popular New Keynesian framework will either be extended to include a meaningful financial sector or be seconded/replaced by other paradigms. Second, the extreme New Keynesian view that monetary policy operates *only* through the interest-rate channel (developed in chapter 3 of Woodford (2003)) is likely to be pushed aside by the view that this policy can operate via *both* stocks (quantitative easing) as well as through the interest rate.¹⁷ Third, future monetary policy procedures are likely to give more emphasis to financial stability in comparison to price stability.¹⁸ In parallel, the role of central banks in supervision and regulation is likely to increase.

Neither old nor new Keynesian models pay much attention to the impacts of financial supervision and regulation as well as of the micro structure of financial markets and contracts on macroeconomic equilibrium. The GFC makes the development of such analysis essential. Preliminary – mostly micro or finance-based – research is starting to emerge. Examples are Hart and Zingale (2009) in the micro area, Duffie and Zhu (2009) in Finance, and Brunnermeier *et al.* (2009) in the more practically oriented regulatory reform arena. The more demanding theoretical macro extensions are likely to follow later. Finally, the wide price gyrations observed in financial markets since summer 2008 are likely to revive the view that bubbles and multiple equilibria driven by *oscillations between fear and greed* may be more common than acknowledged by existing theories. An important challenge in this area is to find ways to evaluate the links between the

¹⁷ Interestingly, the monetary policy procedures of the ECB and of the Bundesbank before it are based on this view.

¹⁸ Chapter 7 in Cukierman (1992) shows that there is a tradeoff between price stability and financial stability, and discusses determinants of this tradeoff.

quality of supervision and regulation on one hand and the likelihood of booms and busts on the other.

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