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# The 2007-2009 Subprime Crisis and the Global Public Policy Response

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## ABSTRACT

In this article, we look at the root causes of the 2007-2009 subprime financial crisis in the United States and the ensuing global economic crisis. We then examine how public authorities in advanced economies responded to the crisis. We emphasize that, from the very start, public policy developed along two complementary but distinct lines of intervention: (i) short-term macroeconomic management, and (ii) medium- to long-term reshaping of the financial regulatory framework. We find that the two sub-sets of policies were pursued at the global level and not simply at the national and/or regional level. Finally, we summarize the main risks that emerged as a consequence of the macroeconomic policy response to the crisis, namely high volumes of public debt, an uncertain inflation outlook and the possible development of bubbles in some asset markets.

## 1. Introduction

This article highlights how the global response to the 2007-2009 subprime crisis and the ensuing global financial crisis<sup>1</sup> involved a

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<sup>1</sup> Throughout this article a fundamental distinction is drawn between the subprime crisis (a localized US event) and the ensuing global financial crisis (a truly global financial event associated with international financial contagion). The National Bureau

combination of short-term macroeconomic management and appropriately designed long-term regulatory changes.

In the United States, the 2007-2009 subprime crisis originated in the financial sector. Excessive granting of credit and lax lending procedures, as well as excessive risk-taking by financial institutions, ultimately led to huge defaults on bank loans. Because many of these loans had been securitized, sold, and dispersed throughout the global financial system, these defaults generated deep mistrust among institutions operating in increasingly borderless financial markets. Interbank markets seized up, severely compromising the banking system's ability to supply loans to firms and households and thus distressing the real economy through an amplification mechanism in the form of an adverse feedback loop (Brunnermeier, 2009).

Anticipating the impact on the global economy, forward-looking financial markets fell sharply (in view of the potential losses associated with "toxic" assets), reducing household wealth and thus further sapping private demand. Meanwhile financial institutions that had taken over both housing collateral associated with unpaid mortgage loans and mortgage-backed securities of uncertain value proceeded to sell the underlying collateral (the houses), putting downward pressure on housing prices and thus doubly reinforcing the damage to household wealth and consumption. For a sample of 23 OECD countries, the subprime crisis ultimately resulted in significant losses of potential economic output, estimated at 8.4% of GDP (year: 2015), putting the corresponding economic losses at an estimated \$4.3 trillion (Ball, 2014).

Globally, the G20 response to the crisis was essentially twofold. First, there was a decision to compensate for the fall in private expenditure by increasing public expenditure, which, coupled with the lowering of interest rates by central banks, stemmed the collapse of global aggregate demand. Second, the root causes of the crisis

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of Economic Research has dated the subprime crisis episode as lasting from December 2007 to June 2009 (NBER, 2010).

began to be addressed. Among the different regulatory measures undertaken, this article singles out:

1. the increase in bank capital ratios and a more rigorous definition of what counts as capital buffers;
2. the initiative to transform informal trading arrangements into formal asset exchanges with trade recording (quantities, prices and asset owners);
3. the attempt to link bank managers' bonuses to the medium-term performance of their financial institutions (in order to discourage short-sighted risk-taking that may generate big short-term profits but ultimately enfeebles those institutions in the medium term).

Concerning financial regulation, this article constitutes a comprehensive exercise covering within a unified perspective the set of short- and long-term global regulatory responses to the global financial crisis, thus expanding on previous studies on this important topic. Among the latter, the Bank for International Settlements (BIS) provides an updated report on the implementation of post-crisis reforms in G20 countries (BIS, 2015); Qureshi (2015) establishes the promotion of balanced and sustainable economic growth as a central goal for G20 economies; and Claessens and Kose (2014) address the global regulatory implications of the latest global systemic meltdown.

The article is organized as follows. Section 2 examines the root causes of the U.S. financial crisis and outlines how the problems in the U.S. financial sector impacted the real economy (both in the United States and in the global economy). Section 3 gives a general overview of the global public policy response. Section 4 provides a summary of the macroeconomic policy measures. Section 5 examines the measures pursued in terms of the financial regulatory framework. Section 6 concludes.

## **2. The root causes of the U.S. "subprime" crisis**

In modern economies, banks and nonbank companies obtain

funds from diverse sources: retained earnings; equity capital invested by the owners of the bank or firm; funds borrowed from banks; and funds raised in bond markets. Banks also rely on their ability to create money.

For banks, retained earnings and the capital supplied by their owners (shareholders) typically correspond to a tiny fraction of the total amount of funds they use. In other words, banks operate with a high degree of leverage.

In the years that preceded the crisis, two developments in banking strategies and practices contained what proved to be unsustainable elements of danger.

First, U.S. banks stepped up their mortgage lending, including a significant amount to individuals with high risk profiles – those belonging to the so called *subprime*<sup>2</sup> segment of the US mortgage loan market. The factors spurring them to take this route are clear enough:

1. a voracious search for new customers;
2. the higher interest rates charged to high-risk borrowers (implying high returns in the short term, before default rates start to increase);
3. the linking of bank managers' bonuses to banks' short-term performance;
4. securitization and other techniques that allowed managers to transfer risk to third parties (the good ratings assigned to some of these financial products helped conceal the poor credit quality of the underlying loans) (Krugman, 2012).

Second, during the preceding upswing of the U.S. business cycle,<sup>3</sup> credit standards eased and became quite lax. Banks and other

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<sup>2</sup> In the mortgage finance industry, the term *subprime* refers to a specific category of high-risk borrowers, notably those with extremely high default probabilities on their mortgage loans. These borrowers' risk profiles entail a correspondingly high degree of credit risk, which obliges lenders to demand higher premiums. These distinct risk profiles are summarized in the borrowers' FICO scores, a credit scoring system widely used by financial institutions in the United States (Bhardwaj and Sengupta, 2015).

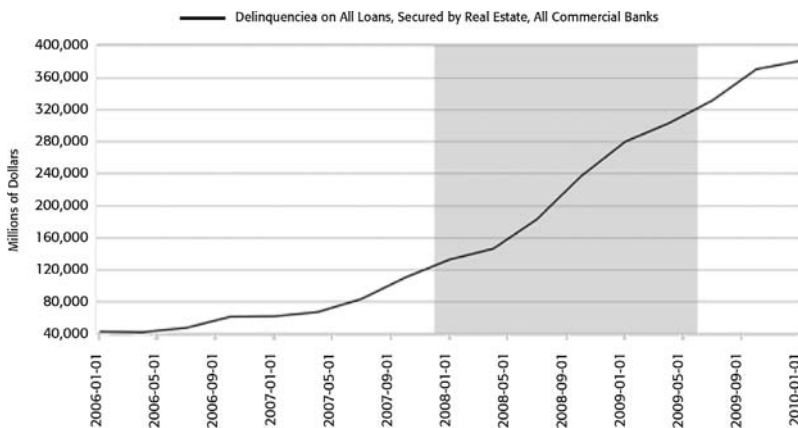
<sup>3</sup> That is, from November 2001 to December 2007 (NBER, 2010).

financial institutions had no difficulty rolling over their debts: whenever a loan they had been granted reached maturity, it could be easily replaced by a new loan, thus allowing financial institutions to take for granted their ability to roll over their debts in the repo markets.

The disruptive factor was the emergence of serial default in the subprime credit segment of the U.S. mortgage market (Shiller, 2008). The initial serial default spread to other credit segments (Figure 1), originating a massive financial contagion in the U.S. housing and credit markets (Doms, et al., 2007).

Since the subprime loans had been securitized – i.e., divided into small slices, with each slice then attached to a security – the value of these securities fell abruptly and they started to be called “toxic assets”. The financial institutions holding them suffered big losses. Because informal over-the-counter trading had expanded by leaps and bounds before the crisis, it was virtually impossible to know who held these securitized loans (“toxic assets”), and this gave rise to widespread mistrust among financial institutions in view of the uncertainty associated with financial positions of uncertain value. Financial institutions became highly reluctant to lend to other financial

**FIGURE 1**  
Delinquencies on Loans and Leases  
Secured by Real Estate in the United States



Source: Federal Reserve Economic Data.

institutions, for fear that the counterparty might be holding huge amounts of toxic assets that could trigger its bankruptcy overnight. It was a minefield: nobody knew when the next financial institution, burdened with toxic assets, would implode.

In this environment of global mistrust, financial institutions highly dependent on rolling over their debts got into serious trouble when they tried to find new lenders; those unable to obtain the funds they needed found themselves unable to fulfil their obligations.

Both financial institutions and government-sponsored enterprises (GSEs) entered this bankruptcy stage quite sequentially in a short period of time. Banks such as Bear Stearns and Lehman Brothers (United States) and Northern Rock (United Kingdom), went into bankruptcy,<sup>4</sup> while GSEs such as Fannie Mae and Freddie Mac were placed under the management of the U.S. government.

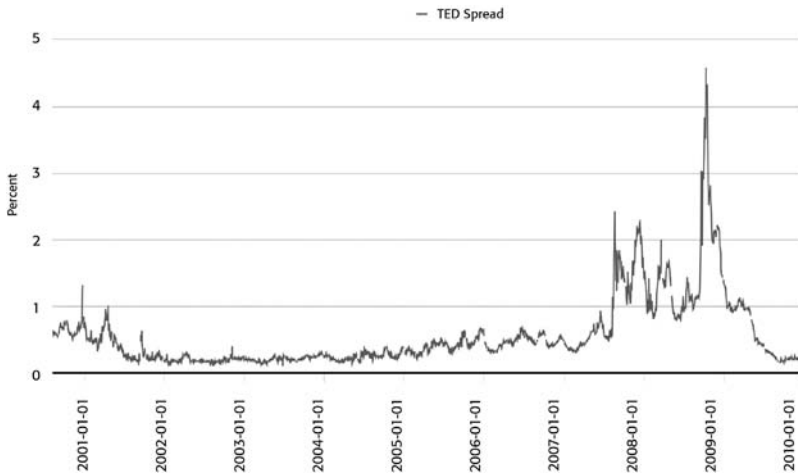
In September 2008, the financial crisis reached its peak with the “Lehman moment”: the American investment bank Lehman Brothers began to implode because of its subprime exposure, and the U.S. government decided neither to nationalize it nor to support its takeover by another bank (Barclays, of the U.K., initially said it might be interested in acquiring Lehman if the U.S. government provided some guarantees). As a consequence, the 158-year old bank was forced to file for bankruptcy. The impact on global financial markets was brutal: mistrust within the financial world was transformed into global panic; not only were there dozens of banks laden with toxic assets, but the Lehman bankruptcy served as a reminder that governments do not always bail out ailing financial institutions. Figure 2 reflects this widespread panic, which caused a steep fall in interbank lending – some segments of the interbank market completely dried up, especially the segments for longer maturities – and a very sharp increase in interbank interest rates (due to the rise in risk premiums). In this context, the U.S. banking system shifted to a

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<sup>4</sup> Bear Stearns was subsequently sold to J.P. Morgan Chase, Lehman went bankrupt, and Northern Rock was nationalized.

more defensive and restrictive stance in supplying loans to households and companies, and the problems in the financial sector consequently spread to the real economy.

**FIGURE 2**  
U.S. TED Spread



Source: Federal Reserve Economic Data.

Note: The TED spread is the difference between the interbank interest rate and the rate on U.S. Treasury Bills.

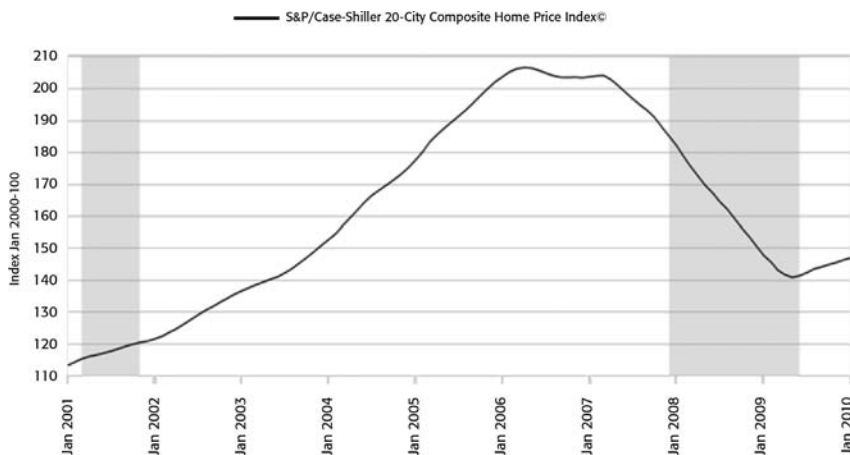
Meanwhile distressed sales of houses by banks following mortgage foreclosure, together with the fall in the demand for houses due to the constriction in the loan supply pipeline, were driving down house prices, which, over the crisis period, fell by around 30% (Figure 3). Because home equity is an important part of U.S. households' wealth, the fall in house prices dealt a major negative shock to U.S. household wealth, and this was an important factor putting downward pressure on personal consumption expenditures and aggregate demand.

Anticipating the damage to the real economy in the months ahead, forward-looking equity markets went into a slump that further depressed household wealth and engendered widespread pes-



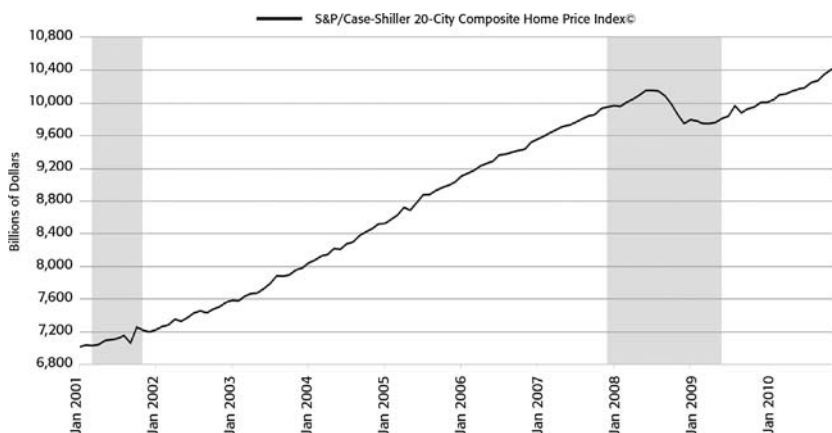
simism, developments that translated into less personal consumption expenditures (Figure 4).

**FIGURE 3**  
U.S. S&P Case-Shiller Home Price Index



Source: Federal Reserve Economic Data.

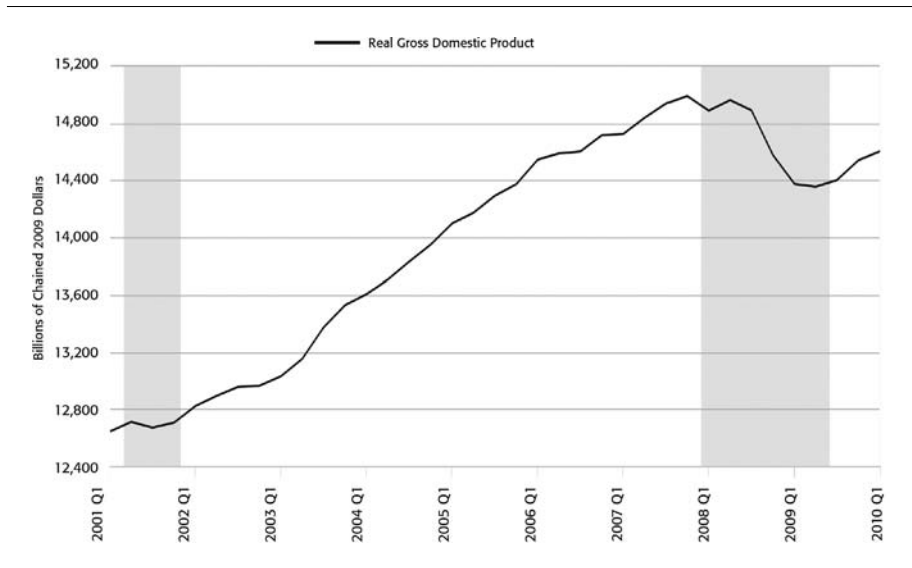
**FIGURE 4**  
U.S. Personal Consumption Expenditures



Source: Federal Reserve Economic Data.

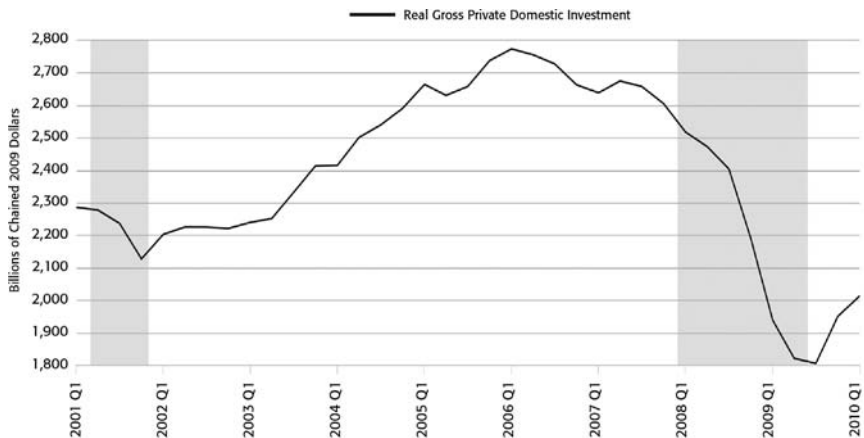
Since personal consumption expenditures make up about two thirds of total expenditure in the United States, aggregate demand fell significantly. Facing diminished demand for their products/ services and greater difficulty in obtaining bank loans, firms started cutting back production and investment and firing workers (Figures 5, 6 and 7). This reinforced the fall in household consumption spending, which, coupled with less investment, translated into negative spiralling aggregate demand and economic output throughout the crisis episode.

**FIGURE 5**  
U.S. Real Gross Domestic Product (GDP)



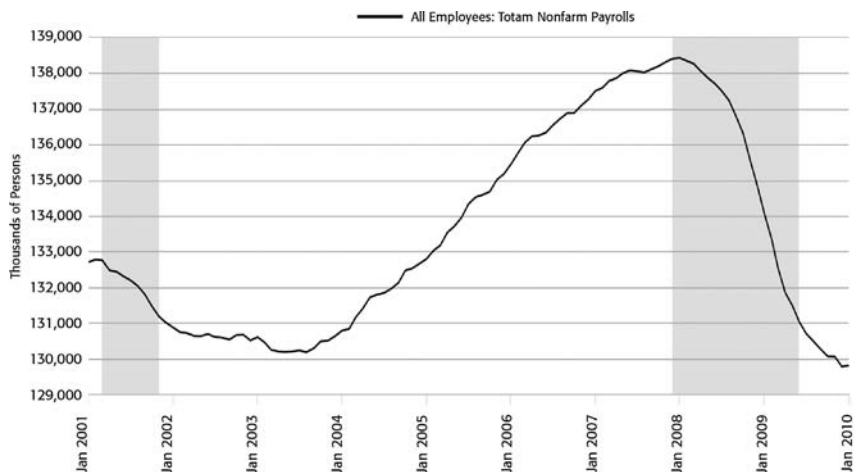
Source: Federal Reserve Economic Data.

**FIGURE 6**  
U.S. Real Gross Private Domestic Investment



Source: Federal Reserve Economic Data.

**FIGURE 7**  
U.S. Total Nonfarm Payrolls (all employees)



Source: Federal Reserve Economic Data.

### 3. Response to the crisis: overview

The authorities' comprehensive response to the global financial crisis developed along two vectors:

1. macroeconomic policy measures to stem the fall in aggregate demand (governments stepped up *public expenditure* and central banks lowered interest rates to stimulate *private expenditure*); and
2. regulatory changes to address the root causes of the crisis (banks operating with excessive leverage; securitization and other forms of transferring risk that created an incentive to increase risk exposure; the misaligned compensation structure for bank managers; and the excessive informality of many transactions carried out through the shadow banking system).

The major industrial countries became involved with the top emerging economies in shaping commitments to be adopted at a global level. In the sphere of macroeconomic policy, this coordination encompassing both advanced and emerging-market economies was important; in its absence, if, for example, all countries except China increased their public spending and lowered their interest rates, the resulting rise in demand would greatly benefit Chinese exports, permitting China to reap economic gains without incurring the corresponding costs (*vis-à-vis* the other countries).

In the domain of financial regulation, coordination was fundamental in order to avoid creating enticing opportunities for financial institutions to transfer operations to countries with easier rules through regulatory arbitrage. For example, if a given country decided to impose less stringent bank capital requirements, many financial institutions would move to that jurisdiction so as to escape the more burdensome requirements in force elsewhere.

The deepening of the financial crisis unleashed by the Lehman Brothers bankruptcy in September 2008 was originally addressed in a G20 finance ministers meeting in early November 2008. This was followed by a series of G20 meetings at the level of heads of state: in mid-November 2008 (in Washington); in April 2009 (in London, with special emphasis on the coordination of macroeconomic policy); in

September 2009 (in Pittsburgh, to discuss financial regulation and assess the results of the macro policy measures); June 2010 (in Toronto); November 2010 (in Seoul); November 2011 (in Cannes); and June 2012 (in Los Cabos).

Table 1 shows the G20 countries' deep concern with the economic and financial fallout from the global financial crisis.

Because the G20 is an informal platform – there are neither offices nor permanent support staff – it relied on the International Monetary Fund (IMF) and on the Financial Stability Board (FSB) for the details of the design, implementation and impact assessment of the proposed policy measures. The IMF was called upon to assess and examine the coordination and the overall coherence of the macroeconomic policies of the G20 countries. The scope of its task included not only an evaluation of monetary and fiscal policy measures, but also an analysis of several types of imbalances (e.g. government deficits and public debt sustainability, current account deficits and external debt). In turn, the FSB was asked to come up with detailed proposals for financial regulation and to monitor each G20 country's compliance with the agreed guidelines and rules.

#### **4. Response to the crisis: macroeconomic policy**

Because the United States imports an immense quantity of goods from other countries, the crisis in the U.S. economy translated into weak aggregate demand in most regions of the world. To compensate for this, governments of the G20 decided to increase public spending.

In the United States, at the beginning of 2009 President Obama put forward a stimulus package worth \$831 billion (approximately 4.6% of annual GDP) for the period 2009-2010. This included spending on infrastructure, education, health, and the energy sector. Although the package did not cause any major stress in financial markets, Corden (2010) questioned the fairness of using debt-financed fiscal stimulus on such a large scale because of the implied

**TABLE 1**  
**G20 Leaders' Summits**

G20 Summits (Location/Date)	Major selected highlights (pledges by Heads of State)
Washington  2008	<ul style="list-style-type: none"> <li>i) short-term management of the global financial crisis</li> <li>ii) promotion of coordination of financial regulatory reform processes</li> <li>iii) implementation of macroeconomic policies in support of aggregate demand (fiscal and monetary policies)</li> </ul>
London 2009	<ul style="list-style-type: none"> <li>i) short-term management of the global financial crisis (including funding to international financial institutions)</li> <li>ii) creation of the Financial Stability Board (FSB) to coordinate and monitor progress on financial regulatory reforms</li> <li>iii) commitments to coordinate fiscal stimulus</li> </ul>
Pittsburgh 2009	<ul style="list-style-type: none"> <li>i) G20 to become the "premier" forum for international economic and financial cooperation</li> <li>ii) creation of the "G-20 Framework for Strong, Sustainable, and Balanced Growth", intended to address global imbalances and promote economic growth</li> <li>iii) increase the voting power of emerging economies at major international financial institutions</li> </ul>
Toronto  2010	<ul style="list-style-type: none"> <li>i) financial sector reforms and correction of global imbalances;</li> <li>ii) stimulus to economic growth; implementation of fiscal consolidation targets</li> <li>iii) redefinition of the nexus between international financial institutions and development</li> </ul>
Seoul   2010	<ul style="list-style-type: none"> <li>i) endorsement of tougher capital standards for financial institutions</li> <li>ii) implementation of global safety nets and the potential need to implement capital controls</li> <li>iii) increase funding for the I.M.F.</li> </ul>
Cannes   2011	<ul style="list-style-type: none"> <li>i) addressing the Eurozone debt crisis, as well as high unemployment in some G20 economies</li> <li>ii) reform of the international monetary system</li> <li>iii) promoting employment</li> </ul>
Los Cabos   2012	<ul style="list-style-type: none"> <li>i) addressing the Eurozone debt crisis, as well as the implementation of European policies in contravention thereof</li> <li>ii) the design of the international financial architecture</li> <li>iii) addressing job creation worldwide</li> </ul>
Saint Petersburg   2013	<ul style="list-style-type: none"> <li>i) addressing international financial architecture and financial regulation</li> <li>ii) addressing economic growth, and job creation</li> <li>iii) addressing investment and multilateral trade</li> </ul>
Brisbane   2014*	<ul style="list-style-type: none"> <li>i) fostering resilience of the global economy through international financial architecture and financial regulation</li> <li>iii) addressing risks in the global financial system (namely, the shadow banking system)</li> <li>iii) address sovereign debt-related issues</li> </ul>

Source: CRS (2014), OECD (2016).

\* Less emphasis has been placed on economic and financial issues since the Brisbane Summit.

burden for future tax-payers. For Wren-Lewis (2010), the problem was the very high starting point in terms of the public debt-to-GDP ratio in the United States. If the government had reduced this ratio to a more reasonable level during the long economic upswing that preceded the crisis, it would have been easier to justify debt-financed stimulus when the crisis struck.

China launched a major stimulus package of RMB¥4 trillion (\$588 billion) during 2009 and 2010, mostly targeted at infrastructure (He, Zhang and Zhang, 2009). According to Woo and Zhang (2010), this task was made easier for the Chinese government by the existence of important state-controlled enterprises and banks, so the government just ordered its companies to raise investment and its banks to fund the new investments. However, this created the risk of large increases in non-performing loans in the future.

In the Eurozone, policy makers agreed to let fiscal deficits breach the Maastricht Treaty ceiling of 3% of GDP (using a clause in the Treaty that allowed derogation from this limit in the event of a deep recession). However, the enormous increase in government borrowing that was needed to fund the extra government spending eventually led to the Eurozone sovereign debt crisis in 2010 and subsequent years.

In Japan, so-called Abenomics involved a strong boost to government spending.<sup>5</sup> Most of the other G20 countries also adopted significant counter-cyclical stimulus packages in the aftermath of the global systemic shock.

At the same time, an overwhelming majority of central banks around the world aggressively lowered their interest rates in order to try to reignite private consumption and investment. In the United States, the federal funds target rate was lowered to the interval 0-0.25% in December 2008 and stayed there until December 2015, when it was raised slightly to the range of 0.25-0.50%. In the Euro-

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<sup>5</sup> Abenomics refers to the package of economic policies of Japan's prime minister Shinzo Abe since 2013, involving both supply-side policy measures – often called structural reforms – and stimulus to aggregate demand (through fiscal and monetary policy).

zone, the reaction was slower, but the European Central Bank (ECB) lowered its main refinancing rate in steps until it eventually reached 0% in March 2016. Many central banks in emerging markets (South Korea, India, among others) also slashed their interest rates.

When interest rates reached zero or almost zero, many central banks resorted to unconventional monetary policy measures. Among these, the most important has been quantitative easing, i.e., large-scale central bank purchases of securities, mainly government bonds. Payment for the securities by the central bank implies injection of liquidity into the economy. In the U.S., the Fed introduced a program which at its peak involved buying up to \$60 billion of securities each month. In the Eurozone, the ECB's quantitative easing program, at its zenith, involved the purchase of €80 billion worth a month. In Japan, where near-zero interest rates were not a novelty because the country had been fighting deflation since the 1990s, Abenomics included a large program of asset purchases by the Japanese central bank. Other countries, for example the United Kingdom, have also adopted programs of quantitative easing.

The combination of ultra-low interest rates and strong unconventional monetary policy measures, such as quantitative easing, has been portrayed as one of high risk. The dangers that this worldwide scenario of lax monetary policy involves are:

1. the enormous amount of liquidity injected into the economy may end up creating strong inflationary pressures (e.g. Ackerman, 2008); and
2. bubbles may develop in many asset markets, owing to the immense volume of cheap liquidity made available to both banks and nonbank financial institutions (e.g. Brana, et al., 2012).

We summarize as follows: fiscal and monetary policy measures aimed at stimulating aggregate expenditure (aggregate demand) were used on a global scale and succeeded in preventing what many had forecast would have been a crisis comparable in scale and scope to the 1929-1933 Great Depression in the United States. All the same, this strategy created many sources of risk for the future.



## 5. Response to the crisis: regulation

Simultaneously, a process was set in motion aimed at creating a more robust global financial system and promoting global financial stability. The global financial crisis indeed challenged the resourcefulness of classical mainstream economics to confront the onset of economic crises, fostering the design and implementation of a set of innovative regulatory responses to the latest economic shock. The key to designing appropriate regulatory frameworks to counter economic and financial crises is to allow financial institutions to maintain their supportive economic role, while suppressing any possibility for the propagation of morally hazardous behaviour and corresponding systemic risk.

In this section, we look at some of the main changes in the regulatory landscape:

1. new rules for capital adequacy, bank liquidity and bank leverage;
2. increased transparency in transactions; and
3. introduction of a cap on bankers' bonuses.

### *1. New rules for capital adequacy, bank liquidity and bank leverage*

The Basel III Accord of 2011, to be phased in from 2013 to 2018, was forged as a global response to the shortcomings of the regulatory framework revealed by the global financial crisis. The response focuses essentially on the strengthening of bank capital requirements and the introduction of new regulatory requirements on bank leverage and liquidity.

First, Basel III emphasized the need to significantly increase both the quantity and the quality of banks' capital.

In terms of the *quantity of capital*, Basel III recommended that the minimum thresholds of common stock and of common stock plus retained earnings (tier-1 capital) should increase from 2% to 4.5% and from 4% to 6%, respectively, of total risk-weighted assets. On top of that, it proposed additional capital buffers: a compulsory "Capital Conservation Buffer" of 2.5% (composed only of common

stock), and a discretionary “Countercyclical Buffer” of an additional 2.5% of common stock during periods of high credit growth (BIS, 2015).

In terms of the *quality of capital*, it is now required that the core tier-1 capital ratio be built using only common stock issued by the bank plus retained earnings. The tier-2 ratio should be harmonized across countries (BIS, 2015). The need for these measures stemmed from the fact that a significant deterioration in the quality of eligible capital had taken place in the years preceding the global financial crisis. For example, banks’ subordinated bonds, which offer little protection for investors in the case of default, were considered equivalent to capital, whereas now they will only be considered as such if they are convertible into equity. Another example concerns projected earnings, which banks can no longer record as retained earnings and thus include them as a major component of bank capital.

Second, Basel III called for the introduction of a minimum 3% bank leverage ratio (tier-1 capital over total loans), which implies that loans can only be extended up to 33 times the corresponding capital base (BIS, 2015).

Third, Basel III also recommended the creation of two mandatory liquidity ratios:

1. the “Liquidity Coverage Ratio”, which requires a bank to hold sufficient high-quality and easy-to-sell assets, such as government bonds, to cover the amounts its clients might be expected to withdraw over 30 days following a crisis (this is an important feature in times of crisis, when many depositors flee and many potential lenders stop lending);
2. the “Net Stable Funding Ratio”, which requires each bank to hold a greater amount of stable funding – obtained from long-term financial instruments – than the amount needed over a one-year period of extended stress (BIS, 2015).

The idea is that banks should rely less on short-term sources of funding which may be hard to roll over if a financial crisis occurs (BIS, 2015).

Banks have voiced concern that these stronger requirements in-

crease the costs associated with supplying loans and thus, by forcing banks to increase interest rates, will end up reducing the rate of credit growth. As a consequence, banks argue, the real economy will be affected by these more stringent global regulations. Moreover, high bank capital financing costs could further encourage the migration of banking activities to the global shadow banking system (Silva de Deos, et al., 2015).

However, the global financial crisis made it clear that there was a real need to strengthen the resilience of the financial system: even some banks that had capital ratios above the legal requirement entered bankruptcy procedures owing to problem loans and/or the steep fall in the prices of the securities they held. These ailing banks were taken over by other banks or bailed out by governments.

A correct balance between the need for a more resilient financial system and the containment of damage to credit growth must be achieved. In other words, some economic growth will have to be sacrificed in order to create a more robust financial system that will, in the future, mitigate the incidence of financial crises and their impact on the real economy. This is especially relevant in the context of much needed financial and technological innovation in the banking industry, which drives banks' business models but also requires appropriate regulatory oversight (Paulet, 2016).

Lastly, it should be observed that the extensive Basel III transition period (2013-2018) will allow banks to adjust gradually and smoothly to the requirements of a more resilient regulatory framework. In particular, they will be able to use retained earnings over the transition period to strengthen their core capital base. As a consequence, the effect on the supply of credit to the economy should not be a major problem.

## *2. Increased transparency in transactions*

As noted, the deepening of the global financial crisis was closely linked to heightened uncertainty and mistrust within the financial system in the aftermath of the Lehman Brothers bankruptcy. This

mistrust spread almost instantaneously, because, in the period that preceded the crisis, over-the-counter transactions – trades involving financial institutions with no public disclosure – had become common practice, making it impossible to know which institutions were exposed to high-risk securitized loans whose value would plummet if the underlying loans defaulted. Thus, international financial contagion within entire banking industries set in, propagating the financial crisis to the global real economy (Bhimjee, et al., 2016). Financial institutions stopped lending to one another for fear that the counterparty institution might be holding significant amounts of securitized loans (“toxic assets”) and go bankrupt overnight.

To make the propagation of financial problems more unlikely in the future, proposals have been made to require that the trading of derivatives, including securitized loans, be restricted to organized and transparent formal markets, where data regarding the quantities traded, the parties involved and the transaction prices are all made publicly available.

### *3. Caps on the bankers' bonuses*

Excessive risk-taking in the banking industry – one of the decisive factors of the crisis – occurred partly because bankers had an incentive to enter “high risk-high return” financial activities: their bonuses were linked to the bank’s current-year earnings, not to its long-term performance. Consequently, in the wake of the crisis, it was proposed that bankers’ bonuses should be capped and linked to their bank’s medium- to-long term results and underlying performance. EU legislation, in place since the beginning of 2014, sets a general cap on bankers’ bonuses of 100% of fixed pay, a limit which can be extended to 200% by shareholder approval.

Banks have argued that this cap may lead to an increase in fixed pay, thereby increasing fixed costs and reducing banks’ ability to adjust when their performance is poorer than expected. Thanassoulis (2012) asserts that stringent bonus caps are company-value destroying. In the same vein, Murphy (2013) argues that the EU cap would

not only increase fixed remuneration but also reduce the quality of European investment bankers. However, in its 2015 annual remuneration report, the European Banking Authority (EBA) stated that the data it collected for 2014 showed only a marginal increase in fixed pay in banks (EBA, 2016).

## 6. Concluding remarks

While explanations of turns in the business cycle that point to credit excesses as the chief cause are common in the economic literature, the 2007-2009 subprime crisis had novel features and the public policy response was likewise innovative in many respects. This article has tracked the details of the decision-making process and examined the response to the crisis in two fundamental dimensions: macroeconomic policy and financial regulation.

Regarding financial regulation, the magnitude of the crisis should draw our attention to the perils of excessive financial liberalization. In fact, the global financial crisis erupted after several decades of a liberalizing drive that changed the legal framework of the financial system in a structural way, creating what proved to be an excess of unchecked freedom.

Regarding macroeconomic policy, the scale of the response that was needed produced the environment we are facing today, characterized by several sources of risk:

- the risk that the inflation level could escape control;
- the risk of bubbles developing in some asset markets;
- the enormous pile of government and private debt that the world is sitting on.

In these respects, it is important to remember that: the exit strategies already outlined by central banks to face possible scenarios of rapidly accelerating inflation may not be able to keep pace with the phenomenon; the self-reinforcing psychology of bubbles makes them difficult to stop; and the process of deleveraging the economy takes time and is subject to resistance from many sides.

While regulatory measures can be enforced – and are being enforced – at international level in the context of the Basel Committee, monetary policy is in the hands of each central bank and fiscal policy is still largely under the command of national governments (although subject to a certain degree of control in some regions, such as the Eurozone).

There are two topics that could well warrant further attention in future research. The first concerns the economic trade-off between the short-term aid given to ailing financial institutions (which is beneficial to them) and the long-term stricter requirements that could encumber the provision of credit by these financial institutions (which is detrimental to them). The second topic concerns the share of regulatory costs that might be passed on to consumers of financial services in the long run, as a direct result of more stringent requirements.

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