

International benchmark of the effects of quantitative easing on economic growth

مقارنة دولية لتأثيرات التسيير الكمي على النمو الاقتصادي

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Abstract:

In response to the global economic and financial crisis of 2008, many Central Banks around the world acted as lenders of last resort and resorted to exceptional monetary policies such as quantitative easing (QE). Since then, this practice hasn't ceased to be used in times of major economic crisis or in case of risk of deflation. Algeria experimented with this kind of policy in 2017, following the collapse of hydrocarbon prices in 2014 that paralyzed the Algerian economy. The objective of this article is to carry out an international benchmark (Japan, Great Britain, the United States, the euro zone and Algeria). The results show the convergences and divergences in the implementation of (QE) between the different economies, as well as its effect on economic growth. The effect is positive for countries whose economy is mainly financed by the financial market; this effect becomes weak for countries whose economy is financed by the banking system.

Keywords: (QE); Unconventional financing; Economic crisis; Economic growth

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Introduction:

The financial crisis of 2008 and the Covid-19 pandemic caused a global economic shock, which forced Central Banks to implement profound reforms in the conduct of their monetary policy. Faced with such a crisis, they explored new exceptional monetary policy measures called « unconventional monetary policy ». The decision to implement unconventional monetary policies isn't random; the economic literature has made us understand that economies can start exploring these types of measures only after they have exhausted all the instruments of traditional monetary policy and its various transmission channels become ineffective. Beiton, Hamdane and Casorla (2019) explain that there are two main conditions for their introduction : if the conventional instruments (policy rate, reserve requirements, open market operations) of monetary policy become ineffective and no longer have the expected effect; i.e., do not revive economic activity or fail to escape deflation. And when the banking system does not function because of the blocking of credit. This happens when banks make losses and do not grant credits anymore, in the case of a universal (large) bank failure or when some borrowers default excessively, thus generating a loss of confidence. Philipponnat & Fares (2013) have linked the dysfunction of the financial sector to moral hazard and conflicts of interest, especially after the subprime crisis, which led to a loss of confidence in the financial system and the banking system.

(QE) is one of the unconventional practices of monetary policy, which consists of a central bank buying financial assets on a massive scale, generally in the form of public or private bonds. The objective is to lower interest rates and increase the money supply in circulation, to stimulate consumption and investment and to boost economic activity.

Many industrialized and developing countries have resorted to this, and Algeria has not been spared this type of measure. It resorted to (QE) (unconventional financing) in 2017, following the drastic fall in hydrocarbon prices in 2014 which had an anemic effect on economic activity and caused it to grind to a halt.

In this context, it's imperative to understand how (QE) has been introduced in the different economies, namely developed (Japan, Great Britain, United States, Euro zone) and developing (Algeria)? To determine what are the divergences and convergences of its implementation between the different economies. And what are its effects on economic growth in the countries considered? The choice of these developed countries is justified by the fact that they're the pioneers in this field and they're the ones that influence the world economy in a remarkable way.

To answer these questions, the Benchmark methodology was opted for. First, a literature review will be conducted on (QE). Then, a country monograph on the effects of (QE) on economic growth will be elaborated and finally, a synthesis of the lessons of the benchmark will be presented.

I- Quantitative Easing: A Review of the Literature:

The concept of quantitative easing or (QE) is attributed to the German economist Richard Werner. According to Werner (1995), the terms "quantitative easing" or "quantitative monetary easing" are literal translations of the Japanese formulas *ryotekikanwa* or *ryotekikinykanwa*. These concepts have not previously been used to describe the money supply, bank reserves or deposit aggregates. Werner first proposed, in 1994 and 1995, a new style of monetary policy to be implemented in Japan, the objective of which is not to decrease the value of money or increase monetary aggregates, but rather to increase credit creation for domestic goods transactions (GDP). Since the term « credit creation » is considered difficult to understand in Japanese, Werner prefaced the standard Japanese term for monetary stimulus « monetary easing » or « easing » with the word « quantitative » to emphasize that « (QE) » determines credit creation for GDP transactions.

This would be done through a variety of measures, including the purchase of treasury bonds and direct lending to business and government by the Central Bank. Also, he proposed that the Central Bank should buy non-performing assets from commercial banks and make direct loans to business and government. Turner (2014) adds that controlling the use of these loans is essential to prevent excessive amounts being injected into purely speculative channels.

Japan was the first country to explore this type of practice in 2001, due to a persistent deflationary monetary scenario over the years. However, the financial and economic crises of 2008 and the health crisis of 2020 have revived the practice of this type of measures to overcome the crisis and support the economy.

Following the analysis of the economic and financial literature review, we found that (QE) is the measure most explored by Central Banks. As a result of this impulse, it has attracted the interest of a considerable number of economists who have defined it in different ways.

Referring to the work of Drumetz, Pfister, & Sahuc (2015, p. 305), the term “quantitative easing” refers to large-scale stock purchases. They argue that this concept is highly equivocal, as in a broader conception (QE) is defined as the creation of reserves and the increase of the Central Bank’s balance sheet. And, in a narrower sense, it focuses on risk-free assets, as opposed to credit easing, which focuses on risky assets.

On the other side, DeBoissieu (2020) considers that the massive purchase of securities by the Central Bank is not a new discovery, but follows from the classic open market (conventional) intervention. Moreover, he states that the transition from conventional to unconventional is conditional on two situations. First, there must be a significant purchase of securities, which leads to the appearance of a threshold, and thus this difference in degree becomes a difference in kind. Secondly, these purchases are neither limited nor offset by reverse operations, which neutralizes the monetary effect and results in a significant increase in the monetary base and the money supply.

As far as Artus (2022, p. 20) is concerned, when there is (QE), the Central Bank buys bonds from economic agents ; the latter are paid by crediting their deposit accounts in the banks; and the banks are paid by crediting, for the same amount, their reserves to the Central Bank. (QE) leads to :

- Economic agents will have to hold less public debt;
- They have to hold more money (bank deposits);
- And for the same amount, to increase the reserves of the banks at the Central Bank, hence the increase in the quantity of Central Bank money (the monetary base, the total balance sheet of the Central Bank).

Figure N°1: Simplified representation of the effect of (QE) on the balance sheets of economic agents

Central bank balance sheet					
Obligations	Bank reserves				
Balance sheet of commercial banks					
	<table> <tr> <td>Credits</td><td>Deposits</td></tr> <tr> <td>Reserves at the central bank</td><td></td></tr> </table>	Credits	Deposits	Reserves at the central bank	
Credits	Deposits				
Reserves at the central bank					
State balance sheet					
Accumulated government deficit	Obligation = public debt				
Balance sheet of economic agents					
	<table> <tr> <td>Deposits</td><td>Accumulated savings</td></tr> <tr> <td>Obligations</td><td>Credits</td></tr> </table>	Deposits	Accumulated savings	Obligations	Credits
Deposits	Accumulated savings				
Obligations	Credits				

Source: Illustrated by the authors based on the work of Artus (2022, p. 20).

From this figure, it's been understood that (QE) is a situation in which the Central Bank massively acquires financial assets on the secondary markets. These massive purchases lead to a drop in interest rates allowing households, companies and governments to continue to raise funds (continue to finance themselves) under good conditions, which favors economic growth and the return of the inflation rate to a level compatible with price stability. If necessary, this leads to an increase in the size of the Central Bank's balance sheet. The aim of this monetary injection into the economy is to revive economic activity, create employment and restore confidence in the financial markets among the various economic agents.

Since the diffusion of (QE), many studies have focused on the different transmission channels and their impact on economic and financial variables. The main transmission channels through which (QE) acts, in order to have a significant impact on the real economy, are the portfolio rebalancing channel proposed by D'Amico, English, López-Salido, & Nelson (2012), the liquidity channel presented by Christensen & Gillan (2022), the expectations channel advocated by Swanson & Williams (2014) and the credit channel put forward in 2014 by Joyce & Spaltro. Kinga, (2017) and Martinache (2018), among others, summarize the potential channels through which this measure simulates the banking and financial system, focusing on interest rates, economic activity and inflation. They admit the existence of four main transmission channels, namely the expectations channel, the liquidity channel, the portfolio composition channel and the duration effect channel. In this enumeration of the different transmission channels, it has been noted that most studies focus on (QE), as this is the measure most used by central banks, and the effectiveness of this type of tool is a prerequisite for a dynamic financial market.

II- Methodological box:

The benchmark methodology

1. A literature review: articles and studies published on the subject were analysed, listing details on the chronology of events and the measures decided by the states. We then proceeded to draw up a synthetic monograph for each country.
2. The decantation of three main themes, comparable to the effects of (QE), to structure our research and observation:
 - How has it been introduced in the different economies considered?
 - What are the divergences and convergences in its implementation between the different economies?
 - What is the effect of QE on economic growth in the countries considered?
3. The elaboration of a monograph per country, on each of the key themes (part 2). These analyses are synthetic in nature.
4. Summary of the lessons learned from the benchmark.

Source: prepared by the authors.

III-Monograph on the effects of quantitative easing by country:

How do banks adjust their balance sheets in response to unconventional monetary policies, and what are the implications for the real economy? These questions have been of great interest since the financial crisis of 2008, as a number of major Central Banks in different economies have implemented such (QE) policies to stimulate economic recovery and continue to do so during the recent coronavirus crisis.

III-1- The Japanese Experience:

The Bank of Japan (BoJ) was the first central bank in the world to implement a (QE) program, in 2001, due to a persistent deflationary monetary situation in the 1990s caused by the Asian crisis (Le Damany, 2021). According to a delegation of the France-Japan Senate group that visited Japan in April 1999, Japan had experienced its worst economic recession since World War II, aggravated by the weakening of the Japanese financial system. The emergency measures were taken when the financial bubble burst was in vain, and the eleven stimulus packages implemented in seven years had failed to restore sustainable growth.

Indeed, during the period from 1990 to 1997, the losses of financial and real estate assets born by Japanese economic agents are estimated at about 1,000 trillion yen, which corresponded to more than two years of Japanese GNP. This situation was exacerbated by the bankruptcy of the Nippon Housing Loan, which led to the bankruptcy of all the housing loan companies, known as *Jusen* in Japanese, which had repercussions on the Japanese taxpayer, who for the first time in its existence had to contribute up to 6 billion dollars to finance their liquidation (Senate, 1999). During the same period, Hyogo Bank and two consumer credit companies (Cosmo Credit, Kizu Credit) also failed.

The Daiwa bank announced a loss of 1.1 billion dollars, which corresponds to fraudulent speculation by one of its traders in the US bond market. This caused a crisis of confidence and an

economic crisis, prompting the government to initiate a battery of monetary and fiscal measures to deal with the situation, as illustrated in the following table:

Table N°1: Measurestaken by the Japanesegovernment to overcome the crisis

November 1997	Fiscal Consolidation Act to reduce the budget deficit to 3% by 2000
January 1998	Decision on a temporarytaxcut : 4 trillion yen
February	1st budget package 1997 :1.1 trillion yen
April	Initial 1998 budget in line with the law on the consolidation of public finances Thendecision on a 16 trillions yen stimulus package (including 7.5 trillion yen of public works).
May	1st fiscal stimulus package : 4.6 trillion yen (implementation of the April stimulus package) Revision of the BudgetaryReformAct - introduction of a budgetaryflexibility clause - the 3% deficittarget for 2003 ispostponed to 2005.
August	Election of new Prime MinisterObuchi: prioritygiven to economicrecovery.
September	Bank of Japan's official interbank rate wasreduced to 0.25%
October	Revision of the official growthforecast for the fiscal year 1998 from + 1.9% to - 1.8
November	Decision on a 23.9 trillion yen stimulus package (including 17.9 trillion yen of public works and 6 trillion yen of taxcuts).
December	Third fiscal stimulus package : 5.7 trillion yen, including 4 trillion yen for public works and 2 trillion yen for stabilizing the financial system and supportingcredit abandonment of the budget reformlaw
February 1999	The Bank of Japanintervenes to bring the interbank rate below 0.15%. Adoption of the initial budget for 1999 up 5.3% on the initial 1997 budget largestincreasein 20 years
Spring 1999	500 billion yen budget package to create 700,000 jobs
November 1999	18 trillion yen stimulus package : support for SMEs and financing of public infrastructure (bridges, roads)

Source: Compiled by the authors from the work of Senate (1999)

Despite the efforts of the Japanese government, the Japanese economy is still facing a major crisis of confidence. Prices have been falling steadily and deflation has set in. Under the incapacity of traditional monetary policies, the BoJ took the decision to reduce its interest rate to 0% and to start a commandant of monetary policy (QE) in 2001. As a result, the BoJ changed its main operational target from the unsecured overnight call rate to the quantity of bank reserves, announcing that it was increasing the target for bank reserves from ¥4 trillion to ¥5 trillion, which was to raise the overnight call rate from 0.15% to zero.

This first QE was aimed at supporting banks and absorbing losses from bad loans. In 2004, the BoJ gradually provided funds to the money market through purchases and sales of Japanese government bills and securities, with an outstanding current account balance at banks of about 35 trillion yen (Fawley & Neely, 2013).

The arrival of the 2008 financial crisis further weakened the Japanese economy, leading to a second QE program in 2011 with the objective of diversifying the assets provided, and then the new

head of government Shinzo Abe, who arrived at the end of 2012, sought to stimulate economic growth and increase the rate of inflation by launching an economic policy dubbed “Abenomics” - the three arrows approach:

- Qualitative and Quantitative Flexibility (QQE);
- Budgetary expansion;
- Structural reform.

Since the application of a third QE program in 2013, the aim of which is to return to an inflation rate of 2% and a large-scale monetary expansion through the massive purchase of securities in the deepest market, that of JGB (Japanese Government Bond). This involves buying up domestic sovereign and corporate debt in a predetermined amount. The desired effect on inflation was based on three transmission channels:

- Lower nominal interest rates through term premium compression;
- Portfolio rebalancing towards riskier assets due to the appreciation of low-risk assets;
- Depreciation of the currency through capital outflows.

Several authors and academic researchers have focused on the effects of (QE) on macroeconomic variables in Japan. Moussa & Girardin (2011) examined the effectiveness of Japanese monetary policy during the “lost” decade. They quantified the effect of QE on economic activity and prices, combined with the advantages of Markov-switching VAR methodology with factor analysis. And they came up with two main results. First, they demonstrated that the decisive regime shift occurred in two stages: it first crept in from late 1995 and then became permanently established in February 1999. Secondly, QE has been able not only to prevent further recessions and deflation, but also to significantly stimulate both output and prices through the interest rate channel. This positive effect of QE has been endorsed by a number of researchers, namely Ugai (2007) who was able to show that there can be a positive effect on the real economy but it’s limited. Honda, Kuroki, & Tachibana (2013) measured the effect of QE on aggregate output and prices as they examined its transmission mechanisms, based on a vector autoregression (VAR) model by including several financial market variables in the VAR system.

To do so, they used monthly data from March 2001 to February 2006 and concluded that QE increased aggregate output via the stock price channel, suggesting that the additional injection of base money is effective even when short-term nominal interest rates are at zero. Ferraira-Lopez, Linhares, Martins, & Sequiera (2022), based on 45 studies, perform an original meta-probit analysis of the effect of the Bank of Japan’s monetary policy on economic growth for the period 2001-2020. They adopted impulse response functions in VAR-type models to estimate whether the effects of QE on output are significant (positive or negative) or not. They found that there is no consensus on the effects on output growth during the years of (QE). On the other hand, they noted that other variables, such as industrial production and the price level, have a stronger effect on the probability of reporting statistically significant (positive) effects of QE on output growth. Finally, they argued that the main implication of their study was that the evidence for significant real effects of EQ was weak.

According to BoJ Governor Kuroda’s speech at the University of Zurich in Switzerland in 2017, the practical approach to large-scale bond purchases has evolved since the 2008 crisis. Initially aimed at pushing down the entire yield curve, the BoJ has set a target for the number of government bonds to be purchased in one year. This approach has been widely used not only by the Bank of Japan but also by other major central banks, as it’s simple to implement in practice. However, one problem with this approach is that the extent to which long-term interest rates fall for a given amount of government bond purchases depends on economic and financial conditions. it’s therefore possible that interest rates will fall insufficiently to achieve the desired yield curve or, conversely, that they will fall excessively. The Bank of Japan has been buying government bonds,

on a scale that far exceeds that of the major Central Banks, the size of the Bank of Japan's balance sheet as of November 2017 is about 500 trillion yen, roughly equivalent to Japan's nominal GDP, at a time when the balance sheets of the Federal Reserve and the European Central Bank (ECB) are equivalent to about 20 to 40% of nominal GDP. This demonstrates the extent of the Bank of Japan's purchases of government bonds. Due to these massive purchases of JGBs over several years, the Bank has a considerable presence in the JGB market, so that it has corresponding control over long-term interest rates. In addition, in order to adjust interest rates, the Bank has implemented an interest rate adjustment system by introducing a powerful tool called "fixed rate purchase operations", in which the Bank buys unlimited amounts of JGBs at a specific interest rate level.

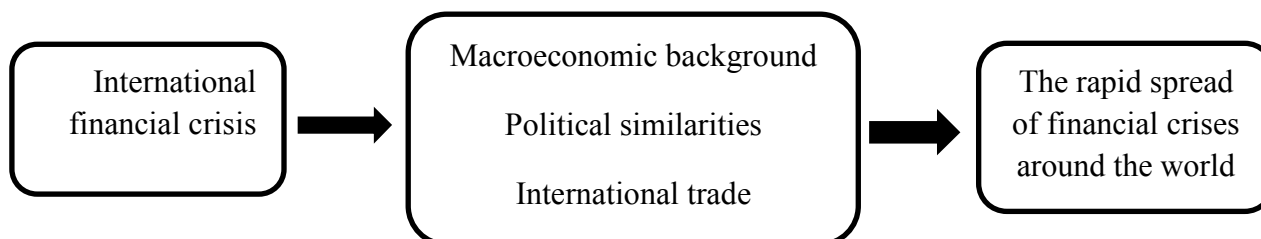
In sum, Kuroda states that when the Bank implemented large-scale JGB purchases and yield curve control, it took into consideration the limitations and problems suggested by the theory. Taking care not to omit them, she proceeded to study the advantages and disadvantages of addressing these problems; and arrived at the current policy framework. Kuroda assumes that these new steps in practice will lead to further theoretical developments in the future. Finally, the BoJ will continue to maintain strong monetary easing in order to ensure that these positive developments are not interrupted.

In the end, according to all the studies analyzed on the effect of QE on economic growth in Japan, (QE) has satisfactory effects on economic growth, but in the short term (momentary and not lasting), where the objective of reaching an inflation threshold of 2% is far from being achieved. On the other hand, it has contributed to the avoidance of a persistent negative inflation rate. The use of these policies will not cease as long as the 2% inflation target is not yet reached, and the BoJ will always resort to such measures when

necessary, depending on the target (the BoJ's targets are, in order, financial stability, monetary stability, the realization of which contributes to the proper development of the national economy).

The conditions for the first application of (QE) in the US, UK and EU are similar. Indeed, the largest banks performed a major function in the face of the 2007 subprime crisis and the 2008 international financial and economic crisis. They intervened to prevent the collapse of the global financial system and to support economic activity. To achieve this goal, they have expanded their toolboxes by conducting unconventional policies (Cortes G. S., Gao, Silva, & Song, 2022). Subprime refers to risky, yet lucrative, long-dated variable-rate mortgages. These loans were highly rated by financial rating agencies, which led banks and investors to securitize them (Lee, Kim, Lee, Kim, & Ban, 2013). This rating made these subprime mortgages attractive to many American households from all social classes, although in the second half of 2006, the Federal Reserve raised its key interest rates, which in turn drove down prices in the US housing market, resulting in the inability of individual borrowers to repay the variable interest rate; this triggered a mortgage crisis known as the subprime crisis (Pino, 2022). This bank liquidity crisis was followed by a freeze in the interbank market. Banks were busy conserving their own liquidity and stopped lending to each other. This liquidity crisis subsequently turned into a banking solvency crisis with the bankruptcy of one of the largest investment banks, Lehman Brothers, in September 2008. This failure created a domino effect on all US financial institutions and led to a huge crisis of confidence (Beccar-Varela, Mariani, Tweneboah, & Florescu, 2017). As a result of globalization, its transmission spread to the global financial and economic system. The transmission channels of the crisis at the international level are illustrated in the figure below.

Figure N°2: Transmission channels of the subprime crisis: Contagion channels



Source: Illustrated by the authors based on the work of Jiang, Tang, Li, Xu, & Di (2022).

In order to deal with the spread of this crisis, measures were taken by the authorities concerned of a fiscal and monetary nature (Cortes G. S., Gao, Silva, & Song, 2022). All attempts were aimed at ensuring the stability of the financial system and reviving growth and inflation. The fiscal support measures were mainly aimed at recapitalizing banks, but the fact that they were combined with the effects of the crisis led to an increase in fiscal deficits. Under the effects of the crisis, Central Banks reacted the first time, by cutting their policy rates sharply to a floor rate to stimulate economic activity (Mafamane&Qachar, 2018); that of the Fed was between 0 and 0.25%, that of the Bank of England was at 0.5% and that of the ECB was at the level of 1.25%. Initially, this policy was aimed at restoring the functioning of financial markets that had collapsed.

Although this rate policy was insufficient as it did not succeed in restoring confidence between the different economic agents, so concerns quickly turned to stimulating real growth and preventing unwanted disinflation (Goliński, 2021). This condition prompted these banks to intervene a second time. By exploring, in parallel, new unconventional instruments, especially (QE), the first bank to have explored these measures after the crisis was the Fed, which implemented its first QE1 program in November 2008, followed by the Bank of England in March 2009 and the ECB at the end of 2010 following the combination of the international economic crisis and the sovereign debt crisis.

It should be noted that the use of these exceptional policies did not stop at this point, the world economy still faced a new health crisis COVID-19, which generated huge health expenditures leading to an increase in the internal debts of the States (Cortes G. S., Gao, Silva, & Song, 2022). Indeed, since 2019 the world economy has been suffering from a synchronous slowdown and the rate of economic growth has reached its lowest level since this crisis (FMI, 2020) (including the banks considered in this study) to support the economies.

III-2- The American Experience:

In the presentation of the economic and financial development of the United States by Chairman Ben S. Bernanke in February 2009, he announced that as a result of the financial crisis the US economy has suffered a significant slowdown. Bernanke in February 2009, he announced that as a result +of the financial crisis the US economy has suffered a significant slowdown. As a result of the crisis, the unemployment rate has risen to 7.6%, leading to a deterioration in the labor market, considerable losses in equity and real estate, and restrictive credit conditions have weighed on consumer confidence and spending. On the other hand, businesses reduced capital spending in response to the easing sales outlook and the difficulty in obtaining credit. In addition, exports fell as the country's major trading partners went into recession and some measures of global growth turned negative for the first time in over 25 years. Real gross domestic product (GDP) fell slightly in the third quarter of 2008, and increased dramatically in the fourth quarter, implying a sharp decline in economic activity. Asset values, credit conditions and consumer and business confidence around the

world have been affected by the financial crisis. The state of the housing and mortgage markets has been a drag on the economy as a whole, directly through its effect on housing construction and related industries and on household wealth, and indirectly through the increase in mortgage defaults and their effect on the health of financial institutions.

With the significant deterioration in financial market conditions and a substantial deterioration in the economic outlook, the Federal Open Market Committee (FOMC) aggressively eased monetary policy in the last few months of 2008, coupled with a cut in policy rates, in coordination with other major Central Banks. With the federal funds rate close to its floor, the Federal Reserve has taken additional steps to ease credit conditions, support housing markets and economic activity. It purchased large amounts of agency debt and mortgage-backed securities to restore stability to some financial markets (Federal Reserve, 2020). The following table summarizes all the Fed's QE.

TableN°2 : Announcement of quantitative easing measures in the US

	Decision	Other information
25 November 2008	The Fed announce that it will buy \$100 billion of GSE (government-sponsored enterprises) debt and up to \$500 billion of MBS	None
1 December 2008	Ben Bernanke indicates that the Fed could buy long-term treasuries.	None
16 December 2008	The FOMC (Federal Open Market Committee) statement mentions the possibility of buying long-term treasuries.	Lowering the target rate for federal funds from 1% to a range between 0% and 0.25%.
28 January 2009	The FOMC statement emphasizes the need for further purchases of agency debt and MBS. Purchases of long-term treasuries are also being considered.	The launch of a Term Asset-Backed Securities Loan Facility (TALF).
18 March 2009	The Fed announce that it will acquire an additional \$750 bn of MBS, another \$100 bn of agency debt and \$300 bn of long-term treasuries.	None
21 September 2010	The FOMC states that further monetary policy easing is being considered to support growth.	None
3 November 2010	The FOMC launches a new long-term securities purchase program (QE2), consisting of the purchase of \$600 bn of Treasury securities over the period from November 2010 to June 2011. The FOMC reserves the right to revise the pace of purchases and the size of the program if circumstances require.	None
9 August 2011	The FOMC statement hints at the possibility of a new long-term securities purchase program.	The Fed is committed to keeping the policy rate between 0% and 0.25% at least until mid-2013.
21 September 2011	The Fed is launching "Operation Twist," which consists of selling \$400 bn of Treasury bonds with maturities of three years or less by the end of June 2012 and buying back an equivalent amount with maturities ranging from 6	Policy rates remain between 0% and 0.25%.

	years to 30 years.	
20 June 2012	The FOMC members decided to extend “Operation Twist” until the end of December 2012. The Fed will buy another \$267 bn of long-term treasuries by selling an equivalent number of short-term securities, in order to leave the size of its balance sheet unchanged.	None
13 September 2012	The Fed announces a third (QE) program QE3. This plan will consist of buying \$40 bn of MBS each month and continuing to buy securities on the markets.	Policy rates will be maintained between 0% and 0.25%, at least until mid-2015.
15 March 2020	The Fed announces a fourth (QE) program QE4. This plan consists of monthly purchases of \$80 bn of agency debt and \$40 bn of mortgage-backed securities for a total of \$120 bn per month.	Policy rates will be lowered to a range between 0% and 0.25%.

Source: Data updated by the authors based on the work of Dupuy (2012, p. 255)

The effect of the Federal Reserve’s (QE) on employment via the bank lending channel was examined by Luck & Zimmermann in 2018, where they found that banks holding mortgage securities extended more loans after QE1 and QE3. The increases are due to newly created home purchase mortgages, home ownership mortgages and additional commercial and industrial loans after QE3. Using spatial variation, they find that regions with a large share of affected banks experienced stronger employment growth after both QEs. Moreover, firms with strong relationships with the affected banks further increased employment and capital investment after QE3. Finally, they concluded that unconventional monetary policy can, similar to conventional monetary policy, affect real economic outcomes.

The macroeconomic effect of large-scale asset purchases (LSAP) was the subject of the study published by Kim, Laubach, & Wei in 2020. In their analysis, they used the structural VAR proxy estimated on monthly data from July 1991 to 2015 of assets held by the Federal Reserve. Monetary policy shocks are detected using instruments constructed on the basis of changes in yields from event studies. They found that unanticipated increases in Federal Reserve holdings during the ZLB period between 2008 and 2015 had significant expansionary effects on the macroeconomy; where, after the shock, real activity and inflation rose and unemployment fell significantly.

The Fed’s balance sheet expanded from 7% of GDP in 2007 to a peak of 26% in 2014, but it was down to 17% in 2019 (de Boissieu, 2020). The Federal Reserve has deflated its balance sheet to prevent a sharp rise in long rates and to avoid a bond crash, although its balance sheet has grown following the 4th QE program to increase the liquidity of US banks, where it reached about US\$8.82 trillion on 6 September 2022 (Statista, 2022). This measure was taken following the damage caused by the COVID-19 pandemic. According to various analyses and studies, the massive asset purchase program in the United States prevented the debt crisis from causing deflation and a blockage of the banking market, which favored the economic recovery and stimulated growth.

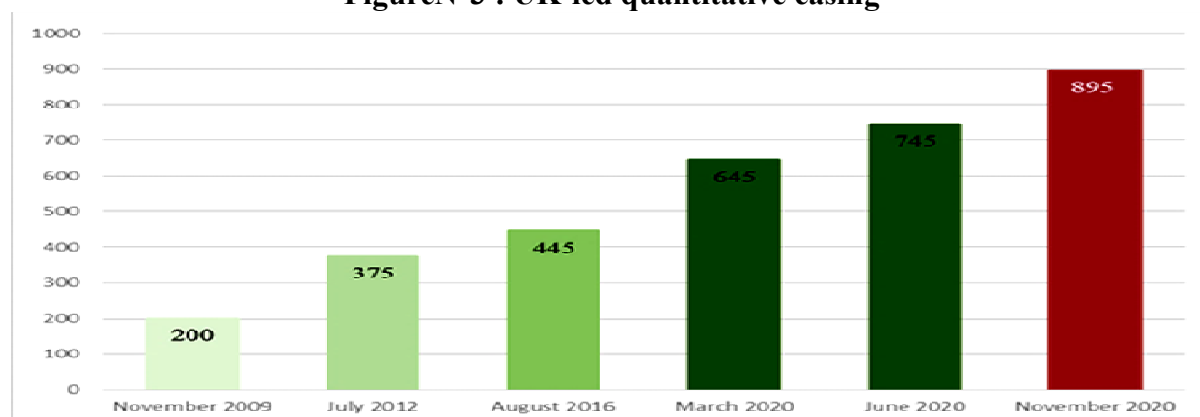
III-3-The English Experience:

The Monetary Policy Committee (MPC) of the Bank of England (BoE) has set monetary policy with the aim of achieving the 2% inflation target and supporting growth and employment. Prior to the financial crisis of 2007, the BoE’s « Bank Rate » was the main tool of monetary policy in the UK. It represents a key interest rate that influences other rates across the economy and other

economic variables. In March 2009, the Bank reduced the Bank Rate to 0.5% above this level, the BoE felt that a further reduction was limited. However, taking into account the « sharp and synchronized » global economic downturn, the BoE felt that a further economic stimulus was needed and therefore introduced (QE).

The Bank of England has stated that, up to the end of 2020, “it has bought £895bn of bonds (the total size of the QE program), or over 40% of UK GDP. Of this, £875 bn is government bonds (Gilts) and £20 bn is corporate bonds; almost half of this amount was before the COVID-19 health crisis and a half since March 2020 (Monetary Policy Committee, 2021). In total, the BoE has conducted four asset purchase programs. QE1 was aimed at supporting the economy to overcome the financial crisis of 2007; QE2 is introduced to achieve the medium-term inflation target; QE3 is mainly aimed at supporting the economy after the EU referendum (its exit from the EU); and QE4 is implemented in order to stimulate the domestic economy following the COVID-19 pandemic and has been carried out twice in 2020, the four QEs are illustrated in the figure below:

FigureN°3 : UK-led quantitative easing



Source: Compiled by the authors using data from Bank of England, (2021)

Compared to other central banks, the BoE’s (QE) has attracted less attention in the academic literature. Most of the literature review has focused on their impact on financial markets; however, the literature on the macroeconomic impact of QE is very limited.

In their study published in 2012, Bridges & Thomas used a simple money supply and demand framework to assess the effect of QE1 on asset prices and nominal spending. They argued that the initial £200 bn effect of asset purchases on the money supply was proportionately offset by other “shocks” to the money supply. Some of these offsets are the indirect result of QE. They estimated that QE boosted the broad money supply by £122 bn, about 8%, after applying estimates of the impact of QE on the money supply to a set of monetarist econometric models.

The latter set out the extent to which asset prices and spending need to adjust to make money consistent with the increase in the broad money supply associated with QE. Their estimate revealed that an 8% increase in money holdings leads to a decline in yields of about 150 basis points, on average in 2010, and an increase in assets value of about 20%. This had an impact on output of 2% at the beginning of 2011, and 1% on inflation, approximately, a year later. They concluded that a QE-induced increase in the money supply probably had a positive effect on GDP and inflation, by stimulating demand through lower yields and higher asset prices.

The effects of the Bank of England’s first (QE) program, between March 2009 and January 2010, on the economy as a whole is the problem addressed by Kapetanios, Mumtaz, Stevens,

&theodoridis (2012). Through this problem, they quantified the impact of the massive purchases of securities and focused on the effect of the fall in long-term interest rates on the integrity of the economy. They employed a multiple approach using three different time-series models. The results of a large BVAR model show that without the QE program, real GDP would have fallen even more in 2009 and inflation would have been very low or even negative. The results obtained from the analysis of an MS-SVAR model and a TVP-SVAR model largely confirm those obtained from the BVAR and even suggest that the impact could have been even greater. With the introduction of QE, the models suggest that QE may have had a maximum effect on the level of real GDP of around 1.5% and a maximum effect on annual CPI inflation of around 1.25% points, hence its positive effect on short-term economic growth.

As explained above, the macroeconomic effect of QE in the US was analyzed using the DSGE model by Falagiarda in 2014, he also measured these macroeconomic effects of QE in the UK. The results show that the massive purchases of government assets substantially boosted output and inflation. The model suggests that the first QE had an effect on the level of real GDP of 1.25% and on inflation of 0.49%.

As mentioned for the Fed case, Weale&Wieladek (2016) also examined the impact of massive government bond purchases on real GDP and CPI in the UK and the US using the Bayesian VAR model, estimated on monthly data from 2009 to 2014. They show that in the UK, an asset purchase announcement of 1% of GDP generates a statistically significant 0.25% increase in real GDP and a 0.32% increase in the CPI. These asset purchases have increased risk appetite and reduced household uncertainty.

The macroeconomic consequences of the two unconventional monetary policies pursued by the Bank of England have been thoroughly analyzed by Churm, Joyce, Capetanios, & Theodoridis (2021). They specifically evaluated QE2 and the Funding for Lending Scheme (FLS). Their analysis is structured in two steps. In the first step, they used both existing and new approaches to determine the effect of unconventional policies on relevant financial variables, such as spreads and bank funding costs. In a second step, they used two econometric models, BVAR and ARDL, to map the effect of changes in these financial variables on the macroeconomy. They find that the second round of QE purchases in 2011-2012 and the initial phase of the FLS each boosted UK GDP by around 0.5-0.8%, their effect on inflation is positive, reaching around 0.6% (Churm, Joyce, Capetanios, & Theodoridis, 2021).

The Bank of England stated in its report on the assessment of the Bank of England's approach to (QE) that the Bank has executed the asset purchase programs effectively, and its impact on the financial market and economic growth is significant, and this was confirmed by the results of the various studies presented earlier.

II-4-The experience of the Europeanzone:

The European Central Bank (ECB) adopts a motto stating that « Price stability is the best contribution monetary policy can make to economic growth » (European Central Bank, 2022). Taking this motto into account and in response to the financial crisis of 2007, combined with extreme tensions in some sovereign debt markets, particularly the « Greek crisis », the ECB lowered its key interest rate to remove the risk of deflation, which was at the time a widespread phenomenon. This decision proved insufficient to revive credit; hence the introduction of some measures outside the usual monetary policy framework. In May 2010, an asset purchase program known as the Securities Market Program (SMP) was introduced. This involves the purchase of eurozone sovereign bonds on the secondary market in response to investors' distrust of high-risk premiums for purchasing these securities. Although this program involves the massive purchase of sovereign bonds, ECB President Jean-Claude Trichet emphasized that this program is not QE, as the

operations are « sterilized » by the absorption of liquidity in the markets. Despite these statements, this program remains within the framework of a very accommodating monetary policy.

After the arrival of the new governor, Mario Draghi, in November 2011, the ECB embarked on several private and public securities purchase programs. But it was not until 2015 that it decided on a large-scale securities purchase program, which it named « quantitative easing » because of its size, otherwise it's not a new practice, the difference lies in the size of the purchases. According to Carré (2015), the reasons that led to the implementation of QE are, first of all, macroeconomic. Since December 2014, the euro zone was in deflation; according to this, the stated objective is to return to targeted inflation, « below, but close to, 2%. » Secondly, for political economic reasons, the QE. The spread of deflation, which has even affected Germany since January 2015, has weakened the position of the northern eurozone countries, which are not in favor of sovereign debt purchases. Moreover, the European Court of Justice ruled on 14 January 2015 that the OMT government securities purchase program is compatible with the Treaty on the Functioning of the European Union. This strengthens the legal certainty of the ECB's securities purchase programs. Furthermore, as with all Central Banks around the world, the arrival of the Covid-19 pandemic which deteriorated the macroeconomic aggregates of the countries pushed the ECB to a second QE in 2020 to support the national economy. The following table summarizes all ECB announcements in terms of public and private securities purchases.

Table N°3 : Announcement of asset purchase programs in the eurozone

CBPP1: from July 2009 and June 2010 CBPP2: from November 2011 to October 2012. CBPP3 (ongoing): since September 2014	Purchase of covered bonds (CBPP) to secure access to market financing for banks.
May 2010 and May 2012	Purchase of government and private sector bonds (SMP) to ensure liquidity and depth in dysfunctional bond markets
September 2012	Launch of Monetary Securities Operations (MSEs) Direct purchase of euro zone member states' bonds (no state has requested activation).
22 January 2015	The ECB announces an extended PPA for bonds issued by European central governments, agencies and institutions in the euro zone, which, together with the ABSPP and CBPP3, involves monthly purchases of €60 billion.
10 March 2016	The PPA is enriched by purchases from the corporate sector (CSPP). Overall monthly purchases increased to €80 billion as of 1 April 2016.
8 December 2016	ECB announces that the €80 billion purchases will continue until March 2017 and will be reduced to €60 billion from April 2017 to December 2017, or beyond if necessary
26 October 2017	Monthly purchases will remain at €60 billion until the end of December 2017 and, from January 2018, will be reduced to €30 billion per month until the end of September 2018.
14 June 2018	After September 2018, the monthly net purchase will be reduced to €15 billion until the end of December, when the program will end

12 September 2019	The PPA will restart with a monthly amount of EUR 20 billion from the beginning of the following November.
12 March 2020	One hundred and twenty billion will be added to the PPA until the end of 2020. Twenty billion until macroeconomic conditions require it.
18 March 2020	The ECB announces the PEPP with a global amount of 750 billion euros until the end of 2020.
4 June 2020	The total number of purchases under the PEPP is increased to at least EUR 1350 billion until the end of June 2021. In addition, the ECB has decided to reinvest the proceeds (including interest) of securities purchased under the PEPP and maturing until the end of 2022
29 October 2020	The ECB announced that its monetary policy instruments will be recalibrated to support the economic recovery and counteract the expected negative inflation trajectory, according to new empirical evidence provided in December.
10 December 2020	The ECB has implemented the further strengthening of the PEPP from EUR 1350 billion to EUR 1850 billion at least until the end of March 2022. In addition, it has extended the reinvestment of the proceeds (including interest) of securities purchased under the PEPP and at maturity until the end of 2023.
9 September 2021	Due to the more positive economic conditions and temporary increases in inflation rates, the ECB decided to implement a moderately lower pace of asset purchases under the PPP.
16 December 2021	The ECB announced the end of the PPP on the planned date (March 2022). To partially compensate for the consequent decrease in its monthly asset purchases, the ECB took two decisions: to increase the pace of monthly purchases under the PPA to €40 billion in the second quarter of 2022 and to €30 billion in the third quarter; and to extend the reinvestment of the proceeds (including interest) of securities purchased under the PEPP and at maturity to the end of 2024.

Source: Compiled by the authors using data from Kanga (2017) and European Central Bank (2022).

The analysis of the effects of QE on economic growth in the euro zone has attracted the attention of a number of authors, but the literature remains very limited as the ECB's QE started later than that of the US, the UK or Japan.

Cova, Pagano, & Pisani (2015), examined the domestic and international macroeconomic effects of the ECB's long-term government bond purchases with the calibration of a five-country DSGE model of the world economy. According to their results, a QE shock corresponding to monthly purchases of 60 billion euros increases the level of GDP and inflation in the euro zone by about 1% over the period from 2015 to 2017 and the international effects are non-negligible and expansionary depending on the monetary policy stance of partner countries and the response of international relative prices.

Andrade, Breckenfelder, De Fiore, Karadi, & Tristani (2016), analyzed the effects of the European Central Bank's QE on yields and on the macroeconomy. The results showed that the announcement of the program in January 2015 significantly and persistently lowered sovereign yields on long-term bonds and increased the stock prices of banks that held more sovereign bonds in

their portfolios. Moreover, referring to a stylized macroeconomic model that incorporates transmission channels (portfolio rebalancing channel, duration effects), the results suggest that the macroeconomic impact of the program is significant.

Sahuc (2016) used a dynamic stochastic general equilibrium model with financial frictions to measure the ECB's QE effects. His results indicate that the macroeconomic effects of purchases are potentially large when the program is combined with forward guidance on the interest rate. He stated that the effects of ECB QE are 0.2% on real GDP growth and 0.1% on inflation, in 2015-2016, in the short run at a constant rate in 2015; while keeping the policy rate unchanged for an additional period (one more year) carries an average effect of 0.6% on growth and inflation between 2015 and 2016.

Hohberger, Priftis, & Vogel (2019), using an open-economy DSGE model, conducted a structural empirical assessment of the macroeconomic effects of the ECB's (QE) program with the inclusion of cross-border government debt holding. They showed that the Central Bank's long-term asset purchases have effects on the real economy insofar as they induce private investors to rebalance the composition of the short- and long-term asset portfolio. They have shown that it has an effect of 0.3% on annual GDP growth and 0.5% on inflation over the period 2015 to 2018.

Kanga (2020) analyzed the macroeconomic and financial effects of unconventional monetary policies in the euro zone using a structural VAR model with dynamic factors. He found that these measures have a small and slow impact on economic activity, especially in the countries most affected by the crisis. This is due to the fact that QE shocks contribute to an increase in output, although the response does not occur until six or ten months (after the shock); the effects of the shock on inflation are small, he pointed out that these effects are short-lived because after a while everything returns to the starting point.

Gambetti&Musso (2020) conducted a study that provides some evidence on the macroeconomic and financial impact of the ECB's massive asset purchase program based on a structural VAR, with time-varying parameters and stochastic volatility. The analysis shows a significant positive macroeconomic impact of the QE shocks, with significant short-run responses of real economic activity growth, inflation; and the transmission of QE to the real economy is mainly through the banking sector.

ABhoff, Belke, & Osowski (2021), examined the effects of the ECB's NCMPs on inflation expectations in the euro zone over the period 2009-2018. They find that an unanticipated positive QE shock temporarily increases inflation expectations in the short run. In the medium term, however, they return to their starting point; hence, there is no lasting effect on GDP and inflation. (Evgenidis&Papadamou, 2021) analyzed the impact of unconventional monetary policy in the euro zone using a Bayesian medium-scale VAR model. The sample covers monthly data from April 2004 to April 2016 in order to provide a rich picture of the transmission of NCB shocks in various dimensions of the economy, and to shed light on the amount of appropriate policy that the Central Bank could undertake to accomplish its mission. They found that QE shocks have a significantly positive impact on both economic activity and inflation; this has curbed episodes of financial market stress and stimulated economic recovery. This was done through several channels including the exchange rate, inflation expectations and the bank credit channel. Moreover, their analysis suggests that a combination of the use of permanent negative interest rates with a steady pace of balance sheet expansion over a long period could bring inflation closer to the target. Summarizing all the studies conducted for the ECB case, it has been found that QE has been able to unlock bank lending and stimulate economic growth in a small way for a short time, as in the medium term they return to the initial situation.

III-5-The Algerian experience:

Unlike the Central Banks considered above, the Bank of Algeria did not resort to (QE) after the financial crisis of 2008. However, it did resort to (QE) after the sudden drop in hydrocarbon prices, which had an anemic effect on economic activity and caused it to be paralyzed. Indeed, following the oil shock of 2014, both the economic and financial situations of Algeria have deteriorated enormously. The fall in oil prices has had a significant impact on public finances, given that Algeria is an almost mono-exporting country and its main resources come from hydrocarbons. This has caused a huge budget deficit and a paralysis of the economic system (Merghit, 2021). Indeed, this situation had generated a rapid erosion of the large budgetary savings amassed over several years and a solid decline in the Revenue Regulation Fund (FRR), whose level was DA 5633.751 billion in 2012, and then to its exhaustion in early 2017 (DGPP, 2020) (Ministry of Finance, 2018). This act reversed the country's economic situation from one of structural excess liquidity to one of structural financing needs.

Faced with an internal financial market that is not large enough to tolerate the Treasury's indebtedness to it, the avoidance of a possible indebtedness to the IMF and the desire to re-establish economic equilibrium have led the state to take a certain number of measures to compensate for the fall in oil prices. These included the depreciation of the exchange rate, the consumption of international foreign exchange reserves and the consumption of financial savings. After having exhausted the resources of the FRR, in mid-2017, the State took the decision to slow down the depreciation of the exchange rate, to abandon the budgetary approach and to start an exceptional monetary approach known as "non-conventional financing". Unconventional financing (the *Planche à billets*) is one of the tools of the unconventional monetary policy of the (QE) type that the Algerian monetary authorities (Central Bank and State) experimented in 2017. The expert Meddah interprets unconventional financing, in the article published by Ouramdane (2017), by financing that is carried out directly between the Bank of Algeria and the Public Treasury via loans, advances and indebtedness (Ouramdane, 2017). This policy is sometimes used to allow governments to repay their debt or fill their budget deficit, or even to get out of a prolonged deflation.

To do so, the Algerian government made amendments to Law 17-10 on money and credit of 11/10/2017 so that it could access non-conventional financing in a legal manner which allows the Central Bank to advance liquidity to the public treasury. In other words, the monetary authorities (State and Central Bank) activated the printing press to finance the deficit of the public treasury (Official Gazette of the Algerian Republic, 2017). Article 45 bis of the Official Gazette of the Algerian Republic No. 57 announced as follows: *"Notwithstanding any provision to the contrary, the Bank of Algeria shall, from the entry into force of this provision, exceptionally and for a period of five years, purchase directly from the Treasury, securities issued by the latter, in order to participate, in particular:*

- *To cover the Treasury's financing needs ;*
- *The financing of the internal public debt ;*
- *Financing of the National Investment Fund (FNI).*

This mechanism is implemented to accompany the realization of a program of economic and budgetary structural reforms that should lead, at the latest, at the end of the above-mentioned period, to the restoration of :

- *The balance of the State's treasury ;*
- *The balance of payments.*

A mechanism for monitoring the implementation of this provision by the Treasury and the Bank of Algeria is defined by regulation".

On a thorough reading of this article, the Bank of Algeria is able to finance directly, particularly the budget deficit, the repurchase of public sector debts and the support of the FNI, for a period of five years. This last point is of paramount importance insofar as the action of supporting the NIF is supposed to revive the economy, through investment, with the aim of generating a counterpart to the money supply, which reduces the risk of inflation (Sajid, 2000). This approach is purely 'Keynesian' since it anticipates the increase in aggregate demand through investment. Regarding sovereign debt, the Bank of Algeria acquires ad hoc government securities of long-term bonds, at an interest rate of 0.5% (International Monetary Fund, 2018).

Several Algerian researchers have analyzed the new strategy implemented by the government, including (Zidelkhalil&Mouhoubi, 2020) analyzed non-conventional financing in Algeria. Their study showed that under the conditions in which this financing was adopted, it made it possible, at least in the short term, to make the inter-temporal budgetary constraint of the State and the social nature of public expenditure viable.

(Kerzabi&Kerzabi, 2020) analyzed the effect of non-conventional financing on inflation in Algeria and found that inflation is not caused by monetary creation, but by the exchange rate because this last is an importing country.

(Zourdani, 2019) analyzed the Non-Conventional Financing Strategy and its Socio-Economic Impact in Algeria and concluded that non-conventional financing has prevented the economic and social development process from coming to a halt.

(Merouani&Zourdani, 2022) analyzed the macroeconomic effects of non-conventional financing in Algeria using the principal component analysis method. The results obtained show that non-conventional financing has only partially filled the budget deficit. They add that non-conventional financing has been used in an autarkic manner, whereas it's included in a scheme of financing the economy; it's a link in the economic activity. It cannot be a source of economic recovery on its own without being accompanied by a number of measures that will enable it to be effective and achieve its objectives.

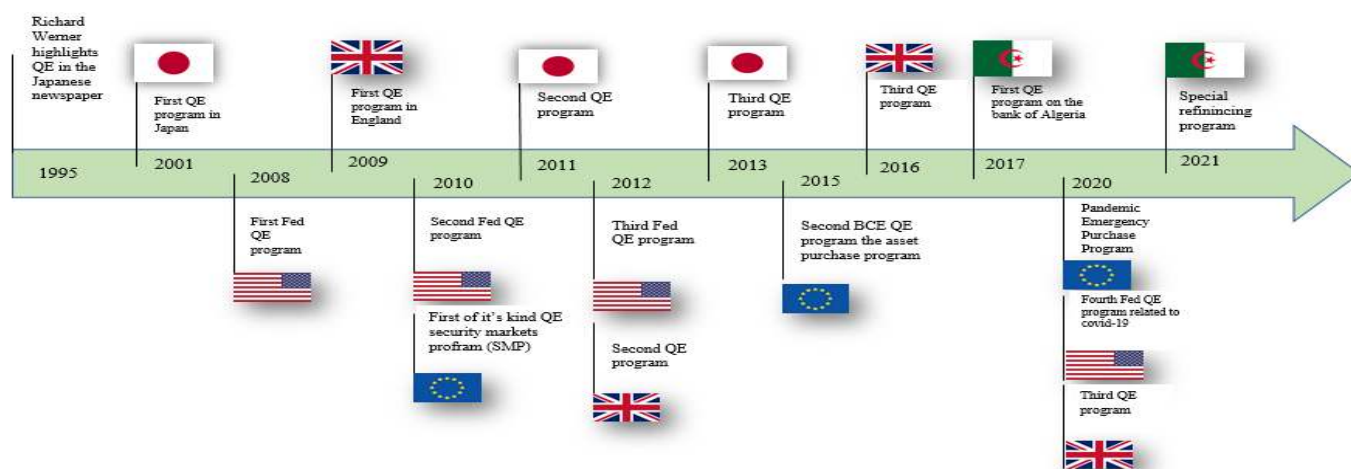
The monetary authorities suspended this financing in 2019 and resumed the use of the remaining room for maneuver of conventional monetary policy, namely the policy rate and the reserve requirement rate, in order to meet the liquidity needs of banks. The question is whether this suspension is permanent or whether it will resume in another form, especially after the new oil shock of 2020 accompanied by the COVID-19 health crisis?

According to the Regulation on the Special Refinancing Program (2021), the State has relaunched the printing press within the framework of a special refinancing program, which consists of temporary liquidity transfer operations carried out at the initiative of the Bank of Algeria. These operations are for twelve month maturities, renewable twice, for a maximum amount of 2100 billion dinars. The instruments that the Bank of Algeria accepts as collateral for these operations are the bonds issued by the Treasury in the context of the repurchase of syndicated loans, but the question that comes to mind is: will it produce the expected effects?

IV-Summary of the Lessons Learned From the Benchmark:

Finally, as has been observed in more than one country, in order to emerge from a major financial or economic crisis and to ensure greater resilience of the financial and economic institutions of nations, the monetary authorities are increasingly using so-called non-traditional instruments, which since 2008 have tended to become part of the central banks' toolbox and become somewhat conventional. The following figure summarizes the history of the implementation of (QE) in the different countries of our study.

Figure N°4: Timeline of major quantitative easing



Source: Adapted by the authors from the literature review.

In the end, the decision on whether or not to adopt unconventional monetary policy measures depends on a series of considerations, what specific measures should be taken and for how long? What are the general conditions of the economy (in particular the presence of deflationary pressures and the effective constraint of the zero lower bound), in other words, the financial and economic structure of a country.

TableN°4 : Summarycomparison of (QE)in the considered countries

	Japan	USA	United Kingdom	The Euro Zone	Algeria
QE trigger event	The Asian stock marketcrisis	Financial crisis 2007	Financial crisis 2007	Financial crisis of 2007 and sovereigndebtcrisis of 2010	A drastic drop in hydrocarbonprices
Conventional monetarypolicy instruments	Exhausted	Exhausted	Exhausted	Exhausted	Unexhausted
Policy rate	ZeroFloor	ZeroFloor	ZeroFloor	ZeroFloor	4%
Financial market	Littledevel opedthroug h the banking system	Highlydeve loped	Highlydevelo ped	Littledevelopedthr ough the banking system.	At the embryonic stage and passes through the banking system which in turnisunderdevelo ped.
Effects of QE on economicgro wth	Significany low in the short term	Significantl y positive	Significanty positive	Significantlylow in the short term	No effect

Source: Synthesis by the authors.

Conclusion:

Monetary policy is one of the main public policies for macroeconomic regulation. It operates alongside fiscal policy and structural policies, which interact extensively. It's generally concerned with adjusting the money supply in the economy to achieve a combination of inflation and macroeconomic stabilisation. To achieve this, monetary policy takes two forms: conventional and unconventional. In this article, we've carried out an international benchmark on the effects of unconventional monetary policies, particularly (QE), on economic growth. By making a benchmarking between the Bank of Algeria and the four major Central Banks in the world (G4). These are the Central Bank of Japan, the Federal Reserve, the European Central Bank and the Bank of England.

After presenting the QE of the G4, they have been compared to the QE "unconventional financing" practiced in Algeria. We were able to determine the convergences and divergences in the implementation of these policies between the different economies as well as their effect on economic growth. As results, we concluded on the one hand, that the trigger for the QE of the G4 group is the Asian stock market crisis for Japan, the financial crisis of 2007 for the United States, the United Kingdom, the financial crisis of 2007 and the sovereign debt crisis of 2010 for the Euro Zone. For Algeria, however, it was the oil crisis of 2014. Moreover, all the G4 countries resorted to unconventional monetary policy (QE) only after having not only exhausted all the traditional instruments of traditional monetary policy, but also after having explored fiscal policy, which was ineffective. For its part, Algeria had taken a number of fiscal measures that were in vain, but it had not exhausted its traditional instruments. On the other hand, the effect on economic growth is very positive for countries whose financing of their economy is mainly based on the financial market; this effect becomes weak for countries whose financing of the economy is based on the banking system. In the case of Algeria, the effect was nil since the economy is mainly financed by resources from the hydrocarbon sector and a very small part by the banking system.

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