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Whatever it takes

- Global issues in the light of Quantitative Easing -

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Declaration:

I hereby declare that I am the sole author of the thesis entitled **"Whatever it takes – Global issues in the light of Quantitative Easing"**. I duly marked out all quotations. The used literature and sources are stated in the attached list of references.

In Prague on Signature

Acknowledgement:

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With special mention to my friends and family. My whole academic journey would not been possible without their love and encouragement.

Abstract

This thesis investigates the global financial system, the process of money creation in modern economies and, ways to innovate towards a sustainable future. The aim of this thesis is to define a concrete plan to finance climate change taking valuable considerations from the "Whatever it takes" approach adopted by world leaders when faced with the Financial Crisis of 2008. Evidence shows that unconventional monetary policies are today widely accepted and regularly used to stimulate or stabilize the economies. Therefore, the solutions presented do not involve a financial innovation but a policy innovation in a way that newly created money by the means of Quantitative Easing (controlled by Central Banks) or by the Special Drawing Rights (controlled by the International Monetary Fund) can be specifically used to tackle other problems globally shared rather than financial crisis'. Results indicate that we can afford the promises made to the Green Climate Fund, we have the instruments needed and, the risks resulting from this green monetary approach can be mitigated. Thus, it is possible to meet the global goal of limiting global warming below 2ºC. The findings of this thesis are value for everyone as they bring forward strategic considerations on behalf of a better world.

Keywords: Quantitative Easing, Special Drawing Rights, Financing Climate Change, Green Bonds

Tato práce zkoumá globální finanční systém, proces tvorby peněz v moderních ekonomikách a možnosti inovací směrem k udržitelné budoucnosti. Cílem této práce je definovat konkrétní plán k financování změny klimatu s cennými úvahami z přístupu "Ať to stojí cokoliv" přijatého světovými lídry během finanční krize v roce 2008. Důkazy ukazují, že netradiční měnové politiky jsou dnes široce akceptovány a pravidelně používány ke stimulaci nebo stabilizaci ekonomik. Předložená řešení nezahrnují finanční inovace, ale inovace politik takovým způsobem, že nově vytvořené prostředky prostřednictvím kvantitativního uvolňování (řízeného centrálními bankami) nebo zvláštních práv čerpání (řízených Mezinárodním měnovým fondem) mohou být specificky používány k řešení jiných globálních problémů spíše, než k řešení finanční krize. Výsledky naznačují, že sliby udělené Fondu pro zelené klima jsou oprávněné, že máme k dispozici potřebné nástroje, a že rizika plynoucí z tohoto zeleného měnového přístupu mohou být zmírněna. Je tak možné splnit světový cíl omezení globálního oteplování pod 2 °C. Závěry této práce jsou významné pro všechny, protože přinášejí strategické úvahy ve prospěch lepšího světa.

Klíčová slova: kvantitativní uvolňování, zvláštních práv čerpání, financování změny klimatu, zelené dluh

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LIST OF ABBREVIATIONS

AfDB - African Development Bank

BOE - Bank of England

BOJ - Bank of Japan

EAPP - Expanded Asset Purchase Programme

ECB – European Central Bank

FED - US Federal Reserve

GCF – Green Climate Fund

HIPC - Heavily Indebted Poor Countries

IMF - International Monetary Fund

MDGs – Millenium Development Goals

SDGs - Sustainable Development Goals

SDRs – Special Drawing Rights

QE – Quantitative Easing

WB – World Bank

UN – United Nations

UNFCCC - United Nations Framework Convention Climate Change

ZCPBs - Zero coupon perpetual bonds'

INTRODUCTION

> "We are the first generation to be able to end poverty, and the last generation that can take steps to avoid the worst impacts of climate change. Future generations will judge us harshly if we fail to uphold our moral and historical responsabilities."
>
> *Ban Ki-moon, former United Nations Secretary-General*

Over the last decades, different goals were set by governments and leading international institutions to address issues that transcend national boundaries. In 2000, following the Millennium Summit of the United Nations, eight international development goals were established which have become known as the Millenium Development Goals (MDGs). They targeted eight specific key areas: poverty, education, gender equality, child mortality, maternal health, diseases, the environment and global partnership. Each goal was supported by specific targets and more than 60 indicators. All the 189 United Nations (UN) member states at the time and at least 23 international organizations committed themselves to achieve these goals by 2015. To accelerate the progress, the G8 finance ministers agreed in June 2015 to provide enough funds to the World Bank (WB), the International Monetary Fund (IMF) and the African Development Bank (AfDB) to cancel $40 to $55 billion (bn) United States dollars (USD) in debt owed by members of the Heavily Indebted Poor Countries (HIPC) to allow them to redirect resources to programs for improving health and education and for alleviation poverty (Tashi, 2013). Nevertheless, despite all the efforts, some of the proposed goals were missed. To build on the MDGs and to complete those that were not achieved, the UN came up with the 2030 Agenda for Sustainable Development with 17 ambitious Sustainable Development Goals (SDGs) and 169 targets.

The Government Spending Watch (GSW) has produced a database which reveals how much the world is spending to address poverty and development issues. The headline conclusion of its report, "Putting Progress at Risk", is that countries are not spending enough money to meet their own targets nor the ones set by international agencies - "nor will they be able to spend more on the new post-2015 goals, including reducing inequality and combating climate change" (Government Spending Watch, 2013).

In 2008, the world's financial system was crumbling. Considered by many economists the worst financial crisis since the Great Depression in the 1930's, the financial crisis of 2007-08 almost brought down the international financial system. On September 9, Lehman Brothers announced a huge amount of loss and its stocks collapsed. AIG followed the same direction. By September 12, Lehman Brothers had run out of cash and the entire investment banking was sinking and, there was obviously a potential danger for the global financial system. Nonetheless, policy makers when faced with such global challenges were able to collaborate, with urgency, and run the risks of unconventional monetary policies.

Traditionally, Central Banks engage in open market operations with government securities to change the size of the money supply and its rate of growth. It is also normally done through interest rate targeting and setting bank reserve requirements. However, in periods of severe economic downturn, these conventional tools become limited as interest rates approach zero and commercial banks become worried about liquidity. Traditional monetary tools may no longer be effective in achieving their goals, and unconventional monetary policies may then be employed to jump-start economic growth and spur demand (Smaghi, 2009).

The world's largest central banks, namely the US Federal Reserve (Fed), the Bank of England (BOE), the Bank of Japan (BOJ), and the European Central Bank (ECB) embarked a monetary policy called Quantitative Easing (QE), considered an unorthodox way of pumping money into the economy and aiming to lower the long-term interest rates in order to combat a recession. In reality, QE is money creation by another name. Between 2008 and 2015, the Fed bought bonds in total worth more than $3,7 trillion and the United Kingdom created £375bn of new money in its QE program between 2009 and 2012 (Hausken & Ncube, 2013).

Money printing policies have been used regularly to stimulate economies, to stabilize the financial system and to save it in the case of the crisis of in 2008 - also known as Great Recession. Furthermore, since the advent of the financial crisis in 2008, it became apparent that money could be created to tackle a problem globally shared. In 2012, Mario Draghi, President of the ECB when asked about the irreversibility of the

Euro and ECB's preparedness to preserve the Euro, he stated: "Within our mandate, the ECB is ready to do **whatever it takes** to preserve the Euro, and believe me, it will be enough."[1] The Bank of Japan repeated the same commitment - **to do whatever it takes**.

It was a story of an American financial analyst and his four-year-old daughter, which inspired me for the writing of this thesis. Some years ago, they were walking to a local coffee place when on their way they passed by a man collecting money for charity. Michael did not have any change to give him, and as a consequence, his daughter was disappointed. Once inside the coffee place, his daughter took out her coloring book and started scribbling what it turned out to be a drawing of a $5 U.S dollar bill to give to the man outside. Michael explained to her that she could not do it - it was not allowed – to which he got the typical four-year-old response: Why not? [2] Whereas it is simple to explain why it is not possible to draw money bills and use them, the same logic can not be applied when the question is: can we create money to tackle other global issues aside from the Financial Crisis of 2008? Can we simply print or create money to finance climate change?

This question has been recently scrutinized and discussed by many economists and other academics. It might be somehow unconventional to ask if central banks could print money to ensure that we stay on track with our globals goals. Instead of using "QE for banks," they should use "QE for climate" - Green QE. Another option to undermine the effects of Climate Change, at an international level, involves the IMF and their ability to issue Special Drawing Righs (SDRs) – an international reserve asset based on a basket composed by the world's main five currencies. Both solutions represent a policy innovation in a way that the newly created money can be specifically used to tackle problems that are globally shared and hence limiting global warming below 2ºC. Money creation throught QE does not necessarily mean that all countries need to be aligned, whereas by issuing SDR, it means that all IMF members

[1] Speech in London, July 26, 2012 by Mario Draghi, President of the ECB in London at the Global Investment Conference
[2] Michael Metcalfe, TED Talk: A provocative way to finance the fight against climate change

must agree with that purpose. The question is: will policy makers and world leaders do whatever it takes to tackle the biggest threat to humanity?

Goals and contribution

The aim of this thesis is first, to provide a precise analysis of money creation in the modern economy and additionally, to propose a new approach to financing climate change. Together with analyses of secondary literature, empiric findings shall form the basis for concrete recommendations on how to keep up with financing climate change and to produce higher impacts and results. The major institutions for the purpose of this thesis are the Central Banks, The IMF and the Green Climate Fund (GCF). The research set out in this thesis contributes to new mechanisms that can be applied in the real world and produce great impacts economically, socially and environmentaly. The concepts presented and developed throughout this thesis will be the basis for recommendation on how to finance global issues rather than Financial Crisis. If succesfuly applied on solving Climate Change, all other global issues become easier to address.

Thesis Structure

This thesis starts by prudently analyzing the international financial system. Chapter 1 sets the theory towards an overview analysis of money, the major institutions responsible for stabilizing and for fixing the financial system as well as how these institutions manage the money supply according to conventional monetary policies. Chapter 2 debunks the process of money creation and the use unconventional monetary policies. These policies are thoroughly analyzed in order to understand its uses and impacts around the world - with special focus on the Euro Area and in the American Economy. Chapter 3 sets the empirical findings on how to finance Climate Change. The Green Climate Fund is used as an intermediary to channel the money created towards green projects around the world. Special focus goes to Quantitative Easing, “Green QE”, but it is also suggested another policy involving the International Monetary Fund for the same purpose. Based on research findings, conclusions are presented in a form of summary of the form and results of the proposals.

1. THE SYSTEM

Few understand how our system works. Famous American entrepreneur Henry Ford, back in the 1930s said: "*It is well enough that people of the nation do not understand our banking and monetary system, for if they did, I believe there would be a revolution before tomorrow morning*" (Maguire, 1957).

This was indeed a powerful statement during severe periods in the American economy. It is true that the majority of people do not understand our banking and monetary system. However, if they did its not certain that they would start a revolution but they would certainly ask more questions and propose new paths.

Those who see the recent crisis as mainly a cyclical phenomenon would rather not address the underlying structural problems that have been growing for years in the financial markets. These include increasing speculation, ever more myopic shortterm demands for financial returns and, perhaps most basically, the ever-enlarging political and economic power of the financial sector relative to the real economy.

In the wake of the crisis, policymakers around the world have been looking for ways to fix the international financial system: how to better regulate banks and other financial institutions, how to more effectively address risk, and how to strengthen economic cooperation. There are many players involved in this effort: national governments, international financial organizations, and groups of countries, such as the Group of 20 leading economies and the European Union. While the international community has taken a few steps towards reforming other aspects of the international monetary and financial system (such as the launch of an enhanced policy coordination approach under the G20 Framework for Strong, Sustainable and Balanced Growth, and the introduction of the IMF's financial safety nets), there are doubts about whether these actions will be effective enough.

This first chapter seeks a thorough comprehension of our financial system, since the origins of money and its uses to the role of major institutions and the policies undertaken by them.

1.1 Money – Functions, stages and its nature over time

We are all accustomed to using money that we seldom notice the roles it plays in almost our everyday operations. Money has some unique features and functions that make it distinguishable from other assets and serves several key functions in our economy: as a medium of exchange, a unit of account and a store of value.

Figure 1- The functions of Money, Source: ECB

Money as a medium of exchange is the most important function of money since it serves as an accepted means of payment. Money eliminates the enormous search costs connected with a barter system – the direct trade of goods and services for other goods and services - because it is universally accepted. Money's second important role is as a unit of account, that is, as a widely recognized measure of value. The price of goods, services, and assets are typically expressed in terms of money and exchange rates allow us to translate different countries' money prices into comparable terms. The convention of quoting prices in money terms simplifies economic calculations by making it easy to compare the prices of different commodities (Krugman, Obstfeld, & Melitz, 2012). Additionally, money can be used to transfer purchasing power from the present into the future which makes it also an asset or a store of value. This attribute is essential for any medium of exchange because no one would be willing to accept it in payment if its value in terms of goods and services evaporated immediately.

Concerning its history, money has evolved through five different stages. Firstly there was Commodity money, which had value apart from its use of money. A large number of items such as cows, goats, and rice were used for that purpose, but it was then replaced by metallic money mainly because of its lack of storage capability, durability, transportability, divisibility, and homogeneity. Metallic money on another

hand is based on coinage – gold and silver used as coins, stamped by a competent authority. As time passed, transportation and storage of coins became inconvenient and dangerous. To avoid that issue, money evolved then into paper money - which is made of paper and functions as a medium of exchange. Initially, paper currency carried a promise that is convertible into a fixed quantity of precious metallic gold and silver. That promise is known as Gold Standard, and it was eliminated in 1914 in England and 1933 in the United States. Gold Standard was then replaced by Fiat Money (Fiat is a Latin word for "it shall be"). Fiat money is the currency that a government has declared to be legal tender, but it is not backed by a physical commodity. The value of fiat money is derived from the relationship between supply and demand rather than the value of the material that the money is made of. Fiat money is based solely on the faith and credit of the economy (Davies, 2002). Afterward, Credit money or bank money arose which basically uses cheques as a medium of exchange. Cheques made it easier to make transactions for large amounts since they are easier to transport. However, cheques have no legal tender; they cannot be enforced in payments of debts. Lastly, money evolved until an electronic banking stage. Electronic money is a modern system of transferring funds using electronic communications. Payments are now made through magnetic strip cards such as bank credit cards, debit cards, and others. This form of banking has reduced processing costs, the lead time for payments and also has increased flexibility. More recently, cryptocurrencies with its blockchain technology such as Bitcoin have been challenging our payment networks and money itself, bringing a new paradigm towards a decentralized currency. Cryptocurrencies however are not consider money since they lack legal tender in most of the countries.

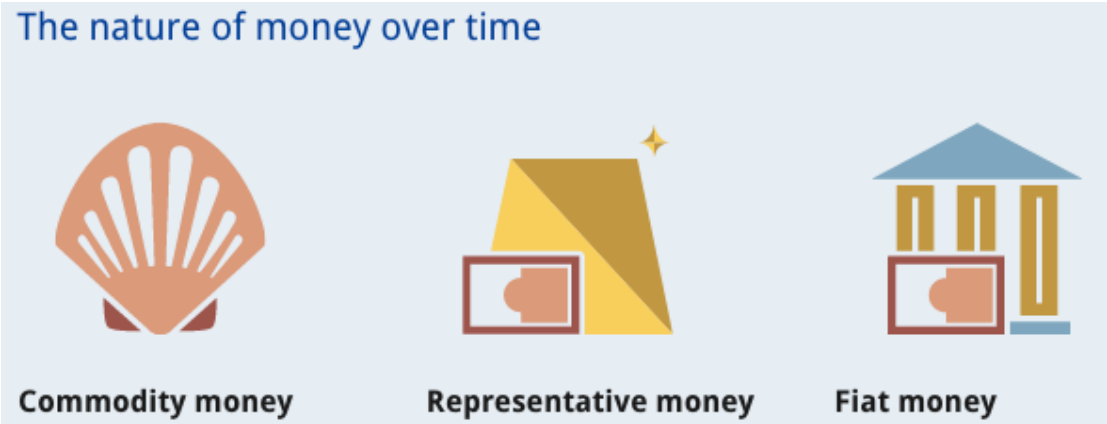

Figure 2 - The nature of money over time, Source: ECB

1.2 - Central Banks and Money Supply

An economy's money supply is controlled by its central bank. The central bank directly regulates the amount of currency in existence and also has indirect control over the amount of checking deposits issued by private banks. The procedures through which the central bank controls the money supply are complex and a more detailed analysis of this process will be provided later on.

Money Supply is the sum of all money in a particular country. For thousands of years, mankind was using commodity money, most notably silver and gold. However, most world countries use fiat currencies now. The fiat money supply includes paper bills, coins, and demand deposits. Money Supply is measured in different aggregates. Every country has its own ways to measure money supply, but in general, there are three money aggregates used throughout the world – M1, M2, M3.

- M1 is the narrowest measure of money. Due to ECB, M1 is the sum of currency in circulation and overnight deposits.

- M2 is a broader measure of money and is the sum of M1, deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months.

- M3, which is an even broader measure of money, includes the sum of M2, repurchase agreements, money market fund shares/units and debts securities with a maturity of up to two years.

What is important to notice is a constant increase over time of these monetary aggregates gloabally, especially in the major economies as figure 3 and 4 shows.

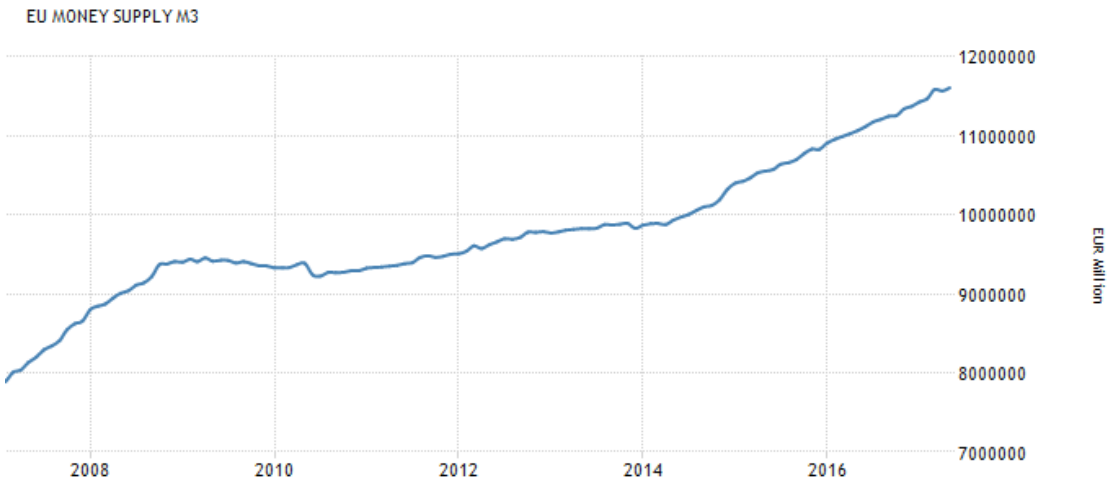

Figure 3 – EU Money Supply M3 – 10 years, Source: ECB

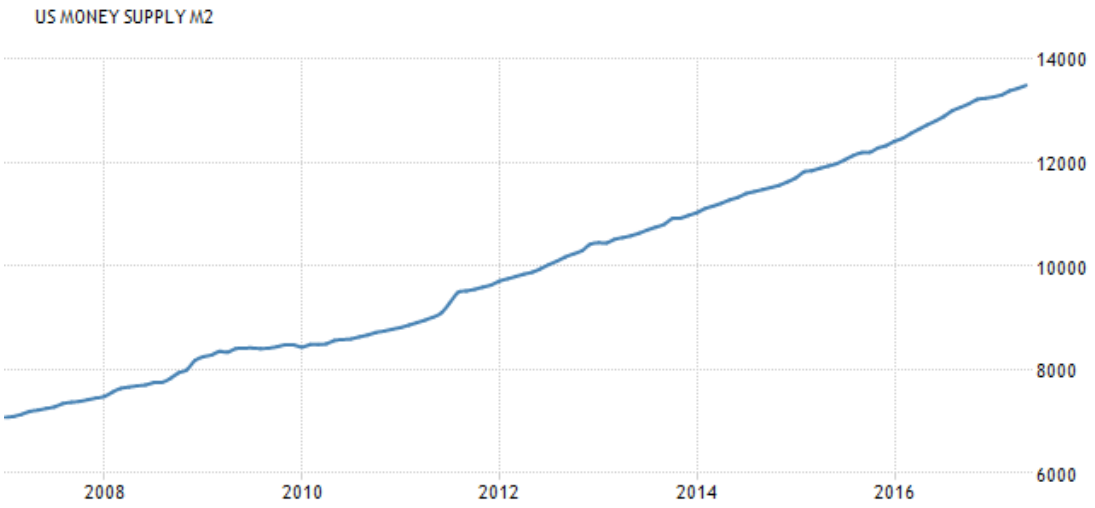

Figure 4 – US Money Supply M2 – 10 years, billions of USD, Source: FED

Central banks are also known as reserve banks and they are the most important institutions in the financial system. Central banks have a monopoly on the creation of money and hence play a key role in ensuring price stability as well as ensuring stable macroeconomic conditions and the soundness of the financial system. Central banks were initially created with a narrow purpose in mind, to help commerce or, like in the case of the UK, to provide stable war funding and support the government in its economic objectives (Danielsson, 2016). Over time, the roles of the central banks have expanded significantly.

Banks acquired a monopoly on the printing of banknotes and have significant autonomy in the setting of interest rates. With the expansion of objectives and power of the central banks, they often find it difficult to reconcile the various tools and objectives. For example, the exercise of financial stability may require significant injections of liquidity into the economy, undermining price stability. Over time, as the nature of the challenges facing the economy has changed, their priorities have shifted. From the second part of the 19th century, until 1914, financial stability was the main objective of most central banks as monetary stability was taken care of by the gold standard. During the Bretton Woods era, and until the 1980s, these roles switched and inflation became the main problem facing central banks, with financial stability becoming less important because heavy regulations limited the scope for financial crisis. Eventually, this led to the neglection of financial stability, contributing to the build-up of systemic risk, and the crisis starting in 2007. This in turn has made financial stability the main objective of central banks. However, massive injections of liquidity into the financial system in recent years are likely to make monetary policy yet again the main objective of central banks.

1.3 – Conventional Monetary Policies

The primary day–to–day function of central banks is monetary policy, the control of the supply of money. Monetary policy is either expansionary, where a central bank increases the total supply of money in the economy, contractionary, when it decreases the money supply, or neutral. The most commonly used tool for monetary policy is interest rates, but central banks may also use open–market operations. A traditional method is reserve requirements, but that is more common in emerging markets.

However, the recession that followed the Financial Crisis of 2008 triggered unprecedented monetary policy easing around the world and proved that conventional monetary policies are no longer adequate in such periods. Most central banks in advanced economies deployed new instruments to affect credit conditions and to provide liquidity at a large scale after shortterm policy rates reached their effective lower bound.

1.3.1 Central Bank interest rate

The most visible demonstration of monetary policy is the setting of interest rates. The central bank rates determine the overnight risk–free market rate, thereby directly influencing the money supply. By increasing the interest rate, banks are more likely to deposit money with the central bank, taking money out of the circulation. This causes borrowing rates to increase throughout the financial system, reducing demand and hence money creation. Interest rates can be raised without limit and thus provide an effective contractionary tool under inflationary conditions. The contrary is not necessarily true because deflation can require negative interest rates, something that used to be difficult to achieve, as we are facing them today. That means different tools are needed to combat deflation. While central banks can buy bonds, they exercise limited control over longer maturities. The latter is influenced by supply and demand in the bond markets, with inflationary expectations being an important determinant. As seen in the following figure, major central banks hold interest rates at zero percent or narrowly close to it.

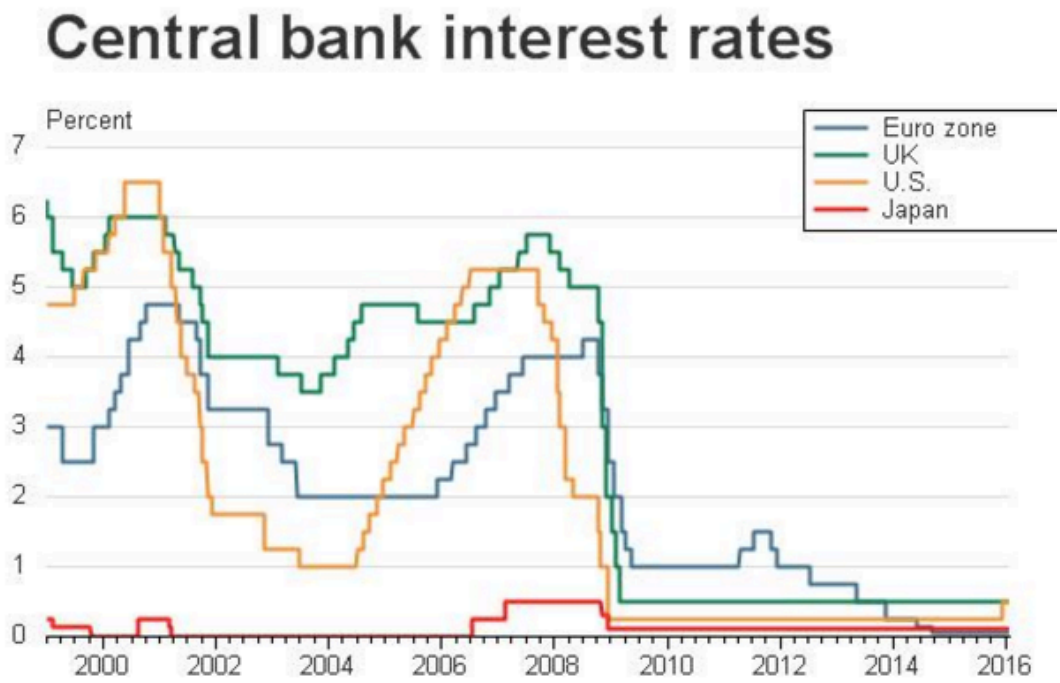

Figure 5 – Central bank interest rates – Euro zone, UK, U.S and Japan, Source: Thomson Reuters Datastrem

1.3.2 Open Market Operations

Central banks can directly control the supply of money by open market operations. This entails buying or selling securities, normally the debt obligations of the central bank's own government, in the open market. The counterparties are typically major banks. When a central bank buys securities, it pays by increasing the reserve account (a bank's account with the central bank) of the seller's bank. It is not a transfer into the account, rather the central bank simply increases the account balance by some number by fiat. Doing so increases the total volume of reserves (money) held collectively by the banking system. This is a modern version of printing money.

Similarly, when the central bank sells securities, it deducts the proceeds from the reserve accounts of the buyers', which reduces the total volume of reserves, and hence money. Expanding or shrinking the total volume of reserves in this way matters because banks can trade reserves among one another or exchange them for other assets. Because the central bank pays only a low rate of interest (often zero or slightly negative, as currently in Switzerland, Japan, and the euro zone) on these balances, any

bank that has more reserves than it needs typically will try to exchange them for some interest–bearing asset (Danielsson, 2016). Expansionary open market operations, when the central bank buys short-dated securities, create a downward pressure on short–term interest rates via two main routes. A direct impact occurs because an instrument is removed from the market, increasing its price and lowering yields. An indirect effect arises because the bank now has cash instead of a security, and hence has a greater capacity to lend and also lower interest rates. Typically, open market operations involve smaller transactions, in a smaller period of time. The scale of QE is much larger.

1.3.3 Reserve Requirements

Reserve requirements give the central bank a degree of control over the money supply. Changes in the reserve requirements lead to changes in the money multiplier. Lowering the reserve requirement has a similar effect as an expansionary open market operation, provided that banks are constrained by reserve requirements. Altering the reserve requirement used to be relatively common, but nowadays most central banks rely on other methods. The main exceptions are in less developed economies, for example Brazil, China, India, Russia and Uruguay.

In the Euro area, a bank's minimum reserve requirement is set for six-week periods called maintnance periods. Until January 2012, banks had to hold a minimum of 2% of certain liabilities, mainly customers' deposits, at their national central bank. Since then, this ratio has been lowered to 1%. The total reserve requirements for euro area banks stand at around 113bn euro (beginning of 2016) (European Central Bank, 2016).

1.4 – Bretton Woods, the IMF and the World Bank

There is no dispute concerning the major role that Central Banks play as a monetary authority. However, they are not the only institutions responsible to manage and oversee the international financial system. An event that profoundly changed the system was the Bretton Woods Conference, in 1944 which represents a landmark system for monetary and exchange rate management and a remarkable achievement of global coordination.

Since the advent of the First World War and with the beginning of the Second World War, it was clear the importance of developing new ideas in order to establish financial order and peace. The inter-war financial system had been chaotic, seeing the collapse of the gold standard, the Great Depression and the rise of protectionism. Thus, independently, John Maynar Keynes from the British Treasury and Harry Dexter White from the United States Treasury Department, started to conceive significant notions for the postwar world. After negotiations between officials of the United States and the United Kingdom and, after consultations with some other Allies, a joint statement was published simultaneously in a number of Allied countries on April 21, 1944. Some weeks later, on May 25, the U.S. Governement invited the Allied countries to send representatives to an international monetary conference "for the purpose of formulating definite proposals for an International Monetary Fund and possibly a Bank for Reconstruction and Development". (United Nations Monetary and Financial Conference, 1944) Thus, 730 delegates from 44 countries (Allied Nations) met from July 1st to July 22nd, 1944 in order to create a new international monetary system - to ensure a foreign exchange rate system, to prevent competitive devaluations and to promote economic growth.

There were three significant results from the meeting, two of which survive today:

- *Creation of the Bretton Woods System in order to stabilize currency exchange rates*

Before Bretton Woods, most countries followed the Gold Standard, meaning that countries guaranteed that they would redeem their currencies for its value in gold.
Under the Bretton Woods System, countries promised that their central banks would maintain fixed exchange rates between their currencies and the U.S. dollar. If a country's currency value became too weak relative to the dollar, the central bank would buy up its currency in foreign exchange markets. That would decrease the supply, which would raise the price. If its currency became too high, the bank would print more of its currency, increasing the supply and lowering its price. Thus, Bretton Woods established the United Sates as the dominant power behind the world economy and allowed the world to slowly transition from a gold standard to a U.S. dollar standard. The United States held three-fourths of the world's supply of gold at the time. No other currency had enough gold to back it as a replacement.

- *Creation of the International Monetary Fund (IMF)*

The Bretton Woods system could not have worked without the IMF. The system needed a kind of global central bank from where member countries could borrow in case they needed to adjust their currency's value and did not have the funds themselves. Nevertheless, countries decided agains giving the IMF the power of a global central bank, to print money as needed. Instead, they agreed to contribute to a fixed pool of national currencies and gold to be held by the IMF. Each member of the Bretton Woods system was then entitled to borrow when needed, within the limits of its contributions. In 1969, in the context of the Bretton Woods fixed exchange rate system, the IMF created an international reserve asset known as the Special Drawing Right (SDR) to supplement its member countries' official reserves. It serves as a supplementary international reserve asset and all IMF member countries hold a part of their foreign reserves in SDR.
IMF's mission is still today "to help ensure stability in the international system by keeping track of the global economy and the economies of member countries, lending to countries with balance of payments difficulties, and giving practical help to members". (IMF, 2017)

- *Creation of the International Bank for Reconstruction and Development, which is today part of the World Bank*

Both the World Bank and the IMF were created with the purpose to foster global monetary cooperation, to secure financial stability, to facilitate international trade and, to promote high employment, sustainable growth and, reduce poverty. Nonetheless, despite its name, the World Bank was not the world's central bank. At the time of the Bretton Woods agreement, the World Bank was set up to lend to the European countries devastated by World War II. However, in the 1970s, the World Bank shifted its attention to poverty eradication. The World Bank is today composed by The International Bank for Reconstruction and Development (IBRD) and The International Developmente Association (IDA) and it loans money to economic development projects in emerging maket countries. Its mission is to "end extreme povery within a generation and boost shared prosperity". (World Bank, 2017)

"History is being written today as we execute these documents and breathe the breath of life into the International Monetary Fund and the International Bank for Reconstruction and Development. We can be thankful that the history we are now writing is not another chapter in the almost endless chronicle of war and strife. Ours is a mission of peace – not just lip service to the ideals of peace – but action, concrete action, designed to establish the economic foundations of peace on the bed rock of genuine international cooperation."

"If these two great international institutions are to achieve the mission which the world has so hopefully entrusted to their care, it will require the wholehearted and concerted cooperation of each of the member countries and their people"

(Treasury Department, Press Release, December 27, 1945).

Since the dollar became a “substitute” for gold, its value began to increase relative to other currencies. There was more demand for it, even thought its worth in gold remained the same. By the early 1960s, the U.S. dollar was seen as overvalued. During that time, a sizeble increse in domesting spending on some social programs and a rise in military spending caused by the Vietnam War gradually worsened the overvaluation of the dollar. The discrepancy in value planted the seed for the collape of the Bretton Woods system.

The system was dissolved between 1968 and 1973. In August 1971, U.S. President Richard Nixon announced the “temporary” suspension of the dollar’s convertibility into gold. An attempt to revive the fixed exchange rates failed, and by March 1973 the major currencies began to float against each other. Bretton Woods System was then abandoned for the free-martet currency valuation and exchange system that still exists today. Since the collapse of the Bretton Woods system, IMF members have been free to choose any form of exchange arrangement they wish (except pegging their currency to gold): allowing the currency to float freely, pegging it to another currency or a basket of currencies, adopting the currency of another country, participating in a currency bloc, or forming part of a monetary union. (IMF, 2017)

2. MONEY CREATION IN MODERN ECONOMIES

> ”When banks extend loans to their customers, they create money by crediting their accounts”
> Sir Mervyn King, Governor of the Bank of England 2003-2013

In order to have a better comprehension of the process of money creation in an economy is required to make a distinction between “broad money” and “base money”. Broad money is the amount of money circulating in the economy that consumers have available for transactions. It comprises currency (banknotes and coins) and bank deposits. Broad money is a useful concept because it measures the amount of money held by those responsible for spending decisions in the economy — households and companies. Base money or “central bank money” includes currency as well as central bank reserves. (McLeay, Radia, & Thoman, 2014).

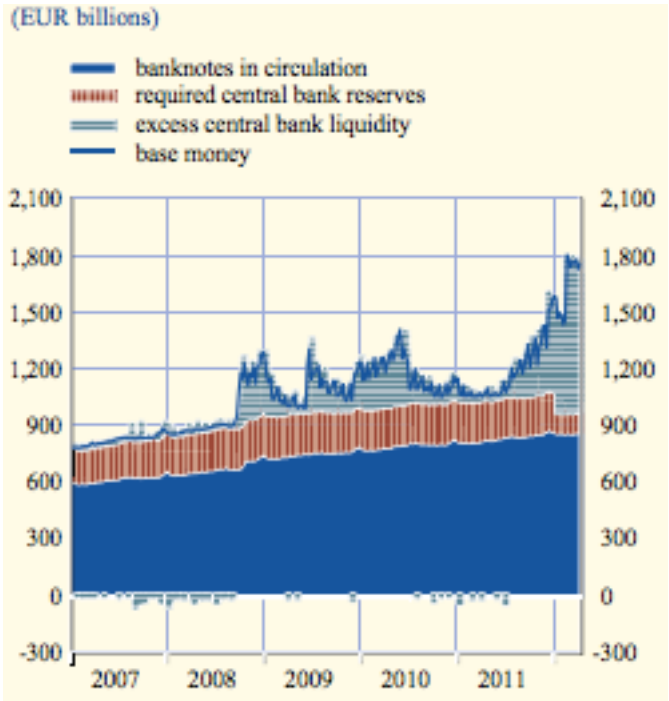

Figure 6 – Base Money in the Euro Area, Source: ECB

In our banking system, unlike currency which is created by Central Banks, bank deposits are mostly created by the commercial banks when they lend money to their customers. This is due to the Fractional Reserve Banking system in which most of the banks in the world operate. In a Fractional Reserve Banking system, deposit-taking financial institutions like banks, are required to keep as a reserve only a small fraction of all the money deposited with them. The money that has been deposited in the bank is used to originate loans for new customers who need financing. The fact that not all depositors will demand their money at once is the main reason why Fractional Reserve Banking is possible.

The following table shows how an initial deposit of $100 USD generated, in fact, $468,5 USD after a few transactions, creating $368.5 out of new money through loans, assuming a 10% reserve requirement rate.

Bank	Deposit	Reserve	Loan
Bank #1	$100	$10	$90
Bank #2	$90	$9	$81
Bank #3	$81	$8.1	$72.9
Bank #4	$72.9	$7.3	$65.6
Bank #5	$65.6	$6.6	$59
Bank #6	$59	$59	$0
Total	$468.5	$100	$368.5

Table 1 – How Fractional-reserve banking works, Source: Canadian Banks

This additional $368,5 USD created by commercial banks enter into the economy, expanding money supply. This effect is known by many economists as Money Multiplier effect.

2.1 – Quantitative Easing, QE

The first monetary policy experiment, which is now effectively known under the name of "quantitative easing", finds its roots in the dramatic situation of faltering growth that the Bank of Japan had to face in 2001.

In exceptional circumstances, when interest rates are at their effective lower bound, money creation and spending in the economy may still be too low to be consistent with the central bank's monetary policy objectives (Mcleay, Radia, & Thomas, 2014). Thus, to avoid the risks of an economy falling into a liquidity trap where people have no incentive to invest and instead hoard money, central banks oftenly use Quantitive Easing as a more effective policy tool compared to open market operations. Instead of buying government securities, the central bank can purchase other securities in the open market outside of government bonds.

Conceptually, open market operations and QE may seem to be the same, because in both cases the central bank is purchasing assets from banks using the money it has created. In practice, the difference between these two operations is significant, in scale, frequency, asset composition, maturities, and motivation. We might say that while open market operations are a scalpel, QE is more like a sledgehammer. In QE, the central bank buys short–dated government bonds, just like under open market operations, but also engages in a broader ranged purchase of assets, including longer–dated securities and even non-government assets, such as corporate bonds. In general, open market operations tend to be more frequent, involve much smaller amounts and shorter maturity assets than QE. The motivation between open market operations and QE also differs. In the former, the explicit objective is to fine tune the quantity of money supplied to the economy, while QE is presented as a way to stimulate the economy and as a means of emergency to directly support the government. It should also be noted that QE is a very recent invention compared to open market operations.

In the following figure, the theory behind QE is exposed.

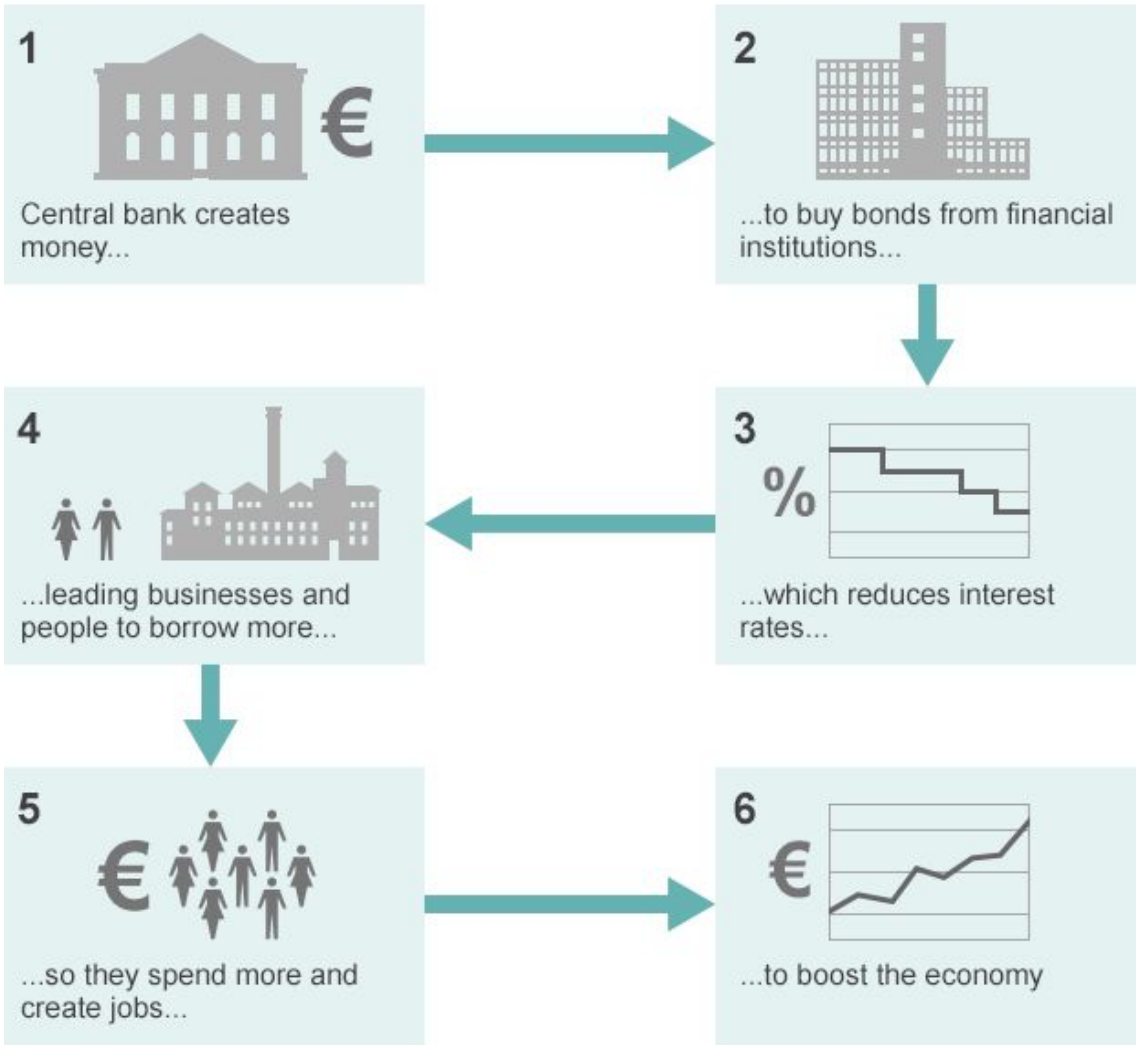

Figure 7: Quantitative Easing: The Theory, source: BBC

Under QE, a central bank creates money and uses it to purchase financial assets from private investors such as banks, pension funds, and insurance companies. This process is electronic and does not involve printing banknotes: the central bank creates money by increasing the credit on its own account. This process works through various transmission channels:

• by announcing large-scale asset purchases, the central bank signals to market participants its commitment to keep interest rates low in the future (because if it chooses to increase them, the price of the bonds it purchased will fall and it will have to bear significant losses on them);

• the low interest rates prompt investors to look for better yields on government bonds elsewhere, which in turn should contribute to lowering the value of the domestic currency and boost exports;

• by purchasing a large quantity of assets held by insurance companies and pension funds, the central bank encourages them to rebalance their portfolios into riskier assets, such as corporate bonds or stocks.

This, then, stimulates expenditure by increasing wealth and lowering borrowing costs. By purchasing assets from the banks, the central bank provides them with extra money; given that, at the moment it costs banks to deposit money in the central bank they should, in principle, use the extra amount available to finance more loans. (Delivorias, 2015).

Nonetheless, it is important to mention that when Central Banks use QE to buy governmetal bonds such as from the pension funds, it can not be said that this extra money has no costs associated for the commercial banks where this money is deposited. This is one of the misconceptions regarding QE.

In the following example, the pension fund receives money in their bank accounts in exchange for those government bonds. The commercial bank simply act as an intermediary to facilitate the transaction between the central bank and the pension fund. The additional reserves are simply a by-product of this transaction. While banks do earn interest on the newly created reservees, the key point is that QE also creates an accompanying liability for the bank in the form of the pension fund's deposit, which the bank will itself pay interest on. In this sense is not free money.

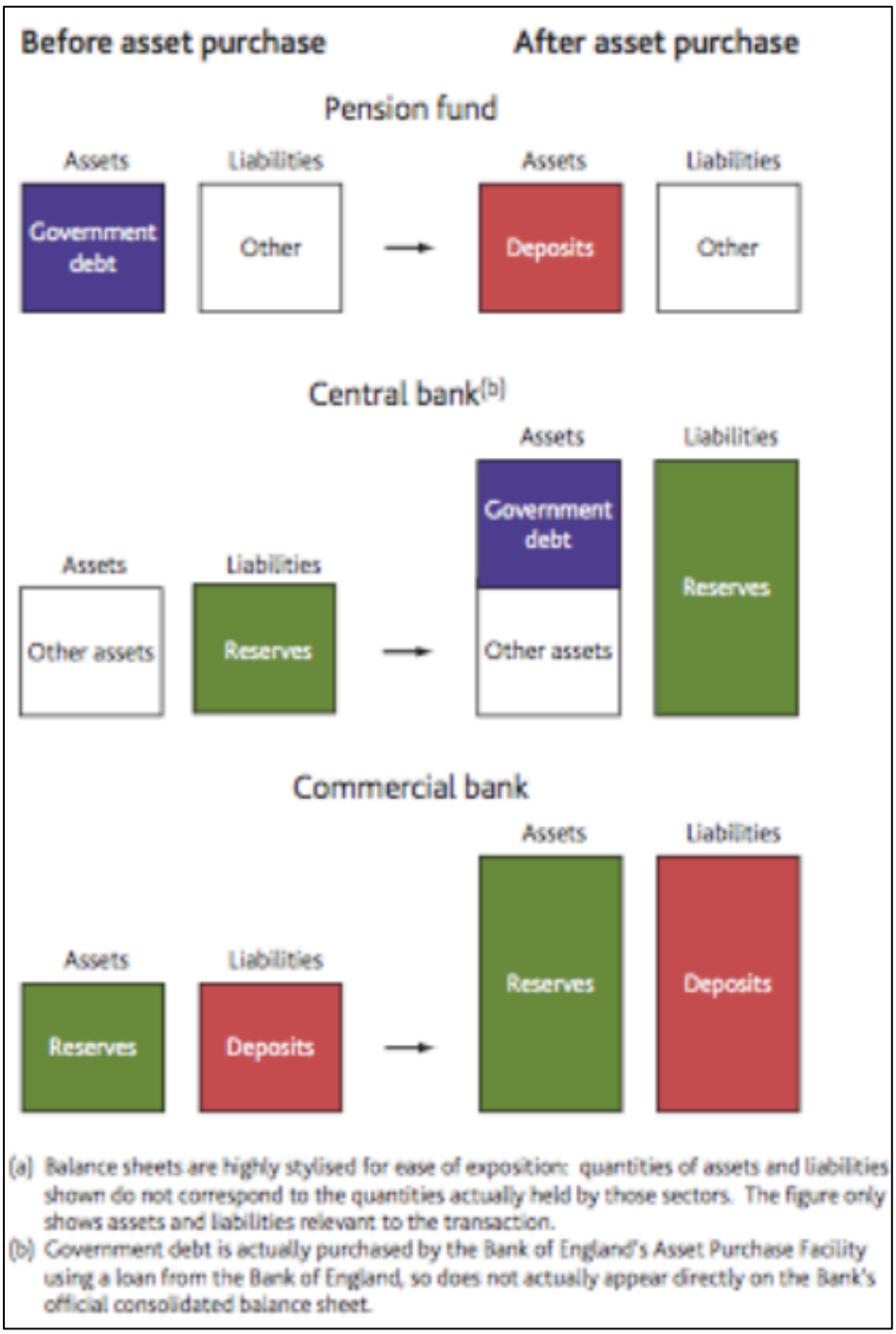

Figure 8 – QE Impacts on balance sheets, Source: BOE

Starting from the fact that QE increases reserves – these reserves are then multiplied up into additional loans – money multiplier theory of monetary policy.

However, banks connot lend those reserves directly to households and companies. They have to make additional loans and matching deposits. The

simple fact of banks having more reserves will not materially affect their incentive to make lots and lots of additional loans to households and companies in the way the money multiplier mechanism would suggest. QE affects the economy manily through the extra bank deposits that pension funds and other asset managers end up holding. Those asset managers will use those deposits to buy high yielding assets, such as bonds and equities that companies issue. That will raise the value of those assets and lower the cost to companies of borrowing using those instruments. That's the key way in which spending in the economy is affected. But that could also mean that QE might reduce bank borrowing if companies use some of the funds raised by issuing bonds and equities to repay some of their bank loans (Mcleay, Radia, & Thomas, 2014).

Some results from the US, UK and Japan

The results of QE programmes in major economies have been mixed. In the Appendix, it is reported empirical evidence on the broader economic effects of QE programs undertaken by the FED and the ECB in their respective economies and not just the impact on interest rates. Visual comparison between the conditional forecasts for the key economic indicators under QE scenario and no-QE scenario are provided, where it is possible to compare the actual path of the economic indicator with the baseline forecast for the variable under the QE scenario, and the counterfactual forecast for the variable under the no-QE scenario. The results are from the book "Quantitative Easing and Its Impact in the US, Japan, the UK and Europe" from Kjell Hausken and Mthuli Ncube (2013).

In 2014, researchers from the Bank of England found that asset purchases have a statistically significant effect on real GDP, with purchases amounting to 1% of GDP leading to a rise of 0.36% in real GDP and of 0.38% in the consumer price index for the United States, and a rise of 0.18% in real GDP and of 0.3% in the consumer price index for the United Kingdom. In Japan, however, although QE contributed to the reduction in longer-term interest rates, aided weaker Japanese banks and encouraged greater risk-tolerance in the financial system, it did not contribute to raising inflation

and, in addition, the resulting depreciation of the yen did not have the expected effect on exports (Delivorias, 2015).

The Euro Area Program

Since the advent of the financial crisis, the ECB embarked on Quantitative Easing on a regular basis. The following picture indentifies a set of key announcements.

No.	Date	Program	Event	QE-related announcement	Outcome
1	March 28, 2008	LTRO	GC Press release	GC decides to conduct supplementary longer-term refinancing operations with a maturity of 6 months	QU
2	October 15, 2008	LTRO	GC Press release	GC decides to conduct all refinancing operations with a fixed-rate tender procedure and full allotment. The list of assets eligible as collectoral is expanded	QU
3	May 7, 2009	LTRO/ CBPP	GC Press release	GC decides to conduct longer-term refinancing operations with a maturity of 12 months, and to purchase euro-denominated covered bonds issued in the euro area	QR
4	June 4, 2009	CBPP	GC Press release	GC releases the technical modalities of the €60 billion covered bonds purchase programs	QR
5	May 10, 2010	SMP	GC Press release	GC decides to conduct interventions in the euro area public and private debt securities markets	QU
6	June 30, 2010	CBPP	GC Press release	The purchases of €60 billion in covered bonds are fully implemented. The Eurosystem central banks intend to keep the purchased covered bonds until maturity	QU
7	October 6, 2011	CBPP	GC Press release	GC decides to launch a new covered bonds purchase programs with an intended amount of €40 billion	QU
8	November 3, 2011	CBPP	GC Press release	GC releases details of the new covered bonds purchase programs. Covered bonds to be purchased under the new program must have a maximum residual of 10.5 years	QR

9	December 8, 2011	LTRO	GC Press release	GC decides to conduct LTROs with a maturity of 36 months, and further expands eligible collectoral	QR
10	August 2, 2012	OMT	ECB Press confer-ence	Draghi indicates the expansion of sovereign debt purchases	QU
11	September 6, 2012	OMT	GC Press release	GC introduces outright monetary transactions with no ex-ante time or size limit	QL

Notes: LTRO represents longer-term refinancing operation; CBPP represents covered bonds purchase programs; SMP represents securities markets program; and OMT represents outright monetary transaction. ECB and GC are the European Central Bank and its Governing Council, respectively. QL, QU, and QR represent lowered, unchanged, and rising interest rates around QE-related events, respectively

Figure 9 : Key events QE-related in the Euro Area, Source: (Hausken & Ncube, 2013)

It is worth noting that assets purchased by the ECB under its SMP (securities market program) and OMT (Outright Monetary Transactions) are sterilized and directed to adddress the malfunctioning of securities markets, and thus do not increase the monetary base. Therefore, the unconventional monetry policy measures, such as SMP and OMTs, do not fall under the usual definition of QE.

On 22 January 2015, the ECB launched a new QE programme, called Expanded Asset Purchase Programme (EAPP). The ECB is commited to revive the euro are economy by creating new money to purchase euro-denominated, investment-grade securities issued by euro are government and European Institutions. The programme is expected to have a positive impact on the economy's growth and to raise inflation, bringing it back to the desired level of lower than but close to 2% which is the primary objective of the ECB – maintain price stability that is 'a year-on-year increase in the harmonised index of consumer prices (HICP) for the euro area of below 2% (European Central Bank).

Under the EAPP, the ECB will add the purchase of 'euro-denominated investment-grade securities issued by euro area governments and European institutions' to its existing purchase programmes. The combined monthly purchases under the three programmes will amount to €60 billion. (Delivorias, 2015)

2.2 The Special Drawing Rights as "International Currency"

Mentioned before as part of the IMF history, the Special Drawing Rigths remain quite unkown withing the public sphere. A few years after the creation of the SDRs, the Bretton Woods system collapsed and the major currencies shifted to floating exchange rate regimes. A country participating in the system needed official reserves – government or central bank holding of golds and widely accepted foreign currencies – that could be used to purchase its domestic currency in foreign exchange markets, as requires to maintaining its exchange rate. However, gold and the U.S. dollar proved to be inadequate for supporting the expansion of world trade and financial flows that was taking place. Therefore, the international community decided to create the SDRs in 1969 as a supplementary international reserve asset under the auspices of the IMF.

The SDR is not a currency, nor a claim on the IMF, but is potentially a claim on freely usable currencies of IMF members. Its status as a reserve asset derives from the commitments of members to hold, accept, and honor obligations denominated in SDR. The SDR also serves as a unit of account of the IMF and some other international organizations.

Thereby, SDR is an interest-bearing international reserve asset based on a basket of international currencies comprising the U.S. dollar, Japanese Yen, Euro, Pound Sterling and most recently the Chinese Renminbi. The SDR currency value is calculated daily and the valuations basket is reviewed every five years. Here is its valuationa in August 1st, 2017:

Tuesday, August 01, 2017				
Currency	Currency amount under Rule O-1	Exchange rate [1]	U.S. dollar equivalent	Percent change in exchange rate against U.S. dollar from previous calculation
Chinese Yuan	1.0174	6.72510	0.151284	0.118
Euro	0.38671	1.18130	0.456821	0.686
Japanese Yen	11.900	110.45000	0.107741	0.113
U.K. Pound Sterling	0.085946	1.32125	0.113556	0.674
U.S. Dollar	0.58252	1.00000	0.582520	
			1.411922	
		U.S.$1.00 = SDR	0.708254 [2]	-0.296 [3]
		SDR1 = US$	1.411920 [4]	

1 The exchange rates for the Japanese yen and the Chinese renminbi are expressed in terms of currency units per U.S. dollar; other rates are expressed as U.S. dollars per currency unit. Chinese renminbi refers to the name of the currency, while Chinese yuan refers to the currency unit.
2 IMF Rule O-2(a) defines the value of the U.S. dollar in terms of the SDR as the reciprocal of the sum of the equivalents in U.S. dollars of the amounts of the currencies in the SDR basket. Under current IMF procedures, each U.S. dollar equivalent is calculated on the basis of the mid-market rates, as provided to the IMF by the Bank of England, based on spot exchange rates observed at around noon London time; the value of the U.S. dollar in terms of the SDR is rounded to six significant digits. The Federal Reserve Bank of New York and the European Central Bank serve as backup providers for these exchange rates.
3 Percent change from previous calculation.
4 The reciprocal of the value of the U.S dollar in terms of the SDR, rounded to six significant digits.

Figure 10: SDRs Value, August 1st 2017, Source: IMF

The SDR interest rate is determined weekly on each Friday and is based o a weighted average of representative interest rates on 3-month debt in the money markets of the 5 currencies constituents of the SDR basket. In net terms, members receive interest at the SDR interest rate on the amount that their holdings exceed their cumulative allocations. Conversely, if a member's SDR holdings are below its allocation, it incurs a net interest obligation. Interest on SDR holdings and allocations are received and paid quarterly.

General allocations of SDRs to participants (currently, all members of the IMF) are proportional to their quotas in the IMF. An SDR allocation represents in fact a low cost way of addding to members' international reserves, allowing members to reduce their reliance on more expensive domestic or external debt for building reserves. Members can exchange SDRs for freely usable currencies among themselves and with prescribed holders; such exchange can take place under a voluntary arrangement or under designation by the Fund. IMF members can also use SDRs in operations and transactions involving the IMF, such as the payment of interest on and repayment of loans, or payment for future quota increases. General allocations of SDRs should "meet a long-term global need to supplement existing reserve assets in a manner that will promote the attainment of the IMF's purposes and avoid economic stagnation and deflation, as well as excess demand and inflation".

Following the Financial Crisis of 2008, the general SDR allocation of August 28, 2009 is by far the biggest allocation to date, bringing total cumulative allocations to about 204 billion SDRs - equivalent to about $318 billion U.S. dollars. (Appendix V: Table SDRs Holdings vs Allocations for all members as of July 31, 2017)

SDRs allocations have occurred as following:

- **1970-72** – 9.3 billion SDRs were allocated in yearly installments
- **1979-81** – 12.1 billion SDRs were allocated in yearly installments
- **August 29, 2009** – 161.2 billion SDRs allocated (around $250 billion U.S. dollars)
- **September 9, 2009 -** a special one-time allocation of 21.5 billion SDRs

The general allocation of $250 billion U.S. dollars implemented on August 28, 2009 was the response to the call by the G-20 Heads of State and the IMF's International Monetary and Financial Committee (IMFC) at their respective meetings in April 2009. These allocations in 2009 have clearly shown that world leaders are able to cooperate and act with urgency when they face the challenges of a global financial crisis. These allocations represent a prime example of a global cooperative monetary response.

We might thing about the consequences of these allocations mainly concerning to inflation. According to the IMF it is "not likely" that SDR allocation would be inflationary since the size of the allocation is small relative to global GDP (around $^{1}/_{3}$ of 1%), trade (less than 1%), and reserves (3%). Nevertheless, a 42-page IMF paper published in January 2011 called "Enhancing International Monetary Stability – A role for the SDR?" suggests "a multiyear, multistep plan to position the SDR as the leading global reserve asset". The truth is that, if boiled down to its essence, the SDR is a kind of super money printed by the IMF and then circulated among central banks and governments. (Rickards, 2014) Indeed, the IMF has issued SDRs three time since their creation, 48 years ago.

3. CHANGING THE PARADIGM

Bill and Melinda Gates Foundation is a success story towards changing the paradigm. The foundation's trust endowment of $43.5 billion U.S dollars makes grant payments in excess of $3 billion every year. Its focus has been on bridging the enormous health deficit between rich and poor countries and on fights it sees as vast, but ultimately winnable. Among its goals are the eradication of malaria and polio, and controlling the spread of tuberculosis and HIV.

Investor Warren Buffet joined the foundation as a trustee in 2006 with a $30 billion pledge. In total, the fund has given $32.9 billion in grants to health programmes around the world. Its work focusses on prevention, immunisation and vaccination.

Since the turn of the century, partly thanks to the work of the foundation, four countries have eradicated malaria. Mortality from the disease has dropped 42% in that time. In 2014, after a massive coordinated effort between the Indian government, the Gates Foundation and Rotary International, India announced it was officially polio-free. The programme employed 2 million vaccinators who spread out across the country. Just five years before, India had more than half the world's polio cases. (Gates Foundation, 2017) It was "the greatest global health achievement I have ever witnessed", said Bill. The foundation now aims to eradicate polio worldwide by 2018.

Gates Foundation is a remarkable example of Philanthropy achieving astonishing results. Funds come mostly from "private initiatives, for the public good, focusing on quality of life". We might wonder what results could Gates Foundation provide with 3, 5 or 10 times more of the actual annual budget.

However, Bill Gates has shown not enough reasons to celebrate. At the most recent annual letter, he stated: "It is fair to ask whether the progress we're predicting will be stifled by climate change. The most dramatic problems caused by climate change are more than 15 years away, but the long-term threat is so serious that the world needs to move much more aggressively – right now – to develop energy sources that are cheaper, can deliver on demand, and emit zero carbon dioxide…"

It is widely consensual among the cientific communtity and others that a sustainable future is only possible if we can limit global warming to 2ºC. To achieve this goal, an estimated $1,000bn USD[3] need to be invested annually in developing climate-friendly renewable energy production. However, it is quite certain that this funding goal would never be achieved only with private money.

A way of financing and providing sums of billions of dollars to the GCF could be with the involvement of public money and thus, the central banks. They can never become insolvent in their own currency due to their monopoly of issuing the legal tender – even if they purchase non-performing assets. The economic potential of central banks was witnessed during the bank bailout, leaving no apparent reason why they should not contribute to saving the climate with a fraction of the funds previously used. In order to do this, central banks would continue doing what most of them are currently doing to combat the effects of the financial crisis: Buying bonds to create new liquidity (Kroll, 2015).

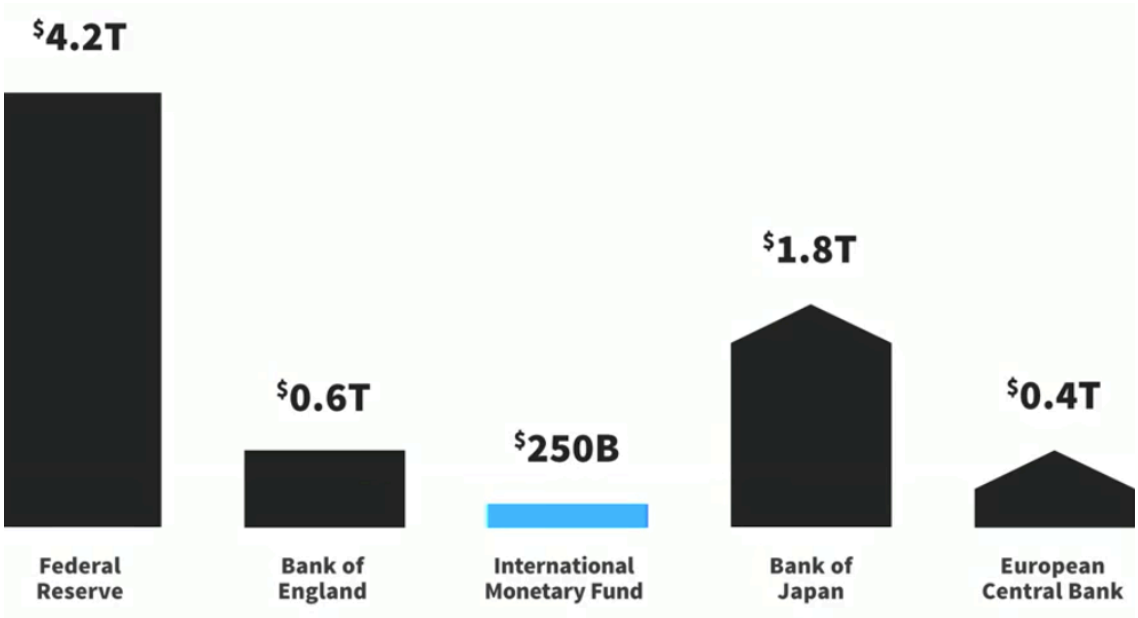

Figure 11: Saving Global financial system after 2008 crisis, Source: Bloomberg

[3] The sum of 1 tn $ is required to achieve the 2 degree target'. Cf. Figueres, Christina in the Guardian of 14/1/2014.

As the previous picture indicates, to respond to the Financial Crisis of 2008, in the subsequent years major Central Banks have created around $7 trillion U.S. dollars under their Quantitative Easing programs and, the IMF created more that $250 billion U.S. dollars worth of SDRs. Back then, policy makers and world leaders, when facing a global treath were able to act collectively, with urgency, and run the risks of unconventional policies.

Banks were "too big, too fail" and they still are. The U.S. Treasury Department has invested about $200 billion in hundreds of banks in 2008 and 2009 through its Capital Purchase Program in an effort to prop up capital and support new lending. As for the Europena bank bailouts, here are the numbers:

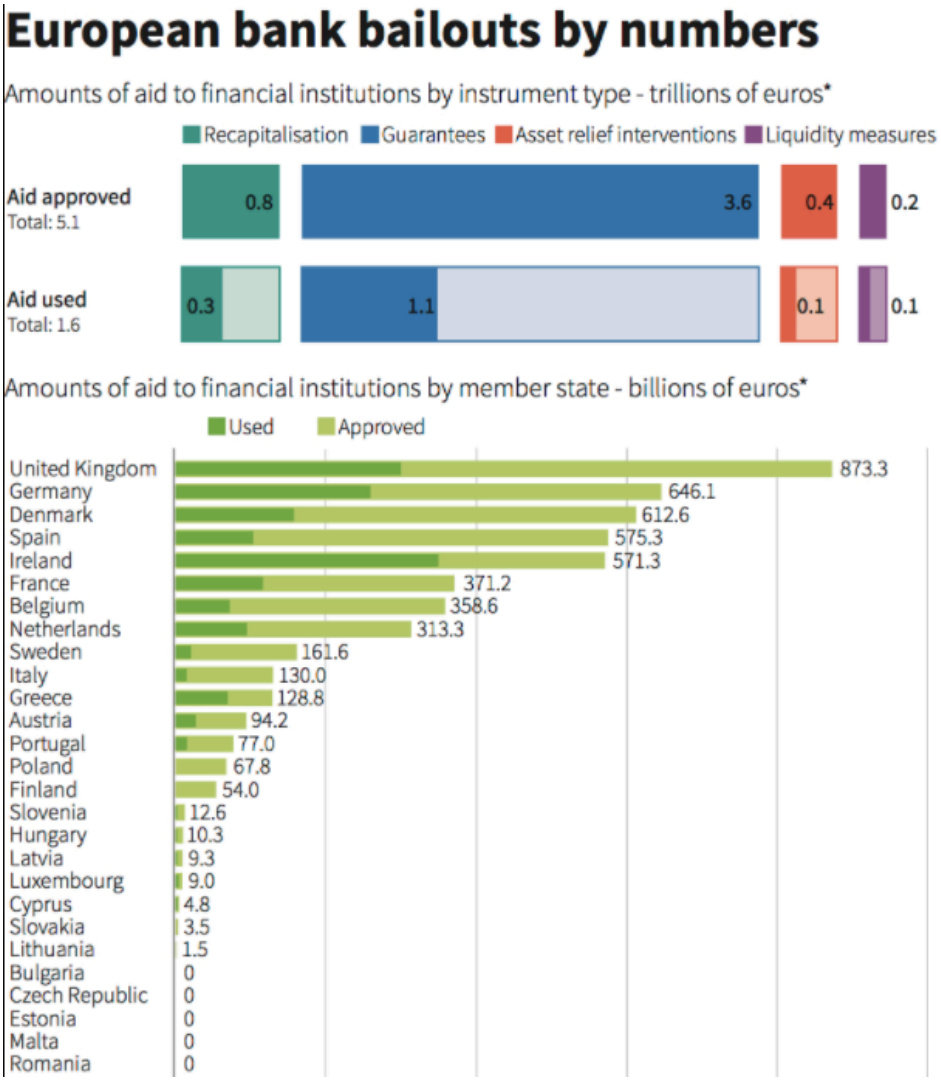

Figure 12: European Bank bailouts by numbers, Source: European Comission State aid Scoreboard, 2012

3.1 The Green Climate Fund, GCF

The UNFCCC (United Nations Framework Convention Climate Change) has previously created various funds to address climate change. These include the Least Developed Countries (LDC) Fund, the Adaptation Fund, and the Special Climate Change Fund. While these previous funds are still operational, most attention has now been given to the Green Climate Fund.

The Green Climate Fund was first mentioned in 2009 as the "Copenhagen Green Climate Fund" following the 15th United Nations Climate Change Conference (COP-15), also known as the Copenhagen Summit. Nonetheless, it was in Cancun (COP-16), in 2010 that the GFF was formally established. In 2011 during the COP-17 in Durban, its governing instrument was approved, and the GCF is launched with its headquarters in Songdo, in the Republic of Korea.

When the Paris Agreement (COP-21) was reached in 2015, the GCF was given a major role in serving the agreement due to its mission: "to advance the goal of keeping the temperature increase on our home planet below 2 degrees Celsius" (GCF, 2017).

The Fund is, in fact, a unique global initiative, set up by 194 countries, to tackle climate change by investing into low-emission and climate-resilient development “to limit or reduce greenhouse gas emissions in developing countries, and to help adapt vulnerable societies to the impacts of climate change” (GCF, 2017).
The GCF aims to deliver equal amounts of funding to mitigation and adaptation, from both public and private sectors to, in particular, the Least Developed Countries (LDCs), Small Island Developing States (SIDS), and the African States.

The innovation of this fund comes from the use of public investment to stimulate private finance. These funds come mostly from developed countries, but also from some developing countries, regions, and one city - Paris. Last year, 2016, marked the first full year of operation of the GCF with a project portfolio of 35 projects, worth

over USD 1.5bn by the end of the year, to be implemented by its 48 partner organizations, know as Accredited Entities.

Resource Mobilization

Following the promises of concerning the GCF, advanced economies have formally agreed to jointly mobilize $100 billion USD per year by 2020, from a variety of sources, to address the pressing mitigation and adaptation needs of developing countries. Governments also agreed that a major share of new multilateral, multi-billion dollar funding should be channeled through the Green Climate Fund. At the G7 Summit in June 2015, leaders emphasized GCF's role as a key institution for global climate finance (Green Climate Fund, 2017).

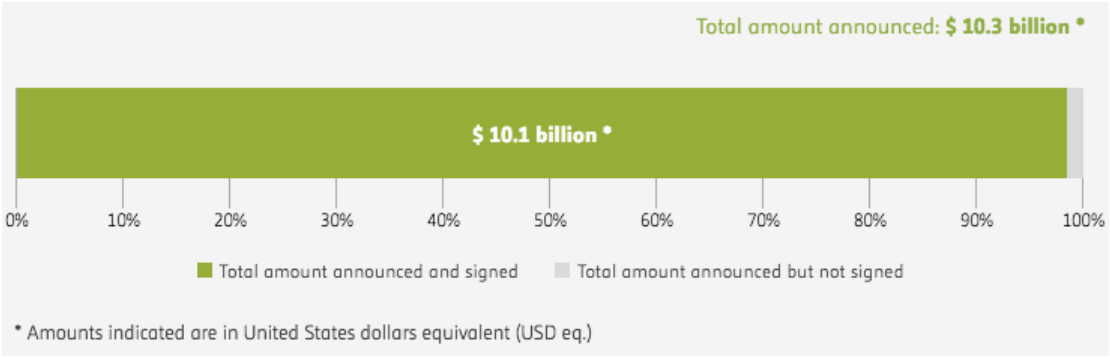

Figure 13 - GCF Resource Mobilization until now, Source: GCF

As of June 2017, the Green Climate Fund has raised $10.3 billion USD equivalent in pledges from 43 state governments. The objective is for all pledges to be converted into contribution agreements within one year from the time at which they are made. In the Appendix it is shown which countries have mobilized resources into the GCF as well as the total amount of contributions announced and signed. Nonetheless, the contributions are substancially far from what was promised.

3.2 Financing the GCF – Green QE

The GCF was created with a very ambitious goal. However, achiving the amount promised of “new and additional” $100 billion USD per year by 2020 seems to be difficult in a world where climate change is not understood as a major threat nor a primary cause for monetary contributions. However, assuming that the GCF manages to obtain a sum close to the promised $100 billion USD, one main question remains: what is the likelihood of receiving $100 billion USD each year in the form of non-repayable grants (and not largely in the form of loans as a recent OECD report assumed).

Thus, to finance the Green Climate Fund, central banks would need to buy "Green Climate Bonds" issued by the GCF. This means a shift in the strategy of their Quantitative Easing program which is translated into financing concrete investment projects through the GCF, rather than investing in government or corporate bonds. Thus, the monetary policies of the central banks would benefit from this new liquidity to finance real production instead of simply purchasing existing financial assets”. (Kroll, 2015) Instead of “QE for the banks”, “QE for the climate”.

Green Climate Bonds

When issuing the Green Climate Bonds, it is necessary to define the caractheristics of theses type of bonds. Green Climate Bonds should have a duration of at least 100 years (ideally perpetual) and would only bear small, if any, interest rates. Due to their very long term, Green Climate Bonds would become permanent assets of the central banks and thus form the foundation of regular money creation. This would ensure that the GCF is at the receiving end of new and virtually non-repayable money, with which it can increase the profitability of many existing climate protection investments. Likewise, it is now possible to finance adaptation and mitigation measures that result in no immediate economically exploitable yield. In this case, the participation of private investors would have to be excluded (Kroll, 2015).

Thus, **Zero coupon perpetual bonds'** (ZCPBs) would be the appropriate form of bond for financing the GCF. These bonds never need to be reimbursed and it only makes sense if the Central Banks are the ones buying these bonds once they have little or no commercial profitability. For global projects like climate finance, it should also be possible for the Central Banks to buy ZCPBs from another organization rather then only from the GCF in order to increase the amount spent globally in a less polarized way.

If the ECB acquires $50bn USD annually on Green Climate Bonds, it represents approximately $4bn USD montly – a small amount compared to the €60bn euros the ECB is currently investing in monthly bonds. Thus, $100bn USD annualy of contributions for the GCF is easy to imagine when more Central Banks are involved in the system. With more involvement, the potential to increase the $100bn USD promised per year is huge. But even if the central banks stop their large-scale purchases of a diverse range of bonds, $100 or 300 billion could easily be found within the regular money creation process. Ideally, all UNFCCC member states and their central banks should be involved in this new Green Climate system. The financing via Green Climate Bonds could also be initiated through the participation of a relevant number of members. The advantage for states participating in the bond purchases would be that Climate Bonds purchased by their central banks would count towards their promised share of the $100 billion, without having to invest their own budget funds. For the real economy, such additional demand would not lead to inflation since it will be globally distributed. Even if new money creation succeeds in stimulating total investment and thus an additional demand of $1,000 billion, this would be a small stimulus package rather than an inflationary risk when seen in relation to the global economic output of around $78,000 billion dollars.

To meet additional demand for money and inject it into the economy, central banks give, usually very short term-credit to banks or buy government or private bonds of differing maturities from them. During ordinary economic times there is likely to be nominal monetary expansion and growth in central bank assets. Central banks can afford to additionally include very long-term bonds in their balance sheets without it constraining their (monetary) room for manoeuvre. This means that it is possible to integrate the purchase of long-term Green Climate Bonds into the money creation

process without it requiring a fundamental change of central bank policy. The current independency of central banks would not be affected by such a new "QE for climate" programme (Kroll, 2015).

Assuming future, nominal, global growth will average 5%, the yearly global growth of the money supply must also be around 5% to avoid restrictive effects on the real economy. The two biggest central banks, the US Federal Reserve and the ECB, could (with $5 trillion USD as their total monetarily effective balance sheet total and a long-term money creation requirement of 5%) potentially create $250 billion USD per year without causing inflation and use this to finance (i.e. buy) long-term bonds of the Green Climate Fund. As the dollar and euro currency zones together account for only 36% of global GDP, the total sustainable money creation potential of all central banks can be estimated at $700bn. (Kroll, 2015) The purchase of Green Climate Bonds for the assumed total of $300bn would still give central banks enough scope to continue their normal monetary operations with the policy measures already in use. A buffer of approximately $400bn dollars could be created to offset possible shortfalls on the part of other central banks. As shown by the massive interventions by central banks during the financial crisis, central banks can expand their balance sheets with once-off purchases of assets of all types - without relevant negative consequences. This means that a once-off purchase of Green Climate Bonds, exceeding the usual extent of monetary expansion, would be possible. This money could be used as start-up financing for many climate protection projects

Green Climate Bonds as a new monetary tool of central banks

When Central Banks buy new Green Climate Bonds, and record this in their balance sheets, they also gain a new monetary policy tool. The advantage of this new tool is that it leads directly to the purchase of new goods and services. The real global economy is thus stimulated without a need for the usual detour of credit creation by private banks. This means that no new debtors and creditors need be found. The new money is created, debt-free.

Banks would reduce their reserves at the central bank, which they do not need to refinance credit creation, and thereby reduce the money supply, because of the

endogeneity of the money supply. The Bank of England has recently identified this as the correct description of monetary policy practice.
The effect of the endogeneity of the money supply is especially important when central banks buy more Green Climate Bonds (for a short period of time as start up financing) than needed for actual money creation.

What distinguishes the new Green Climate Bonds from ordinary bonds?

An ordinary bank or an institutional investor who buys a bond wants to earn interest and be repaid the capital in full at maturity. The business model using ordinary bonds can work in a market economy only if the issuer of bonds can generate that interest and the repayments due in the real economy. Because Green Climate Bonds are not actually repaid and do not yield interest, the only feasible buyers are central banks.
Due to their right to issue legal tender (in their own currency), central banks cannot become insolvent and remain capable of acting even if they have negative capital. When a central bank purchases bonds, it does not do that to earn interest, but to provide the seller of the bond with money and thus boost liquidity in the economy. Thereby, the central bank fulfils the function as issuer of legal tender. (Kroll, 2015)

The Green Climate Finance System: How do the new financial streams flow?

To involve the central banks in the financing of the required $100bn, a new Green Climate Finance System is needed. This entails the participating member states of the UNFCCC allowing their central banks to invest in bonds of the GCF on a long-term basis. It is unnecessary that all member states of the UNFCCC take part. The more states take part in the Green Climate Finance System, the larger the sum available.

An important incentive for UNFCCC members taking part would be that the bonds (purchased by their central banks) would be recorded as funding for the GCF. A government taking part in this system could therefore fund the GCF without using its own budget. It would also be sensible to have an agreement (between central banks taking part in the system) to recognise Green Climate Bonds as tender between them.

In that way, exchange rate fluctuations could be reduced whenever demand for specific currencies and corresponding buying central banks do not coincide. (Kroll, 2015) The Green Climate Finance System at work before the GCF sells these new Green Climate Bonds to central banks, it needs to determine which climate protection projects are to be funded - and to what extent. Only then can it be known which currencies will be needed. When this is established, the GCF sells new Green Climate Bonds of this amount to the respective central banks. The central banks record the new bonds in their balance sheets and issue the new currency to the GCF. The funding of projects will normally be distributed among several central banks.

The most predictable source of opposition to green QE is the fossil fuel lobby: big oil, gas, and coal. These companies have built their businesses on the basis of maximum extraction of fossil fuels. Rather than diversify and move on, their instinct is to oppose any measures which would decarbonise the economy. Anyway, the arguments in favour of green QE are getting stronger and stronger as climate change becomes a greater threat.

What is needed above all is a determination to take some political control over the finance system. There is absolutely no need to accept that banking and the creation of money are matters which have to be left to the private sector, when they are so crucial to the functioning of the whole economy, and when they have recently gone so badly wrong. This lesson was learned by policy makers who introduced QE but they have not used that power strategically and, the money they have created has not provided useful investment and has increased inequality. Thus, Green QE would respond to both crises: the crisis of climate destabilisation, and the after-effects of the 2008 financial crisis. Green QE is a practical plan to tackle both finance and the global environment together. It does not represent a financial innovation but a policy innovation and by doing so, it would create a more stable, secure and prosperous world.

3.3 Financing the GCF: Green Special Drawing Rights

Another solution to tacke climate change would involve the IMF and its Special Drawing Rights. Whereas "Green QE" does not necessarily require an involvement of all central banks, for issuing Special Drawing Rights, it requires a global agreement among all 189 IMF members.

The case for using SDRS, the reserve asset issued by the IMF, for development purposes and the provision of global public goods has originally been made by Soros (2002) and Stiglitz (2003), with the aim of transferring unused SDRs from industrial countries to global funds and to countries in need of development assistance. This proposal has been revived at the 15th Conference of Parties (COP) of the UNFCCC held in Copenhagen in 2009 where George Soros suggested using SDRs to create a global "green fund". (Erten, 2012)

However, what is proposed in this thesis does not aim the unused SDRs since it would be quite arduous to design such proposal without having clear understanding of each country's reserves management and strategy. The intention is to support financing facilities such as the Green Climate Fund by establishing a financing tool that uses the ability of the IMF to create new international reserve money in the shape of SDRs.

"If the IMF can combat the financial crisis with newly created money, why can it not respond to the challenges of climate change in the same way?"

Because SDRs are not accepted as a medium of payment (only SDR members can exchange among themselves for freely usable currencies and, in operations and transactions involving the IMF) the Green Climate Fund would need to change the newly obtained SDRs into the required national currencies at the respective central banks. This means that creating new SDRs becomes a creation of new money in the equivalent national currencies.

This would involve a global agreement (all IMF members) towards a globally shared issue. The IMF member states can agree on the issuance of new SDRs to themselves

(proportionate to their quota shares) and, use the newly created SDRs and forward the majority to the Green Climate Fund. Thus, since majority of countries are currently confronted with huge deficits in their public budgets and are reluctant to spend money on long-term climate related issues, new SDRs can be the most effective solution to make sure that countries keep up with their promises regarding the GCF. The funding problem of the GCF is thereby solved at an international level by the only existing international organization that can create these necessary additional funds at once – the IMF – as previously proved following the financial crisis of 2008. In such a way, countries would not need to spend money coming out of their national budgets.

How can it be done?

The IMF member states could agree on a long-term plan which involves the issuance of new SDRs in every 5 years - when SDR currencies basket composition is reviewed by the Executive Board – to be distributed in yearly installments (as done already in in the first two allocations) with the commitment to channel the majority of the new SDRs to the GCF. The issuance of new SDRs to member states, as mentioned earlier, must be proportionate to their quota shares, which in turn is somehow proportional to the promises made by them to fund the GCF. A small portion (e.g. 10 to 20%) could be retained by the member states for the financing of specific climate protection projects. The amount of SDRs issued for this purpose would need to reflect the financing needs to tackle climate change and, that would be, ideally, $100 billion U.S. per year to support a global transition to renewable energy - as formally agreed by developed countries at the UNFCCC in Copeganhen, 2009.

The performance principle – that the new economic value and green jobs are created in the developing countries only by investing directly to renewable energy infrastructure projects - will be ensured by the GCF.

Concerns

The presented proposal woud be inevitably confronted with fears of inflation. However, it is important to keep magnitudes in mind. The total money supply (M2) of the world, converted into U.S. dollars at market exchange rates, amounted at the end

of 2009 to approximately $45 trillion U.S. dollars. Thus, the allocation of $250 billion U.S. dollars worth of SDRs in 2009, if converted entirely into domestic currencies, increased the world money supply by only 0,55%, approximately. (Cooper, 2011) Considering only the M2 in July 2017 of the Euro Area plus the U.S.A, converted into U.S. dollars at market exchange rates, $500 billion U.S. dollars worth of SDRs would increase M2 by less than 2%. Additionaly, an important argument on the risks of inflation is that most of newly created SRDs would go for developed countries, according to the IMF quotas, and then, those SDRs would be spent in developing countries - the countries more vulnerable to the effects of climate change. Thus, it is possible to predict that the inflationary results of such policy would be barely visible.

Another concern would come from the U.S. Authorities, fearing that the dollar would lose its dominant position as a reserve currency. According to the IMF 2016 report, claims in U.S. dollars represent around 50% of the Total Foreign Exchange Reserves. In order to avoid theatening U.S. dollar's dominant position, IMF member states could agree on a rule that SDRs would never represent, for example, more than 5% of the Total Foreign Exchange Reserves. The existing SDRs, worth of $318 billion U.S. dollars, represented in the end of 2016 less than 3% of the Total Foreign Exchange Reserves. Even applied this rule, with the constant growth of world's reserves, it gives margin to a regular issuance of SDRs.

One last concern arises from an uncontrolled issuance of SDRs. This concern can be easily mitigated since, contrary to quantitative easing, the issuance of new SDRs involves a global agreement among all IMF members.

The possible advantages of such policy clearly offset all these concerns. Moreover, a controlled issuance of SDRs ("international currency") in order to tacke a globally shared problem could always serve as an experiment from which a valuable lesson could we learned. It does not represent a financial innovation, but a policy innovation that might be beneficial to everyone. If the benefits of this policy become clear to world leaders and policy makers, they could use the same policy to tackle other global issues such as the ones presented by the UN Millenium Development Goals and later on, under the UN Sustainable Development Goals.

CONCLUSIONS

This thesis has debunked the international financial system with the main challenge of proposing a sustainable monetary policy that could help countries meet their global goals. It is shown the importance of the Central Banks and the IMF on managing, stabilizing and even fixing the international financial system by the means of unconventional policies under the unconventional times of the Financial Crisis of 2008. Albeit the crisis has been surmounted, we are still living under unconventional times with respect to climate which is seen today as the world's greatest threat to humanity.

The fact that unconventional monetary policies are nowadays widely accepted - since they were largely applied in the most recent financial crisis - opened a window of opportunity to rethink about their uses as well as their porpuses. Financing the climate or any other global issue does not require a financial innovation, but a policy innovation.

Thus, in this thesis, it is suggested that Central Banks embark on Quantitative Easing to finance the Green Climate Fund and consequently, on low-emission and climate-resilient development with the goal of keeping temperature increase on our home planet below 2 degrees Celsius. It is shown that the best way to providing the promised billions of dollars to the Green Climate Fund involves either Central Banks or the IMF.

Central Banks would never become insolvent in their own currency due to their monopoly of issuing the legal tender – even if they purchase non-performing assets. Thus, to finance climate change, it is suggested that the Green Climate Fund issue bonds which would assume the characteristics of a Zero Coupon Perpetual Bond, with perpetual maturity and zero interest. The fact that these Green Climate Bonds are not actually repaid and do not yield interest, the only feasible buyers are in fact central banks. If the inflation consequences were barely felt during the financial crisis of 2008, under Green QE, it is even less likely to be a concern. The newly created

money would be invested globally, mainly on the most vulnerable countries to climate change.

The main finding of this thesis is that it is possible to draw monetary policies which can produce both great environmental and economical results. Not only Green QE, but also by the means of the IMF's Special Drawing Rights. Back in 2008, following the financial crisis, the IMF also adopted a "whatever it takes" commitment to monetary recovery, issuing $250 billion worth of SDRs to stem the collapse of the economy. In fact, issuing this "international currency" would bring more advantages than "printing" national currencies. First of all, everybody would be positively affected since climate change is a global threat and moreover, no one section of society benefits from the printing press over another (competing claims are mitigated). Most important, SDRs issuance is highly unlikely to get out of control since it requires many countries to agree to issue these extra SDRs. Anyway, if world leaders manage to fund the GCF with $250 billion U.S. dollars worth of SDRs, that would be 25 times more than what the fund has today and the results would surely be overwhelming.

Here is an example of what can be achieved with the right incentives. In 2009, Norway promised $1 billion U.S. dollars of its reserves to Brazil if they followed through on their goals on deforestation. That program has since delivered a 70% reduction in deforestation which means saving 3.2 billion tons of carbon dioxide emissions. That saving is equivalent of taking all American cars off the roads for three whole years. With hundreds of other pay-for-performance climate projects organized on a global scale, funded by the GCF, we would be able to make our planet green again.

Sadly enough, there is clearly a fear of printing money that is preventing world leaders and policy makers from embracing Green QE or Green SDRs, and yet those same leaders had no difficulty in creating money to save the capital markets back in 2008. Now they need to do it again to transform the economy, create green jobs, build green infrastructure and deliver hope to future generations – all by the mean of using money creatively.

Today, money-printing policies are widely accepted. That opens a window of opportunity for a collective, controlled global action aimed at a global good. Thus, the real question is not whether we can afford to fund climate change. The real question is: will world leaders and policy makers **do whatever it takes?**

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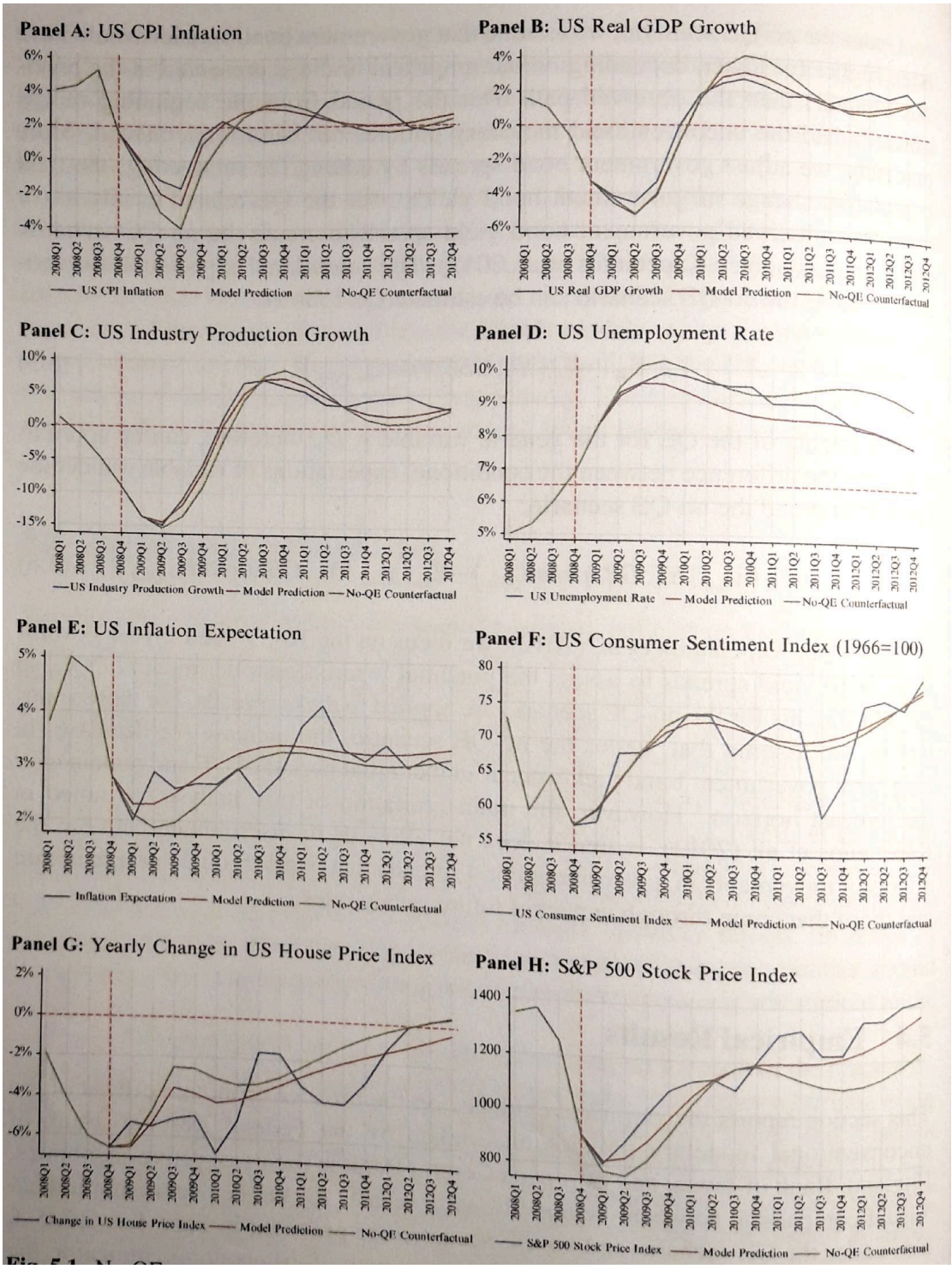
APPENDIX

No.	Date	Program	Event	QE-related news	Outcome
1	November 25, 2008	QE1	FOMC statement	Fed intends to purchase up to $500 billion of agency mortgage-backed securities (MBSs) and up to $100 billion of agency debt	QL
2	December 1, 2008	QE1	Bernanke speech	Fed may purchase long-term Treasury or agency securities in substantial quantities	QL
3	December 16, 2008	QE1	FOMC statement	Fed mentions possible purchase of long-term Treasuries	QL
4	January 28, 2009	QE1	FOMC statement	Fed stands ready to expand agency debt and MBS purchases and purchase long-term Treasuries	QR
5	March 18, 2009	QE1	FOMC statement	FOMC decides to increase the maximum purchases of agency MBSs and debt to $1.25 trillion and $200 billion, respectively; and to purchase up to $300 billion of longer-term Treasuries	QL
6	August 12, 2009	QE1	FOMC statement	Fed slows the pace of the LSAP by extending purchasing period	QU
7	September 23, 2009	QE1	FOMC statement	Fed slows the pace of agency debt and MBS purchases	QU
8	November 4, 2009	QE1	FOMC statement	Fed downsizes the amount of agency debt purchase to $175 billion instead of the $200 billion	QU
9	August 10, 2010	QE1	FOMC statement	Fed decides to keep constant its holdings of securities at current level by reinvesting principal payments from agency debt and agency MBSs in longer-term Treasuries	QL
10	August 27, 2010	QE2	Bernanke speech	Bernanke hints at QE2 in his speech at Federal Reserve Bank of Kansas City Symposium	QU
11	September 21, 2010	QE2	FOMC statement	FOMC reiterates its intention to maintain its policy using new language with added emphasis	QL

No.	Date	Program	Event	QE-related news	Outco
12	November 3, 2010	QE2	FOMC statement	Fed intends to further purchase $600 billion in longer-term Treasury securities	QU
13	September 21, 2011	OT	FOMC statement	Fed intends to purchase $400 billion in Treasuries with remaining maturities of 6–30 years and to sell an equal amount of Treasuries with remaining maturities of 3 years or less	QL
14	June 20, 2012	OT	FOMC statement	FOMC expands the operation twist program by adding additionally $267 billion	QU
15	August 22, 2012	QE3	FOMC statement	FOMC members judge that additional monetary accommodation is likely	QU
16	September 13, 2012	QE3	FOMC statement	Fed launches a new $40 billion per month, open-ended, purchasing program of agency MBSs	QU
17	December 12, 2012	QE3	FOMC statement	Fed would purchase longer-term Treasury securities at a pace of $45 billion per month	QU

Notes: QE1, QE2, and QE3 represent the first, second, and third rounds of the Fed's quantitative easing, respectively; and OT represents operation twist. The Fed and FOMC are the Federal Reserve and Federal Open Market Committee, respectively. QL, QU, and QR represent lowered, unchanged, and rising interest rates around QE-related events, respectively

APPENDIX 1 – Federal Reserve's QE-related events, Source: (Hausken & Ncube, 2013)



APPENDIX II – Broader economic effects of QE – No-QE counterfactual simulations for the USA, Source: (Hausken & Ncube, 2013)

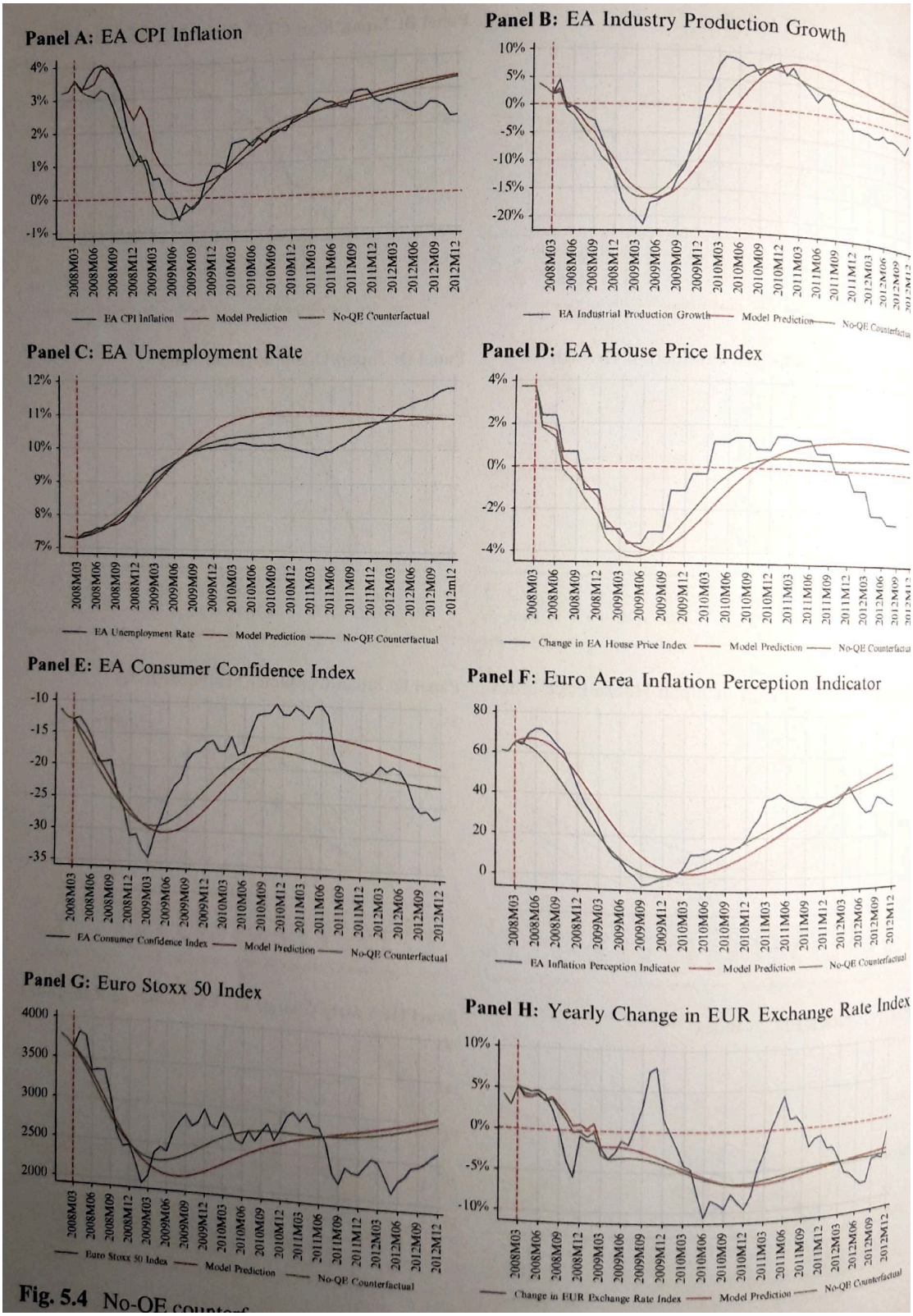


Fig. 5.4 No-QE counter-f

APPENDIX III – Broader economic effects of QE – No-QE counterfactual simulations for the Euro Area, Source: (Hausken & Ncube, 2013)

CONTRIBUTOR	ANNOUNCED	SIGNED	SIGNED PER CAPITA
Sweden	$581 M	$581 M	$59.31
Luxembourg	$46.8 M	$33.4 M	$58.63
Norway	$258 M	$258 M	$50.20
Monaco	$1.08 M	$1.08 M	$28.89
United Kingdom[1]	$1,211 M	$1,211 M	$18.77
France	$1,035 M	$1,035 M	$15.64
Denmark	$71.8 M	$71.8 M	$12.73
Germany	$1,003 M	$1,003 M	$12.40
Switzerland	$100 M	$100 M	$12.21
Japan	$1,500 M	$1,500 M	$11.80
United States of America[2]	$3,000 M	$3,000 M	$9.41
Finland	$107 M	$46.4 M	$8.49
Netherlands	$134 M	$134 M	$7.94
Australia	$187 M	$187 M	$7.92
Canada	$277 M	$277 M	$7.79
Belgium	$66.9 M	$66.9 M	$6.18
Italy	$334 M	$268 M	$4.54
Austria[3]	$34.8 M	$34.8 M	$4.09
Spain[4]	$161 M	$161 M	$3.46
Republic of Korea[5]	$100 M	$100 M	$1.99
Iceland[6]	$1.00 M	$0.50 M	$1.55
Liechtenstein	< $0.1 M	< $0.1 M	$1.48
Estonia	$1.30 M	$1.30 M	$0.99
New Zealand	$2.56 M	$2.56 M	$0.57
Czech Republic	$5.32 M	$5.32 M	$0.57
Malta	$0.20 M	$0.20 M	$0.47

Hungary	$4.30 M	**$4.30 M**	**$0.43**
Panama	$1.00 M	**$1.00 M**	**$0.25**
Latvia	$0.47 M	**$0.47 M**	**$0.24**
Mexico	$10.0 M	**$10.0 M**	**$0.08**
Lithuania	$0.10 M	**$0.10 M**	**$0.04**
Bulgaria	$0.10 M	**$0.10 M**	**$0.02**
Chile	$0.30 M	**$0.30 M**	**$0.02**
Colombia	$6.00 M	**$0.30 M**	**< $0.01**
Romania	$0.10 M	**$0.10 M**	**< $0.01**
Poland	$0.11 M	**$0.11 M**	**< $0.01**
Indonesia[7]	$0.25 M	**$0.25 M**	**< $0.01**
Cyprus	$0.50 M	–	**0**
Ireland	$2.70 M	–	**0**
Vietnam[8]	$0.10 M	–	**0**

1 Out of the United Kingdom's announced pledge of GBP 720 million, GBP 144 million is signed as a grant and GBP 576 million is signed as a capital contribution, as defined in its agreement.
2 USD 1 Billion provided to date.
3 The pledge from Austria was announced in USD but signed in EUR (20 million). The amount shown as signed is calculated in accordance with *.
4 The total amount pledged is EUR 120 million, but EUR 78 million will be paid after IRM (2015-2018).
5 Signed amount includes contributions made prior to GCF's High-Level Pledging Conference.
6 The total amount pledged is EUR 1 million, but EUR 0.4 million is planned to be paid after IRM (2015-2018).
7 Signed amount includes contributions made prior to GCF's High-Level Pledging Conference.
8 The total amount pledged is USD 1 million, but USD 0.4 million is planned to be paid after IRM (2015-2018).
* United States dollars equivalent (USD eq.) based on the reference exchanges rates established for GCF's High-Level Pledging Conference (GCF/BM-2015/Inf.01). Grant equivalent calculated based on the terms in Policies for Contributions. Gross Domestic Product (GDP) in rounded USD eq. per capita. CO2 emissions in rounded metric tonnes per capita. Figures based on latest available data from World Bank and other sources.

APPENDIX IV – Green Climate Fund Contributions: Announced and Signed, Source: (Green Climate Fund, 2017)

Date	SDR Holdings	SDR Allocations
July 31, 2017[1/]	204,157,943,411	204,157,943,411
December 31, 2016[1/]	204,157,943,411	204,157,943,411
December 31, 2015[1/]	204,090,679,885	204,090,679,885
December 31, 2014[1/]	204,090,679,885	204,090,679,885
December 31, 2013[1/]	204,090,679,885	204,090,679,885
December 31, 2012[1/]	204,090,679,885	204,090,679,885
December 31, 2011[1/]	203,985,273,773	203,985,273,773
December 31, 2010[1/]	203,985,273,773	203,985,273,773
December 31, 2009[1/]	203,983,585,060	203,983,585,060
December 31, 2008	21,447,323,308	21,433,330,200
December 31, 2007	21,476,126,503	21,433,330,200
December 31, 2006	21,473,003,105	21,433,330,200
December 31, 2005	21,470,449,848	21,433,330,200
December 31, 2004	21,468,707,977	21,433,330,200
December 31, 2003	21,521,155,135	21,433,330,200
December 31, 2002	21,525,798,965	21,433,330,200
December 31, 2001	21,539,544,273	21,433,330,200
December 31, 2000	21,527,462,743	21,433,330,200
December 31, 1999	21,534,808,792	21,433,330,200
December 31, 1998	21,522,109,231	21,433,330,200
December 31, 1997	21,508,223,319	21,433,330,200
December 31, 1996	21,495,178,073	21,433,330,200
December 31, 1995	21,484,535,660	21,433,330,200
December 31, 1994	21,476,906,050	21,433,330,200
December 31, 1993	21,480,941,838	21,433,330,200
December 31, 1992	21,480,131,756	21,433,330,200
December 31, 1991	21,472,690,929	21,433,330,200
December 31, 1990	21,478,065,797	21,433,330,200
December 31, 1989	21,477,347,564	21,433,330,200
December 31, 1988	21,468,998,934	21,433,330,200
December 31, 1987	21,456,357,578	21,433,330,200
December 31, 1986	21,448,027,411	21,433,330,200
December 31, 1985	21,448,770,690	21,433,330,200
December 31, 1984	21,440,986,033	21,433,330,200

APPENDIX V – Special Drawing Rights (SDRs) Allocations and Holdings for all members as of July 31, 2017, Source: IMF