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How Finance Can Shape Sustainability

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Abstract

Introduction

The aim of this work is to investigate which kind of relationship exists between finance and sustainability. A lot has been said about finance especially after the global financial crisis started in 2007 but to identify the context that will be analyzed in this work there is the need of clarifying what is intended with the terms finance and sustainability.

The term finance lays its roots in past centuries; indeed, in the 18th century, the word *finance* was adapted from French to English speaking and literally meant the "management of money." Today, finance is not merely a word but it came out as an academic discipline of great importance, it might be argued that today finance is a branch of economics.

So nowadays finance has evolved from the strict concept of the management of money, it became the soul that permits the development of any economic activities; the term finance can be easily replaced with the word *exchange* in the sense that also barter could be seen as a form of finance.

But to clarify what is intended for finance a definition should be given, the most comprehensive one is given by academicians that define finance as "The procurement (to get, obtain) of funds and effective (properly planned) utilization of funds."[1]

Once it has been tried to define finance, there is the need to focus the attention on the other main character of this work, sustainability.

In the case of the word sustainability not only there is a lack of an agreement on a common definition, but also, it seems to exist a resistance to any attempt to

[1] Gaurav Akrani, "What is Finance? Meaning Definition Features of Finance", (2011).

determine one. There is, however, a wide range of definition of sustainability but as brilliantly pointed out by Dimitrov there is little research on the bases of these definitions that considers whether if they stem from a common origin or even whether they aim to achieve the same goals. The definitions of sustainability cover a wide range from rhetoric to reality, but in the end, it seems unclear what exactly is being sustained.

But even if identifying a single definition for sustainability seems unlikely, it is possible to define the area of interests of sustainability that will be used in this work: economic, environmental and social.

After having defined what is intended for finance and the area of interests of sustainability it is necessary to move the analysis towards the core of this work that will revolve around the following questions:

a. Does finance encourage a short-term, profit driven behavior that basically ignores the potentially negative effects?

b. Is finance only a tool that reflects human nature?

To answer these questions I will firstly analyze which kind of role finance has played in three major crises of the last 20 years, namely financial, environmental and social; then I will point the attention to the lack of regulatory practices that has had a clear impact in the outburst of these crises; then I will consider successful examples of sustainable finance with a focus on the paradoxically Chinese situation in the sustainability field, since China is at the same time the most important polluter in the world but also one of the countries that is investing more in renewables. Finally, I will consider the role that institutions can play in driving finance into sustainability.

1

20 Years of Crises

The first crisis that is addressed in this work is global financial crisis outburst in 2007. Such crisis was mainly the result of the housing bubble that has characterized the US economy from the 1990s until the first years of the new millennium. The housing bubble was mostly created by lending institutions that started to concede mortgage also to people that do not have sufficient guarantees, but this behavior is not sufficient to explain why the bubble burst. The biggest problem were the subprime mortgages which are a type of mortgages that are normally made out to borrowers with lower credit ratings but even if conceding subprime mortgages was very hazardous for lending institutions, because they were not sure that the borrower would repay his debt in the future, starting from 2003 United States banks expanded the concession of mortgages and, in particular, of the subprime mortgages and this process was favored by four main reasons:

First, the trend of the property market in a continuous rise, indeed, starting from 2000 until mid-2006 the price of houses in the United States grow up at an incredible rhythm (15% per year), by creating a housing bubble. This steady rise in houses' price had favored the lending institutions making the concession of mortgages convenient and a low-risky activity. Indeed, if it was forecast a steady rise of houses' price then banks would not be interested in the repayment of the debt by the borrower, but rather, in that case, banks could have back the house and resell it at a higher price than the amount of the mortgage.

Second, the easy availability of credit, due to low interest rates, had encouraged people to borrow money from the lending institutions.

Third, the securitization of credits played a fundamental role. Securitization means the possibility to combine any financial assets to promote liquidity on the market. So, through securitization banks could resell subprime mortgages and transferring the risk to other operators in the financial markets. There was, therefore, a shift from the old model *originate to hold* to a new one *originate to distribute* to diversify the risk. In support of the shift to the new model, there was also the creation of an incredible variety of new financial products that multiplied the actors connected to a single mortgage: there were simultaneously involved in this process: commercial banks, investment banks, SPVs, insurance companies, pension funds and hedge funds.

The situation started to worsen in 2004 when US interest rates began to rise as a FED response to the end of the recession of the early 2000s, so mortgages became more and more costly and since not all the borrowers had adequate assets to cover their debt became insolvent. This led to a dramatic drop in house prices that caused tremendous financial difficulties to financial institutions that started to fail or to be saved by the government.

The second crisis that is analyzed is the environmental degradation that we are nowadays experiencing.

There are a lot of data that tell us that we are endangering the world in which we are living, one of these is the certainly the greenhouse gases emissions (GHGs). The GHGs emissions have grown dramatically since pre-industrial terms, with an increase of 70% between 1970 and 2004 and even if a lot of countries such as Japan and United States, and organizations such as the European Union agreed to reduce their emissions until 2020, the fight against the global growth in emissions remains difficult to win. According to Broome, there is more than a proportionality relationship between the emission of GHGs and the harm caused to the mankind. A report drafted by the World Health Organization (WHO) affirmed that around seven million people died as a result to air pollution exposure. There are also other major problems such as water pollution, desertification and deforestation that are having or will have a dramatic impact on our life. Other data that can explain how serious is the situation are the ones that regard the rising of temperature caused by global warming. The 4th report of the International Panel of Climate Change (IPCC) estimated that the average temperature of the Earth's surface has increased of 0.74 C° during the twentieth century, and this trend is even worsening, indeed, nine of the ten warmest years (measured with modern meteorological instrument) have occurred since 2000 and 2014 was the warmest since 1880. The latest meteorological disasters, such as floods, hurricanes and extended period of drought, are direct consequences of global warming as pointed out by a World Bank report. The Foreign Direct Investments (FDIs) have played an significant role in exacerbating the global warming issue, since according to the *pollution havens* hypothesis, companies will increase their financial investment in less developed countries to take advantage of less severe environmental regulations. In that matter, it is possible to see how finance can shape the environmental sustainability of less developed countries, by being profit-driven the aspects that regard the massive exploitation of natural resources will not be considered. It is, therefore, evident how the unfortunate combination of policies and finance can have a destroying impact on the environment.

The third and last crisis analyzed is the social one. We are living in a world that is continuing to be much more unequal with increasing differences between rich and poor, for instance in the US the richest 10 percent appropriated the three-quarters of the growth in the period between 1977-2007. The other data that show how much inequality is increasing; for instance the highest global wealth facilities (the top I) have grown at 6%-7% per year versus 2.1% for average global wealth, and these rates are net of inflation. This means that the gap between the richest and the average has considerably widened. And as pointed out by Piketty this situation happens because money tends to reproduce itself.

Concerning the relationship between finance and inequalities it might be affirmed that it is certainly true that financial development aggregates growth and thus creates more benefits for a country by improving capital allocation. But this assumption is valid only with some levels of economic development. Indeed, at early stages of development (which is the situation of the emerging countries) only rich people can have benefits from better financial markets indeed inequality as revealed by a World Bank Report, does not just matter of bad luck or historical backgrounds; it is also an issue of inequality of access to economic opportunities. As it has been said before, money tends to reproduce itself, and that is the main reason of economic inequality because with money it is easier to have access to financial services and to overcome the natural barriers, represented by high-fixed costs imposed by financial institutions. But, as Demirguc-Kunt and Levine have assessed, finance may arise many inequalities between "who can start a business and who cannot, who can pay for an education and who cannot, and can influence the degree to which a person's economic opportunities"[2] are linked to economic capabilities so eventually finance can shape the gap between rich and poor; that is why finance operate both on the extensive and on intensive margin. By operating on the extensive margin finance may increase the availability of financial services because it overthrows the economic barriers, so in this way finance shapes the gap between the rich and the poor in a redistributive way. But it is also true that finance operates as well on the intensive

[2] Demirguc-Kunt and Ross Levine. "Finance and Inequality Theory and Evidence." Cambridge, Massachusetts: National Bureau of Economic Research, 2009.

margin "enhancing the financial services of those already accessing the financial system, which are frequently high-income individuals"[3], and in financial systems that do not lower the fixed costs of accessing to financial services only the quality of the services will be increased instead of enlarging the quantities, so that poor that cannot afford the fixed costs will not have access to that kind of financial systems. So if finance operates on the intensive margin, the gap between rich and poor will wide both regarding the distribution of income and disparities in economic opportunity.

2

Regulation

The concept of regulation is fundamental to understand which were the responsibilities of policy makers in the outburst of both the global financial crisis and the environmental degradation. Concerning regulatory practices in the financial sector, it has been mostly put the attention on the US since as showed in the previous chapter it was from there that the global financial crisis has started. The aftermath of the Great Depression was characterized by a high level of regulation in the financial sector and in some ways the latter was responding to the need of the population. The situation started to change in the 1980s because of two main reasons: first, an increase in the complexity of the financial products such as derivatives, options and swaps, which join the more traditional products such as the bank loans and mortgages and second finance started to get rid of regulation.

With the arrival of new financial products in the market it was clear that new regulatory policies were necessary, but instead of regulating more, a process of deregulation started. Deregulation was supported by government intervention through a series of legislative measures aimed at thinning the relationships between financial

[3] Demirguc-Kunt and Ross Levine. "Finance and Inequality Theory and Evidence." Cambridge, Massachusetts: National Bureau of Economic Research, 2009.

markets and banks. The most prominent example was certainly characterized by the introduction of the Financial Services Modernization Act commonly called Gramm–Leach–Bliley Act (GLBA) from the name of the co-sponsors of this Act. The main innovation introduced by the GLBA was the removal of the prohibition of merging between commercial banks, investment banks and the insurance companies. The result was a total change of the culture of commercial banks in order to emulate the speculative attitude of the Wall Street companies, indeed as brilliantly argued by Stiglitz "Commercial banks are not supposed to be high-risk ventures; they are supposed to manage other people's money very conservatively"[4]. So with GLBA they were not just repealing the Glass Steagall, they were repealing an entire culture, based on the trust between commercial banks and the investors. This marks the path for the coming out of the investing-bank culture because there was a high demand for high profits that can be reached only through high risk taking and big leverage. In substance, the GLBA would stimulate financial institutions to merge and creating enormous financial conglomerates that would dominate not only the US financial system but also its democracy, and put at risk the entire financial stability of the nation because they would not have adequate regulatory safeguards. Considering the regulatory responses given to the Global Financial Crisis both in the US and at the international level it has emerged that these responses present some limits in terms of transparency and enforcement. Indeed, as argued by Claessens and Kodres, the time of reforms is usually in the immediate aftermath of the crises and many times the responses given are superficial, they do not attack the core of the problem, so that reforms remain incomplete. Additionally, reform process takes time to be implemented, in that time "the public cries for reform diminish and financial sector

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[4] Joseph E. Stiglitz, *The Great Divide: Unequal Societies and What Can We Do About Them*, (New York: Norton, 2015), 43.

lobbyists regroup to water down the reforms they perceive as lowering their profitability. The energy for reforms wanes and the perception of the benefits become distant memories"[5].

In conclusion, it might be affirmed that many steps have been taken in the right direction, but there is a long way to go to reform the global financial system.

For what concerns regulation and environment it must be pointed out that regulating the environment has always been a complex issue above all for two main reasons: first, it is a broad and difficult argument to handle, and second, states are usually reluctant in giving up part of their sovereignty in favor of supranational authorities that may enforce International Environmental Law (IEL). Many were the conferences that try to tackle the environmental degradation but since no enforcement mechanisms were established they have mostly resulted in a number of failures. The lack of a supranational authority that might fine countries for their non-compliance was certainly one of the most prominent reasons for such disappointing results and it can also be said that the failure of regulatory practices in the environmental field has two different roots: first, in the period of economic prosperity governments are more interested in maintaining a high level growth so that the environmental aspects become secondary whereas in a period of economic recession governments, which take into account only the re-election, usually hinge on the short-term health of the economy, in substance recessions make people and governments care less about the environment.

[5] Stijn Claessens and Laura Kodres, *IMF Working Paper*: *The Regulatory Responses to the Global Financial Crisis: Some Uncomfortable Questions*. (USA: International Monetary Fund, 2014).

3

Building a Sustainable Finance

Nowadays we are experiencing successful examples of sustainable finance, but it should be clear that in order to use finance as a tool for promoting sustainability the financial investments in the sustainability field should be profitably attractive as much as the others; it means that the environmental component should be taken into account while considering an investment. Many things have changed in the field of sustainable development, and now it is possible to affirm that sustainable development can have a commercial dimension for banks. There is a significant part of the society, formed by savers and investors that explicitly choose to use their enormous financial resources to social or environmental ends. Banks should introduce new products in order to meet the investors' requests; such new products can be much more valuable for the banks also for what concerns the marketing of those banks. When the terms sustainability and banking are put together, we can talk about sustainable investing, commonly known as socially responsible investing (SRI).

The SRI is a steadily growing market; indeed according to the Social Investment Forum more than one out of every nine dollars under professional management in the United States is invested in strategies with SRI. The clear added value of investing in SRI is, apart from having competitive financial returns in the long-term, investing in something that has a positive societal impact. In order to better understand in which way and degree sustainable finance is profitable, it might be useful to consider the case of the ASN Bank. The ASN Bank was set up in 1960, and its core business since the beginning was using finance to stimulate sustainable development, and the results achieved by this bank were incredible, indeed in the period between 1973 and 1989 the bank's deposited capital double every five years. In

1989 the total entrusted fund amounted to €363 million, this sum had increased up to €800 million at the end of 1999.

For the sake of better analyzing the question of building a sustainable finance, it can be useful to consider the case of China. As already well-known China is the world's largest source of carbon emission and its air quality regularly fails to respect the international health standards. As already analyzed in Chapter 2 air pollution causes millions of death per year; in the case of China this situation is even worse. Indeed, according to the famous report Global Burden Disease in 2010 the outdoor air pollution has contributed to the deaths of 1.2 million people in China, it has also been estimated that China's toll from pollution was the loss of 25 million healthy years of life from the population. It might be argued that improving the environmental condition of China is not only a matter of awareness in the sustainability field. Indeed, it has been calculated that the environmental degradation in China has tremendous costs, estimated in $185 billion per year, so in some way the Chinese government is forced to reform its environmental policies in order to stimulate the economy.

It must be pointed out that the Chinese government is looking for a way to develop financial instruments that are at same time environmental friendly; it is in this context that last month the People's Bank of China released the Green Financial Bond Directive. The main goal of this directive is to outline the guidelines on how to use the green bonds, where funds are solely applied to finance new and existing green infrastructure projects; this directive represents China's first guideline on green bonds which should help the country in the transition to a low carbon economy with a massive use of renewable energies and public transit. The directive also identifies subjects entitled of issuing green finance bonds such as financial institutions, development banks, policy banks, commercial banks, finance companies and other financial institutions established by law. Additionally, the approval of the Renewable Energy Law represented a shift in the Chinese behavior, and the impact on the growth rate of renewable energies (especially in the wind sector) was spectacular. The wind power doubled its capacity in the period 2006-2009, and China surpassed the United States at the end of 2010 in the production of wind turbines, "however China's rapid growth in wind power has been accompanied by significant growing pains, which have exposed areas in which the renewable policy framework can be improved. The Chinese government has also released, in 2007, the Mid and Long-Term Development Plan for Renewable Energy, which set targets for meeting 10% of China's primary energy consumption from renewable energy sources, including hydropower, wind, and solar by 2010 and 15% by 2020. As seen in the Chinese case the role of policymakers is fundamental in using finance as tool to shape sustainability. The most prominent tool that governments can use beneficial to stimulate the green bond is, without no doubt, the tax incentive in the form of tax credit bonds, which are "An amount of money that a taxpayer is able to subtract from the amount of tax that they owe to the government"[6] and in order to encourage long-term investments, which would benefit low carbon investments and green bonds, the policymakers can tweak tax codes. There are other institutional actors that can be involved in increasing sustainability, such as the central banks that can use their enormous financial resources to purchase green bonds, including through quantitative easing, liquidity-providing operations and other mechanisms. They can also play a coordinating role in bringing together all the stakeholders in order to increase the size and competitiveness of the green bond market.

[6] *Investopedia,* *http://www.investopedia.com/terms/t/taxcredit.asp* (Accessed January 23, 2016).

Conclusion

It has been deeply analyzed which kind of role finance could have played in last years in shaping sustainability. The study that I have conducted on three major crises in the economic, environmental and social field has shown that finance was certainly one of the major causes of these crises. However it must be pointed out that the aim of this work is not to identify finance as one of the most prominent evils of nowadays, but differently the aim is to show that humans use finance as a tool. Seeing finance as tool in the hands humans lays its roots in the hypothesis of profit-neutrality of finance: if we consider that finance is uninteresting towards the source of profit then it is possible to use it as a way to shape sustainability. There are of course a number of barriers, that have been analyzed in the course of this study, that may obstruct the birth of a sustainable finance, the most important one is certainly the fact that now it is more profitable investing in non-sustainable projects because of both short-term view and lack of governmental policies aimed at stimulating sustainable investments. But as clearly seen with the case study of the ASN Bank in The Netherlands building a sustainable and, at the same time economic valuable, finance is possible indeed the ASN Bank has doubled its capital every five years in the period 1973-1989. It has been found a clear correlation between government policies and environmentally friendly investment. Indeed, the Dutch government made the interest and dividend gained with green investments tax-free, and the results of such policy were outstanding: for 1 Euro lost from the tax free policy there are 45 Euros of private money invested in green projects. The ASN Bank was a precursor in using finance for good purposes but it can play a role of guidance for other financial institutions.

In conclusion it has been explained that finance is no more than a tool in the hands of institutions and policy makers and the use of finance can produce different outcomes, but, since it is profit-neutral, making sustainable and profit-attractive investments will be crucial to using finance as a tool to build a more sustainable world.

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List of Abbreviations

UNCCUR	United Nations Conference on the Conservation and Utilization of Resources
SPV	Special Purpose Vehicle
ARM	Adjustable-Rate Mortgage
MBS	Mortgage-Backed Security
CDO	Collateralized Debt Obligation
CDS	Credit Default Swap
GHG	Greenhouse Gas
WHO	World Health Organization
IPCC	International Panel of Climate Change
GDP	Gross Domestic Product
FDI	Foreign Direct Investment
US	United States
WB	World Bank
EU	European Union
FDIC	Federal Deposit Insurance Corporation
GLBA	Gramm–Leach–Bliley Act
FSB	Financial Stability Board
FSOC	Financial Stability Oversight Council
ORC	Office of Financial Research
CFPB	Consumer Financial Protection Bureau
FIO	Federal Insurance Office
IAC	Investor Advisory Committee
OHC	Office of Housing Counseling
SEC	Security and Exchange Commission
FSF	Financial Stability Forum
IMF	International Monetary Fund
WTO	World Trade Organization
IEL	International Environmental Law
WWII	Second World War
UNCHE	United Nations Conference on the Human Environment
OECD	Organization for Economic Co-operation and Development

UNCED	United Nations Conference on Environment and Development
TFEU	Treaty on the Functioning of the European Union
UNFCCC	United Nations Framework Convention on Climate Change
WSSD	World Summit on Sustainable Development
GCF	Green Climate Fund
ESG	Environmental, Social, and Governance
SRI	Socially Responsible Investing
IRRCi	Investor Responsibility Research Center
GEF	Global Environment Facility
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
GEEREF	Global Energy Efficiency and Renewable Energy Fund
IFC	International Finance Corporation
SDG	Solar Development Group
SHS	Solar House System
SDC	Solar Development Capital
EIB	European Investment Bank
ICMA	Capital Market Association's
CBI	Climate Bond Initiatives
GW	Gig Watts
IEA	International Energy Agency
TWh	Terawatt Hours

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Introduction

i. The Concept

The aim of this work is to investigate in which kind of relationship exists between finance and sustainability. A lot has been said about finance especially after the global financial crisis started in 2007 but to identify the context that will be analysed in this work there is the need of clarifying what is intended with the terms finance and sustainability.

The term finance lays its roots in past centuries; indeed in the 18th century the word *finance* was adapted from French to English speaking and literally meant the "management of money"[1]. Today, finance is not merely a word but it came out as an academic discipline of great importance, it might be argued that today finance is a branch of economics.

So nowadays finance has evolved from the strict concept of the management of money, it became the soul that permits the development of any economic activities; the term finance can be easily replaced with the word *exchange* in the sense that also barter could be seen as a form of finance.

Anyway to clarify what is intended for finance a definition should be given, the most comprehensive one is given by academicians that define finance as:

> "The procurement (to get, obtain) of funds and effective (properly planned) utilisation of funds. It also

1 Gaurav Akrani, "What is Finance? Meaning Definition Features of Finance", (2011).

> deals with profits that adequately compensate for the cost and risks borne by the business."[2]

Once it has been tried to define finance, there is the need to focus the attention on the other main character of this work, the sustainability.

In the case of the word sustainability not only there is a lack of an agreement on a common definition, but also, it seems to exist a resistance to any attempt to determine one[3]. There is, however, a wide range of definition of sustainability but as brilliantly pointed out by Dimitrov there is a little research on the bases of these definitions that considers whether if they stem from a common origin or even whether they aim to achieve the same goals[4]. The definitions of sustainability cover a wide range from rhetoric to reality, but in the end, it seems unclear what exactly is being sustained.

But even if identifying a single definition for sustainability seems unlikely, it is possible to define the area of interests of sustainability that will be used in this work: economic, environmental and social.

ii. The Approach

After having defined what is intended for finance and the area of interests of sustainability it is necessary to move the analysis towards the core of this work that will revolve around the following questions: does finance encourage a short-term, profit driven behaviour that basically ignores the potentially negative effects? Or is it a simple tool that reflects human nature?

[2] Gaurav Akrani, "What is Finance? Meaning Definition Features of Finance", (2011).
[3] Fowke R. and Prasad D. (1996) Sustainable development, cities and local government, Australian Planner, Vol. 33, pp 61-66
[4] Dara K. Dimitrov, "The Paradox of Sustainability Definitions", *APIRA CONFERENCE*, 2010.

To give a satisfying answer to this question it is necessary to deeply investigate in the very nature of finance relating it to the sustainability concept expressed before.

The approaches that I have used to show the relationship between finance and sustainability are multilayer and analytic ones.

The multilayer approach is used for investigating in the three layers of sustainability expressed before, (economic, social and environmental); while the analytic one is used for considering the impact that finance could have in these layers.

iii. Thesis Structure

The first chapter deals with the analysis of three major crises that we have experienced, or that we are still experiencing, in the economic, environmental and social field in which finance might have played a fundamental role in their outburst.

So the first sub-chapter (1.1) will be related to the global financial crisis started 2007, just after the outburst of housing bubble in the United States. The analysis was mainly focused on the role of speculative finance and its implication in the outburst of housing bubble, which was indicated by the experts as the starting point of the crisis.

The second crisis analysed in the second sub-chapter (1.2) is the environmental one, which in some ways can have major effects on our life, since the human behaviour is putting at risk the future of humanity. The study was mainly conducted by considering latest data on environment and which kind of impact finance could have had in that.

The last sub-chapter (1.3) will be focused on a social crisis that is blowing up in last 20 years and a particular attention will be put on the growing inequalities between the richest part and the poorest part of the world. The search was mostly based on the work of Piketty who, in is famous book, Capital in the 21st century, has studied such inequalities. Also in this case the lens was centred on the failure of finance to behave as a sort of scale among rich and poor.

Then in the second chapter, the attention will be moved to the regulatory practices that may have favoured the development of the crises analysed previously.

In 2.1 I will consider the de-regulation process that took place in the financial system especially in the United States and as many experts pointed out this could be the most important cause of the global financial crisis. In the second part of 2.1, the focus will be moved towards the answers gave by the policy makers, in terms of regulatory practices, in the aftermath of the global financial crisis.

In 2.2, in a specular way of what I have done in 2.1, will be assessed the regulatory measures adopted at the global level in the environmental field by making a deep analysis of the International Treaties that regulate the environmental protection, starting with the United Nations Conference on the Conservation and Utilization of Resources (UNCCUR) that took place in 1949.

The last chapter it is divided in three parts: in the first one (3.2) successful examples of sustainable finance will be presented by considering which kind of favourable conditions, regarding policy, they have been encountered to develop: in 3.3 will be analysed a particular situation: the one of China. It is true that China is the most significant polluter in the world, but is also true that it is the country that is investing more in the development of renewable technologies also by issuing the so-called green bonds; this analysis was mainly conducted in order to better understand the role of policy makers in giving a *profit neutrality* of finance. Then the last sub-chapter 3.4 will deal with the role that institutions can play in promoting sustainability.

1

20 Years of Crises

1.1 Introduction

This chapter will deal with three major crises in three different fields namely economic, environmental and social.

Firstly, sub-chapter 1.2 will be centred on analysing the major causes that has led to the global financial crisis started in 2007 and on understanding the role that speculative finance could have had.

Then, sub-chapter in 1.3 will deal with the environmental crisis that we are currently experiencing; the research will mainly be based on the analysis of the causes of environmental degradation by considering the latest data and also in the impact that the financial investments have in the environment.

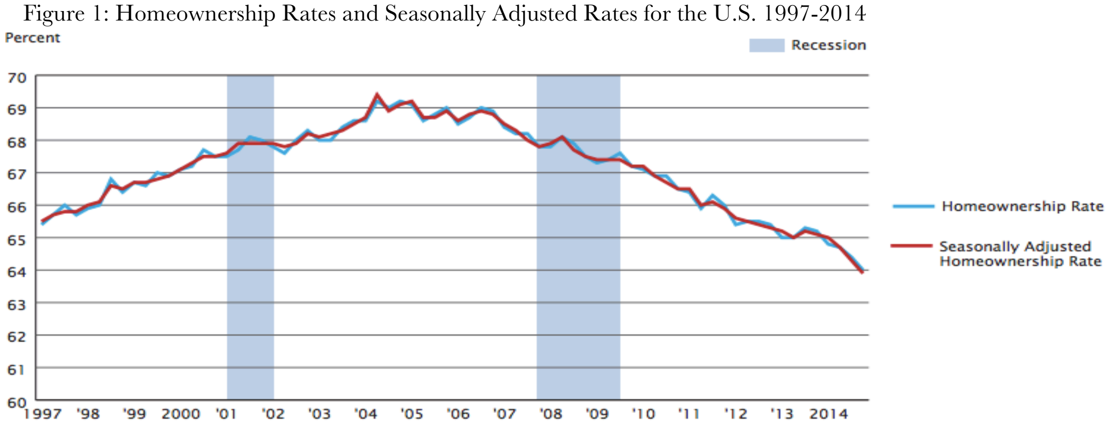
Finally in 1.4 the concept of social crisis will be addressed; in this case the analysis will be based on the work of Pikketty and through a connection between the social crisis and the inequality of income.

1.1 The Global Financial Crisis

The Global Financial Crisis is considered by many economists to have been the worst financial crisis since the Great Depression of the 1930s[5].

I will now analyse the causes that led to the global financial crisis in order to understand which were the relationships between finance and financial crisis. The majority of the economists agree upon the trigger of the financial crisis, which is widely recognized to be the bursting of United States housing bubble, which peaked in 2004 (see figure 1).

Figure 1: Homeownership Rates and Seasonally Adjusted Rates for the U.S. 1997-2014



Source: U.S. Census Bureau

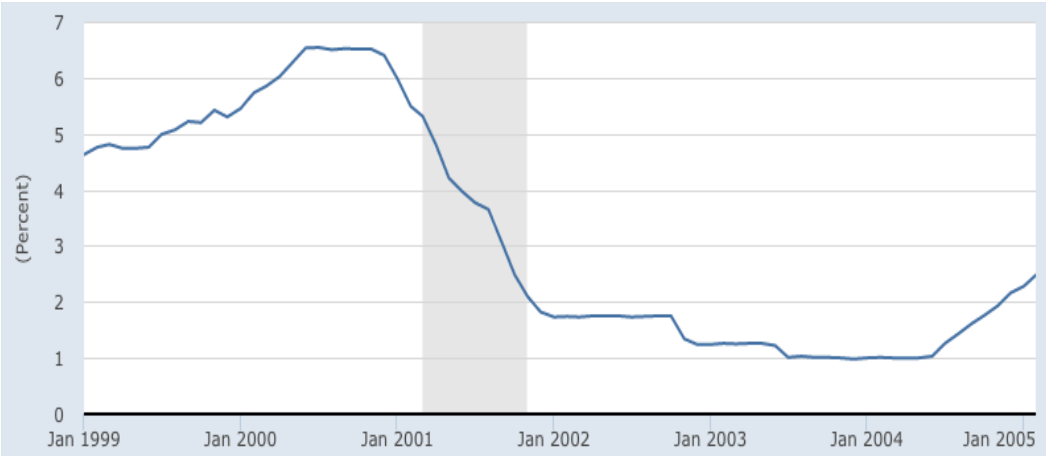
But even if this is certainly true it is important to analyse the causes of the bursting of the house bubble so a little step back is necessary.

At the end of the 1990s and at the early 2000s there was a great strengthening of the American Dream, thanks to the favourable conditions of that time. There was, indeed, easy availability of credit that was partially fuelled by large flows of foreign

[5] Pendery, D. "Three Top Economists Agree 2009 Worst Financial Crisis Since Great Depression; Risks Increase if Right Steps are Not Taken.", Reuters, February 27, 2009. http://www.reuters.com/article/2009/02/27/idUS193520+27-Feb-2009+BW20090227 (Accessed February 2nd 2016).

funds after Russian debt crisis[6] and Asian debt crisis of 1997-1998 that led to a massive house construction. But which was the other reason for such easy availability of credit? The answer is not so difficult; indeed, the Federal Reserve lowered the interest rates in the period between 2000 and 2003 from 6.5% to 1.0%.

Figure 2: Interest Rates in the U.S. 1999-2005



Source: Board of Governors of Federal Reserve

This was done to mitigate the effects of the bursting of the dot-com bubble[7] and the 9/11 terrorists attacks and also in order to fight a risk of deflation that was quite strong at that time. In early 2000s it was clear that credit was fuelling the house bubble rather than business investments, some economists among which Paul Krugman argued that the Federal Reserve "needs to create a housing bubble to replace the Nasdaq bubble"[8].

But now the question is why the housing bubble burst?

To answer this question, it is necessary to start from the very beginning by considering the situation of the subprime mortgages in the United States in the early

[6] For further reading on this topic see Andrei Vavilov, *The Russian Public Debt and Financial Meltdowns.* (Basingstoke: Palgrave Macmillan, 2010).
[7] For further reading on this topic see Ernst Malmsten, Erik Portanger and Charles Drazin. *Boo Hoo: A Dot-com Story from Concept to Catastrophe* (London: Random House Business Books, 2001).
[8] Krugman, Paul, "Dubya's Double Dip?," *The New York Times*, August 2, 2002, http://www.nytimes.com/2002/08/02/opinion/dubya-s-double-dip.html?pagewanted=all&src=pm (accessed August 9, 2015).

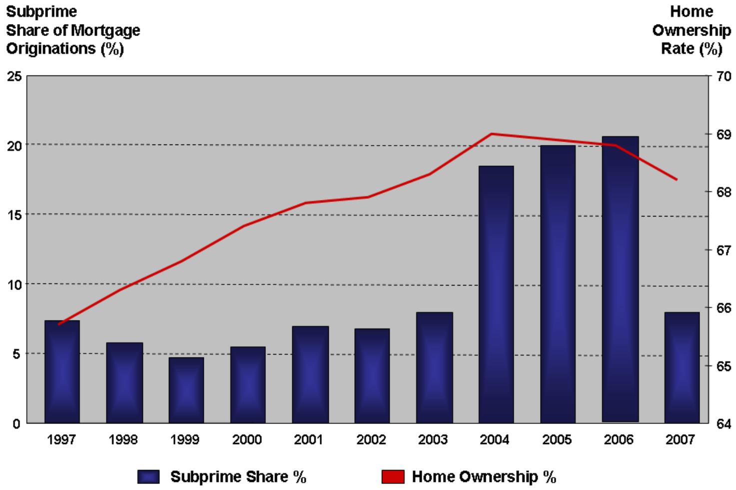
2000s. According to the definition of Investopedia a subprime mortgage could be defined as:

> "A type of mortgage that is normally made out to borrowers with lower credit ratings. As a result of the borrower's lowered credit rating, a conventional mortgage is not offered because the lender views the borrower as having a larger-than-average risk of defaulting on the loan. Lending institutions often charge interest on subprime mortgages at a rate that is higher than a conventional mortgage in order to compensate themselves for carrying more risk."[9]

So by considering this definition, it is quite easy to understand that in periods of weakness in the housing market or the economy in general, these mortgages are the first to run into trouble and create the problem of insolvency. Even if this operation is a risky one for lending institutions, because they are not sure that the borrower would repay his debt in the future, starting from 2003 United States banks expanded the concession of mortgages and, in particular, of the subprime mortgages. This tendency is shown in the figure below:

[9] *Investopedia,* http://www.investopedia.com/terms/s/subprime_mortgage.asp (accessed August 9, 2015).

Figure 3: U.S. Subprime Lending



Source: U.S. Census Bureau, Harvard University

This process was facilitated by four main reasons:

First, the trend of the property market in a continuous rise, indeed, starting from 2000 until mid-2006 the price of houses in the United States grow up at an incredible rhythm (15% per year), by creating a housing bubble. This steady rise in houses' price had favoured the lending institutions making it convenient and a low-risky activity. If you forecast a steady rise of houses' price you would not be interested in the repayment of the debt by the borrower but rather, in that case, banks could have back the house and resell it at a higher price of the amount of the mortgage.

Second, as it has been analysed before (see Fig. 1) the easy availability of credit, due to low interest rates, had encouraged people to borrow money from the lending institutions.

Third, the securitization of credits played a fundamental role. According to the definition of Investopedia securitization means:

> "The process through which an issuer creates a financial instrument by combining other financial assets and then

> marketing different tiers of the repackaged instruments to investors. The process can encompass any type of financial asset and promotes liquidity in the marketplace"[10].

So, through securitization banks could resell subprime mortgages and transferring the risk to other operators in the financial markets. There was therefore a shift from the old model *originate to hold*[11] to a new one *originate to distribute*[12], this new model was strongly praised by the majority of the economists as a tool to reduce banking system risks[13] especially before the outburst of the Global Financial Crisis because risks were diversified and distributed more extensively across the global financial system. Risks were diversified thanks to the creation of the so-called SPV (Special Purpose Vehicle) which was to isolate financial risk. The problem was that these SPVs became a way to hide debt, it seemed that a company had not a liability even if in the reality it had. The most prominent example on this matter was the one that regarded Enron[14].

The fourth and last reason is the leverage, which can be defined according to Investopedia as "the amount of debt used to finance a firm's assets"[15]. Thanks to securitization, banks and the other financial institutions may enormously expand their activities through the leverage, higher is the ratio of the leverage higher is the risk of a company. It is commonly accepted by the economists that a company that has 3 or less of leverage ratio is a low-risky company, on the other hand one that has 5 or more

[10] *Investopedia,* http://www.investopedia.com/terms/s/securitization.asp (accessed 9 August, 2015).

[11] This expression meant "When lenders make loans with the intention of holding them through maturity, as opposed to selling them to other financial institutions and/or investors", NASDAQ Financial Glossary." NASDAQ.com. http://www.nasdaq.com/investing/glossary/o/originate-to-hold (Accessed August 9, 2015).

[12] This expression meant "When lenders make loans with the intention of selling them to other institutions and/or investors, as opposed to holding the loans through maturity", NASDAQ Financial Glossary." NASDAQ.com. http://www.nasdaq.com/investing/glossary/o/originate-to-distribute (Accessed August 9, 2015).

[13] Riksrevisionen, "*The Causes of the Global Financial Crisis and Their Implications for Supreme Audit Institutions"* (Stockholm: Swedish National Audit Office, 2010), 21. http://www.intosai.org/uploads/gaohq4709242v1finalsubgroup1paper.pdf. (Accessed August 9, 2015).

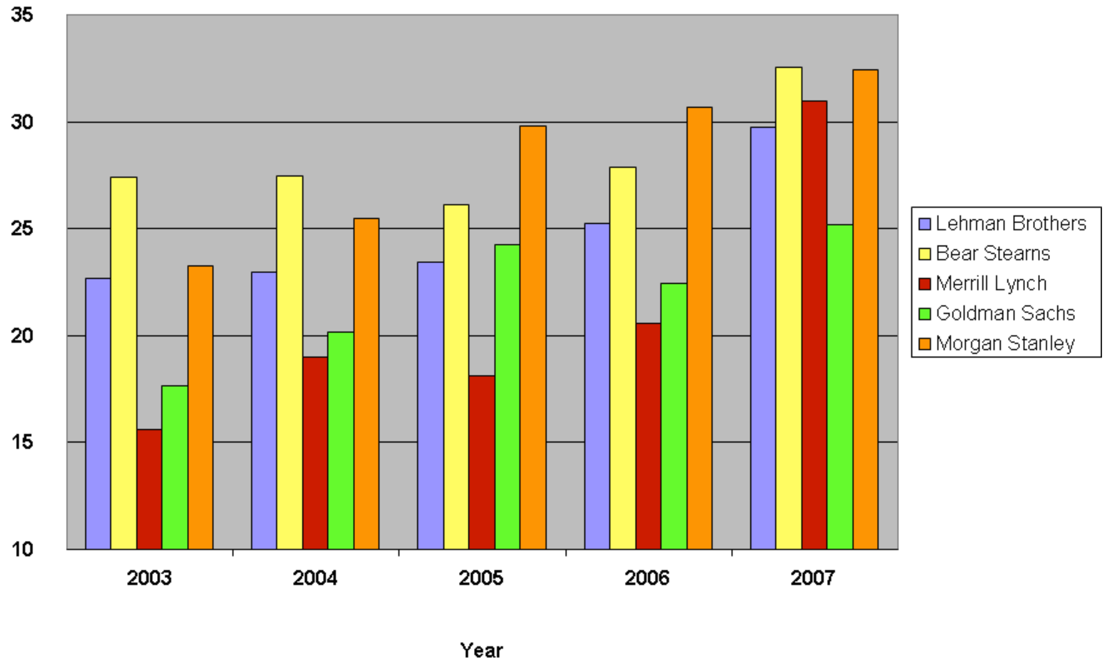
[14] For further reading on this topic see Seabury, Chris, "Enron: The Fall Of A Wall Street Darling" *Investopedia,* http://www.investopedia.com/articles/stocks/09/enron-collapse.asp (Accessed August 9, 2015).

[15] *Investopedia,* http://www.investopedia.com/terms/l/leverage.asp (Accessed August 9, 2015).

is a high-risky company. Before the crisis the US' financial institutions had a leverage ratio of 30. By having said that, it is quite easy to understand that US' financial institutions lived on the brink of bankruptcy for some years.

In the figure below it is possible too see the rise of leverage ratio adopted by the five biggest investment banks in the United States:

Figure 4: Leverage Ratios For Major Investment Banks



Source: (Company Annual Reports (SEC from 10k)

The investment banks may increase their leverage because they can invest in business operation without increasing their equity; this mechanism is really useful for investing, but it comes with greater risk. Indeed, leverage maximises gains and losses. In that period the American Dream was reality, everyone could buy a house, there were some lending institutions that conceded the so-called NINJA (no income, no job and no assets) loan that had the highest-level ok risk.

I have explained the reasons why lending institutions conceded mortgage to the majority of the Americans, but the causes of the financial crisis were more deep and endemic. The financial crisis was mainly caused by speculation, investment banks gained more than they could have ever been imagined at the expense of the American citizens first, and then at the expense of people from all over the world. To better understand the conditions that favoured this enormous speculation it is necessary to address the problem of financial complexity, underestimation of risks, deregulation and the role of the rating agencies that characterized the period prior to the crisis. The financial markets and the financial products have increased exponentially over the past decades; the globalization process led to the formation of complex cross-border institutions. "Global markets have also become increasingly integrated, with large capital flows across borders and emerging economies gaining an increasing share of international trade"[16].

I will now focus my attention on the financial products that are pertinent to crisis:

> - ARM (Adjustable-Rate Mortgage): "A type of mortgage in which the interest rate paid on the outstanding balance varies according to a specific benchmark. The initial interest rate is normally fixed for a period of time after which it is reset periodically, often every month. The interest rate paid by the borrower will be based on a benchmark plus an additional spread, called an ARM margin"[17].
> - MBS (Mortgage-Backed Security): "A type of asset-backed security that is secured by a mortgage or collection of mortgages. These securities must also be grouped in one of the top two ratings as determined by a accredited credit rating agency, and usually pay periodic payments that are similar to coupon payments. Furthermore, the mortgage must have originated from a regulated and authorized financial institution"[18]. With this kind of financial product a small bank could lend mortgages to its

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[16] Riksrevisionen, "*The Causes of the Global Financial Crisis and Their Implications for Supreme Audit Institutions"* (Stockholm: Swedish National Audit Office, 2010), 21. http://www.intosai.org/uploads/gaohq4709242v1finalsubgroup1paper.pdf. (Accessed August 9, 2015).
[17] *Investopedia,* http://www.investopedia.com/terms/a/arm.asp (Accessed 10 August 2015).
[18] *Investopedia*, http://www.investopedia.com/terms/m/mbs.asp (Accessed 10 August 2015).

clients without having to worry about the possibility that the borrower would not have the assets to cover the loan.

- CDO (Collateralized Debt Obligation): " A structured financial product that pools together cash flow-generating assets and repackages this asset pool into discrete tranches that can be sold to investors. A collateralized debt obligation (CDO) is so-called because the pooled assets – such as mortgages, bonds and loans – are essentially debt obligations that serve as collateral for the CDO"[19]. There are different level of risk for a CDO, indeed, the senior trench is the one that has the priority in the market in the event of default; of course this one has lower coupon ratings in order to compensate the safety of this product. On the other hand the junior trench does not have a priority in the market in the event of default, it has lower rating but it has a higher coupon rate. The CDOs were responsible during the crisis for $542 billion in deteriorating financial institutions since the beginning of the financial crisis.

- CDS (Credit Default Swap): "A swap designed to transfer the credit exposure of fixed income products between parties. A credit default swap is also referred to as a credit derivative contract, where the purchaser of the swap makes payments up until the maturity date of a contract. Payments are made to the seller of the swap. In return, the seller agrees to pay off a third party debt if this party defaults on the loan. A CDS is considered insurance against non-payment. A buyer of a CDS might be speculating on the possibility that the third party will indeed default"[20].

All of these financial products were closely related to the new model *originate to distribute*, in pursuance of the diversification of risk but when the crisis broke out in 2007 it became apparent that this variegation was only apparent. These new financial products multiplied the actors connected to a single mortgage: there were

[19] *Investopedia*, http://www.investopedia.com/terms/c/cdo.asp (Accessed 10 August 2015).
[20] *Investopedia*, http://www.investopedia.com/terms/c/creditdefaultswap.asp (Accessed 10 August 2015).

simultaneously involved in this process: commercial banks, investment banks, SPVs, insurance companies, pension funds and hedge funds.

Another element that is important to take into account for better understanding the role of finance in this financial crisis is the underestimation of risk due to several aspects:

- Too much optimism given by the favourable economic conditions in the period prior to the crisis;
- Complexity and opacity of securitized assets and derivatives (ARM, MBS, CDOs, CDS), from which derived uncertainty over their real value;
- Unscrupulous use of mathematical algorithms such as the Gaussian Copula Function[21] developed by David X. Li[22] who seemed to allow you to calculate the value of these instruments through complex correlations of default based on the past;
- Massive resort to CDS to protect the system from the risk of insolvency;
- Creation of a shadow banking system parallel to the major one that had two main problems: it was not regulated and it was full of illiquidity risky assets. Paul Krugman, laureate of Nobel Prize in Economics, affirmed that what happened during the crisis was mainly due to the creation of the shadow banking system and that regulatory procedures should be applied on all banking-like activity[23].

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[21] Donald MacKenzie and Taylor Spears, "The Formula That Killed Wall Street'? The Gaussian Copula and the Material Cultures of Modelling" Edinburgh, University of Edinburgh, June 2012. http://www.sps.ed.ac.uk/__data/assets/pdf_file/0003/84243/Gaussian14.pdf (Accessed 10 August 2015).
[22] Felix Salmon. "Recipe for Disaster: The Formula That Killed Wall Street." *Wired,* February 23,2009. http://archive.wired.com/techbiz/it/magazine/17-03/wp_quant (Accessed 10 August 2015)
[23] For further reading on this topic see Paul R. Krugman, *The Return of Depression Economics and the Crisis of 2008* (New York: W.W. Norton, 2009).

Many economists such as Paul Krugman and the former U.S. Treasury Secretary Timothy Geithner have argued that the regulatory framework did not follow the evolution of the financial products in terms of complexity[24][25]. The financial crisis that we have experienced was just the last part of a long process started in the 1970s where a great development of deregulatory practices occurred. The most common thought, at that time, was that the financial markets could regulate themselves without the need of instruments that could prevent financial failures[26]. But the simultaneous failure of regulators and markets to control the financial sector before the financial crisis resulted in a period of recession and of great government expenditure. The deregulation process was driven by the thirsty of money that affected Wall Street brokers; no one could imagine that mortgages could be treated as normal stocks but without being regulated as normal stocks profits were enormous at that time and it is easy to comprehend that from greater profits derives greater risks. "This evolution has taken the form of cycles in which deregulation accompanied by rapid financial innovation stimulates powerful financial booms that end in crises"[27]. After these crises government intervenes with bailout and then the cycle restarts until the next crisis. This vicious circle caused moral hazard[28], which prompted the financial institutions to misjudge the situation by creating the belief that they were "too-big too-fail".

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[24] Paul R. Krugman. "Financial Romanticism." *International New York Times* (9 October 2011): http://krugman.blogs.nytimes.com/2011/10/09/financial-romanticism/ (Accessed 11 August 2015).

[25] Secretary Timothy F. Geithner, "Written Testimony on Financial Regulatory Reform House Financial Services Committee" Washington September 23,2009. http://financialservices.house.gov/media/file/hearings/111/testimony_-_sec_geithner.pdf (Accessed 11 August 2015).

[26] James Crotty, "The Effects of Increased Product Market Competition and Changes in Financial Markets on the Performance of Nonfinancial Corporations in the Neoliberal Era," Working Papers wp44, Political Economy Research Institute, University of Massachusetts at Amherst. http://www.peri.umass.edu/fileadmin/pdf/working_papers/working_papers_1-50/WP44.pdf (Accessed 11 August 2015).

[27] James Crotty. "Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture." *Cambridge Journal of Economics* (2009): http://www.peri.umass.edu/fileadmin/pdf/conference_papers/SAFER/Crotty_Structural.pdf (Accessed 11 August 2015).

[28] For further reading on this topic see Mark V. Pauly, *The American Economic Review* Vol. 58, No. 3, Part 1, (American Economic Association), 531-537. http://www.jstor.org/stable/1813785 (Accessed 11 August 2015).

The last aspect that is important to take into account before analysing the outburst of the financial crisis is the role of the rating agencies, which ended up in the eye of the storm. First of all I have to define what rating agencies are: according to the definition of Investopedia are

> "Companies that assess the creditworthiness of both debt securities and their issuers. In the United States, the three primary bond-rating agencies are Standard and Poor's, Moody's and Fitch. Each uses a unique letter-based rating system to quickly convey to investors whether a bond carries a low or high default risk and whether the issuer is financially stable"[29].

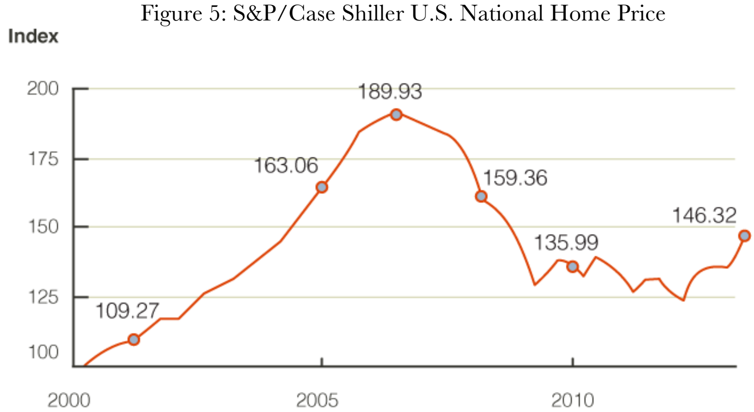
The maximum rating value is the now well-known AAA, which affirms strong solidity of that bond. The main problem of the rating agencies lied in the fact that there was a possible/evident conflict of interest between the rating agencies and the bond issuers since the latters pay the formers for providing ratings. Since the rating was the instrument for evaluating the solidity of a bond there was a strong demand for high ratings, and the profits of the rating agencies would depend on whether they keep banks happy[30]. It is widely accepted that market operations, financial investments and mortgages depend more on the level confidence rather than their real value; the level of confidence in the case of MBS, for instance, is mainly given by theirs rating, and if the ratings are high people will continue to invest in order to pursue their American dream. This mechanism seemed to work perfectly; who have never had the possibility

[29] *Investopedia*, http://www.investopedia.com/terms/b/bond-rating-agencies.asp (Accessed 11 August 2015).
[30] James Crotty. "Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture." *Cambridge Journal of Economics* (2009) 566: http://www.peri.umass.edu/fileadmin/pdf/conference_papers/SAFER/Crotty_Structural.pdf (Accessed 11 August 2015).

of buying a house could do it, investors gained enormous bonus and risks looked widely distributed. But something went wrong, what was it?

Prices of houses started to drop dramatically, as it is evident in the figure below:

Figure 5: S&P/Case Shiller U.S. National Home Price



Source: S&P Dow Jones Indices

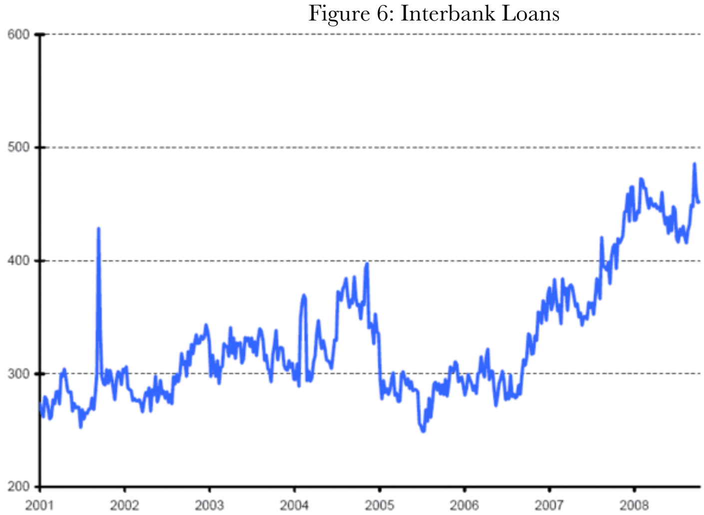
Banks that lent subprime mortgages started to have massive losses, and since the borrowers were not anymore able to repay their debt the flux of money, which is the basis of the securitization, stopped. SPVs must pay interests over their bonds, but they did not have income for being solvent; in that situation their financial stability is undermined and bonds issued by these societies became junk. No one would ever acquire mortgage bonds, but financial institutions all over the world purchased these bonds in the period prior to the crisis, and started to have great losses in their balance sheet.

Up to here I have talked about the financial crisis that affected financial markets, investment and commercial banks without referring to the deep recession that followed the global financial crisis. The so-called liquidity crisis[31] can be dated from August 9, 2007, when BNP Paribas, France's biggest bank, halted withdrawals from

[31] Markus K. Brunnermeier, "Deciphering the Liquidity and Credit Crunch 2007-08", Cambridge National bureau of Economic Research, December 2008. http://www.nber.org/papers/w14612.pdf (Accessed 11 August 2015).

three hedge funds talking about "a complete evaporation of liquidity[32]" in some market segments that had made impossible a fair evaluation of the assets in term of quality and rating. The TED spread indicator could give an interesting thermometer of the credit risk, which is "the price difference between three-month futures contracts for U.S. Treasuries and three-month contracts for Eurodollars having identical expiration months"[33]. In the figure below it is possible to see the dramatic rise of the TED spread that could explain how the perceived risk of default was increasing:

Figure 6: Interbank Loans



Source: Federal Reserve Board

With the Lehman Brothers bankruptcy[34] all the financial institutions were in turmoil, the liquidity crisis had affected not only the financial economy but also the real one, because banks did not even know how many toxic assets had in their balance sheet. So the liquidity crisis quickly became a crisis of confidence between

[32] Sebastian Boyd, "BNP Paribas Freezes Funds as Loan Losses Roil Markets" August 9, 2007. http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aW1wj5i.vyOg (Accessed 11 August 2015).
[33] *Investopedia*, http://www.investopedia.com/terms/t/tedspread.asp (Accessed 11 August 2015).
[34] For further reading on this topic see Lawrence G. McDonald and Patrick Robinson, *A Colossal Failure of Common Sense: The Inside Story of the Collapse of Lehman Brothers* (New York: Random House, 2010).

banks and people. And the phenomenon of credit crunch broke out causing the deepest recession from the 1929 crisis onward.

1.2 Environmental Degradation

In this subchapter, I will point out which are the main causes of environmental degradation by defining it and which could are the relationships between environmental degradation and financial investment by investigating data on that matter.

Environmental degradation could be defined, according to the United Nations definition as "the deterioration in environmental quality from ambient concentrations of pollutants and other activities and processes such as improper land use and natural disasters"[35]. But giving this definition is not so exhaustive because it is important to take into consideration which are the main causes of environmental degradation such as air pollution, water pollution, deforestation, desertification and global warming. The presence of these factors causes an endemic environmental degradation. Therefore, it is necessary to analyse these aspects before investigating on which kind of impact financial investments could have had on environmental degradation.

I will start my analysis by focusing on air pollution, which could be broadly defined as the introduction of harmful elements into Earth's atmosphere. Without the atmosphere there would be any life on Earth because it maintains the temperature warmer than it would be without it, it acts like a blanket[36]. This blanket is the so-called greenhouse effect. Particular gases, which absorb infrared radiation, cause the greenhouse effect, and they are called greenhouse gases (GHGs)[37]. In the figure below it is possible to see the rise of CO2 concentration in the atmosphere:

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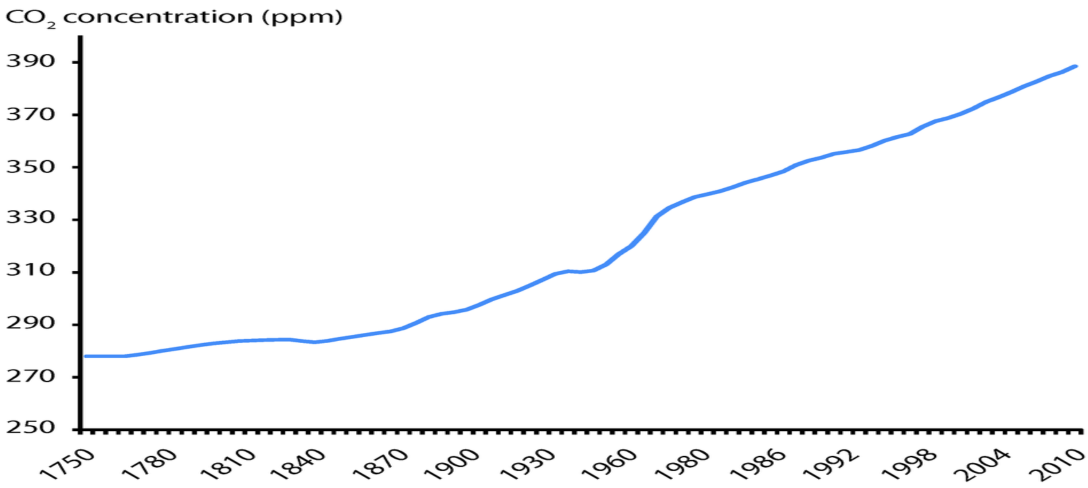
[35] Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, (United Nations: New York, 1997). http://unstats.un.org/unsd/publication/SeriesF/SeriesF_67E.pdf (Accessed August 13, 2015).
[36] John Broome, *Climate Matters: Ethics in a Warming World*. (New York: W.W. Norton, 2012),18.
[37] For an in-depth analysis see the "IPCC Fourth Assessment Record: Climate Change 2007", https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html (Accessed August 13, 2015).

Figure 7: CO2 Concentration in the Atmosphere



Source: European Environment Agency

The GHG emission have grown dramatically since pre-industrial terms, with an increase of 70% between 1970 and 2004[38] and even if a lot of countries such as Japan and the United States, and organizations such as the European Union agreed to reduce their emissions until 2020[39], the fight against the global growth in emissions remains difficult to win. According to Broome, there is more than a proportionality relationship between the emission of GHGs and the harm caused to the mankind[40]. A report drafted by the World Health Organization (WHO) affirmed that around seven million people died as a result to air pollution exposure[41].

The water pollution is another cause of the environmental degradation and could be broadly defined as the harmful substances into water. If we bear in mind that the Earth in which we are living is composed for two-third by water, it is quite easy to understand the seriousness of polluting water. Even if this problem is mainly

[38] IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[39] Center for Climate and Energy Solution http://www.c2es.org/international/history-international-negotiations/2020-targets (Accessed August 13, 2015).
[40] John Broome, *Climate Matters: Ethics in a Warming World*. (New York: W.W. Norton, 2012), 34.
[41] World Health Organization "7 million premature deaths annually linked to air pollution", http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/ (Accessed August 13, 2015).

underestimated it has been calculated that the global water crisis is the most important cause of deaths and diseases all over the world, which kills around 2.2 million people each year[42]. In many countries such as China and India, the problem of the access to potable and safe water is very tough to fight. In China around 75% of the population are without access to unpolluted drinking water[43] while in India the situation is even worst because the 80% of Indian sewage is dumped into Indian rivers[44]. There are several causes of water pollution such as industrial waste, sewage, marine dumping, accidental oil leakage and urban development, which are degrading the world in which we are live. The most prominent example of how human activities is changing the world in a dramatic way is for sure the Great Pacific Garbage Patch[45] also known as Pacific Trash Vortex which is a sort of an island in the middle of the Pacific Ocean formed for the 80% by plastic and marine debris. The creation of this "island" is mainly due to the presence of water current and wind that combine to form the so-called gyres, which redistribute heat and nutrients[46]. The Great Pacific Garbage Trash is result of two enormous masses of garbage[47], the Eastern Garbage Patch which is located west of Hawaii and east of Japan[48] and the other one that is the Western Garbage Patch located between Hawaii and California[49]. The size these two fronts combined is twice the size of United States[50].

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42 UNwater, http://www.unwater.org/wwd10/downloads/WWD2010_Facts_web.pdf (Accessed August 13, 2015).
43 Charles A. Pigott, *China in the World Economy: The Domestic Policy Challenges: Synthesis Report.* Paris: OECD, 2002.
44 Centre for Science and Environment, "Excreta Does Matter", New Dehli, 4-5 March 2013. http://www.cseindia.org/userfiles/aagd2013_report.pdf (Accessed August 13, 2015).
45 For further reading on this topic see Susan L. Dautel, "Transoceanic Trash: International and United States Strategies For the Great Pacific Garbage Patch", 3 Golden Gate U. Envtl. L.J. (2009). http://digitalcommons.law.ggu.edu/gguelj/vol3/iss1/8 (Accessed August 13, 2015).
46 University of California Los Angeles Marine Scientific Center, "Introduction to Climate and Current". http://www.usc.edu/org/cosee-west/oceanglobe/pdf/climatecurents/currentsentire.pdf (Accessed August 13, 2015).
47 Daisy Dumas, "Landfill-on-Sea", Ecologist. 34,35.
48 Id.
49 Daisy Dumas, "Landfill-on-Sea", Ecologist. 34,35.
50 Kathy Marks and Daniel Howden, *The world's rubbish dump: a tip that stretches from Hawaii to Japan*, Independent. February 5, 2008.

Another major problem that caused and still causing environmental degradation is deforestation, which might be defined as "the removal of a forest stand where the land is put to a non-forest use[51]". This sweeping change is detrimental for the ecosystem and can have dramatic consequences for mankind. Forests are the most valuable ecosystems of the world since contain more than the 60% of the world biodiversity[52]. But forests are not only important for the maintenance of the global biodiversity; forests also have a fundamental role in absorbing CO2 and transform it in the oxygen that we breathe. They also influence the global climate because of their ability to maintain the atmospheric humidity level[53]. The main causes of deforestation are ascribable to men activities such as agriculture, cutting and burning of forests, states policies and, of course, population growth. It is widely accepted that the increase in the need of the population is the primary cause of the deforestation process; the are, indeed, increase demands for forest exploitation or to the conversion of forests to agriculture or another form of development such as fossil fuel extraction.

There is another major social consequence related to deforestation that is not always considered in the developed world: the destruction of the livelihood of the indigenous people[54].

Sometimes caused by deforestation is desertification, which is another cause of environmental degradation. Desertification is "the persistent degradation of dry land ecosystems due to human activities and variations in climate"[55]. As the other environmental problems that I have analysed also the desertification is mainly caused by human activities. There is not a single cause for desertification, but a mix of social, political, economic and natural factors causes it. The most important of which is for

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[51] *Dictionary of Forestry*, http://dictionaryofforestry.org/dict/term/deforestation (Accessed August 13, 2015).
[52] S. Maria Packiam, "Deforestation: Causes And Consequences", Vol.2, Issue 03, 1193-1200.
[53] Id.
[54] Id.
[55] Green Facts, Desertification, (2013).

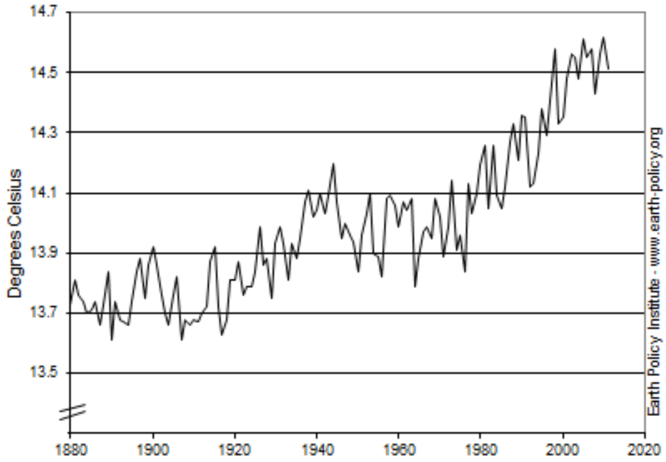
sure an excessive exploitation of resources in terms of cropping with the massive overgraze[56] that characterized the period from the 1970s onward. The consequences of desertification could have a severe impact for bio-diversity, poverty eradication and socio-economic stability[57], it has been calculated that in the next ten years 50 million people could be forced to displace due to the desertification process.

I will conclude my analysis by considering the principal responsible for the environmental degradation that we are experiencing, the global warming. A lot has been said about global warming and its causes and consequences, and the aim of this work is not to show those. Even though to better understand which kind of role finance could have had in the environmental degradation is necessary to point out which are the basic feature of the global warming.

Global warming "is the increase in global average temperature in the course of the twentieth century"[58], due to human activities, in particular, GHG emissions. Last data show that global warming is now changing in a significant way our Earth especially regarding the rise of temperature, which potentially could destroy our lives. The 4th report of the International Panel of Climate Change (IPCC) estimated that the average temperature of the Earth's surface has increased of 0.74 C° during the twentieth century[59]. In the figure below is possible to see this rise of temperature:

[56] C. Hogan, Overgrazing. (2012). http://www.eoearth.org/view/article/155088 (Accessed August 13, 2015).
[57] United Nations, *Desertification. http://www.un.org/en/events/desertificationday/background.shtml* (Accessed August 13, 2015).
[58] United Nations Framework Convention on Climate Change, Introductory note by Laurence Boisson de Chazournes, Audiovisual library on International Law, New York, 9 May, 1992.
[59] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning,Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Figure 8: Average Global Temperature 1880-2011



Source: NASA GISS

And this trend is even worsening. Indeed, nine of the ten warmest years (measured with modern meteorological instrument) have occurred since 2000[60] and 2014 was the warmest since 1880. With our anthropogenic emissions we are modifying our planet and also the greenhouse effect which was already present on Earth, indeed, the greenhouse effect on Earth's surface produces a temperature rise of about 33 ° C (as determined by taking the Earth's average temperature in 1850)[61] and this is what makes our planet habitable and different than the others. The human activities, since the industrial revolution, have increased the amount of greenhouse gases in the atmosphere by changing the radioactive balance and surface energy partition (atmosphere radioactive-convective). The concentration of CO_2 and methane has increased by 36% and 148% from 1750[62]. Over the last three decades of the twentieth century, the growth of GDP per capita and population growth were the flywheels of the increase in greenhouse gas emissions. In light of these studies created

[60] Robert Lee Holtz, "2014 Ranks as Earth's Warmest Year on Record", *The Wall Street Journal*, January 16, 2015).
[61] Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather, 2007: Historical Overview of Climate Change. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[62] U.S. Environmental Protection Agency. 2014. Climate change indicators in the United States, 2014. Third edition. EPA 430-R-14-004. www.epa.gov/climatechange/indicators (Accessed August 17, 2015).

the tools to predict future scenarios. The Special Report on Emissions Scenarios prepared by the IPCC[63] draw the likely scenario for 2100: the concentration of CO2 in the atmosphere could vary between 541 and 970 ppm[64]. This means an increase of 90-250% concentration of carbon dioxide compared to 1750. The fossil fuel reserves are sufficient to reach these levels and go even further in 2100. The process of deforestation, as mention above, will also cause this dramatic increase in the CO2 concentration in the atmosphere. But which are the effects of global warming?

The most known effect is certainly the ice melting with a consequent increase in the sea level; such increase may have disruptive effects, especially in coastal systems[65], by causing coastal erosion and flooding. The majority of the global cities are located on or near the coast in order to facilitate trade and relationship with the other countries, but this situation has exposed them to greater risk from climate hazards, such as coastal erosion, flooding and tsunami[66].

In addition, to ice melting in glaciers and polar ice caps resulting in rising sea levels and reduction of the land, an increase in temperature means an increase in energy in the atmosphere and therefore extreme weather events (such as cyclones, floods, droughts, heat waves and frost etc.) more numerous and more disruptive. Evidence on this matter could be seen from the weather phenomena that we experienced in last years such as the hurricane Katrina[67], the continuous flooding in Bangladesh which is, according to a World Bank Report the most vulnerable country

[63] Nebojsa Nakicenovic and Robert Swart, "Special Report on Emissions Scenarios", Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, July 2000.
[64] Folland, C.K., T.R. Karl, J.R. Christy, R.A. Clarke, G.V. Gruza, J. Jouzel, M.E. Mann, J. Oerlemans, M.J. Salinger and S.-W. Wang, 2001: Observed Climate Variability and Change. In: Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T., Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X. Dai, K. Maskell, and C.A. Johnson (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[65] James J. McCarthy, Climate Change 2001: Impacts, Adaptation, and Vulnerability: Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
[66] Nicholls, R (1995), "Coastal megacities and climate change", GeoJournal Vol 37, No 3, p. 369–379.
[67] Jeffrey Kluger, "Is Global Warming Fueling Katrina?", *Time,* August 29,2005,

in the world to the climate change effects[68] and the European heat wave in summer 2003 that killed around 25000 people[69].

Other expected effects predicted by the IPCC could be consequences in agriculture, slowdowns of the Gulf Stream caused by the decrease in salinity of the Atlantic Ocean (due to ice melting) and the reduction of the ozone layer. In addition, a recent study based on a sample of 1,103 species of plants and animals affirms that around 26% will become extinct for the year 2050, due to future climate changes[70]; following this further also the reduction of the pH of the oceans could be an additional cause for the extinction because many organisms and ecosystems can adapt only to a narrow range of values of ph. Oceans are becoming more acidic due to the increase of CO2 in the atmosphere and consequently the increase in the amount dissolved in water. It is estimated that the pH value at the beginning of the industrial age was equal to 8.25 and decreased to 8.14 in 2004[71], with projections that predict a further decline in the value of an amount comprised between 0.14 and 0.5 in 2100.

Having analysed which kind of factors could lead to the environmental degradation; it is now interesting focusing on which could be the relationship between environmental degradation and the financial investments.

To understand this kind of relationship, a focus on the role of the Foreign Direct Investment (FDI) has to be made. A Foreign Direct Investment "is an investment made by a company or entity based in one country, into a company or entity based in another country"[72]. In the past decade, we have experienced a dramatic increase in FDI particularly in developing and emerging nations, this has happened due to many

[68] "World Bank. 2000. Bangladesh : Climate Change and Sustainable Development. Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/15706 License: CC BY 3.0 Unported."
[69] Van Aalst, Maarten K. "The impacts of climate change on the risk of natural disasters." *Disasters* 30.1 (2006): 5-18.
[70] Chris D. Thomas, Alison Cameron, Rhys E. Green, Michel Bakkenes, Linda J. Beaumont et al. *Extinction risk from climate change* (Nature Publishing Group, 2004).
[71] Mark Z. Jacobson, (2005), Studying ocean acidification with conservative, stable numerical schemes for nonequilibrium air-ocean exchange and ocean equilibrium chemistry, J. Geophys. Res.
[72] *Investopedia* *http://www.investopedia.com/terms/f/fdi.asp* (Accessed 16 December).

of these countries have removed many restrictions on financial flows in and out of their country.[73]At this moment much of the debate around the FDI revolves around the *pollution havens* hypothesis, this means that companies will increase theirs financial investment in less developed countries to take advantage to less severe environmental regulations. The less developed countries may underestimate the impact of such investments in order to be more attractive for the investors; this kind of attitude will, of course, lead to a massive environmental degradation, indeed "Economic theories of sustainability imply that economic growth and the proliferation of FDI will exacerbate existing unsustainable patterns of development unless matched by more efficient use of natural resources"[74]. In that matter, it is possible to see how finance can shape the environmental sustainability of less developed countries, by being profit-driven the aspects that regard the massive exploitation of natural resources will not be considered. It is, therefore, evident how the unfortunate combination of policies and finance can have destroying impact on the environment.

[73] Mabey, N. and McNally, R. (1999). Foreign Direct Investment and the Environment: From Pollution Havens to Sustainable Development. WWF UK. Available at: http://www.oecd.org/investment/mne/2089912.pdf (Accessed 16 Dec. 2015).
[74] Ibid, 4.

1.3 The Social Crisis

In this paragraph, firstly I will address the differences between inequalities with respect to labour and inequalities with respect to capital basing my research on the outstanding work of Thomas Piketty – Capital in the Twenty-First Century – and then I will focus my attention on the connection between the rate on return on capital (r) and the economy's growth rate (g). In the last part of the paragraph, I will try to show up the link between the rising inequalities and the role of finance.

First of all, I will start my analysis by saying that inequalities ever exist; the problem arises when inequalities are too much exacerbated. In traditional societies, the basis of inequalities was the struggle between the landlord and peasant; the situation evolved after the Industrial Revolution in terms of the situation because the landlord became the owner of the firm and the peasant became the worker in the firm, but the conflict remained and indeed was exacerbated because production became more capital intensive than in the past[75]. Also, the capital evolved itself, because it shifted from being real estate and land to financial capital in the twenty-first century[76]. To better understand the concept of inequalities is better, first and foremost, analysing global inequality regarding regional blocs rather than in continental blocs[77]. In the table below it is possible to see the enormous differences regarding income between the different regions of the world:

[75] Thomas Piketty, *Capital in the 21st Century*, (Cambridge, Massachusetts: Harvard University Press, 2014), 39.
[76] Thomas Piketty, *Capital in the 21st Century,39.*
[77] Thomas Piketty, *Capital in the 21st Century,* 40

Table 1.1: Distribution of world GDP, 2012

	Population (million inhabitants)		GDP (billion euros 2012)		Per capita GDP	Equivalent per capita monthly income
					(euros 2012)	
World	**7,050**	*100%*	**71,200**	*100%*	**10,100 €**	**760 €**
Europe	**740**	*10%*	**17,800**	*25%*	**24,000 €**	**1,800 €**
incl. European Union	540	*8%*	14,700	*21%*	27,300 €	2,040 €
incl. Russia/Ukraine	200	*3%*	3,100	*4%*	15,400 €	1,150 €
America	**950**	*13%*	**20,600**	*29%*	**21,500 €**	**1,620 €**
incl. United States/Canada	350	*5%*	14,300	*20%*	40,700 €	3,050 €
incl. Latin America	600	*9%*	6,300	*9%*	10,400 €	780 €
Africa	**1,070**	*15%*	**2,800**	*4%*	**2,600 €**	**200 €**
incl. North Africa	170	*2%*	1,000	*1%*	5,700 €	430 €
incl. Subsaharan Africa	900	*13%*	1,800	*3%*	2,000 €	150 €
Asia	**4,290**	*61%*	**30,000**	*42%*	**7,000 €**	**520 €**
incl. China	1,350	*19%*	10,400	*15%*	7,700 €	580 €
incl. India	1,260	*18%*	4,000	*6%*	3,200 €	240 €
incl. Japan	130	*2%*	3,800	*5%*	30,000 €	2,250 €
incl. Other	1,550	*22%*	11,800	*17%*	7,600 €	570 €

Sources: see Thomas Piketty, *Capital in the 21st Century*

As illustrated from these data there are enormous differences in terms of income between region, for instance, a person in U.S. earns around 40,000€ per year while in India a person earns around 3,200€ per year which means thirteen times less; even if it is important to take into account the difficulties that occur while comparing different countries; a useful method to adjust these data is the purchasing power parity[78]. By definition in all countries inequality of income is given by adding up its two components: inequality of income from labour and inequality of income from capital. If these components are unequally distributed the total inequality will be higher.

By analysing these two components of global inequality, I have to point out that inequality from capital is always greater than inequality from labour[79]. There are some evidence showing this thesis: the upper 10 percent in terms of income from

[78] With this term is meant the "amount of adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each currency's purchasing power". *Investopedia* http://www.investopedia.com/terms/p/ppp.asp (Accessed August 19, 2015).
[79] Thomas Piketty, *Capital in the 21st Century,* 244.

labour receives around 30 percent of total labour income whereas in the case of income with respect to capital the top 10 percent in terms capital income distribution possesses more than 50 percent of the capital distribution and the bottom 50 percent owns always less than 10 percent of the capital distribution. Also, inequality with respect to labour is more justified than the one with respect to capital and this happens for a simple reason: inequality from labour is usually based on talent and effort while inequality from capital is usually inherited wealth. It is important to bear in mind that inherited wealth has lost much of its relevance in the decades that followed World War II because nowadays is more convenient to rely on study, work and professional success.

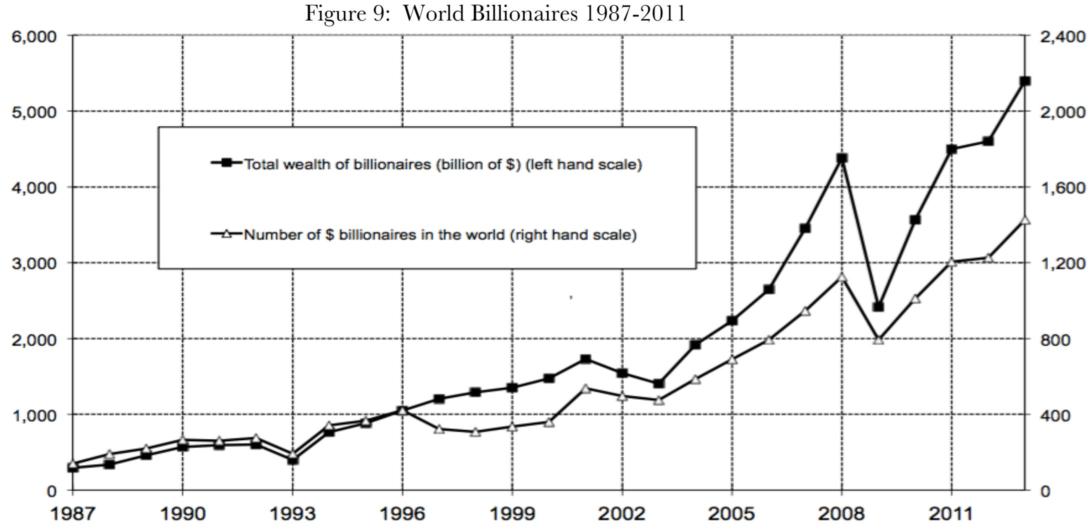
In other words, we experienced a shift from a society of rentiers to a society of "supermanagers"[80], this shift is so much evident in countries such as U.S. because the high level of income inequality between the top 10 percent and the bottom 50 percent is the result of a "hyper meritocratic society"[81] where there are significant differences which derive from very high incomes from labour instead of inherited wealth. After 1980 US had experienced an explosion of inequality, indeed, the richest 10 percent appropriated the three-quarters of the growth in the period between 1977-2007[82].

After having analysed which is the situation of inequality in the U.S. it could be interesting to focus my attention at the global level by trying to answer this question: where is going the world in terms of global inequality? In order to answer this question, I will, at first, analyse the situation of the billionaires and their evolution in terms of number and wealth accumulated in the last years and then I will concentrate on some possible indicators that could help myself in investigating the general trends

[80] Thomas Piketty, *Capital in the 21st Century*, 276
[81] Thomas Piketty, *Capital in the 21st Century,* 265
[82] Thomas Piketty, *Capital in the 21st Century,* 297

of inequality and the differences between regions. In the figure below are illustrated the number of billionaires and their total wealth:

Figure 9: World Billionaires 1987-2011



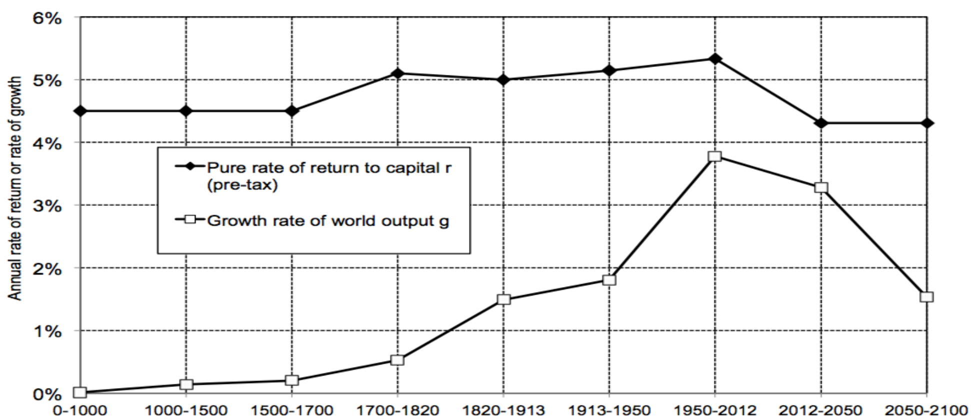
Source: Thomas Piketty, *Capital in the 21st Century*

As it is possible to highlight the number of billionaires rose dramatically in the period between 1987-2013; in 1987 there were 140 billionaires, whereas in 2013 there were 1400, this means a tenfold increase. For what concern the total wealth of billionaires it is possible to notice that rose from $300 billion in 1987 to $5.400 billion in 2013. But these numbers do not explain too much about the rising inequality in the world, they just tell us that wealth increased a lot in the last years. What is necessary to take into account in order to better understand the rising inequality is the average real growth rate per year considered in the same period between 1987-2013. The highest global wealth facilities (the top I) have grown at 6%-7% per year versus 2.1% for average global wealth, these rates are net of inflation[83]. This means that the gap between the richest and the average has considerably widened. This situation happens because money tends to reproduce itself[84], I will explain this concept by providing two examples that Piketty pointed out: the financial situation of Bill Gates – the founder of

[83] Thomas Piketty, *Capital in the 21st Century,* Table 12.1
[84] Thomas Piketty, *Capital in the 21st Century,* 440

Microsoft – and the financial situation of Liliane Bettencourt – the heiress of L'Oreal, the world leader in cosmetics which was founded in 1907 by her father Eugène Schueller, –; Bill Gates in the period between 1990-2010 increased his fortune from $4 billion to $50 billion whereas in the same period the fortune of Liliane Bettencourt increased from $2 billion to $25 billion which a rise of 13% of annual rate even if the heiress of L'Oreal never worked in her life[85]. This tells us that "once a fortune is established, the capital grows according to a dynamic of its own, and it can continue to grow at a rapid pace for decades simply because of its size"[86], and this economic mechanism can have tremendous effects in terms of distribution of wealth. I will now consider the problem of inequalities by using another concept developed by Piketty in his masterpiece: the connection between the rate on return on capital (r) and the economy's growth rate (g). It is an undisputable historical evidence that *r* was greater than g over an extended period period of time[87]. In the figure below it is possible to highlight the historical trend of r and g:

Figure 10: Rate on return on capital and economy's growth rate



Source: Thomas Piketty, *Capital in the 21st Century*

This figure tells us that r has always been greater than g, but in different ways: indeed we see that the gap was reduced during the twentieth century and widen again

[85] Thomas Piketty, *Capital in the 21st Century,* 440
[86] Ibid.
[87] Thomas Piketty, *Capital in the 21st Century,* 353.

in the twenty-first century when g is expected to be between 1% and 2,8%[88] and r is expected to remain stable around 4,5%. But which are the effects of r>g? As argued by Piketty the fact that the return on capital is clearly and continuously greater than the growth rate is a "powerful force for a more unequal distribution"[89]. In order to better understand what is an unequal distribution it could be useful to use the Gini coefficient, which is an indicator that measures the inequality of a distribution; it is usually used to measure the "inequality of the income distribution of a country's residents"[90]. The Gini coefficient is a number from 0 to 1, where 0 means perfect equality (everyone receives the same income), and 1 represents perfect inequality (a person earns the total income of country).

Gini coefficient is defined as the ratio of the area between the line of perfect equality and the Lorenz curve[91] so in formula that means, G=A/A+B. As all the indicators also the Gini coefficient has advantages and disadvantages: the main advantages is, with no doubt the fact that it is simple enough to be compared between different states and easily interpreted. The statistics related to GDP are often criticized as not representing the changes of the entire population; the Gini coefficient shows how income may change for rich and poor. If the Gini coefficient rises with GDP, it means that the state of poverty is not changing for the majority of the population. The main disadvantage of the Gini coefficient, as argued by George Deltas is the "small-sample bias", indeed, the Gini coefficient of a large population based on a small sample will be lower than the Gini of the entire population, in the same way, the Gini

[88] Marian Leimbach, Elmar Kriegler, Niklas Roming, Jana Schwanitz. "Future growth patterns of world regions A GDP scenario approach." *Global Environmental Change*.
[89] Thomas Piketty, *Capital in the 21st Century,* 361.
[90] *Investopedia*, http://www.investopedia.com/terms/g/gini-index.asp (Accessed 21 August 2015).
[91] Definition of Lorenz Curve in the figure above, it is the "straight diagonal line represents perfect equality of wealth distribution; the Lorenz curve lies beneath it, showing the reality of wealth distribution. The difference between the straight line and the curved line is the amount of inequality of wealth distribution, a figure described by the Gini coefficient". *Investopedia,*http://www.investopedia.com/terms/l/lorenz-curve.asp (Accessed 21 August 2015).

will be smaller for a little country rather than a big one, that is why is difficult to compare the Gini between Europe and US[92]

Even though, as mentioned above, the Gini coefficient could have some disadvantages it could be useful in order to understand better the different levels of inequality between countries. Since space does not allow a prolonged discussion, I will focus my attention on macro-areas to have a frame of the different regions of the world.

According to data provided by the World Bank[93] we can easily say that the most egalitarian region of the world (considering the Gini coefficient) is the European Union (EU) with some differences within it, especially between North and South. In countries like Sweden or Norway, the Gini coefficient is around 0,25 whereas in countries like Italy and Spain is around 0,36. In the U.S. the Gini coefficient is 0,41, which means that there are more inequalities than in Europe, this result could be explained by the presence in the U.S. of a hypermeritocratic society, as mentioned above. Continuing with my analysis, I might affirm that the region with most inequalities is South America: in Brazil the Gini coefficient is 52,7, in Colombia 53,5 and in Argentina is 43,8.

I will now move my analysis to the relationship between finance and inequality by focusing the research on the effects that finance could have had in rising inequality that characterized last years.

First and foremost as argued by Claessens and Perotti unequal access to finance may cause "unequal opportunities which can reinforce any initial economic

[92] George Deltas, "The Small-Sample Bias of the Gini Coefficient: Results and Implications for Empirical Research", *The Review of Economics and Statistics*, February 2003, 85(1): 226–234.
[93] World Bank, Gini Index, http://data.worldbank.org/indicator/SI.POV.GINI/ (Accessed 21 August 2015).

inequality"[94]. There are many theories in regard to the relationship between finance and inequality: some theories[95] affirm that financial development enhances growth and reduces inequality; this may happen because there would be more efficiency in the capital allocation that would generate a reduction in income inequality. But what if this relationship would be reversed?

It is certainly true that financial development aggregates growth and thus creates more benefits for a country by improving capital allocation, but this assumption is valid only with some levels of economic development, indeed at early stages of development (which is the situation of the emerging countries) only rich people can have benefits from better financial markets[96] that is why in countries like Brazil, as illustrated before, the Gini coefficient is very high.

Inequality, as revealed by a World Bank Report[97] is not just matter of bad luck or historical backgrounds; it is also a matter of inequality of access to economic opportunities, indeed as pointed out by Patrick Honohan, the real question is not whether people may use financial services, but if people may have real access to them[98] because it is the problem of access to basic financial services (deposits, payments, insurance and credit) that creates inequalities between people. As revealed by some data, in the high income countries about 90 percent of the households use financial services[99], whereas in the developing countries only one-quarter of the population has access to basic financial services.

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[94] Stijn Claessens, Enrico Perotti "Finance and inequality: Channels and evidence," *Journal of Comparative Economics* 35, (2007): 748–773

[95] Philippe Aghion, Patrick Bolton, "A theory of trickle-down growth and development," *Review of Economic Studies* 64, (1997): 151–172.

[96] Stijn Claessens,Enrico Perotti "Finance and inequality: Channels and evidence," 750.

[97] The World Bank. 2005a. World Development Report. Equity and Development. Washington, D.C.: The World Bank
http://wwwwds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2005/09/20/000112742_20050920110826/Rendered/PDF/322040World0Development0Report02006.pdf (Accessed 21 August 2015).

[98] Honohan, Patrick. 2006. Household financial assets in the process of development. Policy, Research working paper; no. WPS 3965. Washington, DC: World Bank.

[99] Stijn Claessens, Enrico Perotti "Finance and inequality: Channels and evidence," 752.

As it has said before, money tends to reproduce itself, and that is the main reason of economic inequality because with money it is easier to have access to financial services and to overcome the natural barriers, represented by high-fixed costs imposed by financial institutions. It is important to take into account that economic inequalities may upraise both in developed and developing countries: the main difference, in this case, is the fact that in developed countries more people have access to financial services than latter, but inequalities may persist, it is only the gap rich and poor that is smaller. But as Demirguc-Kunt and Levine assess finance may arise many inequalities between "who can start a business and who cannot, who can pay for an education and who cannot, and can influence the degree to which a person's economic opportunities"[100] are linked to economic capabilities so eventually finance can shape the gap between the rich and the poor, that is why finance operate both on the extensive and on intensive margin. By working on the extensive margin finance may increase the availability of financial services because it overthrows the economic barriers, so in this way finance shapes the gap between the rich and the poor in a redistributive way. But it is also true that finance also operates on the intensive margin "enhancing the financial services of those already accessing the financial system, which are frequently high-income individuals"[101], and in financial systems that do not lower the fixed costs of accessing to financial services only the quality of the services will be increased instead of enlarging the quantities so that poor that cannot afford the fixed costs will not have access to that kind of financial systems[102]. So if finance operates on the intensive margin, the gap between rich and poor will wide both in terms of distribution of income and disparities in economic opportunity.

[100] Demirguc-Kunt and Ross Levine. "Finance and Inequality Theory and Evidence." Cambridge, Massachusetts: National Bureau of Economic Research, 2009.
[101] Demirguc-Kunt and Ross Levine. "Finance and Inequality Theory and Evidence." 2.
[102] Jeremy Greenwood and Boyan Jovanovic. "Financial Development, Growth, and the Distribution of Income," *The Journal of Political Economy*, Vol. 98, No. 5, Part 1. (Oct., 1990), 1076-1107.

As argued before one of the major concerns that create economic inequality is the unequal access to economic opportunity and, for sure, finance plays a fundamental role again, because "financial development could widen the distribution of income by increasing the returns to skills or the returns to entrepreneurial ability"[103]. This concept is strongly related to the inequality of access financial services. Indeed, if a brilliant entrepreneur profitably uses a bank loan to realize his dream of creating a business, he will have an increase in his income that other people, maybe less talented, have not experienced. The problem that I am trying to point out is the access to a bank loan, or generally speaking to financial services, that most people do not have, so they cannot create a business. The fact that many people are not even able to create a business because of high-fixed costs will widen the gap between who has access to financial services and who has not. This situation will strengthen the connection between the parental wealth and economic opportunity.

It could be interesting analysing the connection between the Global Financial Crisis and the inequality of income: as noted above the financial crisis was mainly cause by speculative finance, which seems to be only interested in enlarging bonus of the "wolf of Wall Street" rather than facilitating the access to financial services. As argued by Zingales there were two surveys useful in order to understand people's perception in regards of finance and its possible benefit to the economy. The benefit that may derive from finance could have a great impact in diminishing the gap between the rich and the poor, but as stated by these two surveys it seems that finance does not have a positive effect both on economic growth and economy. Indeed "57% of readers of The Economist (not a particularly unsympathetic crowd) disagree with the statement that financial innovation boosts economic growth"[104]. And when was

[103] Demirguc-Kunt and Ross Levine. "Finance and Inequality Theory and Evidence." 22.
[104] L.Zingales, "Does finance benefit society", *The American Finance Association",* 47'12'', April 6, 2015.

asked to a sample of American if the U.S. financial system has hurt or benefit the U.S. economy, the 48% affirmed that it hurt it whereas only the 34% thought that it took some benefits[105].

This sentiment was only exacerbated by the outburst of the Global Financial Crisis of 2007 because many people thought that the financial sector caused the crisis so that the trust towards American bankers has dropped dramatically.

There are two sentiments that affect our mind towards the financial sector: first, it is widely accepted that people like Bill Gates, who accumulates enormous amount of wealth, gain good reputation because people have experienced Bill Gates' inventions. The same is not true for the financiers because the reason for their vast amount of wealth is not easily understood and generates envy and public resentment.

Second, as suggested by Zingales what is perceived by the society is that the financial system is a fraudulent one and some evidence in the period prior the financial crisis showed the total absence of transparency that characterized that time allowing fraudulent practises. In that case, the public resentment transforms itself into rage[106] because people cannot enjoy the possible benefits, that derive from financial development.

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[105] Financial Trust Index survey 1 Chicago Booth-Kellogg School, December 2014. The survey, conducted collects information on a representative sample of 1,000 American households.
[106] L. Zingales, "Does finance benefit society" 5

2

Regulation

2.1 Introduction

In this chapter, I will try to analyse the regulatory process in the fields that I have explored in the previous chapter: financial crisis, environmental crisis, inequality of income.

In 2.2 I will start my reasoning by examining the regulation in the period prior to the Global Financial Crisis and the regulatory responses that the policy makers have tried to propose in the subsequent aftermath; then in 2.3 I will consider the environmental degradation in light of the environmental laws proposed at the international level and its limit of applicability due to states' sovereignty.

2.2 (De)regulation in finance

This argument is one of the most debated in the last years, and many scholars have attributed the outburst of the Global Financial Crisis to the deregulation process that characterized the U.S. from the 1980s onward. I will now focus my attention on the regulatory responses to the Global Financial Crisis, but to analyze them it is necessary a little step back and take into consideration the changes in the financial sector which were not accompanied by regulatory measures.

The field of financial regulation gained its importance in the aftermath of the Great Depression of the 1930s where, to restore the confidence in the banking system, many actions had been taken. The most important of which is the Banking Act of 1933 also called Glass-Steagall. This name derives from the two people that sponsored this measure: the Senator Carter Glass, who was a former Treasury Secretary and the Republican Henry Steagall who later became chairman of the House Banking and Currency Committee.

The Banking Act introduced two important novelties to mitigate the speculation that characterized the years before 1929:

- The creation of the Federal Deposit Insurance Corporation (FDIC) to "encourage stability in the financial system through the promotion of sound banking practices"[107].
- The second measure included the introduction of a clear separation between commercial banking and investment banking. The two activities could not be carried out by the same agency, thus having the separation

[107] *Investopedia*, http://www.investopedia.com/terms/f/fdic.asp (Accessed August 25).

between commercial banks and investment banks. The rationale behind this measure was to prevent that the bankruptcy of the broker will also entail the failure of the bank, thereby preventing that the real economy was directly exposed to the risk of adverse events that regards purely financial activities[108].

The Banking Act of 1933 is the benchmark in regarding the regulatory process in the aftermath of the Great Depression of 1929 and the responses given by government after 1929 helped in not having crises for almost 50 years[109]. Fullenkamp and Sharma brilliantly argue the problem that we wait until risks materialize so that taking effective reforms is more challenging and "resources to enact and implement are difficult to garner"[110].

The aftermath of the Great Depression was characterized by a high level of regulation in the financial sector and in some ways the latter was responding to the need of the population. The situation started to change in the 1980s because of two main reasons: first, an increase in the complexity of the financial products such as derivatives options and swaps, which join the more traditional products such as the bank loans and mortgages and second finance started to get rid of regulation.

With the arrival of new financial products in the market it was clear that new regulatory policies were necessary, but instead of regulating more, a process of deregulation started[111]. Deregulation was supported by government intervention through a series of legislative measures aimed at thinning the relationships between financial markets and banks.

[108] George J. Benston, *The Separation of Commercial and Investment Banking: The Glass–Steagall Act Revisited and Reconsidered*, (New York: Oxford University Press, 1990).
[109] Elizabeth Warren, "Sold!", Don Rather Reports, 4'56'', https://www.youtube.com/watch?v=PS3C5WvVPvA (Accessed August 25).
[110] Sunil Sharma and Connel Fullenkamp, "Good Financial Regulation: Changing the Process is Crucial", (February 7, 2012). Available at SSRN: http://ssrn.com/abstract=2044217 (Accessed August 25, 2015)
[111] Elizabeth Warren, https://www.youtube.com/watch?v=PS3C5WvVPvA (Accessed August 25,2015).

First, the elimination of the commission in the stock exchange has made the financial markets more attractive.

Second, the elimination in 1986 of the so-called "Regulation Q", which was a regulation

> "That prohibited banks from being able to pay interest on deposits within checking accounts. Regulation Q was enacted in accordance to the Glass-Steagall Act of 1933, to limit loan sharking and other such unseemly actions. In addition, it motivated consumers to release funds from these accounts and put them into money market funds"[112].

With the abolition of the Regulation Q banks may also continue to fundraise simply raising interest rates offered to investors; after all, they usually concede loans with a variable interest rate in order to maintain their spread stable (if the rate offered on deposits have been increased they would have increased to the same extent that charged on loans). In the presence of a spread constant in time, the gain of the banks depends on the amount of funds that can mediate. This mechanism allows banks to offer more credit so that prompting the various sectors of the economy into debt.

The consequence that derives from this process is that banks have the perception that they were safe because of the spread stability whereas the real risk is the insolvency of the debtor due to the interest rate variability.

Third, which is the signal piece towards deregulation, is the repealing of the Glass-Steagall Act in 1999 with the Financial Services Modernization Act commonly called Gramm–Leach–Bliley Act (GLBA) from the name of the co-sponsors of this Act.

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[112] *Investopedia*, http://www.investopedia.com/terms/r/regulationq.asp (Accessed August 25,2015).

The main innovation introduced by the GLBA was the removal of the prohibition of merging between commercial banks, investment banks, and the insurance companies. The result was a total change of the culture of commercial banks in order to emulate the speculative attitude of the Wall Street companies, indeed as brilliantly argued by Stiglitz "Commercial banks are not supposed to be high-risk ventures; they are supposed to manage other people's money very conservatively"[113]. So with GLBA they were not just repealing the Glass Steagall, they were repealing an entire culture, based on the trust between the commercial banks and the investors. This marks the path for the coming out of the investing-bank culture because there was a high demand for high profits that can be reached only through high risk taking and big leverage[114].

In substance, the GLBA was the just the result of a long process of lobbying carried out by financial institutions since the 1980s[115], indeed even "if the Congress did not repeal the Glass-Steagall Act in the 1980s, the Federal Reserve Bank reinterpreted sections of it to allow banks to earn up to 5% of their revenue from securities transactions. By the end of the 1980s, the limitation was raised to 10% of revenues"[116].

This process continued throughout the 1990s because in 1996 the limitation was raised again to 25% set forth the repealing of the Glass-Steagall Act.

In 1998, in an act of corporate civil disobedience, Citicorp (a banking giant) and Travelers Group (an insurance company) announced their merger. Such an act was not in compliance with the Glass-Steagall Act, for the reasons mentioned above, but was excused thanks to a loophole that provided a two-year period of review for the

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[113] Joseph E. Stiglitz, *The Great Divide: Unequal Societies and What Can We Do About Them*, (New York: Norton, 2015), 43.
[114] Ibid.
[115] Corinne Crawford, "The Repeal Of The Glass- Steagall Act And The Current Financial Crisis", *Journal of Business & Economics Research* 9, no.1 (2011).
[116] Ibid.

proposed mergers. Also, chairman of Travelers affirmed that he would expect a change in the legislation that may allow this kind of financial mergers[117].

In fact, as mentioned above, the legislation has changed and was voted with an overwhelming majority both in the House of Representatives and in the Senate. To show the relation between deregulatory procedures and the financial crisis it might be useful to quote the words of the U.S. Senator Byron L. Dorgan, Democrat of North Dakota at the time of the repealing of the Glass-Steagall with GLBA:

> "I think we will look back in 10 years' time and say we should not have done this but we did because we forgot the lessons of the past, and that that which is true in the 1930's is true in 2010, I wasn't around during the 1930's or the debate over Glass-Steagall. But I was here in the early 1980's when it was decided to allow the expansion of savings and loans. We have now decided in the name of modernization to forget the lessons of the past, of safety and of soundness."[118]

In some ways, it might be arguable that Senator Dorgan was prophetic in considering the possible consequences of the repealing of Glass-Steagall.

Others argued that the GLBA would stimulate financial institutions to merge and creating enormous financial conglomerates that would dominate not only the U.S. financial system but also its democracy, and put at risk the entire financial stability of the nation because they would not have adequate regulatory safeguards. It was not modernization because the taxpayers, in the case in which one of these conglomerates failed, would have paid an enormous bill in to save what was "too big too fail"[119].

As brightly asserted by Elizabeth Warren:

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[117] Mitchell Martin, "Citicorp and Travelers Plan to Merge in Record $70 Billion Deal: A New No. 1:Financial Giants Unite," *International New York Times*, April 7,1998.
[118] Stephen Labaton, "Congress Passes Wide-Ranging Bill Easing Bank Laws," *International New York Times*, November 5, 1999.
[119] Financial Services Modernization Act Of 1999, Conference Report, Senate, November 4, 1999[page: S13871] 11.

> " we can live in a world of ups and downs (…) let's just ride the roller coaster wherever it goes but (…) we have to remember that when it goes down it does not just take down people who gamble, it does not just take down people who invested on Wall Street, it takes down everybody whose got a pension"[120].

To conclude my reasoning on the deregulation of the U.S. as one of the major responsible of the Global Financial Crisis[121] it might be useful to quote the words of Barack Obama when he was the Presidential Candidate:

> "A regulatory structure set up for banks in the 1930"s needed to change. But by the time the Glass-Steagall Act was repealed in 1999, the $300 million lobbying effort that drove deregulation was more about facilitating mergers than creating an efficient regulatory framework (…) Unfortunately, instead of establishing a 21st century regulatory framework, we simply dismantled the old one (…) thereby encouraging a winner take all, anything goes environment that helped foster devastating dislocations in our economy."[122]

Once I have tried to analyze in depth the deregulation, the role of financial institutions in modifying the rules of the game and their possible connection with the financial crisis, it is now time to move my reasoning towards the new regulation that came out in the immediate aftermath of the Global Financial Crisis and try to understand if the role of finance has changed and if it has learnt the lesson from the past.

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[120] Elizabeth Warren, https://www.youtube.com/watch?v=PS3C5WvVPvA (Accessed August 25).
[121] James Crotty. "Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture." *Cambridge Journal of Economics* (2009): http://www.peri.umass.edu/fileadmin/pdf/conference_papers/SAFER/Crotty_Structural.pdf (Accessed 11 August 2015).

[122] Barack Obama "Renewing the American Economy," speech at Cooper Union March 27, 2008*, New York Times*, 3/28/08.

I will begin my analysis by considering, once again, the responses given by the US in terms of financial regulation; then I will analyze, at the global level, the major institutions created in the aftermath of the Global Financial Crisis: the Financial Stability Board (FSB).

The most important innovation in the regulatory field in the U.S. is the Dodd-Frank Wall Street Reform and Consumer Protection Act, commonly called Dodd-Frank from the name of the co-sponsors of the law.

The President Barack Obama signed this federal law on July 21, 2010. It passed as a primary response to the global financial crisis, and it is the most important intervention in regulation since the Glass-Steagall Act of 1933.

The Dodd- Frank was characterized by four major purposes[123]:

- Make the financial system more transparent and accountable;
- Preventing institutions from becoming too big too fail;
- End of the Government bailout funded by taxpayers;
- End risky and abusive financial services practices.

One of the most debated controversies of the Dodd-Frank was the introduction of the so-called Volcker Rule, which takes the name from the former U.S. Federal Reserve Chairman Paul Volcker. The Volcker rule was not included in the President Obama's first proposal in 2009.

This rule was so much debated because of its importance and limitations of the banking system, indeed it aimed at prohibiting the proprietary trading which is, defined by the Volcker Rule in the following manner:

[123] *Investopedia,* http://www.investopedia.com/terms/d/dodd-frank-financial-regulatory-reform-bill.asp (Accessed August 25).

> "The term "proprietary trading", when used with respect to a banking entity or nonbank financial company supervised by the Board, means engaging as a principal for the trading account of the banking entity or nonbank financial company supervised by the Board in any transaction to purchase or sell, or otherwise acquire or dispose of, any security, any derivative, any contract of sale of a commodity for future delivery, any option on any such security, derivative, or contract, or any other security or financial instrument that the appropriate Federal banking agencies, the Securities and Exchange Commission, and the Commodity Futures Trading Commission may, by rule as provided in subsection (b)(2), determine"[124].

The Volcker Rule also aimed at limiting the liabilities that the largest bank can hold in their balance sheet.

As argued by Chatterjee the Volcker rule has regulatory hope comparable to the ones enacted by the Glass-Steagall[125], but the differences lied in what they were trying to regulate, on the one hand Glass-Steagall focused its attention on the structure of banks and prohibited the merger of commercial banks, investment banks and insurance companies, on the other hand the Volcker Rule focused itself on the activities (what a bank can or cannot do)[126].

At first glance, it seems that the Volcker Rule might be able to regulate such a complex financial system, but its efficiency has been highly criticized primarily because many of the activities that caused the financial crisis are still in play today. Chatterjee affirms that the Volcker Rule is just creating busywork for regulatory agencies rather than regulating the financial industry.[127]

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[124] 12 U.S.C. § 1851(h)(4).
[125] R. Rex Chatterjee, "Dictionaries Fail: The Volcker Rule's Reliance on Definitions Renders it Ineffective and a New Solution is Needed to Adequately Regulate Proprietary Trading," 8 BYU INT'L L. & MGMT. REV. 33, 61 (2011), http://ssrn.com/abstract=1857371 (Accessed August 26).
[126] Ibid.
[127] Ibid.

The other novelties introduced by the Dodd-Frank regards the creation of new agencies that have the task of overseeing the banking industry and enforced Dodd-Frank.

In detail these new agencies are:

- Financial Stability Oversight Council (FSOC) with the task of identifying possible threats to the U.S financial stability.[128]
- Office of Financial Research (ORC) with the task of providing technical analysis and financial data to promote financial stability.
- Consumer Financial Protection Bureau (CFPB) will regulate a range of consumer financial services, such as online banking, credit unions and mortgages.
- Federal Insurance Office (FIO) that lacks regulatory authority and will monitor the aspects of the insurance industry, excluding the health one.
- Investor Advisory Committee (IAC) to protect the investors and granting the integrity of the securities in the marketplace.[129]
- Office of Housing Counseling (OHC) that provides advices on matters like purchasing a house and credit issues to give the possibility to the buyer of making responsible choices.[130]

In conclusion, it is important to take into account that the Dodd-Frank have tried to reshape the rating agencies industry. I have pointed out in the first chapter the main

[128] For further reading on this topic see U.S. Department of the Treasury, "Financial Stability Oversight Council," http://www.treasury.gov/initiatives/fsoc/about/Pages/default.aspx (Accessed August 26,2015).
[129] For further reading on this topic see U.S. Securities and Exchange Commission, "Investor Advisory Committee," https://www.sec.gov/spotlight/investor-advisory-committee-2012.shtml (Accessed August 26).
[130] For further reading on this topic see U.S. Department of Housing and Urban Development, "Office of Housing Counseling, " http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/hcc (Accessed August 26).

characteristics of rating agencies, and I have tried to explain the role of the rating agencies in the Global Financial Crisis.

There are two important innovations introduced by the Dodd-Frank in this field: first, rating agencies are now liable for issuing incorrect ratings and second, the Security and Exchange Commission (SEC) may impose sanctions on rating agencies and to bring claims against them for inaccuracy and fraud[131]. Until the Dodd-Frank rating agencies were immune from liability for misstatements under Section 11 of the Security Act of 1933[132]

The SEC should also issue an annual report on internal control and monitor the possible rise of conflict of interests with respect on sales and marketing practices[133].

Some scholars pointed out some concerns about the efficiency of the Dodd-Frank regarding regulation of the credit rating agencies, and its possible adverse effect on the quality of the ratings issued.

The sanctions that may occur to the rating agencies are asymmetric: they might be fined for optimistically biased ratings but not for pessimistically biased ratings[134], therefore in order "to protect (or rebuild) their reputation, credit rating agencies may respond by lowering their ratings beyond a level justified by an issuer's fundamentals"[135]. The authors named this kind of attitude the *reputation effect*.

The unintended effect of the Dodd-Frank would be the issuing of more pessimistic ratings because issuing optimistic ones would have far greater legal and regulatory costs. This means that the rating agencies would lower their rating regardless of their

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[131] Valentin Dimitrov, Darius Palia, and Leo Tang, "Impact of the Dodd-Frank Act on Credit Ratings", *Journal of Financial Economics*, 115, (2015).
[132] Giovanni Majnoni, Richard M. Levich and Carmen Reinhart, *Ratings, Rating Agencies and the Global Financial System* (Boston: Kluwer Academic Publishers), 2002.
[133] U.S. Security and Exchange Commission, "Credit Rating Agencies," https://www.sec.gov/spotlight/dodd-frank/creditratingagencies.shtml (Accessed 27 August).
[134] Anand M. Goel, and Anjan V. Thakor, 2011. "Credit ratings and litigation risk," Unpublished working paper. Navigant Economics and Washington University, Saint Louis.
[135] Valentin Dimitrov, Darius Palia, and Leo Tang, "Impact of the Dodd-Frank Act on Credit Ratings": 2.

data, so that investors would depreciate these ratings and "some of the private information of rating agencies analysts is lost to the market"[136].

At the world level, the major innovation concerning the promotion of financial stability and strengthening the financial system has to be analyzed: the Financial Stability Board (FSB).

The FSB was created in 2009 G20 held in London succeeding the Financial Stability Forum (FSF)[137] with the aim of promoting financial stability through a more strict cooperation between national regulators over the G20 banking system.

As argued by Arner and Taylor "[t]he global financial crisis was as much the result of deficiencies in national regulatory systems as it was due to any shortcomings in the current soft law framework of international standard-setting."[138] It might be said that national deficiencies were more pronounced in some countries (namely the US) rather than in others. But many scholars affirmed that regulatory policies should be harmonized between different countries[139] in order to have a useful indicator of monitoring and evaluation of the financial system, in other words the national regulatory agencies should implement the existing mechanisms for international regulation and supervisory coordination.

One of the most debated issues was the one that regards the behavior of national regulatory supervisors when a crisis occurs: indeed, there are different approaches to handle the crisis that should be harmonized at the international level, but, as the failure of Lehman Brothers showed, the rescue of major bank is "ultimately made by

[136] Ibid.
[137] "G20 Leaders' Declaration, September 2013." *CFR.org*. Council on Foreign Relations, 6 Sept. 2013. (Accessed 27 August 2015).
[138] Douglas W. Arner and Michael W. Taylor, "The Global Financial Crisis and the Financial Stability Board: Hardening the Soft Law of International Financial Regulation?" 32 U. NEW S. WALES L.J. (2009).

[139] Markus Brunnermeier, Andrew Crocket, Charles Goodhart, Martin Hellwig, Avinash D. Persaud and Hyun Shin. "The fundamental principles of financial regulation," Geneva Reports on the World Economy 11. International Center for Monetary and Banking Studies. Geneva, Switzerland (2009).

home country national authorities focusing on national rather than global considerations”.[140]

It might be argued, “financial institutions are international in life [and] national in death.[141] The creation of the FSB aimed at solving the issues mentioned above and its new mandate is to[142]:

- Promote the coordination between national regulatory agencies through the exchange of information;
- Analyze the weaknesses that affect the global financial system;
- Engage in joint action in common problems, and coordinate their respective policy development;
- Create plans for trans-border crises management;
- Coordinate its policy with International Monetary Fund (IMF).

To enhance the existing mechanism of soft law based on a voluntary system, the FSB has created a new framework for having some enforcement measures[143], this is framework is composed by[144]:

- The Standing Committee on Assessment of Vulnerabilities (SCAV) to identifying and assessing risks;

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[140] Lord Adair Turner, *The TurnerReview: A Regulatory Response to the GlobalBanking Crisis* (2009) Financial Services Authority <http://www.fsa.gov.uk/pubs/other/tumer-review.pdf (Accessed 27 August 2015).

[141] *The Economist:* 'banks may be global in life but are national in death.' The Economist, *HomewardBound* <http://www.economist.com/displaystory.cfm?storyid=13057265> . (Accessed 27 August 2015).

[142] Financial Stability Board, Mandate (2009) http://www.financialstabilityboard.org/about/ (Accessed 27 August 2015).

[143] Douglas W. Arner and Michael W. Taylor, “The Global Financial Crisis and the Financial Stability Board: Hardening the Soft Law of International Financial Regulation?” 498.

[144] Financial Stability Board, The Framework (2009), http://www.financialstabilityboard.org/about/ (Accessed August 28 2015).

- The Standing Committee on Supervisory and Regulatory Cooperation (SRC) to give policy responses from the analysis given by the SCAV;
- The Standing Committee on Standards Implementation (SCSI) that should monitor the implementation of the FSB policies.

I have tried to analyze the structure and the goals of the FSB established in 2009, I would now focus my attention over the criticisms that characterize the birth of this international institution.

Helleiner pointed out five main flaws[145]:

- At the operational level the FSB should develop more efficient mechanisms to monitor and ensure compliance; directly connected to this is the problem that FSB does not specify the penalties for non-compliance members causing a diminishing in its authority;
- The production of effective international standards that will minimize the possibility of bursting of crisis such as the one of 2007. In fact the development of unique international standards is hard to achieve since, as mentioned above, the financial products evolve constantly and also because of the "tendency of policy makers to fight the last battle rather than the next one"[146]. On this matter it has to say that reconciling the needs of developing countries and the developed ones in terms of international standards would be unlikely to reach: after 2007 many topics that may regard the interests of developing countries, such as agriculture and the role that restrictions on cross-

[145] Eric Helleiner, (2010) "What Role for the New Financial Stability Board? The Politics of International Standards After the Crisis," *Global Policy*, 1 (3), pp. 282–290.
[146] Eric Helleiner, (2010) "What Role for the New Financial Stability Board? The Politics of International Standards After the Crisis: 287.

border financial movements can play as countercyclical regulatory tools have not been addressed by the regulatory agenda;

- "The legitimacy of the FSB may well quickly become a highly politicized issue among non-members because of its narrow membership"[147]. The only way to increase its legitimacy is the transformation of the FSB into the *fourth pillar* of global economic governance beside the IMF, World Bank and the World Trade Organization (WTO). An alternative way for maintaining this narrow numbers of participant might be the FSB accountability to a universal body such as International Monetary and Financial Committee (IMFC);

- The problem of legitimacy does not regard solely non-members but also within its members' regulatory agencies. If the FSB wants to regulate issues that may threaten the financial stability of a country (affecting the societies), it will enable "a broader set of societal interests to have their voices heard in its deliberations"[148]. On this matter it seems that the FSB has started with the wrong foot: indeed in its charter it is stated that in the development of strategic plans "the FSB should consult widely amongst its Members and with other stakeholders including private sector and non-member authorities"[149]. This Article of the Charter might be controversial above all in time of crisis, when many may think that the private sector was the main cause of the Global Financial Crisis.

- The FSB should clarify its relationship with other global governance institutions. It is clear that the institution that has the major connection with FSB is the G20, as the FSB was born after a G20 meeting, this fact gave it

[147] Ibid.
[148] Ibid, 288.
[149] "Charter of the Financial Stability Board," Art 3 (1), (June 2012), http://www.financialstabilityboard.org/wp-content/uploads/FSB-Charter-with-revised-Annex-FINAL.pdf (Accessed August 28, 2015).

greater authority in global economic governance but its successes would be strictly linked to the FSB's capacity to steer within populous international institutional context.

I have framed the deregulation process that characterized the period from the 1980s onward, then I have analysed the possible connections between that kind of deregulation and the global financial crisis and, in the end, I have tried to consider the regulatory responses given to the Global Financial Crisis both in the U.S. (Dodd-Frank) and at the international level (FSB).

I have pointed out the limits emerged from this kind of responses above all concerning enforcement and transparency. For the future of the regulation of global financial system, something more is expected: as argued by Claessens and Kodres, the time of reforms is usually in the immediate aftermath of the crises and many times the responses given are superficial, they do not attack the core of the problem, so that reforms remain incomplete. Additionally, reform process takes time to be implemented, in that time "the public cries for reform diminish and financial sector lobbyists regroup to water down the reforms they perceive as lowering their profitability. The energy for reforms wanes and the perception of the benefits become distant memories"[150].

In conclusion, it might be affirmed that many steps have been taken in the right direction, but there is a long way to go to reform the global financial system.

[150] Stijn Claessens and Laura Kodres, *IMF Working Paper*: *The Regulatory Responses to the Global Financial Crisis: Some Uncomfortable Questions.* (USA: INTERNATIONAL MONETARY FUND, 2014).

2.3. Regulation and Environment

International Environmental Law (IEL) governs the aspects of environmental regulations.

As pointed out in the first chapter, we are experiencing a process of environmental degradation, which is having grave consequences not only for the world in which we are living but also on our health, indeed many experts affirm that there is a strong connection between environmental degradation and various diseases.[151]

Regulating the environment has always been a complex issue above all for two main reasons: first, it is a broad and challenging argument to handle, and second, states are usually reluctant in giving up part of their sovereignty in favour of supranational authorities that may enforce IEL.

The Environmental Treaties are subject to the general rules of the treaties established in the Vienna Convention of 1969[152] and the customary rules[153]. Nonetheless, some distinctive features characterize Environmental Treaties[154]:

- The presence of a framework agreement focused on general contents;
- This framework is followed by the adoption of a protocol on specific details;
- The use of appendix, which includes technical provisions.

[151] World Health Organization (WHO), "Ambient (outdoor) air quality and health " (2014).
[152] United Nations, Vienna Convention on the Law of Treaties, 23 May 1969, United Nations, Treaty Series, vol. 1155, p. 331, available at: http://www.refworld.org/docid/3ae6b3a10.html (accessed 28 August 2015).
[153] P. Sands, J. Peel, *Principles of International Environmental Law*, 2nd ed., Cambridge University Press, 2012, 98.
[154] Ibid.

This three-tiered approach guarantees a high level of flexibility, allowing amendments that concern scientific and economic development.

It might be argued that regulating the environmental field it is more difficult that regulating the financial one, even though many steps had been taken in order to live in a more sustainable manner. The history of IEL might be dated to the end of the Second World War (WWII) when the first important environmental conference took place in 1949: United Nations Conference on the Conservation and Utilization of Resources (UNCCUR).

This conference was mainly based on the use of resources for both reaching requirements for industrialization and agricultural living standards. The other purpose of the conference was to educate people in conserving resources, starting from the assumption that they are not unlimited. The role of experts was fundamental in exchanging information about natural resources that might serve to the government in developing techniques that took into account both the quality of health and living.

After the conference of 1949 the protection of the environment was not on the agenda of the political leaders for several years, indeed, the other Conference concerning environmental issues was held only in 1972: the United Nations Conference on the Human Environment (UNCHE), but is commonly name the Stockholm Conference because Stockholm was the hosting city.

The contents of the final Declaration of the Stockholm Conference were much more accurate of those identified in 1949. For the first time, two concepts were addressed with high concern: the human capacities of transforming the environment on unprecedented way and the endangering the environment might have serious implications for the human well-being[155].

[155] Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972.

The main innovation introduced by Stockholm was the one specified in Principle 21, which states that:

> "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction".[156]

This Principle represents the benchmark of the IEL because it affirms the possibility for the states of exploiting their natural resources in compliance with their environmental regulation, but it also affirms the prohibition of trans boundary pollution that may endanger the environment of another country[157].

In the environmental field one of the most important principles is the "sustainable development". The Brundtland Commission Report (World Commission on Environment and Development, 1987) furnished the first definition of Sustainable Development which is the:

> "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[158]

As asserted by many scholars, the concept of Sustainable Development has a broad range of applicability, mainly in three distinct fields: economy, environment

[156] Report of the United Nations Conference on the Human Environment, Stockholm, 5-16 June 1972. Principle 21.
[157] P. Sands, J. Peel, *Principles of International Environmental Law*, 2nd ed., Cambridge University Press, 2012, 196-198.
[158] Brundtland, G., M. Khalid, S. Agnelli, S. Al-Athel, B. Chidzero, L. Fadika, V. Hauff, I. Lang, M. Shijun, M. Morino de Botero, M. Singh, S. Okita, and A. Others (1987, May). Our Common Future ('Brundtland report'). Oxford Paperback Reference. Oxford University Press, USA.

and society[159]. This concept has been highly criticized for its haziness and extent, and some scholars noted that the definition was intentionally broad in order to gain widespread acceptance[160].

Sustainable Development and its wide applicability will be analysed in the next chapter.

After the Stockholm Conference mentioned above, many countries have taken steps to mitigate environmental degradation, even though rules and regulation are far from being universal.[161]

Another important point of the development of IEL is, with no doubt, the polluter pays principle, which affirms, "The costs of pollution should be borne by the person responsible for causing the pollution"[162]. The Organization for Economic Co-operation and Development (OECD) was the first institution speaking about that principle in 1972, above all for encouraging a sustainable use of resources and avoiding distortions in international trade and investments[163]. The rationale that lies behind this principle is quite simple: if someone wants to invest in activities that may jeopardize the environment will have to compensate by paying for his damage. The problem that may upraise from an irresponsible use of this principle is that evaluating the extent of the environmental damages may be difficult, and most of the times compensation do not offset the degradation entirely. Taking into account this, it seems that finance may consider profitable investing in projects that cause environmental damages, but ensure enormous profits, rather than investing in projects that may cause less impair to the environment but that are also less profitable.

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[159] Bob Giddings, Bill Hopwood and Geoff O'Brien,(2002), Environment, economy and society: fitting them together into sustainable development. Sust. Dev., 10: 187–196.

[160] Ibid, 188.

[161] Susmita Dasgupta , Ashoka Mody , Subhendu Roy & David Wheeler (2001) Environmental Regulation and Development: A Cross-country Empirical Analysis, Oxford Development Studies, 29:2, 173-187 http://dx.doi.org/10.1080/13600810125568 (Accessed August 29, 2015).

[162] P. Sands, J. Peel, *Principles of International Environmental Law*, 2nd ed., Cambridge University Press, 2012, 228.

[163] OECD Council Recommendation, C(72) 128(1972), 14 ILM 236 (1975).

In continuing the analysis over the IEL, it is necessary to cite the most significant commitment of governments in the environmental field was, with no doubt, the United Nations Conference on Environment and Development (UNCED), commonly named "Earth Summit", held in Rio de Janeiro in 1992. In that conference there was a massive representation of countries (172) and 116 of them sent their respective heads of government.

The two main topics of the Conference were the use of alternative source of energy in order to replace the heavy consumption of fossil fuels (as showed in the first chapter), and the growing scarcity of water.

Three documents were the outcomes of the UNCED:

- Rio Declaration on Environment and Development, which is composed by 27 Principles that should guide the improving of Sustainable Development around the world;[164]
- Agenda 21, which is a non-binding voluntarily action plan of the United Nations for the improvement of Sustainable Development, it is composed of 40 Chapters that address more or less all the aspects of the human life, and specified the cross implementation of Sustainable Development through every level of the government;
- Forest Principles is the informal name given to the Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests (1992)[165]. It pointed out several recommendations for the use and the conservation of forests.

[164] For the full text see UN Doc. A/CONF.151/26 (vol. I) / 31 ILM 874 (1992).
[165] For the full text see UN Doc. A/CONF.151/26 (Vol. III) 1992.

The UNCED represented a watershed in the IEL because many fundamental principles were affirmed in the Rio Declaration on Environment and Development.

First, the precautionary principle affirmed in Principle 15 states that:

> "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation"[166].

In the first chapter I have analysed the problem of environmental degradation, this Principle aims to provide the guidelines for the application of IEL where there is scientific uncertainty. The legal status of this principle is experiencing a continuous evolution and in Europe it has achieved the customary status, indeed, it is an establishing feature of the Treaty on the Functioning of the European Union (TFEU)[167].

In addressing the problem of climate change another important international environmental treaty resulted from the Earth Summit: the United Nations Framework Convention on Climate Change (UNFCCC).

The primary objective of this treaty is "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"[168].

The most important result achieved by the UNFCCC is the adoption of the Kyoto Protocol in 1997, which sets emission targets for developed countries that are

[166] UN Doc. A/CONF.151/26 (vol. I) / 31 ILM 874 (1992).
[167] European Union, Consolidated Version of the Treaty on the Functioning of the European Union art. 191, 2008 Official Journal of the European Communities C 115/47.
[168] UN General Assembly, United Nations Framework Convention on Climate Change: resolution / adopted by the General Assembly, 20 January 1994, A/RES/48/189.

binding under the international law. Two conditions were required for the entering into force of the Kyoto Protocol:

- Ratification by at least 55 countries involved in UNFCCC (reached when Iceland ratified it in 2002);
- The ratifying countries should represent at least the 55% of the total emission of carbon dioxide in 1990 (ratified when Russia ratified in 2004).[169]

Many were the critics moved to the Kyoto Protocol: first of all, the mechanism of compliance was considered too weak, or better saying, weak in comparison to domestic law[170], second, which is probably its major weakness, is the non-ratification of the U.S. which in 1990 accounted for the 36% of the total emission of carbon dioxide.

If it is possible the strength of the Kyoto Protocol is even diminished in last years, because of the Canadian withdrawal due to the fact that it had not reached the goals set in Kyoto (the emissions were 17% higher than in 1990), so that Canada would not withdraw from the Protocol it would have been heavily sanctioned. Canada became the first country to withdraw formally from Kyoto and motivated this choice because the Kyoto Protocol does not cover all major emitters of greenhouse gasses, notably the United States and China[171].

In 2014, in the negotiations held in Lima in order to agree on a post-Kyoto legal framework that would obligate all major polluters to pay for CO2 emissions, was a complete failure, since three of the major polluters of the world namely India, China

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[169] Larry West, "What is the Kyoto Protocol". *About.com (Part of NYT).* http://environment.about.com/od/kyotoprotocol/i/kyotoprotocol.htm (Accessed 31 August, 2015).

[170] Michael Grubb, "The Economics of the Kyoto Protocol," *WORLD ECONOMICS* Vol. 4 No. 3 July–September 2003.

[171] David Ljunggren and Randall Palmer, "Canada to pull out of Kyoto protocol," *Reuters. Financial Post,* December 13, 2011.

and U.S. affirmed that they would not ratify a binding treaty that regards limitations to CO2 emissions.

Also, the data show that the Kyoto Protocol is not sufficient in fighting climate change and control the GHGs emissions, in 2006 the carbon dioxide emissions have grown of 24%[172]. The World Bank also affirmed that the treaty gave little help to developing countries in assisting them in the reduction of emissions[173].

After the Kyoto Protocol signed in 1997, the commitment of the States in terms of regulations in the environmental field has slackened. Two are the primary example of failures in the regulatory process: the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002 and the United Nations Climate Change Conference, commonly known as the Copenhagen Summit, held in Copenhagen in 2009.

The WSSD of Johannesburg was mainly criticized because even if governments recognized the dramatic environmental problems connected to an unsustainable development, they would have done too little above all in terms of new commitments and innovative thinking[174]. The WSSD was made even weaker by the boycott of U.S., which did not send a delegation to Johannesburg.

For what concerns the disappointing measures of the Summit the governments were not able to reach an agreement for what regards the increasing of the contribution of renewable energy's share in the global energy mix. Many were the proposals on this matter; for instance, the EU wanted a contribution up to 15% whereas Brazil advocated a 10%. On the other hand countries such the U.S.

[172] World Bank "Integrating Development into the Global Climate Regime", (2010), 248.
[173] Ibid, 233.
[174] Antonio G. M. La Vina, Gretchen Hoff, and Anne Marie Derose. "The Outcomes of Johannesburg: Assessing the World Summit on Sustainable Development." *SAIS Review*: 53-70.

Australia, Canada, and Japan asked for something more flexible. The outcome of this situation was non-agreement over the contribution of renewable energy.

Also, in climate change the results were unsatisfying. Indeed, the negotiators did not call the U.S. (even if they were not there) to urgently ratify the Kyoto Protocol.

In conclusion, it might be argued that the WSSD was a missed opportunity for the government because they were not able to agree both on the need for reforming the global environmental governance system and on how to ensure effective financing on Sustainable Development[175].

For what concerns the Copenhagen Summit of 2009 it is important to bear in mind that it "was the culmination of two years of intense negotiations on a new global climate agreement"[176].

Unfortunately, the result of the Conference was a total failure: indeed, it was just an agreement among the heads of government that vaguely reaffirmed the limit of the rising temperature to 2C°. In the regards of the financial support of this operation it was created the Green Climate Fund (GCF) for which US$ 30 billion were earmarked, from developed countries to the developing ones in order to assist them in adaptation and mitigation practices to fight climate change. This fund should increase up to US$100 billion a year by 2020[177].

According to Dimitrov the agreement was weak for four main reasons[178]:

- It was non-binding agreement;
- It was made by an undefined number of countries;
- No global targets were set for aggregate emission reductions;

[175] Antonio G. M. La Vina, Gretchen Hoff, and Anne Marie Derose. "The Outcomes of Johannesburg: Assessing the World Summit on Sustainable Development. 62.
[176] Radoslav S. Dimitrov "Inside UN climate change negotiations: The Copenhagen conference." *Review of Policy Research* 27.6 (2010): 796.
[177] Radoslav S. Dimitrov "Inside UN climate change negotiations: The Copenhagen conference," 798.
[178] Ibid.

- It was a free-floating agreement.

After having analysed the most important conferences that regard the process of environmental regulation it might be useful to take into account the principle and rules of IEL in order to better understand how it works.

The principles and rules of IEL are mainly established by treaties and are applied to a range of regulatory techniques that might be divided in two: *direct regulation* and the use of *economic instruments*[179].

The direct regulation concerns primarily the role of the States in instructing the environmental protection bodies to adopt standards that are used in a specific issue. The second part of the direct regulation regards the role of the public authorities, which have the duty to enforce the standards promoted by the State.

The standards fall into three categories[180]:

- The environmental quality standards, which are used in international treaties, define the maximum levels of pollution that are allowed in a given environment. Two are the main approaches for environmental quality standards, first, an absolute prohibition of some activities for avoiding change of any kind in a particular environment, example of that is the prohibition of dumping radioactive waste in the sea; the second approach is more flexible and affirms that a limited alteration of a particular environment due to human activities is acceptable, for instance in the Earth Summit it was affirmed the need of stabilising GHG emissions that would prevent dangerous anthropogenic effect on the climate system;

[179] P. Sands, J. Peel, *Principles of International Environmental Law*, 121
[180] Ibid, 122-123.

- Product Standards, which set the levels for pollutants that, must not be exceeded in assembling a product. Example of these are the limits for ozone-depleting substances in manufacture[181];

- Emission Standards which "set levels for pollutants (…) that are not to be exceeded in emissions from installations or activities"[182] such as the emissions from aircraft.

- Process Standards which should determine the requirements to protect the environment in the installation process.

For what concerns the economic instrument as argued by Sands and Peel they have clearly failed in providing adequate economic incentives in order to prevent environmental degradation.

The international community has tried to move away from the impasse that characterized the regulatory practices in the environmental field. The last major step that has been taken is the agreement reached in Paris in December 2015 by the 195 members of the UNFCCC. Even if is too early to try evaluating the impact of this new agreement, it might be said that this time the international community seemed more determinate in achieving some results. The main provisions contained in the agreement regard:

- In the long term the maintenance of the rising of temperature compared to pre-industrial level well below 2 C°.

- The action plan presented by countries to reduce their emissions.

- Increasing transparency with communication of the results achieved every year.

[181] Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), *Chapter 10,* 472-479.

[182] P. Sands, J. Peel, *Principles of International Environmental Law*, 123.

In this paragraph, it has tried to analyse which are the major weaknesses of regulation in the environmental field by considering the most important conferences on this matter. Finance and the financial sector have several responsibilities in the environmental degradation that we are experiencing, but strong reforms of the regulatory techniques should be implemented in order to reform all system. Also, governments have their responsibility in the environmental degradation, indeed, as analysed in this paragraph, States were not able to agree on an implementation plan that might halt the degradation process. Governments should use finance as a tool for experiencing a new path towards sustainability, in which the financial sector will play, as it is now, a pivotal role in shaping and apply government practices.

We have seen in the first chapter that the environmental degradation is not something that we cannot imagine, it is something visible almost everyday, but as shown by the major conferences over climate change, no serious agreement has been reached over that matter. The biggest problem at stake is the need of a supranational authority that might fine countries for their non-compliance. Only the Kyoto Protocol was a serious endeavour for fighting climate change but, since the major pollutants did not ratify it, it ended in clamorous failure. The failure of regulatory practices in the environmental field has two different roots: first, in the period of economic prosperity governments are more interested in maintaining a high level growth so that the environmental aspects become secondary whereas in a period of economic recession governments, which take into account only the re-election, usually hinge on the short-term health of the economy, in substance recessions make people and governments care less about the environment.

3

Building a Sustainable Finance

3.1 Introduction

The aim of this chapter is to show that it is possible to build a sustainable finance that is more conscious of the challenges facing the world today, but in order to have that an significant paradigm has to be reversed: it is commonly accepted that finance is profit-driven and at first glance there is nothing wrong in this conception. What might be a mistake is the fact that the correlation between finance and sustainability, assuming what I have affirmed before, may be negative, that is for saying that if finance is profit-driven (which it is) and if it is now more profitable investing without integrating environmental, social, and governance (ESG) criteria into investment decisions then sustainability will be put at risk.

In 3.2 successful examples of sustainable finance will be analysed while the 3.3 will deal with the with paradox of China which is the largest polluter in the world but at the same time, one of the countries that is spending more in renewables, then 3.3 will consider the fundamental role in building a sustainable finance.

3.2 Using finance for sustainability

As Muhammad Yunus pointed out Western countries have interpreted the concept of capitalism too narrowly[183]. For Yunus there are two different kinds of people, the first one that is the existing type, i.e. profit maximizing type, and the second one that is the new one and it is not interested in the profit maximization, they want to change the world, and they are social objective-driven: for using Yunus' words "They create a new class of businesses which we may describe as "non-loss-non-dividend" (or "non-loss-token-dividend") business"[184].

Today we think that the first type of people mentioned above, i.e. profit maximizing type only composes the world, and this happened because "economic theory postulates that you are contributing to the society and the world in the best possible manner if you just concentrate on squeezing out the maximum for yourself. When you get your maximum, everybody else will get their maximum"[185]. This way of thinking led to some misleading conclusions. Indeed, we are taking into account only one type of people without considering the different facets, such as emotions, beliefs, priorities, behaviour patterns that each human being has inside.

To use finance as a tool for promoting sustainability the financial investments in the green sector should be profitably attractive as much as the

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[183] Muhammad Yunus, "Social Business is the Solution", Lindau Nobel Graduate Meetings, http://www.mediatheque.lindau-obel.org/videos/31406/social-business-is-the-solution-2008/meeting-2008-eco (Accessed 14 December).
[184] Ibid.
[185] Michael Strong, *Be the Solution: How Entrepreneurs and Conscious Capitalists Can Solve All the World's Problems*. (Hoboken, N.J.: Wiley, 2009), 116.

others; that means the environmental component should be taken into account while considering an investment.

So the question is how is it possible to integrate the environmental risks?

According to Marcel Jeucken, environmental issues can be incorporated into investment decisions through three drivers[186]:

- Legal requirements designed by the governments, such as permits and regulatory levies, governments play a crucial role in shaping the consciousness of the society in the regards of the environment;
- Demands in the production and consumption chain with the respect of the way in which companies operate: companies that are more responsible towards the environment will not merely strive to generate profits at any costs, and now there are more people that want to pay a little more for buying environmentally friendly products;
- Companies and banks themselves should also share this attention to the environment.

Concerning this last point, it is necessary to focus the attention on banks in order to better understand which kind of role finance can have in shaping sustainability, indeed, banks are a natural partner of governments in implementing sustainability policy, but if banks will focus solely on governmental policy in judging environmental risks and the policy of the government is passive, then banks will inhibit the development of sustainability. This assumption might be reversed if the governmental policy on the environment is proactive "then banks will have a neutral or even positive effect on sustainability overall"[187].

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[186] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 102-103.
[187] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 105.

As it is quite easy to understand the role of governments is fundamental in internalising the costs of sustainability issues, indeed they can, through levies, subsidies and tax facilities, stimulate the projects that regard more the Sustainable Development. "By implementing these instruments, the government is trying to apply financial incentives to restrain certain business activities by means of levies or to stimulate others by means of subsidies"[188].

It is really crucial to note that in last years many things have changed in the field of sustainable development, and now it is possible to affirm that sustainable development can have a commercial dimension for banks. There is a significant part of the society, formed by savers and investors that explicitly choose to use their enormous financial resources to social or environmental ends[189]. Banks should introduce new products in order to meet the investors' requests; such new products can be much more valuable for the banks also for what concerns the marketing of those banks.

When the terms sustainability and banking are put together, we can talk about sustainable investing, commonly known as socially responsible investing (SRI).

The SRI is a steadily growing market; indeed according to the Social Investment Forum more than one out of every nine dollars under professional management in the United States is invested in strategies with SRI[190]. The clear added value of investing in SRI is, apart from having competitive financial returns in the long-term, investing in something that has a positive societal impact.

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[188] Ibid, 157.
[189] Ibid, 185
[190] Social Investment Forum (SIF Industry Research Program), '2012 report on socially responsible investing trends in the United States', available at http://www.ussif.org/files/publications/12_trends_exec_summary.pdf (Accessed 16 January,2016).

Investing in SRI will "promote stronger corporate social responsibility, build long-term value for companies and their stakeholders, and foster businesses, generate jobs or introduce products that will yield community and environmental benefits"[191]. The latest data suggest the market size of these kinds of investments is growing exponentially, indeed in 1995 in the United States the SRI had a total amount of $639 million, whereas in 2012 it was of $3,744 million, which means a total increase of more the 600%.

This enormous growth of SRI can be explained by considering that in the last half of the century the world has experienced an increasing prosperity that made possible to think on the importance of things other than material goods, because as it has been pointed out in the previous chapters, also a growing prosperity has its negative aspects[192]. In the 1990s, as mentioned before, a group of savers and investors interested not only in financial return but also in incorporating the environmental component into investments. When enough people are reunited with a common interest in the financial field a market is created: in this case the market for sustainable investment funds. All over the world exist several varieties of definitions for such a market, for instance in some countries anything to do with ethics or environment is just labelled "green" whereas somewhere else it might be labelled as "ethical". Nowadays the term SRI has spread out of the US to rest of the world.

According to Jeucken, there are several differences between the US and Europe, indeed in the US the SRI are more closely linked to the institutional sector while in Europe SRI is largely aimed at the retail market, even if it useful to point out that such differences are fading with the years passing.

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[191] Ibid.
[192] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 186.

To better understand in which way and degree sustainable finance is profitable, it might be useful to consider the case of the ASN Bank. The ASN Bank was set up in 1960, and its core business since the beginning was using finance to stimulate sustainable development, and the results achieved by this bank were incredible, indeed in the period between 1973 and 1989 the bank's deposited capital double every five years. In 1989 the total entrusted fund amounted to €363 million, this sum had increased up to €800 million at the end of 1999. In its inside, the ASN Bank has several divisions that aim at stimulating the diverse branches of sustainable development such as the ASN Savings that invests in activities that positively affect nature and the environment. Alongside the saving facilities at its inside the ASN Bank has also a number of investment fund (with a total turnover of €290 million at the end of 1999).

The ASN Equity Fund is committed to observing a number of criteria (environment, human rights and social policy), but what makes it really fascinating for the aim of this work is the fact that it has been placed for four years in a row in the most performing funds in The Netherlands; the return of the fund was no less than 52 per cent in 1999[193].

The process of selecting a company in which deciding to invest is composed of two main phases: in the first one the environmental and ethical criteria of a company are analysed; in the second phase the economic and financial criteria are assessed. The peculiarity of the ASN Bank is located in the fact that the analysis of the criteria mentioned above are mainly conducted internally, but the majority of banks will outsource this kind of information; that is to say that

[193] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 189.

there is a "growing need for easily accessible and concise environmental information"[194].

In recent years a number of organisations dedicated to the assessment of environmental criteria of companies are born, a prominent example of such companies is represented by the Investor Responsibility Research Center (IRRCi), which has had a great impact in the sustainability market by issuing twenty-eight report; the main characteristic of this center lies in the fact they do not engage in fundraising so that they can avoid any potential conflicts during the assessment period[195]. In order to enlarge the part of investors that decide to invest their resources in sustainable investment funds, there is the need for reliable, regular and comparable information about how the funds select companies and allocate monies among the selected companies.

It might be interesting for the aim of this work to analyse which are the most favourable conditions to the development of the so-called "green funds". The starting point of this analysis is based on the institutional provision that might favour such a development. Once again is useful to recall the situation of The Netherlands in the 1990s. The Dutch government developed in 1992-1993, in collaboration with the banking sector (especially with the ASN Bank mentioned before), the fiscal green fund.

The primary objective of the Dutch government was to stimulate private funds in the direction of environmentally friendly investments[196]. Since the Dutch example is uniqueness in Europe it might be possible that it will have a leading role in the future. Indeed, the European Parliament seems interested in introducing similar activities among European countries. In The Netherlands,

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[194] Ibid, 195

[195] IRRCi website, http://irrcinstitute.org/about/overview/ (Accessed January 17, 2016).

[196] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 196.

the fiscal green regulation submitted by the government has played an significant role in raising the awareness among the Dutch banks of sustainable finance and external environmental care.

As argued by Jeucken "the Dutch government's fiscal regulation was motivated by the idea that without it environmental friendly investments would not take off because the anticipated return of between 3 per cent and 4.5 per cent (gross average) was just too small[197].

So the proposal of the government was to make the interest and dividend gained with green investments tax-free; such proposal was really attractive for savers and investors, and the result of that kind of policy were outstanding, indeed, the tax-free policy implied a tax loss for the government of approximately €10 million per year for every €450 million invested in fiscal green funds, which means a multiplier for the government of 1:45, for 1 Euro lost from the tax free policy there are 45 Euros of private money invested in green projects. These data are, of course, unattainable by public government alone. To fall in the "green category" a business should possess the "green certificate" which is issued by the government that has established some criteria:

- The scale of the project must be greater than €23000;
- The project should have a high environmental return;
- The project should generate a financial return;
- The project should have a return that is insufficient to attract regular investment;

[197] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 197.

- The project should be located or in The Netherlands or in another country covered by the regulation as many developed countries are.

If the project satisfies these criteria the government will issue the "green certificate that is valid for ten years; all green funds are supervised by the Dutch Central Bank, and they must invest at least the 70 per cent of their resources in green project, if this target is not achieved within two years the Central Bank can unilaterally deprive the green status to the fund.

At the world level a number of international funds were established in order to try to tackle the environmental problems in developing countries, however these funds can only play a marginal role in addressing these issues, they should be accompanied by serious actions undertaken by the government of the developing countries[198]. The most successful funds at the international level are:

- The Global Environment Facility (GEF) was established in October 1991 as a $1 billion pilot programme financed by the World Bank, the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) to spread sustainable development across the globe. In 1992, the GEF was restructured and moved out the World Bank system to become a permanent and separate institution[199]. Since 1991, the GEF has received the support of organisations located in 183 countries and it has provided $14.5 billion grants for almost 4,000 projects[200].

- The Global Energy Efficiency and Renewable Energy Fund (GEEREF) is a public-private partnership advised by the

[198] Marcel Jeucken, *Sustainability in Finance: Banking on the Planet*. Delft: Eburon, 2004, 211.
[199] Global Environmental Facility, https://www.thegef.org/gef/whatisgef (Accessed January 18, 2016).
[200] Ibid

European Investment Bank Group. The GEEREF was initiated in 2006 by the European Commission and then launched in 2008 with funding from the European Union, Germany and Norway for a total amount of €112 million[201]. The primary objective of the GEEREF is to "mobilize private investments, in particular in developing countries and emerging economies, in the context of international programmes to promote sustainable development"[202]. The GEEREF has dual nature. Indeed, it is a body established under private law but with a public mission. In May 2015, it successfully fundraised money from the private sector so that the total amount of its was €222 million. The GEEREF is currently investing in projects that need less than €10 million almost all over the world; these projects entail the use of renewable energy resources that could guarantee a high level of energy efficiency.

- The International Finance Corporation (IFC) is a member of the World Bank Group. It is the largest global development institution focused solely on the role of the private sector in developing countries. The IFC does not have a specific area of business, but it has a mantra, it is focused on building sustainable businesses. Their great impact lies in the fact that their work is done in cooperation with the private sector so that the total amount of funds available it is even greater; indeed in 2015 their long-term investments in developing countries totalled $17.7 billion (plus 17 per

[201] GEEREF website, http://geeref.com/about/what-geeref-is.html (Accessed January 19, 2016).
[202] European Union: European Commission, *Communication From the Commission to the Council and the European Parliament Mobilising Public And Private Finance Towards Global Access To Climate-Friendly, Affordable And Secure Energy Services: The Global Energy Efficiency And Renewable Energy* Fund, 6 October 2006, COM (2009) 583 final.

cent compared to the previous year) and more than a third of this amount, $7 billion, came from the private sector[203]. The ICF operates in more than 100 countries.

It might be useful for the goal of this work to analyse also an example of a fund that had the core business in sustainability, but that had failed in achieving it. The case in question is the one of the Solar Development Group (SDG) that had the main goal to increase the delivery of solar house system (SHS) to bring clean electricity to rural households in developing countries. The SDG was born in 1996 after the interest of charitable foundation of the United States led by the Rockefeller Foundation. The SDG had a total budget of $50 million divided between two, but complementary, different entities. These two entities were the Solar Development Capital (SDC) which was a private equity investment fund, and the foundation called Solar Development Foundation (SDF). The SDC invested in commercially sustainable photovoltaic activities and the SDF was focused in financing capacity building in developing countries.

The IFC has analysed the failure of the SDG[204] and tried to identify which could be the causes of such failure. The ones identified were related to a clear overestimation of the market share of the photovoltaic system and tin the fact that the core business of the project was too narrow; the SDG had to focus its activities also in other renewable energies.

However, the IFC concluded its report by saying that the main cause of the failure lied in the fact that at the time in which the SDG is born the photovoltaic system was not mature enough to guarantee a successful business. In conclusion,

[203] IFC website, http://www.ifc.org/wps/wcm/connect/
[204] IFC Case Study, *Solar Development Group,* available at http://www.ifc.org/wps/wcm/connect/ (Accessed January 18, 2016).

it might be argued that today, with the current photovoltaic system, the SDG would not have failed.

3.3 The (Un)sustainability of China

To better analyse the question of building a sustainable finance it can be useful to investigate the case of China. As already well-known China is the world's largest source of carbon emission[205] and its air quality regularly fails to respect the international health standards[206]. As already analysed in Chapter 2 air pollution causes millions of death per year; in the case of China this situation is even worse. Indeed according to the famous report Global Burden Disease in 2010 the outdoor air pollution has contributed to the deaths of 1.2 million people in China[207], it has also been estimated that "China's toll from pollution was the loss of 25 million healthy years of life from the population"[208]. The primary cause of this severe environmental degradation lies in thoughtless economic growth that China has experienced in last years, indeed that economic growth was reached at the expense of the environment. In 2014 China's emission represented the 27% of the total, it has overcome the emissions of the United States (15%) and the European Union (9%) combined[209], these massive emissions have had a clear impact in the Chinese daily life, in December 2015 the Beijing authorities were forced to batten down the hatches by closing schools, limiting road traffic and halting outdoor constructions because of the red alerts for severe pollution. The Chinese emission mostly derives from the coal burned especially in the north but also the enormous increase of car owners has played a

[205] Eleanor Albert and Beina Xu, "China's Environmental Crisis", *Council of Foreign Relations,* (2016).
[206] Lydia Ramsey, "11 Photos That Show Just How Bad China's Recent High Pollution Days Have Been", *UK Business Insider, (*2015).
[207] Richard Horton, "GBD: Understanding Disease, Injury, And Risk", *The Lancet* , Volume 380 , Issue 9859 , 2053 – 2054.
[208] Edward Wong, "Air Pollution Linked to 1.2 Million Premature Deaths in China". *The New York Times*, April 1, 2013.
[209] Global Carbon Project, "Global Carbon Budget", http://www.globalcarbonproject.org/carbonbudget/15/hl-full.htm#FFandIndustry (Accessed January 19, 2016).

significant role in increasing the emissions; in 2004, the car ownerships were 27 million, while in 2014 they were 157 million according to China's Ministry of Public Security.

According to Yanzhong Huang the main Chinese problem in the field of environmental degradation lies in the fact that the Chinese economy is experiencing a period of slowing down, as it can be possible to deduce from the graph below:

Figure 11: China GDP Annual Growth Rate

Source: National Bureau Statistic of China

The Chinese economy is mostly fuelled by large state-owned enterprises so that is hard to develop an environmental awareness at the local level because the government officials often prioritize achieving economic targets rather than the environmental ones[210].

Before analysing some case studies in the field of Chinese sustainability, it might be useful to examine which structural changes China is adopting to halt environmental degradation.

The public opinion has called several times the Chinese government to a serious period of reforms that may halt the pollution problems and something it

[210] Eleanor Albert and Beina Xu, "China's Environmental Crisis", *Council of Foreign Relations,* (2016), http://www.cfr.org/china/chinas-environmental-crisis/p12608 (Accessed January 19, 2016).

has moved in the last months; indeed, the Chinese Communist Party's Central Committee has launched "a wide-ranging set of ecological reforms in a bid to develop what the government calls an 'ecological civilization'"[211]. The proposals contained in these reforms cover the most important issues of the Chinese environment, such as the protection of natural resource rights, the water resource management, the establishment of green financing system and the improvement of environmental compensation mechanism.

As mentioned above the local officials are more interested in hitting economic targets rather than taking care of the environment, with the ecological civilization this issue should be resolved. Indeed environmental audits will be held place when local officials leave their places so that they will pay more attention to environmental protection while in office[212]. A pilot session of an audit will take place in 2016, hen in 2017 full audits in the trial locations, with regular audits starting from 2018.

It might be argued that improving the environmental condition of China is not only a matter of awareness in the sustainability field, indeed, it has been calculated that the environmental degradation in China has tremendous costs, estimated in $185 billion per year[213], so in some way the Chinese government is forced to reform its environmental policies in to stimulate the economy.

The main problem of the Chinese approach is that the Communist Party is addicted to fast growth[214] indeed delivering prosperity among people will forestall demands for political change while a slowdown (as it however happening) may cause social unrest and threaten the party's rule.

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[211] Zhang Chun, "China's New Blueprint for an 'Ecological Civilization'", *The Diplomat,* September 30, 2015.
[212] Ibid.
[213] Edward Wong, "Cost of Environmental Damage in China Growing Rapidly Amid Industrialization", *The New York Times*, March 29,2013.
[214] Joseph Kahn and Jim Yardley, "As China Roars, Pollution Reaches Deadly Extremes", *The New York Times,* August 26,2007. http://www.nytimes.com/2007/08/26/world/asia/26china.html (Accessed January 19,2016)

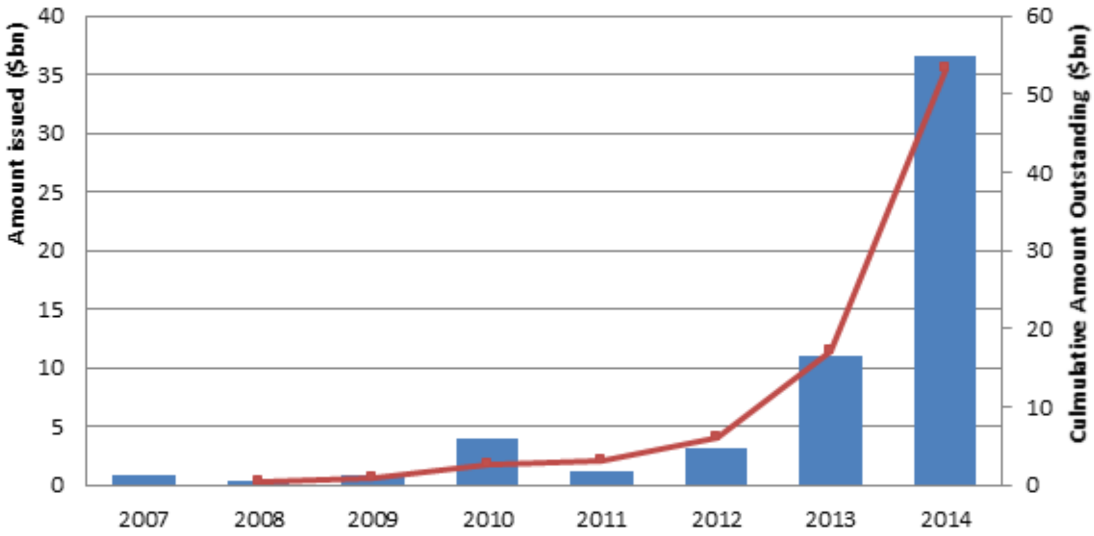
There is also another reason the Chinese government is reluctant to accept environmental changes, that in the short-term will slow the economic growth, and lies its roots in the balance of power theory; with a Chinese economy in decline the United States will immediately regain its hegemony at the world level, by creating a new era of absolute supremacy over the other countries.

It must be pointed out that the Chinese government is looking for a way to develop financial instruments that are at same time environmental friendly; it is in this context that last month the People's Bank of China released the Green Financial Bond Directive[215]. The main goal of this directive is to outline the guidelines on how to use the green bonds, where funds are solely applied to finance new and existing green infrastructure projects[216]; this directive represents China's first guideline on green bonds which should help the country in the transition to a low carbon economy with a massive use of renewable energies and public transit[217]. The directive also identifies subjects entitled of issuing green finance bonds such as financial institutions, development banks, policy banks, commercial banks, finance companies and other financial institutions established by law. China was one of the latest countries to join the green bond market that in last years has become the way in which countries pursue sustainable development, indeed since the first green bond was issued by the European Investment Bank (EIB), green bond market has increased its size by reaching an amount of $35 billion in 2014[218].

In the figure below it is possible to see the exponential rise of the green bond issuance:

[215] The People's Bank of China, "People's Bank of China Announcement [2015] No. 39", December 22, 2015, http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/2993398/index.html (Accessed January 20, 2016).
[216] Shouqing Zhu, "With New Guidelines, China's Green Bond Market Poised to Take Off in the Year of the Monkey", *World Resource Institute,* January 8, 2016.
[217] Ibid.
[218] Climate Bonds Initiative, https://www.climatebonds.net/market/history (Accessed February 2, 2016).

Figure 12: Green Bond Issuance 2007-2014



Source: Climate Bonds Initiative

As any other financial product the green bond market has to be regulated, because as we have seen in Chapter 2 regulation is necessary in order to avoid economic crises, so the international financial community has developed three major standards which are the Capital Market Association's (ICMA) Green Bond Principles[219], the Climate Bond Initiatives (CBI) Climate Bond Taxonomy – Definitions[220], and the Barclays MSCI Green Bond Index[221]. The main goal of these standards is to help the investors in defining and selecting projects and also to verify and disclose information.

To understand which are the types of projects eligible for green bonds a catalogue has been released, namely the Green Bond-Endorsed Project Catalogue, which classifies projects into 31 types under six categories which are: energy conservation, pollution control, resource conservation and recycling,

[219] For further reading on this topic please see ICMA's official website http://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/green-bonds/green-bond-principles/ (Accessed January 20, 2016).
[220] For further reading on this topic please see CBI's official website http://www.climatebonds.net/standards/taxonomy (Accessed January 20, 2016).
[221] For further reading on this topic please see https://www.msci.com/resources/factsheets/Barclays_MSCI_Green_Bond_Index.pdf (Accessed January 20, 2016).

clean transport, clean energy, and ecological conservation and adaptation[222]. The market operators are deeply convinced that with simple and clear guidelines the Chinese green bond market will take off quickly and efficiently so that as pointed out Shouqing Zhu "the 2016 will not only be the year of monkey but it will be the year of the green bond market as well"[223].

It might now be interesting to focus the attention on how a profitable and green market bond can be developed in the Chinese context.

First of all, it must be pointed out that even if the Chinese bond market is rising is still much smaller than the other ones in the developed countries, indeed in 2012 "it stood at 47% of GDP, while in the U.S., Europe and Japan, bond markets stood at respectively 222% of GDP, 190% and 259%. Globally, bond markets represent 138% of GDP"[224]. So it is quite clear that China will do everything that is possible to fill this gap with the rest of the world, the result of such behaviour will create more opportunity for the development of an efficient and bigger green bond market. In order to reaffirm the leading role of institutions in the use of finance for shaping a more sustainable world it might be useful to recall that the development of the Chinese green bond market followed the China's State Council that "has announced it wants to see a labelled green bond market as part of the country's shift to green development"[225].

It must be clear that the Chinese growth is not solely achieved through an unsustainable of resources, but rather there are many examples of Chinese

[222] Shouqing Zhu, "With New Guidelines, China's Green Bond Market Poised to Take Off in the Year of the Monkey", *World Resource Institute,* January 8, 2016. http://www.wri.org/blog/2016/01/new-guidelines-china%E2%80%99s-green-bond-market-poised-take-year-monkey (Accessed January 20, 2016).
[223] Ibid.
[224] Sean Kidney, Beate Sonerud and Padraig Oliver, "Growing a Green Bonds Market in China", *International Institute for Sustainable Development*, March 2015, https://www.climatebonds.net/files/files/Growing%20a%20green%20bonds%20market%20in%20China.pdf (Accessed January 21, 2016).
[225] HSBC report, "Bonds And Climate Change The State Of The Market In 2015", *Climate Bonds Initiative,* July 2015 https://www.climatebonds.net/files/files/CBI-HSBC%20report%207July%20JG01.pdf (Accessed January 21, 2016).

companies leaders in the field of renewables especially for what concerns the wind energy, indeed China has an enormous potential in that field, it is estimated that China has about 2,380 gig watts (GW) of exploitable capacity on land and 200 GW on the sea[226]. In 2010, China became the leading country in the production of wind turbines by overcoming Denmark, Germany, Spain and the United States[227]. In the next years, China will have to face many challenges regarding an increasing demand for electricity which has been evaluated in a 15 per cent per year. "To meet demand in the coming decade, according to statistics from the International Energy Agency (IEA), China will need to add nearly nine times as much electricity generation capacity as the United States will"[228]. On one the main advantage for China that can be applicable also in the energy field is the labour's cost, indeed, even if wages have increased a lot in recent years, Vestas[229] still pays assembly line workers here only $4,100 a year[230].

The business of renewable energies sources is now more active than ever in China, this is also reflected in the birth of many investment funds that are focused in renewables, one of the most prominent is the Nature Elements Capital[231], which was founded in 2009 and is focused in investing in the Chinese context especially in these fields: clean energy, renewable energy including wind, small hydro, solar energy and biomass; energy efficiency including control improvement, waste-heat-recovery, efficiency services, and building materials;

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[226] Jianxiang Yang, "Wind Provides 1.5% of China's Electricity", *Wind Power monthly,* December 2011, http://www.windpowermonthly.com/article/1107732/wind-provides-15-chinas-electricity (Accessed January 21, 2016).
[227] Keith Bradsher, "China Leading Global Race to Make Clean Energy", *The New York Times*, January 2010.
[228] Ibid.
[229] Vestas official website, https://www.vestas.com/#! (Accessed January 21, 2016)
[230] Keith Bradsher, "China Leading Global Race to Make Clean Energy", *The New York Times*, January 2010.
[231] Nature Elements Capital official website, http://www.elementscap.com/en/146.html (Accessed January 21, 2016).

and environmental protection including municipal waste treatment, waste water treatment, waste-to-energy, and electric vehicles or battery[232].

It is also important to take into consideration that shifting toward a low carbon economy requires a huge commitment by national authorities both in terms of financial investments and regulatory policies and, even if the majority of the Chinese policies are always directed to stimulate the economic growth solely, in the past years we have experienced a partial shift in this respect. As mentioned above China is the leading country in the field of wind energy but to understand better the reasons of this success achieved in 2010 we have to step back to 2005 when the Renewable Energy Law was approved.

The Renewable Energy Law represents a benchmark in the Chinese policies towards renewables; indeed, it has created a national framework for promoting the production of renewable energy in China by establishing four key mechanisms:

- A national renewable energy target and central and local renewable energy development and utilization planning[233];
- A mandatory connection and purchase policy by which the electric companies must sign an agreement with renewable electricity generators;
- An *on-grid electricity price* for renewables;
- A cost-sharing mechanism which is funded by fees on electricity sales that should finance public renewable energy grids as well as a

[232] Bloomberg business, http://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=85139359 (Accessed January 21, 2016).
[233] Sara Schuman, Alvin Lin, "China's Renewable Energy Law and its Impact on Renewable Power in China: Progress, Challenges and Recommendations for Improving Implementation", *Energy Policy*, Volume 51, December 2012, Pages 89-109, http://www.sciencedirect.com/science/article/pii/S0301421512006660 (Accessed January 21, 2016).

Renewable Energy Development Special Fund which is intended to promote research and development of renewables[234].

The immediate results of the Renewable Energy Law on the growth rate of renewable energies (especially in the wind sector) were spectacular; the wind power doubled its capacity in the period 2006-2009 and as affirmed before China surpassed the United States at the end of 2010 in the production of wind turbines, "however China's rapid growth in wind power has been accompanied by significant growing pains, which have exposed areas in which the renewable policy framework can be improved"[235]. Especially in terms of energy performance, it is clear that there is room for greater improvement, in 2011 both the United States and China had about 47 GW of grid-connected wind power, but from this capacity, the United States generated 120 terawatt hours (TWh) while China generated only 74 TWh[236].

In conclusion, the Chinese government has also released, in 2007, he Mid- and Long-Term Development Plan for Renewable Energy, which set targets for meeting 10% of China's primary energy consumption from renewable energy sources, including hydropower, wind, and solar by 2010 and 15% by 2020.

In the end, it might be affirmed that China is adopting a dual strategy in the regards of its future economic growth: on one hand the will of maintaining its *status quo* in the current scenario by trying at any cost to pursuing the double digit growth, while on the other hand, it is pushing toward a transition to a low

[234] Sara Schuman, Alvin Lin, "China's Renewable Energy Law and its Impact on Renewable Power in China: Progress, Challenges and Recommendations for Improving Implementation", *Energy Policy*, Volume 51, December 2012, Pages 89-109, http://www.sciencedirect.com/science/article/pii/S0301421512006660 (Accessed January 21, 2016).
[235] Ibid, 2.
[236] Ibid.

carbon economy with massive investments in the renewable sector; for the moment the results of this dual strategy are at least controversial. Indeed China is experiencing a slowing down of the GDP growth and at the same time the highest level of pollution on the Earth; it is clear that more efforts at the institutional level in order to achieve a significant part of its energy needs from renewables.

3.4 Role of institutions in stimulating sustainable development through a responsible finance

One of the greatest questions of our time is finding a way to encourage sustainable development. First of all, it must be pointed out that achieving sustainable development may have different "degrees" in the various countries; these differences are mainly caused by diverse backgrounds that countries have both concerning history and economic situation.

In the previous paragraph it has been analysed the rapid growth of the green bond market, now it is the time to focus the attention on the actions that the public sector should undertake to stimulate the green bond market.

First of all, it is important to bear in mind that even if the green bond market has had an impressive growth in last years the market ($65.9 billion) is still tiny to the overall $100 trillion bond market[237]. The green bonds have shown to be a significant instrument to tackle the environmental degradation, and in order to face the climate change challenges there is the need for a further growth of the green bond market especially in developing countries, because in such countries there is the need for significant investments in order to continue the process of transition to a low carbon economy.

The public sector can have a fundamental role in ensuring that the market will meet its potentials and "The main market development tool used so far has been green bond issuance by multilateral and national development banks. This has been essential to establish models and provide market liquidity[238].

[237] Climate Bonds Initiative report, "Bonds And Climate Change The State Of The Market In 2015", *Climate Bonds Initiative,* July 2015 https://www.climatebonds.net/files/files/CBI-HSBC%20report%207July%20JG01.pdf (Accessed January 21, 2016).
[238] Ibid, 14.

The most prominent tool governments can use in order to stimulate the green bond is, without no doubt, the tax incentive in the form of tax credit bonds, which are

> "An amount of money that a taxpayer is able to subtract from the amount of tax that they owe to the government. The value of a tax credit depends on what the credit is being provided for, and certain types of tax credits are granted to individuals or businesses in specific locations, classifications or industries"[239].

To encourage long-term investments, which would benefit low carbon investments and green bonds, the policymakers can tweak tax codes[240].

To boost the public demand for financial products, that are also environmentally friendly, there should be cooperation between domestic funds and government's regulatory policies that should provide the necessary guidance, on this matter the leader is, with no doubt, the Norway's sovereign wealth fund which also one of the biggest in the world. The CEO has announced in December that would invest in renewable energy, transport and grids if it were allowed to put money into unlisted infrastructure projects[241]. This decision to shift the fund's strategy came just after the announcement of the Norwegian Central Bank which affirmed that the fund should be allowed to invest in green assets[242].

This new behaviour of investment funds can be a towing for the financial sector toward projects and financial products that are at the same time economically attractive and environmentally friendly. The aim of this work is precisely in this

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[239] *Investopedia, http://www.investopedia.com/terms/t/taxcredit.asp* (Accessed January 23, 2016).
[240] For further reading on this topic see Investopedia, http://www.investopedia.com/terms/t/tax-code.asp (Accessed January 23, 2016)
[241] Geert De Clercq and Gwladys Fouche, Norway Oil Fund to Target Green Energy, Infrastructure if Allowed", *Reuters,* December 8, 2015, http://www.reuters.com/article/climatechange-summit-norway-idUSL8N13X2L920151208 (Accessed 24 January, 2016).
[242] Ibid.

direction; try to show how finance can be a valuable player in shaping sustainability, finance should not be considered as a devil that is causing the world's problems but rather a neutral actor that, with right instruments, can drive the world economy toward sustainability.

To achieve this last point finance should be helped by the policymakers with the introduction of policies that aim at stimulating sustainability such as the ones mention above (tax incentive, subsidies and strategic issuance).

There are other institutional actors that can be involved in increasing sustainability, such as the central banks that can use their enormous financial resources to purchase green bonds, including through quantitative easing, liquidity-providing operations and other mechanisms. They can also play a coordinating role in bringing together all the stakeholders to increase the size and competitiveness of the green bond market.

The main problem that the green bond market is currently facing lies in the small dimension of the low carbon investments such as rooftop solar PV, but as suggested by the analysts of Climate Bonds Initiative in their report on green bond market, one way to avoid this problem will be to securitise such small scale investments "supporting financial warehousing of loans and providing credit enhancement for securitisation issuance[243].

As deeply analysed in Chapter 2 the regulatory process is fundamental in order to avoid future financial crises, so that new regulatory measures are also needed for the growing green bond market, this measure should are intended in creating

[243] Climate Bonds Initiative report, "Bonds And Climate Change The State Of The Market In 2015", *Climate Bonds Initiative,* July 2015 https://www.climatebonds.net/files/files/CBI-HSBC%20report%207July%20JG01.pdf (Accessed January 21, 2016).

opportunities for green bonds for instance by using the preferential risk weighting for green bonds in banks' capital ratio requirements[244].

When analysing new regulatory provisions, that are not necessarily directed to the green bond market, it is important to consider their potential impact on these kinds of investments because, as it has happened in the past with Basel III[245] and Solvency II[246], such provisions can disincentive the longer-term investments needed in renewable energy and other low carbon sectors[247].

Finally, to stimulate better the green bond market there is the need for an international financial cooperation; such cooperation will support in the avoidance of fragmentation of the green bond market for instance in countries that have different tax incentives, but also will help the creation of a global green bond market that may favour an important rise of liquidity. This cooperation can be achieved through a mutual recognition of standards for green bonds between governments[248].

On this matter the European Union is very active especially thanks to the work of the EIB that is the major green bond issuer in the world directly followed by the Kreditanstalt für Wiederaufbau that is a German bank; in the table below there reported the most important green bond issuer in order to have a better understanding of the current situation:

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[244] Ibid 15.
[245] For further reading on this topic please see Bank for International Settlements, "Basel III: A global regulatory framework for more resilient banks and banking systems", December 2010.
[246] For further reading on this topic please see European Union: Commission Staff Working Document Executive Summary Of The Impact Assessment, 2014.
[247] Climate Bonds Initiative report, "Bonds And Climate Change The State Of The Market In 2015", *Climate Bonds Initiative,* July 2015 https://www.climatebonds.net/files/files/CBI-HSBC%20report%207July%20JG01.pdf (Accessed January 21, 2016).
[248] Climate Bonds Initiative report, "Bonds And Climate Change The State Of The Market In 2015", *Climate Bonds Initiative,* July 2015 https://www.climatebonds.net/files/files/CBI-HSBC%20report%207July%20JG01.pdf (Accessed January 21, 2016).

Issuer	2014
European Investment Bank (EIB)	$5.6bn
KfW	$3.5bn
GDF Suez	$3.4bn
World Bank	$3.1bn
Toyota	$1.75bn
AfD	$1.3bn
Iberdrola	$1bn
Unibail-Rodamco	$1bn
Ile de France	$829m
Hera SPA	$680m

Table 1.2: Top Green Bond Issuers in 2014

Source: Climate Bonds Initiative

As it might be clear from the above table is the fact that, for the moment no major banks are involved in issuing the green bonds, but, in order have such scenario, the paradigm has to be reversed: it is no more time of short-term investments if we want to live in a more sustainable world, but as mentioned several times the policymakers should be capable of driving finance to a more sustainable behaviour.

It might be argued that to use finance as a tool for building sustainability the role of institutions is of fundamental importance, because without the presence of appropriate norms that will create favourable conditions for the flourishing of sustainable development our future will be certainly put at risk.

Conclusion

It has been deeply analyzed which kind of role finance could have played in last years in shaping sustainability. The study that I have conducted on three major crises in the economic, environmental and social field has shown that finance was certainly one of the major causes of these crises. However it must be pointed out that the aim of this work is not to identify finance as one of the most prominent evils of nowadays, but differently, the aim is to show that humans use finance as a tool.

Seeing finance as a tool of humans lays its roots in the hypothesis of profit-neutrality of finance: if we consider that finance is uninteresting towards the source of profit, then it is possible to use it as a way to shape sustainability. There are of course some barriers that have been analyzed in the course of this study, that may obstruct the birth of a sustainable finance, the most important one is certainly the fact that now it is more profitable investing in non-sustainable projects. In Chapter 1 I have tried to show the effects of such behavior, and the results were the outburst of some crises in the economic, environmental and social fields; it might be argued our way of behaving (that is increasingly unsustainable) will have tremendous effects on the future generations. Better saying by using the definition of sustainable development, we will not meet the needs of future generations.

In Chapter 2 the lack of regulatory measures has been addressed to prove the mistakes of policy makers in promoting sustainability; it has been affirmed, in 2.2 that the de-regulation process that has affected the financial markets was the trigger of the global financial crisis exploded in 2007. The most prominent example of de-regulation took place in 1999 when the Financial Services Modernization Act commonly called Gramm–Leach–Bliley Act (GLBA), from the name of the co-sponsors of this Act, was approved. This act removed the prohibition of merging between commercial and investment banks that started to behave as Wall Street companies endangering the savings of US citizens. These new financial giants were nicknamed "too big too fail", but that was not the reality, indeed during the global financial crisis, a number of banks failed or were saved by the government. In that case, finance was clearly used as a tool to increase the bonus of who was working in these banks and not as an instrument to facilitate the credit access (as they were always repeating). The result was that the global financial crisis had a tremendous impact also on the real economy; indeed the rate of unemployment increase up to 10% in 2009, before the crisis it was always about 5%.

Sub-chapter 2.3 has dealt with regulation and environment, and it has been deeply analyzed the historical process of the attempts in regulating that field. What has emerged from this study is the fact that States were not able to find a binding agreement that takes care about neither environment nor using finance as a tool to promote sustainability. This has happened because countries are more interested in short-term results, and in the time of economic difficulties they tend to care less about the environment so that easier route has been taken: the one that maxims profits in a less period. Of course, such behavior has discouraged environmentally sustainable projects that may take a longer period to be profit-attractive.

In sub-chapter 3.2 it has been studied many examples of sustainable finance, cases in which finance was used as a tool to shape sustainability in a good manner, in particular, the one of the ASN Bank in The Netherlands. This case study has shown that building a sustainable and, at the same time economic valuable; finance is possible indeed the ASN Bank has doubled its capital every five years in the period 1973-1989. It has been found a clear correlation between government policies and environmentally friendly investment. Indeed, the Dutch government made the interest and dividend gained with green investments tax-free, and the results of such policy were outstanding: for 1 Euro lost from the tax-free policy there are 45 Euros of private money invested in green projects. The ASN Bank was a precursor in using finance for good purposes, but it can play a role of guidance for other financial institutions.

Investing in sustainability is also becoming important in the country that is polluting most in the world, China. The Chinese government is understanding that continuing to pursue at any costs its unsustainable growth will have an enormous impact, not only for the healthcare but also for its public balance sheets, indeed is estimated that the environmental degradation costs $185 billion per year to China. To promote sustainability China is fully entering in the green bond market and it is also investing a huge amount of money in developing renewable technologies. Indeed, it has become the world leader in the production of wind turbines.

The sub-chapter 3.4 has dealt with the role that institutions can play in promoting sustainable finance through incentives, subsidies and tax-free policies. Also central banks can play a decisive role in promoting sustainability for through quantitative easing practices that aim at the purchase of green bonds.

In conclusion, it has been explained that finance is no more than a tool in the hands of institutions and policy makers and the use of finance can produce different outcomes, but, since it is profit-neutral, making sustainable and profit-attractive investments will be crucial to using finance as a tool to build a more sustainable world.

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